

Relating energies of interacting two-particle systems in finite volume to the scattering matrix: the box matrix

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July 18, 2017

Abstract

Supplementary material is presented for an implementation of estimating the two-to-two K -matrix from finite-volume energies based on the Lüscher formalism and involving a Hermitian matrix known as the “box matrix”. The basis vectors that block diagonalize the box matrix are presented for spins $J \leq 5$. The box matrix elements themselves are explicitly listed for $S = 0, \frac{1}{2}, 1, \frac{3}{2}$ and for all $L = 0, 1, \dots, L_{\max}$ for $L_{\max} = 6$ for total momenta zero and on-axis. For planar diagonal total momenta, only $S = 0, \frac{1}{2}$ are presented. Explicit expressions for all box matrix elements with $L \leq 6$, total spin $S \leq 2$, and total momentum $\mathbf{P} = (0, 0, 0), (0, 0, p)$, as well as all box matrix elements with $L \leq 6$, $S \leq \frac{3}{2}$, and $\mathbf{P} = (0, p, p), (p, p, p)$, with $p > 0$ have been obtained. Although not all of these results are presented here, they are implemented in the accompanying C++ software package.

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1 Introduction

In Ref. [1], an implementation of estimating the two-to-two K -matrix from finite-volume energies based on the Lüscher formalism and involving a Hermitian matrix known as the “box matrix” was described. The method includes higher partial waves and multiple decay channels. Two fitting procedures for estimating the K -matrix parameters, which properly incorporate all statistical covariances, were discussed. Formulas and software for handling total spins up to $S = 2$ and orbital angular momenta up to $L = 6$ were obtained for total momenta in several directions. First tests involving ρ -meson decay to two pions included the $L = 3$ and $L = 5$ partial waves, and the contributions from these higher waves were found to be negligible in the elastic energy range.

This document contains supplementary material for Ref. [1]. Due to page restrictions, it was not possible to present the basis states that block diagonal the box matrix, nor most of the box matrix elements themselves in Ref. [1]. This information is presented here.

A Basis vectors that block diagonal B

The basis vectors $|\Lambda\lambda nJLSa\rangle$ that block diagonalize the B -matrix are presented in this section for spins $J \leq 5$ in terms of the $|Jm_JLSa\rangle$ states. We have computed basis vectors up to $J = 8$, but only our results for $J \leq 5$ are presented in these tables.

Our choices of the irreducible representation matrices of the symmetry operators are presented in Ref. [2], and the irrep labels for the various little groups are listed in Ref. [2] as well.

Table A1: The basis vectors that block diagonalize the F, B, S, K matrices for total zero momentum. Each basis vector is labelled by an irreducible representation Λ of the little double group O_h^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the first column, $\eta = g$ for even parity, $\eta = u$ for odd parity. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J \leq \frac{5}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
$A_{1\eta}$	1	0^η	1	$ 0\rangle$
$G_{1\eta}$	1	$\frac{1}{2}^\eta$	1	$ \frac{1}{2}\rangle$
$G_{1\eta}$	2	$\frac{1}{2}^\eta$	1	$ \frac{1}{2}\rangle$
$T_{1\eta}$	1	1^η	1	$\frac{1}{\sqrt{2}}(1\rangle - -1\rangle)$
$T_{1\eta}$	2	1^η	1	$\frac{i}{\sqrt{2}}(1\rangle + -1\rangle)$
$T_{1\eta}$	3	1^η	1	$ 0\rangle$
H_η	1	$\frac{3}{2}^\eta$	1	$ \frac{3}{2}\rangle$
H_η	2	$\frac{3}{2}^\eta$	1	$ \frac{1}{2}\rangle$
H_η	3	$\frac{3}{2}^\eta$	1	$ \frac{1}{2}\rangle$
H_η	4	$\frac{3}{2}^\eta$	1	$ \frac{3}{2}\rangle$
E_η	1	2^η	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E_η	2	2^η	1	$ 0\rangle$
$T_{2\eta}$	1	2^η	1	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
$T_{2\eta}$	2	2^η	1	$\frac{i}{\sqrt{2}}(1\rangle - -1\rangle)$
$T_{2\eta}$	3	2^η	1	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
$G_{2\eta}$	1	$\frac{5}{2}^\eta$	1	$\frac{1}{\sqrt{6}}(\frac{5}{2}\rangle - \sqrt{5} \frac{3}{2}\rangle)$
$G_{2\eta}$	2	$\frac{5}{2}^\eta$	1	$\frac{1}{\sqrt{6}}(-\sqrt{5} \frac{3}{2}\rangle + \frac{5}{2}\rangle)$
H_η	1	$\frac{5}{2}^\eta$	1	$\frac{1}{\sqrt{6}}(\frac{3}{2}\rangle + \sqrt{5} \frac{5}{2}\rangle)$
H_η	2	$\frac{5}{2}^\eta$	1	$ \frac{1}{2}\rangle$
H_η	3	$\frac{5}{2}^\eta$	1	$ \frac{1}{2}\rangle$
H_η	4	$\frac{5}{2}^\eta$	1	$\frac{-1}{\sqrt{6}}(\sqrt{5} \frac{5}{2}\rangle + \frac{3}{2}\rangle)$

Table A2: The basis vectors that block diagonalize the F, B, S, K matrices for total zero momentum. Each basis vector is labelled by an irreducible representation Λ of the little double group O_h^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the first column, $\eta = g$ for even parity, $\eta = u$ for odd parity. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J = 3, \frac{7}{2}, 4$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
$A_{2\eta}$	1	3^η	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
$T_{1\eta}$	1	3^η	1	$\frac{1}{4}(\sqrt{5} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle - \sqrt{5} -3\rangle)$
$T_{1\eta}$	2	3^η	1	$\frac{i}{4}(\sqrt{5} 3\rangle + \sqrt{3} 1\rangle + \sqrt{3} -1\rangle + \sqrt{5} -3\rangle)$
$T_{1\eta}$	3	3^η	1	$ 0\rangle$
$T_{2\eta}$	1	3^η	1	$\frac{1}{4}(\sqrt{3} 3\rangle + \sqrt{5} 1\rangle - \sqrt{5} -1\rangle - \sqrt{3} -3\rangle)$
$T_{2\eta}$	2	3^η	1	$\frac{i}{4}(-\sqrt{3} 3\rangle + \sqrt{5} 1\rangle + \sqrt{5} -1\rangle - \sqrt{3} -3\rangle)$
$T_{2\eta}$	3	3^η	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
$G_{1\eta}$	1	$\frac{7}{2}^\eta$	1	$\frac{1}{2\sqrt{3}}(\sqrt{7} \frac{1}{2}\rangle + \sqrt{5} \frac{7}{2}\rangle)$
$G_{1\eta}$	2	$\frac{7}{2}^\eta$	1	$\frac{-1}{2\sqrt{3}}(\sqrt{5} \frac{7}{2}\rangle + \sqrt{7} \frac{1}{2}\rangle)$
$G_{2\eta}$	1	$\frac{7}{2}^\eta$	1	$\frac{1}{2}(\sqrt{3} \frac{5}{2}\rangle - -\frac{3}{2}\rangle)$
$G_{2\eta}$	2	$\frac{7}{2}^\eta$	1	$\frac{1}{2}(\frac{3}{2}\rangle - \sqrt{3} \frac{5}{2}\rangle)$
H_η	1	$\frac{7}{2}^\eta$	1	$\frac{1}{2}(\sqrt{3} \frac{3}{2}\rangle + -\frac{5}{2}\rangle)$
H_η	2	$\frac{7}{2}^\eta$	1	$\frac{1}{2\sqrt{3}}(-\sqrt{5} \frac{1}{2}\rangle + \sqrt{7} \frac{7}{2}\rangle)$
H_η	3	$\frac{7}{2}^\eta$	1	$\frac{1}{2\sqrt{3}}(\sqrt{7} \frac{7}{2}\rangle - \sqrt{5} \frac{1}{2}\rangle)$
H_η	4	$\frac{7}{2}^\eta$	1	$\frac{1}{2}(\frac{5}{2}\rangle + \sqrt{3} \frac{3}{2}\rangle)$
$A_{1\eta}$	1	4^η	1	$\frac{1}{2\sqrt{6}}(\sqrt{5} 4\rangle + \sqrt{14} 0\rangle + \sqrt{5} -4\rangle)$
E_η	1	4^η	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E_η	2	4^η	1	$\frac{1}{2\sqrt{6}}(\sqrt{7} 4\rangle - \sqrt{10} 0\rangle + \sqrt{7} -4\rangle)$
$T_{1\eta}$	1	4^η	1	$\frac{1}{4}(3\rangle + \sqrt{7} 1\rangle + \sqrt{7} -1\rangle + -3\rangle)$
$T_{1\eta}$	2	4^η	1	$\frac{i}{4}(3\rangle - \sqrt{7} 1\rangle + \sqrt{7} -1\rangle - -3\rangle)$
$T_{1\eta}$	3	4^η	1	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
$T_{2\eta}$	1	4^η	1	$\frac{1}{4}(\sqrt{7} 3\rangle - 1\rangle - -1\rangle + \sqrt{7} -3\rangle)$
$T_{2\eta}$	2	4^η	1	$\frac{i}{4}(-\sqrt{7} 3\rangle - 1\rangle + -1\rangle + \sqrt{7} -3\rangle)$
$T_{2\eta}$	3	4^η	1	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$

Table A3: The basis vectors that block diagonalize the F, B, S, K matrices for total zero momentum. Each basis vector is labelled by an irreducible representation Λ of the little double group O_h^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the first column, $\eta = g$ for even parity, $\eta = u$ for odd parity. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J = \frac{9}{2}$, 5 are considered in this table.

Λ	λ	J^η	n	Basis vectors
$G_{1\eta}$	1	$\frac{9\eta}{2}$	1	$\frac{1}{2\sqrt{6}}(3 \frac{9}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle + -\frac{7}{2}\rangle)$
$G_{1\eta}$	2	$\frac{9\eta}{2}$	1	$\frac{1}{2\sqrt{6}}(\frac{7}{2}\rangle + \sqrt{14} -\frac{1}{2}\rangle + 3 -\frac{9}{2}\rangle)$
H_η	1	$\frac{9\eta}{2}$	1	$ \frac{3}{2}\rangle$
H_η	1	$\frac{9\eta}{2}$	2	$ -\frac{5}{2}\rangle$
H_η	2	$\frac{9\eta}{2}$	1	$\frac{1}{4}(-\sqrt{7} \frac{9}{2}\rangle + \sqrt{2} \frac{1}{2}\rangle + \sqrt{7} -\frac{7}{2}\rangle)$
H_η	2	$\frac{9\eta}{2}$	2	$\frac{-1}{4\sqrt{3}}(3 \frac{9}{2}\rangle - \sqrt{14} \frac{1}{2}\rangle + 5 -\frac{7}{2}\rangle)$
H_η	3	$\frac{9\eta}{2}$	1	$\frac{-1}{4}(\sqrt{7} \frac{7}{2}\rangle + \sqrt{2} -\frac{1}{2}\rangle - \sqrt{7} -\frac{9}{2}\rangle)$
H_η	3	$\frac{9\eta}{2}$	2	$\frac{1}{4\sqrt{3}}(5 \frac{7}{2}\rangle - \sqrt{14} -\frac{1}{2}\rangle + 3 -\frac{9}{2}\rangle)$
H_η	4	$\frac{9\eta}{2}$	1	$ -\frac{3}{2}\rangle$
H_η	4	$\frac{9\eta}{2}$	2	$ \frac{5}{2}\rangle$
E_η	1	5^η	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
E_η	2	5^η	1	$\frac{1}{\sqrt{2}}(- 4\rangle + -4\rangle)$
$T_{1\eta}$	1	5^η	1	$\frac{1}{8\sqrt{17}}(17 5\rangle - 3\sqrt{5} 3\rangle + \sqrt{210} 1\rangle - \sqrt{210} -1\rangle$ $+ 3\sqrt{5} -3\rangle - 17 -5\rangle)$
$T_{1\eta}$	1	5^η	2	$\frac{1}{\sqrt{34}}(-\sqrt{14} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle + \sqrt{14} -3\rangle)$
$T_{1\eta}$	2	5^η	1	$\frac{-i}{8\sqrt{17}}(17 5\rangle + 3\sqrt{5} 3\rangle + \sqrt{210} 1\rangle + \sqrt{210} -1\rangle$ $+ 3\sqrt{5} -3\rangle + 17 -5\rangle)$
$T_{1\eta}$	2	5^η	2	$\frac{i}{\sqrt{34}}(-\sqrt{14} 3\rangle + \sqrt{3} 1\rangle + \sqrt{3} -1\rangle - \sqrt{14} -3\rangle)$
$T_{1\eta}$	3	5^η	1	$\frac{-1}{2\sqrt{34}}(\sqrt{5} 4\rangle + 3\sqrt{14} 0\rangle + \sqrt{5} -4\rangle)$
$T_{1\eta}$	3	5^η	2	$\frac{1}{2\sqrt{34}}(3\sqrt{7} 4\rangle - \sqrt{10} 0\rangle + 3\sqrt{7} -4\rangle)$
$T_{2\eta}$	1	5^η	1	$\frac{1}{8}(\sqrt{15} 5\rangle + \sqrt{3} 3\rangle - \sqrt{14} 1\rangle + \sqrt{14} -1\rangle$ $- \sqrt{3} -3\rangle - \sqrt{15} -5\rangle)$
$T_{2\eta}$	2	5^η	1	$\frac{-i}{8}(-\sqrt{15} 5\rangle + \sqrt{3} 3\rangle + \sqrt{14} 1\rangle + \sqrt{14} -1\rangle$ $+ \sqrt{3} -3\rangle - \sqrt{15} -5\rangle)$
$T_{2\eta}$	3	5^η	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$

Table A4: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J \leq \frac{3}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	0^+	1	$ 0\rangle$
A_2	1	0^-	1	$ 0\rangle$
G_1	1	$\frac{1}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{1}{2}^+$	1	$ - \frac{1}{2}\rangle$
G_1	1	$\frac{1}{2}^-$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{1}{2}^-$	1	$ - \frac{1}{2}\rangle$
A_1	1	1^-	1	$ 0\rangle$
A_2	1	1^+	1	$ 0\rangle$
E	1	1^+	1	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
E	2	1^+	1	$\frac{i}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	1	1^-	1	$\frac{1}{\sqrt{2}}(1\rangle - -1\rangle)$
E	2	1^-	1	$\frac{-i}{\sqrt{2}}(1\rangle + -1\rangle)$
G_1	1	$\frac{3}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{3}{2}^+$	1	$ - \frac{1}{2}\rangle$
G_1	1	$\frac{3}{2}^-$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{3}{2}^-$	1	$ - \frac{1}{2}\rangle$
G_2	1	$\frac{3}{2}^+$	1	$ - \frac{3}{2}\rangle$
G_2	2	$\frac{3}{2}^+$	1	$ \frac{3}{2}\rangle$
G_2	1	$\frac{3}{2}^-$	1	$ - \frac{3}{2}\rangle$
G_2	2	$\frac{3}{2}^-$	1	$ \frac{3}{2}\rangle$

Table A5: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J = 2, \frac{5}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	2^+	1	$ 0\rangle$
A_2	1	2^-	1	$ 0\rangle$
B_1	1	2^+	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_1	1	2^-	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_2	1	2^+	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_2	1	2^-	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E	1	2^+	1	$\frac{1}{\sqrt{2}}(1\rangle - -1\rangle)$
E	2	2^+	1	$\frac{-i}{\sqrt{2}}(1\rangle + -1\rangle)$
E	1	2^-	1	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
E	2	2^-	1	$\frac{i}{\sqrt{2}}(- 1\rangle + -1\rangle)$
G_1	1	$\frac{5}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{5}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	1	$\frac{5}{2}^-$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{5}{2}^-$	1	$ \frac{1}{2}\rangle$
G_2	1	$\frac{5}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{5}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{5}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{5}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	1	$\frac{5}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{5}{2}^-$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{5}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{5}{2}^-$	2	$ \frac{3}{2}\rangle$

Table A6: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 3$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	3^-	1	$ 0\rangle$
A_2	1	3^+	1	$ 0\rangle$
B_1	1	3^+	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_1	1	3^-	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_2	1	3^+	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_2	1	3^-	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
E	1	3^+	1	$\frac{1}{\sqrt{2}}(3\rangle + -3\rangle)$
E	1	3^+	2	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
E	2	3^+	1	$\frac{i}{\sqrt{2}}(3\rangle - -3\rangle)$
E	2	3^+	2	$\frac{i}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	1	3^-	1	$\frac{1}{\sqrt{2}}(3\rangle - -3\rangle)$
E	1	3^-	2	$\frac{1}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	2	3^-	1	$\frac{i}{\sqrt{2}}(3\rangle + -3\rangle)$
E	2	3^-	2	$\frac{i}{\sqrt{2}}(1\rangle + -1\rangle)$

Table A7: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = \frac{7}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
G_1	1	$\frac{7}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	1	$\frac{7}{2}^+$	2	$ \frac{7}{2}\rangle$
G_1	2	$\frac{7}{2}^+$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{7}{2}^+$	2	$ \frac{7}{2}\rangle$
G_1	1	$\frac{7}{2}^-$	1	$ \frac{1}{2}\rangle$
G_1	1	$\frac{7}{2}^-$	2	$ \frac{7}{2}\rangle$
G_1	2	$\frac{7}{2}^-$	1	$ \frac{1}{2}\rangle$
G_1	2	$\frac{7}{2}^-$	2	$ \frac{7}{2}\rangle$
G_2	1	$\frac{7}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{7}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{7}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{7}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	1	$\frac{7}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{7}{2}^-$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{7}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{7}{2}^-$	2	$ \frac{3}{2}\rangle$

Table A8: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 4$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	4^+	1	$\frac{1}{\sqrt{2}}(4\rangle + -4\rangle)$
A_1	1	4^+	2	$ 0\rangle$
A_1	1	4^-	1	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
A_2	1	4^+	1	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
A_2	1	4^-	1	$\frac{1}{\sqrt{2}}(4\rangle + -4\rangle)$
A_2	1	4^-	2	$ 0\rangle$
B_1	1	4^+	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_1	1	4^-	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_2	1	4^+	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_2	1	4^-	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E	1	4^+	1	$\frac{1}{\sqrt{2}}(3\rangle - -3\rangle)$
E	1	4^+	2	$\frac{1}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	2	4^+	1	$\frac{i}{\sqrt{2}}(3\rangle + -3\rangle)$
E	2	4^+	2	$\frac{i}{\sqrt{2}}(1\rangle + -1\rangle)$
E	1	4^-	1	$\frac{1}{\sqrt{2}}(3\rangle + -3\rangle)$
E	1	4^-	2	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
E	2	4^-	1	$\frac{i}{\sqrt{2}}(3\rangle - -3\rangle)$
E	2	4^-	2	$\frac{i}{\sqrt{2}}(- 1\rangle + -1\rangle)$

Table A9: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = \frac{9}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
G_1	1	$\frac{9}{2}^+$	1	$ \frac{9}{2}\rangle$
G_1	1	$\frac{9}{2}^+$	2	$ \frac{1}{2}\rangle$
G_1	1	$\frac{9}{2}^+$	3	$ \frac{7}{2}\rangle$
G_1	2	$\frac{9}{2}^+$	1	$ \frac{9}{2}\rangle$
G_1	2	$\frac{9}{2}^+$	2	$ \frac{1}{2}\rangle$
G_1	2	$\frac{9}{2}^+$	3	$ \frac{7}{2}\rangle$
G_1	1	$\frac{9}{2}^-$	1	$ \frac{9}{2}\rangle$
G_1	1	$\frac{9}{2}^-$	2	$ \frac{1}{2}\rangle$
G_1	1	$\frac{9}{2}^-$	3	$ \frac{7}{2}\rangle$
G_1	2	$\frac{9}{2}^-$	1	$ \frac{9}{2}\rangle$
G_1	2	$\frac{9}{2}^-$	2	$ \frac{1}{2}\rangle$
G_1	2	$\frac{9}{2}^-$	3	$ \frac{7}{2}\rangle$
G_2	1	$\frac{9}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{9}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{9}{2}^+$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{9}{2}^+$	2	$ \frac{3}{2}\rangle$
G_2	1	$\frac{9}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	1	$\frac{9}{2}^-$	2	$ \frac{3}{2}\rangle$
G_2	2	$\frac{9}{2}^-$	1	$ \frac{5}{2}\rangle$
G_2	2	$\frac{9}{2}^-$	2	$ \frac{3}{2}\rangle$

Table A10: The basis vectors that block diagonalize the F, B, S, K matrices for on-axis total momentum (0,0,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{4v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 5$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	5^+	1	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
A_1	1	5^-	1	$\frac{1}{\sqrt{2}}(4\rangle + -4\rangle)$
A_1	1	5^-	2	$ 0\rangle$
A_2	1	5^+	1	$\frac{1}{\sqrt{2}}(4\rangle + -4\rangle)$
A_2	1	5^+	2	$ 0\rangle$
A_2	1	5^-	1	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
B_1	1	5^+	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
B_1	1	5^-	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_2	1	5^+	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
B_2	1	5^-	1	$\frac{1}{\sqrt{2}}(2\rangle - -2\rangle)$
E	1	5^+	1	$\frac{1}{\sqrt{2}}(5\rangle + -5\rangle)$
E	1	5^+	2	$\frac{1}{\sqrt{2}}(3\rangle + -3\rangle)$
E	1	5^+	3	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
E	2	5^+	1	$\frac{i}{\sqrt{2}}(- 5\rangle + -5\rangle)$
E	2	5^+	2	$\frac{i}{\sqrt{2}}(3\rangle - -3\rangle)$
E	2	5^+	3	$\frac{i}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	1	5^-	1	$\frac{1}{\sqrt{2}}(5\rangle - -5\rangle)$
E	1	5^-	2	$\frac{1}{\sqrt{2}}(- 3\rangle + -3\rangle)$
E	1	5^-	3	$\frac{1}{\sqrt{2}}(- 1\rangle + -1\rangle)$
E	2	5^-	1	$\frac{-i}{\sqrt{2}}(5\rangle + -5\rangle)$
E	2	5^-	2	$\frac{-i}{\sqrt{2}}(3\rangle + -3\rangle)$
E	2	5^-	3	$\frac{i}{\sqrt{2}}(1\rangle + -1\rangle)$

Table A11: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J \leq \frac{3}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	0^+	1	$ 0\rangle$
A_2	1	0^-	1	$ 0\rangle$
G	1	$\frac{1}{2}^+$	1	$ \frac{1}{2}\rangle$
G	2	$\frac{1}{2}^+$	1	$ \frac{1}{2}\rangle$
G	1	$\frac{1}{2}^-$	1	$\frac{1}{\sqrt{2}}(\frac{1}{2}\rangle + i \frac{1}{2}\rangle)$
G	2	$\frac{1}{2}^-$	1	$\frac{-1}{\sqrt{2}}(i \frac{1}{2}\rangle + \frac{1}{2}\rangle)$
A_1	1	1^-	1	$\frac{1}{2}(1\rangle - i\sqrt{2} 0\rangle + -1\rangle)$
A_2	1	1^+	1	$\frac{1}{2}(1\rangle - i\sqrt{2} 0\rangle + -1\rangle)$
B_1	1	1^+	1	$\frac{1}{2}(1\rangle + i\sqrt{2} 0\rangle + -1\rangle)$
B_1	1	1^-	1	$\frac{1}{\sqrt{2}}(1\rangle - -1\rangle)$
B_2	1	1^+	1	$\frac{1}{\sqrt{2}}(1\rangle - -1\rangle)$
B_2	1	1^-	1	$\frac{1}{2}(1\rangle + i\sqrt{2} 0\rangle + -1\rangle)$
G	1	$\frac{3}{2}^+$	1	$\frac{1}{2}(\frac{3}{2}\rangle + \sqrt{3} \frac{1}{2}\rangle)$
G	1	$\frac{3}{2}^+$	2	$\frac{1}{2}(\frac{1}{2}\rangle - \sqrt{3} \frac{3}{2}\rangle)$
G	2	$\frac{3}{2}^+$	1	$\frac{-1}{2}(\sqrt{3} \frac{1}{2}\rangle + \frac{3}{2}\rangle)$
G	2	$\frac{3}{2}^+$	2	$\frac{1}{2}(\sqrt{3} \frac{3}{2}\rangle - \frac{1}{2}\rangle)$
G	1	$\frac{3}{2}^-$	1	$\frac{i}{2\sqrt{2}}(-2i \frac{3}{2}\rangle - \sqrt{3} \frac{1}{2}\rangle + \frac{3}{2}\rangle)$
G	1	$\frac{3}{2}^-$	2	$\frac{1}{2\sqrt{2}}(\frac{1}{2}\rangle + 2i \frac{1}{2}\rangle + \sqrt{3} \frac{3}{2}\rangle)$
G	2	$\frac{3}{2}^-$	1	$\frac{i}{2\sqrt{2}}(\frac{3}{2}\rangle - \sqrt{3} \frac{1}{2}\rangle - 2i \frac{3}{2}\rangle)$
G	2	$\frac{3}{2}^-$	2	$\frac{1}{2\sqrt{2}}(\sqrt{3} \frac{3}{2}\rangle + 2i \frac{1}{2}\rangle + \frac{1}{2}\rangle)$

Table A12: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spins $J = 2, \frac{5}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	2^+	1	$\frac{1}{2\sqrt{2}}(\sqrt{3} 2\rangle - \sqrt{2} 0\rangle + \sqrt{3} -2\rangle)$
A_1	1	2^+	2	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
A_1	1	2^-	1	$\frac{1}{2}(2\rangle + i 1\rangle - i -1\rangle - -2\rangle)$
A_2	1	2^+	1	$\frac{1}{2}(2\rangle + i 1\rangle - i -1\rangle - -2\rangle)$
A_2	1	2^-	1	$\frac{1}{2\sqrt{2}}(\sqrt{3} 2\rangle - \sqrt{2} 0\rangle + \sqrt{3} -2\rangle)$
A_2	1	2^-	2	$\frac{1}{\sqrt{2}}(1\rangle + -1\rangle)$
B_1	1	2^+	1	$\frac{1}{2}(2\rangle - i 1\rangle + i -1\rangle - -2\rangle)$
B_1	1	2^-	1	$\frac{1}{2\sqrt{2}}(2\rangle + \sqrt{6} 0\rangle + -2\rangle)$
B_2	1	2^+	1	$\frac{1}{2\sqrt{2}}(2\rangle + \sqrt{6} 0\rangle + -2\rangle)$
B_2	1	2^-	1	$\frac{1}{2}(2\rangle - i 1\rangle + i -1\rangle - -2\rangle)$
G	1	$\frac{5}{2}^+$	1	$\frac{1}{2\sqrt{2}}(\sqrt{5} \frac{5}{2}\rangle - \sqrt{2} \frac{1}{2}\rangle + -\frac{3}{2}\rangle)$
G	1	$\frac{5}{2}^+$	2	$\frac{1}{2\sqrt{14}}(7 \frac{3}{2}\rangle + \sqrt{2} -\frac{1}{2}\rangle - \sqrt{5} -\frac{5}{2}\rangle)$
G	1	$\frac{5}{2}^+$	3	$\frac{1}{\sqrt{7}}(\sqrt{5} -\frac{1}{2}\rangle + \sqrt{2} -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^+$	1	$\frac{1}{2\sqrt{2}}(\frac{3}{2}\rangle - \sqrt{2} -\frac{1}{2}\rangle + \sqrt{5} -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^+$	2	$\frac{1}{2\sqrt{14}}(-\sqrt{5} \frac{5}{2}\rangle + \sqrt{2} \frac{1}{2}\rangle + 7 -\frac{3}{2}\rangle)$
G	2	$\frac{5}{2}^+$	3	$\frac{1}{\sqrt{7}}(\sqrt{2} \frac{5}{2}\rangle + \sqrt{5} \frac{1}{2}\rangle)$
G	1	$\frac{5}{2}^-$	1	$\frac{i}{4\sqrt{2}}(-4i \frac{5}{2}\rangle + \sqrt{5} \frac{3}{2}\rangle - \sqrt{10} -\frac{1}{2}\rangle + -\frac{5}{2}\rangle)$
G	1	$\frac{5}{2}^-$	2	$\frac{i}{4\sqrt{2}}(-3 \frac{3}{2}\rangle - \sqrt{2} -\frac{1}{2}\rangle - 4i -\frac{3}{2}\rangle + \sqrt{5} -\frac{5}{2}\rangle)$
G	1	$\frac{5}{2}^-$	3	$\frac{1}{4}(\frac{3}{2}\rangle + 2i\sqrt{2} \frac{1}{2}\rangle + \sqrt{2} -\frac{1}{2}\rangle + \sqrt{5} -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^-$	1	$\frac{-i}{4\sqrt{2}}(\frac{5}{2}\rangle - \sqrt{10} \frac{1}{2}\rangle + \sqrt{5} -\frac{3}{2}\rangle - 4i -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^-$	2	$\frac{i}{4\sqrt{2}}(-\sqrt{5} \frac{5}{2}\rangle + 4i \frac{3}{2}\rangle + \sqrt{2} \frac{1}{2}\rangle + 3 -\frac{3}{2}\rangle)$
G	2	$\frac{5}{2}^-$	3	$\frac{-1}{4}(\sqrt{5} \frac{5}{2}\rangle + \sqrt{2} \frac{1}{2}\rangle + 2i\sqrt{2} -\frac{1}{2}\rangle + -\frac{3}{2}\rangle)$

Table A13: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 3$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	3^+	1	$\frac{1}{4}(\sqrt{3} 3\rangle + \sqrt{5} 1\rangle - \sqrt{5} -1\rangle - \sqrt{3} -3\rangle)$
A_1	1	3^-	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 3\rangle - \sqrt{3} 2\rangle + \sqrt{10} 0\rangle - \sqrt{3} -2\rangle - 2i\sqrt{2} -3\rangle)$
A_1	1	3^-	2	$\frac{1}{4\sqrt{2}}(\sqrt{5} 2\rangle - 2i\sqrt{2} 1\rangle + \sqrt{6} 0\rangle - 2i\sqrt{2} -1\rangle + \sqrt{5} -2\rangle)$
A_2	1	3^+	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 3\rangle - \sqrt{3} 2\rangle + \sqrt{10} 0\rangle - \sqrt{3} -2\rangle - 2i\sqrt{2} -3\rangle)$
A_2	1	3^+	2	$\frac{1}{4\sqrt{2}}(\sqrt{5} 2\rangle - 2i\sqrt{2} 1\rangle + \sqrt{6} 0\rangle - 2i\sqrt{2} -1\rangle + \sqrt{5} -2\rangle)$
A_2	1	3^-	1	$\frac{1}{4}(\sqrt{3} 3\rangle + \sqrt{5} 1\rangle - \sqrt{5} -1\rangle - \sqrt{3} -3\rangle)$
B_1	1	3^+	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 3\rangle + \sqrt{3} 2\rangle - \sqrt{10} 0\rangle + \sqrt{3} -2\rangle - 2i\sqrt{2} -3\rangle)$
B_1	1	3^+	2	$\frac{1}{4\sqrt{2}}(\sqrt{5} 2\rangle + 2i\sqrt{2} 1\rangle + \sqrt{6} 0\rangle + 2i\sqrt{2} -1\rangle + \sqrt{5} -2\rangle)$
B_1	1	3^-	1	$\frac{1}{4}(\sqrt{5} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle - \sqrt{5} -3\rangle)$
B_1	1	3^-	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
B_2	1	3^+	1	$\frac{1}{4}(\sqrt{5} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle - \sqrt{5} -3\rangle)$
B_2	1	3^+	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
B_2	1	3^-	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 3\rangle + \sqrt{3} 2\rangle - \sqrt{10} 0\rangle + \sqrt{3} -2\rangle - 2i\sqrt{2} -3\rangle)$
B_2	1	3^-	2	$\frac{1}{4\sqrt{2}}(\sqrt{5} 2\rangle + 2i\sqrt{2} 1\rangle + \sqrt{6} 0\rangle + 2i\sqrt{2} -1\rangle + \sqrt{5} -2\rangle)$

Table A14: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = \frac{7}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
G	1	$\frac{7}{2}^+$	1	$\frac{1}{4}(\sqrt{7} \frac{7}{2}\rangle + \sqrt{3} \frac{3}{2}\rangle - \sqrt{5} -\frac{1}{2}\rangle + -\frac{5}{2}\rangle)$
G	1	$\frac{7}{2}^+$	2	$\frac{1}{2}(\frac{3}{2}\rangle - \sqrt{3} -\frac{5}{2}\rangle)$
G	1	$\frac{7}{2}^+$	3	$\frac{1}{4\sqrt{3}}(3 \frac{5}{2}\rangle + \sqrt{5} \frac{1}{2}\rangle + 3\sqrt{3} -\frac{3}{2}\rangle - \sqrt{7} -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^+$	4	$\frac{1}{2\sqrt{3}}(\sqrt{7} \frac{1}{2}\rangle + \sqrt{5} -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^+$	1	$\frac{-1}{4}(\frac{5}{2}\rangle - \sqrt{5} \frac{1}{2}\rangle + \sqrt{3} -\frac{3}{2}\rangle + \sqrt{7} -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^+$	2	$\frac{1}{2}(\sqrt{3} \frac{5}{2}\rangle - -\frac{3}{2}\rangle)$
G	2	$\frac{7}{2}^+$	3	$\frac{-1}{4\sqrt{3}}(-\sqrt{7} \frac{7}{2}\rangle + 3\sqrt{3} \frac{3}{2}\rangle + \sqrt{5} -\frac{1}{2}\rangle + 3 -\frac{5}{2}\rangle)$
G	2	$\frac{7}{2}^+$	4	$\frac{-1}{2\sqrt{3}}(\sqrt{5} \frac{7}{2}\rangle + \sqrt{7} -\frac{1}{2}\rangle)$
G	1	$\frac{7}{2}^-$	1	$\frac{i}{8\sqrt{2}}(-8i \frac{7}{2}\rangle - \sqrt{7} \frac{5}{2}\rangle + \sqrt{35} \frac{1}{2}\rangle - \sqrt{21} -\frac{3}{2}\rangle + -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^-$	2	$\frac{i}{8\sqrt{2}}(-5 \frac{5}{2}\rangle + \sqrt{5} \frac{1}{2}\rangle + 3\sqrt{3} -\frac{3}{2}\rangle - 8i -\frac{5}{2}\rangle - \sqrt{7} -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^-$	3	$\frac{i}{8\sqrt{2}}(\sqrt{5} \frac{5}{2}\rangle + 3 \frac{1}{2}\rangle - 8i -\frac{1}{2}\rangle + \sqrt{15} -\frac{3}{2}\rangle + \sqrt{35} -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^-$	4	$\frac{1}{8\sqrt{2}}(3\sqrt{3} \frac{5}{2}\rangle - 8i \frac{3}{2}\rangle + \sqrt{15} \frac{1}{2}\rangle + -\frac{3}{2}\rangle - \sqrt{21} -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^-$	1	$\frac{i}{8\sqrt{2}}(\frac{7}{2}\rangle - \sqrt{21} \frac{3}{2}\rangle + \sqrt{35} -\frac{1}{2}\rangle - \sqrt{7} -\frac{5}{2}\rangle - 8i -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^-$	2	$\frac{i}{8\sqrt{2}}(-\sqrt{7} \frac{7}{2}\rangle - 8i \frac{5}{2}\rangle + 3\sqrt{3} \frac{3}{2}\rangle + \sqrt{5} -\frac{1}{2}\rangle - 5 -\frac{5}{2}\rangle)$
G	2	$\frac{7}{2}^-$	3	$\frac{i}{8\sqrt{2}}(\sqrt{35} \frac{7}{2}\rangle + \sqrt{15} \frac{3}{2}\rangle - 8i \frac{1}{2}\rangle + 3 -\frac{1}{2}\rangle + \sqrt{5} -\frac{5}{2}\rangle)$
G	2	$\frac{7}{2}^-$	4	$\frac{1}{8\sqrt{2}}(-\sqrt{21} \frac{7}{2}\rangle + \frac{3}{2}\rangle + \sqrt{15} -\frac{1}{2}\rangle - 8i -\frac{3}{2}\rangle + 3\sqrt{3} -\frac{5}{2}\rangle)$

Table A15: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 4$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	4^+	1	$\frac{1}{12\sqrt{2}}(9 4\rangle - 2\sqrt{7} 2\rangle + \sqrt{70} 0\rangle - 2\sqrt{7} -2\rangle + 9 -4\rangle)$
A_1	1	4^+	2	$\frac{1}{3\sqrt{2}}(\sqrt{5} 2\rangle + 2\sqrt{2} 0\rangle + \sqrt{5} -2\rangle)$
A_1	1	4^+	3	$\frac{1}{4}(\sqrt{7} 3\rangle - 1\rangle - -1\rangle + \sqrt{7} -3\rangle)$
A_1	1	4^-	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 4\rangle + 3\rangle - \sqrt{7} 1\rangle + \sqrt{7} -1\rangle - -3\rangle$ $+ 2i\sqrt{2} -4\rangle)$
A_1	1	4^-	2	$\frac{1}{4\sqrt{2}}(-\sqrt{7} 3\rangle - 2i\sqrt{2} 2\rangle - 1\rangle + -1\rangle + 2i\sqrt{2} -2\rangle$ $+ \sqrt{7} -3\rangle)$
A_2	1	4^+	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 4\rangle + 3\rangle - \sqrt{7} 1\rangle + \sqrt{7} -1\rangle - -3\rangle$ $+ 2i\sqrt{2} -4\rangle)$
A_2	1	4^+	2	$\frac{1}{4\sqrt{2}}(-\sqrt{7} 3\rangle - 2i\sqrt{2} 2\rangle - 1\rangle + -1\rangle + 2i\sqrt{2} -2\rangle$ $+ \sqrt{7} -3\rangle)$
A_2	1	4^-	1	$\frac{1}{12\sqrt{2}}(9 4\rangle - 2\sqrt{7} 2\rangle + \sqrt{70} 0\rangle - 2\sqrt{7} -2\rangle + 9 -4\rangle)$
A_2	1	4^-	2	$\frac{1}{3\sqrt{2}}(\sqrt{5} 2\rangle + 2\sqrt{2} 0\rangle + \sqrt{5} -2\rangle)$
A_2	1	4^-	3	$\frac{1}{4}(\sqrt{7} 3\rangle - 1\rangle - -1\rangle + \sqrt{7} -3\rangle)$
B_1	1	4^+	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 4\rangle - 3\rangle + \sqrt{7} 1\rangle - \sqrt{7} -1\rangle + -3\rangle$ $+ 2i\sqrt{2} -4\rangle)$
B_1	1	4^+	2	$\frac{1}{4\sqrt{2}}(-\sqrt{7} 3\rangle + 2i\sqrt{2} 2\rangle - 1\rangle + -1\rangle - 2i\sqrt{2} -2\rangle$ $+ \sqrt{7} -3\rangle)$
B_1	1	4^-	1	$\frac{1}{4\sqrt{2}}(\sqrt{7} 4\rangle + 2 2\rangle - \sqrt{10} 0\rangle + 2 -2\rangle + \sqrt{7} -4\rangle)$
B_1	1	4^-	2	$\frac{1}{4}(3\rangle + \sqrt{7} 1\rangle + \sqrt{7} -1\rangle + -3\rangle)$
B_2	1	4^+	1	$\frac{1}{4\sqrt{2}}(\sqrt{7} 4\rangle + 2 2\rangle - \sqrt{10} 0\rangle + 2 -2\rangle + \sqrt{7} -4\rangle)$
B_2	1	4^+	2	$\frac{1}{4}(3\rangle + \sqrt{7} 1\rangle + \sqrt{7} -1\rangle + -3\rangle)$
B_2	1	4^-	1	$\frac{i}{4\sqrt{2}}(-2i\sqrt{2} 4\rangle - 3\rangle + \sqrt{7} 1\rangle - \sqrt{7} -1\rangle + -3\rangle$ $+ 2i\sqrt{2} -4\rangle)$
B_2	1	4^-	2	$\frac{1}{4\sqrt{2}}(-\sqrt{7} 3\rangle + 2i\sqrt{2} 2\rangle - 1\rangle + -1\rangle - 2i\sqrt{2} -2\rangle$ $+ \sqrt{7} -3\rangle)$

Table A16: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = \frac{9}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
G	1	$\frac{9}{2}^+$	1	$\frac{1}{4\sqrt{34}}(17 \frac{9}{2}\rangle - 6 \frac{5}{2}\rangle + 3\sqrt{14} \frac{1}{2}\rangle - 2\sqrt{21} \frac{3}{2}\rangle + 3 \frac{7}{2}\rangle)$
G	1	$\frac{9}{2}^+$	2	$\frac{1}{8}(5 \frac{7}{2}\rangle - \sqrt{14} \frac{1}{2}\rangle + 4 \frac{5}{2}\rangle + 3 \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^+$	3	$\frac{1}{8}(-\sqrt{21} \frac{7}{2}\rangle + 4 \frac{3}{2}\rangle - \sqrt{6} \frac{1}{2}\rangle + \sqrt{21} \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^+$	4	$\frac{1}{6\sqrt{34}}(-19 \frac{5}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle + 5\sqrt{21} \frac{3}{2}\rangle + 18 \frac{7}{2}\rangle)$
G	1	$\frac{9}{2}^+$	5	$\frac{1}{3\sqrt{2}}(\sqrt{7} \frac{5}{2}\rangle + 2\sqrt{2} \frac{1}{2}\rangle + \sqrt{3} \frac{3}{2}\rangle)$
G	2	$\frac{9}{2}^+$	1	$\frac{1}{4\sqrt{34}}(3 \frac{7}{2}\rangle - 2\sqrt{21} \frac{3}{2}\rangle + 3\sqrt{14} \frac{1}{2}\rangle - 6 \frac{5}{2}\rangle + 17 \frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^+$	2	$\frac{1}{8}(3 \frac{9}{2}\rangle + 4 \frac{5}{2}\rangle - \sqrt{14} \frac{1}{2}\rangle + 5 \frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^+$	3	$\frac{1}{8}(\sqrt{21} \frac{9}{2}\rangle - \sqrt{6} \frac{1}{2}\rangle + 4 \frac{3}{2}\rangle - \sqrt{21} \frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^+$	4	$\frac{1}{6\sqrt{34}}(18 \frac{7}{2}\rangle + 5\sqrt{21} \frac{3}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle - 19 \frac{5}{2}\rangle)$
G	2	$\frac{9}{2}^+$	5	$\frac{1}{3\sqrt{2}}(\sqrt{3} \frac{3}{2}\rangle + 2\sqrt{2} \frac{1}{2}\rangle + \sqrt{7} \frac{5}{2}\rangle)$
G	1	$\frac{9}{2}^-$	1	$\frac{i}{16\sqrt{2}}(-16i \frac{9}{2}\rangle + 3 \frac{7}{2}\rangle - 2\sqrt{21} \frac{3}{2}\rangle + 3\sqrt{14} \frac{1}{2}\rangle - 6 \frac{5}{2}\rangle + \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	2	$\frac{i}{8\sqrt{2}}(-5 \frac{7}{2}\rangle - 8i \frac{5}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle + 4 \frac{5}{2}\rangle - 3 \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	3	$\frac{i}{8\sqrt{2}}(\sqrt{21} \frac{7}{2}\rangle + 4 \frac{3}{2}\rangle + \sqrt{6} \frac{1}{2}\rangle - 8i \frac{3}{2}\rangle - \sqrt{21} \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	4	$\frac{i}{16\sqrt{2}}(-7 \frac{7}{2}\rangle + 2\sqrt{21} \frac{3}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle - 10 \frac{5}{2}\rangle - 16i \frac{7}{2}\rangle + 3 \frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	5	$\frac{1}{16}(\sqrt{7} \frac{7}{2}\rangle + 2\sqrt{3} \frac{3}{2}\rangle - 8i\sqrt{2} \frac{1}{2}\rangle + 3\sqrt{2} \frac{1}{2}\rangle + 2\sqrt{7} \frac{5}{2}\rangle + 3\sqrt{7} \frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^-$	1	$\frac{-i}{16\sqrt{2}}(\frac{9}{2}\rangle - 6 \frac{5}{2}\rangle + 3\sqrt{14} \frac{1}{2}\rangle - 2\sqrt{21} \frac{3}{2}\rangle + 3 \frac{7}{2}\rangle - 16i \frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^-$	2	$\frac{-i}{8\sqrt{2}}(-3 \frac{9}{2}\rangle + 4 \frac{5}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle - 8i \frac{5}{2}\rangle - 5 \frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^-$	3	$\frac{-i}{8\sqrt{2}}(-\sqrt{21} \frac{9}{2}\rangle - 8i \frac{3}{2}\rangle + \sqrt{6} \frac{1}{2}\rangle + 4 \frac{3}{2}\rangle + \sqrt{21} \frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^-$	4	$\frac{-i}{16\sqrt{2}}(3 \frac{9}{2}\rangle - 16i \frac{7}{2}\rangle - 10 \frac{5}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle + 2\sqrt{21} \frac{3}{2}\rangle - 7 \frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^-$	5	$\frac{-1}{16}(3\sqrt{7} \frac{9}{2}\rangle + 2\sqrt{7} \frac{5}{2}\rangle + 3\sqrt{2} \frac{1}{2}\rangle - 8i\sqrt{2} \frac{1}{2}\rangle + 2\sqrt{3} \frac{3}{2}\rangle + \sqrt{7} \frac{7}{2}\rangle)$

Table A17: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum (0,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 5$ is considered in this table. (Continued in next table.)

Λ	λ	J^η	n	Basis vectors
A_1	1	5^+	1	$\frac{1}{8}(\sqrt{15} 5\rangle + \sqrt{3} 3\rangle - \sqrt{14} 1\rangle + \sqrt{14} -1\rangle - \sqrt{3} -3\rangle - \sqrt{15} -5\rangle)$
A_1	1	5^+	2	$\frac{1}{2\sqrt{2}}(- 4\rangle - \sqrt{3} 2\rangle + \sqrt{3} -2\rangle + -4\rangle)$
A_1	1	5^-	1	$\frac{i}{16\sqrt{2}}(-8i\sqrt{2} 5\rangle - \sqrt{5} 4\rangle + 2\sqrt{15} 2\rangle - 3\sqrt{14} 0\rangle + 2\sqrt{15} -2\rangle - \sqrt{5} -4\rangle - 8i\sqrt{2} -5\rangle)$
A_1	1	5^-	2	$\frac{-i}{16}(\sqrt{21} 4\rangle + 2\sqrt{7} 2\rangle + 8i 1\rangle + \sqrt{30} 0\rangle + 8i -1\rangle + 2\sqrt{7} -2\rangle + \sqrt{21} -4\rangle)$
A_1	1	5^-	3	$\frac{-1}{16\sqrt{2}}(-9 4\rangle + 8i\sqrt{2} 3\rangle + 2\sqrt{3} 2\rangle + \sqrt{70} 0\rangle + 2\sqrt{3} -2\rangle + 8i\sqrt{2} -3\rangle - 9 -4\rangle)$
A_2	1	5^+	1	$\frac{i}{16\sqrt{2}}(-8i\sqrt{2} 5\rangle - \sqrt{5} 4\rangle + 2\sqrt{15} 2\rangle - 3\sqrt{14} 0\rangle + 2\sqrt{15} -2\rangle - \sqrt{5} -4\rangle - 8i\sqrt{2} -5\rangle)$
A_2	1	5^+	2	$\frac{-i}{16}(\sqrt{21} 4\rangle + 2\sqrt{7} 2\rangle + 8i 1\rangle + \sqrt{30} 0\rangle + 8i -1\rangle + 2\sqrt{7} -2\rangle + \sqrt{21} -4\rangle)$
A_2	1	5^+	3	$\frac{-1}{16\sqrt{2}}(-9 4\rangle + 8i\sqrt{2} 3\rangle + 2\sqrt{3} 2\rangle + \sqrt{70} 0\rangle + 2\sqrt{3} -2\rangle + 8i\sqrt{2} -3\rangle - 9 -4\rangle)$
A_2	1	5^-	1	$\frac{1}{8}(\sqrt{15} 5\rangle + \sqrt{3} 3\rangle - \sqrt{14} 1\rangle + \sqrt{14} -1\rangle - \sqrt{3} -3\rangle - \sqrt{15} -5\rangle)$
A_2	1	5^-	2	$\frac{1}{2\sqrt{2}}(- 4\rangle - \sqrt{3} 2\rangle + \sqrt{3} -2\rangle + -4\rangle)$

Table A18: The basis vectors that block diagonalize the F, B, S, K matrices for planar-diagonal total momentum $(0,1,1)$. Each basis vector is labelled by an irreducible representation Λ of the little double group C_{2v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Only spin $J = 5$ is considered in this table. (Continued from previous table.)

Λ	λ	J^η	n	Basis vectors
B_1	1	5^+	1	$\frac{i}{16\sqrt{2}}(-8i\sqrt{2} 5\rangle + \sqrt{5} 4\rangle - 2\sqrt{15} 2\rangle + 3\sqrt{14} 0\rangle - 2\sqrt{15} -2\rangle + \sqrt{5} -4\rangle - 8i\sqrt{2} -5\rangle)$
B_1	1	5^+	2	$\frac{i}{16\sqrt{2}}(-9 4\rangle - 8i\sqrt{2} 3\rangle + 2\sqrt{3} 2\rangle + \sqrt{70} 0\rangle + 2\sqrt{3} -2\rangle - 8i\sqrt{2} -3\rangle - 9 -4\rangle)$
B_1	1	5^+	3	$\frac{1}{16}(\sqrt{21} 4\rangle + 2\sqrt{7} 2\rangle - 8i 1\rangle + \sqrt{30} 0\rangle - 8i -1\rangle + 2\sqrt{7} -2\rangle + \sqrt{21} -4\rangle)$
B_1	1	5^-	1	$\frac{1}{8\sqrt{17}}(17 5\rangle - 3\sqrt{5} 3\rangle + \sqrt{210} 1\rangle - \sqrt{210} -1\rangle + 3\sqrt{5} -3\rangle - 17 -5\rangle)$
B_1	1	5^-	2	$\frac{1}{2\sqrt{2}}(-\sqrt{3} 4\rangle + 2\rangle - -2\rangle + \sqrt{3} -4\rangle)$
B_1	1	5^-	3	$\frac{1}{\sqrt{34}}(-\sqrt{14} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle + \sqrt{14} -3\rangle)$
B_2	1	5^+	1	$\frac{1}{8\sqrt{17}}(17 5\rangle - 3\sqrt{5} 3\rangle + \sqrt{210} 1\rangle - \sqrt{210} -1\rangle + 3\sqrt{5} -3\rangle - 17 -5\rangle)$
B_2	1	5^+	2	$\frac{1}{2\sqrt{2}}(-\sqrt{3} 4\rangle + 2\rangle - -2\rangle + \sqrt{3} -4\rangle)$
B_2	1	5^+	3	$\frac{1}{\sqrt{34}}(-\sqrt{14} 3\rangle - \sqrt{3} 1\rangle + \sqrt{3} -1\rangle + \sqrt{14} -3\rangle)$
B_2	1	5^-	1	$\frac{i}{16\sqrt{2}}(-8i\sqrt{2} 5\rangle + \sqrt{5} 4\rangle - 2\sqrt{15} 2\rangle + 3\sqrt{14} 0\rangle - 2\sqrt{15} -2\rangle + \sqrt{5} -4\rangle - 8i\sqrt{2} -5\rangle)$
B_2	1	5^-	2	$\frac{i}{16\sqrt{2}}(-9 4\rangle - 8i\sqrt{2} 3\rangle + 2\sqrt{3} 2\rangle + \sqrt{70} 0\rangle + 2\sqrt{3} -2\rangle - 8i\sqrt{2} -3\rangle - 9 -4\rangle)$
B_2	1	5^-	3	$\frac{1}{16}(\sqrt{21} 4\rangle + 2\sqrt{7} 2\rangle - 8i 1\rangle + \sqrt{30} 0\rangle - 8i -1\rangle + 2\sqrt{7} -2\rangle + \sqrt{21} -4\rangle)$

Table A19: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$, and $\nu_2 = \frac{1}{2\sqrt{3}}(2 - \sqrt{2} + i(2 + \sqrt{2}))$, and $\nu_3 = \frac{1}{\sqrt{3}}(\sqrt{2} + i)$. Only spins $J \leq \frac{3}{2}$ are considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	0^+	1	$ 0\rangle$
A_2	1	0^-	1	$ 0\rangle$
G	1	$\frac{1}{2}^+$	1	$ \frac{1}{2}\rangle$
G	2	$\frac{1}{2}^+$	1	$ \frac{1}{2}\rangle$
G	1	$\frac{1}{2}^-$	1	$\frac{1}{\sqrt{3}}(\frac{1}{2}\rangle + \sqrt{2}\nu_1 \frac{1}{2}\rangle)$
G	2	$\frac{1}{2}^-$	1	$\frac{-1}{\sqrt{3}}(-\sqrt{2}\nu_1^* \frac{1}{2}\rangle + \frac{1}{2}\rangle)$
A_1	1	1^-	1	$\frac{-1}{\sqrt{6}}(-\sqrt{2} 1\rangle + \sqrt{2}\nu_1 0\rangle + i\sqrt{2} -1\rangle)$
A_2	1	1^+	1	$\frac{-1}{\sqrt{6}}(-\sqrt{2} 1\rangle + \sqrt{2}\nu_1 0\rangle + i\sqrt{2} -1\rangle)$
E	1	1^+	1	$\frac{1}{\sqrt{6}}(1\rangle + 2\nu_1 0\rangle - i -1\rangle)$
E	2	1^+	1	$\frac{1}{\sqrt{2}}(i 1\rangle - -1\rangle)$
E	1	1^-	1	$\frac{1}{\sqrt{2}}(1\rangle + i -1\rangle)$
E	2	1^-	1	$\frac{1}{\sqrt{6}}(i 1\rangle - 2\nu_1^* 0\rangle + -1\rangle)$
F_1	1	$\frac{3}{2}^+$	1	$\frac{1}{2\sqrt{6}}(\sqrt{6} \frac{3}{2}\rangle + \sqrt{6}\nu_2 \frac{1}{2}\rangle + \sqrt{6}\nu_3 -\frac{1}{2}\rangle - \sqrt{6}\nu_1 -\frac{3}{2}\rangle)$
F_1	1	$\frac{3}{2}^-$	1	$\frac{1}{2\sqrt{6}}(\sqrt{6} \frac{3}{2}\rangle + i\sqrt{6}\nu_2^* \frac{1}{2}\rangle - \sqrt{6}\nu_3^* -\frac{1}{2}\rangle + \sqrt{6}\nu_1 -\frac{3}{2}\rangle)$
F_2	1	$\frac{3}{2}^+$	1	$\frac{1}{2\sqrt{6}}(\sqrt{6} \frac{3}{2}\rangle + i\sqrt{6}\nu_2^* \frac{1}{2}\rangle - \sqrt{6}\nu_3^* -\frac{1}{2}\rangle + \sqrt{6}\nu_1 -\frac{3}{2}\rangle)$
F_2	1	$\frac{3}{2}^-$	1	$\frac{1}{2\sqrt{6}}(\sqrt{6} \frac{3}{2}\rangle + \sqrt{6}\nu_2 \frac{1}{2}\rangle + \sqrt{6}\nu_3 -\frac{1}{2}\rangle - \sqrt{6}\nu_1 -\frac{3}{2}\rangle)$
G	1	$\frac{3}{2}^+$	1	$\frac{1}{\sqrt{6}}(\frac{3}{2}\rangle - i\sqrt{3} \frac{1}{2}\rangle + \sqrt{2}\nu_1^* -\frac{3}{2}\rangle)$
G	2	$\frac{3}{2}^+$	1	$\frac{1}{\sqrt{6}}(\sqrt{2}\nu_1^* \frac{3}{2}\rangle - \sqrt{3} \frac{1}{2}\rangle + i -\frac{3}{2}\rangle)$
G	1	$\frac{3}{2}^-$	1	$\frac{-1}{\sqrt{6}}(-\sqrt{3} \frac{3}{2}\rangle + \sqrt{2}\nu_1 \frac{1}{2}\rangle + i -\frac{1}{2}\rangle)$
G	2	$\frac{3}{2}^-$	1	$\frac{-1}{\sqrt{6}}(\frac{1}{2}\rangle + \sqrt{2}\nu_1 -\frac{1}{2}\rangle + i\sqrt{3} -\frac{3}{2}\rangle)$

Table A20: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1 + i)$. Only spin $J = 2$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	2^+	1	$\frac{-1}{\sqrt{6}}(- 2\rangle + \sqrt{2}\nu_1 1\rangle + \sqrt{2}\nu_1^* -1\rangle + -2\rangle)$
A_2	1	2^-	1	$\frac{-1}{\sqrt{6}}(- 2\rangle + \sqrt{2}\nu_1 1\rangle + \sqrt{2}\nu_1^* -1\rangle + -2\rangle)$
E	1	2^+	1	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E	1	2^+	2	$\frac{1}{\sqrt{2}}(1\rangle + i -1\rangle)$
E	2	2^+	1	$ 0\rangle$
E	2	2^+	2	$\frac{-1}{\sqrt{6}}(\sqrt{2}\nu_1 2\rangle + i 1\rangle + -1\rangle - \sqrt{2}\nu_1 -2\rangle)$
E	1	2^-	1	$\frac{1}{2\sqrt{3}}(2 2\rangle + \sqrt{2}\nu_1 1\rangle + \sqrt{2}\nu_1^* -1\rangle - 2 -2\rangle)$
E	1	2^-	2	$ 0\rangle$
E	2	2^-	1	$\frac{1}{2}(\sqrt{2}\nu_1^* 1\rangle + \sqrt{2}\nu_1 -1\rangle)$
E	2	2^-	2	$\frac{-1}{\sqrt{2}}(2\rangle + -2\rangle)$

Table A21: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$, and $\nu_2 = \frac{1}{2\sqrt{3}}(2 - \sqrt{2} + i(2 + \sqrt{2}))$, and $\nu_3 = \frac{1}{\sqrt{3}}(\sqrt{2} + i)$. Only spin $J = \frac{5}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
F_1	1	$\frac{5}{2}^+$	1	$\frac{1}{4\sqrt{3}}(\sqrt{10} \frac{5}{2}\rangle + \sqrt{2}\nu_1^* \frac{3}{2}\rangle - 2\sqrt{3}\nu_3 \frac{1}{2}\rangle - 2i\sqrt{3}\nu_2 -\frac{1}{2}\rangle + \sqrt{2} -\frac{3}{2}\rangle + \sqrt{10}\nu_1^* -\frac{5}{2}\rangle)$
F_1	1	$\frac{5}{2}^-$	1	$\frac{1}{4\sqrt{3}}(\sqrt{10} \frac{5}{2}\rangle - \sqrt{2}\nu_1^* \frac{3}{2}\rangle + 2\sqrt{3}\nu_3^* \frac{1}{2}\rangle + 2\sqrt{3}\nu_2^* -\frac{1}{2}\rangle + \sqrt{2} -\frac{3}{2}\rangle - \sqrt{10}\nu_1^* -\frac{5}{2}\rangle)$
F_2	1	$\frac{5}{2}^+$	1	$\frac{1}{4\sqrt{3}}(\sqrt{10} \frac{5}{2}\rangle - \sqrt{2}\nu_1^* \frac{3}{2}\rangle + 2\sqrt{3}\nu_3^* \frac{1}{2}\rangle + 2\sqrt{3}\nu_2^* -\frac{1}{2}\rangle + \sqrt{2} -\frac{3}{2}\rangle - \sqrt{10}\nu_1^* -\frac{5}{2}\rangle)$
F_2	1	$\frac{5}{2}^-$	1	$\frac{1}{4\sqrt{3}}(\sqrt{10} \frac{5}{2}\rangle + \sqrt{2}\nu_1^* \frac{3}{2}\rangle - 2\sqrt{3}\nu_3 \frac{1}{2}\rangle - 2i\sqrt{3}\nu_2 -\frac{1}{2}\rangle + \sqrt{2} -\frac{3}{2}\rangle + \sqrt{10}\nu_1^* -\frac{5}{2}\rangle)$
G	1	$\frac{5}{2}^+$	1	$\frac{-1}{4\sqrt{3}}(-4 \frac{5}{2}\rangle + \sqrt{10}\nu_1 \frac{3}{2}\rangle + 2\sqrt{5}\nu_1^* -\frac{1}{2}\rangle + \sqrt{2}\nu_1 -\frac{5}{2}\rangle)$
G	1	$\frac{5}{2}^+$	2	$\frac{1}{2\sqrt{6}}(3 \frac{3}{2}\rangle + i\sqrt{2} -\frac{1}{2}\rangle + 2\sqrt{2}\nu_1^* -\frac{3}{2}\rangle - \sqrt{5} -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^+$	1	$\frac{-1}{4\sqrt{3}}(\sqrt{2}\nu_1^* \frac{5}{2}\rangle + 2\sqrt{5}\nu_1 \frac{1}{2}\rangle + \sqrt{10}\nu_1^* -\frac{3}{2}\rangle + 4 -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^+$	2	$\frac{-i}{2\sqrt{6}}(-\sqrt{5} \frac{5}{2}\rangle - 2\sqrt{2}\nu_1 \frac{3}{2}\rangle - i\sqrt{2} \frac{1}{2}\rangle + 3 -\frac{3}{2}\rangle)$
G	1	$\frac{5}{2}^-$	1	$\frac{1}{\sqrt{6}}(\frac{5}{2}\rangle - \sqrt{5} -\frac{3}{2}\rangle)$
G	1	$\frac{5}{2}^-$	2	$\frac{1}{2\sqrt{3}}(\frac{3}{2}\rangle + 2\nu_1 \frac{1}{2}\rangle - i\sqrt{2} -\frac{1}{2}\rangle + \sqrt{5} -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^-$	1	$\frac{1}{\sqrt{6}}(-\sqrt{5} \frac{3}{2}\rangle + -\frac{5}{2}\rangle)$
G	2	$\frac{5}{2}^-$	2	$\frac{-i}{2\sqrt{3}}(-\sqrt{5} \frac{5}{2}\rangle - i\sqrt{2} \frac{1}{2}\rangle + 2\nu_1^* -\frac{1}{2}\rangle - -\frac{3}{2}\rangle)$

Table A22: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$. Only spin $J=3$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	3^+	1	$\frac{1}{2\sqrt{6}}(\sqrt{3} 3\rangle + 2\nu_1 2\rangle + i\sqrt{5} 1\rangle - \sqrt{5} -1\rangle + 2\nu_1 -2\rangle - i\sqrt{3} -3\rangle)$
A_1	1	3^-	1	$\frac{1}{2\sqrt{6}}(\sqrt{5} 3\rangle + i\sqrt{3} 1\rangle - 2\sqrt{2}\nu_1^* 0\rangle + \sqrt{3} -1\rangle + i\sqrt{5} -3\rangle)$
A_1	1	3^-	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
A_2	1	3^+	1	$\frac{1}{2\sqrt{6}}(\sqrt{5} 3\rangle + i\sqrt{3} 1\rangle - 2\sqrt{2}\nu_1^* 0\rangle + \sqrt{3} -1\rangle + i\sqrt{5} -3\rangle)$
A_2	1	3^+	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
A_2	1	3^-	1	$\frac{1}{2\sqrt{6}}(\sqrt{3} 3\rangle + 2\nu_1 2\rangle + i\sqrt{5} 1\rangle - \sqrt{5} -1\rangle + 2\nu_1 -2\rangle - i\sqrt{3} -3\rangle)$
E	1	3^+	1	$\frac{1}{2\sqrt{42}}(7 3\rangle - i\sqrt{15} 1\rangle + 2\sqrt{10}\nu_1^* 0\rangle - \sqrt{15} -1\rangle + 7i -3\rangle)$
E	1	3^+	2	$\frac{-1}{\sqrt{14}}(-2 1\rangle + \sqrt{6}\nu_1 0\rangle + 2i -1\rangle)$
E	2	3^+	1	$\frac{-1}{2\sqrt{14}}(i 3\rangle - 2\sqrt{3}\nu_1^* 2\rangle + \sqrt{15} 1\rangle + i\sqrt{15} -1\rangle - 2\sqrt{3}\nu_1^* -2\rangle + -3\rangle)$
E	2	3^+	2	$\frac{1}{2\sqrt{21}}(-\sqrt{30} 3\rangle + \sqrt{10}\nu_1 2\rangle + i\sqrt{2} 1\rangle - \sqrt{2} -1\rangle + \sqrt{10}\nu_1 -2\rangle + i\sqrt{30} -3\rangle)$
E	1	3^-	1	$\frac{-1}{6\sqrt{2}}(-3\sqrt{3} 3\rangle + 2\nu_1 2\rangle + i\sqrt{5} 1\rangle - \sqrt{5} -1\rangle + 2\nu_1 -2\rangle + 3i\sqrt{3} -3\rangle)$
E	1	3^-	2	$\frac{1}{3\sqrt{2}}(\sqrt{5} 2\rangle - 2\nu_1 1\rangle + 2\nu_1^* -1\rangle + \sqrt{5} -2\rangle)$
E	2	3^-	1	$\frac{-1}{6\sqrt{2}}(i 3\rangle - \sqrt{15} 1\rangle + 2\sqrt{10}\nu_1 0\rangle + i\sqrt{15} -1\rangle - -3\rangle)$
E	2	3^-	2	$\frac{-1}{6}(\sqrt{10}\nu_1 3\rangle + \sqrt{6}\nu_1^* 1\rangle + 2 0\rangle - \sqrt{6}\nu_1 -1\rangle - \sqrt{10}\nu_1^* -3\rangle)$

Table A23: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$, and $\nu_2 = \frac{1}{2\sqrt{3}}(2 - \sqrt{2} + i(2 + \sqrt{2}))$, and $\nu_3 = \frac{1}{\sqrt{3}}(\sqrt{2} + i)$. Only spin $J = \frac{7}{2}$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
F_1	1	$\frac{7}{2}^+$	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{14} \frac{7}{2}\rangle + i\sqrt{6}\nu_2^* \frac{5}{2}\rangle - 3\sqrt{2}\nu_3^* \frac{3}{2}\rangle + \sqrt{10}\nu_1 \frac{1}{2}\rangle + \sqrt{10} -\frac{1}{2}\rangle$ $+ 3i\sqrt{2}\nu_2^* -\frac{3}{2}\rangle - \sqrt{6}\nu_3^* -\frac{5}{2}\rangle - \sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_1	1	$\frac{7}{2}^-$	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{14} \frac{7}{2}\rangle + \sqrt{6}\nu_2 \frac{5}{2}\rangle + 3\sqrt{2}\nu_3 \frac{3}{2}\rangle - \sqrt{10}\nu_1 \frac{1}{2}\rangle + \sqrt{10} -\frac{1}{2}\rangle$ $+ 3\sqrt{2}\nu_2 -\frac{3}{2}\rangle + \sqrt{6}\nu_3 -\frac{5}{2}\rangle + \sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_2	1	$\frac{7}{2}^+$	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{14} \frac{7}{2}\rangle + \sqrt{6}\nu_2 \frac{5}{2}\rangle + 3\sqrt{2}\nu_3 \frac{3}{2}\rangle - \sqrt{10}\nu_1 \frac{1}{2}\rangle + \sqrt{10} -\frac{1}{2}\rangle$ $+ 3\sqrt{2}\nu_2 -\frac{3}{2}\rangle + \sqrt{6}\nu_3 -\frac{5}{2}\rangle + \sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_2	1	$\frac{7}{2}^-$	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{14} \frac{7}{2}\rangle + i\sqrt{6}\nu_2^* \frac{5}{2}\rangle - 3\sqrt{2}\nu_3^* \frac{3}{2}\rangle + \sqrt{10}\nu_1 \frac{1}{2}\rangle + \sqrt{10} -\frac{1}{2}\rangle$ $+ 3i\sqrt{2}\nu_2^* -\frac{3}{2}\rangle - \sqrt{6}\nu_3^* -\frac{5}{2}\rangle - \sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^+$	1	$\frac{1}{2\sqrt{6}}(\sqrt{7} \frac{7}{2}\rangle + \sqrt{2}\nu_1 \frac{5}{2}\rangle + i\sqrt{3} \frac{3}{2}\rangle - \sqrt{5} -\frac{1}{2}\rangle + \sqrt{6}\nu_1 -\frac{3}{2}\rangle$ $+ i -\frac{5}{2}\rangle)$
G	1	$\frac{7}{2}^+$	2	$\frac{1}{2\sqrt{3}}(\sqrt{7} \frac{1}{2}\rangle + \sqrt{5} -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^+$	3	$\frac{1}{2\sqrt{3}}(\sqrt{3} \frac{5}{2}\rangle + \sqrt{2}\nu_1 \frac{3}{2}\rangle - -\frac{3}{2}\rangle - \sqrt{6}\nu_1 -\frac{5}{2}\rangle)$
G	2	$\frac{7}{2}^+$	1	$\frac{1}{2\sqrt{6}}(- \frac{5}{2}\rangle + \sqrt{6}\nu_1 \frac{3}{2}\rangle + i\sqrt{5} \frac{1}{2}\rangle - \sqrt{3} -\frac{3}{2}\rangle + \sqrt{2}\nu_1 -\frac{5}{2}\rangle$ $- i\sqrt{7} -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^+$	2	$\frac{-1}{2\sqrt{3}}(\sqrt{5} \frac{7}{2}\rangle + \sqrt{7} -\frac{1}{2}\rangle)$
G	2	$\frac{7}{2}^+$	3	$\frac{1}{2\sqrt{3}}(\sqrt{6}\nu_1^* \frac{5}{2}\rangle - \frac{3}{2}\rangle - \sqrt{2}\nu_1^* -\frac{3}{2}\rangle + \sqrt{3} -\frac{5}{2}\rangle)$
G	1	$\frac{7}{2}^-$	1	$\frac{1}{6\sqrt{6}}(9 \frac{7}{2}\rangle + i\sqrt{21} \frac{3}{2}\rangle - \sqrt{70}\nu_1^* \frac{1}{2}\rangle + \sqrt{35} -\frac{1}{2}\rangle + i\sqrt{7} -\frac{5}{2}\rangle$ $- \sqrt{2}\nu_1^* -\frac{7}{2}\rangle)$
G	1	$\frac{7}{2}^-$	2	$\frac{1}{2}(\sqrt{3} \frac{5}{2}\rangle - -\frac{3}{2}\rangle)$
G	1	$\frac{7}{2}^-$	3	$\frac{1}{6\sqrt{6}}(2\sqrt{15} \frac{3}{2}\rangle + \sqrt{2}\nu_1 \frac{1}{2}\rangle + 8i -\frac{1}{2}\rangle + 2\sqrt{5} -\frac{5}{2}\rangle - \sqrt{70}\nu_1 -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^-$	1	$\frac{1}{6\sqrt{6}}(-\sqrt{2}\nu_1^* \frac{7}{2}\rangle + \sqrt{7} \frac{5}{2}\rangle + i\sqrt{35} \frac{1}{2}\rangle - \sqrt{70}\nu_1^* -\frac{1}{2}\rangle + \sqrt{21} -\frac{3}{2}\rangle$ $+ 9i -\frac{7}{2}\rangle)$
G	2	$\frac{7}{2}^-$	2	$\frac{1}{2}(\frac{3}{2}\rangle - \sqrt{3} -\frac{5}{2}\rangle)$
G	2	$\frac{7}{2}^-$	3	$\frac{-i}{6\sqrt{6}}(\sqrt{70}\nu_1^* \frac{7}{2}\rangle + 2\sqrt{5} \frac{5}{2}\rangle - 8i \frac{1}{2}\rangle - \sqrt{2}\nu_1^* -\frac{1}{2}\rangle + 2\sqrt{15} -\frac{3}{2}\rangle)$

Table A24: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$. Only spin $J = 4$ is considered in this table.

Λ	λ	J^η	n	Basis vectors
A_1	1	4^+	1	$\frac{1}{2\sqrt{6}}(\sqrt{5} 4\rangle + \sqrt{14} 0\rangle + \sqrt{5} -4\rangle)$
A_1	1	4^+	2	$\frac{1}{2\sqrt{6}}(\sqrt{7} 3\rangle - 2\nu_1 2\rangle - i 1\rangle - -1\rangle + 2\nu_1 -2\rangle + i\sqrt{7} -3\rangle)$
A_1	1	4^-	1	$\frac{1}{4\sqrt{3}}(2\sqrt{2} 4\rangle + \sqrt{2}\nu_1 3\rangle + \sqrt{14}\nu_1^* 1\rangle + \sqrt{14}\nu_1 -1\rangle + \sqrt{2}\nu_1^* -3\rangle - 2\sqrt{2} -4\rangle)$
A_2	1	4^+	1	$\frac{1}{4\sqrt{3}}(2\sqrt{2} 4\rangle + \sqrt{2}\nu_1 3\rangle + \sqrt{14}\nu_1^* 1\rangle + \sqrt{14}\nu_1 -1\rangle + \sqrt{2}\nu_1^* -3\rangle - 2\sqrt{2} -4\rangle)$
A_2	1	4^-	1	$\frac{1}{2\sqrt{6}}(\sqrt{5} 4\rangle + \sqrt{14} 0\rangle + \sqrt{5} -4\rangle)$
A_2	1	4^-	2	$\frac{1}{2\sqrt{6}}(\sqrt{7} 3\rangle - 2\nu_1 2\rangle - i 1\rangle - -1\rangle + 2\nu_1 -2\rangle + i\sqrt{7} -3\rangle)$
E	1	4^+	1	$\frac{-1}{4\sqrt{6}}(-4\sqrt{2} 4\rangle + \sqrt{2}\nu_1 3\rangle + \sqrt{14}\nu_1^* 1\rangle + \sqrt{14}\nu_1 -1\rangle + \sqrt{2}\nu_1^* -3\rangle + 4\sqrt{2} -4\rangle)$
E	1	4^+	2	$\frac{1}{\sqrt{2}}(2\rangle + -2\rangle)$
E	1	4^+	3	$\frac{1}{4}(\sqrt{7} 3\rangle + i 1\rangle - -1\rangle - i\sqrt{7} -3\rangle)$
E	2	4^+	1	$\frac{-1}{4\sqrt{2}}(\sqrt{2}\nu_1^* 3\rangle + \sqrt{14}\nu_1 1\rangle + \sqrt{14}\nu_1^* -1\rangle + \sqrt{2}\nu_1 -3\rangle)$
E	2	4^+	2	$\frac{1}{2\sqrt{6}}(\sqrt{7} 4\rangle - \sqrt{10} 0\rangle + \sqrt{7} -4\rangle)$
E	2	4^+	3	$\frac{1}{4\sqrt{3}}(i\sqrt{7} 3\rangle - 4\nu_1^* 2\rangle + 1\rangle - i -1\rangle + 4\nu_1^* -2\rangle - \sqrt{7} -3\rangle)$
E	1	4^-	1	$\frac{1}{2\sqrt{6}}(\sqrt{7} 4\rangle - \sqrt{10} 0\rangle + \sqrt{7} -4\rangle)$
E	1	4^-	2	$\frac{1}{2\sqrt{30}}(5 3\rangle + 2\sqrt{7}\nu_1 2\rangle + i\sqrt{7} 1\rangle + \sqrt{7} -1\rangle - 2\sqrt{7}\nu_1 -2\rangle + 5i -3\rangle)$
E	1	4^-	3	$\frac{1}{\sqrt{10}}(- 2\rangle + 2\nu_1 1\rangle + 2\nu_1^* -1\rangle + -2\rangle)$
E	2	4^-	1	$\frac{-1}{\sqrt{2}}(2\rangle + -2\rangle)$
E	2	4^-	2	$\frac{1}{2\sqrt{10}}(2\nu_1 4\rangle + 3i 3\rangle - \sqrt{7} 1\rangle - i\sqrt{7} -1\rangle + 3 -3\rangle - 2\nu_1 -4\rangle)$
E	2	4^-	3	$\frac{-1}{2\sqrt{15}}(-\sqrt{14} 4\rangle + \sqrt{14}\nu_1 3\rangle + \sqrt{2}\nu_1^* 1\rangle + \sqrt{2}\nu_1 -1\rangle + \sqrt{14}\nu_1^* -3\rangle + \sqrt{14} -4\rangle)$

Table A25: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$, and $\nu_2 = \frac{1}{2\sqrt{3}}(2 - \sqrt{2} + i(2 + \sqrt{2}))$, and $\nu_3 = \frac{1}{\sqrt{3}}(\sqrt{2} + i)$. Only spin $J = \frac{9}{2}$ is considered in this table. (Continued in next table.)

Λ	λ	J^η	n	Basis vectors
F_1	1	$\frac{9}{2}^+$	1	$\frac{-1}{8\sqrt{15}}(-5\sqrt{6} \frac{9}{2}\rangle - \sqrt{6}\nu_1^* \frac{7}{2}\rangle + 6\sqrt{2}\nu_3^* \frac{5}{2}\rangle + 2\sqrt{42}\nu_2^* \frac{3}{2}\rangle$ $+ 2\sqrt{21} \frac{1}{2}\rangle - 2\sqrt{21}\nu_1^* -\frac{1}{2}\rangle + 2\sqrt{42}\nu_3^* -\frac{3}{2}\rangle + 6\sqrt{2}\nu_2^* -\frac{5}{2}\rangle$ $+\sqrt{6} -\frac{7}{2}\rangle + 5\sqrt{6}\nu_1^* -\frac{9}{2}\rangle)$
F_1	1	$\frac{9}{2}^+$	2	$\frac{1}{4\sqrt{15}}(2\sqrt{14} \frac{7}{2}\rangle + i\sqrt{42}\nu_2^* \frac{5}{2}\rangle - 3\sqrt{2}\nu_3^* \frac{3}{2}\rangle + 2\nu_1 \frac{1}{2}\rangle$ $- 2 -\frac{1}{2}\rangle - 3i\sqrt{2}\nu_2^* -\frac{3}{2}\rangle + \sqrt{42}\nu_3^* -\frac{5}{2}\rangle - 2\sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_1	1	$\frac{9}{2}^-$	1	$\frac{1}{8\sqrt{15}}(5\sqrt{6} \frac{9}{2}\rangle - \sqrt{6}\nu_1^* \frac{7}{2}\rangle + 6\sqrt{2}\nu_3 \frac{5}{2}\rangle + 2i\sqrt{42}\nu_2 \frac{3}{2}\rangle$ $- 2\sqrt{21} \frac{1}{2}\rangle - 2\sqrt{21}\nu_1^* -\frac{1}{2}\rangle + 2\sqrt{42}\nu_3 -\frac{3}{2}\rangle + 6i\sqrt{2}\nu_2 -\frac{5}{2}\rangle$ $-\sqrt{6} -\frac{7}{2}\rangle + 5\sqrt{6}\nu_1^* -\frac{9}{2}\rangle)$
F_1	1	$\frac{9}{2}^-$	2	$\frac{1}{4\sqrt{15}}(2\sqrt{14} \frac{7}{2}\rangle + \sqrt{42}\nu_2 \frac{5}{2}\rangle + 3\sqrt{2}\nu_3 \frac{3}{2}\rangle - 2\nu_1 \frac{1}{2}\rangle$ $- 2 -\frac{1}{2}\rangle - 3\sqrt{2}\nu_2 -\frac{3}{2}\rangle - \sqrt{42}\nu_3 -\frac{5}{2}\rangle + 2\sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_2	1	$\frac{9}{2}^+$	1	$\frac{1}{8\sqrt{15}}(5\sqrt{6} \frac{9}{2}\rangle - \sqrt{6}\nu_1^* \frac{7}{2}\rangle + 6\sqrt{2}\nu_3 \frac{5}{2}\rangle + 2i\sqrt{42}\nu_2 \frac{3}{2}\rangle$ $- 2\sqrt{21} \frac{1}{2}\rangle - 2\sqrt{21}\nu_1^* -\frac{1}{2}\rangle + 2\sqrt{42}\nu_3 -\frac{3}{2}\rangle + 6i\sqrt{2}\nu_2 -\frac{5}{2}\rangle$ $-\sqrt{6} -\frac{7}{2}\rangle + 5\sqrt{6}\nu_1^* -\frac{9}{2}\rangle)$
F_2	1	$\frac{9}{2}^+$	2	$\frac{1}{4\sqrt{15}}(2\sqrt{14} \frac{7}{2}\rangle + \sqrt{42}\nu_2 \frac{5}{2}\rangle + 3\sqrt{2}\nu_3 \frac{3}{2}\rangle - 2\nu_1 \frac{1}{2}\rangle$ $- 2 -\frac{1}{2}\rangle - 3\sqrt{2}\nu_2 -\frac{3}{2}\rangle - \sqrt{42}\nu_3 -\frac{5}{2}\rangle + 2\sqrt{14}\nu_1 -\frac{7}{2}\rangle)$
F_2	1	$\frac{9}{2}^-$	1	$\frac{-1}{8\sqrt{15}}(-5\sqrt{6} \frac{9}{2}\rangle - \sqrt{6}\nu_1^* \frac{7}{2}\rangle + 6\sqrt{2}\nu_3^* \frac{5}{2}\rangle + 2\sqrt{42}\nu_2^* \frac{3}{2}\rangle$ $+ 2\sqrt{21} \frac{1}{2}\rangle - 2\sqrt{21}\nu_1^* -\frac{1}{2}\rangle + 2\sqrt{42}\nu_3^* -\frac{3}{2}\rangle + 6\sqrt{2}\nu_2^* -\frac{5}{2}\rangle$ $+\sqrt{6} -\frac{7}{2}\rangle + 5\sqrt{6}\nu_1^* -\frac{9}{2}\rangle)$
F_2	1	$\frac{9}{2}^-$	2	$\frac{1}{4\sqrt{15}}(2\sqrt{14} \frac{7}{2}\rangle + i\sqrt{42}\nu_2^* \frac{5}{2}\rangle - 3\sqrt{2}\nu_3^* \frac{3}{2}\rangle + 2\nu_1 \frac{1}{2}\rangle$ $- 2 -\frac{1}{2}\rangle - 3i\sqrt{2}\nu_2^* -\frac{3}{2}\rangle + \sqrt{42}\nu_3^* -\frac{5}{2}\rangle - 2\sqrt{14}\nu_1 -\frac{7}{2}\rangle)$

Table A26: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$. Only spin $J = \frac{9}{2}$ is considered in this table. (Continued from previous table.)

Λ	λ	J^η	n	Basis vectors
G	1	$\frac{9}{2}^+$	1	$\frac{1}{2\sqrt{6}}(3 \frac{9}{2}\rangle + \sqrt{14} \frac{1}{2}\rangle + -\frac{7}{2}\rangle)$
G	1	$\frac{9}{2}^+$	2	$\frac{i}{4\sqrt{6}}(-5 \frac{7}{2}\rangle + 4\sqrt{2}\nu_1 \frac{5}{2}\rangle + \sqrt{14} -\frac{1}{2}\rangle - 4i -\frac{5}{2}\rangle - 3 -\frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^+$	3	$\frac{-1}{4\sqrt{6}}(\sqrt{21} \frac{7}{2}\rangle - 4i \frac{3}{2}\rangle + \sqrt{6} -\frac{1}{2}\rangle + 4\sqrt{2}\nu_1 -\frac{3}{2}\rangle - \sqrt{21} -\frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^+$	1	$\frac{1}{2\sqrt{6}}(\frac{7}{2}\rangle + \sqrt{14} -\frac{1}{2}\rangle + 3 -\frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^+$	2	$\frac{1}{4\sqrt{6}}(3 \frac{9}{2}\rangle - 4i \frac{5}{2}\rangle - \sqrt{14} \frac{1}{2}\rangle + 4\sqrt{2}\nu_1^* -\frac{5}{2}\rangle + 5 -\frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^+$	3	$\frac{i}{4\sqrt{6}}(\sqrt{21} \frac{9}{2}\rangle + 4\sqrt{2}\nu_1^* \frac{3}{2}\rangle - \sqrt{6} \frac{1}{2}\rangle - 4i -\frac{3}{2}\rangle - \sqrt{21} -\frac{7}{2}\rangle)$
G	1	$\frac{9}{2}^-$	1	$\frac{1}{16\sqrt{3}}(16 \frac{9}{2}\rangle + 3\sqrt{2}\nu_1 \frac{7}{2}\rangle + 2\sqrt{42}\nu_1^* \frac{3}{2}\rangle + 6\sqrt{7}\nu_1 -\frac{1}{2}\rangle + 6\sqrt{2}\nu_1^* -\frac{5}{2}\rangle + \sqrt{2}\nu_1 -\frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	2	$\frac{1}{16\sqrt{3}}(-7\sqrt{2}\nu_1 \frac{7}{2}\rangle - 2\sqrt{42}\nu_1^* \frac{3}{2}\rangle + 2\sqrt{7}\nu_1 -\frac{1}{2}\rangle + 10\sqrt{2}\nu_1^* -\frac{5}{2}\rangle + 16 -\frac{7}{2}\rangle + 3\sqrt{2}\nu_1 -\frac{9}{2}\rangle)$
G	1	$\frac{9}{2}^-$	3	$\frac{1}{8\sqrt{3}}(\sqrt{7} \frac{7}{2}\rangle + 2i\sqrt{3} \frac{3}{2}\rangle + 8\nu_1^* \frac{1}{2}\rangle + 3\sqrt{2} -\frac{1}{2}\rangle + 2i\sqrt{7} -\frac{5}{2}\rangle + 3\sqrt{7} -\frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^-$	1	$\frac{1}{16\sqrt{3}}(\sqrt{2}\nu_1^* \frac{9}{2}\rangle + 6\sqrt{2}\nu_1 \frac{5}{2}\rangle + 6\sqrt{7}\nu_1^* \frac{1}{2}\rangle + 2\sqrt{42}\nu_1 -\frac{3}{2}\rangle + 3\sqrt{2}\nu_1^* -\frac{7}{2}\rangle - 16 -\frac{9}{2}\rangle)$
G	2	$\frac{9}{2}^-$	2	$\frac{-1}{16\sqrt{3}}(-3\sqrt{2}\nu_1^* \frac{9}{2}\rangle + 16 \frac{7}{2}\rangle - 10\sqrt{2}\nu_1 \frac{5}{2}\rangle - 2\sqrt{7}\nu_1^* \frac{1}{2}\rangle + 2\sqrt{42}\nu_1 -\frac{3}{2}\rangle + 7\sqrt{2}\nu_1^* -\frac{7}{2}\rangle)$
G	2	$\frac{9}{2}^-$	3	$\frac{-i}{8\sqrt{3}}(3\sqrt{7} \frac{9}{2}\rangle - 2i\sqrt{7} \frac{5}{2}\rangle + 3\sqrt{2} \frac{1}{2}\rangle - 8\nu_1 -\frac{1}{2}\rangle - 2i\sqrt{3} -\frac{3}{2}\rangle + \sqrt{7} -\frac{7}{2}\rangle)$

Table A27: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$. Only spin $J = 5$ is considered in this table. (Continued in next table.)

Λ	λ	J^η	n	Basis vectors
A_1	1	5^+	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{15} 5\rangle + i\sqrt{3} 3\rangle - 4\nu_1^* 2\rangle + \sqrt{14} 1\rangle$ $+i\sqrt{14} -1\rangle - 4\nu_1^* -2\rangle + \sqrt{3} -3\rangle - i\sqrt{15} -5\rangle)$
A_1	1	5^-	1	$\frac{-1}{4\sqrt{102}}(-17 5\rangle + 2\sqrt{5}\nu_1 4\rangle + 3i\sqrt{5} 3\rangle - \sqrt{210} 1\rangle$ $+6\sqrt{14}\nu_1 0\rangle + i\sqrt{210} -1\rangle - 3\sqrt{5} -3\rangle + 2\sqrt{5}\nu_1 -4\rangle$ $+17i -5\rangle)$
A_1	1	5^-	2	$\frac{1}{2\sqrt{102}}(3\sqrt{7} 4\rangle - 4\sqrt{7}\nu_1 3\rangle - 2\sqrt{6}\nu_1^* 1\rangle - \sqrt{10} 0\rangle$ $+2\sqrt{6}\nu_1 -1\rangle + 4\sqrt{7}\nu_1^* -3\rangle + 3\sqrt{7} -4\rangle)$
A_2	1	5^+	1	$\frac{-1}{4\sqrt{102}}(-17 5\rangle + 2\sqrt{5}\nu_1 4\rangle + 3i\sqrt{5} 3\rangle - \sqrt{210} 1\rangle$ $+6\sqrt{14}\nu_1 0\rangle + i\sqrt{210} -1\rangle - 3\sqrt{5} -3\rangle + 2\sqrt{5}\nu_1 -4\rangle$ $+17i -5\rangle)$
A_2	1	5^+	2	$\frac{1}{2\sqrt{102}}(3\sqrt{7} 4\rangle - 4\sqrt{7}\nu_1 3\rangle - 2\sqrt{6}\nu_1^* 1\rangle - \sqrt{10} 0\rangle$ $+2\sqrt{6}\nu_1 -1\rangle + 4\sqrt{7}\nu_1^* -3\rangle + 3\sqrt{7} -4\rangle)$
A_2	1	5^-	1	$\frac{-1}{4\sqrt{6}}(-\sqrt{15} 5\rangle + i\sqrt{3} 3\rangle - 4\nu_1^* 2\rangle + \sqrt{14} 1\rangle$ $+i\sqrt{14} -1\rangle - 4\nu_1^* -2\rangle + \sqrt{3} -3\rangle - i\sqrt{15} -5\rangle)$
E	1	5^+	1	$\frac{1}{4\sqrt{186}}(31 5\rangle + 2\sqrt{5}\nu_1 4\rangle + 3i\sqrt{5} 3\rangle - \sqrt{210} 1\rangle$ $+6\sqrt{14}\nu_1 0\rangle + i\sqrt{210} -1\rangle - 3\sqrt{5} -3\rangle + 2\sqrt{5}\nu_1 -4\rangle$ $-31i -5\rangle)$
E	1	5^+	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
E	1	5^+	3	$\frac{1}{18\sqrt{62}}(81 4\rangle + 44\nu_1 3\rangle + 6\sqrt{42}\nu_1^* 1\rangle - \sqrt{70} 0\rangle$ $-6\sqrt{42}\nu_1 -1\rangle - 44\nu_1^* -3\rangle + 81 -4\rangle)$
E	1	5^+	4	$\frac{1}{9\sqrt{2}}(\sqrt{14} 3\rangle + 3i\sqrt{3} 1\rangle - 4\sqrt{5}\nu_1^* 0\rangle + 3\sqrt{3} -1\rangle$ $+i\sqrt{14} -3\rangle)$
E	2	5^+	1	$\frac{1}{4\sqrt{62}}(i 5\rangle - 3\sqrt{5} 3\rangle + 4\sqrt{15}\nu_1 2\rangle + i\sqrt{210} 1\rangle$ $-\sqrt{210} -1\rangle + 4\sqrt{15}\nu_1 -2\rangle + 3i\sqrt{5} -3\rangle - -5\rangle)$

Table A28: The basis vectors that block diagonalize the F, B, S, K matrices for cubic-diagonal total momentum (1,1,1). Each basis vector is labelled by an irreducible representation Λ of the little double group C_{3v}^D , the row λ (as defined in Ref. [2]), the spin J , and the occurrence number n of Λ in the subduction of J to the little group. In the last column, $|m_J\rangle$ abbreviates $|Jm_JLSa\rangle$ with parity $\eta = (-1)^L$. Note that $\nu_1 = \frac{1}{\sqrt{2}}(1+i)$. Only spin $J = 5$ is considered in this table. (Continued from previous table.)

Λ	λ	J^η	n	Basis vectors
E	2	5^+	2	$\frac{1}{\sqrt{2}}(4\rangle - -4\rangle)$
E	2	5^+	3	$\frac{1}{36\sqrt{31}}(5\sqrt{30}\nu_1 5\rangle + 49\sqrt{6}\nu_1^* 3\rangle - 10\sqrt{2} 2\rangle + 26\sqrt{7}\nu_1 1\rangle$ $- 26\sqrt{7}\nu_1^* -1\rangle - 10\sqrt{2} -2\rangle - 49\sqrt{6}\nu_1 -3\rangle - 5\sqrt{30}\nu_1^* -5\rangle)$
E	2	5^+	4	$\frac{-1}{18}(\sqrt{105} 5\rangle + i\sqrt{21} 3\rangle - 2\sqrt{7}\nu_1^* 2\rangle + 2\sqrt{2} 1\rangle$ $+ 2i\sqrt{2} -1\rangle - 2\sqrt{7}\nu_1^* -2\rangle + \sqrt{21} -3\rangle + i\sqrt{105} -5\rangle)$
E	1	5^-	1	$\frac{1}{4\sqrt{66}}(11\sqrt{3} 5\rangle + i\sqrt{15} 3\rangle - 4\sqrt{5}\nu_1^* 2\rangle + \sqrt{70} 1\rangle$ $+ i\sqrt{70} -1\rangle - 4\sqrt{5}\nu_1^* -2\rangle + \sqrt{15} -3\rangle + 11i\sqrt{3} -5\rangle)$
E	1	5^-	2	$\frac{1}{\sqrt{2}}(- 4\rangle + -4\rangle)$
E	1	5^-	3	$\frac{-1}{\sqrt{330}}(-5\sqrt{6} 3\rangle + 2\sqrt{2}\nu_1 2\rangle - i\sqrt{7} 1\rangle + \sqrt{7} -1\rangle$ $+ 2\sqrt{2}\nu_1 -2\rangle + 5i\sqrt{6} -3\rangle)$
E	1	5^-	4	$\frac{1}{\sqrt{30}}(\sqrt{7} 2\rangle + 2\sqrt{2}\nu_1 1\rangle - 2\sqrt{2}\nu_1^* -1\rangle + \sqrt{7} -2\rangle)$
E	2	5^-	1	$\frac{1}{4\sqrt{66}}(i 5\rangle - 2\sqrt{5}\nu_1^* 4\rangle + 3\sqrt{5} 3\rangle + i\sqrt{210} 1\rangle$ $- 6\sqrt{14}\nu_1^* 0\rangle + \sqrt{210} -1\rangle + 3i\sqrt{5} -3\rangle - 2\sqrt{5}\nu_1^* -4\rangle$ $+ -5\rangle)$
E	2	5^-	2	$\frac{1}{\sqrt{2}}(- 2\rangle + -2\rangle)$
E	2	5^-	3	$\frac{-1}{2\sqrt{330}}(-2\sqrt{10} 5\rangle + 13\sqrt{2}\nu_1 4\rangle + 8i\sqrt{2} 3\rangle + 2\sqrt{21} 1\rangle$ $- 2\sqrt{35}\nu_1 0\rangle - 2i\sqrt{21} -1\rangle - 8\sqrt{2} -3\rangle + 13\sqrt{2}\nu_1 -4\rangle$ $+ 2i\sqrt{10} -5\rangle)$
E	2	5^-	4	$\frac{-1}{4\sqrt{15}}(\sqrt{70}\nu_1^* 5\rangle + \sqrt{14} 4\rangle + \sqrt{14}\nu_1 3\rangle - 2\sqrt{3}\nu_1^* 1\rangle$ $+ 2\sqrt{5} 0\rangle + 2\sqrt{3}\nu_1 -1\rangle - \sqrt{14}\nu_1^* -3\rangle + \sqrt{14} -4\rangle$ $- \sqrt{70}\nu_1 -5\rangle)$

B Box matrix elements

In this section, the box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ are explicitly listed for $S = 0, \frac{1}{2}, 1, \frac{3}{2}$ and for all $L = 0, 1, \dots, L_{\max}$ for $L_{\max} = 6$ for total momenta zero and on-axis. For planar diagonal total momenta, only $S = 0, \frac{1}{2}$ are presented. These quantities depend on a only through \mathbf{s}_a and u_a .

We have obtained explicit expressions for all box matrix elements with $L \leq 6$, total spin $S \leq 2$, and total momentum $\mathbf{P} = (0, 0, 0), (0, 0, p)$, as well as all box matrix elements with $L \leq 6$, $S \leq \frac{3}{2}$, and $\mathbf{P} = (0, p, p), (p, p, p)$, with $p > 0$. Although not all of these results are presented here, they are implemented in the accompanying C++ software package.

Table B1: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{1g}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	0	1	0	0	1	R_{00}
0	0	1	4	4	1	$\frac{2\sqrt{21}}{7}R_{40}$
0	0	1	6	6	1	$-2\sqrt{2}R_{60}$
4	4	1	4	4	1	$R_{00} + \frac{108}{143}R_{40} + \frac{80\sqrt{13}}{143}R_{60} + \frac{560\sqrt{17}}{2431}R_{80}$
4	4	1	6	6	1	$-\frac{40\sqrt{546}}{1001}R_{40} + \frac{42\sqrt{42}}{187}R_{60} - \frac{224\sqrt{9282}}{46189}R_{80} - \frac{1008\sqrt{26}}{4199}R_{10,0}$
6	6	1	6	6	1	$R_{00} - \frac{126}{187}R_{40} - \frac{160\sqrt{13}}{3553}R_{60} + \frac{840\sqrt{17}}{3553}R_{80} - \frac{2016\sqrt{21}}{7429}R_{10,0}$ $+ \frac{30492}{37145}R_{12,0} - \frac{1848\sqrt{1001}}{37145}R_{12,4}$

Table B2: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{2g}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	6	6	1	$R_{00} + \frac{6}{17}R_{40} - \frac{160\sqrt{13}}{323}R_{60} - \frac{40\sqrt{17}}{323}R_{80} - \frac{2592\sqrt{21}}{7429}R_{10,0}$ $+ \frac{1980}{7429}R_{12,0} + \frac{264\sqrt{1001}}{7429}R_{12,4}$

Table B3: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{2u}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	3	3	1	$R_{00} - \frac{12}{11}R_{40} + \frac{80\sqrt{13}}{143}R_{60}$

Table B4: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = E_g$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} + \frac{6}{7}R_{40}$
2	2	1	4	4	1	$-\frac{40\sqrt{3}}{77}R_{40} - \frac{30\sqrt{39}}{143}R_{60}$
2	2	1	6	6	1	$\frac{30\sqrt{910}}{1001}R_{40} + \frac{4\sqrt{70}}{55}R_{60} + \frac{8\sqrt{15470}}{1105}R_{80}$
4	4	1	4	4	1	$R_{00} + \frac{108}{1001}R_{40} - \frac{64\sqrt{13}}{143}R_{60} + \frac{392\sqrt{17}}{2431}R_{80}$
4	4	1	6	6	1	$-\frac{8\sqrt{2730}}{1001}R_{40} - \frac{18\sqrt{210}}{187}R_{60} - \frac{128\sqrt{46410}}{46189}R_{80} - \frac{1512\sqrt{130}}{20995}R_{10,0}$
6	6	1	6	6	1	$R_{00} + \frac{114}{187}R_{40} + \frac{480\sqrt{13}}{3553}R_{60} + \frac{280\sqrt{17}}{3553}R_{80} + \frac{1152\sqrt{21}}{7429}R_{10,0}$ $+ \frac{30492}{37145}R_{12,0} + \frac{264\sqrt{1001}}{37145}R_{12,4}$

Table B5: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = E_u$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	1	$R_{00} - \frac{6}{13}R_{40} + \frac{32\sqrt{13}}{221}R_{60} - \frac{672\sqrt{17}}{4199}R_{80} + \frac{1152\sqrt{21}}{4199}R_{10,0}$

Table B6: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1g}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	4	1	$R_{00} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60} - \frac{448\sqrt{17}}{2431}R_{80}$
4	4	1	6	6	1	$-\frac{12\sqrt{65}}{143}R_{40} + \frac{42\sqrt{5}}{187}R_{60} + \frac{112\sqrt{1105}}{46189}R_{80} + \frac{576\sqrt{1365}}{20995}R_{10,0}$
6	6	1	6	6	1	$R_{00} - \frac{96}{187}R_{40} - \frac{80\sqrt{13}}{3553}R_{60} + \frac{120\sqrt{17}}{3553}R_{80} + \frac{624\sqrt{21}}{7429}R_{10,0}$ $-\frac{26136}{37145}R_{12,0} + \frac{1584\sqrt{1001}}{37145}R_{12,4}$

Table B7: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1u}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	1	1	1	R_{00}
1	1	1	3	3	1	$\frac{4\sqrt{21}}{21}R_{40}$
1	1	1	5	5	1	$\frac{20\sqrt{3927}}{1309}R_{40} + \frac{4\sqrt{51051}}{2431}R_{60}$
1	1	1	5	5	2	$-\frac{2\sqrt{2805}}{561}R_{40} + \frac{24\sqrt{36465}}{2431}R_{60}$
3	3	1	3	3	1	$R_{00} + \frac{6}{11}R_{40} + \frac{100\sqrt{13}}{429}R_{60}$
3	3	1	5	5	1	$\frac{60\sqrt{187}}{2431}R_{40} + \frac{42\sqrt{2431}}{2431}R_{60} + \frac{112\sqrt{11}}{429}R_{80}$
3	3	1	5	5	2	$\frac{12\sqrt{6545}}{1309}R_{40} - \frac{28\sqrt{85085}}{7293}R_{60}$
5	5	1	5	5	1	$R_{00} + \frac{132}{221}R_{40} + \frac{880\sqrt{13}}{3757}R_{60} + \frac{280\sqrt{17}}{3757}R_{80} + \frac{336\sqrt{21}}{3757}R_{10,0}$
5	5	1	5	5	2	$-\frac{24\sqrt{35}}{1547}R_{40} - \frac{120\sqrt{455}}{3757}R_{60} + \frac{2800\sqrt{595}}{214149}R_{80} + \frac{88704\sqrt{15}}{356915}R_{10,0}$
5	5	2	5	5	2	$R_{00} - \frac{132}{221}R_{40} + \frac{352\sqrt{13}}{11271}R_{60} + \frac{7056\sqrt{17}}{71383}R_{80} - \frac{12096\sqrt{21}}{71383}R_{10,0}$

Table B8: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2g}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} - \frac{4}{7}R_{40}$
2	2	1	4	4	1	$-\frac{20\sqrt{3}}{77}R_{40} + \frac{40\sqrt{39}}{143}R_{60}$
2	2	1	6	6	1	$\frac{20\sqrt{715}}{1001}R_{40} - \frac{12\sqrt{55}}{55}R_{60} - \frac{32\sqrt{12155}}{36465}R_{80}$
2	2	1	6	6	2	$\frac{190\sqrt{13}}{1001}R_{40} + \frac{8}{11}R_{60} - \frac{32\sqrt{221}}{663}R_{80}$
4	4	1	4	4	1	$R_{00} - \frac{54}{77}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$
4	4	1	6	6	1	$\frac{4\sqrt{2145}}{1001}R_{40} - \frac{2\sqrt{165}}{187}R_{60} - \frac{144\sqrt{36465}}{46189}R_{80} + \frac{384\sqrt{5005}}{20995}R_{10,0}$
4	4	1	6	6	2	$-\frac{60\sqrt{39}}{1001}R_{40} - \frac{124\sqrt{3}}{187}R_{60} + \frac{64\sqrt{663}}{4199}R_{80} + \frac{192\sqrt{91}}{4199}R_{10,0}$
6	6	1	6	6	1	$R_{00} - \frac{32}{119}R_{40} + \frac{80\sqrt{13}}{323}R_{60} - \frac{920\sqrt{17}}{6783}R_{80} - \frac{720\sqrt{21}}{52003}R_{10,0}$ $+ \frac{91608}{260015}R_{12,0} - \frac{5808\sqrt{1001}}{260015}R_{12,4}$
6	6	1	6	6	2	$\frac{40\sqrt{55}}{1309}R_{40} + \frac{120\sqrt{715}}{3553}R_{60} + \frac{80\sqrt{935}}{24871}R_{80} - \frac{4608\sqrt{1155}}{260015}R_{10,0}$ $- \frac{13728\sqrt{55}}{260015}R_{12,0} + \frac{6336\sqrt{455}}{260015}R_{12,4}$
6	6	2	6	6	2	$R_{00} + \frac{632}{1309}R_{40} - \frac{480\sqrt{13}}{3553}R_{60} + \frac{80\sqrt{17}}{6783}R_{80} + \frac{1728\sqrt{21}}{52003}R_{10,0}$ $- \frac{29040}{52003}R_{12,0} - \frac{1056\sqrt{1001}}{52003}R_{12,4}$

Table B9: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2u}$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	3	3	1	$R_{00} - \frac{2}{11}R_{40} - \frac{60\sqrt{13}}{143}R_{60}$
3	3	1	5	5	1	$-\frac{20\sqrt{11}}{143}R_{40} - \frac{14\sqrt{143}}{143}R_{60} + \frac{112\sqrt{187}}{2431}R_{80}$
5	5	1	5	5	1	$R_{00} + \frac{4}{13}R_{40} - \frac{80\sqrt{13}}{221}R_{60} - \frac{280\sqrt{17}}{4199}R_{80} - \frac{432\sqrt{21}}{4199}R_{10,0}$

Table B10: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1g}$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{1}{2}$	0	1	R_{00}
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	1	$-\frac{4\sqrt{21}}{21}R_{40}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	1	$\frac{2\sqrt{105}}{21}R_{40}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	1	$\frac{4\sqrt{39}}{13}R_{60}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{182}}{13}R_{60}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{6}{11}R_{40} + \frac{100\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{12\sqrt{5}}{143}R_{40} - \frac{56\sqrt{65}}{429}R_{60} - \frac{224\sqrt{85}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{300\sqrt{7}}{1001}R_{40} + \frac{14\sqrt{91}}{143}R_{60} - \frac{112\sqrt{119}}{7293}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{20\sqrt{6}}{429}R_{40} - \frac{126\sqrt{78}}{2431}R_{60} + \frac{112\sqrt{102}}{4199}R_{80} + \frac{96\sqrt{14}}{323}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{84}{143}R_{40} + \frac{128\sqrt{13}}{429}R_{60} + \frac{112\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{24\sqrt{35}}{1001}R_{40} - \frac{56\sqrt{455}}{2431}R_{60} + \frac{1568\sqrt{595}}{138567}R_{80} + \frac{6048\sqrt{15}}{20995}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{64\sqrt{30}}{429}R_{40} + \frac{126\sqrt{390}}{2431}R_{60} - \frac{448\sqrt{510}}{46189}R_{80} - \frac{528\sqrt{70}}{20995}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} - \frac{84}{143}R_{40} - \frac{80\sqrt{13}}{2431}R_{60} + \frac{5880\sqrt{17}}{46189}R_{80}$
						$-\frac{336\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{30\sqrt{42}}{2431}R_{40} + \frac{80\sqrt{546}}{46189}R_{60} - \frac{720\sqrt{714}}{46189}R_{80} + \frac{55440\sqrt{2}}{96577}R_{10,0}$
						$-\frac{4356\sqrt{42}}{37145}R_{12,0} + \frac{1848\sqrt{858}}{37145}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{1458}{2431}R_{40} - \frac{1600\sqrt{13}}{46189}R_{60} + \frac{600\sqrt{17}}{4199}R_{80}$
						$-\frac{10368\sqrt{21}}{96577}R_{10,0} + \frac{4356}{37145}R_{12,0} - \frac{264\sqrt{1001}}{37145}R_{12,4}$

Table B11: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1u}$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	R_{00}
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{4\sqrt{21}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{105}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{4\sqrt{39}}{13}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} + \frac{6}{11}R_{40} + \frac{100\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{12\sqrt{5}}{143}R_{40} - \frac{56\sqrt{65}}{429}R_{60} - \frac{224\sqrt{85}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{300\sqrt{7}}{1001}R_{40} + \frac{14\sqrt{91}}{143}R_{60} - \frac{112\sqrt{119}}{7293}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{84}{143}R_{40} + \frac{128\sqrt{13}}{429}R_{60} + \frac{112\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{24\sqrt{35}}{1001}R_{40} - \frac{56\sqrt{455}}{2431}R_{60} + \frac{1568\sqrt{595}}{138567}R_{80} + \frac{6048\sqrt{15}}{20995}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} - \frac{84}{143}R_{40} - \frac{80\sqrt{13}}{2431}R_{60} + \frac{5880\sqrt{17}}{46189}R_{80}$ $-\frac{336\sqrt{21}}{4199}R_{10,0}$

Table B12: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2g}$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} - \frac{4}{7}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{20\sqrt{3}}{77}R_{40} - \frac{40\sqrt{39}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$-\frac{40\sqrt{77}}{1001}R_{40} - \frac{4\sqrt{1001}}{143}R_{60} + \frac{32\sqrt{1309}}{2431}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{30\sqrt{310310}}{31031}R_{40} + \frac{4\sqrt{23870}}{1705}R_{60} - \frac{256\sqrt{5275270}}{1130415}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{710\sqrt{651}}{31031}R_{40} - \frac{72\sqrt{8463}}{4433}R_{60} - \frac{32\sqrt{11067}}{20553}R_{80}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} - \frac{54}{77}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{20\sqrt{231}}{1001}R_{40} - \frac{2\sqrt{3003}}{143}R_{60} + \frac{16\sqrt{3927}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{8\sqrt{930930}}{31031}R_{40} + \frac{18\sqrt{71610}}{5797}R_{60} - \frac{80\sqrt{15825810}}{1431859}R_{80} - \frac{1344\sqrt{44330}}{650845}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{300\sqrt{217}}{31031}R_{40} + \frac{348\sqrt{2821}}{75361}R_{60} + \frac{1152\sqrt{3689}}{130169}R_{80} - \frac{1344\sqrt{93}}{10013}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{4}{13}R_{40} - \frac{80\sqrt{13}}{221}R_{60} - \frac{280\sqrt{17}}{4199}R_{80}$ $-\frac{432\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{6\sqrt{4030}}{6851}R_{40} - \frac{280\sqrt{310}}{10013}R_{60} - \frac{400\sqrt{68510}}{390507}R_{80} - \frac{45936\sqrt{84630}}{14969435}R_{10,0}$ $+\frac{396\sqrt{4030}}{67735}R_{12,0} + \frac{1320\sqrt{23870}}{230299}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{700\sqrt{1023}}{75361}R_{40} - \frac{840\sqrt{13299}}{1431859}R_{60} - \frac{3680\sqrt{17391}}{4295577}R_{80} + \frac{38016\sqrt{2387}}{2993887}R_{10,0}$ $+\frac{2376\sqrt{1023}}{230299}R_{12,0} - \frac{1584\sqrt{8463}}{230299}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} + \frac{234}{527}R_{40} - \frac{160\sqrt{13}}{589}R_{60} - \frac{520\sqrt{17}}{10013}R_{80}$ $-\frac{2304\sqrt{21}}{13547}R_{10,0} - \frac{235356}{1151495}R_{12,0} + \frac{10296\sqrt{1001}}{1151495}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{126\sqrt{4290}}{75361}R_{40} + \frac{5880\sqrt{330}}{110143}R_{60} + \frac{1640\sqrt{72930}}{4295577}R_{80} - \frac{23328\sqrt{10010}}{14969435}R_{10,0}$ $-\frac{5676\sqrt{4290}}{1151495}R_{12,0} + \frac{5544\sqrt{210}}{1151495}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} - \frac{13932}{75361}R_{40} + \frac{359200\sqrt{13}}{1431859}R_{60} - \frac{16800\sqrt{17}}{130169}R_{80}$ $-\frac{169344\sqrt{21}}{2993887}R_{10,0} + \frac{60984}{230299}R_{12,0} - \frac{3696\sqrt{1001}}{230299}R_{12,4}$

Table B13: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2u}$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} - \frac{4}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$\frac{20\sqrt{3}}{77}R_{40} - \frac{40\sqrt{39}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{40\sqrt{77}}{1001}R_{40} - \frac{4\sqrt{1001}}{143}R_{60} + \frac{32\sqrt{1309}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} - \frac{54}{77}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{20\sqrt{231}}{1001}R_{40} - \frac{2\sqrt{3003}}{143}R_{60} + \frac{16\sqrt{3927}}{2431}R_{80}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{4}{13}R_{40} - \frac{80\sqrt{13}}{221}R_{60} - \frac{280\sqrt{17}}{4199}R_{80}$ $-\frac{432\sqrt{21}}{4199}R_{10,0}$

Table B14: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	R_{00}
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$\frac{2\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{30}}{21}R_{40}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{5}}{11}R_{40} + \frac{6\sqrt{65}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{105}}{231}R_{40} - \frac{6\sqrt{1365}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{42}}{77}R_{40} + \frac{2\sqrt{546}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{2\sqrt{105}}{77}R_{40} - \frac{4\sqrt{1365}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{8\sqrt{159159}}{3445}R_{60} + \frac{16\sqrt{208131}}{148665}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{9646}}{3445}R_{60} + \frac{32\sqrt{12614}}{4505}R_{80}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} + \frac{2}{7}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{12\sqrt{5}}{77}R_{40} - \frac{20\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{30}}{77}R_{40} - \frac{7\sqrt{390}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{6\sqrt{70}}{77}R_{40} + \frac{\sqrt{910}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{40\sqrt{7}}{1001}R_{40} + \frac{4\sqrt{91}}{143}R_{60} + \frac{16\sqrt{119}}{221}R_{80}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{2\sqrt{70}}{77}R_{40} + \frac{4\sqrt{910}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{150\sqrt{8162}}{53053}R_{40} - \frac{68\sqrt{106106}}{37895}R_{60} + \frac{1112\sqrt{138754}}{1932645}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{100\sqrt{1113}}{4081}R_{40} + \frac{188\sqrt{14469}}{37895}R_{60} + \frac{16\sqrt{18921}}{13515}R_{80}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{6}{77}R_{40} - \frac{80\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{120\sqrt{6}}{1001}R_{40} - \frac{14\sqrt{78}}{429}R_{60} + \frac{392\sqrt{102}}{7293}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{60\sqrt{14}}{1001}R_{40} - \frac{2\sqrt{182}}{33}R_{60} + \frac{56\sqrt{238}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{60\sqrt{35}}{1001}R_{40} - \frac{6\sqrt{455}}{143}R_{60} - \frac{64\sqrt{595}}{7293}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{90\sqrt{14}}{1001}R_{40} - \frac{2\sqrt{182}}{143}R_{60} - \frac{112\sqrt{238}}{7293}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{48\sqrt{40810}}{53053}R_{40} - \frac{90\sqrt{530530}}{128843}R_{60} + \frac{144\sqrt{693770}}{2448017}R_{80} - \frac{112\sqrt{17490}}{17119}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{236\sqrt{5565}}{159159}R_{40} - \frac{144\sqrt{72345}}{128843}R_{60} - \frac{16\sqrt{94605}}{13091}R_{80} - \frac{2688\sqrt{265}}{85595}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{9}{143}R_{40} - \frac{8\sqrt{13}}{143}R_{60} - \frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{75\sqrt{21}}{1001}R_{40} - \frac{16\sqrt{273}}{429}R_{60} + \frac{28\sqrt{357}}{7293}R_{80}$

Table B15: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{8\sqrt{210}}{1001}R_{40} - \frac{40\sqrt{2730}}{2431}R_{60} - \frac{280\sqrt{3570}}{138567}R_{80} - \frac{504\sqrt{10}}{20995}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{50\sqrt{21}}{1001}R_{40} + \frac{36\sqrt{273}}{2431}R_{60} - \frac{1568\sqrt{357}}{138567}R_{80} + \frac{4032}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{16\sqrt{61215}}{7579}R_{40} + \frac{12\sqrt{795795}}{128843}R_{60} + \frac{496\sqrt{1040655}}{2448017}R_{80} + \frac{3864\sqrt{2915}}{1112735}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{4\sqrt{3710}}{7579}R_{40} - \frac{3\sqrt{48230}}{128843}R_{60} - \frac{2880\sqrt{63070}}{2448017}R_{80} - \frac{12936\sqrt{1590}}{1112735}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} - \frac{51}{143}R_{40} - \frac{40\sqrt{13}}{429}R_{60} + \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{280\sqrt{170}}{10659}R_{80} - \frac{72\sqrt{210}}{1235}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{30}{143}R_{40} + \frac{28\sqrt{13}}{2431}R_{60} + \frac{13216\sqrt{17}}{138567}R_{80} - \frac{576\sqrt{21}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{336\sqrt{49555}}{188309}R_{80} + \frac{136\sqrt{61215}}{65455}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{4\sqrt{1590}}{429}R_{40} - \frac{21\sqrt{20670}}{2431}R_{60} - \frac{1120\sqrt{27030}}{2448017}R_{80} - \frac{264\sqrt{3710}}{222547}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{76}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} + \frac{1960\sqrt{17}}{46189}R_{80}$ $+ \frac{192\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{4\sqrt{10}}{143}R_{40} + \frac{140\sqrt{130}}{2431}R_{60} - \frac{280\sqrt{170}}{46189}R_{80} - \frac{528\sqrt{210}}{20995}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{750\sqrt{1166}}{128843}R_{40} - \frac{8120\sqrt{15158}}{2448017}R_{60} + \frac{80\sqrt{19822}}{138567}R_{80} + \frac{9072\sqrt{24486}}{5118581}R_{10,0}$ $+ \frac{13068\sqrt{1166}}{1968685}R_{12,0} - \frac{1320\sqrt{9646}}{393737}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{140\sqrt{159}}{128843}R_{40} + \frac{13720\sqrt{2067}}{2448017}R_{60} + \frac{320\sqrt{2703}}{138567}R_{80} + \frac{106128\sqrt{371}}{5118581}R_{10,0}$ $+ \frac{113256\sqrt{159}}{1968685}R_{12,0} + \frac{1584\sqrt{159159}}{1968685}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} - \frac{56}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} - \frac{3360\sqrt{17}}{46189}R_{80}$ $+ \frac{192\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{192\sqrt{2915}}{128843}R_{40} - \frac{2800\sqrt{37895}}{2448017}R_{60} + \frac{11120\sqrt{49555}}{7344051}R_{80} + \frac{1440\sqrt{61215}}{5118581}R_{10,0}$ $- \frac{20592\sqrt{2915}}{1968685}R_{12,0} + \frac{13728\sqrt{24115}}{1968685}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{196\sqrt{1590}}{128843}R_{40} - \frac{9660\sqrt{20670}}{2448017}R_{60} - \frac{1280\sqrt{27030}}{7344051}R_{80} + \frac{139392\sqrt{3710}}{25592905}R_{10,0}$ $+ \frac{8712\sqrt{1590}}{1968685}R_{12,0} - \frac{528\sqrt{1591590}}{1968685}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{4554}{11713}R_{40} + \frac{1760\sqrt{13}}{222547}R_{60} - \frac{6040\sqrt{17}}{222547}R_{80}$ $+ \frac{434880\sqrt{21}}{5118581}R_{10,0} - \frac{3036}{17119}R_{12,0} + \frac{24552\sqrt{1001}}{1968685}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{1890\sqrt{66}}{128843}R_{40} + \frac{45080\sqrt{858}}{2448017}R_{60} + \frac{12640\sqrt{1122}}{7344051}R_{80} - \frac{3024\sqrt{154}}{222547}R_{10,0}$ $+ \frac{22308\sqrt{66}}{1968685}R_{12,0} + \frac{264\sqrt{546}}{23161}R_{12,4}$

Table B16: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{72036}{128843}R_{40} + \frac{48480\sqrt{13}}{2448017}R_{60} + \frac{10280\sqrt{17}}{222547}R_{80}$ $+ \frac{419904\sqrt{21}}{5118581}R_{10,0} + \frac{34848}{393737}R_{12,0} - \frac{2112\sqrt{1001}}{393737}R_{12,4}$

Table B17: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	R_{00}
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{2\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{30}}{21}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{5}}{11}R_{40} + \frac{6\sqrt{65}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{105}}{231}R_{40} - \frac{6\sqrt{1365}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{10\sqrt{42}}{77}R_{40} + \frac{2\sqrt{546}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{2\sqrt{105}}{77}R_{40} - \frac{4\sqrt{1365}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} + \frac{2}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{12\sqrt{5}}{77}R_{40} - \frac{20\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{30}}{77}R_{40} - \frac{7\sqrt{390}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{6\sqrt{70}}{77}R_{40} + \frac{\sqrt{910}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{40\sqrt{7}}{1001}R_{40} + \frac{4\sqrt{91}}{143}R_{60} + \frac{16\sqrt{119}}{221}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{70}}{77}R_{40} + \frac{4\sqrt{910}}{143}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} + \frac{6}{77}R_{40} - \frac{80\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{120\sqrt{6}}{1001}R_{40} - \frac{14\sqrt{78}}{429}R_{60} + \frac{392\sqrt{102}}{7293}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{60\sqrt{14}}{1001}R_{40} - \frac{2\sqrt{182}}{33}R_{60} + \frac{56\sqrt{238}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{60\sqrt{35}}{1001}R_{40} - \frac{6\sqrt{455}}{143}R_{60} - \frac{64\sqrt{595}}{7293}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{90\sqrt{14}}{1001}R_{40} - \frac{2\sqrt{182}}{143}R_{60} - \frac{112\sqrt{238}}{7293}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{9}{143}R_{40} - \frac{8\sqrt{13}}{143}R_{60} - \frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{75\sqrt{21}}{1001}R_{40} - \frac{16\sqrt{273}}{429}R_{60} + \frac{28\sqrt{357}}{7293}R_{80}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{8\sqrt{210}}{1001}R_{40} - \frac{40\sqrt{2730}}{2431}R_{60} - \frac{280\sqrt{3570}}{138567}R_{80} - \frac{504\sqrt{10}}{20995}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$-\frac{50\sqrt{21}}{1001}R_{40} + \frac{36\sqrt{273}}{2431}R_{60} - \frac{1568\sqrt{357}}{138567}R_{80} + \frac{4032}{4199}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} - \frac{51}{143}R_{40} - \frac{40\sqrt{13}}{429}R_{60} + \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{280\sqrt{170}}{10659}R_{80} - \frac{72\sqrt{210}}{1235}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$-\frac{30}{143}R_{40} + \frac{28\sqrt{13}}{2431}R_{60} + \frac{13216\sqrt{17}}{138567}R_{80} - \frac{576\sqrt{21}}{4199}R_{10,0}$

Table B18: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{76}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} + \frac{1960\sqrt{17}}{46189}R_{80}$ $+ \frac{192\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{4\sqrt{10}}{143}R_{40} + \frac{140\sqrt{130}}{2431}R_{60} - \frac{280\sqrt{170}}{46189}R_{80} - \frac{528\sqrt{210}}{20995}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} - \frac{56}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} - \frac{3360\sqrt{17}}{46189}R_{80}$ $+ \frac{192\sqrt{21}}{4199}R_{10,0}$

Table B19: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{1g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	0	1	0	0	1	0
0	0	1	4	4	1	0
0	0	1	6	6	1	0
4	4	1	4	4	1	$R_{00} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60} - \frac{448\sqrt{17}}{2431}R_{80}$
4	4	1	6	6	1	$-\frac{12\sqrt{65}}{143}R_{40} + \frac{42\sqrt{5}}{187}R_{60} + \frac{112\sqrt{1105}}{46189}R_{80} + \frac{576\sqrt{1365}}{20995}R_{10,0}$
6	6	1	6	6	1	$R_{00} - \frac{96}{187}R_{40} - \frac{80\sqrt{13}}{3553}R_{60} + \frac{120\sqrt{17}}{3553}R_{80}$ $+ \frac{624\sqrt{21}}{7429}R_{10,0} - \frac{26136}{37145}R_{12,0} + \frac{1584\sqrt{1001}}{37145}R_{12,4}$

Table B20: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{1u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	1	1	0	1	1	R_{00}
0	1	1	4	3	1	$-\frac{4\sqrt{21}}{21}R_{40}$
0	1	1	4	5	1	$\frac{2\sqrt{105}}{21}R_{40}$
0	1	1	6	5	1	$\frac{4\sqrt{39}}{13}R_{60}$
4	3	1	4	3	1	$R_{00} + \frac{6}{11}R_{40} + \frac{100\sqrt{13}}{429}R_{60}$
4	3	1	4	5	1	$-\frac{12\sqrt{5}}{143}R_{40} - \frac{56\sqrt{65}}{429}R_{60} - \frac{224\sqrt{85}}{2431}R_{80}$
4	3	1	6	5	1	$-\frac{300\sqrt{7}}{1001}R_{40} + \frac{14\sqrt{91}}{143}R_{60} - \frac{112\sqrt{119}}{7293}R_{80}$
4	5	1	4	5	1	$R_{00} + \frac{84}{143}R_{40} + \frac{128\sqrt{13}}{429}R_{60} + \frac{112\sqrt{17}}{2431}R_{80}$
4	5	1	6	5	1	$\frac{24\sqrt{35}}{1001}R_{40} - \frac{56\sqrt{455}}{2431}R_{60} + \frac{1568\sqrt{595}}{138567}R_{80} + \frac{6048\sqrt{15}}{20995}R_{10,0}$
6	5	1	6	5	1	$R_{00} - \frac{84}{143}R_{40} - \frac{80\sqrt{13}}{2431}R_{60} + \frac{5880\sqrt{17}}{46189}R_{80}$ $-\frac{336\sqrt{21}}{4199}R_{10,0}$

Table B21: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{2g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	1	3	2	1	$R_{00} - \frac{4}{7}R_{40}$
3	2	1	3	4	1	$\frac{20\sqrt{3}}{77}R_{40} - \frac{40\sqrt{39}}{143}R_{60}$
3	2	1	6	6	1	$\frac{40\sqrt{143}}{1001}R_{40} + \frac{4\sqrt{11}}{11}R_{60} - \frac{32\sqrt{2431}}{2431}R_{80}$
3	2	1	7	6	1	$\frac{90\sqrt{65}}{1001}R_{40} - \frac{32\sqrt{5}}{55}R_{60} - \frac{32\sqrt{1105}}{3315}R_{80}$
3	4	1	3	4	1	$R_{00} - \frac{54}{77}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$
3	4	1	6	6	1	$\frac{20\sqrt{429}}{1001}R_{40} + \frac{2\sqrt{33}}{11}R_{60} - \frac{16\sqrt{7293}}{2431}R_{80}$
3	4	1	7	6	1	$-\frac{4\sqrt{195}}{1001}R_{40} + \frac{24\sqrt{15}}{187}R_{60} + \frac{32\sqrt{3315}}{4199}R_{80} - \frac{1344\sqrt{455}}{20995}R_{10,0}$
6	6	1	6	6	1	$R_{00} + \frac{32}{119}R_{40} - \frac{80\sqrt{13}}{323}R_{60} - \frac{40\sqrt{17}}{2261}R_{80}$ $+ \frac{5616\sqrt{21}}{52003}R_{10,0} - \frac{11880}{52003}R_{12,0} - \frac{1584\sqrt{1001}}{52003}R_{12,4}$
6	6	1	7	6	1	$\frac{72\sqrt{55}}{1309}R_{40} + \frac{40\sqrt{715}}{3553}R_{60} + \frac{640\sqrt{935}}{74613}R_{80} - \frac{3168\sqrt{1155}}{260015}R_{10,0}$ $- \frac{20592\sqrt{55}}{260015}R_{12,0} + \frac{1056\sqrt{455}}{52003}R_{12,4}$
7	6	1	7	6	1	$R_{00} - \frac{72}{1309}R_{40} + \frac{1280\sqrt{13}}{3553}R_{60} - \frac{240\sqrt{17}}{2261}R_{80}$ $- \frac{4608\sqrt{21}}{52003}R_{10,0} + \frac{5808}{260015}R_{12,0} - \frac{3168\sqrt{1001}}{260015}R_{12,4}$

Table B22: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = A_{2u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	3	3	1	$R_{00} - \frac{2}{11}R_{40} - \frac{60\sqrt{13}}{143}R_{60}$
3	3	1	6	5	1	$\frac{20\sqrt{11}}{143}R_{40} + \frac{14\sqrt{143}}{143}R_{60} - \frac{112\sqrt{187}}{2431}R_{80}$
6	5	1	6	5	1	$R_{00} + \frac{4}{13}R_{40} - \frac{80\sqrt{13}}{221}R_{60} - \frac{280\sqrt{17}}{4199}R_{80}$ $- \frac{432\sqrt{21}}{4199}R_{10,0}$

Table B23: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = E_g$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} - \frac{4}{7}R_{40}$
2	2	1	4	4	1	$-\frac{6\sqrt{10}}{77}R_{40} + \frac{12\sqrt{130}}{143}R_{60}$
2	2	1	5	4	1	$-\frac{2\sqrt{210}}{77}R_{40} + \frac{4\sqrt{2730}}{143}R_{60}$
2	2	1	5	6	1	$-\frac{10\sqrt{7}}{77}R_{40} + \frac{20\sqrt{91}}{143}R_{60}$
2	2	1	6	6	1	$\frac{10\sqrt{130}}{143}R_{40} + \frac{2\sqrt{10}}{55}R_{60} - \frac{16\sqrt{2210}}{1105}R_{80}$
2	2	1	7	6	1	$\frac{2\sqrt{1430}}{65}R_{60} - \frac{16\sqrt{1870}}{2805}R_{80}$
4	4	1	4	4	1	$R_{00} + \frac{54}{1001}R_{40} + \frac{16\sqrt{13}}{715}R_{60} - \frac{1568\sqrt{17}}{12155}R_{80}$
4	4	1	5	4	1	$-\frac{108\sqrt{21}}{1001}R_{40} + \frac{12\sqrt{273}}{715}R_{60} + \frac{224\sqrt{357}}{12155}R_{80}$
4	4	1	5	6	1	$-\frac{54\sqrt{70}}{1001}R_{40} + \frac{6\sqrt{910}}{715}R_{60} + \frac{112\sqrt{1190}}{12155}R_{80}$
4	4	1	6	6	1	$-\frac{12\sqrt{13}}{143}R_{40} - \frac{90}{187}R_{60} + \frac{320\sqrt{221}}{46189}R_{80} + \frac{864\sqrt{273}}{20995}R_{10,0}$
4	4	1	7	6	1	$\frac{12\sqrt{11}}{143}R_{40} - \frac{108\sqrt{143}}{2431}R_{60} + \frac{720\sqrt{187}}{46189}R_{80} - \frac{96\sqrt{231}}{1615}R_{10,0}$
5	4	1	5	4	1	$R_{00} - \frac{54}{143}R_{40} + \frac{64\sqrt{13}}{715}R_{60} - \frac{672\sqrt{17}}{12155}R_{80}$
5	4	1	5	6	1	$\frac{2\sqrt{30}}{143}R_{40} - \frac{112\sqrt{390}}{12155}R_{60} + \frac{4032\sqrt{510}}{230945}R_{80} - \frac{576\sqrt{70}}{4199}R_{10,0}$
5	4	1	6	6	1	$-\frac{8\sqrt{273}}{1001}R_{40} - \frac{40\sqrt{21}}{187}R_{60} + \frac{80\sqrt{4641}}{46189}R_{80} + \frac{3168\sqrt{13}}{20995}R_{10,0}$
5	4	1	7	6	1	$-\frac{32\sqrt{231}}{1001}R_{40} - \frac{6\sqrt{3003}}{2431}R_{60} + \frac{320\sqrt{3927}}{46189}R_{80} - \frac{96\sqrt{11}}{20995}R_{10,0}$
5	6	1	5	6	1	$R_{00} - \frac{56}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} - \frac{3360\sqrt{17}}{46189}R_{80}$ $+ \frac{192\sqrt{21}}{4199}R_{10,0}$
5	6	1	6	6	1	$-\frac{4\sqrt{910}}{1001}R_{40} - \frac{20\sqrt{70}}{187}R_{60} + \frac{40\sqrt{15470}}{46189}R_{80} + \frac{528\sqrt{390}}{20995}R_{10,0}$
5	6	1	7	6	1	$\frac{36\sqrt{770}}{17017}R_{40} + \frac{20\sqrt{10010}}{46189}R_{60} - \frac{400\sqrt{13090}}{138567}R_{80} + \frac{864\sqrt{330}}{482885}R_{10,0}$ $+ \frac{792\sqrt{770}}{37145}R_{12,0} - \frac{3696\sqrt{130}}{37145}R_{12,4}$
6	6	1	6	6	1	$R_{00} + \frac{608}{1309}R_{40} + \frac{240\sqrt{13}}{3553}R_{60} + \frac{40\sqrt{17}}{3553}R_{80}$ $-\frac{2496\sqrt{21}}{52003}R_{10,0} - \frac{26136}{37145}R_{12,0} - \frac{1584\sqrt{1001}}{260015}R_{12,4}$
6	6	1	7	6	1	$\frac{360\sqrt{143}}{17017}R_{40} - \frac{40\sqrt{11}}{209}R_{60} + \frac{160\sqrt{2431}}{138567}R_{80} + \frac{144\sqrt{3003}}{39767}R_{10,0}$ $-\frac{54912\sqrt{7}}{260015}R_{12,4}$
7	6	1	7	6	1	$R_{00} - \frac{576}{1547}R_{40} - \frac{320\sqrt{13}}{4199}R_{60} - \frac{120\sqrt{17}}{4199}R_{80}$ $+ \frac{71424\sqrt{21}}{676039}R_{10,0} - \frac{7656}{37145}R_{12,0} + \frac{1584\sqrt{1001}}{260015}R_{12,4}$

Table B24: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = E_u$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	2	1	1	R_{00}
2	1	1	2	3	1	$-\frac{2\sqrt{6}}{7}R_{40}$
2	1	1	4	3	1	$-\frac{2\sqrt{30}}{21}R_{40}$
2	1	1	4	5	1	$\frac{4\sqrt{6}}{33}R_{40} + \frac{18\sqrt{78}}{143}R_{60}$
2	1	1	5	5	1	$-\frac{2\sqrt{231}}{77}R_{40} + \frac{4\sqrt{3003}}{143}R_{60}$
2	1	1	6	5	1	$\frac{10\sqrt{42}}{77}R_{40} + \frac{2\sqrt{546}}{143}R_{60}$
2	3	1	2	3	1	$R_{00} + \frac{2}{7}R_{40}$
2	3	1	4	3	1	$\frac{12\sqrt{5}}{77}R_{40} + \frac{20\sqrt{65}}{143}R_{60}$
2	3	1	4	5	1	$-\frac{48}{77}R_{40} - \frac{14\sqrt{13}}{143}R_{60}$
2	3	1	5	5	1	$-\frac{2\sqrt{154}}{77}R_{40} + \frac{4\sqrt{2002}}{143}R_{60}$
2	3	1	6	5	1	$-\frac{40\sqrt{7}}{1001}R_{40} - \frac{4\sqrt{91}}{143}R_{60} - \frac{16\sqrt{119}}{221}R_{80}$
4	3	1	4	3	1	$R_{00} + \frac{6}{77}R_{40} - \frac{80\sqrt{13}}{429}R_{60}$
4	3	1	4	5	1	$-\frac{12\sqrt{5}}{1001}R_{40} + \frac{224\sqrt{65}}{2145}R_{60} - \frac{784\sqrt{85}}{12155}R_{80}$
4	3	1	5	5	1	$-\frac{18\sqrt{770}}{1001}R_{40} + \frac{2\sqrt{10010}}{715}R_{60} + \frac{112\sqrt{13090}}{36465}R_{80}$
4	3	1	6	5	1	$-\frac{60\sqrt{35}}{1001}R_{40} - \frac{6\sqrt{455}}{143}R_{60} - \frac{64\sqrt{595}}{7293}R_{80}$
4	5	1	4	5	1	$R_{00} + \frac{12}{143}R_{40} - \frac{512\sqrt{13}}{2145}R_{60} + \frac{392\sqrt{17}}{12155}R_{80}$
4	5	1	5	5	1	$-\frac{36\sqrt{154}}{1001}R_{40} + \frac{4\sqrt{2002}}{715}R_{60} + \frac{224\sqrt{2618}}{36465}R_{80}$
4	5	1	6	5	1	$\frac{24\sqrt{7}}{1001}R_{40} + \frac{120\sqrt{91}}{2431}R_{60} + \frac{4480\sqrt{119}}{138567}R_{80} + \frac{9072\sqrt{3}}{20995}R_{10,0}$
5	5	1	5	5	1	$R_{00} - \frac{4}{13}R_{40} + \frac{48\sqrt{13}}{1105}R_{60} + \frac{672\sqrt{17}}{20995}R_{80}$ $-\frac{960\sqrt{21}}{4199}R_{10,0}$
5	5	1	6	5	1	$-\frac{4\sqrt{22}}{143}R_{40} - \frac{140\sqrt{286}}{2431}R_{60} + \frac{280\sqrt{374}}{46189}R_{80} + \frac{528\sqrt{462}}{20995}R_{10,0}$
6	5	1	6	5	1	$R_{00} + \frac{76}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60} + \frac{1960\sqrt{17}}{46189}R_{80}$ $+\frac{192\sqrt{21}}{4199}R_{10,0}$

Table B25: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	0	1	1	0	1	R_{00}
1	0	1	1	2	1	0
1	0	1	3	2	1	0
1	0	1	3	4	1	$-\frac{2}{3}R_{40}$
1	0	1	4	4	1	$-\frac{2\sqrt{7}}{7}R_{40}$
1	0	1	5	4	1	$\frac{4\sqrt{595}}{119}R_{40}$
1	0	1	5	4	2	$-\frac{2\sqrt{17}}{51}R_{40}$
1	0	1	5	6	1	$-\frac{2\sqrt{9282}}{663}R_{60}$
1	0	1	5	6	2	$-\frac{4\sqrt{6630}}{221}R_{60}$
1	0	1	6	6	1	$\frac{2\sqrt{6}}{3}R_{60}$
1	0	1	7	6	1	0
1	0	1	7	6	2	$\frac{2\sqrt{130}}{13}R_{60}$
1	2	1	1	2	1	R_{00}
1	2	1	3	2	1	$-\frac{2\sqrt{6}}{7}R_{40}$
1	2	1	3	4	1	$\frac{5\sqrt{2}}{21}R_{40}$
1	2	1	4	4	1	$-\frac{\sqrt{14}}{7}R_{40}$
1	2	1	5	4	1	$-\frac{8\sqrt{1190}}{1309}R_{40} - \frac{6\sqrt{15470}}{2431}R_{60}$
1	2	1	5	4	2	$\frac{4\sqrt{34}}{561}R_{40} - \frac{180\sqrt{442}}{2431}R_{60}$
1	2	1	5	6	1	$\frac{60\sqrt{357}}{1309}R_{40} + \frac{14\sqrt{4641}}{7293}R_{60}$
1	2	1	5	6	2	$-\frac{2\sqrt{255}}{187}R_{40} + \frac{28\sqrt{3315}}{2431}R_{60}$
1	2	1	6	6	1	$\frac{2\sqrt{3}}{3}R_{60}$
1	2	1	7	6	1	$-\frac{16\sqrt{19635}}{2805}R_{80}$
1	2	1	7	6	2	$-\frac{4\sqrt{65}}{65}R_{60}$
3	2	1	3	2	1	$R_{00} + \frac{2}{7}R_{40}$
3	2	1	3	4	1	$-\frac{10\sqrt{3}}{77}R_{40} - \frac{50\sqrt{39}}{429}R_{60}$
3	2	1	4	4	1	$\frac{6\sqrt{21}}{77}R_{40} + \frac{10\sqrt{273}}{143}R_{60}$

Table B26: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	1	5	4	1	$\frac{8\sqrt{1785}}{1309}R_{40} + \frac{6\sqrt{23205}}{2431}R_{60}$
3	2	1	5	4	2	$\frac{104\sqrt{51}}{1309}R_{40} - \frac{140\sqrt{663}}{7293}R_{60}$
3	2	1	5	6	1	$-\frac{10\sqrt{238}}{2431}R_{40} - \frac{18\sqrt{3094}}{2431}R_{60} - \frac{8\sqrt{14}}{39}R_{80}$
3	2	1	5	6	2	$-\frac{2\sqrt{170}}{187}R_{40} + \frac{28\sqrt{2210}}{2431}R_{60}$
3	2	1	6	6	1	$-\frac{50\sqrt{26}}{1001}R_{40} + \frac{6\sqrt{2}}{11}R_{60} - \frac{8\sqrt{442}}{663}R_{80}$
3	2	1	7	6	1	$\frac{30\sqrt{770}}{1001}R_{40} + \frac{4\sqrt{10010}}{715}R_{60} + \frac{56\sqrt{13090}}{36465}R_{80}$
3	2	1	7	6	2	$\frac{20\sqrt{30}}{1001}R_{40} - \frac{12\sqrt{390}}{715}R_{60} + \frac{16\sqrt{510}}{3315}R_{80}$
3	4	1	3	4	1	$R_{00} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
3	4	1	4	4	1	$\frac{9\sqrt{7}}{77}R_{40} + \frac{15\sqrt{91}}{143}R_{60}$
3	4	1	5	4	1	$-\frac{54\sqrt{595}}{17017}R_{40} - \frac{12\sqrt{7735}}{2431}R_{60} - \frac{56\sqrt{35}}{429}R_{80}$
3	4	1	5	4	2	$-\frac{54\sqrt{17}}{1309}R_{40} + \frac{280\sqrt{221}}{7293}R_{60}$
3	4	1	5	6	1	$\frac{25\sqrt{714}}{2431}R_{40} + \frac{12\sqrt{9282}}{2431}R_{60} + \frac{4\sqrt{42}}{143}R_{80}$
3	4	1	5	6	2	$\frac{5\sqrt{510}}{187}R_{40} - \frac{56\sqrt{6630}}{7293}R_{60}$
3	4	1	6	6	1	$-\frac{25\sqrt{78}}{1001}R_{40} + \frac{3\sqrt{6}}{11}R_{60} - \frac{4\sqrt{1326}}{663}R_{80}$
3	4	1	7	6	1	$-\frac{4\sqrt{2310}}{3003}R_{40} - \frac{3\sqrt{30030}}{2431}R_{60} - \frac{56\sqrt{39270}}{46189}R_{80} - \frac{56\sqrt{110}}{1615}R_{10,0}$
3	4	1	7	6	2	$-\frac{8\sqrt{10}}{3003}R_{40} + \frac{27\sqrt{130}}{2431}R_{60} - \frac{48\sqrt{170}}{4199}R_{80} - \frac{112\sqrt{210}}{1615}R_{10,0}$
4	4	1	4	4	1	$R_{00} + \frac{27}{143}R_{40} + \frac{\sqrt{13}}{715}R_{60} + \frac{1792\sqrt{17}}{12155}R_{80}$
4	4	1	5	4	1	$-\frac{54\sqrt{85}}{2431}R_{40} - \frac{84\sqrt{1105}}{2431}R_{60} - \frac{280\sqrt{5}}{2431}R_{80}$
4	4	1	5	4	2	$\frac{522\sqrt{119}}{17017}R_{40} - \frac{168\sqrt{1547}}{12155}R_{60} + \frac{1344\sqrt{7}}{12155}R_{80}$
4	4	1	5	6	1	$-\frac{45\sqrt{102}}{2431}R_{40} - \frac{70\sqrt{1326}}{2431}R_{60} - \frac{700\sqrt{6}}{7293}R_{80}$
4	4	1	5	6	2	$\frac{87\sqrt{3570}}{17017}R_{40} - \frac{28\sqrt{46410}}{12155}R_{60} + \frac{224\sqrt{210}}{12155}R_{80}$
4	4	1	6	6	1	$-\frac{3\sqrt{546}}{143}R_{40} + \frac{5\sqrt{42}}{187}R_{60} - \frac{20\sqrt{9282}}{138567}R_{80} - \frac{3456\sqrt{26}}{20995}R_{10,0}$
4	4	1	7	6	1	$\frac{4\sqrt{330}}{715}R_{40} + \frac{63\sqrt{4290}}{12155}R_{60} + \frac{1176\sqrt{5610}}{230945}R_{80} + \frac{168\sqrt{770}}{8075}R_{10,0}$
4	4	1	7	6	2	$-\frac{16\sqrt{70}}{715}R_{40} + \frac{243\sqrt{910}}{12155}R_{60} - \frac{144\sqrt{1190}}{20995}R_{80} - \frac{528\sqrt{30}}{8075}R_{10,0}$
5	4	1	5	4	1	$R_{00} + \frac{108}{221}R_{40} + \frac{32\sqrt{13}}{221}R_{60} + \frac{1064\sqrt{17}}{41327}R_{80}$
5	4	1	5	4	2	$-\frac{216\sqrt{35}}{17017}R_{40} - \frac{48\sqrt{455}}{2431}R_{60} + \frac{560\sqrt{595}}{123981}R_{80}$

Table B27: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	1	5	6	1	$-\frac{4\sqrt{30}}{221}R_{40} - \frac{56\sqrt{390}}{3757}R_{60} - \frac{336\sqrt{510}}{41327}R_{80} - \frac{168\sqrt{70}}{3757}R_{10,0}$
5	4	1	5	6	2	$\frac{40\sqrt{42}}{17017}R_{40} + \frac{420\sqrt{546}}{41327}R_{60} - \frac{5600\sqrt{714}}{785213}R_{80} - \frac{44352\sqrt{2}}{71383}R_{10,0}$
5	4	1	6	6	1	$\frac{20\sqrt{46410}}{17017}R_{40} - \frac{32\sqrt{3570}}{3179}R_{60} + \frac{112\sqrt{2730}}{46189}R_{80} + \frac{264\sqrt{2210}}{27455}R_{10,0}$
5	4	1	7	6	1	$\frac{8\sqrt{1122}}{2431}R_{40} + \frac{126\sqrt{14586}}{41327}R_{60} + \frac{896\sqrt{66}}{46189}R_{80} + \frac{1512\sqrt{2618}}{356915}R_{10,0}$
5	4	1	7	6	2	$\frac{776\sqrt{238}}{17017}R_{40} - \frac{564\sqrt{3094}}{41327}R_{60} + \frac{2016\sqrt{14}}{46189}R_{80} + \frac{528\sqrt{102}}{356915}R_{10,0}$
5	4	2	5	4	2	$R_{00} - \frac{108}{221}R_{40} + \frac{64\sqrt{13}}{3315}R_{60} + \frac{7056\sqrt{17}}{206635}R_{80}$
5	4	2	5	6	1	$\frac{40\sqrt{42}}{17017}R_{40} + \frac{420\sqrt{546}}{41327}R_{60} - \frac{5600\sqrt{714}}{785213}R_{80} - \frac{44352\sqrt{2}}{71383}R_{10,0}$
5	4	2	5	6	2	$\frac{4\sqrt{30}}{221}R_{40} - \frac{112\sqrt{390}}{56355}R_{60} - \frac{42336\sqrt{510}}{3926065}R_{80} + \frac{6048\sqrt{70}}{71383}R_{10,0}$
5	4	2	6	6	1	$\frac{8\sqrt{1326}}{2431}R_{40} + \frac{60\sqrt{102}}{3179}R_{60} - \frac{8960\sqrt{78}}{138567}R_{80} + \frac{3168\sqrt{3094}}{356915}R_{10,0}$
5	4	2	7	6	1	$\frac{64\sqrt{39270}}{36465}R_{40} + \frac{336\sqrt{510510}}{206635}R_{60} + \frac{32\sqrt{2310}}{230945}R_{80} - \frac{4144\sqrt{1870}}{1784575}R_{10,0}$
5	4	2	7	6	2	$-\frac{592\sqrt{170}}{36465}R_{40} + \frac{522\sqrt{2210}}{206635}R_{60} + \frac{1344\sqrt{10}}{20995}R_{80} - \frac{7568\sqrt{3570}}{1784575}R_{10,0}$
5	6	1	5	6	1	$R_{00} + \frac{112}{221}R_{40} + \frac{600\sqrt{13}}{3757}R_{60} + \frac{1400\sqrt{17}}{41327}R_{80}$ $+ \frac{56\sqrt{21}}{3757}R_{10,0}$
5	6	1	5	6	2	$-\frac{32\sqrt{35}}{2431}R_{40} - \frac{900\sqrt{455}}{41327}R_{60} + \frac{14000\sqrt{595}}{2355639}R_{80} + \frac{14784\sqrt{15}}{356915}R_{10,0}$
5	6	1	6	6	1	$\frac{100\sqrt{1547}}{17017}R_{40} - \frac{160\sqrt{119}}{3179}R_{60} + \frac{560\sqrt{91}}{46189}R_{80} + \frac{88\sqrt{663}}{5491}R_{10,0}$
5	6	1	7	6	1	$-\frac{18\sqrt{935}}{41327}R_{40} - \frac{840\sqrt{12155}}{785213}R_{60} - \frac{2240\sqrt{55}}{138567}R_{80} - \frac{27216\sqrt{19635}}{8209045}R_{10,0}$ $-\frac{76692\sqrt{935}}{3157325}R_{12,0} - \frac{8712\sqrt{7735}}{3157325}R_{12,4}$
5	6	1	7	6	2	$-\frac{582\sqrt{1785}}{289289}R_{40} + \frac{3760\sqrt{23205}}{2355639}R_{60} - \frac{560\sqrt{105}}{46189}R_{80} - \frac{28512\sqrt{85}}{8209045}R_{10,0}$ $-\frac{10164\sqrt{1785}}{3157325}R_{12,0} + \frac{4312\sqrt{36465}}{3157325}R_{12,4}$
5	6	2	5	6	2	$R_{00} - \frac{112}{221}R_{40} + \frac{80\sqrt{13}}{3757}R_{60} + \frac{35280\sqrt{17}}{785213}R_{80}$ $-\frac{2016\sqrt{21}}{71383}R_{10,0}$
5	6	2	6	6	1	$\frac{8\sqrt{1105}}{2431}R_{40} + \frac{60\sqrt{85}}{3179}R_{60} - \frac{8960\sqrt{65}}{138567}R_{80} + \frac{1056\sqrt{23205}}{356915}R_{10,0}$
5	6	2	7	6	1	$-\frac{48\sqrt{1309}}{41327}R_{40} - \frac{2240\sqrt{17017}}{785213}R_{60} - \frac{80\sqrt{77}}{138567}R_{80} + \frac{74592\sqrt{561}}{8209045}R_{10,0}$ $+\frac{1584\sqrt{1309}}{631465}R_{12,0} - \frac{7392\sqrt{221}}{631465}R_{12,4}$
5	6	2	7	6	2	$\frac{148\sqrt{51}}{41327}R_{40} - \frac{1160\sqrt{663}}{785213}R_{60} - \frac{1120\sqrt{3}}{12597}R_{80} + \frac{408672\sqrt{119}}{8209045}R_{10,0}$ $-\frac{60984\sqrt{51}}{631465}R_{12,0} + \frac{3696\sqrt{51051}}{631465}R_{12,4}$

Table B28: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	6	6	1	$R_{00} - \frac{512}{1309}R_{40} - \frac{40\sqrt{13}}{3553}R_{60} + \frac{120\sqrt{17}}{24871}R_{80}$ $- \frac{1352\sqrt{21}}{52003}R_{10,0} + \frac{156816}{260015}R_{12,0} - \frac{9504\sqrt{1001}}{260015}R_{12,4}$
6	6	1	7	6	1	$- \frac{18\sqrt{5005}}{17017}R_{40} - \frac{120\sqrt{385}}{3553}R_{60} - \frac{160\sqrt{85085}}{969969}R_{80} + \frac{432\sqrt{2145}}{96577}R_{10,0}$ $- \frac{1716\sqrt{5005}}{1300075}R_{12,0} - \frac{30888\sqrt{5}}{185725}R_{12,4}$
6	6	1	7	6	2	$- \frac{162\sqrt{195}}{17017}R_{40} - \frac{160\sqrt{15}}{10659}R_{60} + \frac{240\sqrt{3315}}{29393}R_{80} - \frac{19008\sqrt{455}}{676039}R_{10,0}$ $+ \frac{18876\sqrt{195}}{1300075}R_{12,0} - \frac{14872\sqrt{1155}}{1300075}R_{12,4}$
7	6	1	7	6	1	$R_{00} + \frac{126}{221}R_{40} + \frac{160\sqrt{13}}{4199}R_{60} + \frac{200\sqrt{17}}{4199}R_{80}$ $+ \frac{576\sqrt{21}}{7429}R_{10,0} + \frac{18348}{185725}R_{12,0} - \frac{792\sqrt{1001}}{185725}R_{12,4}$
7	6	1	7	6	2	$\frac{36\sqrt{231}}{17017}R_{40} + \frac{240\sqrt{3003}}{46189}R_{60} + \frac{320\sqrt{3927}}{969969}R_{80} - \frac{2592\sqrt{11}}{96577}R_{10,0}$ $+ \frac{3432\sqrt{231}}{1300075}R_{12,0} + \frac{4752\sqrt{39}}{185725}R_{12,4}$
7	6	2	7	6	2	$R_{00} - \frac{9234}{17017}R_{40} - \frac{1280\sqrt{13}}{46189}R_{60} + \frac{2760\sqrt{17}}{29393}R_{80}$ $- \frac{34560\sqrt{21}}{676039}R_{10,0} + \frac{39204}{1300075}R_{12,0} - \frac{2376\sqrt{1001}}{1300075}R_{12,4}$

Table B29: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	1	1	1	R_{00}
1	1	1	3	3	1	$-\frac{\sqrt{14}}{7}R_{40}$
1	1	1	4	3	1	$-\frac{\sqrt{210}}{21}R_{40}$
1	1	1	4	5	1	$-\frac{2\sqrt{42}}{21}R_{40}$
1	1	1	5	5	1	$\frac{12\sqrt{6545}}{1309}R_{40} - \frac{2\sqrt{85085}}{2431}R_{60}$
1	1	1	5	5	2	$-\frac{2\sqrt{187}}{187}R_{40} - \frac{60\sqrt{2431}}{2431}R_{60}$
1	1	1	6	5	1	$\frac{2\sqrt{91}}{13}R_{60}$
3	3	1	3	3	1	$R_{00} + \frac{1}{11}R_{40} - \frac{25\sqrt{13}}{143}R_{60}$
3	3	1	4	3	1	$\frac{\sqrt{15}}{11}R_{40} + \frac{35\sqrt{195}}{429}R_{60}$
3	3	1	4	5	1	$\frac{2\sqrt{3}}{11}R_{40} + \frac{70\sqrt{39}}{429}R_{60}$
3	3	1	5	5	1	$\frac{\sqrt{1870}}{221}R_{40} - \frac{28\sqrt{110}}{429}R_{80}$
3	3	1	5	5	2	$\frac{\sqrt{2618}}{119}R_{40}$
3	3	1	6	5	1	$-\frac{25\sqrt{2}}{143}R_{40} + \frac{21\sqrt{26}}{143}R_{60} - \frac{28\sqrt{34}}{663}R_{80}$
4	3	1	4	3	1	$R_{00} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
4	3	1	4	5	1	$-\frac{6\sqrt{5}}{143}R_{40} + \frac{14\sqrt{65}}{2145}R_{60} + \frac{896\sqrt{85}}{12155}R_{80}$
4	3	1	5	5	1	$-\frac{15\sqrt{1122}}{2431}R_{40} - \frac{70\sqrt{14586}}{7293}R_{60} - \frac{700\sqrt{66}}{21879}R_{80}$
4	3	1	5	5	2	$\frac{29\sqrt{39270}}{17017}R_{40} - \frac{28\sqrt{510510}}{36465}R_{60} + \frac{224\sqrt{2310}}{36465}R_{80}$
4	3	1	6	5	1	$-\frac{15\sqrt{30}}{143}R_{40} + \frac{7\sqrt{390}}{429}R_{60} + \frac{28\sqrt{510}}{21879}R_{80}$
4	5	1	4	5	1	$R_{00} + \frac{42}{143}R_{40} - \frac{32\sqrt{13}}{2145}R_{60} - \frac{448\sqrt{17}}{12155}R_{80}$
4	5	1	5	5	1	$-\frac{6\sqrt{5610}}{2431}R_{40} - \frac{28\sqrt{72930}}{7293}R_{60} - \frac{280\sqrt{330}}{21879}R_{80}$
4	5	1	5	5	2	$\frac{58\sqrt{7854}}{17017}R_{40} - \frac{56\sqrt{102102}}{36465}R_{60} + \frac{448\sqrt{462}}{36465}R_{80}$
4	5	1	6	5	1	$\frac{6\sqrt{6}}{143}R_{40} - \frac{140\sqrt{78}}{7293}R_{60} - \frac{1960\sqrt{102}}{415701}R_{80} - \frac{5184\sqrt{14}}{20995}R_{10,0}$
5	5	1	5	5	1	$R_{00} + \frac{88}{221}R_{40} + \frac{264\sqrt{13}}{3757}R_{60} - \frac{56\sqrt{17}}{3757}R_{80}$ $-\frac{280\sqrt{21}}{3757}R_{10,0}$
5	5	1	5	5	2	$-\frac{16\sqrt{35}}{1547}R_{40} - \frac{36\sqrt{455}}{3757}R_{60} - \frac{560\sqrt{595}}{214149}R_{80} - \frac{14784\sqrt{15}}{71383}R_{10,0}$
5	5	1	6	5	1	$\frac{20\sqrt{935}}{2431}R_{40} - \frac{224\sqrt{12155}}{41327}R_{60} + \frac{784\sqrt{55}}{46189}R_{80} + \frac{88\sqrt{19635}}{27455}R_{10,0}$

Table B30: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{1u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	5	5	2	$R_{00} - \frac{88}{221}R_{40} + \frac{176\sqrt{13}}{18785}R_{60} - \frac{7056\sqrt{17}}{356915}R_{80}$ $+ \frac{10080\sqrt{21}}{71383}R_{10,0}$
5	5	2	6	5	1	$\frac{8\sqrt{1309}}{2431}R_{40} + \frac{60\sqrt{17017}}{41327}R_{60} - \frac{8960\sqrt{77}}{138567}R_{80} + \frac{7392\sqrt{561}}{356915}R_{10,0}$
6	5	1	6	5	1	$R_{00} - \frac{64}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60} + \frac{840\sqrt{17}}{46189}R_{80}$ $+ \frac{8\sqrt{21}}{323}R_{10,0}$

Table B31: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} + \frac{8}{21}R_{40}$
2	2	1	3	2	1	$-\frac{10\sqrt{2}}{21}R_{40}$
2	2	1	3	4	1	$-\frac{5\sqrt{6}}{21}R_{40}$
2	2	1	4	4	1	$-\frac{3\sqrt{10}}{77}R_{40} - \frac{16\sqrt{130}}{143}R_{60}$
2	2	1	5	4	1	$\frac{8\sqrt{210}}{231}R_{40} + \frac{2\sqrt{2730}}{143}R_{60}$
2	2	1	5	6	1	$\frac{40\sqrt{7}}{231}R_{40} + \frac{10\sqrt{91}}{143}R_{60}$
2	2	1	6	6	1	$\frac{20\sqrt{5005}}{3003}R_{40} - \frac{6\sqrt{385}}{385}R_{60} + \frac{64\sqrt{85085}}{255255}R_{80}$
2	2	1	6	6	2	$\frac{190\sqrt{91}}{3003}R_{40} + \frac{4\sqrt{7}}{77}R_{60} + \frac{64\sqrt{1547}}{4641}R_{80}$
2	2	1	7	6	1	$-\frac{16\sqrt{36465}}{5049}R_{80}$
2	2	1	7	6	2	$\frac{4\sqrt{195}}{65}R_{60} + \frac{32\sqrt{255}}{2295}R_{80}$
3	2	1	3	2	1	$R_{00} - \frac{2}{21}R_{40}$
3	2	1	3	4	1	$\frac{10\sqrt{3}}{231}R_{40} + \frac{30\sqrt{39}}{143}R_{60}$
3	2	1	4	4	1	$\frac{18\sqrt{5}}{77}R_{40} - \frac{14\sqrt{65}}{143}R_{60}$
3	2	1	5	4	1	$-\frac{8\sqrt{105}}{231}R_{40} - \frac{2\sqrt{1365}}{143}R_{60}$
3	2	1	5	6	1	$\frac{10\sqrt{14}}{429}R_{40} + \frac{6\sqrt{182}}{143}R_{60} - \frac{8\sqrt{238}}{221}R_{80}$
3	2	1	6	6	1	$\frac{50\sqrt{10010}}{21021}R_{40} - \frac{2\sqrt{770}}{77}R_{60} - \frac{40\sqrt{170170}}{51051}R_{80}$
3	2	1	6	6	2	$-\frac{470\sqrt{182}}{21021}R_{40} - \frac{12\sqrt{14}}{77}R_{60} - \frac{32\sqrt{3094}}{4641}R_{80}$
3	2	1	7	6	1	$\frac{10\sqrt{4290}}{1001}R_{40} + \frac{4\sqrt{330}}{165}R_{60} - \frac{248\sqrt{72930}}{328185}R_{80}$
3	2	1	7	6	2	$-\frac{80\sqrt{30}}{1001}R_{40} + \frac{20\sqrt{390}}{429}R_{60} - \frac{32\sqrt{510}}{5967}R_{80}$
3	4	1	3	4	1	$R_{00} - \frac{9}{77}R_{40} - \frac{15\sqrt{13}}{143}R_{60}$
3	4	1	4	4	1	$\frac{9\sqrt{15}}{77}R_{40} - \frac{7\sqrt{195}}{143}R_{60}$
3	4	1	5	4	1	$\frac{18\sqrt{35}}{1001}R_{40} + \frac{4\sqrt{455}}{143}R_{60} - \frac{56\sqrt{595}}{2431}R_{80}$
3	4	1	5	6	1	$-\frac{25\sqrt{42}}{429}R_{40} - \frac{4\sqrt{546}}{143}R_{60} + \frac{12\sqrt{714}}{2431}R_{80}$
3	4	1	6	6	1	$\frac{25\sqrt{30030}}{21021}R_{40} - \frac{\sqrt{2310}}{77}R_{60} - \frac{20\sqrt{510510}}{51051}R_{80}$
3	4	1	6	6	2	$-\frac{235\sqrt{546}}{21021}R_{40} - \frac{6\sqrt{42}}{77}R_{60} - \frac{16\sqrt{9282}}{4641}R_{80}$
3	4	1	7	6	1	$-\frac{4\sqrt{1430}}{3003}R_{40} - \frac{3\sqrt{110}}{187}R_{60} + \frac{248\sqrt{24310}}{138567}R_{80} + \frac{56\sqrt{30030}}{20995}R_{10,0}$

Table B32: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	1	7	6	2	$\frac{32\sqrt{10}}{3003}R_{40} - \frac{75\sqrt{130}}{2431}R_{60} + \frac{160\sqrt{170}}{12597}R_{80} - \frac{112\sqrt{210}}{1615}R_{10,0}$
4	4	1	4	4	1	$R_{00} - \frac{27}{77}R_{40} - \frac{\sqrt{13}}{143}R_{60}$
4	4	1	5	4	1	$\frac{18\sqrt{21}}{1001}R_{40} + \frac{4\sqrt{273}}{143}R_{60} - \frac{56\sqrt{357}}{2431}R_{80}$
4	4	1	5	6	1	$\frac{9\sqrt{70}}{1001}R_{40} + \frac{2\sqrt{910}}{143}R_{60} - \frac{28\sqrt{1190}}{2431}R_{80}$
4	4	1	6	6	1	$\frac{3\sqrt{2002}}{1001}R_{40} - \frac{5\sqrt{154}}{1309}R_{60} + \frac{180\sqrt{34034}}{323323}R_{80} - \frac{768\sqrt{858}}{20995}R_{10,0}$
4	4	1	6	6	2	$-\frac{9\sqrt{910}}{1001}R_{40} - \frac{62\sqrt{70}}{1309}R_{60} - \frac{16\sqrt{15470}}{29393}R_{80} - \frac{384\sqrt{390}}{20995}R_{10,0}$
4	4	1	7	6	1	$\frac{4\sqrt{858}}{429}R_{40} + \frac{21\sqrt{66}}{187}R_{60} - \frac{24\sqrt{14586}}{46189}R_{80} - \frac{88\sqrt{2002}}{20995}R_{10,0}$
4	4	1	7	6	2	$\frac{40\sqrt{6}}{429}R_{40} - \frac{87\sqrt{78}}{2431}R_{60} - \frac{192\sqrt{102}}{4199}R_{80} + \frac{176\sqrt{14}}{1615}R_{10,0}$
5	4	1	5	4	1	$R_{00} + \frac{36}{143}R_{40} - \frac{32\sqrt{13}}{143}R_{60} - \frac{56\sqrt{17}}{2431}R_{80}$
5	4	1	5	6	1	$-\frac{4\sqrt{30}}{429}R_{40} + \frac{56\sqrt{390}}{2431}R_{60} + \frac{336\sqrt{510}}{46189}R_{80} + \frac{216\sqrt{70}}{4199}R_{10,0}$
5	4	1	6	6	1	$\frac{4\sqrt{858}}{273}R_{40} + \frac{80\sqrt{14586}}{138567}R_{80} - \frac{72\sqrt{2002}}{8645}R_{10,0}$
5	4	1	6	6	2	$\frac{8\sqrt{390}}{3003}R_{40} + \frac{28\sqrt{30}}{187}R_{60} + \frac{32\sqrt{6630}}{8151}R_{80} + \frac{3168\sqrt{910}}{146965}R_{10,0}$
5	4	1	7	6	1	$-\frac{8\sqrt{2002}}{3003}R_{40} - \frac{6\sqrt{154}}{187}R_{60} - \frac{128\sqrt{34034}}{138567}R_{80} - \frac{168\sqrt{858}}{20995}R_{10,0}$
5	4	1	7	6	2	$\frac{40\sqrt{14}}{429}R_{40} + \frac{12\sqrt{182}}{2431}R_{60} + \frac{736\sqrt{238}}{138567}R_{80} - \frac{2112\sqrt{6}}{20995}R_{10,0}$
5	6	1	5	6	1	$R_{00} + \frac{112}{429}R_{40} - \frac{600\sqrt{13}}{2431}R_{60} - \frac{1400\sqrt{17}}{46189}R_{80}$ $-\frac{72\sqrt{21}}{4199}R_{10,0}$
5	6	1	6	6	1	$\frac{4\sqrt{715}}{273}R_{40} + \frac{80\sqrt{12155}}{138567}R_{80} - \frac{24\sqrt{15015}}{8645}R_{10,0}$
5	6	1	6	6	2	$\frac{40\sqrt{13}}{3003}R_{40} + \frac{140}{187}R_{60} + \frac{160\sqrt{221}}{8151}R_{80} + \frac{1056\sqrt{273}}{29393}R_{10,0}$
5	6	1	7	6	1	$\frac{2\sqrt{15015}}{17017}R_{40} + \frac{40\sqrt{1155}}{10659}R_{60} + \frac{320\sqrt{255255}}{1247103}R_{80} + \frac{9072\sqrt{715}}{482885}R_{10,0}$ $-\frac{132\sqrt{15015}}{37145}R_{12,0} - \frac{6776\sqrt{15}}{37145}R_{12,4}$
5	6	1	7	6	2	$-\frac{10\sqrt{105}}{2431}R_{40} - \frac{80\sqrt{1365}}{138567}R_{60} - \frac{1840\sqrt{1785}}{1247103}R_{80} + \frac{114048\sqrt{5}}{482885}R_{10,0}$ $+\frac{1452\sqrt{105}}{37145}R_{12,0} - \frac{616\sqrt{2145}}{37145}R_{12,4}$
6	6	1	6	6	1	$R_{00} - \frac{512}{2499}R_{40} + \frac{40\sqrt{13}}{323}R_{60} - \frac{920\sqrt{17}}{47481}R_{80}$ $+\frac{1560\sqrt{21}}{364021}R_{10,0} - \frac{549648}{1820105}R_{12,0} + \frac{34848\sqrt{1001}}{1820105}R_{12,4}$
6	6	1	6	6	2	$\frac{640\sqrt{55}}{27489}R_{40} + \frac{60\sqrt{715}}{3553}R_{60} + \frac{80\sqrt{935}}{174097}R_{80} + \frac{9984\sqrt{1155}}{1820105}R_{10,0}$ $+\frac{82368\sqrt{55}}{1820105}R_{12,0} - \frac{38016\sqrt{455}}{1820105}R_{12,4}$

Table B33: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2g}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	7	6	1	$\frac{10\sqrt{21}}{833}R_{40} + \frac{200\sqrt{273}}{6783}R_{60} + \frac{800\sqrt{357}}{427329}R_{80} - \frac{7920}{52003}R_{10,0}$ $- \frac{143572\sqrt{21}}{1820105}R_{12,0} - \frac{792\sqrt{429}}{260015}R_{12,4}$
6	6	1	7	6	2	$-\frac{10\sqrt{3003}}{7007}R_{40} - \frac{2080\sqrt{231}}{74613}R_{60} + \frac{89360\sqrt{51051}}{61108047}R_{80} + \frac{3168\sqrt{143}}{96577}R_{10,0}$ $- \frac{572\sqrt{3003}}{95795}R_{12,0} + \frac{106392\sqrt{3}}{260015}R_{12,4}$
6	6	2	6	6	2	$R_{00} + \frac{10112}{27489}R_{40} - \frac{240\sqrt{13}}{3553}R_{60} + \frac{80\sqrt{17}}{47481}R_{80}$ $- \frac{3744\sqrt{21}}{364021}R_{10,0} + \frac{174240}{364021}R_{12,0} + \frac{6336\sqrt{1001}}{364021}R_{12,4}$
6	6	2	7	6	1	$-\frac{16\sqrt{1155}}{9163}R_{40} - \frac{320\sqrt{15015}}{74613}R_{60} - \frac{8560\sqrt{19635}}{4700619}R_{80} - \frac{28512\sqrt{55}}{260015}R_{10,0}$ $- \frac{2288\sqrt{1155}}{364021}R_{12,0} + \frac{352\sqrt{195}}{13685}R_{12,4}$
6	6	2	7	6	2	$\frac{1028\sqrt{1365}}{119119}R_{40} - \frac{1880\sqrt{105}}{74613}R_{60} + \frac{2560\sqrt{23205}}{5555277}R_{80} - \frac{9504\sqrt{65}}{482885}R_{10,0}$ $+ \frac{12584\sqrt{1365}}{1820105}R_{12,0} + \frac{2288\sqrt{165}}{260015}R_{12,4}$
7	6	1	7	6	1	$R_{00} + \frac{58}{119}R_{40} - \frac{160\sqrt{13}}{969}R_{60} - \frac{40\sqrt{17}}{2261}R_{80}$ $- \frac{192\sqrt{21}}{2261}R_{10,0} - \frac{15620}{156009}R_{12,0} + \frac{1144\sqrt{1001}}{260015}R_{12,4}$
7	6	1	7	6	2	$-\frac{20\sqrt{143}}{2431}R_{40} - \frac{2800\sqrt{11}}{10659}R_{60} - \frac{800\sqrt{2431}}{323323}R_{80} + \frac{96\sqrt{3003}}{676039}R_{10,0}$ $+ \frac{6424\sqrt{143}}{780045}R_{12,0} - \frac{10736\sqrt{7}}{260015}R_{12,4}$
7	6	2	7	6	2	$R_{00} - \frac{4226}{17017}R_{40} + \frac{11840\sqrt{13}}{138567}R_{60} - \frac{120\sqrt{17}}{1729}R_{80}$ $+ \frac{11904\sqrt{21}}{676039}R_{10,0} + \frac{78892}{780045}R_{12,0} + \frac{88\sqrt{1001}}{52003}R_{12,4}$

Table B34: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	2	1	1	R_{00}
2	1	1	2	3	1	$\frac{4\sqrt{6}}{21}R_{40}$
2	1	1	3	3	1	$-\frac{\sqrt{210}}{21}R_{40}$
2	1	1	4	3	1	$-\frac{\sqrt{30}}{21}R_{40}$
2	1	1	4	5	1	$\frac{2\sqrt{6}}{33}R_{40} - \frac{24\sqrt{78}}{143}R_{60}$
2	1	1	5	5	1	$\frac{8\sqrt{231}}{231}R_{40} + \frac{2\sqrt{3003}}{143}R_{60}$
2	1	1	6	5	1	$\frac{20\sqrt{33}}{231}R_{40} - \frac{6\sqrt{429}}{143}R_{60}$
2	1	1	6	5	2	$\frac{38\sqrt{15}}{231}R_{40} + \frac{4\sqrt{195}}{143}R_{60}$
2	3	1	2	3	1	$R_{00} - \frac{4}{21}R_{40}$
2	3	1	3	3	1	$-\frac{2\sqrt{35}}{21}R_{40}$
2	3	1	4	3	1	$\frac{6\sqrt{5}}{77}R_{40} - \frac{80\sqrt{65}}{429}R_{60}$
2	3	1	4	5	1	$-\frac{24}{77}R_{40} + \frac{56\sqrt{13}}{429}R_{60}$
2	3	1	5	5	1	$\frac{8\sqrt{154}}{231}R_{40} + \frac{2\sqrt{2002}}{143}R_{60}$
2	3	1	6	5	1	$-\frac{40\sqrt{22}}{3003}R_{40} + \frac{6\sqrt{286}}{143}R_{60} + \frac{32\sqrt{374}}{7293}R_{80}$
2	3	1	6	5	2	$-\frac{76\sqrt{10}}{3003}R_{40} - \frac{4\sqrt{130}}{143}R_{60} + \frac{32\sqrt{170}}{663}R_{80}$
3	3	1	3	3	1	$R_{00} - \frac{1}{33}R_{40} + \frac{45\sqrt{13}}{143}R_{60}$
3	3	1	4	3	1	$\frac{15\sqrt{7}}{77}R_{40} - \frac{35\sqrt{91}}{429}R_{60}$
3	3	1	4	5	1	$\frac{6\sqrt{35}}{77}R_{40} - \frac{14\sqrt{455}}{429}R_{60}$
3	3	1	5	5	1	$-\frac{\sqrt{110}}{39}R_{40} - \frac{28\sqrt{1870}}{2431}R_{80}$
3	3	1	6	5	1	$\frac{25\sqrt{770}}{3003}R_{40} - \frac{\sqrt{10010}}{143}R_{60} - \frac{20\sqrt{13090}}{7293}R_{80}$
3	3	1	6	5	2	$-\frac{235\sqrt{14}}{3003}R_{40} - \frac{6\sqrt{182}}{143}R_{60} - \frac{16\sqrt{238}}{663}R_{80}$
4	3	1	4	3	1	$R_{00} - \frac{39}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
4	3	1	4	5	1	$\frac{6\sqrt{5}}{77}R_{40} - \frac{14\sqrt{65}}{429}R_{60}$
4	3	1	5	5	1	$\frac{3\sqrt{770}}{1001}R_{40} + \frac{2\sqrt{10010}}{429}R_{60} - \frac{28\sqrt{13090}}{7293}R_{80}$
4	3	1	6	5	1	$\frac{15\sqrt{110}}{1001}R_{40} - \frac{\sqrt{1430}}{429}R_{60} - \frac{12\sqrt{1870}}{2431}R_{80}$
4	3	1	6	5	2	$-\frac{225\sqrt{2}}{1001}R_{40} - \frac{62\sqrt{26}}{429}R_{60} + \frac{16\sqrt{34}}{663}R_{80}$

Table B35: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = T_{2u}$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	4	5	1	$R_{00} - \frac{6}{11}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$
4	5	1	5	5	1	$\frac{6\sqrt{154}}{1001}R_{40} + \frac{4\sqrt{2002}}{429}R_{60} - \frac{56\sqrt{2618}}{7293}R_{80}$
4	5	1	6	5	1	$-\frac{6\sqrt{22}}{1001}R_{40} + \frac{20\sqrt{286}}{7293}R_{60} + \frac{840\sqrt{374}}{46189}R_{80} - \frac{1152\sqrt{462}}{20995}R_{10,0}$
4	5	1	6	5	2	$\frac{18\sqrt{10}}{1001}R_{40} + \frac{248\sqrt{130}}{7293}R_{60} - \frac{224\sqrt{170}}{12597}R_{80} - \frac{576\sqrt{210}}{20995}R_{10,0}$
5	5	1	5	5	1	$R_{00} + \frac{8}{39}R_{40} - \frac{24\sqrt{13}}{221}R_{60} + \frac{56\sqrt{17}}{4199}R_{80}$ $+ \frac{360\sqrt{21}}{4199}R_{10,0}$
5	5	1	6	5	1	$\frac{44\sqrt{7}}{273}R_{40} + \frac{80\sqrt{119}}{12597}R_{80} - \frac{264\sqrt{3}}{1235}R_{10,0}$
5	5	1	6	5	2	$\frac{8\sqrt{385}}{3003}R_{40} + \frac{28\sqrt{5005}}{2431}R_{60} + \frac{32\sqrt{6545}}{8151}R_{80} + \frac{1056\sqrt{165}}{20995}R_{10,0}$
6	5	1	6	5	1	$R_{00} - \frac{64}{273}R_{40} + \frac{40\sqrt{13}}{221}R_{60} - \frac{920\sqrt{17}}{12597}R_{80}$ $- \frac{120\sqrt{21}}{29393}R_{10,0}$
6	5	1	6	5	2	$\frac{80\sqrt{55}}{3003}R_{40} + \frac{60\sqrt{715}}{2431}R_{60} + \frac{80\sqrt{935}}{46189}R_{80} - \frac{768\sqrt{1155}}{146965}R_{10,0}$
6	5	2	6	5	2	$R_{00} + \frac{1264}{3003}R_{40} - \frac{240\sqrt{13}}{2431}R_{60} + \frac{80\sqrt{17}}{12597}R_{80}$ $+ \frac{288\sqrt{21}}{29393}R_{10,0}$

Table B36: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{1}{2}$	0	1	0
$\frac{1}{2}$	0	1	$\frac{1}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{15}{2}$	6	1	0
$\frac{1}{2}$	2	1	$\frac{1}{2}$	2	1	R_{00}
$\frac{1}{2}$	2	1	$\frac{7}{2}$	2	1	$\frac{2\sqrt{6}}{7}R_{40}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{30}}{21}R_{40}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{2310}}{231}R_{40}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{6\sqrt{1430}}{143}R_{60}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{2\sqrt{1155}}{77}R_{40}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{2\sqrt{6006}}{143}R_{60}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{2\sqrt{910}}{65}R_{60}$
$\frac{1}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{16\sqrt{19635}}{2805}R_{80}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	1	$R_{00} + \frac{2}{7}R_{40}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{12\sqrt{5}}{77}R_{40} - \frac{20\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{12\sqrt{385}}{847}R_{40} - \frac{20\sqrt{5005}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{40\sqrt{165}}{847}R_{40} + \frac{14\sqrt{2145}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{2\sqrt{770}}{1573}R_{40} + \frac{8\sqrt{10010}}{1573}R_{60} + \frac{16\sqrt{13090}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{300\sqrt{77}}{11011}R_{40} - \frac{36\sqrt{1001}}{1573}R_{60} + \frac{16\sqrt{1309}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{20\sqrt{105}}{1001}R_{40} - \frac{12\sqrt{1365}}{715}R_{60} + \frac{16\sqrt{1785}}{3315}R_{80}$

Table B37: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{30\sqrt{770}}{1001}R_{40} + \frac{4\sqrt{10010}}{715}R_{60} + \frac{56\sqrt{13090}}{36465}R_{80}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{6}{77}R_{40} - \frac{80\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{300\sqrt{77}}{11011}R_{40} - \frac{68\sqrt{1001}}{4719}R_{60} + \frac{448\sqrt{1309}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{540\sqrt{33}}{11011}R_{40} - \frac{56\sqrt{429}}{1573}R_{60} + \frac{784\sqrt{561}}{80223}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{30\sqrt{154}}{1573}R_{40} - \frac{32\sqrt{2002}}{1573}R_{60} - \frac{144\sqrt{2618}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{240\sqrt{385}}{11011}R_{40} - \frac{2\sqrt{5005}}{1573}R_{60} + \frac{160\sqrt{6545}}{80223}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{124\sqrt{21}}{3003}R_{40} - \frac{72\sqrt{273}}{2431}R_{60} + \frac{16\sqrt{357}}{4199}R_{80} - \frac{1344}{1615}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{154}}{1001}R_{40} - \frac{18\sqrt{2002}}{2431}R_{60} - \frac{336\sqrt{2618}}{46189}R_{80} - \frac{112\sqrt{66}}{1615}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{294}{1573}R_{40} - \frac{608\sqrt{13}}{4719}R_{60} - \frac{1792\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{540\sqrt{21}}{11011}R_{40} - \frac{56\sqrt{273}}{1573}R_{60} + \frac{784\sqrt{357}}{80223}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{210\sqrt{2}}{1573}R_{40} - \frac{224\sqrt{26}}{1573}R_{60} - \frac{1008\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{12\sqrt{5}}{121}R_{40} - \frac{1624\sqrt{65}}{26741}R_{60} + \frac{784\sqrt{85}}{117249}R_{80} - \frac{1728\sqrt{105}}{20995}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{32\sqrt{33}}{363}R_{40} + \frac{126\sqrt{429}}{26741}R_{60} + \frac{224\sqrt{561}}{39083}R_{80} + \frac{768\sqrt{77}}{20995}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{2}}{143}R_{40} - \frac{126\sqrt{26}}{2431}R_{60} - \frac{2352\sqrt{34}}{46189}R_{80} - \frac{112\sqrt{42}}{1615}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	1	$R_{00} - \frac{756}{1573}R_{40} - \frac{32\sqrt{13}}{1573}R_{60} + \frac{1176\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{40\sqrt{42}}{11011}R_{40} + \frac{196\sqrt{546}}{26741}R_{60} - \frac{3136\sqrt{714}}{508079}R_{80} - \frac{3024\sqrt{2}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{24\sqrt{105}}{1573}R_{40} + \frac{48\sqrt{1365}}{26741}R_{60} - \frac{6048\sqrt{1785}}{508079}R_{80} + \frac{1008\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{24\sqrt{77}}{1573}R_{40} + \frac{48\sqrt{1001}}{26741}R_{60} - \frac{6048\sqrt{1309}}{508079}R_{80} + \frac{336\sqrt{33}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{42}}{143}R_{40} - \frac{126\sqrt{546}}{2431}R_{60} - \frac{64\sqrt{714}}{46189}R_{80} + \frac{168\sqrt{2}}{4199}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	1	$R_{00} + \frac{784}{1573}R_{40} + \frac{320\sqrt{13}}{1573}R_{60} + \frac{560\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	1	$\frac{96\sqrt{10}}{1573}R_{40} - \frac{1260\sqrt{130}}{26741}R_{60} + \frac{7840\sqrt{170}}{508079}R_{80} + \frac{432\sqrt{210}}{20995}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{32\sqrt{66}}{1573}R_{40} - \frac{420\sqrt{858}}{26741}R_{60} + \frac{7840\sqrt{1122}}{1524237}R_{80} + \frac{432\sqrt{154}}{20995}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{12}{2431}R_{40} + \frac{560\sqrt{13}}{46189}R_{60} + \frac{3920\sqrt{17}}{138567}R_{80} + \frac{4032\sqrt{21}}{37145}R_{10,0}$
						$+ \frac{5544}{7429}R_{12,0} + \frac{48\sqrt{1001}}{7429}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} - \frac{564}{1573}R_{40} - \frac{160\sqrt{13}}{26741}R_{60} - \frac{26040\sqrt{17}}{508079}R_{80}$
						$+ \frac{384\sqrt{21}}{4199}R_{10,0}$

Table B38: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{276\sqrt{165}}{26741}R_{40} + \frac{560\sqrt{2145}}{508079}R_{60} - \frac{2880\sqrt{2805}}{508079}R_{80} + \frac{144\sqrt{385}}{96577}R_{10,0}$ $+ \frac{8712\sqrt{165}}{185725}R_{12,0} - \frac{5808\sqrt{1365}}{185725}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{54\sqrt{10}}{2431}R_{40} + \frac{2520\sqrt{130}}{46189}R_{60} + \frac{160\sqrt{170}}{46189}R_{80} - \frac{1296\sqrt{210}}{96577}R_{10,0}$ $+ \frac{5148\sqrt{10}}{185725}R_{12,0} + \frac{648\sqrt{10010}}{185725}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{972}{2431}R_{40} - \frac{480\sqrt{13}}{46189}R_{60} - \frac{120\sqrt{17}}{4199}R_{80}$ $+ \frac{8640\sqrt{21}}{96577}R_{10,0} - \frac{34848}{185725}R_{12,0} + \frac{2112\sqrt{1001}}{185725}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{18\sqrt{66}}{2431}R_{40} + \frac{840\sqrt{858}}{46189}R_{60} + \frac{160\sqrt{1122}}{138567}R_{80} - \frac{1296\sqrt{154}}{96577}R_{10,0}$ $+ \frac{1716\sqrt{66}}{185725}R_{12,0} + \frac{2376\sqrt{546}}{185725}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	1	$R_{00} + \frac{126}{221}R_{40} + \frac{160\sqrt{13}}{4199}R_{60} + \frac{200\sqrt{17}}{4199}R_{80}$ $+ \frac{576\sqrt{21}}{7429}R_{10,0} + \frac{18348}{185725}R_{12,0} - \frac{792\sqrt{1001}}{185725}R_{12,4}$

Table B39: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1u}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	R_{00}
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{14}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	3	1	$-\frac{2\sqrt{70}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{70}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{35}}{21}R_{40}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{2\sqrt{30}}{13}R_{60}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{6\sqrt{14}}{13}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} - \frac{2}{33}R_{40} - \frac{400\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{4\sqrt{5}}{33}R_{40} - \frac{140\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{5}}{33}R_{40} - \frac{140\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{34\sqrt{10}}{429}R_{40} - \frac{56\sqrt{130}}{1287}R_{60} + \frac{112\sqrt{170}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{120\sqrt{1365}}{13013}R_{40} - \frac{14\sqrt{105}}{429}R_{60} + \frac{448\sqrt{23205}}{284427}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{100\sqrt{13}}{1859}R_{40} - \frac{84}{143}R_{60} + \frac{112\sqrt{221}}{8619}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	1	$R_{00} + \frac{14}{33}R_{40} + \frac{160\sqrt{13}}{1287}R_{60}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{20}{429}R_{40} + \frac{196\sqrt{13}}{1287}R_{60} + \frac{448\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{70\sqrt{2}}{429}R_{40} - \frac{224\sqrt{26}}{1287}R_{60} - \frac{112\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{180\sqrt{273}}{13013}R_{40} - \frac{56\sqrt{21}}{429}R_{60} + \frac{784\sqrt{4641}}{284427}R_{80}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{160\sqrt{65}}{1859}R_{40} + \frac{42\sqrt{5}}{143}R_{60} - \frac{224\sqrt{1105}}{94809}R_{80}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	1	$R_{00} + \frac{14}{33}R_{40} + \frac{160\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	1	$-\frac{70\sqrt{2}}{429}R_{40} - \frac{224\sqrt{26}}{1287}R_{60} - \frac{112\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{180\sqrt{273}}{13013}R_{40} - \frac{56\sqrt{21}}{429}R_{60} + \frac{784\sqrt{4641}}{284427}R_{80}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{4\sqrt{65}}{1859}R_{40} + \frac{168\sqrt{5}}{2431}R_{60} - \frac{784\sqrt{1105}}{163761}R_{80} - \frac{576\sqrt{1365}}{20995}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{112}{429}R_{40} - \frac{64\sqrt{13}}{1287}R_{60} - \frac{112\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{120\sqrt{546}}{13013}R_{40} - \frac{532\sqrt{42}}{7293}R_{60} + \frac{3136\sqrt{9282}}{5404113}R_{80} - \frac{9072\sqrt{26}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	1	$\frac{32\sqrt{130}}{1859}R_{40} - \frac{420\sqrt{10}}{2431}R_{60} + \frac{7840\sqrt{2210}}{1801371}R_{80} + \frac{1584\sqrt{2730}}{272935}R_{10,0}$

Table B40: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{1u}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} - \frac{588}{1859}R_{40} - \frac{32\sqrt{13}}{31603}R_{60} - \frac{50568\sqrt{17}}{600457}R_{80}$ $+ \frac{6720\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	1	$\frac{24\sqrt{105}}{1859}R_{40} + \frac{48\sqrt{1365}}{31603}R_{60} - \frac{6048\sqrt{1785}}{600457}R_{80} + \frac{11088\sqrt{5}}{54587}R_{10,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	1	$R_{00} - \frac{972}{1859}R_{40} - \frac{800\sqrt{13}}{31603}R_{60} + \frac{4200\sqrt{17}}{54587}R_{80}$ $- \frac{1728\sqrt{21}}{54587}R_{10,0}$

Table B41: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} + \frac{32}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	1	$\frac{10\sqrt{6}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{10\sqrt{6}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{38\sqrt{30}}{539}R_{40} + \frac{8\sqrt{390}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{8\sqrt{30}}{77}R_{40} - \frac{6\sqrt{390}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$-\frac{160\sqrt{14}}{1001}R_{40} - \frac{46\sqrt{182}}{1001}R_{60} - \frac{32\sqrt{238}}{1547}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{150\sqrt{8866}}{31031}R_{40} - \frac{2\sqrt{682}}{1705}R_{60} + \frac{2048\sqrt{150722}}{1130415}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{710\sqrt{465}}{31031}R_{40} + \frac{36\sqrt{6045}}{22165}R_{60} + \frac{256\sqrt{7905}}{102765}R_{80}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{8\sqrt{7}}{35}R_{60} + \frac{16\sqrt{1547}}{1785}R_{80}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	1	$R_{00} - \frac{18}{49}R_{40}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	4	1	$-\frac{100}{539}R_{40} + \frac{60\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{108\sqrt{5}}{539}R_{40} - \frac{12\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{8\sqrt{5}}{77}R_{40} - \frac{6\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{20\sqrt{21}}{1001}R_{40} + \frac{36\sqrt{273}}{1001}R_{60} - \frac{48\sqrt{357}}{1547}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{120\sqrt{13299}}{31031}R_{40} + \frac{12\sqrt{1023}}{341}R_{60} - \frac{80\sqrt{226083}}{226083}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{450\sqrt{310}}{31031}R_{40} + \frac{116\sqrt{4030}}{22165}R_{60} + \frac{192\sqrt{5270}}{34255}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{30\sqrt{546}}{1001}R_{40} - \frac{12\sqrt{42}}{77}R_{60} - \frac{8\sqrt{9282}}{4641}R_{80}$
$\frac{5}{2}$	4	1	$\frac{5}{2}$	4	1	$R_{00} - \frac{18}{49}R_{40}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	1	$\frac{108\sqrt{5}}{539}R_{40} - \frac{12\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{36\sqrt{5}}{1001}R_{40} + \frac{8\sqrt{65}}{143}R_{60} - \frac{112\sqrt{85}}{2431}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{100\sqrt{21}}{1001}R_{40} - \frac{48\sqrt{273}}{1001}R_{60} + \frac{144\sqrt{357}}{17017}R_{80}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{20\sqrt{13299}}{31031}R_{40} - \frac{2\sqrt{1023}}{341}R_{60} + \frac{256\sqrt{226083}}{226083}R_{80}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{142\sqrt{310}}{31031}R_{40} + \frac{54\sqrt{4030}}{4433}R_{60} + \frac{16\sqrt{5270}}{6851}R_{80}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{2\sqrt{42}}{119}R_{60} - \frac{16\sqrt{9282}}{6783}R_{80} + \frac{1008\sqrt{26}}{4199}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} - \frac{54}{539}R_{40} - \frac{16\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{108}{1001}R_{40} + \frac{24\sqrt{13}}{143}R_{60} - \frac{336\sqrt{17}}{2431}R_{80}$

Table B42: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{16\sqrt{105}}{1001}R_{40} + \frac{2\sqrt{1365}}{1001}R_{60} - \frac{160\sqrt{1785}}{17017}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{8\sqrt{66495}}{5005}R_{40} + \frac{72\sqrt{5115}}{5797}R_{60} - \frac{80\sqrt{1130415}}{1431859}R_{80} + \frac{2688\sqrt{155155}}{3254225}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{30\sqrt{62}}{1001}R_{40} + \frac{696\sqrt{806}}{75361}R_{60} + \frac{576\sqrt{1054}}{130169}R_{80} + \frac{1344\sqrt{1302}}{50065}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{2730}}{5005}R_{40} + \frac{54\sqrt{210}}{1309}R_{60} + \frac{48\sqrt{46410}}{29393}R_{80} - \frac{3696\sqrt{130}}{104975}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	1	$R_{00} + \frac{36}{143}R_{40} - \frac{32\sqrt{13}}{143}R_{60} - \frac{56\sqrt{17}}{2431}R_{80}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{8\sqrt{105}}{1001}R_{40} + \frac{48\sqrt{1365}}{2431}R_{60} + \frac{288\sqrt{1785}}{46189}R_{80} + \frac{1296\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{8\sqrt{66495}}{22165}R_{40} - \frac{56\sqrt{5115}}{5797}R_{60} - \frac{1120\sqrt{1130415}}{4295577}R_{80} - \frac{4176\sqrt{155155}}{3254225}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{280\sqrt{62}}{4433}R_{40} - \frac{252\sqrt{806}}{75361}R_{60} - \frac{5152\sqrt{1054}}{1431859}R_{80} + \frac{6336\sqrt{1302}}{650845}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{24\sqrt{2730}}{5005}R_{40} - \frac{2\sqrt{210}}{187}R_{60} - \frac{64\sqrt{46410}}{138567}R_{80} + \frac{792\sqrt{130}}{104975}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{188}{1001}R_{40} - \frac{160\sqrt{13}}{2431}R_{60} + \frac{1240\sqrt{17}}{46189}R_{80}$ $+ \frac{3456\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{276\sqrt{31031}}{527527}R_{40} - \frac{1400\sqrt{2387}}{110143}R_{60} - \frac{8000\sqrt{527527}}{30069039}R_{80} - \frac{4176\sqrt{13299}}{14969435}R_{10,0}$ $-\frac{792\sqrt{31031}}{474145}R_{12,0} - \frac{29040\sqrt{31}}{230299}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{460\sqrt{6510}}{75361}R_{40} - \frac{420\sqrt{84630}}{1431859}R_{60} - \frac{7360\sqrt{110670}}{30069039}R_{80} + \frac{19008\sqrt{310}}{14969435}R_{10,0}$ $-\frac{26136\sqrt{6510}}{8060465}R_{12,0} + \frac{1584\sqrt{132990}}{1151495}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{162\sqrt{26}}{17017}R_{40} + \frac{200\sqrt{2}}{3553}R_{60} + \frac{800\sqrt{442}}{138567}R_{80} - \frac{42768\sqrt{546}}{3380195}R_{10,0}$ $-\frac{4356\sqrt{26}}{37145}R_{12,0} + \frac{264\sqrt{154}}{7429}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} + \frac{156}{527}R_{40} - \frac{48\sqrt{13}}{589}R_{60} + \frac{104\sqrt{17}}{10013}R_{80}$ $+ \frac{1920\sqrt{21}}{13547}R_{10,0} + \frac{1882848}{5757475}R_{12,0} - \frac{82368\sqrt{1001}}{5757475}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{84\sqrt{4290}}{75361}R_{40} + \frac{1764\sqrt{330}}{110143}R_{60} - \frac{328\sqrt{72930}}{4295577}R_{80} + \frac{3888\sqrt{10010}}{2993887}R_{10,0}$ $+ \frac{45408\sqrt{4290}}{5757475}R_{12,0} - \frac{44352\sqrt{210}}{5757475}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{246\sqrt{4774}}{40579}R_{40} + \frac{56\sqrt{62062}}{110143}R_{60} + \frac{752\sqrt{81158}}{771001}R_{80} - \frac{528\sqrt{2046}}{230299}R_{10,0}$ $-\frac{104676\sqrt{4774}}{40302325}R_{12,0} + \frac{57816\sqrt{806}}{5757475}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} - \frac{9288}{75361}R_{40} + \frac{107760\sqrt{13}}{1431859}R_{60} + \frac{3360\sqrt{17}}{130169}R_{80}$ $+ \frac{141120\sqrt{21}}{2993887}R_{10,0} - \frac{487872}{1151495}R_{12,0} + \frac{29568\sqrt{1001}}{1151495}R_{12,4}$

Table B43: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2g}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{48\sqrt{42315}}{75361}R_{40} - \frac{1008\sqrt{3255}}{110143}R_{60} + \frac{592\sqrt{719355}}{2733549}R_{80} + \frac{28512\sqrt{2015}}{2993887}R_{10,0}$ $+ \frac{5808\sqrt{42315}}{40302325}R_{12,0} + \frac{34848\sqrt{5115}}{5757475}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	1	$R_{00} - \frac{6}{119}R_{40} + \frac{96\sqrt{13}}{323}R_{60} - \frac{24\sqrt{17}}{323}R_{80}$ $- \frac{2496\sqrt{21}}{52003}R_{10,0} + \frac{1452}{185725}R_{12,0} - \frac{792\sqrt{1001}}{185725}R_{12,4}$

Table B44: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2u}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	1	1	R_{00}
$\frac{5}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{2\sqrt{6}}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{30}}{21}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{6}}{33}R_{40} + \frac{24\sqrt{78}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{8\sqrt{6006}}{1001}R_{40} - \frac{6\sqrt{462}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{10\sqrt{14322}}{2387}R_{40} + \frac{2\sqrt{186186}}{4433}R_{60}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	2	$\frac{142\sqrt{14105}}{31031}R_{40} - \frac{108\sqrt{1085}}{4433}R_{60}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} + \frac{2}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$\frac{12\sqrt{5}}{77}R_{40} + \frac{20\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{36}{77}R_{40} - \frac{28\sqrt{13}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{212\sqrt{1001}}{13013}R_{40} - \frac{8\sqrt{77}}{143}R_{60} - \frac{80\sqrt{17017}}{31603}R_{80}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{60\sqrt{2387}}{31031}R_{40} - \frac{6\sqrt{31031}}{4433}R_{60} + \frac{256\sqrt{40579}}{75361}R_{80}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{142\sqrt{84630}}{403403}R_{40} + \frac{54\sqrt{6510}}{4433}R_{60} + \frac{16\sqrt{1438710}}{89063}R_{80}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} + \frac{6}{77}R_{40} - \frac{80\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{12\sqrt{5}}{77}R_{40} - \frac{28\sqrt{65}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{24\sqrt{5005}}{13013}R_{40} + \frac{2\sqrt{385}}{143}R_{60} - \frac{64\sqrt{85085}}{31603}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{120\sqrt{11935}}{31031}R_{40} + \frac{12\sqrt{155155}}{4433}R_{60} - \frac{80\sqrt{202895}}{226083}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{750\sqrt{16926}}{403403}R_{40} + \frac{116\sqrt{1302}}{13299}R_{60} + \frac{64\sqrt{287742}}{89063}R_{80}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	1	$R_{00} - \frac{6}{11}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{36\sqrt{1001}}{13013}R_{40} + \frac{8\sqrt{77}}{143}R_{60} - \frac{112\sqrt{17017}}{31603}R_{80}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{24\sqrt{2387}}{31031}R_{40} - \frac{120\sqrt{31031}}{75361}R_{60} + \frac{2800\sqrt{40579}}{4295577}R_{80} + \frac{8064\sqrt{1023}}{650845}R_{10,0}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{30\sqrt{84630}}{403403}R_{40} - \frac{232\sqrt{6510}}{226083}R_{60} - \frac{448\sqrt{1438710}}{1692197}R_{80} + \frac{12096\sqrt{4030}}{650845}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{28}{169}R_{40} - \frac{32\sqrt{13}}{2873}R_{60} + \frac{2408\sqrt{17}}{54587}R_{80}$ $+ \frac{8640\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{24\sqrt{403}}{5239}R_{40} - \frac{840\sqrt{31}}{6851}R_{60} - \frac{5600\sqrt{6851}}{1692197}R_{80} - \frac{45936\sqrt{8463}}{8460985}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	2	$-\frac{280\sqrt{10230}}{57629}R_{40} - \frac{252\sqrt{132990}}{979693}R_{60} - \frac{5152\sqrt{173910}}{18614167}R_{80} + \frac{19008\sqrt{23870}}{8460985}R_{10,0}$

Table B45: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = G_{2u}$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	1	$R_{00} + \frac{12}{31}R_{40} - \frac{80\sqrt{13}}{403}R_{60} - \frac{280\sqrt{17}}{10013}R_{80}$ $- \frac{384\sqrt{21}}{7657}R_{10,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{84\sqrt{4290}}{57629}R_{40} + \frac{2940\sqrt{330}}{75361}R_{60} + \frac{11480\sqrt{72930}}{55842501}R_{80} - \frac{3888\sqrt{10010}}{8460985}R_{10,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	2	$R_{00} - \frac{9288}{57629}R_{40} + \frac{179600\sqrt{13}}{979693}R_{60} - \frac{117600\sqrt{17}}{1692197}R_{80}$ $- \frac{28224\sqrt{21}}{1692197}R_{10,0}$

Table B46: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	0	1	R_{00}
$\frac{3}{2}$	0	1	$\frac{3}{2}$	2	1	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	2	1	0
$\frac{3}{2}$	0	1	$\frac{7}{2}$	2	1	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	4	1	$-\frac{\sqrt{14}}{7}R_{40}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	4	1	$\frac{2\sqrt{42}}{21}R_{40}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{55}}{11}R_{40}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{1155}}{231}R_{40}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	1	$\frac{2\sqrt{770}}{77}R_{40}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	2	$\frac{2\sqrt{77}}{77}R_{40}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	1	$-\frac{\sqrt{1430}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	2	$\frac{\sqrt{30030}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	1	$-\frac{2\sqrt{858}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	2	$\frac{4\sqrt{2145}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{1591590}}{3445}R_{60}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{24115}}{3445}R_{60}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{29865}}{905}R_{60}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	2	$\frac{219\sqrt{5011890}}{1670630}R_{60}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	3	$-\frac{\sqrt{142142}}{1846}R_{60}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	R_{00}
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{4\sqrt{21}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	2	1	$\frac{2\sqrt{210}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{5\sqrt{14}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{4\sqrt{42}}{147}R_{40}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{7\sqrt{55}}{121}R_{40} - \frac{12\sqrt{715}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{1155}}{363}R_{40} + \frac{12\sqrt{15015}}{1573}R_{60}$

Table B47: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{8\sqrt{770}}{847}R_{40} - \frac{6\sqrt{10010}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{8\sqrt{77}}{847}R_{40} + \frac{60\sqrt{1001}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	1	$-\frac{6\sqrt{110}}{121}R_{40} + \frac{7\sqrt{1430}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	2	$-\frac{2\sqrt{2310}}{847}R_{40} - \frac{7\sqrt{30030}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{66}}{121}R_{40} - \frac{8\sqrt{858}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{2\sqrt{165}}{121}R_{40} + \frac{16\sqrt{2145}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{12\sqrt{1591590}}{17225}R_{60} - \frac{16\sqrt{2081310}}{743325}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{24115}}{17225}R_{60} - \frac{64\sqrt{31535}}{22525}R_{80}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{16\sqrt{29865}}{4525}R_{60} + \frac{112\sqrt{6600165}}{2538525}R_{80}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{219\sqrt{5011890}}{4176575}R_{60} + \frac{3892\sqrt{6554010}}{16385025}R_{80}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{\sqrt{142142}}{4615}R_{60} + \frac{4\sqrt{185878}}{66385}R_{80}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} - \frac{16}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	1	$-\frac{6\sqrt{10}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{6}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{114\sqrt{2}}{539}R_{40} + \frac{20\sqrt{26}}{143}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{1155}}{5929}R_{40} + \frac{16\sqrt{15015}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{3\sqrt{55}}{847}R_{40} - \frac{16\sqrt{715}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	1	$\frac{8\sqrt{330}}{847}R_{40} + \frac{6\sqrt{4290}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{52\sqrt{33}}{847}R_{40} + \frac{60\sqrt{429}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{\sqrt{2310}}{847}R_{40} + \frac{9\sqrt{30030}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	2	$\frac{3\sqrt{110}}{121}R_{40} - \frac{9\sqrt{1430}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{160\sqrt{154}}{11011}R_{40} + \frac{46\sqrt{2002}}{11011}R_{60} - \frac{16\sqrt{2618}}{1547}R_{80}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{16\sqrt{385}}{847}R_{40} + \frac{92\sqrt{5005}}{11011}R_{60}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{150\sqrt{5830}}{53053}R_{40} + \frac{34\sqrt{75790}}{189475}R_{60} - \frac{8896\sqrt{99110}}{9663225}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{100\sqrt{795}}{4081}R_{40} - \frac{94\sqrt{10335}}{189475}R_{60} - \frac{128\sqrt{13515}}{67575}R_{80}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{69685}}{31675}R_{60} - \frac{656\sqrt{15400385}}{17769675}R_{80}$

Table B48: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{3963\sqrt{11694410}}{29236025}R_{60} - \frac{396\sqrt{15292690}}{5461675}R_{80}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{19\sqrt{60918}}{4615}R_{60} - \frac{172\sqrt{79662}}{199155}R_{80}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	1	$R_{00} + \frac{2}{49}R_{40}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{20\sqrt{15}}{539}R_{40} + \frac{10\sqrt{195}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{12\sqrt{5}}{539}R_{40} + \frac{16\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{120\sqrt{462}}{5929}R_{40} - \frac{5\sqrt{6006}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{60\sqrt{22}}{847}R_{40} - \frac{5\sqrt{286}}{121}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{40\sqrt{33}}{847}R_{40} - \frac{30\sqrt{429}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	2	$\frac{12\sqrt{330}}{847}R_{40} - \frac{2\sqrt{4290}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{40\sqrt{231}}{11011}R_{40} + \frac{4\sqrt{3003}}{1573}R_{60} - \frac{56\sqrt{3927}}{7293}R_{80}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	2	$-\frac{20\sqrt{11}}{1573}R_{40} + \frac{4\sqrt{143}}{121}R_{60} - \frac{56\sqrt{187}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{60\sqrt{385}}{11011}R_{40} + \frac{108\sqrt{5005}}{11011}R_{60} + \frac{64\sqrt{6545}}{17017}R_{80}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{90\sqrt{154}}{11011}R_{40} + \frac{36\sqrt{2002}}{11011}R_{60} + \frac{16\sqrt{2618}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{720\sqrt{583}}{53053}R_{40} - \frac{60\sqrt{7579}}{7579}R_{60} + \frac{48\sqrt{9911}}{128843}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{590\sqrt{318}}{53053}R_{40} - \frac{48\sqrt{4134}}{7579}R_{60} - \frac{8\sqrt{5406}}{2067}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{90\sqrt{362362}}{181181}R_{40} - \frac{36\sqrt{27874}}{13937}R_{60} + \frac{120\sqrt{6160154}}{3080077}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	2	$\frac{30795\sqrt{89957}}{12863851}R_{40} + \frac{3610\sqrt{1169441}}{12863851}R_{60} - \frac{356\sqrt{1529269}}{8520213}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{5\sqrt{11715}}{10153}R_{40} + \frac{6\sqrt{152295}}{3905}R_{60} - \frac{244\sqrt{199155}}{863005}R_{80}$
$\frac{5}{2}$	4	1	$\frac{5}{2}$	4	1	$R_{00} + \frac{9}{49}R_{40}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	1	$-\frac{108\sqrt{3}}{539}R_{40} - \frac{10\sqrt{39}}{143}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	1	$\frac{27\sqrt{770}}{11858}R_{40} + \frac{15\sqrt{10010}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{27\sqrt{330}}{1694}R_{40} - \frac{5\sqrt{4290}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{36\sqrt{55}}{11011}R_{40} - \frac{8\sqrt{715}}{1573}R_{60} - \frac{56\sqrt{935}}{2431}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{9\sqrt{22}}{847}R_{40} - \frac{40\sqrt{286}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{385}}{847}R_{40} - \frac{12\sqrt{5005}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{5\sqrt{165}}{121}R_{40} + \frac{4\sqrt{2145}}{1573}R_{60}$

Table B49: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{100\sqrt{231}}{11011}R_{40} + \frac{48\sqrt{3003}}{11011}R_{60} + \frac{72\sqrt{3927}}{17017}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{2310}}{847}R_{40} + \frac{48\sqrt{30030}}{11011}R_{60}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{20\sqrt{8745}}{53053}R_{40} + \frac{34\sqrt{113685}}{37895}R_{60} - \frac{1112\sqrt{148665}}{1932645}R_{80}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{20\sqrt{530}}{4081}R_{40} - \frac{141\sqrt{6890}}{37895}R_{60} - \frac{8\sqrt{9010}}{4505}R_{80}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{418110}}{107695}R_{60} + \frac{656\sqrt{92402310}}{67524765}R_{80} + \frac{1512\sqrt{258830}}{760019}R_{10,0}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	2	$\frac{3963\sqrt{17541615}}{198804970}R_{60} + \frac{792\sqrt{22939035}}{20754365}R_{80} + \frac{5880\sqrt{64255}}{4150873}R_{10,0}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{57\sqrt{10153}}{31382}R_{60} + \frac{344\sqrt{13277}}{252263}R_{80} - \frac{24\sqrt{16401}}{22933}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{6}{539}R_{40} + \frac{64\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{600\sqrt{2310}}{77077}R_{40} - \frac{17\sqrt{30030}}{23595}R_{60} - \frac{784\sqrt{39270}}{401115}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{300\sqrt{110}}{11011}R_{40} - \frac{17\sqrt{1430}}{1815}R_{60} - \frac{784\sqrt{1870}}{133705}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{108\sqrt{165}}{11011}R_{40} + \frac{24\sqrt{2145}}{1573}R_{60} + \frac{448\sqrt{2805}}{80223}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	2	$-\frac{162\sqrt{66}}{11011}R_{40} + \frac{8\sqrt{858}}{1573}R_{60} + \frac{784\sqrt{1122}}{80223}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{120\sqrt{1155}}{11011}R_{40} - \frac{16\sqrt{15015}}{7865}R_{60} + \frac{168\sqrt{19635}}{133705}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{60\sqrt{55}}{1573}R_{40} - \frac{16\sqrt{715}}{605}R_{60} + \frac{504\sqrt{935}}{133705}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{240\sqrt{77}}{11011}R_{40} + \frac{30\sqrt{1001}}{11011}R_{60} + \frac{3200\sqrt{1309}}{561561}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{72\sqrt{770}}{11011}R_{40} + \frac{2\sqrt{10010}}{11011}R_{60} + \frac{160\sqrt{13090}}{80223}R_{80}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{1488\sqrt{2915}}{265265}R_{40} - \frac{360\sqrt{37895}}{128843}R_{60} + \frac{144\sqrt{49555}}{2448017}R_{80} + \frac{224\sqrt{61215}}{85595}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{3658\sqrt{1590}}{795795}R_{40} - \frac{288\sqrt{20670}}{128843}R_{60} - \frac{8\sqrt{27030}}{13091}R_{80} + \frac{2688\sqrt{3710}}{427975}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{24\sqrt{1811810}}{905905}R_{40} + \frac{162\sqrt{139370}}{236929}R_{60} - \frac{2160\sqrt{30800770}}{58521463}R_{80} - \frac{224\sqrt{776490}}{760019}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{8212\sqrt{449785}}{64319255}R_{40} - \frac{16245\sqrt{5847205}}{218685467}R_{60} + \frac{2136\sqrt{7646345}}{53961349}R_{80} + \frac{159544\sqrt{192765}}{103771825}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{2343}}{30459}R_{40} - \frac{27\sqrt{30459}}{13277}R_{60} + \frac{4392\sqrt{39831}}{3279419}R_{80} - \frac{936\sqrt{5467}}{114665}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{63}{3146}R_{40} + \frac{38\sqrt{13}}{1573}R_{60} + \frac{3136\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{75\sqrt{21}}{3146}R_{40} + \frac{76\sqrt{273}}{4719}R_{60} - \frac{448\sqrt{357}}{80223}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{540\sqrt{14}}{11011}R_{40} - \frac{120\sqrt{182}}{1573}R_{60} - \frac{140\sqrt{238}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	2	$-\frac{675\sqrt{35}}{11011}R_{40} + \frac{108\sqrt{455}}{7865}R_{60} - \frac{784\sqrt{595}}{133705}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{45\sqrt{2}}{3146}R_{40} + \frac{42\sqrt{26}}{1573}R_{60} + \frac{1764\sqrt{34}}{26741}R_{80}$

Table B50: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{375\sqrt{42}}{22022}R_{40} + \frac{28\sqrt{546}}{1573}R_{60} - \frac{84\sqrt{714}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{30}}{121}R_{40} - \frac{1160\sqrt{390}}{26741}R_{60} - \frac{140\sqrt{510}}{117249}R_{80} + \frac{144\sqrt{70}}{20995}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{25\sqrt{3}}{121}R_{40} + \frac{1044\sqrt{39}}{26741}R_{60} - \frac{784\sqrt{51}}{117249}R_{80} - \frac{1152\sqrt{7}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{4\sqrt{2226}}{583}R_{40} + \frac{6\sqrt{28938}}{128843}R_{60} - \frac{124\sqrt{37842}}{188309}R_{80} - \frac{30912\sqrt{106}}{1112735}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{2\sqrt{4081}}{6413}R_{40} - \frac{3\sqrt{53053}}{1417273}R_{60} + \frac{1440\sqrt{69377}}{2071399}R_{80} + \frac{18816\sqrt{1749}}{1112735}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	1	$\frac{64\sqrt{7059}}{25883}R_{40} - \frac{972\sqrt{543}}{33847}R_{60} + \frac{1344\sqrt{120003}}{8360209}R_{80} + \frac{7512\sqrt{16471}}{3800095}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{4496\sqrt{848166}}{20214623}R_{40} - \frac{174843\sqrt{11026158}}{1374594364}R_{60} - \frac{44520\sqrt{14418822}}{593574839}R_{80} - \frac{888\sqrt{1979054}}{20754365}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{8\sqrt{4970}}{10153}R_{40} - \frac{999\sqrt{64610}}{690404}R_{60} + \frac{2952\sqrt{84490}}{3279419}R_{80} - \frac{168\sqrt{2130}}{22933}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} - \frac{357}{3146}R_{40} + \frac{190\sqrt{13}}{4719}R_{60} - \frac{2240\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	1	$-\frac{140\sqrt{102}}{6171}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	2	$-\frac{135\sqrt{15}}{1573}R_{40} + \frac{28\sqrt{195}}{7865}R_{60} + \frac{6608\sqrt{255}}{401115}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{375\sqrt{42}}{22022}R_{40} + \frac{28\sqrt{546}}{1573}R_{60} - \frac{84\sqrt{714}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	2	$\frac{255\sqrt{2}}{3146}R_{40} + \frac{70\sqrt{26}}{1573}R_{60} - \frac{1260\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{260\sqrt{1190}}{117249}R_{80} + \frac{144\sqrt{30}}{1235}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{15\sqrt{7}}{121}R_{40} + \frac{116\sqrt{91}}{26741}R_{60} + \frac{944\sqrt{119}}{117249}R_{80} + \frac{1152\sqrt{3}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{1092\sqrt{1802}}{188309}R_{80} - \frac{1088\sqrt{2226}}{65455}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{1749}}{363}R_{40} - \frac{21\sqrt{22737}}{26741}R_{60} + \frac{560\sqrt{29733}}{2071399}R_{80} + \frac{384\sqrt{4081}}{222547}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	1	$\frac{288\sqrt{280007}}{643093}R_{80} - \frac{664\sqrt{7059}}{223535}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	2	$\frac{4\sqrt{1979054}}{111683}R_{40} + \frac{1143\sqrt{25727702}}{7594444}R_{60} - \frac{240\sqrt{33643918}}{31240781}R_{80} - \frac{16\sqrt{848166}}{218467}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	3	$\frac{244\sqrt{2130}}{30459}R_{40} - \frac{189\sqrt{27690}}{690404}R_{60} - \frac{3024\sqrt{36210}}{3279419}R_{80} - \frac{432\sqrt{4970}}{114665}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	1	$R_{00} + \frac{684}{1573}R_{40} + \frac{96\sqrt{13}}{1573}R_{60} + \frac{392\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{36\sqrt{10}}{1573}R_{40} + \frac{56\sqrt{130}}{1573}R_{60} - \frac{56\sqrt{170}}{26741}R_{80}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	1	$\frac{80\sqrt{7}}{11011}R_{40} + \frac{840\sqrt{91}}{26741}R_{60} + \frac{3360\sqrt{119}}{508079}R_{80} + \frac{168\sqrt{3}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{1120\sqrt{51}}{39083}R_{80} + \frac{72\sqrt{7}}{247}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{152\sqrt{105}}{11011}R_{40} - \frac{144\sqrt{1365}}{26741}R_{60} - \frac{2016\sqrt{1785}}{508079}R_{80} - \frac{576\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{40\sqrt{42}}{11011}R_{40} - \frac{420\sqrt{546}}{26741}R_{60} + \frac{1440\sqrt{714}}{508079}R_{80} + \frac{1584\sqrt{2}}{4199}R_{10,0}$

Table B51: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{200\sqrt{159}}{7579}R_{40} - \frac{1624\sqrt{2067}}{128843}R_{60} + \frac{224\sqrt{2703}}{138567}R_{80} + \frac{9072\sqrt{371}}{1112735}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{56\sqrt{1166}}{83369}R_{40} + \frac{4116\sqrt{15158}}{1417273}R_{60} + \frac{448\sqrt{19822}}{508079}R_{80} + \frac{1608\sqrt{24486}}{1112735}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{360\sqrt{98826}}{181181}R_{40} + \frac{202\sqrt{7602}}{33847}R_{60} - \frac{3136\sqrt{1680042}}{25080627}R_{80} + \frac{648\sqrt{4706}}{3800095}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{32\sqrt{2968581}}{1992991}R_{40} - \frac{336\sqrt{38591553}}{4840121}R_{60} - \frac{9904\sqrt{50465877}}{593574839}R_{80} - \frac{111348\sqrt{141361}}{269806745}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{112\sqrt{6035}}{252263}R_{80} - \frac{132\sqrt{7455}}{87685}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	4	2	$R_{00} - \frac{504}{1573}R_{40} + \frac{96\sqrt{13}}{1573}R_{60} - \frac{672\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	1	$\frac{50\sqrt{70}}{11011}R_{40} - \frac{378\sqrt{910}}{133705}R_{60} + \frac{9408\sqrt{1190}}{2540395}R_{80} - \frac{672\sqrt{30}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	2	$\frac{10\sqrt{30}}{1573}R_{40} - \frac{98\sqrt{390}}{133705}R_{60} - \frac{26432\sqrt{510}}{2540395}R_{80} + \frac{288\sqrt{70}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{40\sqrt{42}}{11011}R_{40} - \frac{420\sqrt{546}}{26741}R_{60} + \frac{1440\sqrt{714}}{508079}R_{80} + \frac{1584\sqrt{2}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{16\sqrt{105}}{1573}R_{40} - \frac{144\sqrt{1365}}{26741}R_{60} + \frac{3456\sqrt{1785}}{508079}R_{80} - \frac{576\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{128\sqrt{1590}}{37895}R_{40} - \frac{280\sqrt{20670}}{128843}R_{60} + \frac{15568\sqrt{27030}}{7344051}R_{80} + \frac{144\sqrt{3710}}{222547}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{784\sqrt{2915}}{416845}R_{40} - \frac{5796\sqrt{37895}}{1417273}R_{60} - \frac{3584\sqrt{49555}}{26928187}R_{80} + \frac{4224\sqrt{61215}}{5563675}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	1	$-\frac{384\sqrt{247065}}{905905}R_{40} + \frac{56\sqrt{19005}}{33847}R_{60} + \frac{1888\sqrt{4200105}}{25080627}R_{80} - \frac{5904\sqrt{11765}}{3800095}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	2	$\frac{5612\sqrt{29685810}}{101073115}R_{40} + \frac{14757\sqrt{385915530}}{687297182}R_{60} - \frac{2264\sqrt{504658770}}{593574839}R_{80} + \frac{14568\sqrt{1413610}}{1349033725}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{252\sqrt{142}}{10153}R_{40} + \frac{147\sqrt{1846}}{345202}R_{60} + \frac{14728\sqrt{2414}}{3279419}R_{80} + \frac{1416\sqrt{2982}}{1490645}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	1	$R_{00} + \frac{84}{1573}R_{40} - \frac{60\sqrt{13}}{1573}R_{60} - \frac{980\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	2	$\frac{100\sqrt{21}}{1573}R_{40} - \frac{40\sqrt{273}}{1573}R_{60} + \frac{140\sqrt{357}}{80223}R_{80}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	1	$-\frac{64\sqrt{15}}{1573}R_{40} - \frac{1800\sqrt{195}}{26741}R_{60} - \frac{2800\sqrt{255}}{508079}R_{80} - \frac{72\sqrt{35}}{20995}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	2	$-\frac{200\sqrt{6}}{1573}R_{40} + \frac{810\sqrt{78}}{26741}R_{60} - \frac{7840\sqrt{102}}{508079}R_{80} + \frac{288\sqrt{14}}{4199}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{24\sqrt{1113}}{7579}R_{40} - \frac{40\sqrt{14469}}{128843}R_{60} - \frac{8680\sqrt{18921}}{7344051}R_{80} - \frac{34776\sqrt{53}}{1112735}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{8162}}{83369}R_{40} + \frac{10\sqrt{106106}}{1417273}R_{60} + \frac{16800\sqrt{138754}}{26928187}R_{80} + \frac{10584\sqrt{3498}}{1112735}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	1	$-\frac{48\sqrt{14118}}{440011}R_{40} + \frac{2160\sqrt{1086}}{643093}R_{60} - \frac{1120\sqrt{240006}}{25080627}R_{80} - \frac{135216\sqrt{32942}}{87402185}R_{10,0}$
						$-\frac{672\sqrt{83622}}{1344649}R_{12,4}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{6744\sqrt{424083}}{343648591}R_{40} + \frac{194270\sqrt{5513079}}{6529323229}R_{60} + \frac{74200\sqrt{7209411}}{1780724517}R_{80} + \frac{31968\sqrt{989527}}{477350395}R_{10,0}$
						$-\frac{462\sqrt{424083}}{527459}R_{12,0} - \frac{924\sqrt{3508323}}{95470079}R_{12,4}$

Table B52: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{12\sqrt{2485}}{172601}R_{40} + \frac{1110\sqrt{32305}}{3279419}R_{60} - \frac{1640\sqrt{42245}}{3279419}R_{80} + \frac{6048\sqrt{1065}}{527459}R_{10,0}$ $+ \frac{2574\sqrt{2485}}{527459}R_{12,0} - \frac{11508\sqrt{50765}}{2637295}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{9}{2}$	6	2	$R_{00} - \frac{476}{1573}R_{40} - \frac{100\sqrt{13}}{1573}R_{60} + \frac{700\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	1	$-\frac{400\sqrt{595}}{39083}R_{80} - \frac{72\sqrt{15}}{1235}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	2	$-\frac{120\sqrt{14}}{1573}R_{40} + \frac{90\sqrt{182}}{26741}R_{60} + \frac{9440\sqrt{238}}{508079}R_{80} - \frac{288\sqrt{6}}{4199}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	1	$\frac{1960\sqrt{901}}{188309}R_{80} - \frac{1224\sqrt{1113}}{65455}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	2	$\frac{2\sqrt{3498}}{1573}R_{40} + \frac{70\sqrt{45474}}{26741}R_{60} + \frac{19600\sqrt{59466}}{80784561}R_{80} + \frac{216\sqrt{8162}}{222547}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{80\sqrt{560014}}{643093}R_{80} + \frac{11952\sqrt{14118}}{5141305}R_{10,0} - \frac{4752\sqrt{32942}}{1344649}R_{12,0} + \frac{24192\sqrt{3982}}{1344649}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{6\sqrt{989527}}{1898611}R_{40} - \frac{1270\sqrt{12863851}}{36073609}R_{60} + \frac{400\sqrt{16821959}}{93722343}R_{80} + \frac{576\sqrt{424083}}{5024741}R_{10,0}$ $-\frac{7722\sqrt{989527}}{95470079}R_{12,0} - \frac{133980\sqrt{167063}}{95470079}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	3	$-\frac{122\sqrt{1065}}{172601}R_{40} + \frac{210\sqrt{13845}}{3279419}R_{60} + \frac{1680\sqrt{18105}}{3279419}R_{80} + \frac{15552\sqrt{2485}}{2637295}R_{10,0}$ $-\frac{15246\sqrt{1065}}{2637295}R_{12,0} + \frac{12\sqrt{1066065}}{527459}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{3572}{11011}R_{40} + \frac{480\sqrt{13}}{26741}R_{60} - \frac{8680\sqrt{17}}{508079}R_{80}$ $-\frac{1536\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{188\sqrt{10}}{11011}R_{40} + \frac{280\sqrt{130}}{26741}R_{60} + \frac{1240\sqrt{170}}{508079}R_{80} + \frac{4224\sqrt{210}}{146965}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{6900\sqrt{1855}}{901901}R_{40} - \frac{8120\sqrt{24115}}{2448017}R_{60} + \frac{320\sqrt{31535}}{969969}R_{80} + \frac{9072\sqrt{795}}{25592905}R_{10,0}$ $-\frac{287496\sqrt{1855}}{68903975}R_{12,0} + \frac{528\sqrt{37895}}{393737}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{92\sqrt{122430}}{1417273}R_{40} + \frac{6860\sqrt{1591590}}{26928187}R_{60} + \frac{640\sqrt{2081310}}{10669659}R_{80} + \frac{4824\sqrt{5830}}{25592905}R_{10,0}$ $-\frac{113256\sqrt{122430}}{68903975}R_{12,0} - \frac{17424\sqrt{20670}}{9843425}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{2430\sqrt{23530}}{3080077}R_{40} - \frac{4040\sqrt{1810}}{643093}R_{60} + \frac{7840\sqrt{400010}}{25080627}R_{80} - \frac{34992\sqrt{494130}}{611815295}R_{10,0}$ $+\frac{24948\sqrt{23530}}{33616225}R_{12,0} - \frac{264\sqrt{139370}}{1344649}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{216\sqrt{706805}}{33880847}R_{40} + \frac{6720\sqrt{9188465}}{91962299}R_{60} + \frac{24760\sqrt{12015685}}{593574839}R_{80} + \frac{6012792\sqrt{14842905}}{43438885945}R_{10,0}$ $+\frac{622908\sqrt{706805}}{2386751975}R_{12,0} - \frac{792\sqrt{5847205}}{125618525}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{200\sqrt{25347}}{756789}R_{80} + \frac{21384\sqrt{71}}{403351}R_{10,0} + \frac{5148\sqrt{1491}}{2637295}R_{12,0} - \frac{9768\sqrt{30459}}{2637295}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} - \frac{376}{1573}R_{40} + \frac{480\sqrt{13}}{26741}R_{60} + \frac{14880\sqrt{17}}{508079}R_{80}$ $-\frac{1536\sqrt{21}}{29393}R_{10,0}$

Table B53: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{4416\sqrt{742}}{901901}R_{40} - \frac{7000\sqrt{9646}}{2448017}R_{60} + \frac{111200\sqrt{12614}}{51408357}R_{80} + \frac{720\sqrt{318}}{5118581}R_{10,0}$ $+ \frac{226512\sqrt{742}}{13780795}R_{12,0} - \frac{13728\sqrt{15158}}{1968685}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{1288\sqrt{12243}}{1417273}R_{40} - \frac{48300\sqrt{159159}}{26928187}R_{60} - \frac{25600\sqrt{208131}}{565491927}R_{80} + \frac{12672\sqrt{583}}{25592905}R_{10,0}$ $- \frac{17424\sqrt{12243}}{13780795}R_{12,0} + \frac{11616\sqrt{2067}}{1968685}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	1	$\frac{2592\sqrt{2353}}{3080077}R_{40} - \frac{5600\sqrt{181}}{643093}R_{60} - \frac{23600\sqrt{40001}}{25080627}R_{80} + \frac{318816\sqrt{49413}}{122363059}R_{10,0}$ $- \frac{1584\sqrt{2353}}{292315}R_{12,0} + \frac{34464\sqrt{13937}}{6723245}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{37881\sqrt{282722}}{343648591}R_{40} - \frac{737850\sqrt{3675386}}{6529323229}R_{60} + \frac{28300\sqrt{4806274}}{593574839}R_{80} - \frac{786672\sqrt{5937162}}{43438885945}R_{10,0}$ $+ \frac{203346\sqrt{282722}}{477350395}R_{12,0} + \frac{107316\sqrt{2338882}}{477350395}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{81\sqrt{14910}}{172601}R_{40} - \frac{70\sqrt{193830}}{3279419}R_{60} - \frac{5260\sqrt{253470}}{9838257}R_{80} - \frac{229392\sqrt{710}}{34284835}R_{10,0}$ $+ \frac{7722\sqrt{14910}}{2637295}R_{12,0} - \frac{1548\sqrt{304590}}{2637295}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{3036}{11713}R_{40} + \frac{528\sqrt{13}}{222547}R_{60} + \frac{1208\sqrt{17}}{222547}R_{80}$ $- \frac{362400\sqrt{21}}{5118581}R_{10,0} + \frac{24288}{85595}R_{12,0} - \frac{196416\sqrt{1001}}{9843425}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{1260\sqrt{66}}{128843}R_{40} + \frac{13524\sqrt{858}}{2448017}R_{60} - \frac{2528\sqrt{1122}}{7344051}R_{80} + \frac{2520\sqrt{154}}{222547}R_{10,0}$ $- \frac{178464\sqrt{66}}{9843425}R_{12,0} - \frac{2112\sqrt{546}}{115805}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{2082\sqrt{1745926}}{14840371}R_{40} + \frac{1736\sqrt{134302}}{3098539}R_{60} - \frac{22928\sqrt{29680742}}{281967049}R_{80} + \frac{358512\sqrt{748254}}{926463161}R_{10,0}$ $- \frac{76164\sqrt{1745926}}{2494323895}R_{12,0} + \frac{395208\sqrt{211046}}{1781659925}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{1440\sqrt{52444931}}{163244081}R_{40} + \frac{672\sqrt{681784103}}{23320583}R_{60} + \frac{787296\sqrt{891563827}}{220216265269}R_{80} - \frac{2798136\sqrt{22476399}}{65778884431}R_{10,0}$ $+ \frac{41184\sqrt{52444931}}{885484982725}R_{12,0} - \frac{281952\sqrt{8854339}}{25299570935}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{160\sqrt{959565}}{1215449}R_{80} + \frac{95832\sqrt{131705}}{106888015}R_{10,0} - \frac{837408\sqrt{56445}}{698883175}R_{12,0} + \frac{3168\sqrt{56501445}}{139776635}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{48024}{128843}R_{40} + \frac{14544\sqrt{13}}{2448017}R_{60} - \frac{2056\sqrt{17}}{222547}R_{80}$ $- \frac{349920\sqrt{21}}{5118581}R_{10,0} - \frac{278784}{1968685}R_{12,0} + \frac{16896\sqrt{1001}}{1968685}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{360\sqrt{28807779}}{23320583}R_{40} - \frac{784\sqrt{2215983}}{34083929}R_{60} - \frac{8464\sqrt{489732243}}{9304912617}R_{80} - \frac{2304\sqrt{1371799}}{926463161}R_{10,0}$ $- \frac{208032\sqrt{28807779}}{12471619475}R_{12,0} - \frac{63360\sqrt{28779}}{71266397}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{49644\sqrt{28606326}}{1655761393}R_{40} - \frac{152712\sqrt{371882238}}{31459466467}R_{60} - \frac{527252\sqrt{486307542}}{60058981437}R_{80}$ $- \frac{29407752\sqrt{1362206}}{65778884431}R_{10,0} - \frac{6521658\sqrt{28606326}}{177096996545}R_{12,0} + \frac{3564\sqrt{584386374}}{266311273}R_{12,4}$

Table B54: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_g$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 9.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{72\sqrt{413930}}{172601}R_{40} - \frac{56\sqrt{5381090}}{192907}R_{60} - \frac{68\sqrt{7036810}}{10224071}R_{80} - \frac{10584\sqrt{8692530}}{106888015}R_{10,0}$ $+ \frac{23166\sqrt{413930}}{698883175}R_{12,0} - \frac{24948\sqrt{3424330}}{698883175}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	1	$R_{00} - \frac{9726}{21539}R_{40} + \frac{1248\sqrt{13}}{58463}R_{60} + \frac{3528\sqrt{17}}{58463}R_{80}$ $- \frac{326208\sqrt{21}}{9412543}R_{10,0} + \frac{10164}{292315}R_{12,0} + \frac{8712\sqrt{1001}}{33616225}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{360\sqrt{20306}}{280007}R_{40} + \frac{672\sqrt{1562}}{58463}R_{60} - \frac{20868\sqrt{345202}}{593574839}R_{80} - \frac{445320\sqrt{426426}}{8687777189}R_{10,0}$ $+ \frac{56628\sqrt{20306}}{2386751975}R_{12,0} + \frac{1676664\sqrt{994}}{477350395}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{20\sqrt{596414910}}{4150873}R_{80} - \frac{792\sqrt{1670630}}{365032655}R_{10,0} - \frac{26796\sqrt{35083230}}{2386751975}R_{12,0}$ $+ \frac{7128\sqrt{4240830}}{477350395}R_{12,4}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	2	$R_{00} + \frac{1093401}{2840071}R_{40} - \frac{826828\sqrt{13}}{53961349}R_{60} + \frac{26818\sqrt{17}}{2840071}R_{80}$ $- \frac{337536\sqrt{21}}{35173187}R_{10,0} - \frac{7537695}{95470079}R_{12,0} + \frac{49698\sqrt{1001}}{25123705}R_{12,4}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{9\sqrt{209055}}{15691}R_{40} - \frac{84\sqrt{2717715}}{298129}R_{60} - \frac{6782\sqrt{3553935}}{1780724517}R_{80} - \frac{1124064\sqrt{9955}}{477350395}R_{10,0}$ $+ \frac{150579\sqrt{209055}}{2386751975}R_{12,0} - \frac{17226\sqrt{35295}}{125618525}R_{12,4}$
$\frac{15}{2}$	6	3	$\frac{15}{2}$	6	3	$R_{00} - \frac{3033}{15691}R_{40} - \frac{51780\sqrt{13}}{298129}R_{60} - \frac{990\sqrt{17}}{17537}R_{80}$ $+ \frac{15552\sqrt{21}}{527459}R_{10,0} - \frac{24057}{2637295}R_{12,0} + \frac{5346\sqrt{1001}}{2637295}R_{12,4}$

Table B55: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 5.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	R_{00}
$\frac{3}{2}$	1	1	$\frac{5}{2}$	1	1	0
$\frac{3}{2}$	1	1	$\frac{3}{2}$	3	1	0
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{8\sqrt{2}}{21}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{3}}{3}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{7}}{21}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	5	1	$\frac{2\sqrt{10}}{15}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$-\frac{8\sqrt{6}}{33}R_{40} - \frac{3\sqrt{78}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{8\sqrt{14}}{231}R_{40} + \frac{9\sqrt{182}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{546}}{77}R_{40} - \frac{8\sqrt{42}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{2\sqrt{1365}}{385}R_{40} + \frac{16\sqrt{105}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{12\sqrt{122430}}{3445}R_{60}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	2	$-\frac{6\sqrt{1855}}{3445}R_{60}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	1	1	R_{00}
$\frac{5}{2}$	1	1	$\frac{3}{2}$	3	1	$-\frac{4}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{6}}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{2}}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{3}}{21}R_{40}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{7}}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	1	$\frac{2\sqrt{10}}{55}R_{40} + \frac{12\sqrt{130}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{6}}{33}R_{40} + \frac{21\sqrt{78}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{14}}{11}R_{40} - \frac{3\sqrt{182}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{8\sqrt{546}}{1001}R_{40} + \frac{6\sqrt{42}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{1365}}{385}R_{40} + \frac{12\sqrt{105}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{10\sqrt{1591590}}{53053}R_{40} - \frac{34\sqrt{122430}}{37895}R_{60}$

Table B56: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 5.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	2	$\frac{20\sqrt{24115}}{4081}R_{40} + \frac{282\sqrt{1855}}{37895}R_{60}$
$\frac{3}{2}$	3	1	$\frac{3}{2}$	3	1	R_{00}
$\frac{3}{2}$	3	1	$\frac{5}{2}$	3	1	$\frac{\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{2}}{7}R_{40}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	1	$\frac{\sqrt{3}}{11}R_{40} - \frac{20\sqrt{39}}{429}R_{60}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{7}}{77}R_{40} + \frac{20\sqrt{91}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{10}}{35}R_{40}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{6}}{11}R_{40} + \frac{7\sqrt{78}}{429}R_{60}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{14}}{77}R_{40} - \frac{7\sqrt{182}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{8\sqrt{546}}{1001}R_{40} - \frac{6\sqrt{42}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{8\sqrt{1365}}{5005}R_{40} + \frac{12\sqrt{105}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{4\sqrt{122430}}{3445}R_{60} - \frac{16\sqrt{27057030}}{1932645}R_{80}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	2	$\frac{2\sqrt{1855}}{3445}R_{60} - \frac{64\sqrt{409955}}{58565}R_{80}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} - \frac{1}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{12\sqrt{3}}{77}R_{40} + \frac{50\sqrt{39}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	1	$\frac{9\sqrt{2}}{154}R_{40} + \frac{35\sqrt{26}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{9\sqrt{42}}{154}R_{40} - \frac{5\sqrt{546}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{36\sqrt{15}}{385}R_{40} - \frac{14\sqrt{195}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{3}{77}R_{40} + \frac{28\sqrt{13}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{3\sqrt{21}}{77}R_{40} - \frac{4\sqrt{273}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{212\sqrt{91}}{13013}R_{40} + \frac{8\sqrt{7}}{143}R_{60} - \frac{40\sqrt{1547}}{2873}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{53\sqrt{910}}{5005}R_{40} + \frac{8\sqrt{70}}{143}R_{60}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{60\sqrt{265265}}{689689}R_{40} + \frac{102\sqrt{20405}}{37895}R_{60} - \frac{1112\sqrt{4509505}}{8374795}R_{80}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{20\sqrt{144690}}{53053}R_{40} - \frac{141\sqrt{11130}}{37895}R_{60} - \frac{8\sqrt{2459730}}{58565}R_{80}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} - \frac{2}{231}R_{40} + \frac{320\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{40\sqrt{6}}{231}R_{40} - \frac{35\sqrt{78}}{1287}R_{60}$

Table B57: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 5.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{20\sqrt{14}}{231}R_{40} - \frac{5\sqrt{182}}{99}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{5}}{231}R_{40} + \frac{112\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{680\sqrt{3}}{3003}R_{40} - \frac{28\sqrt{39}}{1287}R_{60} - \frac{392\sqrt{51}}{7293}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{340\sqrt{7}}{3003}R_{40} - \frac{4\sqrt{91}}{99}R_{60} - \frac{56\sqrt{119}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{120\sqrt{273}}{13013}R_{40} + \frac{10\sqrt{21}}{143}R_{60} + \frac{1280\sqrt{4641}}{284427}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{36\sqrt{2730}}{13013}R_{40} + \frac{2\sqrt{210}}{429}R_{60} + \frac{448\sqrt{46410}}{284427}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{240\sqrt{795795}}{689689}R_{40} - \frac{20\sqrt{61215}}{7579}R_{60} + \frac{16\sqrt{13528515}}{1674959}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{590\sqrt{48230}}{689689}R_{40} - \frac{48\sqrt{3710}}{7579}R_{60} - \frac{8\sqrt{819910}}{26871}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	1	$R_{00} + \frac{1}{22}R_{40} - \frac{10\sqrt{13}}{429}R_{60}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{25\sqrt{21}}{462}R_{40} - \frac{20\sqrt{273}}{1287}R_{60}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{40\sqrt{30}}{3003}R_{40} + \frac{49\sqrt{390}}{6435}R_{60} - \frac{784\sqrt{510}}{36465}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{2}}{286}R_{40} + \frac{14\sqrt{26}}{429}R_{60} + \frac{196\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{125\sqrt{42}}{6006}R_{40} + \frac{28\sqrt{546}}{1287}R_{60} - \frac{28\sqrt{714}}{7293}R_{80}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{180\sqrt{182}}{13013}R_{40} - \frac{40\sqrt{14}}{143}R_{60} - \frac{140\sqrt{3094}}{94809}R_{80}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{225\sqrt{455}}{13013}R_{40} + \frac{36\sqrt{35}}{715}R_{60} - \frac{784\sqrt{7735}}{474045}R_{80}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{60\sqrt{530530}}{98527}R_{40} + \frac{2\sqrt{40810}}{7579}R_{60} + \frac{124\sqrt{9019010}}{5024877}R_{80}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	2	$\frac{10\sqrt{72345}}{98527}R_{40} - \frac{\sqrt{5565}}{22737}R_{60} - \frac{160\sqrt{1229865}}{1674959}R_{80}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	3	2	$R_{00} - \frac{17}{66}R_{40} - \frac{50\sqrt{13}}{1287}R_{60}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	5	1	$-\frac{20\sqrt{70}}{3003}R_{40} + \frac{7\sqrt{910}}{495}R_{60} - \frac{112\sqrt{1190}}{12155}R_{80}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{125\sqrt{42}}{6006}R_{40} + \frac{28\sqrt{546}}{1287}R_{60} - \frac{28\sqrt{714}}{7293}R_{80}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{85\sqrt{2}}{858}R_{40} + \frac{70\sqrt{26}}{1287}R_{60} - \frac{140\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{140\sqrt{1326}}{21879}R_{80}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	2	$-\frac{45\sqrt{195}}{1859}R_{40} + \frac{28\sqrt{15}}{2145}R_{60} + \frac{6608\sqrt{3315}}{1422135}R_{80}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	1	$-\frac{28\sqrt{3865290}}{386529}R_{80}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	2	$-\frac{10\sqrt{3445}}{1859}R_{40} - \frac{7\sqrt{265}}{143}R_{60} - \frac{560\sqrt{58565}}{5024877}R_{80}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	1	$R_{00} + \frac{2}{33}R_{40} - \frac{128\sqrt{13}}{1287}R_{60}$

Table B58: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 5.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	1	$-\frac{40\sqrt{15}}{429}R_{40} - \frac{112\sqrt{195}}{6435}R_{60} + \frac{392\sqrt{255}}{36465}R_{80}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{20\sqrt{35}}{429}R_{40} - \frac{16\sqrt{455}}{495}R_{60} + \frac{56\sqrt{595}}{12155}R_{80}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{36\sqrt{1365}}{13013}R_{40} + \frac{8\sqrt{105}}{143}R_{60} + \frac{448\sqrt{23205}}{284427}R_{80}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	2	$-\frac{54\sqrt{546}}{13013}R_{40} + \frac{8\sqrt{42}}{429}R_{60} + \frac{784\sqrt{9282}}{284427}R_{80}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{48\sqrt{159159}}{689689}R_{40} + \frac{200\sqrt{12243}}{128843}R_{60} - \frac{560\sqrt{2705703}}{31824221}R_{80} + \frac{2016\sqrt{7579}}{222547}R_{10,0}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{118\sqrt{9646}}{689689}R_{40} + \frac{480\sqrt{742}}{128843}R_{60} + \frac{280\sqrt{163982}}{510549}R_{80} + \frac{8064\sqrt{4134}}{1112735}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{4}{143}R_{40} + \frac{4\sqrt{13}}{429}R_{60} + \frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{100\sqrt{21}}{3003}R_{40} + \frac{8\sqrt{273}}{1287}R_{60} - \frac{28\sqrt{357}}{7293}R_{80}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{240\sqrt{91}}{13013}R_{40} - \frac{760\sqrt{7}}{2431}R_{60} - \frac{1120\sqrt{1547}}{1801371}R_{80} + \frac{504\sqrt{39}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$-\frac{150\sqrt{910}}{13013}R_{40} + \frac{342\sqrt{70}}{12155}R_{60} - \frac{3136\sqrt{15470}}{9006855}R_{80} - \frac{2016\sqrt{390}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	1	$\frac{24\sqrt{265265}}{98527}R_{40} - \frac{40\sqrt{20405}}{128843}R_{60} - \frac{8680\sqrt{4509505}}{95472663}R_{80} - \frac{11592\sqrt{113685}}{14465555}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	2	$-\frac{2\sqrt{144690}}{98527}R_{40} + \frac{10\sqrt{11130}}{386529}R_{60} + \frac{5600\sqrt{2459730}}{31824221}R_{80} + \frac{116424\sqrt{6890}}{14465555}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} - \frac{68}{429}R_{40} + \frac{20\sqrt{13}}{1287}R_{60} - \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{1120\sqrt{663}}{415701}R_{80} + \frac{216\sqrt{91}}{3211}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$-\frac{30\sqrt{390}}{1859}R_{40} + \frac{266\sqrt{30}}{36465}R_{60} + \frac{26432\sqrt{6630}}{27020565}R_{80} + \frac{864\sqrt{910}}{54587}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	1	$\frac{1960\sqrt{1932645}}{7344051}R_{80} - \frac{1224\sqrt{265265}}{850915}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	2	$\frac{2\sqrt{6890}}{1859}R_{40} + \frac{70\sqrt{530}}{2431}R_{60} + \frac{19600\sqrt{117130}}{95472663}R_{80} + \frac{792\sqrt{144690}}{2893111}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{532}{1859}R_{40} + \frac{96\sqrt{13}}{31603}R_{60} - \frac{16856\sqrt{17}}{600457}R_{80}$ $-\frac{3840\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{28\sqrt{10}}{1859}R_{40} + \frac{56\sqrt{130}}{31603}R_{60} + \frac{2408\sqrt{170}}{600457}R_{80} + \frac{2112\sqrt{210}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	1	$\frac{600\sqrt{2915}}{98527}R_{40} - \frac{4872\sqrt{37895}}{1674959}R_{60} + \frac{224\sqrt{49555}}{600457}R_{80} + \frac{9072\sqrt{61215}}{14465555}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{56\sqrt{1590}}{98527}R_{40} + \frac{4116\sqrt{20670}}{1674959}R_{60} + \frac{448\sqrt{27030}}{600457}R_{80} + \frac{53064\sqrt{3710}}{14465555}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} - \frac{392}{1859}R_{40} + \frac{96\sqrt{13}}{31603}R_{60} + \frac{28896\sqrt{17}}{600457}R_{80}$ $-\frac{3840\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	1	$-\frac{384\sqrt{1166}}{98527}R_{40} - \frac{4200\sqrt{15158}}{1674959}R_{60} + \frac{77840\sqrt{19822}}{31824221}R_{80} + \frac{720\sqrt{24486}}{2893111}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{784\sqrt{159}}{98527}R_{40} - \frac{28980\sqrt{2067}}{1674959}R_{60} - \frac{17920\sqrt{2703}}{31824221}R_{80} + \frac{139392\sqrt{371}}{14465555}R_{10,0}$

Table B59: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = 0$, irrep $\Lambda_B = H_u$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 5.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	1	$R_{00} - \frac{3036}{8957}R_{40} + \frac{880\sqrt{13}}{152269}R_{60} - \frac{42280\sqrt{17}}{2893111}R_{80}$ $+ \frac{72480\sqrt{21}}{2893111}R_{10,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{1260\sqrt{66}}{98527}R_{40} + \frac{22540\sqrt{858}}{1674959}R_{60} + \frac{88480\sqrt{1122}}{95472663}R_{80} - \frac{11592\sqrt{154}}{2893111}R_{10,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	2	$R_{00} + \frac{48024}{98527}R_{40} + \frac{24240\sqrt{13}}{1674959}R_{60} + \frac{71960\sqrt{17}}{2893111}R_{80}$ $+ \frac{69984\sqrt{21}}{2893111}R_{10,0}$

Table B60: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	0	1	0	0	1	R_{00}
0	0	1	1	1	1	R_{10}
0	0	1	2	2	1	R_{20}
0	0	1	3	3	1	R_{30}
0	0	1	4	4	1	$\sqrt{2}R_{44}$
0	0	1	4	4	2	R_{40}
0	0	1	5	5	1	$\sqrt{2}R_{54}$
0	0	1	5	5	2	R_{50}
0	0	1	6	6	1	$\sqrt{2}R_{64}$
0	0	1	6	6	2	R_{60}
1	1	1	1	1	1	$R_{00} + \frac{2\sqrt{5}}{5}R_{20}$
1	1	1	2	2	1	$\frac{2\sqrt{5}}{5}R_{10} + \frac{3\sqrt{105}}{35}R_{30}$
1	1	1	3	3	1	$\frac{3\sqrt{105}}{35}R_{20} + \frac{4\sqrt{21}}{21}R_{40}$
1	1	1	4	4	1	$\frac{\sqrt{66}}{11}R_{54}$
1	1	1	4	4	2	$\frac{4\sqrt{21}}{21}R_{30} + \frac{5\sqrt{33}}{33}R_{50}$
1	1	1	5	5	1	$\frac{\sqrt{66}}{11}R_{44} + \frac{2\sqrt{4290}}{143}R_{64}$
1	1	1	5	5	2	$\frac{5\sqrt{33}}{33}R_{40} + \frac{6\sqrt{429}}{143}R_{60}$
1	1	1	6	6	1	$\frac{2\sqrt{4290}}{143}R_{54} + \frac{\sqrt{4290}}{65}R_{74}$
1	1	1	6	6	2	$\frac{6\sqrt{429}}{143}R_{50} + \frac{7\sqrt{65}}{65}R_{70}$
2	2	1	2	2	1	$R_{00} + \frac{2\sqrt{5}}{7}R_{20} + \frac{6}{7}R_{40}$
2	2	1	3	3	1	$\frac{3\sqrt{105}}{35}R_{10} + \frac{4\sqrt{5}}{15}R_{30} + \frac{10\sqrt{385}}{231}R_{50}$
2	2	1	4	4	1	$-\frac{4\sqrt{10}}{11}R_{44} + \frac{15\sqrt{26}}{143}R_{64}$
2	2	1	4	4	2	$\frac{6}{7}R_{20} + \frac{20\sqrt{5}}{77}R_{40} + \frac{15\sqrt{65}}{143}R_{60}$
2	2	1	5	5	1	$-\frac{2\sqrt{10}}{13}R_{54} + \frac{3\sqrt{10}}{13}R_{74}$
2	2	1	5	5	2	$\frac{10\sqrt{385}}{231}R_{30} + \frac{10\sqrt{5}}{39}R_{50} + \frac{21\sqrt{33}}{143}R_{70}$
2	2	1	6	6	1	$\frac{15\sqrt{26}}{143}R_{44} - \frac{2\sqrt{10}}{55}R_{64} + \frac{6\sqrt{24310}}{1105}R_{84}$

Table B61: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	6	6	2	$\frac{15\sqrt{65}}{143}R_{40} + \frac{14\sqrt{5}}{55}R_{60} + \frac{28\sqrt{1105}}{1105}R_{80}$
3	3	1	3	3	1	$R_{00} + \frac{4\sqrt{5}}{15}R_{20} + \frac{6}{11}R_{40} + \frac{100\sqrt{13}}{429}R_{60}$
3	3	1	4	4	1	$-\frac{12\sqrt{154}}{143}R_{54} + \frac{5\sqrt{154}}{143}R_{74}$
3	3	1	4	4	2	$\frac{4\sqrt{21}}{21}R_{10} + \frac{6}{11}R_{30} + \frac{60\sqrt{77}}{1001}R_{50} + \frac{35\sqrt{105}}{429}R_{70}$
3	3	1	5	5	1	$-\frac{12\sqrt{154}}{143}R_{44} - \frac{\sqrt{10010}}{143}R_{64} + \frac{4\sqrt{1190}}{221}R_{84}$
3	3	1	5	5	2	$\frac{10\sqrt{385}}{231}R_{20} + \frac{60\sqrt{77}}{1001}R_{40} + \frac{7\sqrt{1001}}{429}R_{60} + \frac{56\sqrt{1309}}{2431}R_{80}$
3	3	1	6	6	1	$-\frac{\sqrt{10010}}{143}R_{54} - \frac{48\sqrt{10010}}{12155}R_{74} + \frac{2\sqrt{14630}}{323}R_{94}$
3	3	1	6	6	2	$\frac{100\sqrt{13}}{429}R_{30} + \frac{7\sqrt{1001}}{429}R_{50} + \frac{168\sqrt{1365}}{12155}R_{70} + \frac{84\sqrt{1729}}{4199}R_{90}$
4	4	1	4	4	1	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80} + \frac{21\sqrt{24310}}{2431}R_{88}$
4	4	1	4	4	2	$\frac{54\sqrt{2}}{143}R_{44} - \frac{12\sqrt{130}}{143}R_{64} + \frac{21\sqrt{1870}}{2431}R_{84}$
4	4	1	5	5	1	$\frac{\sqrt{33}}{11}R_{10} - \frac{12\sqrt{77}}{143}R_{30} + \frac{6}{13}R_{50} - \frac{28\sqrt{165}}{2431}R_{70}$ $+ \frac{63\sqrt{209}}{46189}R_{90} + \frac{21\sqrt{41990}}{4199}R_{98}$
4	4	1	5	5	2	$\frac{6\sqrt{2}}{13}R_{54} - \frac{140\sqrt{2}}{221}R_{74} + \frac{63\sqrt{494}}{4199}R_{94}$
4	4	1	6	6	1	$\frac{15\sqrt{13}}{143}R_{20} - \frac{12\sqrt{65}}{143}R_{40} + \frac{42\sqrt{5}}{187}R_{60} - \frac{252\sqrt{1105}}{46189}R_{80}$ $- \frac{84\sqrt{374}}{3553}R_{88} + \frac{3\sqrt{1365}}{4199}R_{10,0} + \frac{3\sqrt{7854}}{323}R_{10,8}$
4	4	1	6	6	2	$-\frac{4\sqrt{26}}{143}R_{44} + \frac{42\sqrt{10}}{187}R_{64} - \frac{252\sqrt{24310}}{46189}R_{84} + \frac{21\sqrt{22}}{323}R_{10,4}$
4	4	2	4	4	2	$R_{00} + \frac{20\sqrt{5}}{77}R_{20} + \frac{486}{1001}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$ $+ \frac{490\sqrt{17}}{2431}R_{80}$
4	4	2	5	5	1	$-\frac{6\sqrt{2}}{13}R_{54} - \frac{120\sqrt{2}}{221}R_{74} + \frac{105\sqrt{494}}{4199}R_{94}$
4	4	2	5	5	2	$\frac{5\sqrt{33}}{33}R_{10} + \frac{60\sqrt{77}}{1001}R_{30} + \frac{6}{13}R_{50} + \frac{280\sqrt{165}}{7293}R_{70}$ $+ \frac{2646\sqrt{209}}{46189}R_{90}$
4	4	2	6	6	1	$-\frac{12\sqrt{130}}{143}R_{44} - \frac{96\sqrt{2}}{187}R_{64} - \frac{348\sqrt{4862}}{46189}R_{84} + \frac{21\sqrt{110}}{323}R_{10,4}$
4	4	2	6	6	2	$\frac{15\sqrt{65}}{143}R_{20} + \frac{20\sqrt{13}}{143}R_{40} + \frac{84}{187}R_{60} + \frac{1512\sqrt{221}}{46189}R_{80}$ $+ \frac{210\sqrt{273}}{4199}R_{10,0}$

Table B62: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 3.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	1	$R_{00} - \frac{2\sqrt{5}}{13}R_{20} - \frac{6}{13}R_{40} + \frac{32\sqrt{13}}{221}R_{60}$ $- \frac{217\sqrt{17}}{4199}R_{80} + \frac{21\sqrt{24310}}{4199}R_{88} + \frac{30\sqrt{21}}{4199}R_{10,0} + \frac{6\sqrt{510510}}{4199}R_{10,8}$
5	5	1	5	5	2	$\frac{6\sqrt{2}}{13}R_{44} - \frac{8\sqrt{130}}{221}R_{64} - \frac{77\sqrt{1870}}{4199}R_{84} + \frac{126\sqrt{286}}{4199}R_{10,4}$
5	5	1	6	6	1	$\frac{2\sqrt{2145}}{143}R_{10} - \frac{\sqrt{5005}}{143}R_{30} - \frac{8\sqrt{65}}{221}R_{50} + \frac{70\sqrt{429}}{2717}R_{70}$ $- \frac{6\sqrt{13585}}{2717}R_{90} + \frac{6\sqrt{646}}{323}R_{98} + \frac{33\sqrt{16445}}{96577}R_{11,0} + \frac{33\sqrt{44574}}{7429}R_{11,8}$
5	5	1	6	6	2	$\frac{32\sqrt{26}}{221}R_{54} - \frac{210\sqrt{26}}{4199}R_{74} - \frac{42\sqrt{38}}{323}R_{94} + \frac{231\sqrt{230}}{7429}R_{11,4}$
5	5	2	5	5	2	$R_{00} + \frac{10\sqrt{5}}{39}R_{20} + \frac{6}{13}R_{40} + \frac{80\sqrt{13}}{663}R_{60}$ $+ \frac{490\sqrt{17}}{4199}R_{80} + \frac{756\sqrt{21}}{4199}R_{10,0}$
5	5	2	6	6	1	$- \frac{8\sqrt{130}}{221}R_{54} - \frac{240\sqrt{130}}{4199}R_{74} - \frac{14\sqrt{190}}{323}R_{94} + \frac{693\sqrt{46}}{7429}R_{11,4}$
5	5	2	6	6	2	$\frac{6\sqrt{429}}{143}R_{10} + \frac{7\sqrt{1001}}{429}R_{30} + \frac{80\sqrt{13}}{663}R_{50} + \frac{420\sqrt{2145}}{46189}R_{70}$ $+ \frac{420\sqrt{2717}}{46189}R_{90} + \frac{1386\sqrt{3289}}{96577}R_{11,0}$
6	6	1	6	6	1	$R_{00} - \frac{2\sqrt{5}}{55}R_{20} - \frac{96}{187}R_{40} - \frac{80\sqrt{13}}{3553}R_{60}$ $+ \frac{445\sqrt{17}}{3553}R_{80} + \frac{15\sqrt{24310}}{3553}R_{88} - \frac{498\sqrt{21}}{7429}R_{10,0} + \frac{6\sqrt{510510}}{7429}R_{10,8}$ $+ \frac{2178}{37145}R_{12,0} + \frac{66\sqrt{277134}}{37145}R_{12,8}$
6	6	1	6	6	2	$\frac{42\sqrt{10}}{187}R_{44} - \frac{80\sqrt{26}}{3553}R_{64} - \frac{105\sqrt{374}}{3553}R_{84} - \frac{126\sqrt{1430}}{7429}R_{10,4}$ $+ \frac{1848\sqrt{143}}{37145}R_{12,4}$
6	6	2	6	6	2	$R_{00} + \frac{14\sqrt{5}}{55}R_{20} + \frac{84}{187}R_{40} + \frac{400\sqrt{13}}{3553}R_{60}$ $+ \frac{350\sqrt{17}}{3553}R_{80} + \frac{756\sqrt{21}}{7429}R_{10,0} + \frac{30492}{37145}R_{12,0}$

Table B63: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown.

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	4	1	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80} - \frac{21\sqrt{24310}}{2431}R_{88}$
4	4	1	5	5	1	$\frac{\sqrt{33}}{11}R_{10} - \frac{12\sqrt{77}}{143}R_{30} + \frac{6}{13}R_{50} - \frac{28\sqrt{165}}{2431}R_{70}$ $+ \frac{63\sqrt{209}}{46189}R_{90} - \frac{21\sqrt{41990}}{4199}R_{98}$
4	4	1	6	6	1	$\frac{15\sqrt{13}}{143}R_{20} - \frac{12\sqrt{65}}{143}R_{40} + \frac{42\sqrt{5}}{187}R_{60} - \frac{252\sqrt{1105}}{46189}R_{80}$ $+ \frac{84\sqrt{374}}{3553}R_{88} + \frac{3\sqrt{1365}}{4199}R_{10,0} - \frac{3\sqrt{7854}}{323}R_{10,8}$
5	5	1	5	5	1	$R_{00} - \frac{2\sqrt{5}}{13}R_{20} - \frac{6}{13}R_{40} + \frac{32\sqrt{13}}{221}R_{60}$ $- \frac{217\sqrt{17}}{4199}R_{80} - \frac{21\sqrt{24310}}{4199}R_{88} + \frac{30\sqrt{21}}{4199}R_{10,0} - \frac{6\sqrt{510510}}{4199}R_{10,8}$
5	5	1	6	6	1	$\frac{2\sqrt{2145}}{143}R_{10} - \frac{\sqrt{5005}}{143}R_{30} - \frac{8\sqrt{65}}{221}R_{50} + \frac{70\sqrt{429}}{2717}R_{70}$ $- \frac{6\sqrt{13585}}{2717}R_{90} - \frac{6\sqrt{646}}{323}R_{98} + \frac{33\sqrt{16445}}{96577}R_{11,0} - \frac{33\sqrt{44574}}{7429}R_{11,8}$
6	6	1	6	6	1	$R_{00} - \frac{2\sqrt{5}}{55}R_{20} - \frac{96}{187}R_{40} - \frac{80\sqrt{13}}{3553}R_{60}$ $+ \frac{445\sqrt{17}}{3553}R_{80} - \frac{15\sqrt{24310}}{3553}R_{88} - \frac{498\sqrt{21}}{7429}R_{10,0} - \frac{6\sqrt{510510}}{7429}R_{10,8}$ $+ \frac{2178}{37145}R_{12,0} - \frac{66\sqrt{277134}}{37145}R_{12,8}$

Table B64: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40} + \frac{\sqrt{70}}{7}R_{44}$
2	2	1	3	3	1	$\frac{\sqrt{21}}{7}R_{10} - \frac{2}{3}R_{30} + \frac{5\sqrt{77}}{231}R_{50} + \frac{\sqrt{110}}{11}R_{54}$
2	2	1	4	4	1	$\frac{\sqrt{15}}{7}R_{20} - \frac{30\sqrt{3}}{77}R_{40} - \frac{2\sqrt{210}}{77}R_{44} + \frac{5\sqrt{39}}{143}R_{60}$ $+ \frac{5\sqrt{546}}{143}R_{64}$
2	2	1	5	5	1	$\frac{5\sqrt{11}}{33}R_{30} - \frac{10\sqrt{7}}{39}R_{50} - \frac{2\sqrt{10}}{13}R_{54} + \frac{\sqrt{1155}}{143}R_{70}$ $+ \frac{3\sqrt{10}}{13}R_{74}$
2	2	1	6	6	1	$\frac{15\sqrt{143}}{143}R_{44} - \frac{2\sqrt{55}}{55}R_{64} + \frac{\sqrt{1105}}{1105}R_{84} + \frac{2\sqrt{119}}{17}R_{88}$
2	2	1	6	6	2	$\frac{5\sqrt{182}}{143}R_{40} + \frac{\sqrt{65}}{143}R_{44} - \frac{2\sqrt{14}}{11}R_{60} - \frac{6}{11}R_{64}$ $+ \frac{\sqrt{3094}}{221}R_{80} + \frac{3\sqrt{2431}}{221}R_{84}$
3	3	1	3	3	1	$R_{00} - \frac{7}{11}R_{40} + \frac{\sqrt{70}}{11}R_{44} + \frac{10\sqrt{13}}{143}R_{60}$ $+ \frac{10\sqrt{182}}{143}R_{64}$
3	3	1	4	4	1	$\frac{2\sqrt{7}}{7}R_{10} - \frac{\sqrt{3}}{11}R_{30} - \frac{40\sqrt{231}}{1001}R_{50} + \frac{4\sqrt{330}}{143}R_{54}$ $+ \frac{7\sqrt{35}}{143}R_{70} + \frac{7\sqrt{330}}{143}R_{74}$
3	3	1	5	5	1	$\frac{\sqrt{55}}{11}R_{20} - \frac{10\sqrt{11}}{143}R_{40} - \frac{2\sqrt{770}}{143}R_{44} - \frac{7\sqrt{143}}{143}R_{60}$ $+ \frac{\sqrt{2002}}{143}R_{64} + \frac{56\sqrt{187}}{2431}R_{80} + \frac{12\sqrt{238}}{221}R_{84}$
3	3	1	6	6	1	$\frac{\sqrt{91}}{13}R_{54} - \frac{6\sqrt{91}}{221}R_{74} + \frac{\sqrt{133}}{323}R_{94} + \frac{14\sqrt{323}}{323}R_{98}$
3	3	1	6	6	2	$\frac{20\sqrt{182}}{429}R_{30} - \frac{7\sqrt{286}}{429}R_{50} - \frac{\sqrt{5005}}{143}R_{54} - \frac{70\sqrt{390}}{2431}R_{70}$ $+ \frac{6\sqrt{5005}}{2431}R_{74} + \frac{63\sqrt{494}}{4199}R_{90} + \frac{3\sqrt{7315}}{323}R_{94}$
4	4	1	4	4	1	$R_{00} + \frac{8\sqrt{5}}{77}R_{20} - \frac{27}{91}R_{40} + \frac{81\sqrt{70}}{1001}R_{44}$ $- \frac{2\sqrt{13}}{13}R_{60} + \frac{6\sqrt{182}}{143}R_{64} + \frac{196\sqrt{17}}{2431}R_{80} + \frac{42\sqrt{2618}}{2431}R_{84}$
4	4	1	5	5	1	$\frac{\sqrt{77}}{11}R_{10} + \frac{2\sqrt{33}}{143}R_{30} - \frac{\sqrt{21}}{13}R_{50} + \frac{\sqrt{30}}{13}R_{54}$ $- \frac{64\sqrt{385}}{2431}R_{70} + \frac{20\sqrt{30}}{221}R_{74} + \frac{252\sqrt{4389}}{46189}R_{90} + \frac{42\sqrt{7410}}{4199}R_{94}$
4	4	1	6	6	1	$-\frac{4\sqrt{429}}{143}R_{44} + \frac{9\sqrt{165}}{187}R_{64} - \frac{18\sqrt{3315}}{4199}R_{84} - \frac{12\sqrt{357}}{323}R_{88}$ $+ \frac{7\sqrt{3}}{323}R_{10,4} + \frac{42\sqrt{17}}{323}R_{10,8}$
4	4	1	6	6	2	$\frac{2\sqrt{2730}}{143}R_{20} - \frac{4\sqrt{195}}{143}R_{44} - \frac{\sqrt{42}}{17}R_{60} + \frac{23\sqrt{3}}{187}R_{64}$ $- \frac{18\sqrt{9282}}{3553}R_{80} + \frac{222\sqrt{7293}}{46189}R_{84} + \frac{315\sqrt{26}}{4199}R_{10,0} + \frac{21\sqrt{165}}{323}R_{10,4}$

Table B65: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	1	$R_{00} + \frac{2\sqrt{5}}{13}R_{20} - \frac{1}{13}R_{40} + \frac{\sqrt{70}}{13}R_{44}$ $- \frac{24\sqrt{13}}{221}R_{60} + \frac{8\sqrt{182}}{221}R_{64} - \frac{28\sqrt{17}}{247}R_{80} + \frac{42\sqrt{2618}}{4199}R_{84}$ $+ \frac{360\sqrt{21}}{4199}R_{10,0} + \frac{36\sqrt{10010}}{4199}R_{10,4}$
5	5	1	6	6	1	$- \frac{4\sqrt{1001}}{221}R_{54} + \frac{75\sqrt{1001}}{4199}R_{74} - \frac{2\sqrt{1463}}{323}R_{94} - \frac{4\sqrt{3553}}{323}R_{98}$ $+ \frac{3\sqrt{8855}}{7429}R_{11,4} + \frac{6\sqrt{245157}}{7429}R_{11,8}$
5	5	1	6	6	2	$\frac{4\sqrt{858}}{143}R_{10} + \frac{2\sqrt{2002}}{429}R_{30} - \frac{20\sqrt{26}}{663}R_{50} + \frac{4\sqrt{455}}{221}R_{54}$ $- \frac{287\sqrt{4290}}{46189}R_{70} + \frac{81\sqrt{455}}{4199}R_{74} - \frac{270\sqrt{5434}}{46189}R_{90} + \frac{6\sqrt{665}}{323}R_{94}$ $+ \frac{495\sqrt{6578}}{96577}R_{11,0} + \frac{495\sqrt{161}}{7429}R_{11,4}$
6	6	1	6	6	1	$R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40} - \frac{20\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} + \frac{33}{37145}R_{12,0} + \frac{66\sqrt{676039}}{37145}R_{12,12}$
6	6	1	6	6	2	$\frac{3\sqrt{154}}{187}R_{44} - \frac{20\sqrt{10010}}{3553}R_{64} + \frac{5\sqrt{1190}}{323}R_{84} + \frac{5\sqrt{442}}{323}R_{88}$ $- \frac{126\sqrt{182}}{7429}R_{10,4} - \frac{54\sqrt{9282}}{7429}R_{10,8} + \frac{66\sqrt{455}}{37145}R_{12,4} + \frac{33\sqrt{125970}}{37145}R_{12,8}$
6	6	2	6	6	2	$R_{00} + \frac{2\sqrt{5}}{11}R_{20} + \frac{1}{17}R_{40} + \frac{14\sqrt{70}}{187}R_{44}$ $- \frac{20\sqrt{13}}{323}R_{60} + \frac{120\sqrt{182}}{3553}R_{64} - \frac{355\sqrt{17}}{3553}R_{80} + \frac{30\sqrt{2618}}{3553}R_{84}$ $- \frac{630\sqrt{21}}{7429}R_{10,0} + \frac{36\sqrt{10010}}{7429}R_{10,4} + \frac{3267}{7429}R_{12,0} + \frac{198\sqrt{1001}}{7429}R_{12,4}$

Table B66: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40} - \frac{\sqrt{70}}{7}R_{44}$
2	2	1	3	3	1	$\frac{\sqrt{21}}{7}R_{10} - \frac{2}{3}R_{30} + \frac{5\sqrt{77}}{231}R_{50} - \frac{\sqrt{110}}{11}R_{54}$
2	2	1	4	4	1	$\frac{\sqrt{15}}{7}R_{20} - \frac{30\sqrt{3}}{77}R_{40} + \frac{2\sqrt{210}}{77}R_{44} + \frac{5\sqrt{39}}{143}R_{60}$ $- \frac{5\sqrt{546}}{143}R_{64}$
2	2	1	5	5	1	$\frac{5\sqrt{11}}{33}R_{30} - \frac{10\sqrt{7}}{39}R_{50} + \frac{2\sqrt{10}}{13}R_{54} + \frac{\sqrt{1155}}{143}R_{70}$ $- \frac{3\sqrt{10}}{13}R_{74}$
2	2	1	6	6	1	$\frac{15\sqrt{143}}{143}R_{44} - \frac{2\sqrt{55}}{55}R_{64} + \frac{\sqrt{1105}}{1105}R_{84} - \frac{2\sqrt{119}}{17}R_{88}$
2	2	1	6	6	2	$-\frac{5\sqrt{182}}{143}R_{40} + \frac{\sqrt{65}}{143}R_{44} + \frac{2\sqrt{14}}{11}R_{60} - \frac{6}{11}R_{64}$ $- \frac{\sqrt{3094}}{221}R_{80} + \frac{3\sqrt{2431}}{221}R_{84}$
3	3	1	3	3	1	$R_{00} - \frac{7}{11}R_{40} - \frac{\sqrt{70}}{11}R_{44} + \frac{10\sqrt{13}}{143}R_{60}$ $- \frac{10\sqrt{182}}{143}R_{64}$
3	3	1	4	4	1	$\frac{2\sqrt{7}}{7}R_{10} - \frac{\sqrt{3}}{11}R_{30} - \frac{40\sqrt{231}}{1001}R_{50} - \frac{4\sqrt{330}}{143}R_{54}$ $+ \frac{7\sqrt{35}}{143}R_{70} - \frac{7\sqrt{330}}{143}R_{74}$
3	3	1	5	5	1	$\frac{\sqrt{55}}{11}R_{20} - \frac{10\sqrt{11}}{143}R_{40} + \frac{2\sqrt{770}}{143}R_{44} - \frac{7\sqrt{143}}{143}R_{60}$ $- \frac{\sqrt{2002}}{143}R_{64} + \frac{56\sqrt{187}}{2431}R_{80} - \frac{12\sqrt{238}}{221}R_{84}$
3	3	1	6	6	1	$\frac{\sqrt{91}}{13}R_{54} - \frac{6\sqrt{91}}{221}R_{74} + \frac{\sqrt{133}}{323}R_{94} - \frac{14\sqrt{323}}{323}R_{98}$
3	3	1	6	6	2	$-\frac{20\sqrt{182}}{429}R_{30} + \frac{7\sqrt{286}}{429}R_{50} - \frac{\sqrt{5005}}{143}R_{54} + \frac{70\sqrt{390}}{2431}R_{70}$ $+ \frac{6\sqrt{5005}}{2431}R_{74} - \frac{63\sqrt{494}}{4199}R_{90} + \frac{3\sqrt{7315}}{323}R_{94}$
4	4	1	4	4	1	$R_{00} + \frac{8\sqrt{5}}{77}R_{20} - \frac{27}{91}R_{40} - \frac{81\sqrt{70}}{1001}R_{44}$ $- \frac{2\sqrt{13}}{13}R_{60} - \frac{6\sqrt{182}}{143}R_{64} + \frac{196\sqrt{17}}{2431}R_{80} - \frac{42\sqrt{2618}}{2431}R_{84}$
4	4	1	5	5	1	$\frac{\sqrt{77}}{11}R_{10} + \frac{2\sqrt{33}}{143}R_{30} - \frac{\sqrt{21}}{13}R_{50} - \frac{\sqrt{30}}{13}R_{54}$ $- \frac{64\sqrt{385}}{2431}R_{70} - \frac{20\sqrt{30}}{221}R_{74} + \frac{252\sqrt{4389}}{46189}R_{90} - \frac{42\sqrt{7410}}{4199}R_{94}$
4	4	1	6	6	1	$-\frac{4\sqrt{429}}{143}R_{44} + \frac{9\sqrt{165}}{187}R_{64} - \frac{18\sqrt{3315}}{4199}R_{84} + \frac{12\sqrt{357}}{323}R_{88}$ $+ \frac{7\sqrt{3}}{323}R_{10,4} - \frac{42\sqrt{17}}{323}R_{10,8}$
4	4	1	6	6	2	$-\frac{2\sqrt{2730}}{143}R_{20} - \frac{4\sqrt{195}}{143}R_{44} + \frac{\sqrt{42}}{17}R_{60} + \frac{23\sqrt{3}}{187}R_{64}$ $+ \frac{18\sqrt{9282}}{3553}R_{80} + \frac{222\sqrt{7293}}{46189}R_{84} - \frac{315\sqrt{26}}{4199}R_{10,0} + \frac{21\sqrt{165}}{323}R_{10,4}$

Table B67: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 2.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	1	$R_{00} + \frac{2\sqrt{5}}{13}R_{20} - \frac{1}{13}R_{40} - \frac{\sqrt{70}}{13}R_{44}$ $- \frac{24\sqrt{13}}{221}R_{60} - \frac{8\sqrt{182}}{221}R_{64} - \frac{28\sqrt{17}}{247}R_{80} - \frac{42\sqrt{2618}}{4199}R_{84}$ $+ \frac{360\sqrt{21}}{4199}R_{10,0} - \frac{36\sqrt{10010}}{4199}R_{10,4}$
5	5	1	6	6	1	$- \frac{4\sqrt{1001}}{221}R_{54} + \frac{75\sqrt{1001}}{4199}R_{74} - \frac{2\sqrt{1463}}{323}R_{94} + \frac{4\sqrt{3553}}{323}R_{98}$ $+ \frac{3\sqrt{8855}}{7429}R_{11,4} - \frac{6\sqrt{245157}}{7429}R_{11,8}$
5	5	1	6	6	2	$- \frac{4\sqrt{858}}{143}R_{10} - \frac{2\sqrt{2002}}{429}R_{30} + \frac{20\sqrt{26}}{663}R_{50} + \frac{4\sqrt{455}}{221}R_{54}$ $+ \frac{287\sqrt{4290}}{46189}R_{70} + \frac{81\sqrt{455}}{4199}R_{74} + \frac{270\sqrt{5434}}{46189}R_{90} + \frac{6\sqrt{665}}{323}R_{94}$ $- \frac{495\sqrt{6578}}{96577}R_{11,0} + \frac{495\sqrt{161}}{7429}R_{11,4}$
6	6	1	6	6	1	$R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40} - \frac{20\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} + \frac{33}{37145}R_{12,0} - \frac{66\sqrt{676039}}{37145}R_{12,12}$
6	6	1	6	6	2	$- \frac{3\sqrt{154}}{187}R_{44} + \frac{20\sqrt{10010}}{3553}R_{64} - \frac{5\sqrt{1190}}{323}R_{84} + \frac{5\sqrt{442}}{323}R_{88}$ $+ \frac{126\sqrt{182}}{7429}R_{10,4} - \frac{54\sqrt{9282}}{7429}R_{10,8} - \frac{66\sqrt{455}}{37145}R_{12,4} + \frac{33\sqrt{125970}}{37145}R_{12,8}$
6	6	2	6	6	2	$R_{00} + \frac{2\sqrt{5}}{11}R_{20} + \frac{1}{17}R_{40} - \frac{14\sqrt{70}}{187}R_{44}$ $- \frac{20\sqrt{13}}{323}R_{60} - \frac{120\sqrt{182}}{3553}R_{64} - \frac{355\sqrt{17}}{3553}R_{80} - \frac{30\sqrt{2618}}{3553}R_{84}$ $- \frac{630\sqrt{21}}{7429}R_{10,0} - \frac{36\sqrt{10010}}{7429}R_{10,4} + \frac{3267}{7429}R_{12,0} - \frac{198\sqrt{1001}}{7429}R_{12,4}$

Table B68: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	1	1	1	$R_{00} - \frac{\sqrt{5}}{5} R_{20}$
1	1	1	2	2	1	$\frac{\sqrt{15}}{5} R_{10} - \frac{3\sqrt{35}}{35} R_{30}$
1	1	1	3	3	1	$\frac{2\sqrt{3}}{3} R_{44}$
1	1	1	3	3	2	$-\frac{3\sqrt{70}}{35} R_{20} + \frac{\sqrt{14}}{7} R_{40}$
1	1	1	4	4	1	$\frac{2\sqrt{33}}{11} R_{54}$
1	1	1	4	4	2	$-\frac{\sqrt{210}}{21} R_{30} + \frac{\sqrt{330}}{33} R_{50}$
1	1	1	5	5	1	$\frac{\sqrt{165}}{11} R_{44} - \frac{\sqrt{429}}{143} R_{64}$
1	1	1	5	5	2	$\frac{\sqrt{33}}{33} R_{44} - \frac{3\sqrt{2145}}{143} R_{64}$
1	1	1	5	5	3	$-\frac{\sqrt{55}}{11} R_{40} + \frac{3\sqrt{715}}{143} R_{60}$
1	1	1	6	6	1	$\frac{\sqrt{195}}{13} R_{54} - \frac{\sqrt{195}}{65} R_{74}$
1	1	1	6	6	2	$\frac{3\sqrt{143}}{143} R_{54} - \frac{\sqrt{143}}{13} R_{74}$
1	1	1	6	6	3	$-\frac{3\sqrt{1001}}{143} R_{50} + \frac{\sqrt{1365}}{65} R_{70}$
2	2	1	2	2	1	$R_{00} + \frac{\sqrt{5}}{7} R_{20} - \frac{4}{7} R_{40}$
2	2	1	3	3	1	$\frac{2\sqrt{165}}{33} R_{54}$
2	2	1	3	3	2	$-\frac{2\sqrt{210}}{35} R_{10} - \frac{\sqrt{10}}{15} R_{30} + \frac{5\sqrt{770}}{231} R_{50}$
2	2	1	4	4	1	$\frac{2\sqrt{15}}{11} R_{44} + \frac{20\sqrt{39}}{143} R_{64}$
2	2	1	4	4	2	$-\frac{\sqrt{30}}{7} R_{20} - \frac{5\sqrt{6}}{77} R_{40} + \frac{10\sqrt{78}}{143} R_{60}$
2	2	1	5	5	1	$\frac{5\sqrt{3}}{13} R_{54} - \frac{\sqrt{3}}{13} R_{74}$
2	2	1	5	5	2	$-\frac{7\sqrt{15}}{39} R_{54} - \frac{3\sqrt{15}}{13} R_{74}$
2	2	1	5	5	3	$-\frac{20\sqrt{77}}{231} R_{30} - \frac{5}{39} R_{50} + \frac{7\sqrt{165}}{143} R_{70}$
2	2	1	6	6	1	$\frac{5\sqrt{429}}{143} R_{44} + \frac{3\sqrt{165}}{55} R_{64} - \frac{4\sqrt{3315}}{1105} R_{84}$
2	2	1	6	6	2	$\frac{3\sqrt{65}}{143} R_{44} - \frac{7}{11} R_{64} - \frac{4\sqrt{2431}}{221} R_{84}$
2	2	1	6	6	3	$-\frac{5\sqrt{455}}{143} R_{40} - \frac{\sqrt{35}}{55} R_{60} + \frac{8\sqrt{7735}}{1105} R_{80}$
3	3	1	3	3	1	$R_{00} - \frac{\sqrt{5}}{3} R_{20} + \frac{3}{11} R_{40} - \frac{5\sqrt{13}}{429} R_{60}$
3	3	1	3	3	2	$\frac{\sqrt{42}}{11} R_{44} - \frac{5\sqrt{2730}}{429} R_{64}$
3	3	1	4	4	1	$\frac{\sqrt{3}}{3} R_{10} - \frac{3\sqrt{7}}{11} R_{30} + \frac{15\sqrt{11}}{143} R_{50} - \frac{7\sqrt{15}}{429} R_{70}$

Table B69: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	4	4	2	$\frac{9\sqrt{110}}{143}R_{54} - \frac{7\sqrt{110}}{143}R_{74}$
3	3	1	5	5	1	$\frac{14\sqrt{442}}{221}R_{88}$
3	3	1	5	5	2	$-\frac{2\sqrt{55}}{33}R_{20} + \frac{30\sqrt{11}}{143}R_{40} - \frac{14\sqrt{143}}{429}R_{60} + \frac{14\sqrt{187}}{2431}R_{80}$
3	3	1	5	5	3	$-\frac{2\sqrt{165}}{143}R_{44} + \frac{14\sqrt{429}}{429}R_{64} - \frac{14\sqrt{51}}{221}R_{84}$
3	3	1	6	6	1	$\frac{14\sqrt{646}}{323}R_{98}$
3	3	1	6	6	2	$-\frac{10\sqrt{273}}{429}R_{30} + \frac{14\sqrt{429}}{429}R_{50} - \frac{126\sqrt{65}}{2431}R_{70} + \frac{14\sqrt{741}}{4199}R_{90}$
3	3	1	6	6	3	$-\frac{2\sqrt{3003}}{429}R_{54} + \frac{30\sqrt{3003}}{2431}R_{74} - \frac{2\sqrt{4389}}{323}R_{94}$
3	3	2	3	3	2	$R_{00} + \frac{\sqrt{5}}{5}R_{20} + \frac{1}{11}R_{40} - \frac{25\sqrt{13}}{143}R_{60}$
3	3	2	4	4	1	$-\frac{\sqrt{462}}{143}R_{54} - \frac{5\sqrt{462}}{143}R_{74}$
3	3	2	4	4	2	$\frac{\sqrt{35}}{7}R_{10} + \frac{\sqrt{15}}{11}R_{30} + \frac{\sqrt{1155}}{1001}R_{50} - \frac{35\sqrt{7}}{143}R_{70}$
3	3	2	5	5	1	$\frac{2\sqrt{2310}}{143}R_{44} - \frac{\sqrt{6006}}{143}R_{64} + \frac{\sqrt{714}}{221}R_{84}$
3	3	2	5	5	2	$\frac{4\sqrt{462}}{143}R_{44} + \frac{\sqrt{30030}}{429}R_{64} + \frac{3\sqrt{3570}}{221}R_{84}$
3	3	2	5	5	3	$\frac{5\sqrt{154}}{77}R_{20} + \frac{\sqrt{770}}{91}R_{40} - \frac{14\sqrt{13090}}{2431}R_{80}$
3	3	2	6	6	1	$-\frac{\sqrt{2730}}{85}R_{74} + \frac{\sqrt{3990}}{323}R_{94}$
3	3	2	6	6	2	$\frac{2\sqrt{2002}}{143}R_{54} + \frac{27\sqrt{2002}}{2431}R_{74} + \frac{5\sqrt{2926}}{323}R_{94}$
3	3	2	6	6	3	$\frac{25\sqrt{182}}{429}R_{30} + \frac{7\sqrt{286}}{429}R_{50} - \frac{14\sqrt{390}}{12155}R_{70} - \frac{126\sqrt{494}}{4199}R_{90}$
4	4	1	4	4	1	$R_{00} - \frac{\sqrt{5}}{11}R_{20} - \frac{81}{143}R_{40} + \frac{17\sqrt{13}}{143}R_{60}$ $-\frac{56\sqrt{17}}{2431}R_{80}$
4	4	1	4	4	2	$\frac{27\sqrt{10}}{143}R_{44} + \frac{3\sqrt{26}}{143}R_{64} - \frac{84\sqrt{374}}{2431}R_{84}$
4	4	1	5	5	1	$\frac{42\sqrt{8398}}{4199}R_{98}$
4	4	1	5	5	2	$-\frac{4\sqrt{33}}{33}R_{10} + \frac{6\sqrt{77}}{143}R_{30} + \frac{6}{13}R_{50} - \frac{266\sqrt{165}}{7293}R_{70}$ $+\frac{378\sqrt{209}}{46189}R_{90}$
4	4	1	5	5	3	$\frac{2\sqrt{15}}{13}R_{54} + \frac{14\sqrt{15}}{221}R_{74} - \frac{42\sqrt{3705}}{4199}R_{94}$
4	4	1	6	6	1	$\frac{42\sqrt{34}}{323}R_{88} + \frac{12\sqrt{714}}{323}R_{10,8}$
4	4	1	6	6	2	$-\frac{6\sqrt{195}}{143}R_{20} + \frac{10\sqrt{39}}{143}R_{40} + \frac{42\sqrt{3}}{187}R_{60} - \frac{882\sqrt{663}}{46189}R_{80}$ $+\frac{60\sqrt{91}}{4199}R_{10,0}$

Table B70: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	6	6	3	$-\frac{2\sqrt{273}}{143}R_{44} + \frac{10\sqrt{105}}{187}R_{64} + \frac{30\sqrt{255255}}{46189}R_{84} - \frac{12\sqrt{231}}{323}R_{10,4}$
4	4	2	4	4	2	$R_{00} + \frac{17\sqrt{5}}{77}R_{20} + \frac{243}{1001}R_{40} - \frac{\sqrt{13}}{143}R_{60}$ $-\frac{392\sqrt{17}}{2431}R_{80}$
4	4	2	5	5	1	$\frac{6\sqrt{2}}{13}R_{54} - \frac{75\sqrt{2}}{221}R_{74} + \frac{21\sqrt{494}}{4199}R_{94}$
4	4	2	5	5	2	$\frac{\sqrt{10}}{17}R_{74} + \frac{63\sqrt{2470}}{4199}R_{94}$
4	4	2	5	5	3	$\frac{2\sqrt{22}}{11}R_{10} + \frac{19\sqrt{462}}{1001}R_{30} + \frac{\sqrt{6}}{13}R_{50} - \frac{14\sqrt{110}}{2431}R_{70}$ $-\frac{882\sqrt{1254}}{46189}R_{90}$
4	4	2	6	6	1	$\frac{6\sqrt{286}}{143}R_{44} + \frac{3\sqrt{110}}{187}R_{64} - \frac{3\sqrt{2210}}{247}R_{84} + \frac{42\sqrt{2}}{323}R_{10,4}$
4	4	2	6	6	2	$\frac{4\sqrt{390}}{143}R_{44} + \frac{21\sqrt{6}}{187}R_{64} + \frac{129\sqrt{14586}}{46189}R_{84} + \frac{14\sqrt{330}}{323}R_{10,4}$
4	4	2	6	6	3	$\frac{5\sqrt{546}}{143}R_{20} + \frac{\sqrt{2730}}{143}R_{40} + \frac{2\sqrt{210}}{187}R_{60} - \frac{18\sqrt{46410}}{46189}R_{80}$ $-\frac{252\sqrt{130}}{4199}R_{10,0}$
5	5	1	5	5	1	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+\frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
5	5	1	5	5	2	$\frac{35\sqrt{4862}}{4199}R_{88} - \frac{9\sqrt{102102}}{4199}R_{10,8}$
5	5	1	5	5	3	$-\frac{2\sqrt{3}}{13}R_{44} + \frac{10\sqrt{195}}{221}R_{64} - \frac{35\sqrt{2805}}{4199}R_{84} + \frac{21\sqrt{429}}{4199}R_{10,4}$
5	5	1	6	6	1	$\frac{\sqrt{39}}{13}R_{10} - \frac{\sqrt{91}}{13}R_{30} + \frac{10\sqrt{143}}{221}R_{50} - \frac{70\sqrt{195}}{4199}R_{70}$ $+\frac{15\sqrt{247}}{4199}R_{90} - \frac{33\sqrt{299}}{96577}R_{11,0}$
5	5	1	6	6	2	$\frac{5\sqrt{1938}}{323}R_{98} - \frac{33\sqrt{14858}}{7429}R_{11,8}$
5	5	1	6	6	3	$-\frac{2\sqrt{1365}}{221}R_{54} + \frac{70\sqrt{1365}}{4199}R_{74} - \frac{3\sqrt{1995}}{323}R_{94} + \frac{33\sqrt{483}}{7429}R_{11,4}$
5	5	2	5	5	2	$R_{00} + \frac{\sqrt{5}}{39}R_{20} - \frac{6}{13}R_{40} - \frac{58\sqrt{13}}{663}R_{60}$ $+\frac{511\sqrt{17}}{4199}R_{80} - \frac{135\sqrt{21}}{4199}R_{10,0}$
5	5	2	5	5	3	$-\frac{2\sqrt{15}}{13}R_{44} - \frac{2\sqrt{39}}{51}R_{64} + \frac{7\sqrt{561}}{4199}R_{84} + \frac{63\sqrt{2145}}{4199}R_{10,4}$
5	5	2	6	6	1	$-\frac{\sqrt{7106}}{323}R_{98} - \frac{9\sqrt{490314}}{7429}R_{11,8}$
5	5	2	6	6	2	$\frac{9\sqrt{143}}{143}R_{10} - \frac{\sqrt{3003}}{429}R_{30} - \frac{50\sqrt{39}}{663}R_{50} - \frac{378\sqrt{715}}{46189}R_{70}$ $+\frac{265\sqrt{8151}}{46189}R_{90} - \frac{165\sqrt{9867}}{96577}R_{11,0}$
5	5	2	6	6	3	$-\frac{22\sqrt{273}}{663}R_{54} - \frac{90\sqrt{273}}{4199}R_{74} - \frac{\sqrt{399}}{323}R_{94} + \frac{99\sqrt{2415}}{7429}R_{11,4}$

Table B71: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 4.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	5	5	3	$R_{00} + \frac{3\sqrt{5}}{13}R_{20} + \frac{4}{13}R_{40} + \frac{8\sqrt{13}}{221}R_{60}$ $- \frac{98\sqrt{17}}{4199}R_{80} - \frac{630\sqrt{21}}{4199}R_{10,0}$
5	5	3	6	6	1	$\frac{6\sqrt{429}}{221}R_{54} + \frac{50\sqrt{429}}{4199}R_{74} - \frac{7\sqrt{627}}{323}R_{94} + \frac{21\sqrt{3795}}{7429}R_{11,4}$
5	5	3	6	6	2	$- \frac{2\sqrt{65}}{221}R_{54} + \frac{18\sqrt{65}}{4199}R_{74} + \frac{7\sqrt{95}}{323}R_{94} + \frac{1155\sqrt{23}}{7429}R_{11,4}$
5	5	3	6	6	3	$\frac{\sqrt{15015}}{143}R_{10} + \frac{7\sqrt{715}}{429}R_{30} + \frac{8\sqrt{455}}{663}R_{50} + \frac{80\sqrt{3003}}{46189}R_{70}$ $- \frac{18\sqrt{95095}}{46189}R_{90} - \frac{198\sqrt{115115}}{96577}R_{11,0}$
6	6	1	6	6	1	$R_{00} - \frac{\sqrt{5}}{5}R_{20} - \frac{6}{17}R_{40} + \frac{50\sqrt{13}}{323}R_{60}$ $- \frac{25\sqrt{17}}{323}R_{80} + \frac{147\sqrt{21}}{7429}R_{10,0} - \frac{396}{37145}R_{12,0}$
6	6	1	6	6	2	$\frac{5\sqrt{1326}}{323}R_{88} + \frac{9\sqrt{3094}}{7429}R_{10,8} - \frac{132\sqrt{41990}}{37145}R_{12,8}$
6	6	1	6	6	3	$- \frac{2\sqrt{1155}}{187}R_{44} + \frac{30\sqrt{3003}}{3553}R_{64} + \frac{5\sqrt{357}}{323}R_{84} - \frac{105\sqrt{1365}}{7429}R_{10,4}$ $+ \frac{264\sqrt{546}}{37145}R_{12,4}$
6	6	2	6	6	2	$R_{00} + \frac{\sqrt{5}}{11}R_{20} - \frac{54}{187}R_{40} - \frac{430\sqrt{13}}{3553}R_{60}$ $- \frac{5\sqrt{17}}{187}R_{80} + \frac{45\sqrt{21}}{391}R_{10,0} - \frac{1452}{7429}R_{12,0}$
6	6	2	6	6	3	$- \frac{42\sqrt{7}}{187}R_{44} - \frac{50\sqrt{455}}{3553}R_{64} - \frac{5\sqrt{6545}}{3553}R_{84} + \frac{27\sqrt{1001}}{7429}R_{10,4}$ $+ \frac{264\sqrt{10010}}{37145}R_{12,4}$
6	6	3	6	6	3	$R_{00} + \frac{13\sqrt{5}}{55}R_{20} + \frac{64}{187}R_{40} + \frac{200\sqrt{13}}{3553}R_{60}$ $+ \frac{50\sqrt{17}}{3553}R_{80} - \frac{234\sqrt{21}}{7429}R_{10,0} - \frac{26136}{37145}R_{12,0}$

Table B72: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{1}{2}$	0	1	R_{00}
$\frac{1}{2}$	0	1	$\frac{1}{2}$	1	1	$-\frac{\sqrt{3}}{3}R_{10}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	1	1	$\frac{\sqrt{6}}{3}R_{10}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{10}}{5}R_{20}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	2	1	$\frac{\sqrt{15}}{5}R_{20}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{21}}{7}R_{30}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{7}}{7}R_{30}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	2	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	1	$-\frac{2}{3}R_{40}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{2}}{3}R_{44}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	1	R_{44}
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{5}}{3}R_{40}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	3	$\frac{1}{3}R_{44}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{11}}{11}R_{54}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{55}}{11}R_{50}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	3	$-\frac{3\sqrt{11}}{11}R_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	1	$\frac{\sqrt{110}}{11}R_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	2	$\frac{\sqrt{66}}{11}R_{50}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	3	$\frac{\sqrt{22}}{11}R_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	1	$-\frac{\sqrt{26}}{13}R_{64}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	2	$-\frac{\sqrt{78}}{13}R_{60}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	3	$-\frac{\sqrt{130}}{13}R_{64}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{143}}{13}R_{64}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	2	$\frac{\sqrt{91}}{13}R_{60}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	3	$\frac{\sqrt{39}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	R_{00}

Table B73: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	1	1	$-\frac{\sqrt{10}}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	2	1	$\frac{\sqrt{6}}{3}R_{10}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	2	1	$-\frac{\sqrt{21}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{\sqrt{15}}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2}{3}R_{40}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	2	$-\frac{2\sqrt{2}}{3}R_{44}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	1	$\frac{2\sqrt{7}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	2	0
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{11}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{55}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	3	$-\frac{3\sqrt{11}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	1	R_{44}
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{5}}{3}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	3	$\frac{1}{3}R_{44}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{\sqrt{26}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{\sqrt{78}}{13}R_{60}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	3	$-\frac{\sqrt{130}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{\sqrt{110}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	2	$\frac{\sqrt{66}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{22}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{5}}{5}R_{74}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{105}}{15}R_{70}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	3	$-\frac{\sqrt{165}}{15}R_{74}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	$R_{00} + \frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{3}}{15}R_{10} - \frac{9\sqrt{7}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	1	$\frac{3\sqrt{2}}{5}R_{10} + \frac{2\sqrt{42}}{35}R_{30}$

Table B74: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{30}}{35}R_{20} - \frac{2\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{9\sqrt{10}}{35}R_{20} + \frac{5\sqrt{2}}{21}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	2	$-\frac{2}{3}R_{44}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{14}}{21}R_{30} - \frac{5\sqrt{22}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{11}}{11}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{22}}{11}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	3	$-\frac{\sqrt{22}}{11}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{4\sqrt{2}}{11}R_{44} - \frac{3\sqrt{130}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{10}}{33}R_{40} - \frac{9\sqrt{130}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	3	$-\frac{8\sqrt{2}}{33}R_{44} - \frac{9\sqrt{130}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{3\sqrt{5}}{11}R_{44} + \frac{19\sqrt{13}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{5\sqrt{3}}{11}R_{40} + \frac{7\sqrt{39}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{3}{11}R_{44} - \frac{5\sqrt{65}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{7\sqrt{55}}{143}R_{54} - \frac{3\sqrt{55}}{65}R_{74}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{33}}{143}R_{50} - \frac{21\sqrt{5}}{65}R_{70}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	3	$-\frac{17\sqrt{11}}{143}R_{54} - \frac{3\sqrt{11}}{13}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	1	$\frac{3\sqrt{10}}{13}R_{54} + \frac{2\sqrt{10}}{13}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{9\sqrt{154}}{143}R_{50} + \frac{4\sqrt{210}}{195}R_{70}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{3\sqrt{330}}{143}R_{54} - \frac{2\sqrt{330}}{195}R_{74}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	$R_{00} + \frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{\sqrt{30}}{35}R_{20} - \frac{2\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	1	$\frac{3\sqrt{2}}{5}R_{10} + \frac{2\sqrt{42}}{35}R_{30}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{14}}{21}R_{30} - \frac{5\sqrt{22}}{33}R_{50}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{2\sqrt{11}}{11}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{9\sqrt{10}}{35}R_{20} + \frac{5\sqrt{2}}{21}R_{40}$

Table B75: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	2	$-\frac{2}{3}R_{44}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{4\sqrt{2}}{11}R_{44} - \frac{3\sqrt{130}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{10}}{33}R_{40} - \frac{9\sqrt{130}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{8\sqrt{2}}{33}R_{44} - \frac{9\sqrt{130}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{22}}{11}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	3	$-\frac{\sqrt{22}}{11}R_{54}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{7\sqrt{55}}{143}R_{54} - \frac{3\sqrt{55}}{65}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{33}}{143}R_{50} - \frac{21\sqrt{5}}{65}R_{70}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	3	$-\frac{17\sqrt{11}}{143}R_{54} - \frac{3\sqrt{11}}{13}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{3\sqrt{5}}{11}R_{44} + \frac{19\sqrt{13}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{5\sqrt{3}}{11}R_{40} + \frac{7\sqrt{39}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{3}{11}R_{44} - \frac{5\sqrt{65}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{286}}{65}R_{64} - \frac{6\sqrt{34}}{85}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{182}}{65}R_{60} - \frac{4\sqrt{238}}{85}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{78}}{65}R_{64} - \frac{2\sqrt{1122}}{85}R_{84}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} + \frac{8\sqrt{5}}{35}R_{20} + \frac{2}{7}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{3}}{35}R_{10} - \frac{8\sqrt{7}}{105}R_{30} - \frac{50\sqrt{11}}{231}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	1	$\frac{6}{7}R_{10} + \frac{2\sqrt{21}}{21}R_{30} + \frac{10\sqrt{33}}{231}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{15}}{105}R_{20} - \frac{10\sqrt{3}}{77}R_{40} - \frac{50\sqrt{39}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{6}}{11}R_{44} - \frac{10\sqrt{390}}{429}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{4\sqrt{3}}{11}R_{44} + \frac{3\sqrt{195}}{143}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{10\sqrt{3}}{21}R_{20} + \frac{8\sqrt{15}}{77}R_{40} + \frac{7\sqrt{195}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{4\sqrt{3}}{11}R_{44} - \frac{\sqrt{195}}{33}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{12\sqrt{33}}{143}R_{54} - \frac{5\sqrt{33}}{143}R_{74}$

Table B76: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{105}}{231}R_{30} - \frac{8\sqrt{165}}{429}R_{50} - \frac{105}{143}R_{70}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{4\sqrt{33}}{429}R_{54} - \frac{15\sqrt{33}}{143}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	1	$-\frac{\sqrt{330}}{143}R_{54} + \frac{14\sqrt{330}}{715}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{50\sqrt{14}}{231}R_{30} + \frac{35\sqrt{22}}{429}R_{50} + \frac{28\sqrt{30}}{715}R_{70}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	3	$-\frac{9\sqrt{66}}{143}R_{54} - \frac{6\sqrt{66}}{143}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{8\sqrt{30}}{143}R_{44} + \frac{7\sqrt{78}}{143}R_{64} - \frac{2\sqrt{1122}}{221}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{10\sqrt{2}}{143}R_{40} - \frac{7\sqrt{26}}{143}R_{60} - \frac{28\sqrt{34}}{221}R_{80}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	3	$-\frac{12\sqrt{6}}{143}R_{44} - \frac{\sqrt{390}}{143}R_{64} - \frac{2\sqrt{5610}}{221}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{5\sqrt{165}}{143}R_{44} + \frac{4\sqrt{429}}{715}R_{64} + \frac{58\sqrt{51}}{1105}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{25\sqrt{21}}{143}R_{40} + \frac{16\sqrt{273}}{715}R_{60} + \frac{12\sqrt{357}}{1105}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{15\sqrt{5}}{143}R_{44} - \frac{76\sqrt{13}}{715}R_{64} - \frac{22\sqrt{187}}{1105}R_{84}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} + \frac{8\sqrt{5}}{35}R_{20} + \frac{2}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{15}}{105}R_{20} - \frac{10\sqrt{3}}{77}R_{40} - \frac{50\sqrt{39}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{6}}{11}R_{44} - \frac{10\sqrt{390}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	1	$\frac{6}{7}R_{10} + \frac{2\sqrt{21}}{21}R_{30} + \frac{10\sqrt{33}}{231}R_{50}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{12\sqrt{33}}{143}R_{54} - \frac{5\sqrt{33}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{105}}{231}R_{30} - \frac{8\sqrt{165}}{429}R_{50} - \frac{105}{143}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	3	$\frac{4\sqrt{33}}{429}R_{54} - \frac{15\sqrt{33}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{4\sqrt{3}}{11}R_{44} + \frac{3\sqrt{195}}{143}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{10\sqrt{3}}{21}R_{20} + \frac{8\sqrt{15}}{77}R_{40} + \frac{7\sqrt{195}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{4\sqrt{3}}{11}R_{44} - \frac{\sqrt{195}}{33}R_{64}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{8\sqrt{30}}{143}R_{44} + \frac{7\sqrt{78}}{143}R_{64} - \frac{2\sqrt{1122}}{221}R_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{10\sqrt{2}}{143}R_{40} - \frac{7\sqrt{26}}{143}R_{60} - \frac{28\sqrt{34}}{221}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{12\sqrt{6}}{143}R_{44} - \frac{\sqrt{390}}{143}R_{64} - \frac{2\sqrt{5610}}{221}R_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	1	$-\frac{\sqrt{330}}{143}R_{54} + \frac{14\sqrt{330}}{715}R_{74}$

Table B77: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{50\sqrt{14}}{231}R_{30} + \frac{35\sqrt{22}}{429}R_{50} + \frac{28\sqrt{30}}{715}R_{70}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	3	$-\frac{9\sqrt{66}}{143}R_{54} - \frac{6\sqrt{66}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{15}}{13}R_{54} + \frac{20\sqrt{15}}{221}R_{74} - \frac{2\sqrt{3705}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{231}}{143}R_{50} - \frac{48\sqrt{35}}{1105}R_{70} - \frac{12\sqrt{399}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{5\sqrt{55}}{143}R_{54} - \frac{36\sqrt{55}}{1105}R_{74} - \frac{2\sqrt{13585}}{323}R_{94}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} + \frac{5\sqrt{5}}{21}R_{20} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{3\sqrt{2}}{11}R_{44} - \frac{5\sqrt{130}}{143}R_{64}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{3}}{63}R_{10} - \frac{3\sqrt{7}}{77}R_{30} - \frac{75\sqrt{11}}{1001}R_{50} - \frac{245\sqrt{15}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{15\sqrt{22}}{143}R_{54} - \frac{35\sqrt{22}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{24\sqrt{11}}{143}R_{54} + \frac{10\sqrt{11}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{15}}{9}R_{10} + \frac{6\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} + \frac{140\sqrt{3}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	3	$-\frac{12\sqrt{11}}{143}R_{54} - \frac{50\sqrt{11}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{36}{143}R_{44} + \frac{8\sqrt{65}}{143}R_{64} - \frac{14\sqrt{935}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{10}{231}R_{20} - \frac{54\sqrt{5}}{1001}R_{40} - \frac{14\sqrt{65}}{429}R_{60} - \frac{196\sqrt{85}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	3	$\frac{48}{143}R_{44} + \frac{4\sqrt{65}}{143}R_{64} - \frac{42\sqrt{935}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{30\sqrt{10}}{143}R_{44} - \frac{7\sqrt{26}}{143}R_{64} + \frac{37\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{5\sqrt{30}}{33}R_{20} + \frac{25\sqrt{6}}{143}R_{40} + \frac{14\sqrt{78}}{429}R_{60} + \frac{42\sqrt{102}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{60\sqrt{2}}{143}R_{44} - \frac{5\sqrt{130}}{143}R_{64} - \frac{19\sqrt{1870}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{2\sqrt{110}}{143}R_{54} + \frac{105\sqrt{110}}{2431}R_{74} - \frac{7\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{25\sqrt{42}}{3003}R_{30} - \frac{7\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70} - \frac{294\sqrt{114}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{4\sqrt{22}}{143}R_{54} + \frac{15\sqrt{22}}{2431}R_{74} - \frac{35\sqrt{5434}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{5}}{13}R_{54} - \frac{18\sqrt{5}}{1105}R_{74} + \frac{2\sqrt{1235}}{221}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{350}{429}R_{30} + \frac{20\sqrt{77}}{429}R_{50} + \frac{324\sqrt{105}}{12155}R_{70} + \frac{60\sqrt{133}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{6\sqrt{165}}{143}R_{54} - \frac{366\sqrt{165}}{12155}R_{74} - \frac{6\sqrt{40755}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	2	$R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	1	$\frac{15\sqrt{22}}{143}R_{54} - \frac{35\sqrt{22}}{429}R_{74}$

Table B78: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{\sqrt{3}}{9}R_{10} - \frac{\sqrt{7}}{11}R_{30} + \frac{5\sqrt{11}}{143}R_{50} - \frac{7\sqrt{15}}{1287}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	1	0
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{6\sqrt{110}}{143}R_{54} - \frac{14\sqrt{110}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	3	$\frac{2\sqrt{6}}{9}R_{10} - \frac{2\sqrt{14}}{11}R_{30} + \frac{10\sqrt{22}}{143}R_{50} - \frac{14\sqrt{30}}{1287}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{28\sqrt{12155}}{2431}R_{88}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	2	$-\frac{6\sqrt{10}}{143}R_{44} + \frac{14\sqrt{26}}{143}R_{64} - \frac{42\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	3	$\frac{2\sqrt{10}}{33}R_{20} - \frac{30\sqrt{2}}{143}R_{40} + \frac{14\sqrt{26}}{429}R_{60} - \frac{14\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{14\sqrt{4862}}{2431}R_{88}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	2	$-\frac{10\sqrt{3}}{143}R_{44} + \frac{14\sqrt{195}}{429}R_{64} - \frac{14\sqrt{2805}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{2\sqrt{5}}{11}R_{20} - \frac{90}{143}R_{40} + \frac{14\sqrt{13}}{143}R_{60} - \frac{42\sqrt{17}}{2431}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{14\sqrt{92378}}{4199}R_{98}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	2	$-\frac{14\sqrt{33}}{429}R_{54} + \frac{210\sqrt{33}}{2431}R_{74} - \frac{14\sqrt{8151}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{10\sqrt{7}}{143}R_{30} - \frac{14\sqrt{11}}{143}R_{50} + \frac{126\sqrt{15}}{2431}R_{70} - \frac{42\sqrt{19}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	1	$-\frac{28\sqrt{4199}}{4199}R_{98}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{154}}{143}R_{54} + \frac{90\sqrt{154}}{2431}R_{74} - \frac{6\sqrt{38038}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{10\sqrt{210}}{429}R_{30} - \frac{14\sqrt{330}}{429}R_{50} + \frac{630\sqrt{2}}{2431}R_{70} - \frac{14\sqrt{570}}{4199}R_{90}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{5\sqrt{5}}{21}R_{20} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{2}}{11}R_{44} - \frac{5\sqrt{130}}{143}R_{64}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{36}{143}R_{44} + \frac{8\sqrt{65}}{143}R_{64} - \frac{14\sqrt{935}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$-\frac{10}{231}R_{20} - \frac{54\sqrt{5}}{1001}R_{40} - \frac{14\sqrt{65}}{429}R_{60} - \frac{196\sqrt{85}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{48}{143}R_{44} + \frac{4\sqrt{65}}{143}R_{64} - \frac{42\sqrt{935}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{24\sqrt{11}}{143}R_{54} + \frac{10\sqrt{11}}{143}R_{74}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{15}}{9}R_{10} + \frac{6\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} + \frac{140\sqrt{3}}{1287}R_{70}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	3	$-\frac{12\sqrt{11}}{143}R_{54} - \frac{50\sqrt{11}}{429}R_{74}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{110}}{143}R_{54} + \frac{105\sqrt{110}}{2431}R_{74} - \frac{7\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	2	$-\frac{25\sqrt{42}}{3003}R_{30} - \frac{7\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70} - \frac{294\sqrt{114}}{4199}R_{90}$

Table B79: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{4\sqrt{22}}{143}R_{54} + \frac{15\sqrt{22}}{2431}R_{74} - \frac{35\sqrt{5434}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{30\sqrt{10}}{143}R_{44} - \frac{7\sqrt{26}}{143}R_{64} + \frac{37\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{5\sqrt{30}}{33}R_{20} + \frac{25\sqrt{6}}{143}R_{40} + \frac{14\sqrt{78}}{429}R_{60} + \frac{42\sqrt{102}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{60\sqrt{2}}{143}R_{44} - \frac{5\sqrt{130}}{143}R_{64} - \frac{19\sqrt{1870}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{55}}{143}R_{44} + \frac{54\sqrt{143}}{2431}R_{64} + \frac{402\sqrt{17}}{4199}R_{84} - \frac{14\sqrt{65}}{323}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{10\sqrt{7}}{429}R_{40} - \frac{36\sqrt{91}}{2431}R_{60} - \frac{108\sqrt{119}}{4199}R_{80} - \frac{140\sqrt{3}}{323}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{16\sqrt{15}}{429}R_{44} - \frac{6\sqrt{39}}{2431}R_{64} - \frac{18\sqrt{561}}{4199}R_{84} - \frac{14\sqrt{2145}}{969}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	2	$R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	1	$-\frac{28\sqrt{12155}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	2	$-\frac{6\sqrt{10}}{143}R_{44} + \frac{14\sqrt{26}}{143}R_{64} - \frac{42\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	3	$\frac{2\sqrt{10}}{33}R_{20} - \frac{30\sqrt{2}}{143}R_{40} + \frac{14\sqrt{26}}{429}R_{60} - \frac{14\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	1	0
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{6\sqrt{110}}{143}R_{54} - \frac{14\sqrt{110}}{429}R_{74}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	3	$\frac{2\sqrt{6}}{9}R_{10} - \frac{2\sqrt{14}}{11}R_{30} + \frac{10\sqrt{22}}{143}R_{50} - \frac{14\sqrt{30}}{1287}R_{70}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{14\sqrt{92378}}{4199}R_{98}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	2	$-\frac{14\sqrt{33}}{429}R_{54} + \frac{210\sqrt{33}}{2431}R_{74} - \frac{14\sqrt{8151}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	3	$\frac{10\sqrt{7}}{143}R_{30} - \frac{14\sqrt{11}}{143}R_{50} + \frac{126\sqrt{15}}{2431}R_{70} - \frac{42\sqrt{19}}{4199}R_{90}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{14\sqrt{4862}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{10\sqrt{3}}{143}R_{44} + \frac{14\sqrt{195}}{429}R_{64} - \frac{14\sqrt{2805}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{2\sqrt{5}}{11}R_{20} - \frac{90}{143}R_{40} + \frac{14\sqrt{13}}{143}R_{60} - \frac{42\sqrt{17}}{2431}R_{80}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{84\sqrt{221}}{4199}R_{88} - \frac{4\sqrt{4641}}{323}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{2\sqrt{14}}{429}R_{44} - \frac{18\sqrt{910}}{2431}R_{64} + \frac{18\sqrt{13090}}{4199}R_{84} - \frac{2\sqrt{2002}}{323}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{14\sqrt{30}}{429}R_{40} - \frac{42\sqrt{390}}{2431}R_{60} + \frac{42\sqrt{510}}{4199}R_{80} - \frac{2\sqrt{70}}{323}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{18\sqrt{5}}{143}R_{44} - \frac{20\sqrt{13}}{143}R_{64} + \frac{35\sqrt{187}}{2431}R_{84}$

Table B80: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{7\sqrt{24310}}{2431}R_{88}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{3}}{11}R_{10} + \frac{12\sqrt{7}}{143}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{28\sqrt{15}}{2431}R_{70}$ $-\frac{63\sqrt{19}}{46189}R_{90}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{6\sqrt{55}}{143}R_{54} + \frac{140\sqrt{55}}{2431}R_{74} - \frac{63\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	3	$-\frac{63\sqrt{461890}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{\sqrt{30}}{11}R_{10} - \frac{12\sqrt{70}}{143}R_{30} + \frac{6\sqrt{110}}{143}R_{50} - \frac{140\sqrt{6}}{2431}R_{70}$ $+\frac{63\sqrt{190}}{46189}R_{90}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{6\sqrt{66}}{143}R_{54} - \frac{140\sqrt{66}}{2431}R_{74} + \frac{63\sqrt{16302}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{42\sqrt{230945}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{15\sqrt{2}}{143}R_{20} + \frac{12\sqrt{10}}{143}R_{40} - \frac{42\sqrt{130}}{2431}R_{60} + \frac{252\sqrt{170}}{46189}R_{80}$ $-\frac{3\sqrt{210}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{4\sqrt{6}}{143}R_{44} - \frac{42\sqrt{390}}{2431}R_{64} + \frac{252\sqrt{5610}}{46189}R_{84} - \frac{21\sqrt{858}}{4199}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	3	$\frac{168\sqrt{12155}}{46189}R_{88} - \frac{6\sqrt{255255}}{4199}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{15\sqrt{11}}{143}R_{20} - \frac{12\sqrt{55}}{143}R_{40} + \frac{42\sqrt{715}}{2431}R_{60} - \frac{252\sqrt{935}}{46189}R_{80}$ $+\frac{3\sqrt{1155}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{4\sqrt{7}}{143}R_{44} + \frac{42\sqrt{455}}{2431}R_{64} - \frac{252\sqrt{6545}}{46189}R_{84} + \frac{21\sqrt{1001}}{4199}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{84\sqrt{14586}}{46189}R_{88} + \frac{9\sqrt{34034}}{4199}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} + \frac{8\sqrt{5}}{33}R_{20} + \frac{54}{143}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$ $+\frac{98\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	3	$\frac{30\sqrt{5}}{143}R_{44} - \frac{4\sqrt{13}}{143}R_{64} - \frac{63\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{6\sqrt{55}}{143}R_{54} + \frac{140\sqrt{55}}{2431}R_{74} - \frac{63\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{3}}{99}R_{10} - \frac{24\sqrt{7}}{1001}R_{30} - \frac{6\sqrt{11}}{143}R_{50} - \frac{1568\sqrt{15}}{21879}R_{70}$ $-\frac{7938\sqrt{19}}{46189}R_{90}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	3	$\frac{6\sqrt{55}}{143}R_{54} + \frac{28\sqrt{55}}{663}R_{74} - \frac{189\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{14\sqrt{22}}{143}R_{54} - \frac{150\sqrt{22}}{2431}R_{74} + \frac{161\sqrt{5434}}{46189}R_{94}$

Table B81: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{3\sqrt{10}}{11}R_{10} + \frac{14\sqrt{210}}{429}R_{30} + \frac{8\sqrt{330}}{429}R_{50} + \frac{420\sqrt{2}}{2431}R_{70}$ $+ \frac{294\sqrt{570}}{46189}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{2\sqrt{110}}{143}R_{54} - \frac{6\sqrt{110}}{221}R_{74} - \frac{7\sqrt{27170}}{3553}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{24\sqrt{2}}{143}R_{44} + \frac{10\sqrt{130}}{2431}R_{64} + \frac{490\sqrt{1870}}{46189}R_{84} - \frac{63\sqrt{286}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{6}}{429}R_{20} - \frac{2\sqrt{30}}{143}R_{40} - \frac{56\sqrt{390}}{7293}R_{60} - \frac{588\sqrt{510}}{46189}R_{80}$ $- \frac{378\sqrt{70}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{12\sqrt{10}}{143}R_{44} + \frac{118\sqrt{26}}{2431}R_{64} + \frac{322\sqrt{374}}{46189}R_{84} - \frac{63\sqrt{1430}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{28\sqrt{11}}{143}R_{44} - \frac{36\sqrt{715}}{2431}R_{64} - \frac{48\sqrt{85}}{4199}R_{84} + \frac{329\sqrt{13}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{45\sqrt{7}}{143}R_{20} + \frac{32\sqrt{35}}{429}R_{40} + \frac{36\sqrt{455}}{2431}R_{60} + \frac{432\sqrt{595}}{46189}R_{80}$ $+ \frac{154\sqrt{15}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	3	$-\frac{140\sqrt{3}}{429}R_{44} - \frac{60\sqrt{195}}{2431}R_{64} - \frac{288\sqrt{2805}}{46189}R_{84} - \frac{175\sqrt{429}}{12597}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	4	3	$R_{00} - \frac{4\sqrt{5}}{33}R_{20} - \frac{6}{13}R_{40} + \frac{4\sqrt{13}}{39}R_{60}$ $- \frac{49\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	1	$-\frac{63\sqrt{461890}}{46189}R_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	2	$\frac{6\sqrt{55}}{143}R_{54} + \frac{28\sqrt{55}}{663}R_{74} - \frac{189\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	3	$\frac{7\sqrt{3}}{99}R_{10} + \frac{4\sqrt{7}}{143}R_{30} - \frac{14\sqrt{11}}{143}R_{50} + \frac{1316\sqrt{15}}{21879}R_{70}$ $- \frac{567\sqrt{19}}{46189}R_{90}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	1	$\frac{14\sqrt{46189}}{46189}R_{98}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	2	$\frac{2\sqrt{66}}{33}R_{54} - \frac{7\sqrt{16302}}{2717}R_{94}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	3	$\frac{3\sqrt{6}}{11}R_{10} - \frac{16\sqrt{14}}{143}R_{30} - \frac{10\sqrt{22}}{143}R_{50} + \frac{168\sqrt{30}}{2431}R_{70}$ $- \frac{735\sqrt{38}}{46189}R_{90}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	1	$-\frac{560\sqrt{2431}}{46189}R_{88} - \frac{18\sqrt{51051}}{4199}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	2	$-\frac{8\sqrt{6}}{143}R_{44} + \frac{98\sqrt{390}}{7293}R_{64} + \frac{224\sqrt{5610}}{46189}R_{84} - \frac{63\sqrt{858}}{4199}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	3	$\frac{7\sqrt{10}}{143}R_{20} - \frac{14\sqrt{26}}{221}R_{60} + \frac{168\sqrt{34}}{3553}R_{80} - \frac{45\sqrt{42}}{4199}R_{10,0}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	1	$-\frac{84\sqrt{442}}{4199}R_{88} - \frac{5\sqrt{9282}}{4199}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	2	$-\frac{28\sqrt{7}}{429}R_{44} + \frac{54\sqrt{455}}{2431}R_{64} + \frac{36\sqrt{6545}}{46189}R_{84} - \frac{41\sqrt{1001}}{4199}R_{10,4}$

Table B82: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	3	$\frac{45\sqrt{3}}{143}R_{20} - \frac{4\sqrt{15}}{33}R_{40} - \frac{42\sqrt{195}}{2431}R_{60} + \frac{84\sqrt{255}}{3553}R_{80}$ $- \frac{77\sqrt{35}}{4199}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{18\sqrt{5}}{143}R_{44} - \frac{20\sqrt{13}}{143}R_{64} + \frac{35\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	3	$\frac{7\sqrt{24310}}{2431}R_{88}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{15\sqrt{2}}{143}R_{20} + \frac{12\sqrt{10}}{143}R_{40} - \frac{42\sqrt{130}}{2431}R_{60} + \frac{252\sqrt{170}}{46189}R_{80}$ $- \frac{3\sqrt{210}}{4199}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{4\sqrt{6}}{143}R_{44} - \frac{42\sqrt{390}}{2431}R_{64} + \frac{252\sqrt{5610}}{46189}R_{84} - \frac{21\sqrt{858}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{168\sqrt{12155}}{46189}R_{88} - \frac{6\sqrt{255255}}{4199}R_{10,8}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{\sqrt{30}}{11}R_{10} - \frac{12\sqrt{70}}{143}R_{30} + \frac{6\sqrt{110}}{143}R_{50} - \frac{140\sqrt{6}}{2431}R_{70}$ $+ \frac{63\sqrt{190}}{46189}R_{90}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{6\sqrt{66}}{143}R_{54} - \frac{140\sqrt{66}}{2431}R_{74} + \frac{63\sqrt{16302}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	3	$\frac{42\sqrt{230945}}{46189}R_{98}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{385}}{143}R_{30} + \frac{28\sqrt{5}}{221}R_{50} - \frac{1890\sqrt{33}}{46189}R_{70} + \frac{12\sqrt{1045}}{4199}R_{90}$ $- \frac{3\sqrt{1265}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{28\sqrt{77}}{2431}R_{54} - \frac{1890\sqrt{77}}{46189}R_{74} + \frac{12\sqrt{19019}}{4199}R_{94} - \frac{3\sqrt{115115}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{4\sqrt{277134}}{4199}R_{98} - \frac{3\sqrt{2124694}}{7429}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} + \frac{8\sqrt{5}}{33}R_{20} + \frac{54}{143}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$ $+ \frac{98\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	3	$\frac{30\sqrt{5}}{143}R_{44} - \frac{4\sqrt{13}}{143}R_{64} - \frac{63\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{24\sqrt{2}}{143}R_{44} + \frac{10\sqrt{130}}{2431}R_{64} + \frac{490\sqrt{1870}}{46189}R_{84} - \frac{63\sqrt{286}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{6}}{429}R_{20} - \frac{2\sqrt{30}}{143}R_{40} - \frac{56\sqrt{390}}{7293}R_{60} - \frac{588\sqrt{510}}{46189}R_{80}$ $- \frac{378\sqrt{70}}{4199}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{12\sqrt{10}}{143}R_{44} + \frac{118\sqrt{26}}{2431}R_{64} + \frac{322\sqrt{374}}{46189}R_{84} - \frac{63\sqrt{1430}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{14\sqrt{22}}{143}R_{54} - \frac{150\sqrt{22}}{2431}R_{74} + \frac{161\sqrt{5434}}{46189}R_{94}$

Table B83: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{3\sqrt{10}}{11}R_{10} + \frac{14\sqrt{210}}{429}R_{30} + \frac{8\sqrt{330}}{429}R_{50} + \frac{420\sqrt{2}}{2431}R_{70}$ $+ \frac{294\sqrt{570}}{46189}R_{90}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{2\sqrt{110}}{143}R_{54} - \frac{6\sqrt{110}}{221}R_{74} - \frac{7\sqrt{27170}}{3553}R_{94}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{4}{221}R_{54} + \frac{900}{4199}R_{74} + \frac{112\sqrt{247}}{4199}R_{94} - \frac{63\sqrt{1495}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{7\sqrt{5}}{429}R_{30} - \frac{32\sqrt{385}}{7293}R_{50} - \frac{1620\sqrt{21}}{46189}R_{70} - \frac{48\sqrt{665}}{4199}R_{90}$ $-\frac{198\sqrt{805}}{7429}R_{11,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{60\sqrt{33}}{2431}R_{54} + \frac{60\sqrt{33}}{2717}R_{74} - \frac{21\sqrt{49335}}{7429}R_{11,4}$
$\frac{9}{2}$	5	3	$\frac{9}{2}$	5	3	$R_{00} - \frac{4\sqrt{5}}{33}R_{20} - \frac{6}{13}R_{40} + \frac{4\sqrt{13}}{39}R_{60}$ $-\frac{49\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	1	$-\frac{560\sqrt{2431}}{46189}R_{88} - \frac{18\sqrt{51051}}{4199}R_{10,8}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	2	$-\frac{8\sqrt{6}}{143}R_{44} + \frac{98\sqrt{390}}{7293}R_{64} + \frac{224\sqrt{5610}}{46189}R_{84} - \frac{63\sqrt{858}}{4199}R_{10,4}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	3	$\frac{7\sqrt{10}}{143}R_{20} - \frac{14\sqrt{26}}{221}R_{60} + \frac{168\sqrt{34}}{3553}R_{80} - \frac{45\sqrt{42}}{4199}R_{10,0}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	1	$\frac{14\sqrt{46189}}{46189}R_{98}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{2\sqrt{66}}{33}R_{54} - \frac{7\sqrt{16302}}{2717}R_{94}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{3\sqrt{6}}{11}R_{10} - \frac{16\sqrt{14}}{143}R_{30} - \frac{10\sqrt{22}}{143}R_{50} + \frac{168\sqrt{30}}{2431}R_{70}$ $-\frac{735\sqrt{38}}{46189}R_{90}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	1	$-\frac{20\sqrt{8398}}{4199}R_{98} - \frac{9\sqrt{579462}}{7429}R_{11,8}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	2	$-\frac{4\sqrt{77}}{187}R_{54} + \frac{90\sqrt{77}}{3553}R_{74} + \frac{12\sqrt{19019}}{4199}R_{94} - \frac{9\sqrt{115115}}{7429}R_{11,4}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{7\sqrt{105}}{429}R_{30} - \frac{28\sqrt{165}}{7293}R_{50} - \frac{14490}{46189}R_{70} + \frac{4\sqrt{285}}{221}R_{90}$ $-\frac{33\sqrt{345}}{7429}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} - \frac{25\sqrt{5}}{143}R_{20} - \frac{54}{143}R_{40} + \frac{310\sqrt{13}}{2431}R_{60}$ $-\frac{2135\sqrt{17}}{46189}R_{80} + \frac{27\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{14\sqrt{15}}{143}R_{44} - \frac{10\sqrt{39}}{187}R_{64} - \frac{35\sqrt{561}}{2717}R_{84} + \frac{21\sqrt{2145}}{4199}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{315\sqrt{4862}}{46189}R_{88} + \frac{3\sqrt{102102}}{4199}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{9\sqrt{3}}{143}R_{10} - \frac{\sqrt{7}}{143}R_{30} + \frac{190\sqrt{11}}{2431}R_{50} - \frac{3150\sqrt{15}}{46189}R_{70}$ $+\frac{1185\sqrt{19}}{46189}R_{90} - \frac{363\sqrt{23}}{96577}R_{11,0}$

Table B84: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	2	$-\frac{50\sqrt{165}}{2431}R_{54} - \frac{70\sqrt{165}}{46189}R_{74} + \frac{105\sqrt{40755}}{46189}R_{94} - \frac{231\sqrt{9867}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{45\sqrt{92378}}{46189}R_{98} - \frac{33\sqrt{6374082}}{96577}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{66}}{13}R_{10} - \frac{6\sqrt{154}}{143}R_{30} - \frac{30\sqrt{2}}{221}R_{50} + \frac{1120\sqrt{330}}{46189}R_{70}$ $-\frac{45\sqrt{418}}{4199}R_{90} + \frac{162\sqrt{506}}{96577}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{38\sqrt{770}}{2431}R_{54} - \frac{420\sqrt{770}}{46189}R_{74} - \frac{3\sqrt{190190}}{4199}R_{94} + \frac{96\sqrt{46046}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{2\sqrt{692835}}{4199}R_{98} + \frac{12\sqrt{5311735}}{96577}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} + \frac{35\sqrt{5}}{143}R_{20} + \frac{56}{143}R_{40} + \frac{200\sqrt{13}}{2431}R_{60}$ $+\frac{2450\sqrt{17}}{46189}R_{80} + \frac{126\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{42\sqrt{3}}{143}R_{44} + \frac{10\sqrt{195}}{2431}R_{64} - \frac{175\sqrt{2805}}{46189}R_{84} - \frac{63\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{50\sqrt{165}}{2431}R_{54} - \frac{70\sqrt{165}}{46189}R_{74} + \frac{105\sqrt{40755}}{46189}R_{94} - \frac{231\sqrt{9867}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	2	$-\frac{\sqrt{3}}{143}R_{10} - \frac{7\sqrt{7}}{429}R_{30} - \frac{200\sqrt{11}}{7293}R_{50} - \frac{1960\sqrt{15}}{46189}R_{70}$ $-\frac{3150\sqrt{19}}{46189}R_{90} - \frac{15246\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	3	$\frac{90\sqrt{33}}{2431}R_{54} + \frac{210\sqrt{33}}{4199}R_{74} + \frac{105\sqrt{8151}}{46189}R_{94} - \frac{231\sqrt{49335}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{14\sqrt{30}}{221}R_{54} - \frac{290\sqrt{30}}{4199}R_{74} - \frac{7\sqrt{7410}}{4199}R_{94} + \frac{588\sqrt{1794}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{3\sqrt{14}}{13}R_{10} + \frac{28\sqrt{6}}{143}R_{30} + \frac{40\sqrt{462}}{2431}R_{50} + \frac{1500\sqrt{70}}{46189}R_{70}$ $+\frac{30\sqrt{798}}{4199}R_{90} + \frac{396\sqrt{966}}{96577}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	3	$-\frac{14\sqrt{110}}{2431}R_{54} - \frac{810\sqrt{110}}{46189}R_{74} - \frac{7\sqrt{27170}}{4199}R_{94} - \frac{336\sqrt{6578}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	3	$R_{00} - \frac{\sqrt{5}}{143}R_{20} - \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+\frac{245\sqrt{17}}{2717}R_{80} - \frac{105\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	1	$-\frac{45\sqrt{92378}}{46189}R_{98} - \frac{33\sqrt{6374082}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{90\sqrt{33}}{2431}R_{54} + \frac{210\sqrt{33}}{4199}R_{74} + \frac{105\sqrt{8151}}{46189}R_{94} - \frac{231\sqrt{49335}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{7\sqrt{3}}{143}R_{10} + \frac{7\sqrt{7}}{143}R_{30} - \frac{70\sqrt{11}}{2431}R_{50} - \frac{3514\sqrt{15}}{46189}R_{70}$ $+\frac{3405\sqrt{19}}{46189}R_{90} - \frac{1815\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	1	$\frac{6\sqrt{4199}}{4199}R_{98} + \frac{12\sqrt{289731}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	2	$\frac{98\sqrt{154}}{2431}R_{54} + \frac{600\sqrt{154}}{46189}R_{74} - \frac{3\sqrt{38038}}{4199}R_{94} - \frac{60\sqrt{230230}}{96577}R_{11,4}$

Table B85: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{3\sqrt{10}}{13}R_{10} - \frac{2\sqrt{210}}{143}R_{30} - \frac{58\sqrt{330}}{2431}R_{50} - \frac{2100\sqrt{2}}{46189}R_{70}$ $+ \frac{63\sqrt{570}}{4199}R_{90} - \frac{462\sqrt{690}}{96577}R_{11,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} - \frac{25\sqrt{5}}{143}R_{20} - \frac{54}{143}R_{40} + \frac{310\sqrt{13}}{2431}R_{60}$ $- \frac{2135\sqrt{17}}{46189}R_{80} + \frac{27\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{14\sqrt{15}}{143}R_{44} - \frac{10\sqrt{39}}{187}R_{64} - \frac{35\sqrt{561}}{2717}R_{84} + \frac{21\sqrt{2145}}{4199}R_{10,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	3	$\frac{315\sqrt{4862}}{46189}R_{88} + \frac{3\sqrt{102102}}{4199}R_{10,8}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{9\sqrt{110}}{715}R_{20} + \frac{30\sqrt{22}}{2431}R_{40} + \frac{630\sqrt{286}}{46189}R_{60} - \frac{720\sqrt{374}}{46189}R_{80}$ $+ \frac{645\sqrt{462}}{96577}R_{10,0} - \frac{198\sqrt{22}}{37145}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{24\sqrt{70}}{2431}R_{44} - \frac{70\sqrt{182}}{3553}R_{64} - \frac{60\sqrt{2618}}{46189}R_{84} + \frac{441\sqrt{10010}}{96577}R_{10,4}$ $- \frac{264\sqrt{1001}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{80\sqrt{36465}}{46189}R_{88} - \frac{18\sqrt{85085}}{96577}R_{10,8} - \frac{132\sqrt{46189}}{37145}R_{12,8}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} + \frac{35\sqrt{5}}{143}R_{20} + \frac{56}{143}R_{40} + \frac{200\sqrt{13}}{2431}R_{60}$ $+ \frac{2450\sqrt{17}}{46189}R_{80} + \frac{126\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{42\sqrt{3}}{143}R_{44} + \frac{10\sqrt{195}}{2431}R_{64} - \frac{175\sqrt{2805}}{46189}R_{84} - \frac{63\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{28\sqrt{330}}{2431}R_{44} - \frac{10\sqrt{858}}{3553}R_{64} + \frac{70\sqrt{102}}{4199}R_{84} + \frac{2121\sqrt{390}}{96577}R_{10,4}$ $- \frac{1848\sqrt{39}}{37145}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{\sqrt{210}}{715}R_{20} - \frac{20\sqrt{42}}{2431}R_{40} - \frac{200\sqrt{546}}{46189}R_{60} - \frac{300\sqrt{714}}{46189}R_{80}$ $- \frac{20790\sqrt{2}}{96577}R_{10,0} - \frac{4356\sqrt{42}}{37145}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{168\sqrt{10}}{2431}R_{44} + \frac{1990\sqrt{26}}{46189}R_{64} + \frac{490\sqrt{374}}{46189}R_{84} + \frac{189\sqrt{1430}}{96577}R_{10,4}$ $- \frac{1848\sqrt{143}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	3	$R_{00} - \frac{\sqrt{5}}{143}R_{20} - \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+ \frac{245\sqrt{17}}{2717}R_{80} - \frac{105\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	1	$-\frac{120\sqrt{221}}{4199}R_{88} - \frac{642\sqrt{4641}}{96577}R_{10,8} - \frac{132\sqrt{62985}}{37145}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	2	$-\frac{84\sqrt{14}}{2431}R_{44} + \frac{230\sqrt{910}}{46189}R_{64} + \frac{120\sqrt{13090}}{46189}R_{84} + \frac{549\sqrt{2002}}{96577}R_{10,4}$ $- \frac{264\sqrt{5005}}{37145}R_{12,4}$

Table B86: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 15.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	3	$\frac{7\sqrt{6}}{143}R_{20} + \frac{42\sqrt{30}}{2431}R_{40} - \frac{350\sqrt{390}}{46189}R_{60} - \frac{540\sqrt{510}}{46189}R_{80}$ $+ \frac{4059\sqrt{70}}{96577}R_{10,0} - \frac{726\sqrt{30}}{37145}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{4\sqrt{5}}{65}R_{20} - \frac{108}{221}R_{40} + \frac{20\sqrt{13}}{4199}R_{60}$ $+ \frac{395\sqrt{17}}{4199}R_{80} - \frac{5184\sqrt{21}}{96577}R_{10,0} + \frac{1782}{37145}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{54\sqrt{385}}{2431}R_{44} - \frac{20\sqrt{1001}}{3553}R_{64} - \frac{135\sqrt{119}}{4199}R_{84} - \frac{756\sqrt{455}}{96577}R_{10,4}$ $+ \frac{132\sqrt{182}}{7429}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{25\sqrt{6630}}{4199}R_{88} + \frac{216\sqrt{15470}}{96577}R_{10,8} + \frac{66\sqrt{8398}}{37145}R_{12,8}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{16\sqrt{5}}{65}R_{20} + \frac{972}{2431}R_{40} + \frac{4000\sqrt{13}}{46189}R_{60}$ $+ \frac{250\sqrt{17}}{4199}R_{80} + \frac{3888\sqrt{21}}{96577}R_{10,0} + \frac{4356}{37145}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{126\sqrt{105}}{2431}R_{44} + \frac{420\sqrt{273}}{46189}R_{64} - \frac{5\sqrt{3927}}{4199}R_{84} - \frac{180\sqrt{15015}}{96577}R_{10,4}$ $- \frac{132\sqrt{6006}}{37145}R_{12,4}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	3	$R_{00} + \frac{4\sqrt{5}}{65}R_{20} - \frac{828}{2431}R_{40} - \frac{4540\sqrt{13}}{46189}R_{60}$ $+ \frac{35\sqrt{17}}{4199}R_{80} + \frac{7056\sqrt{21}}{96577}R_{10,0} - \frac{5082}{37145}R_{12,0}$

Table B87: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	$R_{00} - \frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	1	$\frac{\sqrt{3}}{5}R_{10} - \frac{3\sqrt{7}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	1	0
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	2	$\frac{2\sqrt{3}}{5}R_{10} - \frac{6\sqrt{7}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{2\sqrt{14}}{7}R_{44}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	2	$\frac{6\sqrt{5}}{35}R_{20} - \frac{2}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{21}}{21}R_{44}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{3\sqrt{2}}{7}R_{20} - \frac{\sqrt{10}}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{231}}{33}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	2	$\frac{\sqrt{70}}{21}R_{30} - \frac{\sqrt{110}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{35}}{21}R_{30} - \frac{2\sqrt{55}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{6}}{33}R_{44} - \frac{6\sqrt{390}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{5}}{11}R_{40} - \frac{6\sqrt{65}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{1}{11}R_{44} - \frac{9\sqrt{65}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{\sqrt{35}}{11}R_{40} - \frac{3\sqrt{455}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{\sqrt{165}}{11}R_{44} - \frac{\sqrt{429}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{9\sqrt{11}}{143}R_{54} - \frac{3\sqrt{11}}{13}R_{74}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	2	$\frac{3\sqrt{385}}{143}R_{50} - \frac{\sqrt{21}}{13}R_{70}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{15}}{13}R_{54} - \frac{\sqrt{15}}{65}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	1	0
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{6\sqrt{11}}{143}R_{54} - \frac{2\sqrt{11}}{13}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{6\sqrt{154}}{143}R_{50} - \frac{2\sqrt{210}}{65}R_{70}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	4	$\frac{6\sqrt{5}}{13}R_{54} - \frac{6\sqrt{5}}{65}R_{74}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	$R_{00} - \frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{2\sqrt{14}}{7}R_{44}$

Table B88: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	2	$\frac{6\sqrt{5}}{35}R_{20} - \frac{2}{7}R_{40}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	1	0
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	2	$\frac{2\sqrt{3}}{5}R_{10} - \frac{6\sqrt{7}}{35}R_{30}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{231}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{\sqrt{70}}{21}R_{30} - \frac{\sqrt{110}}{33}R_{50}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{21}}{21}R_{44}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{2}}{7}R_{20} - \frac{\sqrt{10}}{7}R_{40}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{2\sqrt{6}}{33}R_{44} - \frac{6\sqrt{390}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{5}}{11}R_{40} - \frac{6\sqrt{65}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{35}}{21}R_{30} - \frac{2\sqrt{55}}{33}R_{50}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{9\sqrt{11}}{143}R_{54} - \frac{3\sqrt{11}}{13}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{3\sqrt{385}}{143}R_{50} - \frac{\sqrt{21}}{13}R_{70}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	3	$\frac{\sqrt{15}}{13}R_{54} - \frac{\sqrt{15}}{65}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{1}{11}R_{44} - \frac{9\sqrt{65}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{\sqrt{35}}{11}R_{40} - \frac{3\sqrt{455}}{143}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{165}}{11}R_{44} - \frac{\sqrt{429}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$-\frac{4\sqrt{595}}{85}R_{88}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{2\sqrt{65}}{65}R_{64} - \frac{2\sqrt{935}}{85}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{2\sqrt{182}}{65}R_{60} - \frac{2\sqrt{238}}{85}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	4	$\frac{2\sqrt{143}}{65}R_{64} - \frac{2\sqrt{17}}{85}R_{84}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	2	$\frac{\sqrt{14}}{7}R_{44}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{3}}{7}R_{10} + \frac{2\sqrt{7}}{21}R_{30} - \frac{5\sqrt{11}}{231}R_{50}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	2	$-\frac{5\sqrt{154}}{77}R_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	1	$\frac{3\sqrt{2}}{7}R_{10} - \frac{2\sqrt{42}}{21}R_{30} + \frac{5\sqrt{66}}{231}R_{50}$

Table B89: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{385}}{77}R_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{30}}{21}R_{20} + \frac{10\sqrt{6}}{77}R_{40} - \frac{5\sqrt{78}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{4\sqrt{35}}{77}R_{44} - \frac{10\sqrt{91}}{143}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{105}}{21}R_{20} - \frac{10\sqrt{21}}{77}R_{40} + \frac{5\sqrt{273}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{70}}{77}R_{44} + \frac{5\sqrt{182}}{143}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{3}}{33}R_{30} + \frac{10\sqrt{231}}{429}R_{50} - \frac{3\sqrt{35}}{143}R_{70}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{770}}{143}R_{54} - \frac{3\sqrt{770}}{143}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{10\sqrt{2}}{33}R_{30} - \frac{20\sqrt{154}}{429}R_{50} + \frac{2\sqrt{210}}{143}R_{70}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{110}}{143}R_{54} + \frac{6\sqrt{110}}{143}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	3	0
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$-\frac{10\sqrt{14}}{143}R_{40} + \frac{4\sqrt{182}}{143}R_{60} - \frac{2\sqrt{238}}{221}R_{80}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{2\sqrt{10}}{143}R_{44} + \frac{12\sqrt{26}}{143}R_{64} - \frac{6\sqrt{374}}{221}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	3	$-\frac{4\sqrt{4641}}{221}R_{88}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{15\sqrt{143}}{143}R_{44} - \frac{2\sqrt{55}}{55}R_{64} + \frac{\sqrt{1105}}{1105}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{15\sqrt{14}}{143}R_{40} - \frac{6\sqrt{182}}{143}R_{60} + \frac{3\sqrt{238}}{221}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{5}{143}R_{44} - \frac{6\sqrt{65}}{143}R_{64} + \frac{3\sqrt{935}}{221}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	4	$\frac{2\sqrt{1547}}{221}R_{88}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	2	2	$R_{00} + \frac{2\sqrt{5}}{35}R_{20} - \frac{3}{7}R_{40}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	1	$-\frac{5\sqrt{154}}{77}R_{54}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	2	$\frac{3\sqrt{3}}{35}R_{10} + \frac{2\sqrt{7}}{15}R_{30} - \frac{25\sqrt{11}}{231}R_{50}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	1	$\frac{2\sqrt{231}}{231}R_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	2	$\frac{\sqrt{30}}{7}R_{10} - \frac{3\sqrt{110}}{77}R_{50}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{8\sqrt{21}}{77}R_{44} - \frac{10\sqrt{1365}}{429}R_{64}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	2	$\frac{\sqrt{2}}{7}R_{20} + \frac{8\sqrt{10}}{77}R_{40} - \frac{5\sqrt{130}}{143}R_{60}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{6}}{11}R_{44} - \frac{\sqrt{390}}{429}R_{64}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	2	$\frac{5}{7}R_{20} - \frac{2\sqrt{5}}{77}R_{40} - \frac{7\sqrt{65}}{143}R_{60}$

Table B90: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{66}}{39}R_{54} - \frac{15\sqrt{66}}{143}R_{74}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	2	$\frac{3\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} - \frac{35\sqrt{3}}{143}R_{70}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	1	$-\frac{2\sqrt{11}}{13}R_{54} - \frac{6\sqrt{11}}{143}R_{74}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	2	$\frac{10\sqrt{5}}{33}R_{30} - \frac{2\sqrt{385}}{429}R_{50} - \frac{12\sqrt{21}}{143}R_{70}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	3	$\frac{2\sqrt{15}}{13}R_{54} - \frac{2\sqrt{15}}{65}R_{74}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{16}{143}R_{44} - \frac{6\sqrt{65}}{143}R_{64} - \frac{6\sqrt{935}}{221}R_{84}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	2	$\frac{6\sqrt{35}}{143}R_{40} + \frac{2\sqrt{455}}{143}R_{60} - \frac{4\sqrt{595}}{221}R_{80}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	3	$-\frac{4\sqrt{165}}{143}R_{44} + \frac{2\sqrt{429}}{143}R_{64} - \frac{2\sqrt{51}}{221}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	1	$\frac{2\sqrt{595}}{85}R_{88}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	2	$\frac{15}{143}R_{44} - \frac{46\sqrt{65}}{715}R_{64} - \frac{7\sqrt{935}}{1105}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{25\sqrt{14}}{143}R_{40} - \frac{6\sqrt{182}}{715}R_{60} - \frac{27\sqrt{238}}{1105}R_{80}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	4	$\frac{15\sqrt{55}}{143}R_{44} + \frac{34\sqrt{143}}{715}R_{64} - \frac{47\sqrt{17}}{1105}R_{84}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	2	$\frac{\sqrt{14}}{7}R_{44}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{30}}{21}R_{20} + \frac{10\sqrt{6}}{77}R_{40} - \frac{5\sqrt{78}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{4\sqrt{35}}{77}R_{44} - \frac{10\sqrt{91}}{143}R_{64}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	1	$\frac{3\sqrt{2}}{7}R_{10} - \frac{2\sqrt{42}}{21}R_{30} + \frac{5\sqrt{66}}{231}R_{50}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{385}}{77}R_{54}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{5\sqrt{3}}{33}R_{30} + \frac{10\sqrt{231}}{429}R_{50} - \frac{3\sqrt{35}}{143}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{770}}{143}R_{54} - \frac{3\sqrt{770}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{105}}{21}R_{20} - \frac{10\sqrt{21}}{77}R_{40} + \frac{5\sqrt{273}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{70}}{77}R_{44} + \frac{5\sqrt{182}}{143}R_{64}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{10\sqrt{14}}{143}R_{40} + \frac{4\sqrt{182}}{143}R_{60} - \frac{2\sqrt{238}}{221}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{10}}{143}R_{44} + \frac{12\sqrt{26}}{143}R_{64} - \frac{6\sqrt{374}}{221}R_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{4641}}{221}R_{88}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{2}}{33}R_{30} - \frac{20\sqrt{154}}{429}R_{50} + \frac{2\sqrt{210}}{143}R_{70}$

Table B91: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{110}}{143}R_{54} + \frac{6\sqrt{110}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	3	0
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{13}}{13}R_{54} + \frac{6\sqrt{13}}{221}R_{74} - \frac{\sqrt{19}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{154}}{143}R_{50} + \frac{6\sqrt{210}}{221}R_{70} - \frac{3\sqrt{266}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{11}}{143}R_{54} + \frac{30\sqrt{11}}{221}R_{74} - \frac{3\sqrt{2717}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	4	$-\frac{2\sqrt{29393}}{323}R_{98}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	3	2	$R_{00} + \frac{2\sqrt{5}}{35}R_{20} - \frac{3}{7}R_{40}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	1	$-\frac{8\sqrt{21}}{77}R_{44} - \frac{10\sqrt{1365}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	2	$\frac{\sqrt{2}}{7}R_{20} + \frac{8\sqrt{10}}{77}R_{40} - \frac{5\sqrt{130}}{143}R_{60}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	1	$\frac{2\sqrt{231}}{231}R_{54}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{\sqrt{30}}{7}R_{10} - \frac{3\sqrt{110}}{77}R_{50}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{66}}{39}R_{54} - \frac{15\sqrt{66}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{3\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} - \frac{35\sqrt{3}}{143}R_{70}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{6}}{11}R_{44} - \frac{\sqrt{390}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{5}{7}R_{20} - \frac{2\sqrt{5}}{77}R_{40} - \frac{7\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	1	$\frac{16}{143}R_{44} - \frac{6\sqrt{65}}{143}R_{64} - \frac{6\sqrt{935}}{221}R_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{6\sqrt{35}}{143}R_{40} + \frac{2\sqrt{455}}{143}R_{60} - \frac{4\sqrt{595}}{221}R_{80}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{165}}{143}R_{44} + \frac{2\sqrt{429}}{143}R_{64} - \frac{2\sqrt{51}}{221}R_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{2\sqrt{11}}{13}R_{54} - \frac{6\sqrt{11}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{10\sqrt{5}}{33}R_{30} - \frac{2\sqrt{385}}{429}R_{50} - \frac{12\sqrt{21}}{143}R_{70}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{2\sqrt{15}}{13}R_{54} - \frac{2\sqrt{15}}{65}R_{74}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{11305}}{323}R_{98}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	2	$\frac{7\sqrt{11}}{143}R_{54} - \frac{18\sqrt{11}}{221}R_{74} - \frac{5\sqrt{2717}}{323}R_{94}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{3\sqrt{154}}{143}R_{50} + \frac{22\sqrt{210}}{1105}R_{70} - \frac{9\sqrt{266}}{323}R_{90}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	4	$-\frac{\sqrt{5}}{13}R_{54} + \frac{186\sqrt{5}}{1105}R_{74} - \frac{\sqrt{1235}}{323}R_{94}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} - \frac{\sqrt{5}}{21}R_{20} - \frac{39}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$

Table B92: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{3\sqrt{210}}{77}R_{44} + \frac{5\sqrt{546}}{429}R_{64}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{5\sqrt{3}}{63}R_{10} - \frac{5\sqrt{7}}{77}R_{30} + \frac{115\sqrt{11}}{1001}R_{50} - \frac{49\sqrt{15}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{5\sqrt{2310}}{1001}R_{54} - \frac{7\sqrt{2310}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{42}}{9}R_{10} - \frac{2\sqrt{2}}{11}R_{30} - \frac{5\sqrt{154}}{143}R_{50} + \frac{20\sqrt{210}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{2\sqrt{1155}}{143}R_{54} + \frac{4\sqrt{1155}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{70}}{231}R_{20} - \frac{30\sqrt{14}}{1001}R_{40} + \frac{\sqrt{182}}{33}R_{60} - \frac{28\sqrt{238}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{24\sqrt{105}}{1001}R_{44} - \frac{2\sqrt{273}}{429}R_{64} - \frac{28\sqrt{3927}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{105}}{33}R_{20} - \frac{10\sqrt{21}}{143}R_{40} - \frac{10\sqrt{273}}{429}R_{60} + \frac{30\sqrt{357}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{10\sqrt{15}}{143}R_{44} + \frac{2\sqrt{39}}{33}R_{64} + \frac{2\sqrt{561}}{143}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{2\sqrt{3094}}{221}R_{88}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	1	$-\frac{50\sqrt{3}}{429}R_{30} - \frac{2\sqrt{231}}{429}R_{50} + \frac{174\sqrt{35}}{2431}R_{70} - \frac{42\sqrt{399}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{10\sqrt{165}}{429}R_{54} + \frac{6\sqrt{165}}{2431}R_{74} - \frac{14\sqrt{40755}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	3	$-\frac{14\sqrt{58786}}{4199}R_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{78}}{13}R_{54} - \frac{6\sqrt{78}}{221}R_{74} + \frac{\sqrt{114}}{323}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{140\sqrt{3}}{429}R_{30} - \frac{10\sqrt{231}}{429}R_{50} - \frac{144\sqrt{35}}{2431}R_{70} + \frac{50\sqrt{399}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{19\sqrt{66}}{429}R_{54} + \frac{90\sqrt{66}}{2431}R_{74} + \frac{11\sqrt{16302}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	4	$-\frac{2\sqrt{176358}}{4199}R_{98}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	2	$R_{00} + \frac{\sqrt{5}}{7}R_{20} - \frac{9}{77}R_{40} - \frac{15\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	1	$-\frac{5\sqrt{2310}}{1001}R_{54} - \frac{7\sqrt{2310}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{\sqrt{3}}{21}R_{10} + \frac{\sqrt{7}}{11}R_{30} + \frac{85\sqrt{11}}{1001}R_{50} - \frac{49\sqrt{15}}{429}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	1	$\frac{2\sqrt{165}}{143}R_{54} + \frac{4\sqrt{165}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{\sqrt{6}}{3}R_{10} + \frac{4\sqrt{14}}{77}R_{30} - \frac{5\sqrt{22}}{143}R_{50} - \frac{28\sqrt{30}}{429}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{12\sqrt{15}}{143}R_{44} - \frac{2\sqrt{39}}{33}R_{64} - \frac{84\sqrt{561}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{3\sqrt{10}}{77}R_{20} + \frac{180\sqrt{2}}{1001}R_{40} + \frac{7\sqrt{26}}{143}R_{60} - \frac{196\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{20\sqrt{10}}{143}R_{44} - \frac{\sqrt{26}}{143}R_{64} + \frac{3\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{\sqrt{70}}{11}R_{20} + \frac{5\sqrt{14}}{143}R_{40} - \frac{2\sqrt{182}}{143}R_{60} - \frac{54\sqrt{238}}{2431}R_{80}$

Table B93: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	3	$-\frac{10\sqrt{66}}{143}R_{44} + \frac{\sqrt{4290}}{143}R_{64} - \frac{\sqrt{510}}{221}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{110}}{143}R_{54} - \frac{93\sqrt{110}}{2431}R_{74} - \frac{21\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{15\sqrt{2}}{143}R_{30} + \frac{3\sqrt{154}}{143}R_{50} + \frac{38\sqrt{210}}{2431}R_{70} - \frac{126\sqrt{266}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	3	$-\frac{2\sqrt{6}}{13}R_{54} + \frac{25\sqrt{6}}{221}R_{74} - \frac{7\sqrt{1482}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{2\sqrt{4522}}{323}R_{98}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{7\sqrt{110}}{143}R_{54} - \frac{36\sqrt{110}}{2431}R_{74} - \frac{\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{140\sqrt{5}}{429}R_{30} + \frac{2\sqrt{385}}{429}R_{50} - \frac{108\sqrt{21}}{2431}R_{70} - \frac{54\sqrt{665}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	4	$\frac{\sqrt{2}}{13}R_{54} + \frac{72\sqrt{2}}{221}R_{74} - \frac{29\sqrt{494}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} - \frac{\sqrt{5}}{21}R_{20} - \frac{39}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{210}}{77}R_{44} + \frac{5\sqrt{546}}{429}R_{64}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{5\sqrt{70}}{231}R_{20} - \frac{30\sqrt{14}}{1001}R_{40} + \frac{\sqrt{182}}{33}R_{60} - \frac{28\sqrt{238}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{24\sqrt{105}}{1001}R_{44} - \frac{2\sqrt{273}}{429}R_{64} - \frac{28\sqrt{3927}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{42}}{9}R_{10} - \frac{2\sqrt{2}}{11}R_{30} - \frac{5\sqrt{154}}{143}R_{50} + \frac{20\sqrt{210}}{1287}R_{70}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{1155}}{143}R_{54} + \frac{4\sqrt{1155}}{429}R_{74}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{50\sqrt{3}}{429}R_{30} - \frac{2\sqrt{231}}{429}R_{50} + \frac{174\sqrt{35}}{2431}R_{70} - \frac{42\sqrt{399}}{4199}R_{90}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{10\sqrt{165}}{429}R_{54} + \frac{6\sqrt{165}}{2431}R_{74} - \frac{14\sqrt{40755}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	3	$-\frac{14\sqrt{58786}}{4199}R_{98}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{2\sqrt{105}}{33}R_{20} - \frac{10\sqrt{21}}{143}R_{40} - \frac{10\sqrt{273}}{429}R_{60} + \frac{30\sqrt{357}}{2431}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{10\sqrt{15}}{143}R_{44} + \frac{2\sqrt{39}}{33}R_{64} + \frac{2\sqrt{561}}{143}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{2\sqrt{3094}}{221}R_{88}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{858}}{429}R_{44} - \frac{3\sqrt{330}}{187}R_{64} + \frac{6\sqrt{6630}}{4199}R_{84} - \frac{7\sqrt{6}}{969}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{20\sqrt{21}}{429}R_{40} - \frac{6\sqrt{273}}{2431}R_{60} + \frac{96\sqrt{357}}{4199}R_{80} - \frac{70}{323}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{8\sqrt{6}}{429}R_{44} + \frac{3\sqrt{390}}{187}R_{64} + \frac{6\sqrt{5610}}{4199}R_{84} - \frac{7\sqrt{858}}{323}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	4	$-\frac{24\sqrt{9282}}{4199}R_{88} - \frac{14\sqrt{442}}{323}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	2	$R_{00} + \frac{\sqrt{5}}{7}R_{20} - \frac{9}{77}R_{40} - \frac{15\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	1	$-\frac{12\sqrt{15}}{143}R_{44} - \frac{2\sqrt{39}}{33}R_{64} - \frac{84\sqrt{561}}{2431}R_{84}$

Table B94: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	2	$\frac{3\sqrt{10}}{77}R_{20} + \frac{180\sqrt{2}}{1001}R_{40} + \frac{7\sqrt{26}}{143}R_{60} - \frac{196\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	1	$\frac{2\sqrt{165}}{143}R_{54} + \frac{4\sqrt{165}}{429}R_{74}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{\sqrt{6}}{3}R_{10} + \frac{4\sqrt{14}}{77}R_{30} - \frac{5\sqrt{22}}{143}R_{50} - \frac{28\sqrt{30}}{429}R_{70}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{4\sqrt{110}}{143}R_{54} - \frac{93\sqrt{110}}{2431}R_{74} - \frac{21\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{15\sqrt{2}}{143}R_{30} + \frac{3\sqrt{154}}{143}R_{50} + \frac{38\sqrt{210}}{2431}R_{70} - \frac{126\sqrt{266}}{4199}R_{90}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{2\sqrt{6}}{13}R_{54} + \frac{25\sqrt{6}}{221}R_{74} - \frac{7\sqrt{1482}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{20\sqrt{10}}{143}R_{44} - \frac{\sqrt{26}}{143}R_{64} + \frac{3\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{\sqrt{70}}{11}R_{20} + \frac{5\sqrt{14}}{143}R_{40} - \frac{2\sqrt{182}}{143}R_{60} - \frac{54\sqrt{238}}{2431}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	3	$-\frac{10\sqrt{66}}{143}R_{44} + \frac{\sqrt{4290}}{143}R_{64} - \frac{\sqrt{510}}{221}R_{84}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{12\sqrt{238}}{323}R_{88} - \frac{14\sqrt{102}}{323}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{4\sqrt{10}}{143}R_{44} - \frac{111\sqrt{26}}{2431}R_{64} - \frac{84\sqrt{374}}{4199}R_{84} - \frac{7\sqrt{1430}}{323}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{4\sqrt{35}}{143}R_{40} + \frac{30\sqrt{455}}{2431}R_{60} + \frac{36\sqrt{595}}{4199}R_{80} - \frac{42\sqrt{15}}{323}R_{10,0}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	4	$-\frac{8\sqrt{22}}{143}R_{44} - \frac{15\sqrt{1430}}{2431}R_{64} + \frac{120\sqrt{170}}{4199}R_{84} - \frac{7\sqrt{26}}{323}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{2\sqrt{5}}{33}R_{20} - \frac{51}{143}R_{40} - \frac{40\sqrt{13}}{429}R_{60}$ $+ \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{15\sqrt{30}}{143}R_{44} + \frac{16\sqrt{78}}{429}R_{64} + \frac{14\sqrt{1122}}{2431}R_{84}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{3}}{99}R_{10} - \frac{10\sqrt{7}}{143}R_{30} - \frac{\sqrt{11}}{143}R_{50} + \frac{2408\sqrt{15}}{21879}R_{70}$ $-\frac{2268\sqrt{19}}{46189}R_{90}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{330}}{143}R_{54} - \frac{112\sqrt{330}}{7293}R_{74} - \frac{126\sqrt{81510}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{6\sqrt{2}}{11}R_{10} - \frac{2\sqrt{42}}{429}R_{30} - \frac{20\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70}$ $+ \frac{1050\sqrt{114}}{46189}R_{90}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{4\sqrt{2310}}{429}R_{54} + \frac{18\sqrt{2310}}{2431}R_{74} + \frac{14\sqrt{570570}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	3	$-\frac{28\sqrt{4199}}{4199}R_{98}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{10\sqrt{30}}{429}R_{20} - \frac{10\sqrt{6}}{143}R_{40} + \frac{28\sqrt{78}}{7293}R_{60} + \frac{1974\sqrt{102}}{46189}R_{80}$ $-\frac{270\sqrt{14}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{2\sqrt{210}}{143}R_{44} + \frac{4\sqrt{546}}{7293}R_{64} - \frac{98\sqrt{7854}}{46189}R_{84} - \frac{18\sqrt{30030}}{4199}R_{10,4}$

Table B95: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	3	$\frac{140\sqrt{221}}{4199}R_{88} - \frac{36\sqrt{4641}}{4199}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{4\sqrt{3003}}{429}R_{44} + \frac{3\sqrt{1155}}{187}R_{64} - \frac{6\sqrt{23205}}{4199}R_{84} + \frac{7\sqrt{21}}{969}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{18\sqrt{30}}{143}R_{20} - \frac{20\sqrt{6}}{429}R_{40} - \frac{105\sqrt{78}}{2431}R_{60} - \frac{1050\sqrt{102}}{46189}R_{80}$ $+ \frac{275\sqrt{14}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{28\sqrt{21}}{429}R_{44} + \frac{21\sqrt{1365}}{2431}R_{64} + \frac{6\sqrt{19635}}{2431}R_{84} + \frac{\sqrt{3003}}{221}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	4	$-\frac{84\sqrt{663}}{4199}R_{88} - \frac{2\sqrt{1547}}{247}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} + \frac{2\sqrt{5}}{11}R_{20} + \frac{9}{143}R_{40} - \frac{8\sqrt{13}}{143}R_{60}$ $-\frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{\sqrt{330}}{143}R_{54} - \frac{112\sqrt{330}}{7293}R_{74} - \frac{126\sqrt{81510}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{\sqrt{3}}{33}R_{10} + \frac{62\sqrt{7}}{1001}R_{30} + \frac{\sqrt{11}}{13}R_{50} + \frac{392\sqrt{15}}{7293}R_{70}$ $-\frac{5292\sqrt{19}}{46189}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{4\sqrt{55}}{143}R_{54} + \frac{54\sqrt{55}}{2431}R_{74} + \frac{42\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{2\sqrt{21}}{11}R_{10} + \frac{42}{143}R_{30} - \frac{4\sqrt{105}}{187}R_{70} - \frac{1260\sqrt{133}}{46189}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{3}}{13}R_{54} + \frac{50\sqrt{3}}{221}R_{74} - \frac{14\sqrt{741}}{4199}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{16\sqrt{5}}{143}R_{44} - \frac{172\sqrt{13}}{2431}R_{64} - \frac{1218\sqrt{187}}{46189}R_{84} - \frac{126\sqrt{715}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{2\sqrt{35}}{143}R_{20} + \frac{10\sqrt{7}}{143}R_{40} + \frac{64\sqrt{91}}{2431}R_{60} + \frac{756\sqrt{119}}{46189}R_{80}$ $-\frac{1260\sqrt{3}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{4\sqrt{33}}{143}R_{44} - \frac{20\sqrt{2145}}{2431}R_{64} + \frac{70\sqrt{255}}{4199}R_{84} - \frac{42\sqrt{39}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{12\sqrt{119}}{323}R_{88} + \frac{14\sqrt{51}}{323}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{28\sqrt{5}}{143}R_{44} - \frac{15\sqrt{13}}{2431}R_{64} + \frac{150\sqrt{187}}{46189}R_{84} + \frac{7\sqrt{715}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{30\sqrt{14}}{143}R_{20} + \frac{4\sqrt{70}}{143}R_{40} - \frac{3\sqrt{910}}{2431}R_{60} - \frac{18\sqrt{1190}}{2717}R_{80}$ $-\frac{231\sqrt{30}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	4	$-\frac{28\sqrt{11}}{143}R_{44} - \frac{3\sqrt{715}}{2431}R_{64} + \frac{186\sqrt{85}}{4199}R_{84} - \frac{161\sqrt{13}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{2\sqrt{5}}{33}R_{20} - \frac{51}{143}R_{40} - \frac{40\sqrt{13}}{429}R_{60}$ $+ \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{15\sqrt{30}}{143}R_{44} + \frac{16\sqrt{78}}{429}R_{64} + \frac{14\sqrt{1122}}{2431}R_{84}$

Table B96: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{10\sqrt{30}}{429}R_{20} - \frac{10\sqrt{6}}{143}R_{40} + \frac{28\sqrt{78}}{7293}R_{60} + \frac{1974\sqrt{102}}{46189}R_{80}$ $-\frac{270\sqrt{14}}{4199}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{2\sqrt{210}}{143}R_{44} + \frac{4\sqrt{546}}{7293}R_{64} - \frac{98\sqrt{7854}}{46189}R_{84} - \frac{18\sqrt{30030}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{140\sqrt{221}}{4199}R_{88} - \frac{36\sqrt{4641}}{4199}R_{10,8}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{6\sqrt{2}}{11}R_{10} - \frac{2\sqrt{42}}{429}R_{30} - \frac{20\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70}$ $+\frac{1050\sqrt{114}}{46189}R_{90}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{4\sqrt{2310}}{429}R_{54} + \frac{18\sqrt{2310}}{2431}R_{74} + \frac{14\sqrt{570570}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{28\sqrt{4199}}{4199}R_{98}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{273}}{221}R_{54} - \frac{75\sqrt{273}}{4199}R_{74} + \frac{2\sqrt{399}}{323}R_{94} - \frac{3\sqrt{2415}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{10\sqrt{42}}{429}R_{30} - \frac{140\sqrt{66}}{7293}R_{50} + \frac{63\sqrt{10}}{2717}R_{70} + \frac{10\sqrt{114}}{247}R_{90}$ $-\frac{165\sqrt{138}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{116\sqrt{231}}{7293}R_{54} + \frac{315\sqrt{231}}{46189}R_{74} - \frac{2\sqrt{57057}}{4199}R_{94} - \frac{9\sqrt{345345}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	4	$-\frac{4\sqrt{12597}}{4199}R_{98} - \frac{18\sqrt{96577}}{7429}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} + \frac{2\sqrt{5}}{11}R_{20} + \frac{9}{143}R_{40} - \frac{8\sqrt{13}}{143}R_{60}$ $-\frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{16\sqrt{5}}{143}R_{44} - \frac{172\sqrt{13}}{2431}R_{64} - \frac{1218\sqrt{187}}{46189}R_{84} - \frac{126\sqrt{715}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$\frac{2\sqrt{35}}{143}R_{20} + \frac{10\sqrt{7}}{143}R_{40} + \frac{64\sqrt{91}}{2431}R_{60} + \frac{756\sqrt{119}}{46189}R_{80}$ $-\frac{1260\sqrt{3}}{4199}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{4\sqrt{33}}{143}R_{44} - \frac{20\sqrt{2145}}{2431}R_{64} + \frac{70\sqrt{255}}{4199}R_{84} - \frac{42\sqrt{39}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	1	$\frac{4\sqrt{55}}{143}R_{54} + \frac{54\sqrt{55}}{2431}R_{74} + \frac{42\sqrt{13585}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{2\sqrt{21}}{11}R_{10} + \frac{42}{143}R_{30} - \frac{4\sqrt{105}}{187}R_{70} - \frac{1260\sqrt{133}}{46189}R_{90}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{4\sqrt{3}}{13}R_{54} + \frac{50\sqrt{3}}{221}R_{74} - \frac{14\sqrt{741}}{4199}R_{94}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{4\sqrt{2261}}{323}R_{98} - \frac{6\sqrt{156009}}{7429}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{76\sqrt{55}}{2431}R_{54} - \frac{1773\sqrt{55}}{46189}R_{74} - \frac{14\sqrt{13585}}{4199}R_{94} - \frac{105\sqrt{3289}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{14\sqrt{10}}{429}R_{30} + \frac{4\sqrt{770}}{561}R_{50} + \frac{135\sqrt{42}}{3553}R_{70} + \frac{18\sqrt{1330}}{4199}R_{90}$ $-\frac{99\sqrt{1610}}{7429}R_{11,0}$

Table B97: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	4	$-\frac{44}{221}R_{54} - \frac{1125}{4199}R_{74} + \frac{98\sqrt{247}}{4199}R_{94} - \frac{21\sqrt{1495}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{17\sqrt{5}}{143}R_{20} - \frac{2}{11}R_{40} - \frac{250\sqrt{13}}{2431}R_{60}$ $-\frac{175\sqrt{17}}{3553}R_{80} + \frac{225\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{14\sqrt{35}}{143}R_{44} + \frac{90\sqrt{91}}{2431}R_{64} + \frac{315\sqrt{1309}}{46189}R_{84} + \frac{9\sqrt{5005}}{4199}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{35\sqrt{1326}}{4199}R_{88} - \frac{27\sqrt{3094}}{4199}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{5\sqrt{3}}{143}R_{10} - \frac{25\sqrt{7}}{429}R_{30} - \frac{290\sqrt{11}}{7293}R_{50} + \frac{1162\sqrt{15}}{46189}R_{70}$ $+\frac{4545\sqrt{19}}{46189}R_{90} - \frac{5445\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	2	$-\frac{10\sqrt{385}}{2431}R_{54} - \frac{378\sqrt{385}}{46189}R_{74} - \frac{45\sqrt{95095}}{46189}R_{94} - \frac{495\sqrt{23023}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	3	$\frac{15\sqrt{25194}}{4199}R_{98} - \frac{99\sqrt{193154}}{96577}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{8\sqrt{182}}{221}R_{54} + \frac{150\sqrt{182}}{4199}R_{74} - \frac{4\sqrt{266}}{323}R_{94} + \frac{6\sqrt{1610}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{6\sqrt{3}}{13}R_{10} + \frac{6\sqrt{7}}{143}R_{30} - \frac{180\sqrt{11}}{2431}R_{50} - \frac{4200\sqrt{15}}{46189}R_{70}$ $-\frac{150\sqrt{19}}{4199}R_{90} + \frac{4950\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{84\sqrt{154}}{2431}R_{54} + \frac{1350\sqrt{154}}{46189}R_{74} + \frac{6\sqrt{38038}}{4199}R_{94} + \frac{36\sqrt{230230}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	4	$-\frac{14\sqrt{8398}}{4199}R_{98} - \frac{42\sqrt{579462}}{96577}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} + \frac{29\sqrt{5}}{143}R_{20} + \frac{24}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60}$ $-\frac{2590\sqrt{17}}{46189}R_{80} - \frac{270\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{2\sqrt{231}}{143}R_{44} - \frac{10\sqrt{15015}}{2431}R_{64} + \frac{35\sqrt{1785}}{4199}R_{84} - \frac{21\sqrt{273}}{4199}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{10\sqrt{385}}{2431}R_{54} - \frac{378\sqrt{385}}{46189}R_{74} - \frac{45\sqrt{95095}}{46189}R_{94} - \frac{495\sqrt{23023}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{3\sqrt{3}}{143}R_{10} + \frac{19\sqrt{7}}{429}R_{30} + \frac{40\sqrt{11}}{663}R_{50} + \frac{168\sqrt{15}}{2717}R_{70}$ $+\frac{90\sqrt{19}}{2717}R_{90} - \frac{10890\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	3	$\frac{10\sqrt{21}}{221}R_{54} - \frac{350\sqrt{21}}{4199}R_{74} + \frac{15\sqrt{5187}}{4199}R_{94} - \frac{33\sqrt{31395}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{8\sqrt{323}}{323}R_{98} + \frac{12\sqrt{22287}}{7429}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{28\sqrt{385}}{2431}R_{54} + \frac{450\sqrt{385}}{46189}R_{74} + \frac{2\sqrt{95095}}{4199}R_{94} + \frac{60\sqrt{23023}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{2\sqrt{30}}{13}R_{10} + \frac{6\sqrt{70}}{143}R_{30} + \frac{24\sqrt{110}}{2431}R_{50} - \frac{1750\sqrt{6}}{46189}R_{70}$ $-\frac{72\sqrt{190}}{4199}R_{90} - \frac{1782\sqrt{230}}{96577}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	4	$-\frac{44\sqrt{7}}{221}R_{54} - \frac{150\sqrt{7}}{4199}R_{74} + \frac{2\sqrt{1729}}{221}R_{94} - \frac{120\sqrt{10465}}{96577}R_{11,4}$

Table B98: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	3	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+ \frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	1	$\frac{15\sqrt{25194}}{4199}R_{98} - \frac{99\sqrt{193154}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{10\sqrt{21}}{221}R_{54} - \frac{350\sqrt{21}}{4199}R_{74} + \frac{15\sqrt{5187}}{4199}R_{94} - \frac{33\sqrt{31395}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{\sqrt{3}}{13}R_{10} - \frac{\sqrt{7}}{13}R_{30} + \frac{10\sqrt{11}}{221}R_{50} - \frac{70\sqrt{15}}{4199}R_{70}$ $+ \frac{15\sqrt{19}}{4199}R_{90} - \frac{33\sqrt{23}}{96577}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	1	0
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	2	$\frac{10\sqrt{25194}}{4199}R_{98} - \frac{66\sqrt{193154}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{4\sqrt{210}}{221}R_{54} - \frac{140\sqrt{210}}{4199}R_{74} + \frac{6\sqrt{51870}}{4199}R_{94} - \frac{66\sqrt{12558}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	4	$\frac{6}{13}R_{10} - \frac{2\sqrt{21}}{13}R_{30} + \frac{20\sqrt{33}}{221}R_{50} - \frac{420\sqrt{5}}{4199}R_{70}$ $+ \frac{30\sqrt{57}}{4199}R_{90} - \frac{66\sqrt{69}}{96577}R_{11,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{17\sqrt{5}}{143}R_{20} - \frac{2}{11}R_{40} - \frac{250\sqrt{13}}{2431}R_{60}$ $- \frac{175\sqrt{17}}{3553}R_{80} + \frac{225\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{14\sqrt{35}}{143}R_{44} + \frac{90\sqrt{91}}{2431}R_{64} + \frac{315\sqrt{1309}}{46189}R_{84} + \frac{9\sqrt{5005}}{4199}R_{10,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	3	$\frac{35\sqrt{1326}}{4199}R_{88} - \frac{27\sqrt{3094}}{4199}R_{10,8}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{6\sqrt{2002}}{2431}R_{44} + \frac{40\sqrt{770}}{3553}R_{64} - \frac{10\sqrt{15470}}{4199}R_{84} + \frac{252\sqrt{14}}{7429}R_{10,4}$ $- \frac{132\sqrt{35}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{5}}{143}R_{20} - \frac{30}{187}R_{40} - \frac{1260\sqrt{13}}{46189}R_{60} + \frac{120\sqrt{17}}{3553}R_{80}$ $+ \frac{8910\sqrt{21}}{96577}R_{10,0} - \frac{2178}{7429}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{112\sqrt{14}}{2431}R_{44} + \frac{60\sqrt{910}}{46189}R_{64} - \frac{30\sqrt{13090}}{46189}R_{84} - \frac{522\sqrt{2002}}{96577}R_{10,4}$ $- \frac{396\sqrt{5005}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	4	$\frac{80\sqrt{442}}{4199}R_{88} + \frac{162\sqrt{9282}}{96577}R_{10,8} - \frac{66\sqrt{125970}}{37145}R_{12,8}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} + \frac{29\sqrt{5}}{143}R_{20} + \frac{24}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60}$ $- \frac{2590\sqrt{17}}{46189}R_{80} - \frac{270\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{2\sqrt{231}}{143}R_{44} - \frac{10\sqrt{15015}}{2431}R_{64} + \frac{35\sqrt{1785}}{4199}R_{84} - \frac{21\sqrt{273}}{4199}R_{10,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{20\sqrt{17}}{323}R_{88} + \frac{216\sqrt{357}}{7429}R_{10,8} - \frac{132\sqrt{4845}}{37145}R_{12,8}$

Table B99: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{84\sqrt{35}}{2431}R_{44} - \frac{940\sqrt{91}}{46189}R_{64} - \frac{310\sqrt{1309}}{46189}R_{84} - \frac{486\sqrt{5005}}{96577}R_{10,4}$ $-\frac{132\sqrt{2002}}{7429}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{6\sqrt{2}}{143}R_{20} + \frac{106\sqrt{10}}{2431}R_{40} + \frac{840\sqrt{130}}{46189}R_{60} + \frac{810\sqrt{170}}{46189}R_{80}$ $+\frac{792\sqrt{210}}{96577}R_{10,0} - \frac{6534\sqrt{10}}{37145}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	4	$\frac{48\sqrt{77}}{2431}R_{44} - \frac{100\sqrt{5005}}{46189}R_{64} - \frac{50\sqrt{595}}{4199}R_{84} + \frac{3654\sqrt{91}}{96577}R_{10,4}$ $-\frac{132\sqrt{910}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	3	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+\frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	1	$-\frac{132\sqrt{156009}}{37145}R_{12,12}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	2	$-\frac{20\sqrt{1326}}{4199}R_{88} + \frac{990\sqrt{3094}}{96577}R_{10,8} - \frac{66\sqrt{41990}}{37145}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	3	$-\frac{2\sqrt{2310}}{2431}R_{44} + \frac{140\sqrt{6006}}{46189}R_{64} - \frac{60\sqrt{714}}{4199}R_{84} + \frac{462\sqrt{2730}}{96577}R_{10,4}$ $-\frac{132\sqrt{273}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	4	$\frac{2\sqrt{15}}{65}R_{20} - \frac{30\sqrt{3}}{221}R_{40} + \frac{140\sqrt{39}}{4199}R_{60} - \frac{60\sqrt{51}}{4199}R_{80}$ $+\frac{990\sqrt{7}}{96577}R_{10,0} - \frac{66\sqrt{3}}{37145}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40} - \frac{20\sqrt{13}}{323}R_{60}$ $+\frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} + \frac{33}{37145}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{9\sqrt{2002}}{2431}R_{44} - \frac{60\sqrt{770}}{3553}R_{64} + \frac{15\sqrt{15470}}{4199}R_{84} - \frac{378\sqrt{14}}{7429}R_{10,4}$ $+\frac{198\sqrt{35}}{37145}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{5\sqrt{170}}{323}R_{88} - \frac{54\sqrt{3570}}{7429}R_{10,8} + \frac{33\sqrt{1938}}{7429}R_{12,8}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	4	$\frac{66\sqrt{52003}}{37145}R_{12,12}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{2\sqrt{5}}{13}R_{20} - \frac{9}{187}R_{40} - \frac{3700\sqrt{13}}{46189}R_{60}$ $-\frac{25\sqrt{17}}{323}R_{80} - \frac{2250\sqrt{21}}{96577}R_{10,0} + \frac{1815}{7429}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{378\sqrt{14}}{2431}R_{44} + \frac{560\sqrt{910}}{46189}R_{64} + \frac{10\sqrt{13090}}{4199}R_{84} + \frac{432\sqrt{2002}}{96577}R_{10,4}$ $+\frac{66\sqrt{5005}}{37145}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	4	$\frac{75\sqrt{442}}{4199}R_{88} - \frac{126\sqrt{9282}}{96577}R_{10,8} - \frac{33\sqrt{125970}}{37145}R_{12,8}$

Table B100: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 14.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	3	$R_{00} + \frac{14\sqrt{5}}{65}R_{20} + \frac{567}{2431}R_{40} + \frac{500\sqrt{13}}{46189}R_{60}$ $- \frac{125\sqrt{17}}{4199}R_{80} - \frac{5022\sqrt{21}}{96577}R_{10,0} - \frac{9801}{37145}R_{12,0}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	4	$\frac{27\sqrt{770}}{2431}R_{44} - \frac{460\sqrt{2002}}{46189}R_{64} - \frac{35\sqrt{238}}{4199}R_{84} + \frac{1134\sqrt{910}}{96577}R_{10,4}$ $- \frac{462\sqrt{91}}{37145}R_{12,4}$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	4	$R_{00} - \frac{14\sqrt{5}}{65}R_{20} - \frac{63}{221}R_{40} + \frac{580\sqrt{13}}{4199}R_{60}$ $- \frac{295\sqrt{17}}{4199}R_{80} + \frac{1746\sqrt{21}}{96577}R_{10,0} - \frac{363}{37145}R_{12,0}$

Table B101: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	0	1	0	0	1	0
0	0	1	1	1	1	0
0	0	1	2	2	1	0
0	0	1	3	3	1	0
0	0	1	4	3	1	0
0	0	1	4	4	1	0
0	0	1	4	4	2	0
0	0	1	5	4	1	0
0	0	1	4	5	1	0
0	0	1	5	5	1	0
0	0	1	5	5	2	0
0	0	1	6	5	1	0
0	0	1	5	6	1	0
0	0	1	6	6	1	0
0	0	1	6	6	2	0
0	0	1	7	6	1	0
1	1	1	1	1	1	$R_{00} - \frac{\sqrt{5}}{5}R_{20}$
1	1	1	2	2	1	$\frac{\sqrt{15}}{5}R_{10} - \frac{3\sqrt{35}}{35}R_{30}$
1	1	1	3	3	1	$\frac{3\sqrt{70}}{35}R_{20} - \frac{\sqrt{14}}{7}R_{40}$
1	1	1	4	3	1	$\frac{2\sqrt{3}}{3}R_{44}$
1	1	1	4	4	1	$-\frac{2\sqrt{165}}{55}R_{54}$
1	1	1	4	4	2	$\frac{\sqrt{210}}{21}R_{30} - \frac{\sqrt{330}}{33}R_{50}$
1	1	1	5	4	1	$\frac{4\sqrt{165}}{55}R_{54}$
1	1	1	4	5	1	$\frac{4\sqrt{15}}{15}R_{44}$
1	1	1	5	5	1	$\frac{3\sqrt{110}}{55}R_{44} - \frac{5\sqrt{286}}{143}R_{64}$
1	1	1	5	5	2	$\frac{\sqrt{55}}{11}R_{40} - \frac{3\sqrt{715}}{143}R_{60}$

Table B102: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	6	5	1	$\frac{2\sqrt{26}}{13}R_{64}$
1	1	1	5	6	1	$\frac{2\sqrt{22}}{11}R_{54}$
1	1	1	6	6	1	$\frac{\sqrt{10010}}{143}R_{54} - \frac{3\sqrt{10010}}{455}R_{74}$
1	1	1	6	6	2	$\frac{3\sqrt{1001}}{143}R_{50} - \frac{\sqrt{1365}}{65}R_{70}$
1	1	1	7	6	1	$\frac{4\sqrt{35}}{35}R_{74}$
2	2	1	2	2	1	$R_{00} + \frac{\sqrt{5}}{7}R_{20} - \frac{4}{7}R_{40}$
2	2	1	3	3	1	$\frac{2\sqrt{210}}{35}R_{10} + \frac{\sqrt{10}}{15}R_{30} - \frac{5\sqrt{770}}{231}R_{50}$
2	2	1	4	3	1	$\frac{2\sqrt{165}}{33}R_{54}$
2	2	1	4	4	1	$-\frac{2\sqrt{3}}{11}R_{44} - \frac{4\sqrt{195}}{143}R_{64}$
2	2	1	4	4	2	$\frac{\sqrt{30}}{7}R_{20} + \frac{5\sqrt{6}}{77}R_{40} - \frac{10\sqrt{78}}{143}R_{60}$
2	2	1	5	4	1	$\frac{4\sqrt{3}}{11}R_{44} + \frac{8\sqrt{195}}{143}R_{64}$
2	2	1	4	5	1	$\frac{4\sqrt{33}}{33}R_{54}$
2	2	1	5	5	1	$-\frac{\sqrt{2}}{13}R_{54} - \frac{5\sqrt{2}}{13}R_{74}$
2	2	1	5	5	2	$\frac{20\sqrt{77}}{231}R_{30} + \frac{5}{39}R_{50} - \frac{7\sqrt{165}}{143}R_{70}$
2	2	1	6	5	1	$\frac{20\sqrt{22}}{143}R_{54} + \frac{2\sqrt{22}}{13}R_{74}$
2	2	1	5	6	1	$\frac{2\sqrt{10}}{11}R_{44} + \frac{20\sqrt{26}}{143}R_{64}$
2	2	1	6	6	1	$\frac{5\sqrt{182}}{143}R_{44} - \frac{\sqrt{70}}{385}R_{64} - \frac{12\sqrt{170170}}{7735}R_{84}$
2	2	1	6	6	2	$\frac{5\sqrt{455}}{143}R_{40} + \frac{\sqrt{35}}{55}R_{60} - \frac{8\sqrt{7735}}{1105}R_{80}$
2	2	1	7	6	1	$\frac{4\sqrt{5005}}{455}R_{64} + \frac{16\sqrt{595}}{595}R_{84}$
3	3	1	3	3	1	$R_{00} + \frac{\sqrt{5}}{5}R_{20} + \frac{1}{11}R_{40} - \frac{25\sqrt{13}}{143}R_{60}$
3	3	1	4	3	1	$-\frac{\sqrt{42}}{11}R_{44} + \frac{5\sqrt{2730}}{429}R_{64}$
3	3	1	4	4	1	$-\frac{\sqrt{2310}}{715}R_{54} - \frac{\sqrt{2310}}{143}R_{74}$
3	3	1	4	4	2	$\frac{\sqrt{35}}{7}R_{10} + \frac{\sqrt{15}}{11}R_{30} + \frac{\sqrt{1155}}{1001}R_{50} - \frac{35\sqrt{7}}{143}R_{70}$
3	3	1	5	4	1	$\frac{2\sqrt{2310}}{715}R_{54} + \frac{2\sqrt{2310}}{143}R_{74}$
3	3	1	4	5	1	$-\frac{2\sqrt{210}}{55}R_{44} + \frac{10\sqrt{546}}{429}R_{64}$
3	3	1	5	5	1	$-\frac{2\sqrt{385}}{65}R_{44} - \frac{10\sqrt{119}}{221}R_{84}$

Table B103: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	5	5	2	$\frac{5\sqrt{154}}{77}R_{20} + \frac{\sqrt{770}}{91}R_{40} - \frac{14\sqrt{13090}}{2431}R_{80}$
3	3	1	6	5	1	$\frac{10\sqrt{35}}{143}R_{44} + \frac{6\sqrt{91}}{143}R_{64} + \frac{4\sqrt{1309}}{221}R_{84}$
3	3	1	5	6	1	$\frac{2\sqrt{77}}{143}R_{54} + \frac{10\sqrt{77}}{143}R_{74}$
3	3	1	6	6	1	$-\frac{2\sqrt{715}}{143}R_{54} + \frac{8\sqrt{715}}{12155}R_{74} - \frac{6\sqrt{1045}}{323}R_{94}$
3	3	1	6	6	2	$\frac{25\sqrt{182}}{429}R_{30} + \frac{7\sqrt{286}}{429}R_{50} - \frac{14\sqrt{390}}{12155}R_{70} - \frac{126\sqrt{494}}{4199}R_{90}$
3	3	1	7	6	1	$\frac{2\sqrt{10}}{13}R_{54} + \frac{174\sqrt{10}}{1105}R_{74} + \frac{4\sqrt{2470}}{323}R_{94}$
4	3	1	4	3	1	$R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
4	3	1	4	4	1	$-\frac{\sqrt{15}}{15}R_{10} + \frac{3\sqrt{35}}{55}R_{30} - \frac{3\sqrt{55}}{143}R_{50} + \frac{7\sqrt{3}}{429}R_{70}$
4	3	1	4	4	2	$-\frac{9\sqrt{110}}{143}R_{54} + \frac{7\sqrt{110}}{143}R_{74}$
4	3	1	5	4	1	$\frac{2\sqrt{15}}{15}R_{10} - \frac{6\sqrt{35}}{55}R_{30} + \frac{6\sqrt{55}}{143}R_{50} - \frac{14\sqrt{3}}{429}R_{70}$
4	3	1	4	5	1	$\frac{2}{33}R_{20} - \frac{6\sqrt{5}}{143}R_{40} + \frac{14\sqrt{65}}{2145}R_{60} - \frac{14\sqrt{85}}{12155}R_{80}$ $+ \frac{42\sqrt{4862}}{2431}R_{88}$
4	3	1	5	5	1	$-\frac{\sqrt{66}}{33}R_{20} + \frac{3\sqrt{330}}{143}R_{40} - \frac{7\sqrt{4290}}{2145}R_{60} + \frac{7\sqrt{5610}}{12155}R_{80}$ $+ \frac{14\sqrt{663}}{663}R_{88}$
4	3	1	5	5	2	$\frac{2\sqrt{165}}{143}R_{44} - \frac{14\sqrt{429}}{429}R_{64} + \frac{14\sqrt{51}}{221}R_{84}$
4	3	1	6	5	1	$\frac{5\sqrt{6}}{33}R_{20} - \frac{15\sqrt{30}}{143}R_{40} + \frac{7\sqrt{390}}{429}R_{60} - \frac{7\sqrt{510}}{2431}R_{80}$ $+ \frac{14\sqrt{7293}}{7293}R_{88}$
4	3	1	5	6	1	$\frac{5\sqrt{42}}{429}R_{30} - \frac{7\sqrt{66}}{429}R_{50} + \frac{63\sqrt{10}}{2431}R_{70} - \frac{7\sqrt{114}}{4199}R_{90}$ $+ \frac{14\sqrt{692835}}{12597}R_{98}$
4	3	1	6	6	1	$-\frac{5\sqrt{390}}{429}R_{30} + \frac{\sqrt{30030}}{429}R_{50} - \frac{45\sqrt{182}}{2431}R_{70} + \frac{\sqrt{51870}}{4199}R_{90}$ $+ \frac{2\sqrt{74613}}{969}R_{98}$
4	3	1	6	6	2	$\frac{2\sqrt{3003}}{429}R_{54} - \frac{30\sqrt{3003}}{2431}R_{74} + \frac{2\sqrt{4389}}{323}R_{94}$
4	3	1	7	6	1	$\frac{10\sqrt{165}}{429}R_{30} - \frac{2\sqrt{105}}{39}R_{50} + \frac{90\sqrt{77}}{2431}R_{70} - \frac{2\sqrt{21945}}{4199}R_{90}$ $+ \frac{2\sqrt{176358}}{4199}R_{98}$
4	4	1	4	4	1	$R_{00} - \frac{17\sqrt{5}}{55}R_{20} + \frac{27}{143}R_{40} + \frac{\sqrt{13}}{715}R_{60}$ $-\frac{28\sqrt{17}}{12155}R_{80} - \frac{84\sqrt{24310}}{12155}R_{88}$

Table B104: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	4	2	$\frac{27\sqrt{2}}{143}R_{44} + \frac{3\sqrt{130}}{715}R_{64} - \frac{84\sqrt{1870}}{12155}R_{84}$
4	4	1	5	4	1	$-\frac{6\sqrt{5}}{55}R_{20} + \frac{54}{143}R_{40} - \frac{42\sqrt{13}}{715}R_{60} + \frac{126\sqrt{17}}{12155}R_{80}$ $-\frac{42\sqrt{24310}}{12155}R_{88}$
4	4	1	4	5	1	$-\frac{2\sqrt{3}}{15}R_{10} + \frac{6\sqrt{7}}{55}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{14\sqrt{15}}{2145}R_{70}$
4	4	1	5	5	1	$\frac{6\sqrt{22}}{55}R_{10} - \frac{19\sqrt{462}}{715}R_{30} + \frac{\sqrt{6}}{13}R_{50} + \frac{21\sqrt{110}}{12155}R_{70}$ $-\frac{21\sqrt{1254}}{46189}R_{90} - \frac{14\sqrt{62985}}{4199}R_{98}$
4	4	1	5	5	2	$\frac{2\sqrt{3}}{13}R_{54} + \frac{14\sqrt{3}}{221}R_{74} - \frac{42\sqrt{741}}{4199}R_{94}$
4	4	1	6	5	1	$-\frac{5\sqrt{42}}{143}R_{30} + \frac{7\sqrt{66}}{143}R_{50} - \frac{189\sqrt{10}}{2431}R_{70} + \frac{21\sqrt{114}}{4199}R_{90}$ $-\frac{14\sqrt{692835}}{20995}R_{98}$
4	4	1	5	6	1	$-\frac{\sqrt{6}}{11}R_{20} + \frac{9\sqrt{30}}{143}R_{40} - \frac{7\sqrt{390}}{715}R_{60} + \frac{21\sqrt{510}}{12155}R_{80}$ $-\frac{14\sqrt{7293}}{2431}R_{88}$
4	4	1	6	6	1	$\frac{\sqrt{2730}}{143}R_{20} - \frac{3\sqrt{546}}{143}R_{40} + \frac{5\sqrt{42}}{187}R_{60} + \frac{15\sqrt{9282}}{46189}R_{80}$ $+\frac{2\sqrt{19635}}{3553}R_{88} - \frac{18\sqrt{26}}{4199}R_{10,0} - \frac{36\sqrt{935}}{1615}R_{10,8}$
4	4	1	6	6	2	$-\frac{2\sqrt{1365}}{715}R_{44} + \frac{10\sqrt{21}}{187}R_{64} + \frac{30\sqrt{51051}}{46189}R_{84} - \frac{12\sqrt{1155}}{1615}R_{10,4}$
4	4	1	7	6	1	$-\frac{2\sqrt{231}}{143}R_{40} + \frac{18\sqrt{3003}}{2431}R_{60} - \frac{18\sqrt{3927}}{4199}R_{80} + \frac{18\sqrt{46410}}{20995}R_{88}$ $+\frac{6\sqrt{11}}{323}R_{10,0} - \frac{18\sqrt{2210}}{1615}R_{10,8}$
4	4	2	4	4	2	$R_{00} + \frac{17\sqrt{5}}{77}R_{20} + \frac{243}{1001}R_{40} - \frac{\sqrt{13}}{143}R_{60}$ $-\frac{392\sqrt{17}}{2431}R_{80}$
4	4	2	5	4	1	$-\frac{54\sqrt{2}}{143}R_{44} - \frac{6\sqrt{130}}{715}R_{64} + \frac{168\sqrt{1870}}{12155}R_{84}$
4	4	2	4	5	1	$-\frac{18\sqrt{22}}{143}R_{54} + \frac{14\sqrt{22}}{143}R_{74}$
4	4	2	5	5	1	$-\frac{2\sqrt{3}}{13}R_{54} + \frac{12\sqrt{3}}{221}R_{74} - \frac{70\sqrt{741}}{4199}R_{94}$
4	4	2	5	5	2	$\frac{2\sqrt{22}}{11}R_{10} + \frac{19\sqrt{462}}{1001}R_{30} + \frac{\sqrt{6}}{13}R_{50} - \frac{14\sqrt{110}}{2431}R_{70}$ $-\frac{882\sqrt{1254}}{46189}R_{90}$
4	4	2	6	5	1	$-\frac{2\sqrt{33}}{143}R_{54} + \frac{90\sqrt{33}}{2431}R_{74} + \frac{28\sqrt{8151}}{4199}R_{94}$
4	4	2	5	6	1	$-\frac{18\sqrt{15}}{143}R_{44} - \frac{2\sqrt{39}}{143}R_{64} + \frac{56\sqrt{561}}{2431}R_{84}$
4	4	2	6	6	1	$-\frac{6\sqrt{273}}{143}R_{44} - \frac{32\sqrt{105}}{1309}R_{64} + \frac{58\sqrt{255255}}{323323}R_{84} - \frac{12\sqrt{231}}{323}R_{10,4}$

Table B105: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	6	6	2	$\frac{5\sqrt{546}}{143}R_{20} + \frac{\sqrt{2730}}{143}R_{40} + \frac{2\sqrt{210}}{187}R_{60} - \frac{18\sqrt{46410}}{46189}R_{80}$ $- \frac{252\sqrt{130}}{4199}R_{10,0}$
4	4	2	7	6	1	$\frac{2\sqrt{462}}{143}R_{44} + \frac{18\sqrt{30030}}{17017}R_{64} + \frac{180\sqrt{3570}}{29393}R_{84} + \frac{8\sqrt{546}}{323}R_{10,4}$
5	4	1	5	4	1	$R_{00} - \frac{8\sqrt{5}}{55}R_{20} - \frac{54}{143}R_{40} + \frac{64\sqrt{13}}{715}R_{60}$ $- \frac{217\sqrt{17}}{12155}R_{80} - \frac{21\sqrt{24310}}{12155}R_{88}$
5	4	1	4	5	1	$-\frac{\sqrt{3}}{165}R_{10} + \frac{24\sqrt{7}}{715}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{784\sqrt{15}}{36465}R_{70}$ $- \frac{189\sqrt{19}}{46189}R_{90} + \frac{63\sqrt{461890}}{46189}R_{98}$
5	4	1	5	5	1	$-\frac{2\sqrt{22}}{55}R_{10} - \frac{2\sqrt{462}}{715}R_{30} + \frac{2\sqrt{6}}{13}R_{50} - \frac{322\sqrt{110}}{12155}R_{70}$ $+ \frac{84\sqrt{1254}}{46189}R_{90}$
5	4	1	5	5	2	$-\frac{4\sqrt{3}}{13}R_{54} - \frac{28\sqrt{3}}{221}R_{74} + \frac{84\sqrt{741}}{4199}R_{94}$
5	4	1	6	5	1	$\frac{5\sqrt{2}}{11}R_{10} - \frac{10\sqrt{42}}{143}R_{30} - \frac{4\sqrt{66}}{143}R_{50} + \frac{14\sqrt{10}}{143}R_{70}$ $- \frac{21\sqrt{114}}{2717}R_{90} - \frac{42\sqrt{692835}}{230945}R_{98}$
5	4	1	5	6	1	$\frac{\sqrt{6}}{143}R_{20} + \frac{2\sqrt{30}}{143}R_{40} - \frac{112\sqrt{390}}{12155}R_{60} + \frac{1302\sqrt{510}}{230945}R_{80}$ $+ \frac{252\sqrt{7293}}{46189}R_{88} - \frac{15\sqrt{70}}{4199}R_{10,0} + \frac{30\sqrt{17017}}{4199}R_{10,8}$
5	4	1	6	6	1	$-\frac{4\sqrt{2730}}{1001}R_{20} + \frac{2\sqrt{546}}{1001}R_{40} + \frac{10\sqrt{42}}{187}R_{60} - \frac{150\sqrt{9282}}{46189}R_{80}$ $+ \frac{12\sqrt{19635}}{3553}R_{88} + \frac{66\sqrt{26}}{4199}R_{10,0} + \frac{12\sqrt{935}}{1615}R_{10,8}$
5	4	1	6	6	2	$\frac{4\sqrt{1365}}{715}R_{44} - \frac{20\sqrt{21}}{187}R_{64} - \frac{60\sqrt{51051}}{46189}R_{84} + \frac{24\sqrt{1155}}{1615}R_{10,4}$
5	4	1	7	6	1	$\frac{15\sqrt{1155}}{1001}R_{20} - \frac{32\sqrt{231}}{1001}R_{40} - \frac{6\sqrt{3003}}{2431}R_{60} + \frac{216\sqrt{3927}}{46189}R_{80}$ $+ \frac{24\sqrt{46410}}{20995}R_{88} - \frac{111\sqrt{11}}{4199}R_{10,0} - \frac{27\sqrt{2210}}{20995}R_{10,8}$
4	5	1	4	5	1	$R_{00} - \frac{56\sqrt{5}}{165}R_{20} + \frac{42}{143}R_{40} - \frac{32\sqrt{13}}{2145}R_{60}$ $+ \frac{7\sqrt{17}}{12155}R_{80} - \frac{21\sqrt{24310}}{12155}R_{88}$
4	5	1	5	5	1	$-\frac{2\sqrt{330}}{165}R_{20} + \frac{6\sqrt{66}}{143}R_{40} - \frac{14\sqrt{858}}{2145}R_{60} + \frac{14\sqrt{1122}}{12155}R_{80}$ $+ \frac{28\sqrt{3315}}{3315}R_{88}$
4	5	1	5	5	2	$\frac{4\sqrt{33}}{143}R_{44} - \frac{28\sqrt{2145}}{2145}R_{64} + \frac{28\sqrt{255}}{1105}R_{84}$
4	5	1	6	5	1	$-\frac{\sqrt{30}}{429}R_{20} + \frac{6\sqrt{6}}{143}R_{40} - \frac{140\sqrt{78}}{7293}R_{60} + \frac{490\sqrt{102}}{46189}R_{80}$ $- \frac{196\sqrt{36465}}{138567}R_{88} - \frac{27\sqrt{14}}{4199}R_{10,0} + \frac{54\sqrt{85085}}{20995}R_{10,8}$

Table B106: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	5	6	1	$\frac{9\sqrt{10}}{55}R_{10} - \frac{98\sqrt{210}}{2145}R_{30} + \frac{8\sqrt{330}}{429}R_{50} - \frac{126\sqrt{2}}{2431}R_{70}$ $+ \frac{7\sqrt{570}}{46189}R_{90} - \frac{70\sqrt{138567}}{138567}R_{98}$
4	5	1	6	6	1	$-\frac{10\sqrt{78}}{429}R_{30} + \frac{2\sqrt{6006}}{429}R_{50} - \frac{18\sqrt{910}}{2431}R_{70} + \frac{2\sqrt{10374}}{4199}R_{90}$ $+ \frac{4\sqrt{373065}}{4845}R_{98}$
4	5	1	6	6	2	$\frac{4\sqrt{15015}}{2145}R_{54} - \frac{12\sqrt{15015}}{2431}R_{74} + \frac{4\sqrt{21945}}{1615}R_{94}$
4	5	1	7	6	1	$-\frac{\sqrt{33}}{429}R_{30} + \frac{16\sqrt{21}}{663}R_{50} - \frac{450\sqrt{385}}{46189}R_{70} + \frac{8\sqrt{4389}}{4199}R_{90}$ $-\frac{8\sqrt{881790}}{20995}R_{98} - \frac{3\sqrt{5313}}{7429}R_{11,0} + \frac{9\sqrt{6760390}}{37145}R_{11,8}$
5	5	1	5	5	1	$R_{00} - \frac{9\sqrt{5}}{65}R_{20} - \frac{4}{13}R_{40} + \frac{48\sqrt{13}}{1105}R_{60}$ $+ \frac{217\sqrt{17}}{20995}R_{80} - \frac{21\sqrt{24310}}{20995}R_{88} - \frac{25\sqrt{21}}{4199}R_{10,0} - \frac{5\sqrt{510510}}{4199}R_{10,8}$
5	5	1	5	5	2	$\frac{4\sqrt{2}}{13}R_{44} - \frac{12\sqrt{130}}{1105}R_{64} + \frac{77\sqrt{1870}}{20995}R_{84} - \frac{105\sqrt{286}}{4199}R_{10,4}$
5	5	1	6	5	1	$-\frac{4\sqrt{55}}{143}R_{20} + \frac{2\sqrt{11}}{143}R_{40} + \frac{70\sqrt{143}}{2431}R_{60} - \frac{1050\sqrt{187}}{46189}R_{80}$ $-\frac{42\sqrt{2210}}{4199}R_{88} + \frac{22\sqrt{231}}{4199}R_{10,0} - \frac{22\sqrt{46410}}{20995}R_{10,8}$
5	5	1	5	6	1	$-\frac{2\sqrt{165}}{165}R_{10} - \frac{2\sqrt{385}}{715}R_{30} + \frac{2\sqrt{5}}{13}R_{50} - \frac{322\sqrt{33}}{7293}R_{70}$ $+ \frac{84\sqrt{1045}}{46189}R_{90}$
5	5	1	6	6	1	$\frac{5\sqrt{3003}}{429}R_{10} - \frac{5\sqrt{143}}{143}R_{30} - \frac{4\sqrt{91}}{221}R_{50} + \frac{8\sqrt{15015}}{8151}R_{70}$ $+ \frac{9\sqrt{19019}}{19019}R_{90} - \frac{9\sqrt{22610}}{11305}R_{98} - \frac{165\sqrt{23023}}{676039}R_{11,0} - \frac{33\sqrt{1560090}}{52003}R_{11,8}$
5	5	1	6	6	2	$\frac{16\sqrt{910}}{1105}R_{54} - \frac{8\sqrt{910}}{4199}R_{74} + \frac{9\sqrt{1330}}{1615}R_{94} - \frac{165\sqrt{322}}{7429}R_{11,4}$
5	5	1	7	6	1	$-\frac{2\sqrt{2}}{13}R_{30} + \frac{2\sqrt{154}}{221}R_{50} + \frac{90\sqrt{210}}{4199}R_{70} - \frac{594\sqrt{266}}{29393}R_{90}$ $-\frac{4\sqrt{1616615}}{11305}R_{98} + \frac{264\sqrt{322}}{52003}R_{11,0} - \frac{8\sqrt{111546435}}{260015}R_{11,8}$
5	5	2	5	5	2	$R_{00} + \frac{3\sqrt{5}}{13}R_{20} + \frac{4}{13}R_{40} + \frac{8\sqrt{13}}{221}R_{60}$ $-\frac{98\sqrt{17}}{4199}R_{80} - \frac{630\sqrt{21}}{4199}R_{10,0}$
5	5	2	6	5	1	$-\frac{14\sqrt{22}}{143}R_{44} - \frac{18\sqrt{1430}}{2431}R_{64} + \frac{28\sqrt{170}}{4199}R_{84} + \frac{462\sqrt{26}}{4199}R_{10,4}$
5	5	2	5	6	1	$-\frac{2\sqrt{10}}{13}R_{54} - \frac{14\sqrt{10}}{221}R_{74} + \frac{42\sqrt{2470}}{4199}R_{94}$
5	5	2	6	6	1	$-\frac{4\sqrt{182}}{221}R_{54} - \frac{320\sqrt{182}}{29393}R_{74} + \frac{3\sqrt{266}}{323}R_{94} - \frac{99\sqrt{1610}}{7429}R_{11,4}$
5	5	2	6	6	2	$\frac{\sqrt{15015}}{143}R_{10} + \frac{7\sqrt{715}}{429}R_{30} + \frac{8\sqrt{455}}{663}R_{50} + \frac{80\sqrt{3003}}{46189}R_{70}$ $-\frac{18\sqrt{95095}}{46189}R_{90} - \frac{198\sqrt{115115}}{96577}R_{11,0}$

Table B107: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	7	6	1	$-\frac{4\sqrt{77}}{221}R_{54} - \frac{60\sqrt{77}}{29393}R_{74} + \frac{8\sqrt{19019}}{4199}R_{94} + \frac{12\sqrt{115115}}{7429}R_{11,4}$
6	5	1	6	5	1	$R_{00} - \frac{5\sqrt{5}}{143}R_{20} - \frac{64}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60}$ $+ \frac{3115\sqrt{17}}{46189}R_{80} - \frac{105\sqrt{24310}}{46189}R_{88} - \frac{83\sqrt{21}}{4199}R_{10,0} - \frac{\sqrt{510510}}{4199}R_{10,8}$
6	5	1	5	6	1	$-\frac{\sqrt{15}}{429}R_{10} + \frac{\sqrt{35}}{143}R_{30} + \frac{20\sqrt{55}}{2431}R_{50} - \frac{980\sqrt{3}}{8151}R_{70}$ $+ \frac{45\sqrt{95}}{2717}R_{90} + \frac{45\sqrt{92378}}{46189}R_{98} - \frac{363\sqrt{115}}{96577}R_{11,0} + \frac{33\sqrt{6374082}}{96577}R_{11,8}$
6	5	1	6	6	1	$-\frac{2\sqrt{273}}{273}R_{10} - \frac{6\sqrt{13}}{143}R_{30} + \frac{90\sqrt{1001}}{17017}R_{50} + \frac{1030\sqrt{1365}}{138567}R_{70}$ $-\frac{240\sqrt{1729}}{29393}R_{90} + \frac{1452\sqrt{2093}}{676039}R_{11,0}$
6	5	1	6	6	2	$-\frac{10\sqrt{10010}}{2431}R_{54} - \frac{10\sqrt{10010}}{2717}R_{74} + \frac{66\sqrt{3542}}{7429}R_{11,4}$
6	5	1	7	6	1	$\frac{3\sqrt{462}}{91}R_{10} - \frac{8\sqrt{22}}{143}R_{30} - \frac{160\sqrt{14}}{1547}R_{50} + \frac{30\sqrt{2310}}{46189}R_{70}$ $+ \frac{135\sqrt{2926}}{29393}R_{90} - \frac{2\sqrt{146965}}{4199}R_{98} - \frac{1074\sqrt{3542}}{676039}R_{11,0} - \frac{4\sqrt{10140585}}{96577}R_{11,8}$
5	6	1	5	6	1	$R_{00} - \frac{21\sqrt{5}}{143}R_{20} - \frac{56}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60}$ $-\frac{1085\sqrt{17}}{46189}R_{80} - \frac{105\sqrt{24310}}{46189}R_{88} + \frac{5\sqrt{21}}{4199}R_{10,0} - \frac{\sqrt{510510}}{4199}R_{10,8}$
5	6	1	6	6	1	$-\frac{20\sqrt{91}}{1001}R_{20} + \frac{2\sqrt{455}}{1001}R_{40} + \frac{10\sqrt{35}}{187}R_{60} - \frac{150\sqrt{7735}}{46189}R_{80}$ $+ \frac{30\sqrt{2618}}{3553}R_{88} + \frac{22\sqrt{195}}{4199}R_{10,0} + \frac{2\sqrt{1122}}{323}R_{10,8}$
5	6	1	6	6	2	$\frac{2\sqrt{182}}{143}R_{44} - \frac{10\sqrt{70}}{187}R_{64} - \frac{30\sqrt{170170}}{46189}R_{84} + \frac{12\sqrt{154}}{323}R_{10,4}$
5	6	1	7	6	1	$-\frac{\sqrt{154}}{1001}R_{20} + \frac{36\sqrt{770}}{17017}R_{40} + \frac{20\sqrt{10010}}{46189}R_{60} - \frac{90\sqrt{13090}}{46189}R_{80}$ $-\frac{20\sqrt{1547}}{4199}R_{88} + \frac{999\sqrt{330}}{96577}R_{10,0} + \frac{486\sqrt{663}}{96577}R_{10,8} - \frac{66\sqrt{770}}{37145}R_{12,0}$ $+ \frac{44\sqrt{440895}}{37145}R_{12,8}$
6	6	1	6	6	1	$R_{00} - \frac{13\sqrt{5}}{385}R_{20} - \frac{512}{1309}R_{40} - \frac{40\sqrt{13}}{3553}R_{60}$ $+ \frac{445\sqrt{17}}{24871}R_{80} + \frac{15\sqrt{24310}}{24871}R_{88} + \frac{1079\sqrt{21}}{52003}R_{10,0} - \frac{13\sqrt{510510}}{52003}R_{10,8}$ $-\frac{13068}{260015}R_{12,0} - \frac{396\sqrt{277134}}{260015}R_{12,8}$
6	6	1	6	6	2	$\frac{32\sqrt{10}}{187}R_{44} - \frac{40\sqrt{26}}{3553}R_{64} - \frac{15\sqrt{374}}{3553}R_{84} + \frac{39\sqrt{1430}}{7429}R_{10,4}$ $-\frac{1584\sqrt{143}}{37145}R_{12,4}$
6	6	1	7	6	1	$-\frac{2\sqrt{1430}}{455}R_{20} - \frac{90\sqrt{286}}{17017}R_{40} + \frac{10\sqrt{22}}{209}R_{60} + \frac{90\sqrt{4862}}{29393}R_{80}$ $-\frac{100\sqrt{85}}{2261}R_{88} - \frac{180\sqrt{6006}}{39767}R_{10,0} - \frac{288\sqrt{1785}}{52003}R_{10,8} + \frac{1716\sqrt{286}}{260015}R_{12,0}$ $-\frac{1144\sqrt{969}}{260015}R_{12,8}$

Table B108: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	2	$R_{00} + \frac{13\sqrt{5}}{55}R_{20} + \frac{64}{187}R_{40} + \frac{200\sqrt{13}}{3553}R_{60}$ $+ \frac{50\sqrt{17}}{3553}R_{80} - \frac{234\sqrt{21}}{7429}R_{10,0} - \frac{26136}{37145}R_{12,0}$
6	6	2	7	6	1	$-\frac{36\sqrt{715}}{2431}R_{44} - \frac{20\sqrt{11}}{209}R_{64} - \frac{40\sqrt{221}}{4199}R_{84} + \frac{36\sqrt{5}}{437}R_{10,4}$ $+ \frac{13728\sqrt{2}}{37145}R_{12,4}$
7	6	1	7	6	1	$R_{00} + \frac{16\sqrt{5}}{455}R_{20} - \frac{576}{1547}R_{40} - \frac{320\sqrt{13}}{4199}R_{60}$ $+ \frac{785\sqrt{17}}{29393}R_{80} - \frac{75\sqrt{24310}}{29393}R_{88} + \frac{31032\sqrt{21}}{676039}R_{10,0} - \frac{216\sqrt{510510}}{676039}R_{10,8}$ $- \frac{25278}{260015}R_{12,0} - \frac{66\sqrt{277134}}{260015}R_{12,8}$

Table B109: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	0	1	1	0	1	R_{00}
1	0	1	0	1	1	$-\frac{\sqrt{3}}{3}R_{10}$
1	0	1	2	1	1	$\frac{\sqrt{6}}{3}R_{10}$
1	0	1	1	2	1	$-\frac{\sqrt{10}}{5}R_{20}$
1	0	1	3	2	1	$\frac{\sqrt{15}}{5}R_{20}$
1	0	1	2	3	1	$-\frac{\sqrt{21}}{7}R_{30}$
1	0	1	4	3	1	0
1	0	1	4	3	2	$\frac{2\sqrt{7}}{7}R_{30}$
1	0	1	3	4	1	$-\frac{2}{3}R_{40}$
1	0	1	4	4	1	$\frac{2\sqrt{10}}{5}R_{44}$
1	0	1	5	4	1	$\frac{\sqrt{10}}{5}R_{44}$
1	0	1	5	4	2	$\frac{\sqrt{5}}{3}R_{40}$
1	0	1	4	5	1	$-\frac{3\sqrt{110}}{55}R_{54}$
1	0	1	4	5	2	$-\frac{\sqrt{55}}{11}R_{50}$
1	0	1	5	5	1	$\frac{4\sqrt{15}}{15}R_{54}$
1	0	1	6	5	1	$\frac{2\sqrt{165}}{33}R_{54}$
1	0	1	6	5	2	$\frac{\sqrt{66}}{11}R_{50}$
1	0	1	5	6	1	$-\frac{2\sqrt{195}}{39}R_{64}$
1	0	1	5	6	2	$-\frac{\sqrt{78}}{13}R_{60}$
1	0	1	6	6	1	$\frac{4\sqrt{21}}{21}R_{64}$
1	0	1	7	6	1	$\frac{\sqrt{6006}}{91}R_{64}$
1	0	1	7	6	2	$\frac{\sqrt{91}}{13}R_{60}$
0	1	1	0	1	1	R_{00}
0	1	1	2	1	1	$-\frac{\sqrt{10}}{5}R_{20}$
0	1	1	1	2	1	$\frac{\sqrt{6}}{3}R_{10}$
0	1	1	3	2	1	$-\frac{\sqrt{21}}{7}R_{30}$

Table B110: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	1	1	2	3	1	$\frac{\sqrt{15}}{5}R_{20}$
0	1	1	4	3	1	$-\frac{2\sqrt{2}}{3}R_{44}$
0	1	1	4	3	2	$-\frac{2}{3}R_{40}$
0	1	1	3	4	1	$\frac{2\sqrt{7}}{7}R_{30}$
0	1	1	4	4	1	0
0	1	1	5	4	1	$-\frac{\sqrt{110}}{11}R_{54}$
0	1	1	5	4	2	$-\frac{\sqrt{55}}{11}R_{50}$
0	1	1	4	5	1	$\frac{\sqrt{10}}{3}R_{44}$
0	1	1	4	5	2	$\frac{\sqrt{5}}{3}R_{40}$
0	1	1	5	5	1	0
0	1	1	6	5	1	$-\frac{2\sqrt{39}}{13}R_{64}$
0	1	1	6	5	2	$-\frac{\sqrt{78}}{13}R_{60}$
0	1	1	5	6	1	$\frac{2\sqrt{33}}{11}R_{54}$
0	1	1	5	6	2	$\frac{\sqrt{66}}{11}R_{50}$
0	1	1	6	6	1	0
0	1	1	7	6	1	$-\frac{\sqrt{210}}{15}R_{74}$
0	1	1	7	6	2	$-\frac{\sqrt{105}}{15}R_{70}$
2	1	1	2	1	1	$R_{00} + \frac{\sqrt{5}}{5}R_{20}$
2	1	1	1	2	1	$-\frac{\sqrt{3}}{15}R_{10} - \frac{9\sqrt{7}}{35}R_{30}$
2	1	1	3	2	1	$\frac{3\sqrt{2}}{5}R_{10} + \frac{2\sqrt{42}}{35}R_{30}$
2	1	1	2	3	1	$-\frac{\sqrt{30}}{35}R_{20} - \frac{2\sqrt{6}}{7}R_{40}$
2	1	1	4	3	1	$-\frac{2}{3}R_{44}$
2	1	1	4	3	2	$\frac{9\sqrt{10}}{35}R_{20} + \frac{5\sqrt{2}}{21}R_{40}$
2	1	1	3	4	1	$-\frac{\sqrt{14}}{21}R_{30} - \frac{5\sqrt{22}}{33}R_{50}$
2	1	1	4	4	1	$\frac{6\sqrt{55}}{55}R_{54}$
2	1	1	5	4	1	$-\frac{2\sqrt{55}}{55}R_{54}$

Table B111: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	5	4	2	$\frac{2\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50}$
2	1	1	4	5	1	$\frac{28\sqrt{5}}{165}R_{44} - \frac{18\sqrt{13}}{143}R_{64}$
2	1	1	4	5	2	$-\frac{2\sqrt{10}}{33}R_{40} - \frac{9\sqrt{130}}{143}R_{60}$
2	1	1	5	5	1	$\frac{2\sqrt{330}}{55}R_{44} + \frac{4\sqrt{858}}{143}R_{64}$
2	1	1	6	5	1	$\frac{\sqrt{30}}{11}R_{44} - \frac{\sqrt{78}}{143}R_{64}$
2	1	1	6	5	2	$\frac{5\sqrt{3}}{11}R_{40} + \frac{7\sqrt{39}}{143}R_{60}$
2	1	1	5	6	1	$\frac{3\sqrt{66}}{143}R_{54} - \frac{\sqrt{66}}{13}R_{74}$
2	1	1	5	6	2	$-\frac{5\sqrt{33}}{143}R_{50} - \frac{21\sqrt{5}}{65}R_{70}$
2	1	1	6	6	1	$\frac{4\sqrt{30030}}{1001}R_{54} + \frac{2\sqrt{30030}}{455}R_{74}$
2	1	1	7	6	1	$\frac{6\sqrt{105}}{91}R_{54} + \frac{8\sqrt{105}}{1365}R_{74}$
2	1	1	7	6	2	$\frac{9\sqrt{154}}{143}R_{50} + \frac{4\sqrt{210}}{195}R_{70}$
1	2	1	1	2	1	$R_{00} + \frac{\sqrt{5}}{5}R_{20}$
1	2	1	3	2	1	$-\frac{\sqrt{30}}{35}R_{20} - \frac{2\sqrt{6}}{7}R_{40}$
1	2	1	2	3	1	$\frac{3\sqrt{2}}{5}R_{10} + \frac{2\sqrt{42}}{35}R_{30}$
1	2	1	4	3	1	$-\frac{2\sqrt{11}}{11}R_{54}$
1	2	1	4	3	2	$-\frac{\sqrt{14}}{21}R_{30} - \frac{5\sqrt{22}}{33}R_{50}$
1	2	1	3	4	1	$\frac{9\sqrt{10}}{35}R_{20} + \frac{5\sqrt{2}}{21}R_{40}$
1	2	1	4	4	1	$\frac{2\sqrt{5}}{5}R_{44}$
1	2	1	5	4	1	$-\frac{4\sqrt{5}}{55}R_{44} - \frac{30\sqrt{13}}{143}R_{64}$
1	2	1	5	4	2	$-\frac{2\sqrt{10}}{33}R_{40} - \frac{9\sqrt{130}}{143}R_{60}$
1	2	1	4	5	1	$\frac{2\sqrt{55}}{55}R_{54}$
1	2	1	4	5	2	$\frac{2\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50}$
1	2	1	5	5	1	$\frac{2\sqrt{30}}{15}R_{54}$
1	2	1	6	5	1	$-\frac{5\sqrt{330}}{429}R_{54} - \frac{3\sqrt{330}}{65}R_{74}$
1	2	1	6	5	2	$-\frac{5\sqrt{33}}{143}R_{50} - \frac{21\sqrt{5}}{65}R_{70}$
1	2	1	5	6	1	$\frac{3\sqrt{6}}{11}R_{44} + \frac{7\sqrt{390}}{429}R_{64}$

Table B112: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	2	1	5	6	2	$\frac{5\sqrt{3}}{11}R_{40} + \frac{7\sqrt{39}}{143}R_{60}$
1	2	1	6	6	1	$\frac{2\sqrt{42}}{21}R_{64}$
1	2	1	7	6	1	$-\frac{2\sqrt{3003}}{455}R_{64} - \frac{4\sqrt{357}}{85}R_{84}$
1	2	1	7	6	2	$-\frac{\sqrt{182}}{65}R_{60} - \frac{4\sqrt{238}}{85}R_{80}$
3	2	1	3	2	1	$R_{00} + \frac{8\sqrt{5}}{35}R_{20} + \frac{2}{7}R_{40}$
3	2	1	2	3	1	$-\frac{\sqrt{3}}{35}R_{10} - \frac{8\sqrt{7}}{105}R_{30} - \frac{50\sqrt{11}}{231}R_{50}$
3	2	1	4	3	1	$-\frac{2\sqrt{66}}{33}R_{54}$
3	2	1	4	3	2	$\frac{6}{7}R_{10} + \frac{2\sqrt{21}}{21}R_{30} + \frac{10\sqrt{33}}{231}R_{50}$
3	2	1	3	4	1	$-\frac{2\sqrt{15}}{105}R_{20} - \frac{10\sqrt{3}}{77}R_{40} - \frac{50\sqrt{39}}{429}R_{60}$
3	2	1	4	4	1	$-\frac{6\sqrt{30}}{55}R_{44} + \frac{10\sqrt{78}}{143}R_{64}$
3	2	1	5	4	1	$-\frac{8\sqrt{30}}{55}R_{44} - \frac{5\sqrt{78}}{143}R_{64}$
3	2	1	5	4	2	$\frac{10\sqrt{3}}{21}R_{20} + \frac{8\sqrt{15}}{77}R_{40} + \frac{7\sqrt{195}}{429}R_{60}$
3	2	1	4	5	1	$\frac{56\sqrt{330}}{2145}R_{54} - \frac{3\sqrt{330}}{143}R_{74}$
3	2	1	4	5	2	$-\frac{2\sqrt{105}}{231}R_{30} - \frac{8\sqrt{165}}{429}R_{50} - \frac{105}{143}R_{70}$
3	2	1	5	5	1	$\frac{4\sqrt{5}}{65}R_{54} + \frac{4\sqrt{5}}{13}R_{74}$
3	2	1	6	5	1	$-\frac{10\sqrt{55}}{143}R_{54} - \frac{16\sqrt{55}}{715}R_{74}$
3	2	1	6	5	2	$\frac{50\sqrt{14}}{231}R_{30} + \frac{35\sqrt{22}}{429}R_{50} + \frac{28\sqrt{30}}{715}R_{70}$
3	2	1	5	6	1	$\frac{28}{143}R_{44} + \frac{6\sqrt{65}}{143}R_{64} - \frac{4\sqrt{935}}{221}R_{84}$
3	2	1	5	6	2	$-\frac{10\sqrt{2}}{143}R_{40} - \frac{7\sqrt{26}}{143}R_{60} - \frac{28\sqrt{34}}{221}R_{80}$
3	2	1	6	6	1	$\frac{20\sqrt{455}}{1001}R_{44} + \frac{12\sqrt{7}}{77}R_{64} + \frac{8\sqrt{17017}}{1547}R_{84}$
3	2	1	7	6	1	$\frac{15\sqrt{770}}{1001}R_{44} - \frac{32\sqrt{2002}}{5005}R_{64} - \frac{2\sqrt{238}}{455}R_{84}$
3	2	1	7	6	2	$\frac{25\sqrt{21}}{143}R_{40} + \frac{16\sqrt{273}}{715}R_{60} + \frac{12\sqrt{357}}{1105}R_{80}$
2	3	1	2	3	1	$R_{00} + \frac{8\sqrt{5}}{35}R_{20} + \frac{2}{7}R_{40}$
2	3	1	4	3	1	$\frac{2\sqrt{6}}{11}R_{44} - \frac{10\sqrt{390}}{429}R_{64}$
2	3	1	4	3	2	$-\frac{2\sqrt{15}}{105}R_{20} - \frac{10\sqrt{3}}{77}R_{40} - \frac{50\sqrt{39}}{429}R_{60}$
2	3	1	3	4	1	$\frac{6}{7}R_{10} + \frac{2\sqrt{21}}{21}R_{30} + \frac{10\sqrt{33}}{231}R_{50}$

Table B113: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	3	1	4	4	1	$\frac{2\sqrt{330}}{55}R_{54}$
2	3	1	5	4	1	$\frac{8\sqrt{330}}{715}R_{54} - \frac{5\sqrt{330}}{143}R_{74}$
2	3	1	5	4	2	$-\frac{2\sqrt{105}}{231}R_{30} - \frac{8\sqrt{165}}{429}R_{50} - \frac{105}{143}R_{70}$
2	3	1	4	5	1	$-\frac{8\sqrt{30}}{55}R_{44} + \frac{7\sqrt{78}}{429}R_{64}$
2	3	1	4	5	2	$\frac{10\sqrt{3}}{21}R_{20} + \frac{8\sqrt{15}}{77}R_{40} + \frac{7\sqrt{195}}{429}R_{60}$
2	3	1	5	5	1	$\frac{4\sqrt{55}}{55}R_{44} + \frac{8\sqrt{143}}{143}R_{64}$
2	3	1	6	5	1	$-\frac{4\sqrt{5}}{143}R_{44} + \frac{2\sqrt{13}}{143}R_{64} - \frac{12\sqrt{187}}{221}R_{84}$
2	3	1	6	5	2	$-\frac{10\sqrt{2}}{143}R_{40} - \frac{7\sqrt{26}}{143}R_{60} - \frac{28\sqrt{34}}{221}R_{80}$
2	3	1	5	6	1	$-\frac{14\sqrt{11}}{143}R_{54} + \frac{8\sqrt{11}}{143}R_{74}$
2	3	1	5	6	2	$\frac{50\sqrt{14}}{231}R_{30} + \frac{35\sqrt{22}}{429}R_{50} + \frac{28\sqrt{30}}{715}R_{70}$
2	3	1	6	6	1	$\frac{8\sqrt{5005}}{1001}R_{54} + \frac{4\sqrt{5005}}{455}R_{74}$
2	3	1	7	6	1	$-\frac{\sqrt{70}}{91}R_{54} - \frac{48\sqrt{70}}{7735}R_{74} - \frac{2\sqrt{17290}}{323}R_{94}$
2	3	1	7	6	2	$-\frac{\sqrt{231}}{143}R_{50} - \frac{48\sqrt{35}}{1105}R_{70} - \frac{12\sqrt{399}}{323}R_{90}$
4	3	1	4	3	1	$R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
4	3	1	4	3	2	$\frac{3\sqrt{2}}{11}R_{44} - \frac{5\sqrt{130}}{143}R_{64}$
4	3	1	3	4	1	$\frac{15\sqrt{22}}{143}R_{54} - \frac{35\sqrt{22}}{429}R_{74}$
4	3	1	4	4	1	$-\frac{\sqrt{15}}{15}R_{10} + \frac{3\sqrt{35}}{55}R_{30} - \frac{3\sqrt{55}}{143}R_{50} + \frac{7\sqrt{3}}{429}R_{70}$
4	3	1	5	4	1	$\frac{2\sqrt{15}}{15}R_{10} - \frac{6\sqrt{35}}{55}R_{30} + \frac{6\sqrt{55}}{143}R_{50} - \frac{14\sqrt{3}}{429}R_{70}$
4	3	1	5	4	2	$\frac{6\sqrt{110}}{143}R_{54} - \frac{14\sqrt{110}}{429}R_{74}$
4	3	1	4	5	1	$\frac{2}{33}R_{20} - \frac{6\sqrt{5}}{143}R_{40} + \frac{14\sqrt{65}}{2145}R_{60} - \frac{14\sqrt{85}}{12155}R_{80}$ $-\frac{42\sqrt{4862}}{2431}R_{88}$
4	3	1	4	5	2	$-\frac{6\sqrt{10}}{143}R_{44} + \frac{14\sqrt{26}}{143}R_{64} - \frac{42\sqrt{374}}{2431}R_{84}$
4	3	1	5	5	1	$-\frac{\sqrt{66}}{33}R_{20} + \frac{3\sqrt{330}}{143}R_{40} - \frac{7\sqrt{4290}}{2145}R_{60} + \frac{7\sqrt{5610}}{12155}R_{80}$ $-\frac{14\sqrt{663}}{663}R_{88}$
4	3	1	6	5	1	$\frac{5\sqrt{6}}{33}R_{20} - \frac{15\sqrt{30}}{143}R_{40} + \frac{7\sqrt{390}}{429}R_{60} - \frac{7\sqrt{510}}{2431}R_{80}$ $-\frac{14\sqrt{7293}}{7293}R_{88}$

Table B114: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	3	1	6	5	2	$-\frac{10\sqrt{3}}{143}R_{44} + \frac{14\sqrt{195}}{429}R_{64} - \frac{14\sqrt{2805}}{2431}R_{84}$
4	3	1	5	6	1	$\frac{5\sqrt{42}}{429}R_{30} - \frac{7\sqrt{66}}{429}R_{50} + \frac{63\sqrt{10}}{2431}R_{70} - \frac{7\sqrt{114}}{4199}R_{90}$ $-\frac{14\sqrt{692835}}{12597}R_{98}$
4	3	1	5	6	2	$-\frac{14\sqrt{33}}{429}R_{54} + \frac{210\sqrt{33}}{2431}R_{74} - \frac{14\sqrt{8151}}{4199}R_{94}$
4	3	1	6	6	1	$-\frac{5\sqrt{390}}{429}R_{30} + \frac{\sqrt{30030}}{429}R_{50} - \frac{45\sqrt{182}}{2431}R_{70} + \frac{\sqrt{51870}}{4199}R_{90}$ $-\frac{2\sqrt{74613}}{969}R_{98}$
4	3	1	7	6	1	$\frac{10\sqrt{165}}{429}R_{30} - \frac{2\sqrt{105}}{39}R_{50} + \frac{90\sqrt{77}}{2431}R_{70} - \frac{2\sqrt{21945}}{4199}R_{90}$ $-\frac{2\sqrt{176358}}{4199}R_{98}$
4	3	1	7	6	2	$-\frac{2\sqrt{154}}{143}R_{54} + \frac{90\sqrt{154}}{2431}R_{74} - \frac{6\sqrt{38038}}{4199}R_{94}$
4	3	2	4	3	2	$R_{00} + \frac{5\sqrt{5}}{21}R_{20} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
4	3	2	3	4	1	$-\frac{\sqrt{3}}{63}R_{10} - \frac{3\sqrt{7}}{77}R_{30} - \frac{75\sqrt{11}}{1001}R_{50} - \frac{245\sqrt{15}}{1287}R_{70}$
4	3	2	4	4	1	$-\frac{9\sqrt{110}}{143}R_{54} + \frac{7\sqrt{110}}{143}R_{74}$
4	3	2	5	4	1	$-\frac{6\sqrt{110}}{143}R_{54} - \frac{4\sqrt{110}}{143}R_{74}$
4	3	2	5	4	2	$\frac{2\sqrt{15}}{9}R_{10} + \frac{6\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} + \frac{140\sqrt{3}}{1287}R_{70}$
4	3	2	4	5	1	$-\frac{6\sqrt{10}}{143}R_{44} + \frac{14\sqrt{26}}{143}R_{64} - \frac{42\sqrt{374}}{2431}R_{84}$
4	3	2	4	5	2	$-\frac{10}{231}R_{20} - \frac{54\sqrt{5}}{1001}R_{40} - \frac{14\sqrt{65}}{429}R_{60} - \frac{196\sqrt{85}}{2431}R_{80}$
4	3	2	5	5	1	$-\frac{6\sqrt{165}}{143}R_{44} - \frac{2\sqrt{429}}{429}R_{64} + \frac{56\sqrt{51}}{663}R_{84}$
4	3	2	6	5	1	$-\frac{30\sqrt{15}}{143}R_{44} - \frac{32\sqrt{39}}{429}R_{64} - \frac{58\sqrt{561}}{7293}R_{84}$
4	3	2	6	5	2	$\frac{5\sqrt{30}}{33}R_{20} + \frac{25\sqrt{6}}{143}R_{40} + \frac{14\sqrt{78}}{429}R_{60} + \frac{42\sqrt{102}}{2431}R_{80}$
4	3	2	5	6	1	$\frac{14\sqrt{33}}{429}R_{54} + \frac{180\sqrt{33}}{2431}R_{74} - \frac{70\sqrt{8151}}{12597}R_{94}$
4	3	2	5	6	2	$-\frac{25\sqrt{42}}{3003}R_{30} - \frac{7\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70} - \frac{294\sqrt{114}}{4199}R_{90}$
4	3	2	6	6	1	$-\frac{2\sqrt{15015}}{3003}R_{54} + \frac{30\sqrt{15015}}{17017}R_{74} + \frac{4\sqrt{21945}}{969}R_{94}$
4	3	2	7	6	1	$-\frac{4\sqrt{210}}{91}R_{54} - \frac{192\sqrt{210}}{7735}R_{74} - \frac{2\sqrt{51870}}{4199}R_{94}$
4	3	2	7	6	2	$\frac{350}{429}R_{30} + \frac{20\sqrt{77}}{429}R_{50} + \frac{324\sqrt{105}}{12155}R_{70} + \frac{60\sqrt{133}}{4199}R_{90}$
3	4	1	3	4	1	$R_{00} + \frac{5\sqrt{5}}{21}R_{20} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
3	4	1	4	4	1	$-\frac{9\sqrt{10}}{55}R_{44} + \frac{15\sqrt{26}}{143}R_{64}$

Table B115: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	1	5	4	1	$\frac{54\sqrt{10}}{715}R_{44} + \frac{10\sqrt{26}}{143}R_{64} - \frac{70\sqrt{374}}{2431}R_{84}$
3	4	1	5	4	2	$-\frac{10}{231}R_{20} - \frac{54\sqrt{5}}{1001}R_{40} - \frac{14\sqrt{65}}{429}R_{60} - \frac{196\sqrt{85}}{2431}R_{80}$
3	4	1	4	5	1	$-\frac{42\sqrt{110}}{715}R_{54} + \frac{4\sqrt{110}}{429}R_{74}$
3	4	1	4	5	2	$\frac{2\sqrt{15}}{9}R_{10} + \frac{6\sqrt{35}}{77}R_{30} + \frac{6\sqrt{55}}{143}R_{50} + \frac{140\sqrt{3}}{1287}R_{70}$
3	4	1	5	5	1	$\frac{2\sqrt{15}}{65}R_{54} + \frac{2\sqrt{15}}{13}R_{74}$
3	4	1	6	5	1	$\frac{2\sqrt{165}}{143}R_{54} + \frac{40\sqrt{165}}{2431}R_{74} - \frac{14\sqrt{40755}}{4199}R_{94}$
3	4	1	6	5	2	$-\frac{25\sqrt{42}}{3003}R_{30} - \frac{7\sqrt{66}}{429}R_{50} - \frac{210\sqrt{10}}{2431}R_{70} - \frac{294\sqrt{114}}{4199}R_{90}$
3	4	1	5	6	1	$-\frac{70\sqrt{3}}{143}R_{44} - \frac{4\sqrt{195}}{143}R_{64} + \frac{6\sqrt{2805}}{2431}R_{84}$
3	4	1	5	6	2	$\frac{5\sqrt{30}}{33}R_{20} + \frac{25\sqrt{6}}{143}R_{40} + \frac{14\sqrt{78}}{429}R_{60} + \frac{42\sqrt{102}}{2431}R_{80}$
3	4	1	6	6	1	$\frac{10\sqrt{1365}}{1001}R_{44} + \frac{6\sqrt{21}}{77}R_{64} + \frac{4\sqrt{51051}}{1547}R_{84}$
3	4	1	7	6	1	$-\frac{2\sqrt{2310}}{3003}R_{44} + \frac{24\sqrt{6006}}{17017}R_{64} + \frac{6\sqrt{714}}{1729}R_{84} - \frac{14\sqrt{2730}}{969}R_{10,4}$
3	4	1	7	6	2	$-\frac{10\sqrt{7}}{429}R_{40} - \frac{36\sqrt{91}}{2431}R_{60} - \frac{108\sqrt{119}}{4199}R_{80} - \frac{140\sqrt{3}}{323}R_{10,0}$
4	4	1	4	4	1	$R_{00} - \frac{17\sqrt{5}}{55}R_{20} + \frac{27}{143}R_{40} + \frac{\sqrt{13}}{715}R_{60}$ $-\frac{28\sqrt{17}}{12155}R_{80} + \frac{84\sqrt{24310}}{12155}R_{88}$
4	4	1	5	4	1	$-\frac{6\sqrt{5}}{55}R_{20} + \frac{54}{143}R_{40} - \frac{42\sqrt{13}}{715}R_{60} + \frac{126\sqrt{17}}{12155}R_{80}$ $+\frac{42\sqrt{24310}}{12155}R_{88}$
4	4	1	5	4	2	$\frac{18\sqrt{2}}{143}R_{44} - \frac{42\sqrt{130}}{715}R_{64} + \frac{126\sqrt{1870}}{12155}R_{84}$
4	4	1	4	5	1	$-\frac{2\sqrt{3}}{15}R_{10} + \frac{6\sqrt{7}}{55}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{14\sqrt{15}}{2145}R_{70}$
4	4	1	4	5	2	$-\frac{18\sqrt{22}}{143}R_{54} + \frac{14\sqrt{22}}{143}R_{74}$
4	4	1	5	5	1	$\frac{6\sqrt{22}}{55}R_{10} - \frac{19\sqrt{462}}{715}R_{30} + \frac{\sqrt{6}}{13}R_{50} + \frac{21\sqrt{110}}{12155}R_{70}$ $-\frac{21\sqrt{1254}}{46189}R_{90} + \frac{14\sqrt{62985}}{4199}R_{98}$
4	4	1	6	5	1	$-\frac{5\sqrt{42}}{143}R_{30} + \frac{7\sqrt{66}}{143}R_{50} - \frac{189\sqrt{10}}{2431}R_{70} + \frac{21\sqrt{114}}{4199}R_{90}$ $+\frac{14\sqrt{692835}}{20995}R_{98}$
4	4	1	6	5	2	$\frac{14\sqrt{165}}{715}R_{54} - \frac{126\sqrt{165}}{2431}R_{74} + \frac{42\sqrt{40755}}{20995}R_{94}$
4	4	1	5	6	1	$-\frac{\sqrt{6}}{11}R_{20} + \frac{9\sqrt{30}}{143}R_{40} - \frac{7\sqrt{390}}{715}R_{60} + \frac{21\sqrt{510}}{12155}R_{80}$ $+\frac{14\sqrt{7293}}{2431}R_{88}$

Table B116: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	5	6	2	$\frac{6\sqrt{15}}{143}R_{44} - \frac{14\sqrt{39}}{143}R_{64} + \frac{42\sqrt{561}}{2431}R_{84}$
4	4	1	6	6	1	$\frac{\sqrt{2730}}{143}R_{20} - \frac{3\sqrt{546}}{143}R_{40} + \frac{5\sqrt{42}}{187}R_{60} + \frac{15\sqrt{9282}}{46189}R_{80}$ $- \frac{2\sqrt{19635}}{3553}R_{88} - \frac{18\sqrt{26}}{4199}R_{10,0} + \frac{36\sqrt{935}}{1615}R_{10,8}$
4	4	1	7	6	1	$- \frac{2\sqrt{231}}{143}R_{40} + \frac{18\sqrt{3003}}{2431}R_{60} - \frac{18\sqrt{3927}}{4199}R_{80} - \frac{18\sqrt{46410}}{20995}R_{88}$ $+ \frac{6\sqrt{11}}{323}R_{10,0} + \frac{18\sqrt{2210}}{1615}R_{10,8}$
4	4	1	7	6	2	$- \frac{2\sqrt{70}}{715}R_{44} + \frac{54\sqrt{182}}{2431}R_{64} - \frac{54\sqrt{2618}}{4199}R_{84} + \frac{6\sqrt{10010}}{1615}R_{10,4}$
5	4	1	5	4	1	$R_{00} - \frac{8\sqrt{5}}{55}R_{20} - \frac{54}{143}R_{40} + \frac{64\sqrt{13}}{715}R_{60}$ $- \frac{217\sqrt{17}}{12155}R_{80} + \frac{21\sqrt{24310}}{12155}R_{88}$
5	4	1	5	4	2	$\frac{54\sqrt{2}}{143}R_{44} - \frac{16\sqrt{130}}{715}R_{64} - \frac{7\sqrt{1870}}{1105}R_{84}$
5	4	1	4	5	1	$- \frac{\sqrt{3}}{165}R_{10} + \frac{24\sqrt{7}}{715}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{784\sqrt{15}}{36465}R_{70}$ $- \frac{189\sqrt{19}}{46189}R_{90} - \frac{63\sqrt{461890}}{46189}R_{98}$
5	4	1	4	5	2	$\frac{6\sqrt{22}}{143}R_{54} + \frac{224\sqrt{22}}{2431}R_{74} - \frac{315\sqrt{5434}}{46189}R_{94}$
5	4	1	5	5	1	$- \frac{2\sqrt{22}}{55}R_{10} - \frac{2\sqrt{462}}{715}R_{30} + \frac{2\sqrt{6}}{13}R_{50} - \frac{322\sqrt{110}}{12155}R_{70}$ $+ \frac{84\sqrt{1254}}{46189}R_{90}$
5	4	1	6	5	1	$\frac{5\sqrt{2}}{11}R_{10} - \frac{10\sqrt{42}}{143}R_{30} - \frac{4\sqrt{66}}{143}R_{50} + \frac{14\sqrt{10}}{143}R_{70}$ $- \frac{21\sqrt{114}}{2717}R_{90} + \frac{42\sqrt{692835}}{230945}R_{98}$
5	4	1	6	5	2	$\frac{32\sqrt{165}}{715}R_{54} - \frac{28\sqrt{165}}{2431}R_{74} - \frac{294\sqrt{40755}}{230945}R_{94}$
5	4	1	5	6	1	$\frac{\sqrt{6}}{143}R_{20} + \frac{2\sqrt{30}}{143}R_{40} - \frac{112\sqrt{390}}{12155}R_{60} + \frac{1302\sqrt{510}}{230945}R_{80}$ $- \frac{252\sqrt{7293}}{46189}R_{88} - \frac{15\sqrt{70}}{4199}R_{10,0} - \frac{30\sqrt{17017}}{4199}R_{10,8}$
5	4	1	5	6	2	$- \frac{4\sqrt{15}}{143}R_{44} + \frac{56\sqrt{39}}{2431}R_{64} + \frac{84\sqrt{561}}{4199}R_{84} - \frac{42\sqrt{2145}}{4199}R_{10,4}$
5	4	1	6	6	1	$- \frac{4\sqrt{2730}}{1001}R_{20} + \frac{2\sqrt{546}}{1001}R_{40} + \frac{10\sqrt{42}}{187}R_{60} - \frac{150\sqrt{9282}}{46189}R_{80}$ $- \frac{12\sqrt{19635}}{3553}R_{88} + \frac{66\sqrt{26}}{4199}R_{10,0} - \frac{12\sqrt{935}}{1615}R_{10,8}$
5	4	1	7	6	1	$\frac{15\sqrt{1155}}{1001}R_{20} - \frac{32\sqrt{231}}{1001}R_{40} - \frac{6\sqrt{3003}}{2431}R_{60} + \frac{216\sqrt{3927}}{46189}R_{80}$ $- \frac{24\sqrt{46410}}{20995}R_{88} - \frac{111\sqrt{11}}{4199}R_{10,0} + \frac{27\sqrt{2210}}{20995}R_{10,8}$
5	4	1	7	6	2	$- \frac{16\sqrt{70}}{715}R_{44} + \frac{6\sqrt{182}}{143}R_{64} - \frac{72\sqrt{2618}}{46189}R_{84} - \frac{3\sqrt{10010}}{1235}R_{10,4}$

Table B117: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	2	5	4	2	$R_{00} + \frac{8\sqrt{5}}{33}R_{20} + \frac{54}{143}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$ $+ \frac{98\sqrt{17}}{2431}R_{80}$
5	4	2	4	5	1	$-\frac{6\sqrt{22}}{143}R_{54} + \frac{784\sqrt{22}}{7293}R_{74} - \frac{189\sqrt{5434}}{46189}R_{94}$
5	4	2	4	5	2	$-\frac{\sqrt{3}}{99}R_{10} - \frac{24\sqrt{7}}{1001}R_{30} - \frac{6\sqrt{11}}{143}R_{50} - \frac{1568\sqrt{15}}{21879}R_{70}$ $- \frac{7938\sqrt{19}}{46189}R_{90}$
5	4	2	5	5	1	$-\frac{4\sqrt{3}}{13}R_{54} - \frac{28\sqrt{3}}{221}R_{74} + \frac{84\sqrt{741}}{4199}R_{94}$
5	4	2	6	5	1	$-\frac{8\sqrt{33}}{143}R_{54} - \frac{160\sqrt{33}}{2431}R_{74} - \frac{98\sqrt{8151}}{46189}R_{94}$
5	4	2	6	5	2	$\frac{3\sqrt{10}}{11}R_{10} + \frac{14\sqrt{210}}{429}R_{30} + \frac{8\sqrt{330}}{429}R_{50} + \frac{420\sqrt{2}}{2431}R_{70}$ $+ \frac{294\sqrt{570}}{46189}R_{90}$
5	4	2	5	6	1	$-\frac{4\sqrt{15}}{143}R_{44} + \frac{56\sqrt{39}}{2431}R_{64} + \frac{84\sqrt{561}}{4199}R_{84} - \frac{42\sqrt{2145}}{4199}R_{10,4}$
5	4	2	5	6	2	$-\frac{5\sqrt{6}}{429}R_{20} - \frac{2\sqrt{30}}{143}R_{40} - \frac{56\sqrt{390}}{7293}R_{60} - \frac{588\sqrt{510}}{46189}R_{80}$ $- \frac{378\sqrt{70}}{4199}R_{10,0}$
5	4	2	6	6	1	$-\frac{4\sqrt{273}}{143}R_{44} - \frac{36\sqrt{105}}{1309}R_{64} + \frac{8\sqrt{255255}}{46189}R_{84} + \frac{12\sqrt{231}}{323}R_{10,4}$
5	4	2	7	6	1	$-\frac{16\sqrt{462}}{429}R_{44} - \frac{48\sqrt{30030}}{17017}R_{64} - \frac{24\sqrt{3570}}{4199}R_{84} - \frac{67\sqrt{546}}{12597}R_{10,4}$
5	4	2	7	6	2	$\frac{45\sqrt{7}}{143}R_{20} + \frac{32\sqrt{35}}{429}R_{40} + \frac{36\sqrt{455}}{2431}R_{60} + \frac{432\sqrt{595}}{46189}R_{80}$ $+ \frac{154\sqrt{15}}{4199}R_{10,0}$
4	5	1	4	5	1	$R_{00} - \frac{56\sqrt{5}}{165}R_{20} + \frac{42}{143}R_{40} - \frac{32\sqrt{13}}{2145}R_{60}$ $+ \frac{7\sqrt{17}}{12155}R_{80} + \frac{21\sqrt{24310}}{12155}R_{88}$
4	5	1	4	5	2	$\frac{42\sqrt{2}}{143}R_{44} - \frac{32\sqrt{130}}{715}R_{64} + \frac{21\sqrt{1870}}{12155}R_{84}$
4	5	1	5	5	1	$-\frac{2\sqrt{330}}{165}R_{20} + \frac{6\sqrt{66}}{143}R_{40} - \frac{14\sqrt{858}}{2145}R_{60} + \frac{14\sqrt{1122}}{12155}R_{80}$ $- \frac{28\sqrt{3315}}{3315}R_{88}$
4	5	1	6	5	1	$-\frac{\sqrt{30}}{429}R_{20} + \frac{6\sqrt{6}}{143}R_{40} - \frac{140\sqrt{78}}{7293}R_{60} + \frac{490\sqrt{102}}{46189}R_{80}$ $+ \frac{196\sqrt{36465}}{138567}R_{88} - \frac{27\sqrt{14}}{4199}R_{10,0} - \frac{54\sqrt{85085}}{20995}R_{10,8}$
4	5	1	6	5	2	$\frac{4\sqrt{15}}{715}R_{44} - \frac{280\sqrt{39}}{7293}R_{64} + \frac{980\sqrt{561}}{46189}R_{84} - \frac{126\sqrt{2145}}{20995}R_{10,4}$
4	5	1	5	6	1	$\frac{9\sqrt{10}}{55}R_{10} - \frac{98\sqrt{210}}{2145}R_{30} + \frac{8\sqrt{330}}{429}R_{50} - \frac{126\sqrt{2}}{2431}R_{70}$ $+ \frac{7\sqrt{570}}{46189}R_{90} + \frac{70\sqrt{138567}}{138567}R_{98}$

Table B118: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	5	6	2	$\frac{16\sqrt{165}}{429}R_{54} - \frac{84\sqrt{165}}{2431}R_{74} + \frac{14\sqrt{40755}}{46189}R_{94}$
4	5	1	6	6	1	$-\frac{10\sqrt{78}}{429}R_{30} + \frac{2\sqrt{6006}}{429}R_{50} - \frac{18\sqrt{910}}{2431}R_{70} + \frac{2\sqrt{10374}}{4199}R_{90}$ $-\frac{4\sqrt{373065}}{4845}R_{98}$
4	5	1	7	6	1	$-\frac{\sqrt{33}}{429}R_{30} + \frac{16\sqrt{21}}{663}R_{50} - \frac{450\sqrt{385}}{46189}R_{70} + \frac{8\sqrt{4389}}{4199}R_{90}$ $+\frac{8\sqrt{881790}}{20995}R_{98} - \frac{3\sqrt{5313}}{7429}R_{11,0} - \frac{9\sqrt{6760390}}{37145}R_{11,8}$
4	5	1	7	6	2	$\frac{16\sqrt{770}}{12155}R_{54} - \frac{450\sqrt{770}}{46189}R_{74} + \frac{24\sqrt{190190}}{20995}R_{94} - \frac{9\sqrt{46046}}{7429}R_{11,4}$
4	5	2	4	5	2	$R_{00} + \frac{8\sqrt{5}}{33}R_{20} + \frac{54}{143}R_{40} + \frac{32\sqrt{13}}{429}R_{60}$ $+\frac{98\sqrt{17}}{2431}R_{80}$
4	5	2	5	5	1	$-\frac{12\sqrt{33}}{143}R_{44} - \frac{4\sqrt{2145}}{2145}R_{64} + \frac{112\sqrt{255}}{3315}R_{84}$
4	5	2	6	5	1	$\frac{12\sqrt{3}}{143}R_{44} + \frac{128\sqrt{195}}{7293}R_{64} + \frac{812\sqrt{2805}}{138567}R_{84} - \frac{126\sqrt{429}}{4199}R_{10,4}$
4	5	2	6	5	2	$-\frac{5\sqrt{6}}{429}R_{20} - \frac{2\sqrt{30}}{143}R_{40} - \frac{56\sqrt{390}}{7293}R_{60} - \frac{588\sqrt{510}}{46189}R_{80}$ $-\frac{378\sqrt{70}}{4199}R_{10,0}$
4	5	2	5	6	1	$-\frac{16\sqrt{165}}{429}R_{54} - \frac{72\sqrt{165}}{2431}R_{74} + \frac{70\sqrt{40755}}{138567}R_{94}$
4	5	2	5	6	2	$\frac{3\sqrt{10}}{11}R_{10} + \frac{14\sqrt{210}}{429}R_{30} + \frac{8\sqrt{330}}{429}R_{50} + \frac{420\sqrt{2}}{2431}R_{70}$ $+\frac{294\sqrt{570}}{46189}R_{90}$
4	5	2	6	6	1	$-\frac{4\sqrt{3003}}{3003}R_{54} + \frac{60\sqrt{3003}}{17017}R_{74} + \frac{8\sqrt{4389}}{969}R_{94}$
4	5	2	7	6	1	$\frac{32\sqrt{42}}{1547}R_{54} + \frac{960\sqrt{42}}{29393}R_{74} + \frac{8\sqrt{10374}}{4199}R_{94} - \frac{21\sqrt{62790}}{7429}R_{11,4}$
4	5	2	7	6	2	$-\frac{7\sqrt{5}}{429}R_{30} - \frac{32\sqrt{385}}{7293}R_{50} - \frac{1620\sqrt{21}}{46189}R_{70} - \frac{48\sqrt{665}}{4199}R_{90}$ $-\frac{198\sqrt{805}}{7429}R_{11,0}$
5	5	1	5	5	1	$R_{00} - \frac{9\sqrt{5}}{65}R_{20} - \frac{4}{13}R_{40} + \frac{48\sqrt{13}}{1105}R_{60}$ $+\frac{217\sqrt{17}}{20995}R_{80} + \frac{21\sqrt{24310}}{20995}R_{88} - \frac{25\sqrt{21}}{4199}R_{10,0} + \frac{5\sqrt{510510}}{4199}R_{10,8}$
5	5	1	6	5	1	$-\frac{4\sqrt{55}}{143}R_{20} + \frac{2\sqrt{11}}{143}R_{40} + \frac{70\sqrt{143}}{2431}R_{60} - \frac{1050\sqrt{187}}{46189}R_{80}$ $+\frac{42\sqrt{2210}}{4199}R_{88} + \frac{22\sqrt{231}}{4199}R_{10,0} + \frac{22\sqrt{46410}}{20995}R_{10,8}$
5	5	1	6	5	2	$\frac{14\sqrt{110}}{715}R_{44} - \frac{70\sqrt{286}}{2431}R_{64} - \frac{210\sqrt{34}}{4199}R_{84} + \frac{924\sqrt{130}}{20995}R_{10,4}$
5	5	1	5	6	1	$-\frac{2\sqrt{165}}{165}R_{10} - \frac{2\sqrt{385}}{715}R_{30} + \frac{2\sqrt{5}}{13}R_{50} - \frac{322\sqrt{33}}{7293}R_{70}$ $+\frac{84\sqrt{1045}}{46189}R_{90}$

Table B119: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	6	2	$-\frac{2\sqrt{10}}{13}R_{54} - \frac{14\sqrt{10}}{221}R_{74} + \frac{42\sqrt{2470}}{4199}R_{94}$
5	5	1	6	6	1	$\frac{5\sqrt{3003}}{429}R_{10} - \frac{5\sqrt{143}}{143}R_{30} - \frac{4\sqrt{91}}{221}R_{50} + \frac{8\sqrt{15015}}{8151}R_{70}$ $+ \frac{9\sqrt{19019}}{19019}R_{90} + \frac{9\sqrt{22610}}{11305}R_{98} - \frac{165\sqrt{23023}}{676039}R_{11,0} + \frac{33\sqrt{1560090}}{52003}R_{11,8}$
5	5	1	7	6	1	$-\frac{2\sqrt{2}}{13}R_{30} + \frac{2\sqrt{154}}{221}R_{50} + \frac{90\sqrt{210}}{4199}R_{70} - \frac{594\sqrt{266}}{29393}R_{90}$ $+ \frac{4\sqrt{1616615}}{11305}R_{98} + \frac{264\sqrt{322}}{52003}R_{11,0} + \frac{8\sqrt{111546435}}{260015}R_{11,8}$
5	5	1	7	6	2	$\frac{92\sqrt{105}}{3315}R_{54} - \frac{180\sqrt{105}}{4199}R_{74} - \frac{44\sqrt{25935}}{20995}R_{94} + \frac{44\sqrt{6279}}{7429}R_{11,4}$
6	5	1	6	5	1	$R_{00} - \frac{5\sqrt{5}}{143}R_{20} - \frac{64}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60}$ $+ \frac{3115\sqrt{17}}{46189}R_{80} + \frac{105\sqrt{24310}}{46189}R_{88} - \frac{83\sqrt{21}}{4199}R_{10,0} + \frac{\sqrt{510510}}{4199}R_{10,8}$
6	5	1	6	5	2	$\frac{28\sqrt{10}}{143}R_{44} - \frac{40\sqrt{26}}{2431}R_{64} - \frac{735\sqrt{374}}{46189}R_{84} - \frac{21\sqrt{1430}}{4199}R_{10,4}$
6	5	1	5	6	1	$-\frac{\sqrt{15}}{429}R_{10} + \frac{\sqrt{35}}{143}R_{30} + \frac{20\sqrt{55}}{2431}R_{50} - \frac{980\sqrt{3}}{8151}R_{70}$ $+ \frac{45\sqrt{95}}{2717}R_{90} - \frac{45\sqrt{92378}}{46189}R_{98} - \frac{363\sqrt{115}}{96577}R_{11,0} - \frac{33\sqrt{6374082}}{96577}R_{11,8}$
6	5	1	5	6	2	$\frac{20\sqrt{110}}{2431}R_{54} + \frac{1120\sqrt{110}}{46189}R_{74} + \frac{105\sqrt{27170}}{46189}R_{94} - \frac{693\sqrt{6578}}{96577}R_{11,4}$
6	5	1	6	6	1	$-\frac{2\sqrt{273}}{273}R_{10} - \frac{6\sqrt{13}}{143}R_{30} + \frac{90\sqrt{1001}}{17017}R_{50} + \frac{1030\sqrt{1365}}{138567}R_{70}$ $- \frac{240\sqrt{1729}}{29393}R_{90} + \frac{1452\sqrt{2093}}{676039}R_{11,0}$
6	5	1	7	6	1	$\frac{3\sqrt{462}}{91}R_{10} - \frac{8\sqrt{22}}{143}R_{30} - \frac{160\sqrt{14}}{1547}R_{50} + \frac{30\sqrt{2310}}{46189}R_{70}$ $+ \frac{135\sqrt{2926}}{29393}R_{90} + \frac{2\sqrt{146965}}{4199}R_{98} - \frac{1074\sqrt{3542}}{676039}R_{11,0} + \frac{4\sqrt{10140585}}{96577}R_{11,8}$
6	5	1	7	6	2	$\frac{8\sqrt{1155}}{429}R_{54} + \frac{60\sqrt{1155}}{46189}R_{74} - \frac{2\sqrt{285285}}{4199}R_{94} - \frac{4\sqrt{69069}}{5681}R_{11,4}$
6	5	2	6	5	2	$R_{00} + \frac{35\sqrt{5}}{143}R_{20} + \frac{56}{143}R_{40} + \frac{200\sqrt{13}}{2431}R_{60}$ $+ \frac{2450\sqrt{17}}{46189}R_{80} + \frac{126\sqrt{21}}{4199}R_{10,0}$
6	5	2	5	6	1	$-\frac{80\sqrt{22}}{2431}R_{54} + \frac{980\sqrt{22}}{46189}R_{74} + \frac{315\sqrt{5434}}{46189}R_{94} - \frac{231\sqrt{32890}}{96577}R_{11,4}$
6	5	2	5	6	2	$-\frac{\sqrt{3}}{143}R_{10} - \frac{7\sqrt{7}}{429}R_{30} - \frac{200\sqrt{11}}{7293}R_{50} - \frac{1960\sqrt{15}}{46189}R_{70}$ $- \frac{3150\sqrt{19}}{46189}R_{90} - \frac{15246\sqrt{23}}{96577}R_{11,0}$
6	5	2	6	6	1	$-\frac{10\sqrt{10010}}{2431}R_{54} - \frac{10\sqrt{10010}}{2717}R_{74} + \frac{66\sqrt{3542}}{7429}R_{11,4}$
6	5	2	7	6	1	$-\frac{8\sqrt{35}}{221}R_{54} - \frac{240\sqrt{35}}{4199}R_{74} - \frac{14\sqrt{8645}}{4199}R_{94} - \frac{12\sqrt{2093}}{4199}R_{11,4}$
6	5	2	7	6	2	$\frac{3\sqrt{14}}{13}R_{10} + \frac{28\sqrt{6}}{143}R_{30} + \frac{40\sqrt{462}}{2431}R_{50} + \frac{1500\sqrt{70}}{46189}R_{70}$ $+ \frac{30\sqrt{798}}{4199}R_{90} + \frac{396\sqrt{966}}{96577}R_{11,0}$

Table B120: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	6	1	5	6	1	$R_{00} - \frac{21\sqrt{5}}{143}R_{20} - \frac{56}{143}R_{40} + \frac{240\sqrt{13}}{2431}R_{60}$ $- \frac{1085\sqrt{17}}{46189}R_{80} + \frac{105\sqrt{24310}}{46189}R_{88} + \frac{5\sqrt{21}}{4199}R_{10,0} + \frac{\sqrt{510510}}{4199}R_{10,8}$
5	6	1	5	6	2	$\frac{56\sqrt{2}}{143}R_{44} - \frac{60\sqrt{130}}{2431}R_{64} - \frac{35\sqrt{1870}}{4199}R_{84} + \frac{21\sqrt{286}}{4199}R_{10,4}$
5	6	1	6	6	1	$-\frac{20\sqrt{91}}{1001}R_{20} + \frac{2\sqrt{455}}{1001}R_{40} + \frac{10\sqrt{35}}{187}R_{60} - \frac{150\sqrt{7735}}{46189}R_{80}$ $- \frac{30\sqrt{2618}}{3553}R_{88} + \frac{22\sqrt{195}}{4199}R_{10,0} - \frac{2\sqrt{1122}}{323}R_{10,8}$
5	6	1	7	6	1	$-\frac{\sqrt{154}}{1001}R_{20} + \frac{36\sqrt{770}}{17017}R_{40} + \frac{20\sqrt{10010}}{46189}R_{60} - \frac{90\sqrt{13090}}{46189}R_{80}$ $+ \frac{20\sqrt{1547}}{4199}R_{88} + \frac{999\sqrt{330}}{96577}R_{10,0} - \frac{486\sqrt{663}}{96577}R_{10,8} - \frac{66\sqrt{770}}{37145}R_{12,0}$ $- \frac{44\sqrt{440895}}{37145}R_{12,8}$
5	6	1	7	6	2	$\frac{12\sqrt{21}}{2431}R_{44} - \frac{40\sqrt{1365}}{8151}R_{64} + \frac{20\sqrt{19635}}{46189}R_{84} + \frac{54\sqrt{3003}}{5681}R_{10,4}$ $- \frac{88\sqrt{30030}}{37145}R_{12,4}$
5	6	2	5	6	2	$R_{00} + \frac{35\sqrt{5}}{143}R_{20} + \frac{56}{143}R_{40} + \frac{200\sqrt{13}}{2431}R_{60}$ $+ \frac{2450\sqrt{17}}{46189}R_{80} + \frac{126\sqrt{21}}{4199}R_{10,0}$
5	6	2	6	6	1	$-\frac{2\sqrt{910}}{143}R_{44} - \frac{90\sqrt{14}}{1309}R_{64} + \frac{20\sqrt{34034}}{46189}R_{84} + \frac{6\sqrt{770}}{323}R_{10,4}$
5	6	2	7	6	1	$\frac{12\sqrt{385}}{2431}R_{44} + \frac{1600\sqrt{1001}}{323323}R_{64} + \frac{100\sqrt{119}}{4199}R_{84} + \frac{1206\sqrt{455}}{96577}R_{10,4}$ $- \frac{1848\sqrt{182}}{37145}R_{12,4}$
5	6	2	7	6	2	$-\frac{\sqrt{210}}{715}R_{20} - \frac{20\sqrt{42}}{2431}R_{40} - \frac{200\sqrt{546}}{46189}R_{60} - \frac{300\sqrt{714}}{46189}R_{80}$ $- \frac{20790\sqrt{2}}{96577}R_{10,0} - \frac{4356\sqrt{42}}{37145}R_{12,0}$
6	6	1	6	6	1	$R_{00} - \frac{13\sqrt{5}}{385}R_{20} - \frac{512}{1309}R_{40} - \frac{40\sqrt{13}}{3553}R_{60}$ $+ \frac{445\sqrt{17}}{24871}R_{80} - \frac{15\sqrt{24310}}{24871}R_{88} + \frac{1079\sqrt{21}}{52003}R_{10,0} + \frac{13\sqrt{510510}}{52003}R_{10,8}$ $- \frac{13068}{260015}R_{12,0} + \frac{396\sqrt{277134}}{260015}R_{12,8}$
6	6	1	7	6	1	$-\frac{2\sqrt{1430}}{455}R_{20} - \frac{90\sqrt{286}}{17017}R_{40} + \frac{10\sqrt{22}}{209}R_{60} + \frac{90\sqrt{4862}}{29393}R_{80}$ $+ \frac{100\sqrt{85}}{2261}R_{88} - \frac{180\sqrt{6006}}{39767}R_{10,0} + \frac{288\sqrt{1785}}{52003}R_{10,8} + \frac{1716\sqrt{286}}{260015}R_{12,0}$ $+ \frac{1144\sqrt{969}}{260015}R_{12,8}$
6	6	1	7	6	2	$\frac{36\sqrt{195}}{2431}R_{44} - \frac{2060\sqrt{3}}{10659}R_{64} - \frac{20\sqrt{7293}}{4199}R_{84} - \frac{36\sqrt{165}}{7429}R_{10,4}$ $+ \frac{2288\sqrt{66}}{37145}R_{12,4}$

Table B121: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 13.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
7	6	1	7	6	1	$R_{00} + \frac{16\sqrt{5}}{455}R_{20} - \frac{576}{1547}R_{40} - \frac{320\sqrt{13}}{4199}R_{60}$ $+ \frac{785\sqrt{17}}{29393}R_{80} + \frac{75\sqrt{24310}}{29393}R_{88} + \frac{31032\sqrt{21}}{676039}R_{10,0} + \frac{216\sqrt{510510}}{676039}R_{10,8}$ $- \frac{25278}{260015}R_{12,0} + \frac{66\sqrt{277134}}{260015}R_{12,8}$
7	6	1	7	6	2	$\frac{90\sqrt{330}}{2431}R_{44} + \frac{80\sqrt{858}}{46189}R_{64} - \frac{5\sqrt{102}}{221}R_{84} - \frac{72\sqrt{390}}{5083}R_{10,4}$ $- \frac{792\sqrt{39}}{37145}R_{12,4}$
7	6	2	7	6	2	$R_{00} + \frac{16\sqrt{5}}{65}R_{20} + \frac{972}{2431}R_{40} + \frac{4000\sqrt{13}}{46189}R_{60}$ $+ \frac{250\sqrt{17}}{4199}R_{80} + \frac{3888\sqrt{21}}{96577}R_{10,0} + \frac{4356}{37145}R_{12,0}$

Table B122: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	2	1	1	$R_{00} - \frac{\sqrt{5}}{5} R_{20}$
2	1	1	2	2	1	$-\frac{\sqrt{5}}{5} R_{10} + \frac{\sqrt{105}}{35} R_{30}$
2	1	1	3	2	1	$\frac{\sqrt{10}}{5} R_{10} - \frac{\sqrt{210}}{35} R_{30}$
2	1	1	2	3	1	$\frac{\sqrt{30}}{35} R_{20} - \frac{\sqrt{6}}{21} R_{40} + \frac{2\sqrt{105}}{21} R_{44}$
2	1	1	3	3	1	$-\frac{\sqrt{42}}{14} R_{20} + \frac{\sqrt{210}}{42} R_{40} + \frac{\sqrt{3}}{3} R_{44}$
2	1	1	4	3	1	$\frac{3\sqrt{6}}{14} R_{20} - \frac{\sqrt{30}}{14} R_{40} + \frac{\sqrt{21}}{21} R_{44}$
2	1	1	3	4	1	$\frac{\sqrt{70}}{42} R_{30} - \frac{\sqrt{110}}{66} R_{50} + \frac{\sqrt{77}}{11} R_{54}$
2	1	1	4	4	1	$-\frac{\sqrt{42}}{14} R_{30} + \frac{\sqrt{66}}{22} R_{50} + \frac{\sqrt{1155}}{55} R_{54}$
2	1	1	5	4	1	$\frac{\sqrt{2}}{3} R_{30} - \frac{\sqrt{154}}{33} R_{50} + \frac{2\sqrt{55}}{55} R_{54}$
2	1	1	4	5	1	$\frac{\sqrt{6}}{11} R_{40} - \frac{2\sqrt{105}}{165} R_{44} - \frac{3\sqrt{78}}{143} R_{60} + \frac{6\sqrt{273}}{143} R_{64}$
2	1	1	5	5	1	$-\frac{\sqrt{231}}{33} R_{40} - \frac{\sqrt{330}}{165} R_{44} + \frac{\sqrt{3003}}{143} R_{60} + \frac{3\sqrt{858}}{143} R_{64}$
2	1	1	6	5	1	$\frac{\sqrt{165}}{11} R_{44} - \frac{\sqrt{429}}{143} R_{64}$
2	1	1	6	5	2	$-\frac{\sqrt{210}}{33} R_{40} + \frac{\sqrt{3}}{33} R_{44} + \frac{\sqrt{2730}}{143} R_{60} - \frac{3\sqrt{195}}{143} R_{64}$
2	1	1	5	6	1	$\frac{\sqrt{1155}}{143} R_{50} - \frac{3\sqrt{66}}{143} R_{54} - \frac{\sqrt{7}}{13} R_{70} + \frac{\sqrt{66}}{13} R_{74}$
2	1	1	6	6	1	$-\frac{\sqrt{1365}}{91} R_{54} + \frac{\sqrt{1365}}{455} R_{74}$
2	1	1	6	6	2	$-\frac{\sqrt{4290}}{143} R_{50} - \frac{3\sqrt{3003}}{1001} R_{54} + \frac{\sqrt{26}}{13} R_{70} + \frac{\sqrt{3003}}{91} R_{74}$
2	1	1	7	6	1	$\frac{3\sqrt{910}}{91} R_{54} - \frac{3\sqrt{910}}{455} R_{74}$
2	1	1	7	6	2	$-\frac{18\sqrt{11}}{143} R_{50} + \frac{3\sqrt{770}}{1001} R_{54} + \frac{6\sqrt{15}}{65} R_{70} - \frac{\sqrt{770}}{91} R_{74}$
2	2	1	2	2	1	$R_{00} - \frac{\sqrt{5}}{7} R_{20} - \frac{2}{21} R_{40} - \frac{2\sqrt{70}}{21} R_{44}$
2	2	1	3	2	1	$-\frac{\sqrt{10}}{7} R_{20} + \frac{5\sqrt{2}}{21} R_{40} - \frac{2\sqrt{35}}{21} R_{44}$
2	2	1	2	3	1	$-\frac{\sqrt{30}}{15} R_{10} + \frac{\sqrt{70}}{35} R_{30}$
2	2	1	3	3	1	$\frac{2\sqrt{42}}{21} R_{10} - \frac{\sqrt{2}}{6} R_{30} - \frac{5\sqrt{154}}{462} R_{50} - \frac{\sqrt{55}}{11} R_{54}$
2	2	1	4	3	1	$-\frac{5\sqrt{14}}{42} R_{30} + \frac{5\sqrt{22}}{66} R_{50} - \frac{\sqrt{385}}{33} R_{54}$
2	2	1	3	4	1	$-\frac{\sqrt{30}}{14} R_{20} + \frac{5\sqrt{6}}{42} R_{40} - \frac{\sqrt{105}}{21} R_{44}$
2	2	1	4	4	1	$\frac{5\sqrt{2}}{14} R_{20} - \frac{9\sqrt{10}}{154} R_{40} - \frac{3\sqrt{7}}{77} R_{44} - \frac{2\sqrt{130}}{143} R_{60}$ $-\frac{4\sqrt{455}}{143} R_{64}$

Table B123: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	5	4	1	$-\frac{\sqrt{210}}{33}R_{40} + \frac{2\sqrt{3}}{33}R_{44} + \frac{\sqrt{2730}}{143}R_{60} - \frac{6\sqrt{195}}{143}R_{64}$
2	2	1	4	5	1	$-\frac{\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50} - \frac{2\sqrt{77}}{33}R_{54}$
2	2	1	5	5	1	$\frac{2\sqrt{55}}{33}R_{30} - \frac{\sqrt{35}}{39}R_{50} - \frac{\sqrt{2}}{13}R_{54} - \frac{5\sqrt{231}}{429}R_{70}$ $-\frac{5\sqrt{2}}{13}R_{74}$
2	2	1	6	5	1	$-\frac{5}{13}R_{54} + \frac{1}{13}R_{74}$
2	2	1	6	5	2	$\frac{5\sqrt{154}}{143}R_{50} - \frac{3\sqrt{55}}{143}R_{54} - \frac{\sqrt{210}}{39}R_{70} + \frac{\sqrt{55}}{13}R_{74}$
2	2	1	5	6	1	$-\frac{5\sqrt{7}}{33}R_{40} + \frac{\sqrt{10}}{33}R_{44} + \frac{5\sqrt{91}}{143}R_{60} - \frac{15\sqrt{26}}{143}R_{64}$
2	2	1	6	6	1	$\frac{5\sqrt{1001}}{143}R_{44} - \frac{\sqrt{385}}{385}R_{64} - \frac{2\sqrt{7735}}{7735}R_{84} - \frac{4\sqrt{17}}{17}R_{88}$
2	2	1	6	6	2	$\frac{35\sqrt{26}}{429}R_{40} + \frac{\sqrt{455}}{429}R_{44} - \frac{\sqrt{2}}{11}R_{60} - \frac{3\sqrt{7}}{77}R_{64}$ $-\frac{2\sqrt{442}}{221}R_{80} - \frac{6\sqrt{17017}}{1547}R_{84}$
2	2	1	7	6	1	$-\frac{\sqrt{2310}}{105}R_{64} + \frac{\sqrt{46410}}{1785}R_{84} - \frac{2\sqrt{102}}{51}R_{88}$
2	2	1	7	6	2	$\frac{2\sqrt{195}}{65}R_{60} - \frac{\sqrt{2730}}{273}R_{64} - \frac{2\sqrt{255}}{85}R_{80} + \frac{\sqrt{39270}}{357}R_{84}$
3	2	1	3	2	1	$R_{00} - \frac{1}{3}R_{40} - \frac{\sqrt{70}}{21}R_{44}$
3	2	1	2	3	1	$-\frac{\sqrt{15}}{105}R_{10} + \frac{4\sqrt{35}}{105}R_{30} - \frac{5\sqrt{55}}{231}R_{50} + \frac{5\sqrt{154}}{77}R_{54}$
3	2	1	3	3	1	$-\frac{\sqrt{21}}{21}R_{10} - \frac{1}{3}R_{30} + \frac{10\sqrt{77}}{231}R_{50}$
3	2	1	4	3	1	$\frac{3\sqrt{3}}{7}R_{10} - \frac{\sqrt{7}}{21}R_{30} - \frac{20\sqrt{11}}{231}R_{50} - \frac{2\sqrt{770}}{231}R_{54}$
3	2	1	3	4	1	$\frac{5\sqrt{3}}{33}R_{40} + \frac{5\sqrt{210}}{231}R_{44} - \frac{5\sqrt{39}}{143}R_{60} + \frac{5\sqrt{546}}{143}R_{64}$
3	2	1	4	4	1	$-\frac{2}{7}R_{20} - \frac{9\sqrt{5}}{77}R_{40} + \frac{9\sqrt{14}}{77}R_{44} + \frac{7\sqrt{65}}{143}R_{60}$ $+\frac{\sqrt{910}}{143}R_{64}$
3	2	1	5	4	1	$\frac{\sqrt{21}}{7}R_{20} - \frac{4\sqrt{105}}{231}R_{40} + \frac{4\sqrt{6}}{33}R_{44} - \frac{\sqrt{1365}}{143}R_{60}$ $-\frac{\sqrt{390}}{143}R_{64}$
3	2	1	4	5	1	$\frac{\sqrt{35}}{231}R_{30} + \frac{16\sqrt{55}}{429}R_{50} + \frac{8\sqrt{154}}{429}R_{54} - \frac{21\sqrt{3}}{143}R_{70}$ $+\frac{9\sqrt{154}}{143}R_{74}$
3	2	1	5	5	1	$-\frac{\sqrt{110}}{33}R_{30} - \frac{\sqrt{70}}{39}R_{50} + \frac{6}{13}R_{54} + \frac{8\sqrt{462}}{429}R_{70}$ $+\frac{4}{13}R_{74}$
3	2	1	6	5	1	$\frac{5\sqrt{2}}{13}R_{54} - \frac{\sqrt{2}}{13}R_{74}$

Table B124: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	1	6	5	2	$-\frac{20}{33}R_{30} + \frac{10\sqrt{77}}{429}R_{50} - \frac{5\sqrt{110}}{143}R_{54} + \frac{10\sqrt{105}}{429}R_{70}$ $+ \frac{\sqrt{110}}{143}R_{74}$
3	2	1	5	6	1	$\frac{5\sqrt{14}}{429}R_{40} - \frac{14\sqrt{5}}{429}R_{44} + \frac{3\sqrt{182}}{143}R_{60} + \frac{6\sqrt{13}}{143}R_{64}$ $- \frac{4\sqrt{238}}{221}R_{80} + \frac{12\sqrt{187}}{221}R_{84}$
3	2	1	6	6	1	$\frac{10\sqrt{2002}}{1001}R_{44} - \frac{\sqrt{770}}{77}R_{64} + \frac{\sqrt{15470}}{1547}R_{84} - \frac{2\sqrt{34}}{17}R_{88}$
3	2	1	6	6	2	$-\frac{40\sqrt{13}}{429}R_{40} - \frac{10\sqrt{910}}{3003}R_{44} - \frac{2}{11}R_{60} + \frac{9\sqrt{14}}{77}R_{64}$ $+ \frac{6\sqrt{221}}{221}R_{80} + \frac{3\sqrt{34034}}{1547}R_{84}$
3	2	1	7	6	1	$\frac{15\sqrt{3003}}{1001}R_{44} + \frac{16\sqrt{1155}}{1155}R_{64} - \frac{23\sqrt{23205}}{23205}R_{84} - \frac{2\sqrt{51}}{51}R_{88}$
3	2	1	7	6	2	$-\frac{15\sqrt{30}}{143}R_{40} + \frac{15\sqrt{21}}{1001}R_{44} + \frac{8\sqrt{390}}{715}R_{60} - \frac{32\sqrt{1365}}{3003}R_{64}$ $+ \frac{11\sqrt{510}}{1105}R_{80} + \frac{\sqrt{19635}}{4641}R_{84}$
2	3	1	2	3	1	$R_{00} - \frac{8\sqrt{5}}{35}R_{20} + \frac{1}{21}R_{40} - \frac{\sqrt{70}}{21}R_{44}$
2	3	1	3	3	1	$-\frac{\sqrt{7}}{7}R_{20} + \frac{\sqrt{35}}{21}R_{40} + \frac{\sqrt{2}}{3}R_{44}$
2	3	1	4	3	1	$-\frac{1}{21}R_{20} + \frac{9\sqrt{5}}{77}R_{40} - \frac{3\sqrt{14}}{77}R_{44} - \frac{10\sqrt{65}}{429}R_{60}$ $+ \frac{10\sqrt{910}}{429}R_{64}$
2	3	1	3	4	1	$\frac{2\sqrt{5}}{7}R_{10} - \frac{\sqrt{105}}{21}R_{30} + \frac{\sqrt{165}}{231}R_{50} - \frac{\sqrt{462}}{77}R_{54}$
2	3	1	4	4	1	$-\frac{\sqrt{7}}{7}R_{30} + \frac{\sqrt{11}}{11}R_{50} + \frac{\sqrt{770}}{55}R_{54}$
2	3	1	5	4	1	$-\frac{\sqrt{3}}{33}R_{30} + \frac{8\sqrt{231}}{429}R_{50} - \frac{8\sqrt{330}}{715}R_{54} - \frac{5\sqrt{35}}{143}R_{70}$ $+ \frac{5\sqrt{330}}{143}R_{74}$
2	3	1	4	5	1	$\frac{5\sqrt{5}}{21}R_{20} - \frac{36}{77}R_{40} + \frac{12\sqrt{70}}{385}R_{44} + \frac{7\sqrt{13}}{429}R_{60}$ $- \frac{7\sqrt{182}}{429}R_{64}$
2	3	1	5	5	1	$-\frac{\sqrt{154}}{33}R_{40} - \frac{2\sqrt{55}}{165}R_{44} + \frac{\sqrt{2002}}{143}R_{60} + \frac{6\sqrt{143}}{143}R_{64}$
2	3	1	6	5	1	$-\frac{2\sqrt{110}}{143}R_{44} + \frac{\sqrt{286}}{143}R_{64} - \frac{\sqrt{34}}{221}R_{84} + \frac{2\sqrt{15470}}{221}R_{88}$
2	3	1	6	5	2	$\frac{4\sqrt{35}}{429}R_{40} - \frac{2\sqrt{2}}{429}R_{44} - \frac{2\sqrt{455}}{143}R_{60} + \frac{3\sqrt{130}}{143}R_{64}$ $+ \frac{2\sqrt{595}}{221}R_{80} - \frac{3\sqrt{1870}}{221}R_{84}$
2	3	1	5	6	1	$\frac{5\sqrt{10}}{33}R_{30} - \frac{7\sqrt{770}}{429}R_{50} + \frac{14\sqrt{11}}{143}R_{54} + \frac{4\sqrt{42}}{429}R_{70}$ $- \frac{8\sqrt{11}}{143}R_{74}$

Table B125: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	3	1	6	6	1	$-\frac{\sqrt{910}}{91}R_{54} + \frac{\sqrt{910}}{455}R_{74}$
2	3	1	6	6	2	$-\frac{2\sqrt{715}}{143}R_{50} - \frac{3\sqrt{2002}}{1001}R_{54} + \frac{2\sqrt{39}}{39}R_{70} + \frac{\sqrt{2002}}{91}R_{74}$
2	3	1	7	6	1	$-\frac{\sqrt{1365}}{273}R_{54} + \frac{36\sqrt{1365}}{7735}R_{74} - \frac{\sqrt{1995}}{969}R_{94} + \frac{14\sqrt{4845}}{969}R_{98}$
2	3	1	7	6	2	$\frac{\sqrt{66}}{143}R_{50} - \frac{\sqrt{1155}}{3003}R_{54} - \frac{108\sqrt{10}}{1105}R_{70} + \frac{12\sqrt{1155}}{1547}R_{74}$ $+ \frac{7\sqrt{114}}{323}R_{90} - \frac{\sqrt{285285}}{969}R_{94}$
3	3	1	3	3	1	$R_{00} - \frac{7}{66}R_{40} + \frac{\sqrt{70}}{66}R_{44} - \frac{15\sqrt{13}}{286}R_{60}$ $- \frac{15\sqrt{182}}{286}R_{64}$
3	3	1	4	3	1	$-\frac{\sqrt{35}}{21}R_{20} - \frac{15\sqrt{7}}{154}R_{40} - \frac{3\sqrt{10}}{22}R_{44} + \frac{35\sqrt{91}}{858}R_{60}$ $- \frac{35\sqrt{26}}{858}R_{64}$
3	3	1	3	4	1	$-\frac{\sqrt{7}}{14}R_{10} - \frac{\sqrt{3}}{6}R_{30} + \frac{5\sqrt{231}}{231}R_{50}$
3	3	1	4	4	1	$\frac{\sqrt{105}}{14}R_{10} - \frac{\sqrt{5}}{22}R_{30} - \frac{2\sqrt{385}}{1001}R_{50} + \frac{\sqrt{22}}{143}R_{54}$ $- \frac{7\sqrt{21}}{143}R_{70} - \frac{21\sqrt{22}}{143}R_{74}$
3	3	1	5	4	1	$-\frac{\sqrt{105}}{33}R_{30} - \frac{7\sqrt{165}}{429}R_{50} - \frac{3\sqrt{462}}{143}R_{54} + \frac{56}{143}R_{70}$ $- \frac{2\sqrt{462}}{143}R_{74}$
3	3	1	4	5	1	$-\frac{2\sqrt{7}}{21}R_{20} - \frac{3\sqrt{35}}{77}R_{40} - \frac{3\sqrt{2}}{11}R_{44} + \frac{7\sqrt{455}}{429}R_{60}$ $- \frac{7\sqrt{130}}{429}R_{64}$
3	3	1	5	5	1	$\frac{3\sqrt{22}}{22}R_{20} - \frac{\sqrt{110}}{78}R_{40} - \frac{\sqrt{77}}{39}R_{44} - \frac{14\sqrt{1870}}{2431}R_{80}$ $- \frac{6\sqrt{595}}{221}R_{84}$
3	3	1	6	5	1	$\frac{5\sqrt{154}}{143}R_{44} - \frac{\sqrt{10010}}{286}R_{64} + \frac{\sqrt{1190}}{442}R_{84} + \frac{7\sqrt{442}}{221}R_{88}$
3	3	1	6	5	2	$\frac{140}{429}R_{40} - \frac{5\sqrt{70}}{429}R_{44} + \frac{7\sqrt{13}}{143}R_{60} + \frac{9\sqrt{182}}{286}R_{64}$ $- \frac{21\sqrt{17}}{221}R_{80} + \frac{3\sqrt{2618}}{442}R_{84}$
3	3	1	5	6	1	$-\frac{5\sqrt{14}}{66}R_{30} - \frac{35\sqrt{22}}{858}R_{50} - \frac{3\sqrt{385}}{143}R_{54} + \frac{28\sqrt{30}}{429}R_{70}$ $- \frac{2\sqrt{385}}{143}R_{74}$
3	3	1	6	6	1	$\frac{\sqrt{26}}{13}R_{54} + \frac{\sqrt{26}}{442}R_{74} - \frac{3\sqrt{38}}{646}R_{94} - \frac{3\sqrt{4522}}{323}R_{98}$
3	3	1	6	6	2	$\frac{70\sqrt{13}}{429}R_{30} - \frac{2\sqrt{1001}}{429}R_{50} - \frac{\sqrt{1430}}{143}R_{54} + \frac{5\sqrt{1365}}{7293}R_{70}$ $- \frac{\sqrt{1430}}{4862}R_{74} - \frac{27\sqrt{1729}}{4199}R_{90} - \frac{9\sqrt{2090}}{646}R_{94}$

Table B126: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	7	6	1	$\frac{\sqrt{39}}{39}R_{54} - \frac{15\sqrt{39}}{221}R_{74} + \frac{16\sqrt{57}}{969}R_{94} + \frac{4\sqrt{6783}}{969}R_{98}$
3	3	1	7	6	2	$\frac{\sqrt{2310}}{143}R_{50} - \frac{\sqrt{33}}{39}R_{54} + \frac{9\sqrt{14}}{221}R_{70} + \frac{15\sqrt{33}}{221}R_{74}$ $- \frac{2\sqrt{3990}}{323}R_{90} + \frac{4\sqrt{8151}}{969}R_{94}$
4	3	1	4	3	1	$R_{00} + \frac{2\sqrt{5}}{21}R_{20} - \frac{3}{14}R_{40} - \frac{9\sqrt{70}}{154}R_{44}$ $- \frac{5\sqrt{13}}{78}R_{60} - \frac{5\sqrt{182}}{286}R_{64}$
4	3	1	3	4	1	$-\frac{1}{42}R_{10} + \frac{\sqrt{21}}{154}R_{30} + \frac{50\sqrt{33}}{1001}R_{50} + \frac{5\sqrt{2310}}{1001}R_{54}$ $- \frac{49\sqrt{5}}{429}R_{70} + \frac{7\sqrt{2310}}{429}R_{74}$
4	3	1	4	4	1	$-\frac{\sqrt{15}}{30}R_{10} - \frac{39\sqrt{35}}{770}R_{30} - \frac{3\sqrt{55}}{143}R_{50} + \frac{98\sqrt{3}}{429}R_{70}$
4	3	1	5	4	1	$\frac{2\sqrt{35}}{15}R_{10} + \frac{\sqrt{15}}{55}R_{30} - \frac{\sqrt{1155}}{143}R_{50} - \frac{5\sqrt{66}}{143}R_{54}$ $- \frac{32\sqrt{7}}{429}R_{70} - \frac{10\sqrt{66}}{429}R_{74}$
4	3	1	4	5	1	$-\frac{4}{231}R_{20} + \frac{3\sqrt{5}}{91}R_{40} + \frac{45\sqrt{14}}{1001}R_{44} + \frac{7\sqrt{65}}{195}R_{60}$ $+ \frac{7\sqrt{910}}{715}R_{64} - \frac{392\sqrt{85}}{12155}R_{80} + \frac{84\sqrt{13090}}{12155}R_{84}$
4	3	1	5	5	1	$-\frac{\sqrt{154}}{66}R_{20} - \frac{3\sqrt{770}}{286}R_{40} + \frac{15\sqrt{11}}{143}R_{44} - \frac{2\sqrt{10010}}{2145}R_{60}$ $+ \frac{16\sqrt{715}}{2145}R_{64} + \frac{42\sqrt{13090}}{12155}R_{80} + \frac{14\sqrt{85}}{1105}R_{84}$
4	3	1	6	5	1	$-\frac{15\sqrt{22}}{143}R_{44} + \frac{3\sqrt{1430}}{286}R_{64} - \frac{3\sqrt{170}}{442}R_{84} + \frac{\sqrt{3094}}{221}R_{88}$
4	3	1	6	5	2	$-\frac{4\sqrt{35}}{33}R_{20} - \frac{15\sqrt{10}}{143}R_{44} + \frac{\sqrt{91}}{39}R_{60} + \frac{23\sqrt{26}}{858}R_{64}$ $+ \frac{3\sqrt{119}}{187}R_{80} + \frac{37\sqrt{374}}{4862}R_{84}$
4	3	1	5	6	1	$-\frac{5\sqrt{2}}{858}R_{30} + \frac{7\sqrt{154}}{858}R_{50} + \frac{7\sqrt{55}}{429}R_{54} + \frac{48\sqrt{210}}{2431}R_{70}$ $+ \frac{90\sqrt{55}}{2431}R_{74} - \frac{84\sqrt{266}}{4199}R_{90} + \frac{28\sqrt{13585}}{4199}R_{94}$
4	3	1	6	6	1	$\frac{3\sqrt{182}}{91}R_{54} - \frac{75\sqrt{182}}{3094}R_{74} + \frac{3\sqrt{266}}{646}R_{94} - \frac{7\sqrt{646}}{323}R_{98}$
4	3	1	6	6	2	$-\frac{10\sqrt{91}}{429}R_{30} - \frac{10\sqrt{143}}{429}R_{50} + \frac{\sqrt{10010}}{273}R_{54} - \frac{9\sqrt{195}}{2431}R_{70}$ $+ \frac{9\sqrt{10010}}{3094}R_{74} + \frac{105\sqrt{247}}{4199}R_{90} + \frac{\sqrt{14630}}{646}R_{94}$
4	3	1	7	6	1	$\frac{\sqrt{273}}{91}R_{54} + \frac{33\sqrt{273}}{1547}R_{74} - \frac{2\sqrt{399}}{323}R_{94}$
4	3	1	7	6	2	$-\frac{20\sqrt{210}}{429}R_{30} + \frac{\sqrt{330}}{429}R_{50} - \frac{27\sqrt{231}}{1001}R_{54} + \frac{423\sqrt{2}}{2431}R_{70}$ $+ \frac{45\sqrt{231}}{17017}R_{74} + \frac{28\sqrt{570}}{4199}R_{90} + \frac{2\sqrt{57057}}{4199}R_{94}$

Table B127: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	1	3	4	1	$R_{00} - \frac{9}{22}R_{40} - \frac{9\sqrt{70}}{154}R_{44} + \frac{5\sqrt{13}}{286}R_{60}$ $- \frac{5\sqrt{182}}{286}R_{64}$
3	4	1	4	4	1	$-\frac{\sqrt{3}}{7}R_{20} - \frac{9\sqrt{15}}{154}R_{40} + \frac{9\sqrt{42}}{154}R_{44} + \frac{7\sqrt{195}}{286}R_{60}$ $+ \frac{\sqrt{2730}}{286}R_{64}$
3	4	1	5	4	1	$-\frac{\sqrt{7}}{77}R_{20} + \frac{9\sqrt{35}}{1001}R_{40} - \frac{9\sqrt{2}}{143}R_{44} + \frac{2\sqrt{455}}{143}R_{60}$ $+ \frac{2\sqrt{130}}{143}R_{64} - \frac{28\sqrt{595}}{2431}R_{80} + \frac{42\sqrt{1870}}{2431}R_{84}$
3	4	1	4	5	1	$\frac{\sqrt{5}}{3}R_{10} - \frac{\sqrt{105}}{77}R_{30} - \frac{4\sqrt{165}}{143}R_{50} - \frac{2\sqrt{462}}{143}R_{54}$ $+ \frac{28}{429}R_{70} - \frac{4\sqrt{462}}{429}R_{74}$
3	4	1	5	5	1	$-\frac{\sqrt{330}}{66}R_{30} - \frac{\sqrt{210}}{78}R_{50} + \frac{3\sqrt{3}}{13}R_{54} + \frac{4\sqrt{154}}{143}R_{70}$ $+ \frac{2\sqrt{3}}{13}R_{74}$
3	4	1	6	5	1	$-\frac{\sqrt{6}}{13}R_{54} + \frac{25\sqrt{6}}{442}R_{74} - \frac{7\sqrt{1482}}{8398}R_{94} + \frac{7\sqrt{176358}}{4199}R_{98}$
3	4	1	6	5	2	$\frac{10\sqrt{3}}{429}R_{30} - \frac{2\sqrt{231}}{429}R_{50} + \frac{\sqrt{330}}{143}R_{54} - \frac{125\sqrt{35}}{2431}R_{70}$ $- \frac{25\sqrt{330}}{4862}R_{74} + \frac{63\sqrt{399}}{4199}R_{90} - \frac{21\sqrt{81510}}{8398}R_{94}$
3	4	1	5	6	1	$\frac{\sqrt{210}}{22}R_{20} - \frac{25\sqrt{42}}{858}R_{40} + \frac{35\sqrt{15}}{429}R_{44} - \frac{2\sqrt{546}}{143}R_{60}$ $- \frac{4\sqrt{39}}{143}R_{64} + \frac{6\sqrt{714}}{2431}R_{80} - \frac{18\sqrt{561}}{2431}R_{84}$
3	4	1	6	6	1	$\frac{5\sqrt{6006}}{1001}R_{44} - \frac{\sqrt{2310}}{154}R_{64} + \frac{\sqrt{46410}}{3094}R_{84} - \frac{\sqrt{102}}{17}R_{88}$
3	4	1	6	6	2	$-\frac{20\sqrt{39}}{429}R_{40} - \frac{5\sqrt{2730}}{3003}R_{44} - \frac{\sqrt{3}}{11}R_{60} + \frac{9\sqrt{42}}{154}R_{64}$ $+ \frac{3\sqrt{663}}{221}R_{80} + \frac{3\sqrt{102102}}{3094}R_{84}$
3	4	1	7	6	1	$-\frac{2\sqrt{1001}}{1001}R_{44} - \frac{12\sqrt{385}}{1309}R_{64} + \frac{69\sqrt{7735}}{29393}R_{84} + \frac{30\sqrt{17}}{323}R_{88}$ $- \frac{7\sqrt{7}}{323}R_{10,4} + \frac{14\sqrt{357}}{323}R_{10,8}$
3	4	1	7	6	2	$\frac{2\sqrt{10}}{143}R_{40} - \frac{2\sqrt{7}}{1001}R_{44} - \frac{18\sqrt{130}}{2431}R_{60} + \frac{120\sqrt{455}}{17017}R_{64}$ $- \frac{99\sqrt{170}}{4199}R_{80} - \frac{15\sqrt{6545}}{29393}R_{84} + \frac{7\sqrt{210}}{323}R_{10,0} - \frac{7\sqrt{1001}}{323}R_{10,4}$
4	4	1	4	4	1	$R_{00} + \frac{34\sqrt{5}}{385}R_{20} - \frac{27}{182}R_{40} + \frac{81\sqrt{70}}{2002}R_{44}$ $+ \frac{\sqrt{13}}{130}R_{60} - \frac{3\sqrt{182}}{1430}R_{64} - \frac{784\sqrt{17}}{12155}R_{80} - \frac{168\sqrt{2618}}{12155}R_{84}$
4	4	1	5	4	1	$-\frac{\sqrt{105}}{55}R_{20} - \frac{9\sqrt{21}}{143}R_{40} - \frac{9\sqrt{30}}{143}R_{44} - \frac{4\sqrt{273}}{715}R_{60}$ $- \frac{16\sqrt{78}}{715}R_{64} + \frac{252\sqrt{357}}{12155}R_{80} - \frac{42\sqrt{1122}}{12155}R_{84}$

Table B128: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	5	1	$-\frac{\sqrt{3}}{15}R_{10} - \frac{39\sqrt{7}}{385}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{196\sqrt{15}}{2145}R_{70}$
4	4	1	5	5	1	$\frac{2\sqrt{462}}{55}R_{10} + \frac{19\sqrt{22}}{1430}R_{30} - \frac{\sqrt{14}}{26}R_{50} + \frac{\sqrt{5}}{13}R_{54}$ $+ \frac{16\sqrt{2310}}{12155}R_{70} - \frac{6\sqrt{5}}{221}R_{74} - \frac{252\sqrt{2926}}{46189}R_{90} - \frac{84\sqrt{1235}}{4199}R_{94}$
4	4	1	6	5	1	$\frac{9\sqrt{10}}{65}R_{54} - \frac{45\sqrt{10}}{442}R_{74} + \frac{63\sqrt{2470}}{41990}R_{94} + \frac{21\sqrt{293930}}{20995}R_{98}$
4	4	1	6	5	2	$\frac{14\sqrt{5}}{143}R_{30} + \frac{2\sqrt{385}}{143}R_{50} + \frac{\sqrt{22}}{13}R_{54} + \frac{27\sqrt{21}}{2431}R_{70}$ $+ \frac{27\sqrt{22}}{442}R_{74} - \frac{63\sqrt{665}}{4199}R_{90} + \frac{21\sqrt{5434}}{8398}R_{94}$
4	4	1	5	6	1	$-\frac{\sqrt{14}}{22}R_{20} - \frac{9\sqrt{70}}{286}R_{40} - \frac{45}{143}R_{44} - \frac{2\sqrt{910}}{715}R_{60}$ $-\frac{16\sqrt{65}}{715}R_{64} + \frac{126\sqrt{1190}}{12155}R_{80} - \frac{42\sqrt{935}}{12155}R_{84}$
4	4	1	6	6	1	$-\frac{3\sqrt{10010}}{715}R_{44} + \frac{45\sqrt{154}}{2618}R_{64} + \frac{45\sqrt{3094}}{58786}R_{84} + \frac{3\sqrt{170}}{323}R_{88}$ $-\frac{6\sqrt{70}}{1615}R_{10,4} - \frac{12\sqrt{3570}}{1615}R_{10,8}$
4	4	1	6	6	2	$\frac{28\sqrt{13}}{143}R_{20} - \frac{3\sqrt{182}}{143}R_{44} - \frac{\sqrt{5}}{17}R_{60} + \frac{23\sqrt{70}}{2618}R_{64}$ $+ \frac{9\sqrt{1105}}{3553}R_{80} - \frac{111\sqrt{170170}}{646646}R_{84} - \frac{36\sqrt{1365}}{4199}R_{10,0} - \frac{18\sqrt{154}}{323}R_{10,4}$
4	4	1	7	6	1	$\frac{2\sqrt{15015}}{715}R_{44} + \frac{18\sqrt{231}}{1309}R_{64} - \frac{9\sqrt{4641}}{1547}R_{84} + \frac{54\sqrt{255}}{1615}R_{88}$ $+ \frac{\sqrt{105}}{85}R_{10,4} + \frac{6\sqrt{595}}{323}R_{10,8}$
4	4	1	7	6	2	$\frac{14\sqrt{6}}{143}R_{40} - \frac{6\sqrt{105}}{715}R_{44} + \frac{72\sqrt{78}}{2431}R_{60} + \frac{342\sqrt{273}}{17017}R_{64}$ $+ \frac{9\sqrt{102}}{4199}R_{80} + \frac{9\sqrt{3927}}{1729}R_{84} - \frac{33\sqrt{14}}{323}R_{10,0} + \frac{3\sqrt{15015}}{1615}R_{10,4}$
5	4	1	5	4	1	$R_{00} + \frac{8\sqrt{5}}{55}R_{20} - \frac{9}{143}R_{40} - \frac{9\sqrt{70}}{143}R_{44}$ $-\frac{48\sqrt{13}}{715}R_{60} - \frac{16\sqrt{182}}{715}R_{64} - \frac{28\sqrt{17}}{715}R_{80} - \frac{42\sqrt{2618}}{12155}R_{84}$
5	4	1	4	5	1	$-\frac{\sqrt{7}}{165}R_{10} - \frac{4\sqrt{3}}{715}R_{30} + \frac{\sqrt{231}}{143}R_{50} + \frac{\sqrt{330}}{143}R_{54}$ $+ \frac{1792\sqrt{35}}{36465}R_{70} + \frac{112\sqrt{330}}{7293}R_{74} - \frac{756\sqrt{399}}{46189}R_{90} + \frac{126\sqrt{81510}}{46189}R_{94}$
5	4	1	5	5	1	$-\frac{\sqrt{22}}{55}R_{10} - \frac{23\sqrt{462}}{2145}R_{30} - \frac{4\sqrt{6}}{39}R_{50} - \frac{28\sqrt{110}}{12155}R_{70}$ $+ \frac{504\sqrt{1254}}{46189}R_{90}$
5	4	1	6	5	1	$-\frac{2\sqrt{210}}{65}R_{54} + \frac{5\sqrt{210}}{221}R_{74} - \frac{7\sqrt{51870}}{20995}R_{94} + \frac{14\sqrt{125970}}{20995}R_{98}$
5	4	1	6	5	2	$-\frac{4\sqrt{5}}{11}R_{10} - \frac{8\sqrt{105}}{429}R_{30} + \frac{4\sqrt{165}}{429}R_{50} + \frac{2\sqrt{462}}{143}R_{54}$ $+ \frac{574}{2431}R_{70} + \frac{27\sqrt{462}}{2431}R_{74} + \frac{378\sqrt{285}}{46189}R_{90} + \frac{21\sqrt{114114}}{46189}R_{94}$

Table B129: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	1	5	6	1	$-\frac{\sqrt{6}}{143}R_{20} + \frac{\sqrt{30}}{429}R_{40} + \frac{10\sqrt{21}}{429}R_{44} + \frac{84\sqrt{390}}{12155}R_{60}$ $+ \frac{56\sqrt{1365}}{12155}R_{64} + \frac{168\sqrt{510}}{13585}R_{80} + \frac{504\sqrt{19635}}{230945}R_{84} - \frac{180\sqrt{70}}{4199}R_{10,0}$ $+ \frac{60\sqrt{3003}}{4199}R_{10,4}$
5	4	1	6	6	1	$-\frac{2\sqrt{4290}}{715}R_{44} + \frac{10\sqrt{66}}{187}R_{64} - \frac{35\sqrt{1326}}{4199}R_{84} + \frac{2\sqrt{3570}}{323}R_{88}$ $+ \frac{21\sqrt{30}}{1615}R_{10,4} - \frac{54\sqrt{170}}{1615}R_{10,8}$
5	4	1	6	6	2	$-\frac{8\sqrt{273}}{1001}R_{20} - \frac{20\sqrt{1365}}{3003}R_{40} + \frac{14\sqrt{78}}{429}R_{44} - \frac{4\sqrt{105}}{187}R_{60}$ $+ \frac{6\sqrt{30}}{187}R_{64} + \frac{6\sqrt{23205}}{46189}R_{80} + \frac{21\sqrt{72930}}{46189}R_{84} + \frac{198\sqrt{65}}{4199}R_{10,0}$ $+ \frac{3\sqrt{66}}{323}R_{10,4}$
5	4	1	7	6	1	$-\frac{16\sqrt{715}}{715}R_{44} + \frac{3\sqrt{11}}{187}R_{64} + \frac{84\sqrt{221}}{4199}R_{84} + \frac{24\sqrt{595}}{1615}R_{88}$ $- \frac{77\sqrt{5}}{1615}R_{10,4} + \frac{2\sqrt{255}}{323}R_{10,8}$
5	4	1	7	6	2	$-\frac{90\sqrt{70}}{1001}R_{20} - \frac{32\sqrt{14}}{1001}R_{40} - \frac{112\sqrt{5}}{715}R_{44} + \frac{27\sqrt{182}}{2431}R_{60}$ $+ \frac{87\sqrt{13}}{2431}R_{64} + \frac{36\sqrt{238}}{2431}R_{80} + \frac{588\sqrt{187}}{46189}R_{84} + \frac{11\sqrt{6}}{221}R_{10,0}$ $+ \frac{103\sqrt{715}}{20995}R_{10,4}$
4	5	1	4	5	1	$R_{00} + \frac{16\sqrt{5}}{165}R_{20} - \frac{3}{13}R_{40} - \frac{9\sqrt{70}}{143}R_{44}$ $- \frac{16\sqrt{13}}{195}R_{60} - \frac{16\sqrt{182}}{715}R_{64} + \frac{196\sqrt{17}}{12155}R_{80} - \frac{42\sqrt{2618}}{12155}R_{84}$
4	5	1	5	5	1	$-\frac{\sqrt{770}}{165}R_{20} - \frac{3\sqrt{154}}{143}R_{40} + \frac{6\sqrt{55}}{143}R_{44} - \frac{4\sqrt{2002}}{2145}R_{60}$ $+ \frac{32\sqrt{143}}{2145}R_{64} + \frac{84\sqrt{2618}}{12155}R_{80} + \frac{28\sqrt{17}}{1105}R_{84}$
4	5	1	6	5	1	$\frac{6\sqrt{110}}{715}R_{44} - \frac{30\sqrt{286}}{2431}R_{64} + \frac{105\sqrt{34}}{4199}R_{84} - \frac{14\sqrt{15470}}{4199}R_{88}$ $- \frac{63\sqrt{130}}{20995}R_{10,4} + \frac{126\sqrt{6630}}{20995}R_{10,8}$
4	5	1	6	5	2	$\frac{4\sqrt{7}}{429}R_{20} + \frac{6\sqrt{2}}{143}R_{44} - \frac{4\sqrt{455}}{663}R_{60} - \frac{46\sqrt{130}}{7293}R_{64}$ $- \frac{42\sqrt{595}}{3553}R_{80} - \frac{259\sqrt{1870}}{46189}R_{84} + \frac{378\sqrt{15}}{4199}R_{10,0} - \frac{189\sqrt{286}}{4199}R_{10,4}$
4	5	1	5	6	1	$\frac{3\sqrt{210}}{55}R_{10} + \frac{49\sqrt{10}}{2145}R_{30} - \frac{4\sqrt{770}}{429}R_{50} - \frac{40\sqrt{11}}{429}R_{54}$ $- \frac{96\sqrt{42}}{2431}R_{70} - \frac{180\sqrt{11}}{2431}R_{74} + \frac{84\sqrt{1330}}{46189}R_{90} - \frac{140\sqrt{2717}}{46189}R_{94}$
4	5	1	6	6	1	$\frac{6\sqrt{910}}{455}R_{54} - \frac{15\sqrt{910}}{1547}R_{74} + \frac{3\sqrt{1330}}{1615}R_{94} - \frac{14\sqrt{3230}}{1615}R_{98}$
4	5	1	6	6	2	$-\frac{4\sqrt{455}}{429}R_{30} - \frac{4\sqrt{715}}{429}R_{50} + \frac{2\sqrt{2002}}{273}R_{54} - \frac{18\sqrt{39}}{2431}R_{70}$ $+ \frac{9\sqrt{2002}}{1547}R_{74} + \frac{42\sqrt{1235}}{4199}R_{90} + \frac{\sqrt{2926}}{323}R_{94}$

Table B130: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	7	6	1	$-\frac{8\sqrt{1365}}{7735}R_{54} - \frac{165\sqrt{1365}}{29393}R_{74} + \frac{8\sqrt{1995}}{1615}R_{94} - \frac{21\sqrt{483}}{7429}R_{11,4}$ $+ \frac{126\sqrt{37145}}{37145}R_{11,8}$
4	5	1	7	6	2	$\frac{2\sqrt{42}}{429}R_{30} - \frac{8\sqrt{66}}{7293}R_{50} + \frac{216\sqrt{1155}}{85085}R_{54} - \frac{2115\sqrt{10}}{46189}R_{70}$ $- \frac{225\sqrt{1155}}{323323}R_{74} - \frac{112\sqrt{114}}{4199}R_{90} - \frac{8\sqrt{285285}}{20995}R_{94} + \frac{231\sqrt{138}}{7429}R_{11,0}$ $- \frac{21\sqrt{69069}}{7429}R_{11,4}$
5	5	1	5	5	1	$R_{00} + \frac{9\sqrt{5}}{65}R_{20} - \frac{2}{39}R_{40} + \frac{2\sqrt{70}}{39}R_{44}$ $- \frac{36\sqrt{13}}{1105}R_{60} + \frac{12\sqrt{182}}{1105}R_{64} + \frac{28\sqrt{17}}{1235}R_{80} - \frac{42\sqrt{2618}}{20995}R_{84}$ $- \frac{300\sqrt{21}}{4199}R_{10,0} - \frac{30\sqrt{10010}}{4199}R_{10,4}$
5	5	1	6	5	1	$- \frac{2\sqrt{35}}{65}R_{44} + \frac{10\sqrt{91}}{221}R_{64} - \frac{35\sqrt{1309}}{4199}R_{84} - \frac{14\sqrt{12155}}{4199}R_{88}$ $+ \frac{21\sqrt{5005}}{20995}R_{10,4} + \frac{18\sqrt{255255}}{20995}R_{10,8}$
5	5	1	6	5	2	$\frac{4\sqrt{22}}{143}R_{20} + \frac{10\sqrt{110}}{429}R_{40} + \frac{14\sqrt{77}}{429}R_{44} + \frac{14\sqrt{1430}}{2431}R_{60}$ $+ \frac{6\sqrt{5005}}{2431}R_{64} - \frac{21\sqrt{1870}}{46189}R_{80} + \frac{21\sqrt{595}}{4199}R_{84} - \frac{33\sqrt{2310}}{4199}R_{10,0}$ $+ \frac{33\sqrt{91}}{4199}R_{10,4}$
5	5	1	5	6	1	$- \frac{\sqrt{165}}{165}R_{10} - \frac{23\sqrt{385}}{2145}R_{30} - \frac{4\sqrt{5}}{39}R_{50} - \frac{28\sqrt{33}}{7293}R_{70}$ $+ \frac{504\sqrt{1045}}{46189}R_{90}$
5	5	1	6	6	1	$- \frac{14\sqrt{715}}{1105}R_{54} + \frac{20\sqrt{715}}{4199}R_{74} + \frac{3\sqrt{1045}}{1615}R_{94} + \frac{6\sqrt{124355}}{11305}R_{98}$ $- \frac{15\sqrt{253}}{7429}R_{11,4} - \frac{6\sqrt{8580495}}{52003}R_{11,8}$
5	5	1	6	6	2	$\frac{2\sqrt{30030}}{429}R_{10} + \frac{2\sqrt{1430}}{429}R_{30} - \frac{2\sqrt{910}}{663}R_{50} + \frac{14\sqrt{13}}{221}R_{54}$ $- \frac{164\sqrt{6006}}{138567}R_{70} + \frac{108\sqrt{13}}{4199}R_{74} + \frac{81\sqrt{190190}}{323323}R_{90} - \frac{9\sqrt{19}}{323}R_{94}$ $- \frac{495\sqrt{230230}}{676039}R_{11,0} - \frac{495\sqrt{115}}{7429}R_{11,4}$
5	5	1	7	6	1	$\frac{14\sqrt{4290}}{3315}R_{54} + \frac{15\sqrt{4290}}{4199}R_{74} - \frac{23\sqrt{6270}}{4845}R_{94} + \frac{2\sqrt{746130}}{6783}R_{98}$ $+ \frac{22\sqrt{1518}}{7429}R_{11,4} + \frac{48\sqrt{5720330}}{260015}R_{11,8}$
5	5	1	7	6	2	$\frac{4\sqrt{33}}{143}R_{30} + \frac{12\sqrt{21}}{221}R_{50} + \frac{14\sqrt{30}}{255}R_{54} + \frac{450\sqrt{385}}{46189}R_{70}$ $+ \frac{15\sqrt{30}}{323}R_{74} - \frac{22\sqrt{4389}}{29393}R_{90} + \frac{11\sqrt{7410}}{4845}R_{94} - \frac{264\sqrt{5313}}{52003}R_{11,0}$ $+ \frac{22\sqrt{1794}}{7429}R_{11,4}$

Table B131: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	1	6	5	1	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+ \frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
6	5	1	6	5	2	$-\frac{2\sqrt{154}}{143}R_{44} + \frac{10\sqrt{10010}}{2431}R_{64} - \frac{35\sqrt{1190}}{4199}R_{84} + \frac{35\sqrt{442}}{4199}R_{88}$ $+ \frac{21\sqrt{182}}{4199}R_{10,4} - \frac{9\sqrt{9282}}{4199}R_{10,8}$
6	5	1	5	6	1	$\frac{10\sqrt{7}}{221}R_{54} - \frac{350\sqrt{7}}{4199}R_{74} + \frac{15\sqrt{1729}}{4199}R_{94} - \frac{30\sqrt{4199}}{4199}R_{98}$ $- \frac{33\sqrt{10465}}{96577}R_{11,4} + \frac{66\sqrt{289731}}{96577}R_{11,8}$
6	5	1	6	6	1	$-\frac{\sqrt{273}}{91}R_{10} + \frac{\sqrt{13}}{13}R_{30} - \frac{10\sqrt{1001}}{1547}R_{50} + \frac{10\sqrt{1365}}{4199}R_{70}$ $- \frac{15\sqrt{1729}}{29393}R_{90} + \frac{33\sqrt{2093}}{676039}R_{11,0}$
6	5	1	6	6	2	$-\frac{10\sqrt{26}}{221}R_{54} + \frac{350\sqrt{26}}{4199}R_{74} - \frac{15\sqrt{38}}{323}R_{94} - \frac{15\sqrt{4522}}{2261}R_{98}$ $+ \frac{33\sqrt{230}}{7429}R_{11,4} + \frac{33\sqrt{312018}}{52003}R_{11,8}$
6	5	1	7	6	1	$\frac{3\sqrt{182}}{91}R_{10} - \frac{\sqrt{78}}{13}R_{30} + \frac{10\sqrt{6006}}{1547}R_{50} - \frac{30\sqrt{910}}{4199}R_{70}$ $+ \frac{15\sqrt{10374}}{29393}R_{90} - \frac{33\sqrt{12558}}{676039}R_{11,0}$
6	5	1	7	6	2	$-\frac{12\sqrt{15}}{221}R_{54} + \frac{420\sqrt{15}}{4199}R_{74} - \frac{18\sqrt{3705}}{4199}R_{94} + \frac{10\sqrt{440895}}{29393}R_{98}$ $+ \frac{198\sqrt{897}}{96577}R_{11,4} - \frac{66\sqrt{3380195}}{676039}R_{11,8}$
6	5	2	6	5	2	$R_{00} + \frac{25\sqrt{5}}{143}R_{20} + \frac{2}{39}R_{40} - \frac{28\sqrt{70}}{429}R_{44}$ $- \frac{10\sqrt{13}}{221}R_{60} - \frac{60\sqrt{182}}{2431}R_{64} - \frac{2485\sqrt{17}}{46189}R_{80} - \frac{210\sqrt{2618}}{46189}R_{84}$ $- \frac{105\sqrt{21}}{4199}R_{10,0} - \frac{6\sqrt{10010}}{4199}R_{10,4}$
6	5	2	5	6	1	$\frac{2\sqrt{6}}{429}R_{10} + \frac{2\sqrt{14}}{429}R_{30} - \frac{50\sqrt{22}}{7293}R_{50} - \frac{10\sqrt{385}}{2431}R_{54}$ $- \frac{4018\sqrt{30}}{138567}R_{70} - \frac{378\sqrt{385}}{46189}R_{74} - \frac{2025\sqrt{38}}{46189}R_{90} - \frac{45\sqrt{95095}}{46189}R_{94}$ $+ \frac{5445\sqrt{46}}{96577}R_{11,0} - \frac{495\sqrt{23023}}{96577}R_{11,4}$
6	5	2	6	6	1	$\frac{10\sqrt{26}}{221}R_{54} - \frac{350\sqrt{26}}{4199}R_{74} + \frac{15\sqrt{38}}{323}R_{94} - \frac{15\sqrt{4522}}{2261}R_{98}$ $- \frac{33\sqrt{230}}{7429}R_{11,4} + \frac{33\sqrt{312018}}{52003}R_{11,8}$
6	5	2	6	6	2	$\frac{\sqrt{273}}{273}R_{10} + \frac{7\sqrt{13}}{143}R_{30} + \frac{10\sqrt{1001}}{1309}R_{50} + \frac{50\sqrt{1365}}{10659}R_{70}$ $- \frac{45\sqrt{1729}}{29393}R_{90} - \frac{5445\sqrt{2093}}{676039}R_{11,0}$
6	5	2	7	6	1	$\frac{4\sqrt{39}}{51}R_{54} - \frac{2\sqrt{57}}{57}R_{94} - \frac{22\sqrt{6783}}{6783}R_{98} + \frac{2\sqrt{345}}{391}R_{11,4}$ $- \frac{30\sqrt{52003}}{52003}R_{11,8}$

Table B132: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	2	7	6	2	$\frac{9\sqrt{70}}{91}R_{10} + \frac{7\sqrt{30}}{143}R_{30} - \frac{6\sqrt{2310}}{17017}R_{50} - \frac{392\sqrt{33}}{7293}R_{54}$ $- \frac{2250\sqrt{14}}{46189}R_{70} - \frac{2100\sqrt{33}}{46189}R_{74} - \frac{97\sqrt{3990}}{29393}R_{90} - \frac{28\sqrt{8151}}{12597}R_{94}$ $- \frac{957\sqrt{4830}}{676039}R_{11,0} - \frac{56\sqrt{49335}}{96577}R_{11,4}$
5	6	1	5	6	1	$R_{00} + \frac{21\sqrt{5}}{143}R_{20} - \frac{28}{429}R_{40} - \frac{28\sqrt{70}}{429}R_{44}$ $- \frac{180\sqrt{13}}{2431}R_{60} - \frac{60\sqrt{182}}{2431}R_{64} - \frac{140\sqrt{17}}{2717}R_{80} - \frac{210\sqrt{2618}}{46189}R_{84}$ $+ \frac{60\sqrt{21}}{4199}R_{10,0} - \frac{6\sqrt{10010}}{4199}R_{10,4}$
5	6	1	6	6	1	$- \frac{2\sqrt{143}}{143}R_{44} + \frac{10\sqrt{55}}{187}R_{64} - \frac{35\sqrt{1105}}{4199}R_{84} + \frac{10\sqrt{119}}{323}R_{88}$ $+ \frac{21}{323}R_{10,4} - \frac{18\sqrt{51}}{323}R_{10,8}$
5	6	1	6	6	2	$- \frac{4\sqrt{910}}{1001}R_{20} - \frac{50\sqrt{182}}{3003}R_{40} + \frac{14\sqrt{65}}{429}R_{44} - \frac{10\sqrt{14}}{187}R_{60}$ $+ \frac{30}{187}R_{64} + \frac{15\sqrt{3094}}{46189}R_{80} + \frac{105\sqrt{2431}}{46189}R_{84} + \frac{165\sqrt{78}}{4199}R_{10,0}$ $+ \frac{3\sqrt{55}}{323}R_{10,4}$
5	6	1	7	6	1	$\frac{6\sqrt{858}}{2431}R_{44} - \frac{10\sqrt{330}}{10659}R_{64} - \frac{35\sqrt{6630}}{12597}R_{84} - \frac{10\sqrt{714}}{969}R_{88}$ $+ \frac{693\sqrt{6}}{7429}R_{10,4} - \frac{270\sqrt{34}}{7429}R_{10,8} - \frac{616\sqrt{15}}{37145}R_{12,4} + \frac{132\sqrt{22610}}{37145}R_{12,8}$
5	6	1	7	6	2	$\frac{4\sqrt{21}}{1001}R_{20} + \frac{24\sqrt{105}}{17017}R_{40} + \frac{42\sqrt{6}}{2431}R_{44} - \frac{60\sqrt{1365}}{46189}R_{60}$ $- \frac{290\sqrt{390}}{138567}R_{64} - \frac{10\sqrt{1785}}{2431}R_{80} - \frac{245\sqrt{5610}}{138567}R_{84} - \frac{594\sqrt{5}}{5083}R_{10,0}$ $- \frac{927\sqrt{858}}{96577}R_{10,4} + \frac{1452\sqrt{105}}{37145}R_{12,0} - \frac{616\sqrt{2145}}{37145}R_{12,4}$
6	6	1	6	6	1	$R_{00} - \frac{13\sqrt{5}}{35}R_{20} + \frac{48}{119}R_{40} - \frac{10\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{2261}R_{80} + \frac{39\sqrt{21}}{52003}R_{10,0} - \frac{198}{260015}R_{12,0} - \frac{396\sqrt{676039}}{260015}R_{12,12}$
6	6	1	6	6	2	$\frac{16\sqrt{154}}{1309}R_{44} - \frac{10\sqrt{10010}}{3553}R_{64} + \frac{5\sqrt{1190}}{2261}R_{84} + \frac{5\sqrt{442}}{2261}R_{88}$ $+ \frac{39\sqrt{182}}{7429}R_{10,4} + \frac{117\sqrt{9282}}{52003}R_{10,8} - \frac{396\sqrt{455}}{260015}R_{12,4} - \frac{198\sqrt{125970}}{260015}R_{12,8}$
6	6	1	7	6	1	$- \frac{\sqrt{30}}{35}R_{20} + \frac{15\sqrt{6}}{119}R_{40} - \frac{10\sqrt{78}}{323}R_{60} + \frac{30\sqrt{102}}{2261}R_{80}$ $- \frac{495\sqrt{14}}{52003}R_{10,0} + \frac{429\sqrt{6}}{260015}R_{12,0} - \frac{66\sqrt{4056234}}{260015}R_{12,12}$
6	6	1	7	6	2	$- \frac{6\sqrt{15015}}{17017}R_{44} + \frac{60\sqrt{231}}{3553}R_{64} - \frac{180\sqrt{4641}}{29393}R_{84} + \frac{20\sqrt{255}}{2261}R_{88}$ $+ \frac{198\sqrt{105}}{7429}R_{10,4} - \frac{990\sqrt{595}}{52003}R_{10,8} - \frac{2574\sqrt{42}}{260015}R_{12,4} + \frac{858\sqrt{323}}{52003}R_{12,8}$

Table B133: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	2	$R_{00} + \frac{13\sqrt{5}}{77}R_{20} + \frac{16}{357}R_{40} + \frac{32\sqrt{70}}{561}R_{44}$ $- \frac{10\sqrt{13}}{323}R_{60} + \frac{60\sqrt{182}}{3553}R_{64} - \frac{355\sqrt{17}}{24871}R_{80} + \frac{30\sqrt{2618}}{24871}R_{84}$ $+ \frac{195\sqrt{21}}{7429}R_{10,0} - \frac{78\sqrt{10010}}{52003}R_{10,4} - \frac{19602}{52003}R_{12,0} - \frac{1188\sqrt{1001}}{52003}R_{12,4}$
6	6	2	7	6	1	$- \frac{18\sqrt{231}}{1309}R_{44} + \frac{20\sqrt{15015}}{10659}R_{64} + \frac{40\sqrt{1785}}{6783}R_{84} - \frac{100\sqrt{663}}{6783}R_{88}$ $- \frac{162\sqrt{273}}{7429}R_{10,4} + \frac{54\sqrt{1547}}{52003}R_{10,8} + \frac{110\sqrt{2730}}{52003}R_{12,4} + \frac{726\sqrt{20995}}{260015}R_{12,8}$
6	6	2	7	6	2	$\frac{\sqrt{78}}{91}R_{20} + \frac{171\sqrt{390}}{17017}R_{40} + \frac{36\sqrt{273}}{2431}R_{44} + \frac{150\sqrt{30}}{3553}R_{60}$ $+ \frac{160\sqrt{105}}{10659}R_{64} + \frac{50\sqrt{6630}}{29393}R_{80} + \frac{20\sqrt{255255}}{88179}R_{84} - \frac{297\sqrt{910}}{96577}R_{10,0}$ $+ \frac{288\sqrt{231}}{52003}R_{10,4} - \frac{4719\sqrt{390}}{260015}R_{12,0} + \frac{286\sqrt{2310}}{260015}R_{12,4}$
7	6	1	7	6	1	$R_{00} - \frac{8\sqrt{5}}{35}R_{20} - \frac{27}{119}R_{40} + \frac{40\sqrt{13}}{323}R_{60}$ $- \frac{145\sqrt{17}}{2261}R_{80} + \frac{864\sqrt{21}}{52003}R_{10,0} - \frac{2343}{260015}R_{12,0} - \frac{66\sqrt{676039}}{260015}R_{12,12}$
7	6	1	7	6	2	$- \frac{45\sqrt{10010}}{17017}R_{44} + \frac{120\sqrt{154}}{3553}R_{64} + \frac{15\sqrt{3094}}{29393}R_{84} + \frac{45\sqrt{170}}{2261}R_{88}$ $- \frac{216\sqrt{70}}{7429}R_{10,4} - \frac{144\sqrt{3570}}{52003}R_{10,8} + \frac{8514\sqrt{7}}{260015}R_{12,4} - \frac{165\sqrt{1938}}{52003}R_{12,8}$
7	6	2	7	6	2	$R_{00} + \frac{88\sqrt{5}}{455}R_{20} + \frac{2259}{17017}R_{40} - \frac{162\sqrt{70}}{2431}R_{44}$ $- \frac{1000\sqrt{13}}{46189}R_{60} - \frac{1200\sqrt{182}}{46189}R_{64} - \frac{1375\sqrt{17}}{29393}R_{80} - \frac{150\sqrt{2618}}{29393}R_{84}$ $- \frac{4032\sqrt{21}}{96577}R_{10,0} - \frac{1296\sqrt{10010}}{676039}R_{10,4} - \frac{21417}{260015}R_{12,0} - \frac{198\sqrt{1001}}{52003}R_{12,4}$

Table B134: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	2	1	1	$R_{00} - \frac{\sqrt{5}}{5} R_{20}$
2	1	1	2	2	1	$-\frac{\sqrt{5}}{5} R_{10} + \frac{\sqrt{105}}{35} R_{30}$
2	1	1	3	2	1	$\frac{\sqrt{10}}{5} R_{10} - \frac{\sqrt{210}}{35} R_{30}$
2	1	1	2	3	1	$\frac{\sqrt{30}}{35} R_{20} - \frac{\sqrt{6}}{21} R_{40} - \frac{2\sqrt{105}}{21} R_{44}$
2	1	1	3	3	1	$-\frac{\sqrt{42}}{14} R_{20} + \frac{\sqrt{210}}{42} R_{40} - \frac{\sqrt{3}}{3} R_{44}$
2	1	1	4	3	1	$\frac{3\sqrt{6}}{14} R_{20} - \frac{\sqrt{30}}{14} R_{40} - \frac{\sqrt{21}}{21} R_{44}$
2	1	1	3	4	1	$\frac{\sqrt{70}}{42} R_{30} - \frac{\sqrt{110}}{66} R_{50} - \frac{\sqrt{77}}{11} R_{54}$
2	1	1	4	4	1	$-\frac{\sqrt{42}}{14} R_{30} + \frac{\sqrt{66}}{22} R_{50} - \frac{\sqrt{1155}}{55} R_{54}$
2	1	1	5	4	1	$\frac{\sqrt{2}}{3} R_{30} - \frac{\sqrt{154}}{33} R_{50} - \frac{2\sqrt{55}}{55} R_{54}$
2	1	1	4	5	1	$\frac{\sqrt{6}}{11} R_{40} + \frac{2\sqrt{105}}{165} R_{44} - \frac{3\sqrt{78}}{143} R_{60} - \frac{6\sqrt{273}}{143} R_{64}$
2	1	1	5	5	1	$-\frac{\sqrt{231}}{33} R_{40} + \frac{\sqrt{330}}{165} R_{44} + \frac{\sqrt{3003}}{143} R_{60} - \frac{3\sqrt{858}}{143} R_{64}$
2	1	1	6	5	1	$\frac{\sqrt{165}}{11} R_{44} - \frac{\sqrt{429}}{143} R_{64}$
2	1	1	6	5	2	$\frac{\sqrt{210}}{33} R_{40} + \frac{\sqrt{3}}{33} R_{44} - \frac{\sqrt{2730}}{143} R_{60} - \frac{3\sqrt{195}}{143} R_{64}$
2	1	1	5	6	1	$\frac{\sqrt{1155}}{143} R_{50} + \frac{3\sqrt{66}}{143} R_{54} - \frac{\sqrt{7}}{13} R_{70} - \frac{\sqrt{66}}{13} R_{74}$
2	1	1	6	6	1	$-\frac{\sqrt{1365}}{91} R_{54} + \frac{\sqrt{1365}}{455} R_{74}$
2	1	1	6	6	2	$\frac{\sqrt{4290}}{143} R_{50} - \frac{3\sqrt{3003}}{1001} R_{54} - \frac{\sqrt{26}}{13} R_{70} + \frac{\sqrt{3003}}{91} R_{74}$
2	1	1	7	6	1	$\frac{3\sqrt{910}}{91} R_{54} - \frac{3\sqrt{910}}{455} R_{74}$
2	1	1	7	6	2	$\frac{18\sqrt{11}}{143} R_{50} + \frac{3\sqrt{770}}{1001} R_{54} - \frac{6\sqrt{15}}{65} R_{70} - \frac{\sqrt{770}}{91} R_{74}$
2	2	1	2	2	1	$R_{00} - \frac{\sqrt{5}}{7} R_{20} - \frac{2}{21} R_{40} + \frac{2\sqrt{70}}{21} R_{44}$
2	2	1	3	2	1	$-\frac{\sqrt{10}}{7} R_{20} + \frac{5\sqrt{2}}{21} R_{40} + \frac{2\sqrt{35}}{21} R_{44}$
2	2	1	2	3	1	$-\frac{\sqrt{30}}{15} R_{10} + \frac{\sqrt{70}}{35} R_{30}$
2	2	1	3	3	1	$\frac{2\sqrt{42}}{21} R_{10} - \frac{\sqrt{2}}{6} R_{30} - \frac{5\sqrt{154}}{462} R_{50} + \frac{\sqrt{55}}{11} R_{54}$
2	2	1	4	3	1	$-\frac{5\sqrt{14}}{42} R_{30} + \frac{5\sqrt{22}}{66} R_{50} + \frac{\sqrt{385}}{33} R_{54}$
2	2	1	3	4	1	$-\frac{\sqrt{30}}{14} R_{20} + \frac{5\sqrt{6}}{42} R_{40} + \frac{\sqrt{105}}{21} R_{44}$
2	2	1	4	4	1	$\frac{5\sqrt{2}}{14} R_{20} - \frac{9\sqrt{10}}{154} R_{40} + \frac{3\sqrt{7}}{77} R_{44} - \frac{2\sqrt{130}}{143} R_{60}$ $+ \frac{4\sqrt{455}}{143} R_{64}$

Table B135: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	5	4	1	$-\frac{\sqrt{210}}{33}R_{40} - \frac{2\sqrt{3}}{33}R_{44} + \frac{\sqrt{2730}}{143}R_{60} + \frac{6\sqrt{195}}{143}R_{64}$
2	2	1	4	5	1	$-\frac{\sqrt{70}}{21}R_{30} + \frac{\sqrt{110}}{33}R_{50} + \frac{2\sqrt{77}}{33}R_{54}$
2	2	1	5	5	1	$\frac{2\sqrt{55}}{33}R_{30} - \frac{\sqrt{35}}{39}R_{50} + \frac{\sqrt{2}}{13}R_{54} - \frac{5\sqrt{231}}{429}R_{70}$ $+ \frac{5\sqrt{2}}{13}R_{74}$
2	2	1	6	5	1	$-\frac{5}{13}R_{54} + \frac{1}{13}R_{74}$
2	2	1	6	5	2	$-\frac{5\sqrt{154}}{143}R_{50} - \frac{3\sqrt{55}}{143}R_{54} + \frac{\sqrt{210}}{39}R_{70} + \frac{\sqrt{55}}{13}R_{74}$
2	2	1	5	6	1	$-\frac{5\sqrt{7}}{33}R_{40} - \frac{\sqrt{10}}{33}R_{44} + \frac{5\sqrt{91}}{143}R_{60} + \frac{15\sqrt{26}}{143}R_{64}$
2	2	1	6	6	1	$\frac{5\sqrt{1001}}{143}R_{44} - \frac{\sqrt{385}}{385}R_{64} - \frac{2\sqrt{7735}}{7735}R_{84} + \frac{4\sqrt{17}}{17}R_{88}$
2	2	1	6	6	2	$-\frac{35\sqrt{26}}{429}R_{40} + \frac{\sqrt{455}}{429}R_{44} + \frac{\sqrt{2}}{11}R_{60} - \frac{3\sqrt{7}}{77}R_{64}$ $+ \frac{2\sqrt{442}}{221}R_{80} - \frac{6\sqrt{17017}}{1547}R_{84}$
2	2	1	7	6	1	$-\frac{\sqrt{2310}}{105}R_{64} + \frac{\sqrt{46410}}{1785}R_{84} + \frac{2\sqrt{102}}{51}R_{88}$
2	2	1	7	6	2	$-\frac{2\sqrt{195}}{65}R_{60} - \frac{\sqrt{2730}}{273}R_{64} + \frac{2\sqrt{255}}{85}R_{80} + \frac{\sqrt{39270}}{357}R_{84}$
3	2	1	3	2	1	$R_{00} - \frac{1}{3}R_{40} + \frac{\sqrt{70}}{21}R_{44}$
3	2	1	2	3	1	$-\frac{\sqrt{15}}{105}R_{10} + \frac{4\sqrt{35}}{105}R_{30} - \frac{5\sqrt{55}}{231}R_{50} - \frac{5\sqrt{154}}{77}R_{54}$
3	2	1	3	3	1	$-\frac{\sqrt{21}}{21}R_{10} - \frac{1}{3}R_{30} + \frac{10\sqrt{77}}{231}R_{50}$
3	2	1	4	3	1	$\frac{3\sqrt{3}}{7}R_{10} - \frac{\sqrt{7}}{21}R_{30} - \frac{20\sqrt{11}}{231}R_{50} + \frac{2\sqrt{770}}{231}R_{54}$
3	2	1	3	4	1	$\frac{5\sqrt{3}}{33}R_{40} - \frac{5\sqrt{210}}{231}R_{44} - \frac{5\sqrt{39}}{143}R_{60} - \frac{5\sqrt{546}}{143}R_{64}$
3	2	1	4	4	1	$-\frac{2}{7}R_{20} - \frac{9\sqrt{5}}{77}R_{40} - \frac{9\sqrt{14}}{77}R_{44} + \frac{7\sqrt{65}}{143}R_{60}$ $-\frac{\sqrt{910}}{143}R_{64}$
3	2	1	5	4	1	$\frac{\sqrt{21}}{7}R_{20} - \frac{4\sqrt{105}}{231}R_{40} - \frac{4\sqrt{6}}{33}R_{44} - \frac{\sqrt{1365}}{143}R_{60}$ $+ \frac{\sqrt{390}}{143}R_{64}$
3	2	1	4	5	1	$\frac{\sqrt{35}}{231}R_{30} + \frac{16\sqrt{55}}{429}R_{50} - \frac{8\sqrt{154}}{429}R_{54} - \frac{21\sqrt{3}}{143}R_{70}$ $-\frac{9\sqrt{154}}{143}R_{74}$
3	2	1	5	5	1	$-\frac{\sqrt{110}}{33}R_{30} - \frac{\sqrt{70}}{39}R_{50} - \frac{6}{13}R_{54} + \frac{8\sqrt{462}}{429}R_{70}$ $-\frac{4}{13}R_{74}$
3	2	1	6	5	1	$\frac{5\sqrt{2}}{13}R_{54} - \frac{\sqrt{2}}{13}R_{74}$

Table B136: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	1	6	5	2	$\frac{20}{33}R_{30} - \frac{10\sqrt{77}}{429}R_{50} - \frac{5\sqrt{110}}{143}R_{54} - \frac{10\sqrt{105}}{429}R_{70}$ $+ \frac{\sqrt{110}}{143}R_{74}$
3	2	1	5	6	1	$\frac{5\sqrt{14}}{429}R_{40} + \frac{14\sqrt{5}}{429}R_{44} + \frac{3\sqrt{182}}{143}R_{60} - \frac{6\sqrt{13}}{143}R_{64}$ $- \frac{4\sqrt{238}}{221}R_{80} - \frac{12\sqrt{187}}{221}R_{84}$
3	2	1	6	6	1	$\frac{10\sqrt{2002}}{1001}R_{44} - \frac{\sqrt{770}}{77}R_{64} + \frac{\sqrt{15470}}{1547}R_{84} + \frac{2\sqrt{34}}{17}R_{88}$
3	2	1	6	6	2	$\frac{40\sqrt{13}}{429}R_{40} - \frac{10\sqrt{910}}{3003}R_{44} + \frac{2}{11}R_{60} + \frac{9\sqrt{14}}{77}R_{64}$ $- \frac{6\sqrt{221}}{221}R_{80} + \frac{3\sqrt{34034}}{1547}R_{84}$
3	2	1	7	6	1	$\frac{15\sqrt{3003}}{1001}R_{44} + \frac{16\sqrt{1155}}{1155}R_{64} - \frac{23\sqrt{23205}}{23205}R_{84} + \frac{2\sqrt{51}}{51}R_{88}$
3	2	1	7	6	2	$\frac{15\sqrt{30}}{143}R_{40} + \frac{15\sqrt{21}}{1001}R_{44} - \frac{8\sqrt{390}}{715}R_{60} - \frac{32\sqrt{1365}}{3003}R_{64}$ $- \frac{11\sqrt{510}}{1105}R_{80} + \frac{\sqrt{19635}}{4641}R_{84}$
2	3	1	2	3	1	$R_{00} - \frac{8\sqrt{5}}{35}R_{20} + \frac{1}{21}R_{40} + \frac{\sqrt{70}}{21}R_{44}$
2	3	1	3	3	1	$-\frac{\sqrt{7}}{7}R_{20} + \frac{\sqrt{35}}{21}R_{40} - \frac{\sqrt{2}}{3}R_{44}$
2	3	1	4	3	1	$-\frac{1}{21}R_{20} + \frac{9\sqrt{5}}{77}R_{40} + \frac{3\sqrt{14}}{77}R_{44} - \frac{10\sqrt{65}}{429}R_{60}$ $- \frac{10\sqrt{910}}{429}R_{64}$
2	3	1	3	4	1	$\frac{2\sqrt{5}}{7}R_{10} - \frac{\sqrt{105}}{21}R_{30} + \frac{\sqrt{165}}{231}R_{50} + \frac{\sqrt{462}}{77}R_{54}$
2	3	1	4	4	1	$-\frac{\sqrt{7}}{7}R_{30} + \frac{\sqrt{11}}{11}R_{50} - \frac{\sqrt{770}}{55}R_{54}$
2	3	1	5	4	1	$-\frac{\sqrt{3}}{33}R_{30} + \frac{8\sqrt{231}}{429}R_{50} + \frac{8\sqrt{330}}{715}R_{54} - \frac{5\sqrt{35}}{143}R_{70}$ $- \frac{5\sqrt{330}}{143}R_{74}$
2	3	1	4	5	1	$\frac{5\sqrt{5}}{21}R_{20} - \frac{36}{77}R_{40} - \frac{12\sqrt{70}}{385}R_{44} + \frac{7\sqrt{13}}{429}R_{60}$ $+ \frac{7\sqrt{182}}{429}R_{64}$
2	3	1	5	5	1	$-\frac{\sqrt{154}}{33}R_{40} + \frac{2\sqrt{55}}{165}R_{44} + \frac{\sqrt{2002}}{143}R_{60} - \frac{6\sqrt{143}}{143}R_{64}$
2	3	1	6	5	1	$-\frac{2\sqrt{110}}{143}R_{44} + \frac{\sqrt{286}}{143}R_{64} - \frac{\sqrt{34}}{221}R_{84} - \frac{2\sqrt{15470}}{221}R_{88}$
2	3	1	6	5	2	$-\frac{4\sqrt{35}}{429}R_{40} - \frac{2\sqrt{2}}{429}R_{44} + \frac{2\sqrt{455}}{143}R_{60} + \frac{3\sqrt{130}}{143}R_{64}$ $- \frac{2\sqrt{595}}{221}R_{80} - \frac{3\sqrt{1870}}{221}R_{84}$
2	3	1	5	6	1	$\frac{5\sqrt{10}}{33}R_{30} - \frac{7\sqrt{770}}{429}R_{50} - \frac{14\sqrt{11}}{143}R_{54} + \frac{4\sqrt{42}}{429}R_{70}$ $+ \frac{8\sqrt{11}}{143}R_{74}$

Table B137: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	3	1	6	6	1	$-\frac{\sqrt{910}}{91}R_{54} + \frac{\sqrt{910}}{455}R_{74}$
2	3	1	6	6	2	$\frac{2\sqrt{715}}{143}R_{50} - \frac{3\sqrt{2002}}{1001}R_{54} - \frac{2\sqrt{39}}{39}R_{70} + \frac{\sqrt{2002}}{91}R_{74}$
2	3	1	7	6	1	$-\frac{\sqrt{1365}}{273}R_{54} + \frac{36\sqrt{1365}}{7735}R_{74} - \frac{\sqrt{1995}}{969}R_{94} - \frac{14\sqrt{4845}}{969}R_{98}$
2	3	1	7	6	2	$-\frac{\sqrt{66}}{143}R_{50} - \frac{\sqrt{1155}}{3003}R_{54} + \frac{108\sqrt{10}}{1105}R_{70} + \frac{12\sqrt{1155}}{1547}R_{74}$ $-\frac{7\sqrt{114}}{323}R_{90} - \frac{\sqrt{285285}}{969}R_{94}$
3	3	1	3	3	1	$R_{00} - \frac{7}{66}R_{40} - \frac{\sqrt{70}}{66}R_{44} - \frac{15\sqrt{13}}{286}R_{60}$ $+\frac{15\sqrt{182}}{286}R_{64}$
3	3	1	4	3	1	$-\frac{\sqrt{35}}{21}R_{20} - \frac{15\sqrt{7}}{154}R_{40} + \frac{3\sqrt{10}}{22}R_{44} + \frac{35\sqrt{91}}{858}R_{60}$ $+\frac{35\sqrt{26}}{858}R_{64}$
3	3	1	3	4	1	$-\frac{\sqrt{7}}{14}R_{10} - \frac{\sqrt{3}}{6}R_{30} + \frac{5\sqrt{231}}{231}R_{50}$
3	3	1	4	4	1	$\frac{\sqrt{105}}{14}R_{10} - \frac{\sqrt{5}}{22}R_{30} - \frac{2\sqrt{385}}{1001}R_{50} - \frac{\sqrt{22}}{143}R_{54}$ $-\frac{7\sqrt{21}}{143}R_{70} + \frac{21\sqrt{22}}{143}R_{74}$
3	3	1	5	4	1	$-\frac{\sqrt{105}}{33}R_{30} - \frac{7\sqrt{165}}{429}R_{50} + \frac{3\sqrt{462}}{143}R_{54} + \frac{56}{143}R_{70}$ $+\frac{2\sqrt{462}}{143}R_{74}$
3	3	1	4	5	1	$-\frac{2\sqrt{7}}{21}R_{20} - \frac{3\sqrt{35}}{77}R_{40} + \frac{3\sqrt{2}}{11}R_{44} + \frac{7\sqrt{455}}{429}R_{60}$ $+\frac{7\sqrt{130}}{429}R_{64}$
3	3	1	5	5	1	$\frac{3\sqrt{22}}{22}R_{20} - \frac{\sqrt{110}}{78}R_{40} + \frac{\sqrt{77}}{39}R_{44} - \frac{14\sqrt{1870}}{2431}R_{80}$ $+\frac{6\sqrt{595}}{221}R_{84}$
3	3	1	6	5	1	$\frac{5\sqrt{154}}{143}R_{44} - \frac{\sqrt{10010}}{286}R_{64} + \frac{\sqrt{1190}}{442}R_{84} - \frac{7\sqrt{442}}{221}R_{88}$
3	3	1	6	5	2	$-\frac{140}{429}R_{40} - \frac{5\sqrt{70}}{429}R_{44} - \frac{7\sqrt{13}}{143}R_{60} + \frac{9\sqrt{182}}{286}R_{64}$ $+\frac{21\sqrt{17}}{221}R_{80} + \frac{3\sqrt{2618}}{442}R_{84}$
3	3	1	5	6	1	$-\frac{5\sqrt{14}}{66}R_{30} - \frac{35\sqrt{22}}{858}R_{50} + \frac{3\sqrt{385}}{143}R_{54} + \frac{28\sqrt{30}}{429}R_{70}$ $+\frac{2\sqrt{385}}{143}R_{74}$
3	3	1	6	6	1	$\frac{\sqrt{26}}{13}R_{54} + \frac{\sqrt{26}}{442}R_{74} - \frac{3\sqrt{38}}{646}R_{94} + \frac{3\sqrt{4522}}{323}R_{98}$
3	3	1	6	6	2	$-\frac{70\sqrt{13}}{429}R_{30} + \frac{2\sqrt{1001}}{429}R_{50} - \frac{\sqrt{1430}}{143}R_{54} - \frac{5\sqrt{1365}}{7293}R_{70}$ $-\frac{\sqrt{1430}}{4862}R_{74} + \frac{27\sqrt{1729}}{4199}R_{90} - \frac{9\sqrt{2090}}{646}R_{94}$

Table B138: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	7	6	1	$\frac{\sqrt{39}}{39}R_{54} - \frac{15\sqrt{39}}{221}R_{74} + \frac{16\sqrt{57}}{969}R_{94} - \frac{4\sqrt{6783}}{969}R_{98}$
3	3	1	7	6	2	$-\frac{\sqrt{2310}}{143}R_{50} - \frac{\sqrt{33}}{39}R_{54} - \frac{9\sqrt{14}}{221}R_{70} + \frac{15\sqrt{33}}{221}R_{74}$ $+ \frac{2\sqrt{3990}}{323}R_{90} + \frac{4\sqrt{8151}}{969}R_{94}$
4	3	1	4	3	1	$R_{00} + \frac{2\sqrt{5}}{21}R_{20} - \frac{3}{14}R_{40} + \frac{9\sqrt{70}}{154}R_{44}$ $- \frac{5\sqrt{13}}{78}R_{60} + \frac{5\sqrt{182}}{286}R_{64}$
4	3	1	3	4	1	$-\frac{1}{42}R_{10} + \frac{\sqrt{21}}{154}R_{30} + \frac{50\sqrt{33}}{1001}R_{50} - \frac{5\sqrt{2310}}{1001}R_{54}$ $- \frac{49\sqrt{5}}{429}R_{70} - \frac{7\sqrt{2310}}{429}R_{74}$
4	3	1	4	4	1	$-\frac{\sqrt{15}}{30}R_{10} - \frac{39\sqrt{35}}{770}R_{30} - \frac{3\sqrt{55}}{143}R_{50} + \frac{98\sqrt{3}}{429}R_{70}$
4	3	1	5	4	1	$\frac{2\sqrt{35}}{15}R_{10} + \frac{\sqrt{15}}{55}R_{30} - \frac{\sqrt{1155}}{143}R_{50} + \frac{5\sqrt{66}}{143}R_{54}$ $- \frac{32\sqrt{7}}{429}R_{70} + \frac{10\sqrt{66}}{429}R_{74}$
4	3	1	4	5	1	$-\frac{4}{231}R_{20} + \frac{3\sqrt{5}}{91}R_{40} - \frac{45\sqrt{14}}{1001}R_{44} + \frac{7\sqrt{65}}{195}R_{60}$ $- \frac{7\sqrt{910}}{715}R_{64} - \frac{392\sqrt{85}}{12155}R_{80} - \frac{84\sqrt{13090}}{12155}R_{84}$
4	3	1	5	5	1	$-\frac{\sqrt{154}}{66}R_{20} - \frac{3\sqrt{770}}{286}R_{40} - \frac{15\sqrt{11}}{143}R_{44} - \frac{2\sqrt{10010}}{2145}R_{60}$ $- \frac{16\sqrt{715}}{2145}R_{64} + \frac{42\sqrt{13090}}{12155}R_{80} - \frac{14\sqrt{85}}{1105}R_{84}$
4	3	1	6	5	1	$-\frac{15\sqrt{22}}{143}R_{44} + \frac{3\sqrt{1430}}{286}R_{64} - \frac{3\sqrt{170}}{442}R_{84} - \frac{\sqrt{3094}}{221}R_{88}$
4	3	1	6	5	2	$\frac{4\sqrt{35}}{33}R_{20} - \frac{15\sqrt{10}}{143}R_{44} - \frac{\sqrt{91}}{39}R_{60} + \frac{23\sqrt{26}}{858}R_{64}$ $- \frac{3\sqrt{119}}{187}R_{80} + \frac{37\sqrt{374}}{4862}R_{84}$
4	3	1	5	6	1	$-\frac{5\sqrt{2}}{858}R_{30} + \frac{7\sqrt{154}}{858}R_{50} - \frac{7\sqrt{55}}{429}R_{54} + \frac{48\sqrt{210}}{2431}R_{70}$ $- \frac{90\sqrt{55}}{2431}R_{74} - \frac{84\sqrt{266}}{4199}R_{90} - \frac{28\sqrt{13585}}{4199}R_{94}$
4	3	1	6	6	1	$\frac{3\sqrt{182}}{91}R_{54} - \frac{75\sqrt{182}}{3094}R_{74} + \frac{3\sqrt{266}}{646}R_{94} + \frac{7\sqrt{646}}{323}R_{98}$
4	3	1	6	6	2	$\frac{10\sqrt{91}}{429}R_{30} + \frac{10\sqrt{143}}{429}R_{50} + \frac{\sqrt{10010}}{273}R_{54} + \frac{9\sqrt{195}}{2431}R_{70}$ $+ \frac{9\sqrt{10010}}{3094}R_{74} - \frac{105\sqrt{247}}{4199}R_{90} + \frac{\sqrt{14630}}{646}R_{94}$
4	3	1	7	6	1	$\frac{\sqrt{273}}{91}R_{54} + \frac{33\sqrt{273}}{1547}R_{74} - \frac{2\sqrt{399}}{323}R_{94}$
4	3	1	7	6	2	$\frac{20\sqrt{210}}{429}R_{30} - \frac{\sqrt{330}}{429}R_{50} - \frac{27\sqrt{231}}{1001}R_{54} - \frac{423\sqrt{2}}{2431}R_{70}$ $+ \frac{45\sqrt{231}}{17017}R_{74} - \frac{28\sqrt{570}}{4199}R_{90} + \frac{2\sqrt{57057}}{4199}R_{94}$

Table B139: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	1	3	4	1	$R_{00} - \frac{9}{22}R_{40} + \frac{9\sqrt{70}}{154}R_{44} + \frac{5\sqrt{13}}{286}R_{60}$ $+ \frac{5\sqrt{182}}{286}R_{64}$
3	4	1	4	4	1	$-\frac{\sqrt{3}}{7}R_{20} - \frac{9\sqrt{15}}{154}R_{40} - \frac{9\sqrt{42}}{154}R_{44} + \frac{7\sqrt{195}}{286}R_{60}$ $-\frac{\sqrt{2730}}{286}R_{64}$
3	4	1	5	4	1	$-\frac{\sqrt{7}}{77}R_{20} + \frac{9\sqrt{35}}{1001}R_{40} + \frac{9\sqrt{2}}{143}R_{44} + \frac{2\sqrt{455}}{143}R_{60}$ $-\frac{2\sqrt{130}}{143}R_{64} - \frac{28\sqrt{595}}{2431}R_{80} - \frac{42\sqrt{1870}}{2431}R_{84}$
3	4	1	4	5	1	$\frac{\sqrt{5}}{3}R_{10} - \frac{\sqrt{105}}{77}R_{30} - \frac{4\sqrt{165}}{143}R_{50} + \frac{2\sqrt{462}}{143}R_{54}$ $+ \frac{28}{429}R_{70} + \frac{4\sqrt{462}}{429}R_{74}$
3	4	1	5	5	1	$-\frac{\sqrt{330}}{66}R_{30} - \frac{\sqrt{210}}{78}R_{50} - \frac{3\sqrt{3}}{13}R_{54} + \frac{4\sqrt{154}}{143}R_{70}$ $-\frac{2\sqrt{3}}{13}R_{74}$
3	4	1	6	5	1	$-\frac{\sqrt{6}}{13}R_{54} + \frac{25\sqrt{6}}{442}R_{74} - \frac{7\sqrt{1482}}{8398}R_{94} - \frac{7\sqrt{176358}}{4199}R_{98}$
3	4	1	6	5	2	$-\frac{10\sqrt{3}}{429}R_{30} + \frac{2\sqrt{231}}{429}R_{50} + \frac{\sqrt{330}}{143}R_{54} + \frac{125\sqrt{35}}{2431}R_{70}$ $-\frac{25\sqrt{330}}{4862}R_{74} - \frac{63\sqrt{399}}{4199}R_{90} - \frac{21\sqrt{81510}}{8398}R_{94}$
3	4	1	5	6	1	$\frac{\sqrt{210}}{22}R_{20} - \frac{25\sqrt{42}}{858}R_{40} - \frac{35\sqrt{15}}{429}R_{44} - \frac{2\sqrt{546}}{143}R_{60}$ $+ \frac{4\sqrt{39}}{143}R_{64} + \frac{6\sqrt{714}}{2431}R_{80} + \frac{18\sqrt{561}}{2431}R_{84}$
3	4	1	6	6	1	$\frac{5\sqrt{6006}}{1001}R_{44} - \frac{\sqrt{2310}}{154}R_{64} + \frac{\sqrt{46410}}{3094}R_{84} + \frac{\sqrt{102}}{17}R_{88}$
3	4	1	6	6	2	$\frac{20\sqrt{39}}{429}R_{40} - \frac{5\sqrt{2730}}{3003}R_{44} + \frac{\sqrt{3}}{11}R_{60} + \frac{9\sqrt{42}}{154}R_{64}$ $-\frac{3\sqrt{663}}{221}R_{80} + \frac{3\sqrt{102102}}{3094}R_{84}$
3	4	1	7	6	1	$-\frac{2\sqrt{1001}}{1001}R_{44} - \frac{12\sqrt{385}}{1309}R_{64} + \frac{69\sqrt{7735}}{29393}R_{84} - \frac{30\sqrt{17}}{323}R_{88}$ $-\frac{7\sqrt{7}}{323}R_{10,4} - \frac{14\sqrt{357}}{323}R_{10,8}$
3	4	1	7	6	2	$-\frac{2\sqrt{10}}{143}R_{40} - \frac{2\sqrt{7}}{1001}R_{44} + \frac{18\sqrt{130}}{2431}R_{60} + \frac{120\sqrt{455}}{17017}R_{64}$ $+ \frac{99\sqrt{170}}{4199}R_{80} - \frac{15\sqrt{6545}}{29393}R_{84} - \frac{7\sqrt{210}}{323}R_{10,0} - \frac{7\sqrt{1001}}{323}R_{10,4}$
4	4	1	4	4	1	$R_{00} + \frac{34\sqrt{5}}{385}R_{20} - \frac{27}{182}R_{40} - \frac{81\sqrt{70}}{2002}R_{44}$ $+ \frac{\sqrt{13}}{130}R_{60} + \frac{3\sqrt{182}}{1430}R_{64} - \frac{784\sqrt{17}}{12155}R_{80} + \frac{168\sqrt{2618}}{12155}R_{84}$
4	4	1	5	4	1	$-\frac{\sqrt{105}}{55}R_{20} - \frac{9\sqrt{21}}{143}R_{40} + \frac{9\sqrt{30}}{143}R_{44} - \frac{4\sqrt{273}}{715}R_{60}$ $+ \frac{16\sqrt{78}}{715}R_{64} + \frac{252\sqrt{357}}{12155}R_{80} + \frac{42\sqrt{1122}}{12155}R_{84}$

Table B140: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	5	1	$-\frac{\sqrt{3}}{15}R_{10} - \frac{39\sqrt{7}}{385}R_{30} - \frac{6\sqrt{11}}{143}R_{50} + \frac{196\sqrt{15}}{2145}R_{70}$
4	4	1	5	5	1	$\frac{2\sqrt{462}}{55}R_{10} + \frac{19\sqrt{22}}{1430}R_{30} - \frac{\sqrt{14}}{26}R_{50} - \frac{\sqrt{5}}{13}R_{54}$ $+ \frac{16\sqrt{2310}}{12155}R_{70} + \frac{6\sqrt{5}}{221}R_{74} - \frac{252\sqrt{2926}}{46189}R_{90} + \frac{84\sqrt{1235}}{4199}R_{94}$
4	4	1	6	5	1	$\frac{9\sqrt{10}}{65}R_{54} - \frac{45\sqrt{10}}{442}R_{74} + \frac{63\sqrt{2470}}{41990}R_{94} - \frac{21\sqrt{293930}}{20995}R_{98}$
4	4	1	6	5	2	$-\frac{14\sqrt{5}}{143}R_{30} - \frac{2\sqrt{385}}{143}R_{50} + \frac{\sqrt{22}}{13}R_{54} - \frac{27\sqrt{21}}{2431}R_{70}$ $+ \frac{27\sqrt{22}}{442}R_{74} + \frac{63\sqrt{665}}{4199}R_{90} + \frac{21\sqrt{5434}}{8398}R_{94}$
4	4	1	5	6	1	$-\frac{\sqrt{14}}{22}R_{20} - \frac{9\sqrt{70}}{286}R_{40} + \frac{45}{143}R_{44} - \frac{2\sqrt{910}}{715}R_{60}$ $+ \frac{16\sqrt{65}}{715}R_{64} + \frac{126\sqrt{1190}}{12155}R_{80} + \frac{42\sqrt{935}}{12155}R_{84}$
4	4	1	6	6	1	$-\frac{3\sqrt{10010}}{715}R_{44} + \frac{45\sqrt{154}}{2618}R_{64} + \frac{45\sqrt{3094}}{58786}R_{84} - \frac{3\sqrt{170}}{323}R_{88}$ $-\frac{6\sqrt{70}}{1615}R_{10,4} + \frac{12\sqrt{3570}}{1615}R_{10,8}$
4	4	1	6	6	2	$-\frac{28\sqrt{13}}{143}R_{20} - \frac{3\sqrt{182}}{143}R_{44} + \frac{\sqrt{5}}{17}R_{60} + \frac{23\sqrt{70}}{2618}R_{64}$ $-\frac{9\sqrt{1105}}{3553}R_{80} - \frac{111\sqrt{170170}}{646646}R_{84} + \frac{36\sqrt{1365}}{4199}R_{10,0} - \frac{18\sqrt{154}}{323}R_{10,4}$
4	4	1	7	6	1	$\frac{2\sqrt{15015}}{715}R_{44} + \frac{18\sqrt{231}}{1309}R_{64} - \frac{9\sqrt{4641}}{1547}R_{84} - \frac{54\sqrt{255}}{1615}R_{88}$ $+ \frac{\sqrt{105}}{85}R_{10,4} - \frac{6\sqrt{595}}{323}R_{10,8}$
4	4	1	7	6	2	$-\frac{14\sqrt{6}}{143}R_{40} - \frac{6\sqrt{105}}{715}R_{44} - \frac{72\sqrt{78}}{2431}R_{60} + \frac{342\sqrt{273}}{17017}R_{64}$ $-\frac{9\sqrt{102}}{4199}R_{80} + \frac{9\sqrt{3927}}{1729}R_{84} + \frac{33\sqrt{14}}{323}R_{10,0} + \frac{3\sqrt{15015}}{1615}R_{10,4}$
5	4	1	5	4	1	$R_{00} + \frac{8\sqrt{5}}{55}R_{20} - \frac{9}{143}R_{40} + \frac{9\sqrt{70}}{143}R_{44}$ $-\frac{48\sqrt{13}}{715}R_{60} + \frac{16\sqrt{182}}{715}R_{64} - \frac{28\sqrt{17}}{715}R_{80} + \frac{42\sqrt{2618}}{12155}R_{84}$
5	4	1	4	5	1	$-\frac{\sqrt{7}}{165}R_{10} - \frac{4\sqrt{3}}{715}R_{30} + \frac{\sqrt{231}}{143}R_{50} - \frac{\sqrt{330}}{143}R_{54}$ $+ \frac{1792\sqrt{35}}{36465}R_{70} - \frac{112\sqrt{330}}{7293}R_{74} - \frac{756\sqrt{399}}{46189}R_{90} - \frac{126\sqrt{81510}}{46189}R_{94}$
5	4	1	5	5	1	$-\frac{\sqrt{22}}{55}R_{10} - \frac{23\sqrt{462}}{2145}R_{30} - \frac{4\sqrt{6}}{39}R_{50} - \frac{28\sqrt{110}}{12155}R_{70}$ $+ \frac{504\sqrt{1254}}{46189}R_{90}$
5	4	1	6	5	1	$-\frac{2\sqrt{210}}{65}R_{54} + \frac{5\sqrt{210}}{221}R_{74} - \frac{7\sqrt{51870}}{20995}R_{94} - \frac{14\sqrt{125970}}{20995}R_{98}$
5	4	1	6	5	2	$\frac{4\sqrt{5}}{11}R_{10} + \frac{8\sqrt{105}}{429}R_{30} - \frac{4\sqrt{165}}{429}R_{50} + \frac{2\sqrt{462}}{143}R_{54}$ $-\frac{574}{2431}R_{70} + \frac{27\sqrt{462}}{2431}R_{74} - \frac{378\sqrt{285}}{46189}R_{90} + \frac{21\sqrt{114114}}{46189}R_{94}$

Table B141: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	1	5	6	1	$-\frac{\sqrt{6}}{143}R_{20} + \frac{\sqrt{30}}{429}R_{40} - \frac{10\sqrt{21}}{429}R_{44} + \frac{84\sqrt{390}}{12155}R_{60}$ $-\frac{56\sqrt{1365}}{12155}R_{64} + \frac{168\sqrt{510}}{13585}R_{80} - \frac{504\sqrt{19635}}{230945}R_{84} - \frac{180\sqrt{70}}{4199}R_{10,0}$ $-\frac{60\sqrt{3003}}{4199}R_{10,4}$
5	4	1	6	6	1	$-\frac{2\sqrt{4290}}{715}R_{44} + \frac{10\sqrt{66}}{187}R_{64} - \frac{35\sqrt{1326}}{4199}R_{84} - \frac{2\sqrt{3570}}{323}R_{88}$ $+\frac{21\sqrt{30}}{1615}R_{10,4} + \frac{54\sqrt{170}}{1615}R_{10,8}$
5	4	1	6	6	2	$\frac{8\sqrt{273}}{1001}R_{20} + \frac{20\sqrt{1365}}{3003}R_{40} + \frac{14\sqrt{78}}{429}R_{44} + \frac{4\sqrt{105}}{187}R_{60}$ $+\frac{6\sqrt{30}}{187}R_{64} - \frac{6\sqrt{23205}}{46189}R_{80} + \frac{21\sqrt{72930}}{46189}R_{84} - \frac{198\sqrt{65}}{4199}R_{10,0}$ $+\frac{3\sqrt{66}}{323}R_{10,4}$
5	4	1	7	6	1	$-\frac{16\sqrt{715}}{715}R_{44} + \frac{3\sqrt{11}}{187}R_{64} + \frac{84\sqrt{221}}{4199}R_{84} - \frac{24\sqrt{595}}{1615}R_{88}$ $-\frac{77\sqrt{5}}{1615}R_{10,4} - \frac{2\sqrt{255}}{323}R_{10,8}$
5	4	1	7	6	2	$\frac{90\sqrt{70}}{1001}R_{20} + \frac{32\sqrt{14}}{1001}R_{40} - \frac{112\sqrt{5}}{715}R_{44} - \frac{27\sqrt{182}}{2431}R_{60}$ $+\frac{87\sqrt{13}}{2431}R_{64} - \frac{36\sqrt{238}}{2431}R_{80} + \frac{588\sqrt{187}}{46189}R_{84} - \frac{11\sqrt{6}}{221}R_{10,0}$ $+\frac{103\sqrt{715}}{20995}R_{10,4}$
4	5	1	4	5	1	$R_{00} + \frac{16\sqrt{5}}{165}R_{20} - \frac{3}{13}R_{40} + \frac{9\sqrt{70}}{143}R_{44}$ $-\frac{16\sqrt{13}}{195}R_{60} + \frac{16\sqrt{182}}{715}R_{64} + \frac{196\sqrt{17}}{12155}R_{80} + \frac{42\sqrt{2618}}{12155}R_{84}$
4	5	1	5	5	1	$-\frac{\sqrt{770}}{165}R_{20} - \frac{3\sqrt{154}}{143}R_{40} - \frac{6\sqrt{55}}{143}R_{44} - \frac{4\sqrt{2002}}{2145}R_{60}$ $-\frac{32\sqrt{143}}{2145}R_{64} + \frac{84\sqrt{2618}}{12155}R_{80} - \frac{28\sqrt{17}}{1105}R_{84}$
4	5	1	6	5	1	$\frac{6\sqrt{110}}{715}R_{44} - \frac{30\sqrt{286}}{2431}R_{64} + \frac{105\sqrt{34}}{4199}R_{84} + \frac{14\sqrt{15470}}{4199}R_{88}$ $-\frac{63\sqrt{130}}{20995}R_{10,4} - \frac{126\sqrt{6630}}{20995}R_{10,8}$
4	5	1	6	5	2	$-\frac{4\sqrt{7}}{429}R_{20} + \frac{6\sqrt{2}}{143}R_{44} + \frac{4\sqrt{455}}{663}R_{60} - \frac{46\sqrt{130}}{7293}R_{64}$ $+\frac{42\sqrt{595}}{3553}R_{80} - \frac{259\sqrt{1870}}{46189}R_{84} - \frac{378\sqrt{15}}{4199}R_{10,0} - \frac{189\sqrt{286}}{4199}R_{10,4}$
4	5	1	5	6	1	$\frac{3\sqrt{210}}{55}R_{10} + \frac{49\sqrt{10}}{2145}R_{30} - \frac{4\sqrt{770}}{429}R_{50} + \frac{40\sqrt{11}}{429}R_{54}$ $-\frac{96\sqrt{42}}{2431}R_{70} + \frac{180\sqrt{11}}{2431}R_{74} + \frac{84\sqrt{1330}}{46189}R_{90} + \frac{140\sqrt{2717}}{46189}R_{94}$
4	5	1	6	6	1	$\frac{6\sqrt{910}}{455}R_{54} - \frac{15\sqrt{910}}{1547}R_{74} + \frac{3\sqrt{1330}}{1615}R_{94} + \frac{14\sqrt{3230}}{1615}R_{98}$
4	5	1	6	6	2	$\frac{4\sqrt{455}}{429}R_{30} + \frac{4\sqrt{715}}{429}R_{50} + \frac{2\sqrt{2002}}{273}R_{54} + \frac{18\sqrt{39}}{2431}R_{70}$ $+\frac{9\sqrt{2002}}{1547}R_{74} - \frac{42\sqrt{1235}}{4199}R_{90} + \frac{\sqrt{2926}}{323}R_{94}$

Table B142: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	7	6	1	$-\frac{8\sqrt{1365}}{7735}R_{54} - \frac{165\sqrt{1365}}{29393}R_{74} + \frac{8\sqrt{1995}}{1615}R_{94} - \frac{21\sqrt{483}}{7429}R_{11,4}$ $-\frac{126\sqrt{37145}}{37145}R_{11,8}$
4	5	1	7	6	2	$-\frac{2\sqrt{42}}{429}R_{30} + \frac{8\sqrt{66}}{7293}R_{50} + \frac{216\sqrt{1155}}{85085}R_{54} + \frac{2115\sqrt{10}}{46189}R_{70}$ $-\frac{225\sqrt{1155}}{323323}R_{74} + \frac{112\sqrt{114}}{4199}R_{90} - \frac{8\sqrt{285285}}{20995}R_{94} - \frac{231\sqrt{138}}{7429}R_{11,0}$ $-\frac{21\sqrt{69069}}{7429}R_{11,4}$
5	5	1	5	5	1	$R_{00} + \frac{9\sqrt{5}}{65}R_{20} - \frac{2}{39}R_{40} - \frac{2\sqrt{70}}{39}R_{44}$ $-\frac{36\sqrt{13}}{1105}R_{60} - \frac{12\sqrt{182}}{1105}R_{64} + \frac{28\sqrt{17}}{1235}R_{80} + \frac{42\sqrt{2618}}{20995}R_{84}$ $-\frac{300\sqrt{21}}{4199}R_{10,0} + \frac{30\sqrt{10010}}{4199}R_{10,4}$
5	5	1	6	5	1	$-\frac{2\sqrt{35}}{65}R_{44} + \frac{10\sqrt{91}}{221}R_{64} - \frac{35\sqrt{1309}}{4199}R_{84} + \frac{14\sqrt{12155}}{4199}R_{88}$ $+\frac{21\sqrt{5005}}{20995}R_{10,4} - \frac{18\sqrt{255255}}{20995}R_{10,8}$
5	5	1	6	5	2	$-\frac{4\sqrt{22}}{143}R_{20} - \frac{10\sqrt{110}}{429}R_{40} + \frac{14\sqrt{77}}{429}R_{44} - \frac{14\sqrt{1430}}{2431}R_{60}$ $+\frac{6\sqrt{5005}}{2431}R_{64} + \frac{21\sqrt{1870}}{46189}R_{80} + \frac{21\sqrt{595}}{4199}R_{84} + \frac{33\sqrt{2310}}{4199}R_{10,0}$ $+\frac{33\sqrt{91}}{4199}R_{10,4}$
5	5	1	5	6	1	$-\frac{\sqrt{165}}{165}R_{10} - \frac{23\sqrt{385}}{2145}R_{30} - \frac{4\sqrt{5}}{39}R_{50} - \frac{28\sqrt{33}}{7293}R_{70}$ $+\frac{504\sqrt{1045}}{46189}R_{90}$
5	5	1	6	6	1	$-\frac{14\sqrt{715}}{1105}R_{54} + \frac{20\sqrt{715}}{4199}R_{74} + \frac{3\sqrt{1045}}{1615}R_{94} - \frac{6\sqrt{124355}}{11305}R_{98}$ $-\frac{15\sqrt{253}}{7429}R_{11,4} + \frac{6\sqrt{8580495}}{52003}R_{11,8}$
5	5	1	6	6	2	$-\frac{2\sqrt{30030}}{429}R_{10} - \frac{2\sqrt{1430}}{429}R_{30} + \frac{2\sqrt{910}}{663}R_{50} + \frac{14\sqrt{13}}{221}R_{54}$ $+\frac{164\sqrt{6006}}{138567}R_{70} + \frac{108\sqrt{13}}{4199}R_{74} - \frac{81\sqrt{190190}}{323323}R_{90} - \frac{9\sqrt{19}}{323}R_{94}$ $+\frac{495\sqrt{230230}}{676039}R_{11,0} - \frac{495\sqrt{115}}{7429}R_{11,4}$
5	5	1	7	6	1	$\frac{14\sqrt{4290}}{3315}R_{54} + \frac{15\sqrt{4290}}{4199}R_{74} - \frac{23\sqrt{6270}}{4845}R_{94} - \frac{2\sqrt{746130}}{6783}R_{98}$ $+\frac{22\sqrt{1518}}{7429}R_{11,4} - \frac{48\sqrt{5720330}}{260015}R_{11,8}$
5	5	1	7	6	2	$-\frac{4\sqrt{33}}{143}R_{30} - \frac{12\sqrt{21}}{221}R_{50} + \frac{14\sqrt{30}}{255}R_{54} - \frac{450\sqrt{385}}{46189}R_{70}$ $+\frac{15\sqrt{30}}{323}R_{74} + \frac{22\sqrt{4389}}{29393}R_{90} + \frac{11\sqrt{7410}}{4845}R_{94} + \frac{264\sqrt{5313}}{52003}R_{11,0}$ $+\frac{22\sqrt{1794}}{7429}R_{11,4}$

Table B143: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	1	6	5	1	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+ \frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
6	5	1	6	5	2	$\frac{2\sqrt{154}}{143}R_{44} - \frac{10\sqrt{10010}}{2431}R_{64} + \frac{35\sqrt{1190}}{4199}R_{84} + \frac{35\sqrt{442}}{4199}R_{88}$ $- \frac{21\sqrt{182}}{4199}R_{10,4} - \frac{9\sqrt{9282}}{4199}R_{10,8}$
6	5	1	5	6	1	$\frac{10\sqrt{7}}{221}R_{54} - \frac{350\sqrt{7}}{4199}R_{74} + \frac{15\sqrt{1729}}{4199}R_{94} + \frac{30\sqrt{4199}}{4199}R_{98}$ $- \frac{33\sqrt{10465}}{96577}R_{11,4} - \frac{66\sqrt{289731}}{96577}R_{11,8}$
6	5	1	6	6	1	$-\frac{\sqrt{273}}{91}R_{10} + \frac{\sqrt{13}}{13}R_{30} - \frac{10\sqrt{1001}}{1547}R_{50} + \frac{10\sqrt{1365}}{4199}R_{70}$ $- \frac{15\sqrt{1729}}{29393}R_{90} + \frac{33\sqrt{2093}}{676039}R_{11,0}$
6	5	1	6	6	2	$\frac{10\sqrt{26}}{221}R_{54} - \frac{350\sqrt{26}}{4199}R_{74} + \frac{15\sqrt{38}}{323}R_{94} - \frac{15\sqrt{4522}}{2261}R_{98}$ $- \frac{33\sqrt{230}}{7429}R_{11,4} + \frac{33\sqrt{312018}}{52003}R_{11,8}$
6	5	1	7	6	1	$\frac{3\sqrt{182}}{91}R_{10} - \frac{\sqrt{78}}{13}R_{30} + \frac{10\sqrt{6006}}{1547}R_{50} - \frac{30\sqrt{910}}{4199}R_{70}$ $+ \frac{15\sqrt{10374}}{29393}R_{90} - \frac{33\sqrt{12558}}{676039}R_{11,0}$
6	5	1	7	6	2	$\frac{12\sqrt{15}}{221}R_{54} - \frac{420\sqrt{15}}{4199}R_{74} + \frac{18\sqrt{3705}}{4199}R_{94} + \frac{10\sqrt{440895}}{29393}R_{98}$ $- \frac{198\sqrt{897}}{96577}R_{11,4} - \frac{66\sqrt{3380195}}{676039}R_{11,8}$
6	5	2	6	5	2	$R_{00} + \frac{25\sqrt{5}}{143}R_{20} + \frac{2}{39}R_{40} + \frac{28\sqrt{70}}{429}R_{44}$ $- \frac{10\sqrt{13}}{221}R_{60} + \frac{60\sqrt{182}}{2431}R_{64} - \frac{2485\sqrt{17}}{46189}R_{80} + \frac{210\sqrt{2618}}{46189}R_{84}$ $- \frac{105\sqrt{21}}{4199}R_{10,0} + \frac{6\sqrt{10010}}{4199}R_{10,4}$
6	5	2	5	6	1	$-\frac{2\sqrt{6}}{429}R_{10} - \frac{2\sqrt{14}}{429}R_{30} + \frac{50\sqrt{22}}{7293}R_{50} - \frac{10\sqrt{385}}{2431}R_{54}$ $+ \frac{4018\sqrt{30}}{138567}R_{70} - \frac{378\sqrt{385}}{46189}R_{74} + \frac{2025\sqrt{38}}{46189}R_{90} - \frac{45\sqrt{95095}}{46189}R_{94}$ $- \frac{5445\sqrt{46}}{96577}R_{11,0} - \frac{495\sqrt{23023}}{96577}R_{11,4}$
6	5	2	6	6	1	$-\frac{10\sqrt{26}}{221}R_{54} + \frac{350\sqrt{26}}{4199}R_{74} - \frac{15\sqrt{38}}{323}R_{94} - \frac{15\sqrt{4522}}{2261}R_{98}$ $+ \frac{33\sqrt{230}}{7429}R_{11,4} + \frac{33\sqrt{312018}}{52003}R_{11,8}$
6	5	2	6	6	2	$\frac{\sqrt{273}}{273}R_{10} + \frac{7\sqrt{13}}{143}R_{30} + \frac{10\sqrt{1001}}{1309}R_{50} + \frac{50\sqrt{1365}}{10659}R_{70}$ $- \frac{45\sqrt{1729}}{29393}R_{90} - \frac{5445\sqrt{2093}}{676039}R_{11,0}$
6	5	2	7	6	1	$-\frac{4\sqrt{39}}{51}R_{54} + \frac{2\sqrt{57}}{57}R_{94} - \frac{22\sqrt{6783}}{6783}R_{98} - \frac{2\sqrt{345}}{391}R_{11,4}$ $- \frac{30\sqrt{52003}}{52003}R_{11,8}$

Table B144: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	2	7	6	2	$\frac{9\sqrt{70}}{91}R_{10} + \frac{7\sqrt{30}}{143}R_{30} - \frac{6\sqrt{2310}}{17017}R_{50} + \frac{392\sqrt{33}}{7293}R_{54}$ $- \frac{2250\sqrt{14}}{46189}R_{70} + \frac{2100\sqrt{33}}{46189}R_{74} - \frac{97\sqrt{3990}}{29393}R_{90} + \frac{28\sqrt{8151}}{12597}R_{94}$ $- \frac{957\sqrt{4830}}{676039}R_{11,0} + \frac{56\sqrt{49335}}{96577}R_{11,4}$
5	6	1	5	6	1	$R_{00} + \frac{21\sqrt{5}}{143}R_{20} - \frac{28}{429}R_{40} + \frac{28\sqrt{70}}{429}R_{44}$ $- \frac{180\sqrt{13}}{2431}R_{60} + \frac{60\sqrt{182}}{2431}R_{64} - \frac{140\sqrt{17}}{2717}R_{80} + \frac{210\sqrt{2618}}{46189}R_{84}$ $+ \frac{60\sqrt{21}}{4199}R_{10,0} + \frac{6\sqrt{10010}}{4199}R_{10,4}$
5	6	1	6	6	1	$- \frac{2\sqrt{143}}{143}R_{44} + \frac{10\sqrt{55}}{187}R_{64} - \frac{35\sqrt{1105}}{4199}R_{84} - \frac{10\sqrt{119}}{323}R_{88}$ $+ \frac{21}{323}R_{10,4} + \frac{18\sqrt{51}}{323}R_{10,8}$
5	6	1	6	6	2	$\frac{4\sqrt{910}}{1001}R_{20} + \frac{50\sqrt{182}}{3003}R_{40} + \frac{14\sqrt{65}}{429}R_{44} + \frac{10\sqrt{14}}{187}R_{60}$ $+ \frac{30}{187}R_{64} - \frac{15\sqrt{3094}}{46189}R_{80} + \frac{105\sqrt{2431}}{46189}R_{84} - \frac{165\sqrt{78}}{4199}R_{10,0}$ $+ \frac{3\sqrt{55}}{323}R_{10,4}$
5	6	1	7	6	1	$\frac{6\sqrt{858}}{2431}R_{44} - \frac{10\sqrt{330}}{10659}R_{64} - \frac{35\sqrt{6630}}{12597}R_{84} + \frac{10\sqrt{714}}{969}R_{88}$ $+ \frac{693\sqrt{6}}{7429}R_{10,4} + \frac{270\sqrt{34}}{7429}R_{10,8} - \frac{616\sqrt{15}}{37145}R_{12,4} - \frac{132\sqrt{22610}}{37145}R_{12,8}$
5	6	1	7	6	2	$- \frac{4\sqrt{21}}{1001}R_{20} - \frac{24\sqrt{105}}{17017}R_{40} + \frac{42\sqrt{6}}{2431}R_{44} + \frac{60\sqrt{1365}}{46189}R_{60}$ $- \frac{290\sqrt{390}}{138567}R_{64} + \frac{10\sqrt{1785}}{2431}R_{80} - \frac{245\sqrt{5610}}{138567}R_{84} + \frac{594\sqrt{5}}{5083}R_{10,0}$ $- \frac{927\sqrt{858}}{96577}R_{10,4} - \frac{1452\sqrt{105}}{37145}R_{12,0} - \frac{616\sqrt{2145}}{37145}R_{12,4}$
6	6	1	6	6	1	$R_{00} - \frac{13\sqrt{5}}{35}R_{20} + \frac{48}{119}R_{40} - \frac{10\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{2261}R_{80} + \frac{39\sqrt{21}}{52003}R_{10,0} - \frac{198}{260015}R_{12,0} + \frac{396\sqrt{676039}}{260015}R_{12,12}$
6	6	1	6	6	2	$- \frac{16\sqrt{154}}{1309}R_{44} + \frac{10\sqrt{10010}}{3553}R_{64} - \frac{5\sqrt{1190}}{2261}R_{84} + \frac{5\sqrt{442}}{2261}R_{88}$ $- \frac{39\sqrt{182}}{7429}R_{10,4} + \frac{117\sqrt{9282}}{52003}R_{10,8} + \frac{396\sqrt{455}}{260015}R_{12,4} - \frac{198\sqrt{125970}}{260015}R_{12,8}$
6	6	1	7	6	1	$- \frac{\sqrt{30}}{35}R_{20} + \frac{15\sqrt{6}}{119}R_{40} - \frac{10\sqrt{78}}{323}R_{60} + \frac{30\sqrt{102}}{2261}R_{80}$ $- \frac{495\sqrt{14}}{52003}R_{10,0} + \frac{429\sqrt{6}}{260015}R_{12,0} + \frac{66\sqrt{4056234}}{260015}R_{12,12}$
6	6	1	7	6	2	$\frac{6\sqrt{15015}}{17017}R_{44} - \frac{60\sqrt{231}}{3553}R_{64} + \frac{180\sqrt{4641}}{29393}R_{84} + \frac{20\sqrt{255}}{2261}R_{88}$ $- \frac{198\sqrt{105}}{7429}R_{10,4} - \frac{990\sqrt{595}}{52003}R_{10,8} + \frac{2574\sqrt{42}}{260015}R_{12,4} + \frac{858\sqrt{323}}{52003}R_{12,8}$

Table B145: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	2	$R_{00} + \frac{13\sqrt{5}}{77}R_{20} + \frac{16}{357}R_{40} - \frac{32\sqrt{70}}{561}R_{44}$ $- \frac{10\sqrt{13}}{323}R_{60} - \frac{60\sqrt{182}}{3553}R_{64} - \frac{355\sqrt{17}}{24871}R_{80} - \frac{30\sqrt{2618}}{24871}R_{84}$ $+ \frac{195\sqrt{21}}{7429}R_{10,0} + \frac{78\sqrt{10010}}{52003}R_{10,4} - \frac{19602}{52003}R_{12,0} + \frac{1188\sqrt{1001}}{52003}R_{12,4}$
6	6	2	7	6	1	$\frac{18\sqrt{231}}{1309}R_{44} - \frac{20\sqrt{15015}}{10659}R_{64} - \frac{40\sqrt{1785}}{6783}R_{84} - \frac{100\sqrt{663}}{6783}R_{88}$ $+ \frac{162\sqrt{273}}{7429}R_{10,4} + \frac{54\sqrt{1547}}{52003}R_{10,8} - \frac{110\sqrt{2730}}{52003}R_{12,4} + \frac{726\sqrt{20995}}{260015}R_{12,8}$
6	6	2	7	6	2	$\frac{\sqrt{78}}{91}R_{20} + \frac{171\sqrt{390}}{17017}R_{40} - \frac{36\sqrt{273}}{2431}R_{44} + \frac{150\sqrt{30}}{3553}R_{60}$ $- \frac{160\sqrt{105}}{10659}R_{64} + \frac{50\sqrt{6630}}{29393}R_{80} - \frac{20\sqrt{255255}}{88179}R_{84} - \frac{297\sqrt{910}}{96577}R_{10,0}$ $- \frac{288\sqrt{231}}{52003}R_{10,4} - \frac{4719\sqrt{390}}{260015}R_{12,0} - \frac{286\sqrt{2310}}{260015}R_{12,4}$
7	6	1	7	6	1	$R_{00} - \frac{8\sqrt{5}}{35}R_{20} - \frac{27}{119}R_{40} + \frac{40\sqrt{13}}{323}R_{60}$ $- \frac{145\sqrt{17}}{2261}R_{80} + \frac{864\sqrt{21}}{52003}R_{10,0} - \frac{2343}{260015}R_{12,0} + \frac{66\sqrt{676039}}{260015}R_{12,12}$
7	6	1	7	6	2	$\frac{45\sqrt{10010}}{17017}R_{44} - \frac{120\sqrt{154}}{3553}R_{64} - \frac{15\sqrt{3094}}{29393}R_{84} + \frac{45\sqrt{170}}{2261}R_{88}$ $+ \frac{216\sqrt{70}}{7429}R_{10,4} - \frac{144\sqrt{3570}}{52003}R_{10,8} - \frac{8514\sqrt{7}}{260015}R_{12,4} - \frac{165\sqrt{1938}}{52003}R_{12,8}$
7	6	2	7	6	2	$R_{00} + \frac{88\sqrt{5}}{455}R_{20} + \frac{2259}{17017}R_{40} + \frac{162\sqrt{70}}{2431}R_{44}$ $- \frac{1000\sqrt{13}}{46189}R_{60} + \frac{1200\sqrt{182}}{46189}R_{64} - \frac{1375\sqrt{17}}{29393}R_{80} + \frac{150\sqrt{2618}}{29393}R_{84}$ $- \frac{4032\sqrt{21}}{96577}R_{10,0} + \frac{1296\sqrt{10010}}{676039}R_{10,4} - \frac{21417}{260015}R_{12,0} + \frac{198\sqrt{1001}}{52003}R_{12,4}$

Table B146: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	0	1	1	0	1	R_{00}
1	0	1	1	1	1	$-\frac{\sqrt{2}}{2}R_{10}$
1	0	1	2	1	1	$\frac{\sqrt{2}}{2}R_{10}$
1	0	1	1	2	1	$\frac{\sqrt{10}}{10}R_{20}$
1	0	1	2	2	1	$-\frac{\sqrt{2}}{2}R_{20}$
1	0	1	3	2	1	0
1	0	1	3	2	2	$\frac{\sqrt{10}}{5}R_{20}$
1	0	1	2	3	1	$\frac{\sqrt{7}}{7}R_{30}$
1	0	1	3	3	1	0
1	0	1	3	3	2	$\frac{\sqrt{2}}{2}R_{30}$
1	0	1	4	3	1	0
1	0	1	4	3	2	$\frac{\sqrt{70}}{14}R_{30}$
1	0	1	3	4	1	$\frac{\sqrt{7}}{3}R_{44}$
1	0	1	3	4	2	$\frac{\sqrt{6}}{6}R_{40}$
1	0	1	4	4	1	$\frac{\sqrt{5}}{5}R_{44}$
1	0	1	4	4	2	$\frac{\sqrt{2}}{2}R_{40}$
1	0	1	5	4	1	R_{44}
1	0	1	5	4	2	$\frac{\sqrt{5}}{15}R_{44}$
1	0	1	5	4	3	$\frac{\sqrt{3}}{3}R_{40}$
1	0	1	4	5	1	$\frac{6\sqrt{55}}{55}R_{54}$
1	0	1	4	5	2	$\frac{\sqrt{22}}{11}R_{50}$
1	0	1	5	5	1	$-\frac{\sqrt{6}}{6}R_{54}$
1	0	1	5	5	2	$-\frac{\sqrt{30}}{10}R_{54}$
1	0	1	5	5	3	$\frac{\sqrt{2}}{2}R_{50}$
1	0	1	6	5	1	$\frac{\sqrt{30}}{6}R_{54}$
1	0	1	6	5	2	$\frac{\sqrt{22}}{22}R_{54}$

Table B147: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	0	1	6	5	3	$\frac{\sqrt{154}}{22} R_{50}$
1	0	1	5	6	1	$\frac{\sqrt{78}}{78} R_{64}$
1	0	1	5	6	2	$\frac{\sqrt{390}}{26} R_{64}$
1	0	1	5	6	3	$\frac{\sqrt{130}}{26} R_{60}$
1	0	1	6	6	1	$-\frac{\sqrt{462}}{42} R_{64}$
1	0	1	6	6	2	$-\frac{\sqrt{70}}{14} R_{64}$
1	0	1	6	6	3	$\frac{\sqrt{2}}{2} R_{60}$
1	0	1	7	6	1	0
1	0	1	7	6	2	$\frac{\sqrt{6006}}{91} R_{64}$
1	0	1	7	6	3	$\frac{\sqrt{546}}{91} R_{64}$
1	0	1	7	6	4	$\frac{2\sqrt{13}}{13} R_{60}$
1	1	1	1	1	1	$R_{00} + \frac{\sqrt{5}}{10} R_{20}$
1	1	1	2	1	1	$-\frac{3\sqrt{5}}{10} R_{20}$
1	1	1	1	2	1	$-\frac{1}{2} R_{10}$
1	1	1	2	2	1	$\frac{3\sqrt{5}}{10} R_{10} + \frac{\sqrt{105}}{35} R_{30}$
1	1	1	3	2	1	0
1	1	1	3	2	2	$-\frac{\sqrt{21}}{7} R_{30}$
1	1	1	2	3	1	$-\frac{\sqrt{30}}{10} R_{20}$
1	1	1	3	3	1	$-\frac{\sqrt{2}}{2} R_{44}$
1	1	1	3	3	2	$-\frac{2\sqrt{105}}{35} R_{20} - \frac{\sqrt{21}}{14} R_{40}$
1	1	1	4	3	1	$-\frac{\sqrt{6}}{6} R_{44}$
1	1	1	4	3	2	$-\frac{\sqrt{15}}{6} R_{40}$
1	1	1	3	4	1	0
1	1	1	3	4	2	$-\frac{3\sqrt{7}}{14} R_{30}$
1	1	1	4	4	1	$-\frac{2\sqrt{330}}{55} R_{54}$
1	1	1	4	4	2	$-\frac{5\sqrt{21}}{42} R_{30} - \frac{2\sqrt{33}}{33} R_{50}$

Table B148: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	5	4	1	$-\frac{\sqrt{66}}{22}R_{54}$
1	1	1	5	4	2	$-\frac{3\sqrt{330}}{110}R_{54}$
1	1	1	5	4	3	$-\frac{3\sqrt{22}}{22}R_{50}$
1	1	1	4	5	1	$-\frac{\sqrt{30}}{15}R_{44}$
1	1	1	4	5	2	$-\frac{\sqrt{3}}{3}R_{40}$
1	1	1	5	5	1	$\frac{3\sqrt{11}}{11}R_{44} + \frac{\sqrt{715}}{286}R_{64}$
1	1	1	5	5	2	$\frac{\sqrt{55}}{55}R_{44} + \frac{15\sqrt{143}}{286}R_{64}$
1	1	1	5	5	3	$-\frac{\sqrt{33}}{11}R_{40} - \frac{5\sqrt{429}}{286}R_{60}$
1	1	1	6	5	1	$-\frac{\sqrt{143}}{26}R_{64}$
1	1	1	6	5	2	$-\frac{\sqrt{195}}{26}R_{64}$
1	1	1	6	5	3	$-\frac{\sqrt{273}}{26}R_{60}$
1	1	1	5	6	1	$-\frac{\sqrt{55}}{22}R_{54}$
1	1	1	5	6	2	$-\frac{3\sqrt{11}}{22}R_{54}$
1	1	1	5	6	3	$-\frac{\sqrt{165}}{22}R_{50}$
1	1	1	6	6	1	$\frac{\sqrt{455}}{26}R_{54} + \frac{3\sqrt{455}}{455}R_{74}$
1	1	1	6	6	2	$\frac{\sqrt{3003}}{286}R_{54} + \frac{\sqrt{3003}}{91}R_{74}$
1	1	1	6	6	3	$-\frac{7\sqrt{429}}{286}R_{50} - \frac{3\sqrt{65}}{65}R_{70}$
1	1	1	7	6	1	0
1	1	1	7	6	2	$-\frac{3\sqrt{35}}{35}R_{74}$
1	1	1	7	6	3	$-\frac{\sqrt{385}}{35}R_{74}$
1	1	1	7	6	4	$-\frac{\sqrt{10}}{5}R_{70}$
2	1	1	2	1	1	$R_{00} + \frac{\sqrt{5}}{10}R_{20}$
2	1	1	1	2	1	$-\frac{1}{10}R_{10} + \frac{3\sqrt{21}}{35}R_{30}$
2	1	1	2	2	1	$-\frac{\sqrt{5}}{10}R_{10} - \frac{2\sqrt{105}}{35}R_{30}$
2	1	1	3	2	1	0
2	1	1	3	2	2	$\frac{4}{5}R_{10} + \frac{\sqrt{21}}{35}R_{30}$

Table B149: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	2	3	1	$-\frac{\sqrt{30}}{70}R_{20} + \frac{4\sqrt{6}}{21}R_{40}$
2	1	1	3	3	1	$-\frac{\sqrt{2}}{2}R_{44}$
2	1	1	3	3	2	$\frac{\sqrt{105}}{35}R_{20} + \frac{5\sqrt{21}}{42}R_{40}$
2	1	1	4	3	1	$-\frac{\sqrt{6}}{6}R_{44}$
2	1	1	4	3	2	$\frac{3\sqrt{3}}{7}R_{20} + \frac{\sqrt{15}}{42}R_{40}$
2	1	1	3	4	1	$\frac{\sqrt{462}}{33}R_{54}$
2	1	1	3	4	2	$-\frac{\sqrt{7}}{42}R_{30} + \frac{5\sqrt{11}}{33}R_{50}$
2	1	1	4	4	1	$-\frac{\sqrt{330}}{55}R_{54}$
2	1	1	4	4	2	$\frac{\sqrt{21}}{14}R_{30} + \frac{\sqrt{33}}{11}R_{50}$
2	1	1	5	4	1	$\frac{\sqrt{66}}{22}R_{54}$
2	1	1	5	4	2	$-\frac{7\sqrt{330}}{330}R_{54}$
2	1	1	5	4	3	$\frac{4\sqrt{14}}{21}R_{30} + \frac{\sqrt{22}}{66}R_{50}$
2	1	1	4	5	1	$\frac{7\sqrt{30}}{165}R_{44} + \frac{12\sqrt{78}}{143}R_{64}$
2	1	1	4	5	2	$-\frac{\sqrt{3}}{33}R_{40} + \frac{12\sqrt{39}}{143}R_{60}$
2	1	1	5	5	1	$\frac{2\sqrt{11}}{11}R_{44} - \frac{3\sqrt{715}}{286}R_{64}$
2	1	1	5	5	2	$-\frac{2\sqrt{55}}{55}R_{44} + \frac{3\sqrt{143}}{286}R_{64}$
2	1	1	5	5	3	$\frac{2\sqrt{33}}{33}R_{40} + \frac{7\sqrt{429}}{286}R_{60}$
2	1	1	6	5	1	$\frac{\sqrt{55}}{11}R_{44} + \frac{9\sqrt{143}}{286}R_{64}$
2	1	1	6	5	2	$\frac{\sqrt{3}}{11}R_{44} - \frac{7\sqrt{195}}{286}R_{64}$
2	1	1	6	5	3	$\frac{5\sqrt{21}}{33}R_{40} + \frac{\sqrt{273}}{286}R_{60}$
2	1	1	5	6	1	$-\frac{9\sqrt{55}}{286}R_{54} + \frac{\sqrt{55}}{65}R_{74}$
2	1	1	5	6	2	$\frac{21\sqrt{11}}{286}R_{54} + \frac{3\sqrt{11}}{13}R_{74}$
2	1	1	5	6	3	$-\frac{\sqrt{165}}{286}R_{50} + \frac{7}{13}R_{70}$
2	1	1	6	6	1	$\frac{3\sqrt{455}}{182}R_{54} - \frac{8\sqrt{455}}{455}R_{74}$
2	1	1	6	6	2	$-\frac{\sqrt{3003}}{154}R_{54}$
2	1	1	6	6	3	$\frac{5\sqrt{429}}{286}R_{50} + \frac{4\sqrt{65}}{65}R_{70}$

Table B150: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	1	1	7	6	1	0
2	1	1	7	6	2	$\frac{12\sqrt{35}}{91}R_{54} + \frac{27\sqrt{35}}{455}R_{74}$
2	1	1	7	6	3	$\frac{12\sqrt{385}}{1001}R_{54} - \frac{\sqrt{385}}{65}R_{74}$
2	1	1	7	6	4	$\frac{12\sqrt{66}}{143}R_{50} + \frac{\sqrt{10}}{65}R_{70}$
1	2	1	1	2	1	$R_{00} - \frac{\sqrt{5}}{10}R_{20}$
1	2	1	2	2	1	$-\frac{1}{2}R_{20}$
1	2	1	3	2	1	$\frac{\sqrt{42}}{7}R_{44}$
1	2	1	3	2	2	$-\frac{2\sqrt{5}}{35}R_{20} + \frac{3}{7}R_{40}$
1	2	1	2	3	1	$\frac{3\sqrt{6}}{10}R_{10} - \frac{2\sqrt{14}}{35}R_{30}$
1	2	1	3	3	1	0
1	2	1	3	3	2	$\frac{1}{2}R_{30}$
1	2	1	4	3	1	$\frac{2\sqrt{22}}{11}R_{54}$
1	2	1	4	3	2	$-\frac{\sqrt{35}}{42}R_{30} + \frac{2\sqrt{55}}{33}R_{50}$
1	2	1	3	4	1	$-\frac{5\sqrt{14}}{42}R_{44}$
1	2	1	3	4	2	$\frac{6\sqrt{15}}{35}R_{20} - \frac{5\sqrt{3}}{42}R_{40}$
1	2	1	4	4	1	$\frac{\sqrt{10}}{10}R_{44}$
1	2	1	4	4	2	$\frac{1}{2}R_{40}$
1	2	1	5	4	1	$-\frac{2\sqrt{2}}{11}R_{44} + \frac{3\sqrt{130}}{286}R_{64}$
1	2	1	5	4	2	$-\frac{2\sqrt{10}}{165}R_{44} + \frac{45\sqrt{26}}{286}R_{64}$
1	2	1	5	4	3	$-\frac{2\sqrt{6}}{33}R_{40} + \frac{15\sqrt{78}}{286}R_{60}$
1	2	1	4	5	1	$-\frac{2\sqrt{110}}{55}R_{54}$
1	2	1	4	5	2	$\frac{5\sqrt{7}}{21}R_{30} - \frac{2\sqrt{11}}{33}R_{50}$
1	2	1	5	5	1	$-\frac{\sqrt{3}}{6}R_{54}$
1	2	1	5	5	2	$-\frac{\sqrt{15}}{10}R_{54}$
1	2	1	5	5	3	$\frac{1}{2}R_{50}$
1	2	1	6	5	1	$-\frac{5\sqrt{15}}{78}R_{54} + \frac{3\sqrt{15}}{65}R_{74}$

Table B151: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	2	1	6	5	2	$-\frac{5\sqrt{11}}{286}R_{54} + \frac{3\sqrt{11}}{13}R_{74}$
1	2	1	6	5	3	$-\frac{5\sqrt{77}}{286}R_{50} + \frac{3\sqrt{105}}{65}R_{70}$
1	2	1	5	6	1	$\frac{3\sqrt{15}}{11}R_{44} - \frac{7\sqrt{39}}{858}R_{64}$
1	2	1	5	6	2	$\frac{\sqrt{3}}{11}R_{44} - \frac{7\sqrt{195}}{286}R_{64}$
1	2	1	5	6	3	$\frac{3\sqrt{5}}{11}R_{40} - \frac{7\sqrt{65}}{286}R_{60}$
1	2	1	6	6	1	$-\frac{\sqrt{231}}{42}R_{64}$
1	2	1	6	6	2	$-\frac{\sqrt{35}}{14}R_{64}$
1	2	1	6	6	3	$\frac{1}{2}R_{60}$
1	2	1	7	6	1	$\frac{2\sqrt{1785}}{85}R_{88}$
1	2	1	7	6	2	$-\frac{2\sqrt{3003}}{455}R_{64} + \frac{\sqrt{357}}{85}R_{84}$
1	2	1	7	6	3	$-\frac{2\sqrt{273}}{455}R_{64} + \frac{\sqrt{3927}}{85}R_{84}$
1	2	1	7	6	4	$-\frac{2\sqrt{26}}{65}R_{60} + \frac{7\sqrt{34}}{85}R_{80}$
2	2	1	2	2	1	$R_{00} + \frac{\sqrt{5}}{14}R_{20} + \frac{8}{21}R_{40}$
2	2	1	3	2	1	$\frac{\sqrt{210}}{21}R_{44}$
2	2	1	3	2	2	$-\frac{2}{7}R_{20} - \frac{5\sqrt{5}}{21}R_{40}$
2	2	1	2	3	1	$-\frac{\sqrt{30}}{30}R_{10} - \frac{2\sqrt{70}}{35}R_{30}$
2	2	1	3	3	1	$-\frac{\sqrt{330}}{33}R_{54}$
2	2	1	3	3	2	$-\frac{8\sqrt{105}}{105}R_{10} - \frac{\sqrt{5}}{30}R_{30} - \frac{5\sqrt{385}}{231}R_{50}$
2	2	1	4	3	1	$\frac{\sqrt{110}}{33}R_{54}$
2	2	1	4	3	2	$-\frac{5\sqrt{7}}{42}R_{30} - \frac{5\sqrt{11}}{33}R_{50}$
2	2	1	3	4	1	$\frac{\sqrt{70}}{14}R_{44}$
2	2	1	3	4	2	$-\frac{\sqrt{3}}{7}R_{20} - \frac{5\sqrt{15}}{42}R_{40}$
2	2	1	4	4	1	$\frac{3\sqrt{2}}{22}R_{44} - \frac{8\sqrt{130}}{143}R_{64}$
2	2	1	4	4	2	$-\frac{5}{7}R_{20} - \frac{3\sqrt{5}}{154}R_{40} - \frac{8\sqrt{65}}{143}R_{60}$
2	2	1	5	4	1	$\frac{2\sqrt{10}}{11}R_{44} - \frac{15\sqrt{26}}{286}R_{64}$
2	2	1	5	4	2	$-\frac{2\sqrt{2}}{11}R_{44} + \frac{3\sqrt{130}}{286}R_{64}$

Table B152: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	5	4	3	$-\frac{2\sqrt{30}}{33}R_{40} - \frac{7\sqrt{390}}{286}R_{60}$
2	2	1	4	5	1	$\frac{2\sqrt{22}}{33}R_{54}$
2	2	1	4	5	2	$-\frac{\sqrt{35}}{21}R_{30} - \frac{2\sqrt{55}}{33}R_{50}$
2	2	1	5	5	1	$\frac{\sqrt{15}}{26}R_{54} + \frac{\sqrt{15}}{39}R_{74}$
2	2	1	5	5	2	$-\frac{7\sqrt{3}}{78}R_{54} + \frac{5\sqrt{3}}{13}R_{74}$
2	2	1	5	5	3	$-\frac{8\sqrt{385}}{231}R_{30} - \frac{\sqrt{5}}{78}R_{50} - \frac{35\sqrt{33}}{429}R_{70}$
2	2	1	6	5	1	$\frac{5\sqrt{3}}{26}R_{54} - \frac{8\sqrt{3}}{39}R_{74}$
2	2	1	6	5	2	$-\frac{\sqrt{55}}{22}R_{54}$
2	2	1	6	5	3	$-\frac{5\sqrt{385}}{286}R_{50} - \frac{4\sqrt{21}}{39}R_{70}$
2	2	1	5	6	1	$\frac{10\sqrt{3}}{33}R_{44} - \frac{5\sqrt{195}}{286}R_{64}$
2	2	1	5	6	2	$-\frac{2\sqrt{15}}{33}R_{44} + \frac{5\sqrt{39}}{286}R_{64}$
2	2	1	5	6	3	$-\frac{10}{33}R_{40} - \frac{35\sqrt{13}}{286}R_{60}$
2	2	1	6	6	1	$\frac{5\sqrt{3003}}{429}R_{44} + \frac{3\sqrt{1155}}{770}R_{64} + \frac{8\sqrt{23205}}{7735}R_{84}$
2	2	1	6	6	2	$\frac{\sqrt{455}}{143}R_{44} - \frac{\sqrt{7}}{22}R_{64} + \frac{8\sqrt{17017}}{1547}R_{84}$
2	2	1	6	6	3	$-\frac{35\sqrt{65}}{429}R_{40} - \frac{\sqrt{5}}{110}R_{60} - \frac{16\sqrt{1105}}{1105}R_{80}$
2	2	1	7	6	1	$\frac{2\sqrt{357}}{51}R_{88}$
2	2	1	7	6	2	$\frac{2\sqrt{15015}}{1365}R_{64} - \frac{\sqrt{1785}}{105}R_{84}$
2	2	1	7	6	3	$-\frac{2\sqrt{1365}}{195}R_{64} - \frac{\sqrt{19635}}{1785}R_{84}$
2	2	1	7	6	4	$-\frac{2\sqrt{130}}{65}R_{60} - \frac{3\sqrt{170}}{85}R_{80}$
3	2	1	3	2	1	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40}$
3	2	1	3	2	2	$\frac{\sqrt{42}}{21}R_{44}$
3	2	1	2	3	1	$\frac{10\sqrt{231}}{231}R_{54}$
3	2	1	3	3	1	$-\frac{\sqrt{21}}{14}R_{10} + \frac{1}{3}R_{30} - \frac{5\sqrt{77}}{462}R_{50}$
3	2	1	3	3	2	$-\frac{5\sqrt{66}}{66}R_{54}$
3	2	1	4	3	1	$\frac{3\sqrt{7}}{14}R_{10} - \frac{\sqrt{3}}{3}R_{30} + \frac{5\sqrt{231}}{462}R_{50}$
3	2	1	4	3	2	$\frac{\sqrt{2310}}{154}R_{54}$

Table B153: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	1	3	4	1	$\frac{\sqrt{15}}{42}R_{20} - \frac{5\sqrt{3}}{77}R_{40} + \frac{5\sqrt{39}}{858}R_{60}$
3	2	1	3	4	2	$-\frac{5\sqrt{14}}{77}R_{44} + \frac{5\sqrt{910}}{286}R_{64}$
3	2	1	4	4	1	$-\frac{\sqrt{21}}{14}R_{20} + \frac{3\sqrt{105}}{77}R_{40} - \frac{\sqrt{1365}}{286}R_{60}$
3	2	1	4	4	2	$\frac{3\sqrt{42}}{77}R_{44} - \frac{3\sqrt{2730}}{286}R_{64}$
3	2	1	5	4	1	0
3	2	1	5	4	2	$\frac{2\sqrt{21}}{21}R_{20} - \frac{4\sqrt{105}}{77}R_{40} + \frac{2\sqrt{1365}}{429}R_{60}$
3	2	1	5	4	3	$-\frac{4\sqrt{7}}{77}R_{44} + \frac{2\sqrt{455}}{143}R_{64}$
3	2	1	4	5	1	$\frac{\sqrt{15}}{33}R_{30} - \frac{2\sqrt{1155}}{429}R_{50} + \frac{3\sqrt{7}}{143}R_{70}$
3	2	1	4	5	2	$-\frac{2\sqrt{462}}{143}R_{54} + \frac{3\sqrt{462}}{143}R_{74}$
3	2	1	5	5	1	0
3	2	1	5	5	2	$\frac{\sqrt{110}}{33}R_{30} - \frac{2\sqrt{70}}{39}R_{50} + \frac{\sqrt{462}}{143}R_{70}$
3	2	1	5	5	3	$\frac{2\sqrt{42}}{39}R_{54} - \frac{\sqrt{42}}{13}R_{74}$
3	2	1	6	5	1	0
3	2	1	6	5	2	$\frac{5\sqrt{6}}{33}R_{30} - \frac{10\sqrt{462}}{429}R_{50} + \frac{3\sqrt{70}}{143}R_{70}$
3	2	1	6	5	3	$-\frac{10\sqrt{66}}{429}R_{54} + \frac{5\sqrt{66}}{143}R_{74}$
3	2	1	5	6	1	$\frac{2\sqrt{17017}}{221}R_{88}$
3	2	1	5	6	2	$\frac{5\sqrt{14}}{143}R_{40} - \frac{2\sqrt{182}}{143}R_{60} + \frac{\sqrt{238}}{221}R_{80}$
3	2	1	5	6	3	$\frac{\sqrt{210}}{429}R_{44} - \frac{2\sqrt{546}}{143}R_{64} + \frac{\sqrt{7854}}{221}R_{84}$
3	2	1	6	6	1	$\frac{2\sqrt{17}}{17}R_{88}$
3	2	1	6	6	2	$\frac{5\sqrt{78}}{143}R_{40} - \frac{2\sqrt{6}}{11}R_{60} + \frac{\sqrt{1326}}{221}R_{80}$
3	2	1	6	6	3	$-\frac{5\sqrt{546}}{3003}R_{44} + \frac{2\sqrt{210}}{77}R_{64} - \frac{\sqrt{510510}}{1547}R_{84}$
3	2	1	7	6	1	$\frac{15\sqrt{143}}{143}R_{44} - \frac{2\sqrt{55}}{55}R_{64} + \frac{\sqrt{1105}}{1105}R_{84}$
3	2	1	7	6	2	$\frac{2\sqrt{221}}{221}R_{88}$
3	2	1	7	6	3	$\frac{15\sqrt{10}}{143}R_{40} - \frac{6\sqrt{130}}{143}R_{60} + \frac{3\sqrt{170}}{221}R_{80}$
3	2	1	7	6	4	$\frac{5\sqrt{21}}{1001}R_{44} - \frac{6\sqrt{1365}}{1001}R_{64} + \frac{3\sqrt{19635}}{1547}R_{84}$
3	2	2	3	2	2	$R_{00} + \frac{6\sqrt{5}}{35}R_{20} + \frac{1}{21}R_{40}$

Table B154: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	2	2	3	1	$-\frac{2\sqrt{6}}{105}R_{10} - \frac{2\sqrt{14}}{105}R_{30} + \frac{25\sqrt{22}}{231}R_{50}$
3	2	2	3	3	1	$-\frac{5\sqrt{66}}{66}R_{54}$
3	2	2	3	3	2	$\frac{\sqrt{21}}{42}R_{10} + \frac{1}{3}R_{30} + \frac{25\sqrt{77}}{462}R_{50}$
3	2	2	4	3	1	$-\frac{\sqrt{22}}{66}R_{54}$
3	2	2	4	3	2	$\frac{3\sqrt{15}}{14}R_{10} + \frac{\sqrt{35}}{21}R_{30} + \frac{\sqrt{55}}{462}R_{50}$
3	2	2	3	4	1	$-\frac{5\sqrt{14}}{77}R_{44} + \frac{5\sqrt{910}}{286}R_{64}$
3	2	2	3	4	2	$-\frac{\sqrt{15}}{70}R_{20} - \frac{5\sqrt{3}}{231}R_{40} + \frac{25\sqrt{39}}{286}R_{60}$
3	2	2	4	4	1	$-\frac{9\sqrt{10}}{55}R_{44} - \frac{25\sqrt{26}}{286}R_{64}$
3	2	2	4	4	2	$\frac{\sqrt{5}}{14}R_{20} + \frac{27}{77}R_{40} + \frac{35\sqrt{13}}{286}R_{60}$
3	2	2	5	4	1	$-\frac{4\sqrt{2}}{11}R_{44} + \frac{3\sqrt{130}}{143}R_{64}$
3	2	2	5	4	2	$-\frac{8\sqrt{10}}{55}R_{44} - \frac{5\sqrt{26}}{143}R_{64}$
3	2	2	5	4	3	$\frac{\sqrt{30}}{7}R_{20} + \frac{2\sqrt{6}}{21}R_{40}$
3	2	2	4	5	1	$\frac{14\sqrt{110}}{2145}R_{54} + \frac{9\sqrt{110}}{143}R_{74}$
3	2	2	4	5	2	$-\frac{5\sqrt{7}}{231}R_{30} - \frac{2\sqrt{11}}{429}R_{50} + \frac{21\sqrt{15}}{143}R_{70}$
3	2	2	5	5	1	$\frac{4\sqrt{3}}{13}R_{54} - \frac{5\sqrt{3}}{39}R_{74}$
3	2	2	5	5	2	$\frac{16\sqrt{15}}{195}R_{54} + \frac{\sqrt{15}}{13}R_{74}$
3	2	2	5	5	3	$\frac{5\sqrt{77}}{231}R_{30} + \frac{14}{39}R_{50} + \frac{14\sqrt{165}}{429}R_{70}$
3	2	2	6	5	1	$\frac{\sqrt{15}}{15}R_{74}$
3	2	2	6	5	2	$-\frac{20\sqrt{11}}{143}R_{54} - \frac{9\sqrt{11}}{143}R_{74}$
3	2	2	6	5	3	$\frac{25}{33}R_{30} + \frac{10\sqrt{77}}{429}R_{50} - \frac{2\sqrt{105}}{2145}R_{70}$
3	2	2	5	6	1	$\frac{14\sqrt{15}}{429}R_{44} - \frac{6\sqrt{39}}{143}R_{64} + \frac{\sqrt{561}}{221}R_{84}$
3	2	2	5	6	2	$\frac{28\sqrt{3}}{429}R_{44} + \frac{2\sqrt{195}}{143}R_{64} + \frac{3\sqrt{2805}}{221}R_{84}$
3	2	2	5	6	3	$-\frac{\sqrt{5}}{39}R_{40} + \frac{14\sqrt{85}}{221}R_{80}$
3	2	2	6	6	1	$\frac{10\sqrt{15015}}{3003}R_{44} + \frac{2\sqrt{231}}{77}R_{64} - \frac{\sqrt{4641}}{221}R_{84}$
3	2	2	6	6	2	$-\frac{20\sqrt{91}}{1001}R_{44} + \frac{2\sqrt{35}}{77}R_{64} + \frac{\sqrt{85085}}{1547}R_{84}$
3	2	2	6	6	3	$\frac{25\sqrt{13}}{429}R_{40} + \frac{4}{11}R_{60} + \frac{6\sqrt{221}}{221}R_{80}$

Table B155: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	2	2	7	6	1	$\frac{2\sqrt{1785}}{255}R_{88}$
3	2	2	7	6	2	$\frac{15\sqrt{1155}}{1001}R_{44} + \frac{58\sqrt{3003}}{15015}R_{64} + \frac{43\sqrt{357}}{3315}R_{84}$
3	2	2	7	6	3	$\frac{15\sqrt{105}}{1001}R_{44} - \frac{382\sqrt{273}}{15015}R_{64} - \frac{79\sqrt{3927}}{23205}R_{84}$
3	2	2	7	6	4	$\frac{75\sqrt{2}}{143}R_{40} + \frac{2\sqrt{26}}{55}R_{60} - \frac{3\sqrt{34}}{1105}R_{80}$
2	3	1	2	3	1	$R_{00} + \frac{4\sqrt{5}}{35}R_{20} - \frac{4}{21}R_{40}$
2	3	1	3	3	1	$-\frac{\sqrt{3}}{3}R_{44}$
2	3	1	3	3	2	$\frac{\sqrt{70}}{35}R_{20} + \frac{5\sqrt{14}}{42}R_{40}$
2	3	1	4	3	1	$\frac{3}{11}R_{44} + \frac{40\sqrt{65}}{429}R_{64}$
2	3	1	4	3	2	$-\frac{\sqrt{2}}{21}R_{20} - \frac{3\sqrt{10}}{154}R_{40} + \frac{20\sqrt{130}}{429}R_{60}$
2	3	1	3	4	1	$-\frac{2\sqrt{77}}{77}R_{54}$
2	3	1	3	4	2	$\frac{4\sqrt{2}}{7}R_{10} + \frac{\sqrt{42}}{42}R_{30} - \frac{5\sqrt{66}}{231}R_{50}$
2	3	1	4	4	1	$-\frac{2\sqrt{55}}{55}R_{54}$
2	3	1	4	4	2	$\frac{\sqrt{14}}{14}R_{30} + \frac{\sqrt{22}}{11}R_{50}$
2	3	1	5	4	1	$-\frac{12\sqrt{11}}{143}R_{54} + \frac{5\sqrt{11}}{143}R_{74}$
2	3	1	5	4	2	$\frac{28\sqrt{55}}{715}R_{54} + \frac{15\sqrt{55}}{143}R_{74}$
2	3	1	5	4	3	$-\frac{4\sqrt{21}}{231}R_{30} - \frac{4\sqrt{33}}{429}R_{50} + \frac{35\sqrt{5}}{143}R_{70}$
2	3	1	4	5	1	$-\frac{12\sqrt{5}}{55}R_{44} - \frac{28\sqrt{13}}{429}R_{64}$
2	3	1	4	5	2	$\frac{5\sqrt{10}}{21}R_{20} + \frac{6\sqrt{2}}{77}R_{40} - \frac{14\sqrt{26}}{429}R_{60}$
2	3	1	5	5	1	$\frac{2\sqrt{66}}{33}R_{44} - \frac{\sqrt{4290}}{286}R_{64}$
2	3	1	5	5	2	$-\frac{2\sqrt{330}}{165}R_{44} + \frac{\sqrt{858}}{286}R_{64}$
2	3	1	5	5	3	$\frac{2\sqrt{22}}{33}R_{40} + \frac{7\sqrt{286}}{286}R_{60}$
2	3	1	6	5	1	$-\frac{2\sqrt{330}}{429}R_{44} - \frac{3\sqrt{858}}{286}R_{64} + \frac{4\sqrt{102}}{221}R_{84}$
2	3	1	6	5	2	$-\frac{2\sqrt{2}}{143}R_{44} + \frac{7\sqrt{130}}{286}R_{64} + \frac{4\sqrt{1870}}{221}R_{84}$
2	3	1	6	5	3	$-\frac{10\sqrt{14}}{429}R_{40} - \frac{\sqrt{182}}{286}R_{60} + \frac{8\sqrt{238}}{221}R_{80}$
2	3	1	5	6	1	$\frac{7\sqrt{330}}{286}R_{54} - \frac{4\sqrt{330}}{2145}R_{74}$
2	3	1	5	6	2	$-\frac{49\sqrt{66}}{858}R_{54} - \frac{4\sqrt{66}}{143}R_{74}$

Table B156: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	3	1	5	6	3	$\frac{20\sqrt{70}}{231}R_{30} + \frac{7\sqrt{110}}{858}R_{50} - \frac{28\sqrt{6}}{429}R_{70}$
2	3	1	6	6	1	$\frac{\sqrt{2730}}{182}R_{54} - \frac{8\sqrt{2730}}{1365}R_{74}$
2	3	1	6	6	2	$-\frac{\sqrt{2002}}{154}R_{54}$
2	3	1	6	6	3	$\frac{5\sqrt{286}}{286}R_{50} + \frac{4\sqrt{390}}{195}R_{70}$
2	3	1	7	6	1	$\frac{2\sqrt{67830}}{969}R_{98}$
2	3	1	7	6	2	$-\frac{2\sqrt{210}}{273}R_{54} - \frac{162\sqrt{210}}{7735}R_{74} + \frac{\sqrt{51870}}{969}R_{94}$
2	3	1	7	6	3	$-\frac{2\sqrt{2310}}{3003}R_{54} + \frac{6\sqrt{2310}}{1105}R_{74} + \frac{\sqrt{570570}}{969}R_{94}$
2	3	1	7	6	4	$-\frac{4\sqrt{11}}{143}R_{50} - \frac{12\sqrt{15}}{1105}R_{70} + \frac{42\sqrt{19}}{323}R_{90}$
3	3	1	3	3	1	$R_{00} - \frac{\sqrt{5}}{4}R_{20} + \frac{1}{22}R_{40} + \frac{5\sqrt{13}}{572}R_{60}$
3	3	1	3	3	2	$\frac{\sqrt{42}}{66}R_{44} + \frac{5\sqrt{2730}}{572}R_{64}$
3	3	1	4	3	1	$-\frac{\sqrt{15}}{12}R_{20} + \frac{5\sqrt{3}}{22}R_{40} - \frac{35\sqrt{39}}{1716}R_{60}$
3	3	1	4	3	2	$\frac{\sqrt{30}}{22}R_{44} - \frac{35\sqrt{78}}{572}R_{64}$
3	3	1	3	4	1	$-\frac{3\sqrt{7}}{28}R_{10} + \frac{\sqrt{3}}{6}R_{30} - \frac{5\sqrt{231}}{924}R_{50}$
3	3	1	3	4	2	$-\frac{5\sqrt{22}}{44}R_{54}$
3	3	1	4	4	1	$\frac{\sqrt{5}}{4}R_{10} - \frac{\sqrt{105}}{22}R_{30} + \frac{\sqrt{165}}{572}R_{50} + \frac{7}{143}R_{70}$
3	3	1	4	4	2	$\frac{3\sqrt{66}}{572}R_{54} + \frac{7\sqrt{66}}{143}R_{74}$
3	3	1	5	4	1	0
3	3	1	5	4	2	$-\frac{\sqrt{105}}{33}R_{30} + \frac{14\sqrt{165}}{429}R_{50} - \frac{21}{143}R_{70}$
3	3	1	5	4	3	$\frac{14\sqrt{11}}{143}R_{54} - \frac{21\sqrt{11}}{143}R_{74}$
3	3	1	4	5	1	$-\frac{\sqrt{3}}{6}R_{20} + \frac{\sqrt{15}}{11}R_{40} - \frac{7\sqrt{195}}{858}R_{60}$
3	3	1	4	5	2	$\frac{\sqrt{6}}{11}R_{44} - \frac{7\sqrt{390}}{286}R_{64}$
3	3	1	5	5	1	$-\frac{7\sqrt{1105}}{221}R_{88}$
3	3	1	5	5	2	$-\frac{\sqrt{22}}{11}R_{20} + \frac{\sqrt{110}}{26}R_{40} - \frac{7\sqrt{1870}}{4862}R_{80}$
3	3	1	5	5	3	$-\frac{\sqrt{66}}{78}R_{44} + \frac{7\sqrt{510}}{442}R_{84}$
3	3	1	6	5	1	$-\frac{7\sqrt{221}}{221}R_{88}$
3	3	1	6	5	2	$-\frac{35\sqrt{6}}{286}R_{40} + \frac{7\sqrt{78}}{143}R_{60} - \frac{7\sqrt{102}}{442}R_{80}$

Table B157: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	6	5	3	$-\frac{5\sqrt{42}}{858}R_{44} + \frac{\sqrt{2730}}{143}R_{64} - \frac{\sqrt{39270}}{442}R_{84}$
3	3	1	5	6	1	0
3	3	1	5	6	2	$-\frac{5\sqrt{14}}{66}R_{30} + \frac{35\sqrt{22}}{429}R_{50} - \frac{7\sqrt{30}}{286}R_{70}$
3	3	1	5	6	3	$\frac{7\sqrt{330}}{429}R_{54} - \frac{7\sqrt{330}}{286}R_{74}$
3	3	1	6	6	1	$-\frac{6\sqrt{2261}}{323}R_{98}$
3	3	1	6	6	2	$-\frac{35\sqrt{78}}{858}R_{30} + \frac{2\sqrt{6006}}{429}R_{50} + \frac{3\sqrt{910}}{4862}R_{70} - \frac{3\sqrt{10374}}{4199}R_{90}$
3	3	1	6	6	3	$-\frac{2\sqrt{858}}{429}R_{54} - \frac{5\sqrt{858}}{4862}R_{74} + \frac{3\sqrt{1254}}{323}R_{94}$
3	3	1	7	6	1	$-\frac{\sqrt{91}}{26}R_{54} + \frac{3\sqrt{91}}{221}R_{74} - \frac{\sqrt{133}}{646}R_{94}$
3	3	1	7	6	2	$-\frac{\sqrt{29393}}{323}R_{98}$
3	3	1	7	6	3	$-\frac{3\sqrt{770}}{286}R_{50} + \frac{15\sqrt{42}}{221}R_{70} - \frac{3\sqrt{1330}}{646}R_{90}$
3	3	1	7	6	4	$-\frac{3\sqrt{33}}{286}R_{54} + \frac{15\sqrt{33}}{221}R_{74} - \frac{3\sqrt{8151}}{646}R_{94}$
3	3	2	3	3	2	$R_{00} + \frac{3\sqrt{5}}{20}R_{20} + \frac{1}{66}R_{40} + \frac{75\sqrt{13}}{572}R_{60}$
3	3	2	4	3	1	$-\frac{3\sqrt{14}}{22}R_{44} - \frac{25\sqrt{910}}{1716}R_{64}$
3	3	2	4	3	2	$\frac{5\sqrt{7}}{84}R_{20} + \frac{9\sqrt{35}}{154}R_{40} + \frac{35\sqrt{455}}{1716}R_{60}$
3	3	2	3	4	1	$-\frac{5\sqrt{22}}{44}R_{54}$
3	3	2	3	4	2	$\frac{\sqrt{7}}{28}R_{10} + \frac{\sqrt{3}}{6}R_{30} + \frac{25\sqrt{231}}{924}R_{50}$
3	3	2	4	4	1	$-\frac{\sqrt{770}}{2860}R_{54} + \frac{3\sqrt{770}}{143}R_{74}$
3	3	2	4	4	2	$\frac{5\sqrt{21}}{28}R_{10} + \frac{5}{22}R_{30} + \frac{\sqrt{77}}{4004}R_{50} + \frac{7\sqrt{105}}{143}R_{70}$
3	3	2	5	4	1	$-\frac{6\sqrt{154}}{143}R_{54} + \frac{5\sqrt{154}}{286}R_{74}$
3	3	2	5	4	2	$-\frac{8\sqrt{770}}{715}R_{54} - \frac{3\sqrt{770}}{286}R_{74}$
3	3	2	5	4	3	$\frac{5\sqrt{6}}{66}R_{30} + \frac{7\sqrt{462}}{429}R_{50} + \frac{7\sqrt{70}}{143}R_{70}$
3	3	2	4	5	1	$-\frac{3\sqrt{70}}{55}R_{44} - \frac{25\sqrt{182}}{858}R_{64}$
3	3	2	4	5	2	$\frac{\sqrt{35}}{42}R_{20} + \frac{9\sqrt{7}}{77}R_{40} + \frac{35\sqrt{91}}{858}R_{60}$
3	3	2	5	5	1	$\frac{\sqrt{231}}{39}R_{44} - \frac{\sqrt{1785}}{442}R_{84}$
3	3	2	5	5	2	$\frac{2\sqrt{1155}}{195}R_{44} - \frac{15\sqrt{357}}{442}R_{84}$
3	3	2	5	5	3	$\frac{3\sqrt{385}}{77}R_{20} + \frac{11\sqrt{77}}{546}R_{40} + \frac{35\sqrt{1309}}{2431}R_{80}$

Table B158: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	2	6	5	1	$-\frac{5\sqrt{1155}}{429}R_{44} - \frac{\sqrt{3003}}{143}R_{64} + \frac{7\sqrt{357}}{442}R_{84}$
3	3	2	6	5	2	$\frac{10\sqrt{7}}{143}R_{44} - \frac{\sqrt{455}}{143}R_{64} - \frac{\sqrt{6545}}{442}R_{84}$
3	3	2	6	5	3	$\frac{175}{858}R_{40} + \frac{14\sqrt{13}}{143}R_{60} + \frac{21\sqrt{17}}{221}R_{80}$
3	3	2	5	6	1	$-\frac{2\sqrt{1155}}{143}R_{54} + \frac{5\sqrt{1155}}{858}R_{74}$
3	3	2	5	6	2	$-\frac{8\sqrt{231}}{429}R_{54} - \frac{5\sqrt{231}}{286}R_{74}$
3	3	2	5	6	3	$\frac{5\sqrt{5}}{66}R_{30} + \frac{7\sqrt{385}}{429}R_{50} + \frac{35\sqrt{21}}{429}R_{70}$
3	3	2	6	6	1	$\frac{\sqrt{195}}{510}R_{74} - \frac{3\sqrt{285}}{323}R_{94}$
3	3	2	6	6	2	$\frac{4\sqrt{143}}{143}R_{54} - \frac{9\sqrt{143}}{4862}R_{74} - \frac{15\sqrt{209}}{323}R_{94}$
3	3	2	6	6	3	$\frac{175\sqrt{13}}{858}R_{30} + \frac{2\sqrt{1001}}{429}R_{50} + \frac{\sqrt{1365}}{36465}R_{70} + \frac{54\sqrt{1729}}{4199}R_{90}$
3	3	2	7	6	1	$-\frac{7\sqrt{4845}}{969}R_{98}$
3	3	2	7	6	2	$-\frac{7\sqrt{15}}{78}R_{54} - \frac{69\sqrt{15}}{1105}R_{74} + \frac{11\sqrt{3705}}{1938}R_{94}$
3	3	2	7	6	3	$\frac{17\sqrt{165}}{858}R_{54} - \frac{3\sqrt{165}}{1105}R_{74} - \frac{\sqrt{40755}}{1938}R_{94}$
3	3	2	7	6	4	$\frac{5\sqrt{154}}{286}R_{50} + \frac{27\sqrt{210}}{1105}R_{70} + \frac{15\sqrt{266}}{646}R_{90}$
4	3	1	4	3	1	$R_{00} - \frac{\sqrt{5}}{12}R_{20} - \frac{9}{22}R_{40} + \frac{85\sqrt{13}}{1716}R_{60}$
4	3	1	4	3	2	$\frac{3\sqrt{10}}{22}R_{44} + \frac{5\sqrt{26}}{572}R_{64}$
4	3	1	3	4	1	$-\frac{\sqrt{21}}{252}R_{10} + \frac{3}{22}R_{30} - \frac{75\sqrt{77}}{4004}R_{50} + \frac{7\sqrt{105}}{1287}R_{70}$
4	3	1	3	4	2	$\frac{5\sqrt{66}}{572}R_{54} + \frac{35\sqrt{66}}{429}R_{74}$
4	3	1	4	4	1	$-\frac{\sqrt{15}}{20}R_{10} - \frac{3\sqrt{35}}{110}R_{30} + \frac{3\sqrt{55}}{52}R_{50} - \frac{14\sqrt{3}}{143}R_{70}$
4	3	1	4	4	2	$-\frac{45\sqrt{22}}{572}R_{54} - \frac{14\sqrt{22}}{143}R_{74}$
4	3	1	5	4	1	0
4	3	1	5	4	2	$\frac{8\sqrt{15}}{45}R_{10} - \frac{3\sqrt{35}}{55}R_{30} - \frac{6\sqrt{55}}{143}R_{50} + \frac{133\sqrt{3}}{1287}R_{70}$
4	3	1	5	4	3	$\frac{10\sqrt{33}}{143}R_{54} + \frac{7\sqrt{33}}{429}R_{74}$
4	3	1	4	5	1	$\frac{1}{66}R_{20} + \frac{9\sqrt{5}}{143}R_{40} - \frac{119\sqrt{65}}{4290}R_{60} + \frac{112\sqrt{85}}{12155}R_{80}$
4	3	1	4	5	2	$-\frac{15\sqrt{2}}{143}R_{44} - \frac{7\sqrt{130}}{1430}R_{64} + \frac{168\sqrt{1870}}{12155}R_{84}$
4	3	1	5	5	1	$-\frac{7\sqrt{3315}}{663}R_{88}$
4	3	1	5	5	2	$\frac{\sqrt{66}}{33}R_{20} + \frac{\sqrt{330}}{286}R_{40} - \frac{14\sqrt{4290}}{2145}R_{60} + \frac{63\sqrt{5610}}{24310}R_{80}$

Table B159: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	3	1	5	5	3	$\frac{15\sqrt{22}}{286}R_{44} - \frac{14\sqrt{1430}}{2145}R_{64} - \frac{77\sqrt{170}}{2210}R_{84}$
4	3	1	6	5	1	$-\frac{7\sqrt{663}}{663}R_{88}$
4	3	1	6	5	2	$\frac{2\sqrt{10}}{11}R_{20} - \frac{75\sqrt{2}}{286}R_{40} - \frac{7\sqrt{26}}{143}R_{60} + \frac{147\sqrt{34}}{4862}R_{80}$
4	3	1	6	5	3	$-\frac{15\sqrt{14}}{286}R_{44} + \frac{5\sqrt{910}}{429}R_{64} + \frac{5\sqrt{13090}}{4862}R_{84}$
4	3	1	5	6	1	$\frac{28\sqrt{138567}}{12597}R_{98}$
4	3	1	5	6	2	$\frac{5\sqrt{42}}{858}R_{30} + \frac{7\sqrt{66}}{429}R_{50} - \frac{399\sqrt{10}}{4862}R_{70} + \frac{42\sqrt{114}}{4199}R_{90}$
4	3	1	5	6	3	$-\frac{7\sqrt{110}}{429}R_{54} - \frac{63\sqrt{110}}{4862}R_{74} + \frac{14\sqrt{27170}}{4199}R_{94}$
4	3	1	6	6	1	$-\frac{2\sqrt{6783}}{969}R_{98}$
4	3	1	6	6	2	$\frac{15\sqrt{26}}{286}R_{30} - \frac{3\sqrt{2730}}{374}R_{70} + \frac{15\sqrt{3458}}{4199}R_{90}$
4	3	1	6	6	3	$\frac{8\sqrt{286}}{429}R_{54} - \frac{45\sqrt{286}}{4862}R_{74} - \frac{7\sqrt{418}}{323}R_{94}$
4	3	1	7	6	1	$\frac{\sqrt{273}}{26}R_{54} - \frac{3\sqrt{273}}{221}R_{74} + \frac{\sqrt{399}}{646}R_{94}$
4	3	1	7	6	2	$-\frac{3\sqrt{88179}}{4199}R_{98}$
4	3	1	7	6	3	$\frac{40\sqrt{30}}{429}R_{30} - \frac{7\sqrt{2310}}{858}R_{50} - \frac{135\sqrt{14}}{2431}R_{70} + \frac{23\sqrt{3990}}{8398}R_{90}$
4	3	1	7	6	4	$-\frac{23\sqrt{11}}{286}R_{54} + \frac{225\sqrt{11}}{2431}R_{74} + \frac{21\sqrt{2717}}{8398}R_{94}$
4	3	2	4	3	2	$R_{00} + \frac{17\sqrt{5}}{84}R_{20} + \frac{27}{154}R_{40} - \frac{5\sqrt{13}}{1716}R_{60}$
4	3	2	3	4	1	$-\frac{45\sqrt{770}}{4004}R_{54} + \frac{7\sqrt{770}}{429}R_{74}$
4	3	2	3	4	2	$-\frac{\sqrt{5}}{84}R_{10} - \frac{\sqrt{105}}{154}R_{30} - \frac{5\sqrt{165}}{4004}R_{50} + \frac{245}{429}R_{70}$
4	3	2	4	4	1	$-\frac{45\sqrt{22}}{572}R_{54} - \frac{14\sqrt{22}}{143}R_{74}$
4	3	2	4	4	2	$\frac{\sqrt{15}}{60}R_{10} + \frac{27\sqrt{35}}{770}R_{30} + \frac{27\sqrt{55}}{572}R_{50} + \frac{98\sqrt{3}}{429}R_{70}$
4	3	2	5	4	1	$-\frac{6\sqrt{110}}{143}R_{54} + \frac{5\sqrt{110}}{286}R_{74}$
4	3	2	5	4	2	$-\frac{\sqrt{22}}{66}R_{74}$
4	3	2	5	4	3	$\frac{4\sqrt{10}}{15}R_{10} + \frac{19\sqrt{210}}{770}R_{30} + \frac{\sqrt{330}}{143}R_{50} - \frac{7\sqrt{2}}{429}R_{70}$
4	3	2	4	5	1	$-\frac{15\sqrt{2}}{143}R_{44} - \frac{7\sqrt{130}}{1430}R_{64} + \frac{168\sqrt{1870}}{12155}R_{84}$
4	3	2	4	5	2	$-\frac{17}{462}R_{20} - \frac{27\sqrt{5}}{1001}R_{40} + \frac{7\sqrt{65}}{4290}R_{60} + \frac{784\sqrt{85}}{12155}R_{80}$
4	3	2	5	5	1	$-\frac{3\sqrt{165}}{143}R_{44} + \frac{10\sqrt{429}}{429}R_{64} - \frac{35\sqrt{51}}{1326}R_{84}$
4	3	2	5	5	2	$\frac{10\sqrt{33}}{143}R_{44} + \frac{6\sqrt{2145}}{715}R_{64} + \frac{49\sqrt{255}}{2210}R_{84}$

Table B160: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	3	2	5	5	3	$\frac{\sqrt{11}}{33}R_{20} + \frac{9\sqrt{55}}{286}R_{40} + \frac{28\sqrt{715}}{2145}R_{60} + \frac{147\sqrt{935}}{12155}R_{80}$
4	3	2	6	5	1	$-\frac{15\sqrt{33}}{143}R_{44} - \frac{\sqrt{2145}}{429}R_{64} + \frac{\sqrt{255}}{78}R_{84}$
4	3	2	6	5	2	$-\frac{30\sqrt{5}}{143}R_{44} - \frac{7\sqrt{13}}{143}R_{64} - \frac{43\sqrt{187}}{4862}R_{84}$
4	3	2	6	5	3	$\frac{10\sqrt{7}}{33}R_{20} + \frac{15\sqrt{35}}{286}R_{40} + \frac{2\sqrt{455}}{429}R_{60} - \frac{3\sqrt{595}}{2431}R_{80}$
4	3	2	5	6	1	$\frac{14\sqrt{33}}{429}R_{54} - \frac{225\sqrt{33}}{4862}R_{74} + \frac{14\sqrt{8151}}{12597}R_{94}$
4	3	2	5	6	2	$\frac{3\sqrt{165}}{374}R_{74} + \frac{14\sqrt{40755}}{4199}R_{94}$
4	3	2	5	6	3	$-\frac{95\sqrt{7}}{6006}R_{30} - \frac{7\sqrt{11}}{429}R_{50} + \frac{21\sqrt{15}}{2431}R_{70} + \frac{588\sqrt{19}}{4199}R_{90}$
4	3	2	6	6	1	$\frac{4\sqrt{273}}{273}R_{54} + \frac{75\sqrt{273}}{3094}R_{74} - \frac{13\sqrt{399}}{969}R_{94}$
4	3	2	6	6	2	$\frac{4\sqrt{5005}}{1001}R_{54} + \frac{21\sqrt{5005}}{4862}R_{74} + \frac{\sqrt{7315}}{323}R_{94}$
4	3	2	6	6	3	$\frac{5\sqrt{455}}{858}R_{30} + \frac{4\sqrt{715}}{429}R_{50} + \frac{135\sqrt{39}}{2431}R_{70} + \frac{42\sqrt{1235}}{4199}R_{90}$
4	3	2	7	6	1	$\frac{\sqrt{6783}}{323}R_{98}$
4	3	2	7	6	2	$-\frac{9\sqrt{21}}{182}R_{54} + \frac{27\sqrt{21}}{1547}R_{74} + \frac{23\sqrt{5187}}{8398}R_{94}$
4	3	2	7	6	3	$-\frac{5\sqrt{231}}{154}R_{54} - \frac{3\sqrt{231}}{187}R_{74} - \frac{5\sqrt{57057}}{8398}R_{94}$
4	3	2	7	6	4	$\frac{40\sqrt{70}}{429}R_{30} + \frac{23\sqrt{110}}{858}R_{50} + \frac{81\sqrt{6}}{2431}R_{70} - \frac{21\sqrt{190}}{8398}R_{90}$
3	4	1	3	4	1	$R_{00} - \frac{25\sqrt{5}}{84}R_{20} + \frac{27}{154}R_{40} - \frac{5\sqrt{13}}{1716}R_{60}$
3	4	1	3	4	2	$\frac{9\sqrt{42}}{154}R_{44} - \frac{5\sqrt{2730}}{1716}R_{64}$
3	4	1	4	4	1	$-\frac{3\sqrt{7}}{28}R_{20} + \frac{9\sqrt{35}}{154}R_{40} - \frac{3\sqrt{455}}{572}R_{60}$
3	4	1	4	4	2	$\frac{9\sqrt{14}}{154}R_{44} - \frac{9\sqrt{910}}{572}R_{64}$
3	4	1	5	4	1	$\frac{7\sqrt{170170}}{2431}R_{88}$
3	4	1	5	4	2	$-\frac{2\sqrt{7}}{231}R_{20} + \frac{27\sqrt{35}}{1001}R_{40} - \frac{4\sqrt{455}}{429}R_{60} + \frac{7\sqrt{595}}{2431}R_{80}$
3	4	1	5	4	3	$\frac{9\sqrt{21}}{1001}R_{44} - \frac{4\sqrt{1365}}{429}R_{64} + \frac{7\sqrt{19635}}{2431}R_{84}$
3	4	1	4	5	1	$\frac{\sqrt{105}}{18}R_{10} - \frac{3\sqrt{5}}{11}R_{30} + \frac{3\sqrt{385}}{286}R_{50} - \frac{4\sqrt{21}}{1287}R_{70}$
3	4	1	4	5	2	$\frac{9\sqrt{154}}{286}R_{54} - \frac{4\sqrt{154}}{429}R_{74}$
3	4	1	5	5	1	0
3	4	1	5	5	2	$\frac{\sqrt{330}}{66}R_{30} - \frac{\sqrt{210}}{39}R_{50} + \frac{3\sqrt{154}}{286}R_{70}$
3	4	1	5	5	3	$\frac{\sqrt{14}}{13}R_{54} - \frac{3\sqrt{14}}{26}R_{74}$

Table B161: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 16 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	1	6	5	1	$\frac{14\sqrt{88179}}{4199}R_{98}$
3	4	1	6	5	2	$-\frac{5\sqrt{2}}{286}R_{30} + \frac{2\sqrt{154}}{143}R_{50} - \frac{75\sqrt{210}}{4862}R_{70} + \frac{21\sqrt{266}}{4199}R_{90}$
3	4	1	6	5	3	$\frac{2\sqrt{22}}{143}R_{54} - \frac{375\sqrt{22}}{4862}R_{74} + \frac{21\sqrt{5434}}{4199}R_{94}$
3	4	1	5	6	1	$-\frac{3\sqrt{51051}}{2431}R_{88}$
3	4	1	5	6	2	$\frac{\sqrt{210}}{33}R_{20} - \frac{25\sqrt{42}}{286}R_{40} + \frac{4\sqrt{546}}{429}R_{60} - \frac{3\sqrt{714}}{4862}R_{80}$
3	4	1	5	6	3	$-\frac{5\sqrt{70}}{286}R_{44} + \frac{4\sqrt{182}}{143}R_{64} - \frac{9\sqrt{2618}}{4862}R_{84}$
3	4	1	6	6	1	$\frac{\sqrt{51}}{17}R_{88}$
3	4	1	6	6	2	$\frac{15\sqrt{26}}{286}R_{40} - \frac{3\sqrt{2}}{11}R_{60} + \frac{3\sqrt{442}}{442}R_{80}$
3	4	1	6	6	3	$-\frac{5\sqrt{182}}{2002}R_{44} + \frac{3\sqrt{70}}{77}R_{64} - \frac{3\sqrt{170170}}{3094}R_{84}$
3	4	1	7	6	1	$-\frac{2\sqrt{429}}{429}R_{44} + \frac{3\sqrt{165}}{374}R_{64} - \frac{3\sqrt{3315}}{4199}R_{84} + \frac{7\sqrt{3}}{1938}R_{10,4}$
3	4	1	7	6	2	$-\frac{30\sqrt{663}}{4199}R_{88} + \frac{7\sqrt{1547}}{323}R_{10,8}$
3	4	1	7	6	3	$-\frac{2\sqrt{30}}{429}R_{40} + \frac{45\sqrt{390}}{4862}R_{60} - \frac{45\sqrt{510}}{4199}R_{80} + \frac{7\sqrt{70}}{646}R_{10,0}$
3	4	1	7	6	4	$-\frac{2\sqrt{7}}{3003}R_{44} + \frac{135\sqrt{455}}{34034}R_{64} - \frac{135\sqrt{6545}}{29393}R_{84} + \frac{7\sqrt{1001}}{646}R_{10,4}$
3	4	2	3	4	2	$R_{00} + \frac{5\sqrt{5}}{28}R_{20} + \frac{9}{154}R_{40} - \frac{25\sqrt{13}}{572}R_{60}$
3	4	2	4	4	1	$-\frac{9\sqrt{30}}{110}R_{44} - \frac{25\sqrt{78}}{572}R_{64}$
3	4	2	4	4	2	$\frac{\sqrt{15}}{28}R_{20} + \frac{27\sqrt{3}}{154}R_{40} + \frac{35\sqrt{39}}{572}R_{60}$
3	4	2	5	4	1	$\frac{9\sqrt{6}}{143}R_{44} - \frac{2\sqrt{390}}{143}R_{64} + \frac{7\sqrt{5610}}{4862}R_{84}$
3	4	2	5	4	2	$\frac{18\sqrt{30}}{715}R_{44} + \frac{10\sqrt{78}}{429}R_{64} + \frac{105\sqrt{1122}}{4862}R_{84}$
3	4	2	5	4	3	$-\frac{\sqrt{10}}{77}R_{20} - \frac{9\sqrt{2}}{182}R_{40} + \frac{245\sqrt{34}}{2431}R_{80}$
3	4	2	4	5	1	$-\frac{7\sqrt{330}}{1430}R_{54} - \frac{4\sqrt{330}}{429}R_{74}$
3	4	2	4	5	2	$\frac{5}{6}R_{10} + \frac{5\sqrt{21}}{77}R_{30} + \frac{\sqrt{33}}{286}R_{50} - \frac{28\sqrt{5}}{429}R_{70}$
3	4	2	5	5	1	$\frac{6}{13}R_{54} - \frac{5}{26}R_{74}$
3	4	2	5	5	2	$\frac{8\sqrt{5}}{65}R_{54} + \frac{3\sqrt{5}}{26}R_{74}$
3	4	2	5	5	3	$\frac{5\sqrt{231}}{462}R_{30} + \frac{7\sqrt{3}}{39}R_{50} + \frac{7\sqrt{55}}{143}R_{70}$
3	4	2	6	5	1	$-\frac{5\sqrt{5}}{34}R_{74} + \frac{21\sqrt{1235}}{4199}R_{94}$
3	4	2	6	5	2	$\frac{4\sqrt{33}}{143}R_{54} + \frac{225\sqrt{33}}{4862}R_{74} + \frac{35\sqrt{8151}}{4199}R_{94}$

Table B162: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 17 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	4	2	6	5	3	$-\frac{25\sqrt{3}}{858}R_{30} - \frac{2\sqrt{231}}{429}R_{50} + \frac{5\sqrt{35}}{2431}R_{70} + \frac{126\sqrt{399}}{4199}R_{90}$
3	4	2	5	6	1	$-\frac{35\sqrt{5}}{143}R_{44} + \frac{12\sqrt{13}}{143}R_{64} - \frac{9\sqrt{187}}{4862}R_{84}$
3	4	2	5	6	2	$-\frac{70}{143}R_{44} - \frac{4\sqrt{65}}{143}R_{64} - \frac{27\sqrt{935}}{4862}R_{84}$
3	4	2	5	6	3	$\frac{5\sqrt{3}}{11}R_{20} + \frac{5\sqrt{15}}{78}R_{40} - \frac{21\sqrt{255}}{2431}R_{80}$
3	4	2	6	6	1	$\frac{5\sqrt{5005}}{1001}R_{44} + \frac{3\sqrt{77}}{77}R_{64} - \frac{3\sqrt{1547}}{442}R_{84}$
3	4	2	6	6	2	$-\frac{10\sqrt{273}}{1001}R_{44} + \frac{\sqrt{105}}{77}R_{64} + \frac{\sqrt{255255}}{3094}R_{84}$
3	4	2	6	6	3	$\frac{25\sqrt{39}}{858}R_{40} + \frac{2\sqrt{3}}{11}R_{60} + \frac{3\sqrt{663}}{221}R_{80}$
3	4	2	7	6	1	$-\frac{6\sqrt{595}}{323}R_{88} + \frac{7\sqrt{255}}{323}R_{10,8}$
3	4	2	7	6	2	$-\frac{2\sqrt{385}}{1001}R_{44} - \frac{87\sqrt{1001}}{34034}R_{64} - \frac{129\sqrt{119}}{4199}R_{84} + \frac{7\sqrt{455}}{646}R_{10,4}$
3	4	2	7	6	3	$-\frac{2\sqrt{35}}{1001}R_{44} + \frac{573\sqrt{91}}{34034}R_{64} + \frac{237\sqrt{1309}}{29393}R_{84} + \frac{7\sqrt{5005}}{646}R_{10,4}$
3	4	2	7	6	4	$-\frac{10\sqrt{6}}{429}R_{40} - \frac{3\sqrt{78}}{374}R_{60} + \frac{9\sqrt{102}}{4199}R_{80} + \frac{105\sqrt{14}}{646}R_{10,0}$
4	4	1	4	4	1	$R_{00} - \frac{17\sqrt{5}}{220}R_{20} - \frac{81}{286}R_{40} - \frac{17\sqrt{13}}{2860}R_{60}$ $+ \frac{224\sqrt{17}}{12155}R_{80}$
4	4	1	4	4	2	$\frac{27\sqrt{10}}{286}R_{44} - \frac{3\sqrt{26}}{2860}R_{64} + \frac{336\sqrt{374}}{12155}R_{84}$
4	4	1	5	4	1	$\frac{21\sqrt{4862}}{2431}R_{88}$
4	4	1	5	4	2	$-\frac{6\sqrt{5}}{55}R_{20} - \frac{9}{143}R_{40} + \frac{84\sqrt{13}}{715}R_{60} - \frac{567\sqrt{17}}{12155}R_{80}$
4	4	1	5	4	3	$\frac{9\sqrt{15}}{143}R_{44} - \frac{28\sqrt{39}}{715}R_{64} - \frac{21\sqrt{561}}{1105}R_{84}$
4	4	1	4	5	1	$-\frac{\sqrt{3}}{10}R_{10} - \frac{3\sqrt{7}}{55}R_{30} + \frac{3\sqrt{11}}{26}R_{50} - \frac{28\sqrt{15}}{715}R_{70}$
4	4	1	4	5	2	$-\frac{9\sqrt{110}}{286}R_{54} - \frac{28\sqrt{110}}{715}R_{74}$
4	4	1	5	5	1	$-\frac{28\sqrt{12597}}{4199}R_{98}$
4	4	1	5	5	2	$-\frac{8\sqrt{22}}{55}R_{10} + \frac{19\sqrt{462}}{1430}R_{30} + \frac{\sqrt{6}}{13}R_{50} + \frac{133\sqrt{110}}{24310}R_{70}$ $-\frac{126\sqrt{1254}}{46189}R_{90}$
4	4	1	5	5	3	$\frac{\sqrt{10}}{13}R_{54} - \frac{21\sqrt{10}}{2210}R_{74} + \frac{42\sqrt{2470}}{4199}R_{94}$
4	4	1	6	5	1	$\frac{14\sqrt{62985}}{20995}R_{98}$
4	4	1	6	5	2	$-\frac{9\sqrt{70}}{286}R_{30} + \frac{63\sqrt{6}}{374}R_{70} - \frac{63\sqrt{190}}{4199}R_{90}$
4	4	1	6	5	3	$\frac{8\sqrt{770}}{715}R_{54} - \frac{27\sqrt{770}}{4862}R_{74} - \frac{21\sqrt{190190}}{20995}R_{94}$

Table B163: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 18 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	5	6	1	$\frac{7\sqrt{36465}}{2431}R_{88}$
4	4	1	5	6	2	$-\frac{\sqrt{6}}{11}R_{20} - \frac{3\sqrt{30}}{286}R_{40} + \frac{14\sqrt{390}}{715}R_{60} - \frac{189\sqrt{510}}{24310}R_{80}$
4	4	1	5	6	3	$\frac{45\sqrt{2}}{286}R_{44} - \frac{14\sqrt{130}}{715}R_{64} - \frac{21\sqrt{1870}}{2210}R_{84}$
4	4	1	6	6	1	$-\frac{\sqrt{1785}}{323}R_{88} - \frac{144\sqrt{85}}{1615}R_{10,8}$
4	4	1	6	6	2	$-\frac{6\sqrt{182}}{143}R_{20} + \frac{3\sqrt{910}}{286}R_{40} + \frac{3\sqrt{70}}{187}R_{60} + \frac{63\sqrt{15470}}{92378}R_{80}$ $-\frac{24\sqrt{390}}{4199}R_{10,0}$
4	4	1	6	6	3	$-\frac{21\sqrt{130}}{1430}R_{44} + \frac{25\sqrt{2}}{187}R_{64} - \frac{75\sqrt{4862}}{92378}R_{84} + \frac{72\sqrt{110}}{1615}R_{10,4}$
4	4	1	7	6	1	$\frac{2\sqrt{15015}}{715}R_{44} - \frac{9\sqrt{231}}{374}R_{64} + \frac{9\sqrt{4641}}{4199}R_{84} - \frac{7\sqrt{105}}{3230}R_{10,4}$
4	4	1	7	6	2	$-\frac{54\sqrt{23205}}{20995}R_{88} - \frac{3\sqrt{1105}}{1615}R_{10,8}$
4	4	1	7	6	3	$-\frac{6\sqrt{42}}{143}R_{40} + \frac{9\sqrt{546}}{4862}R_{60} + \frac{63\sqrt{714}}{4199}R_{80} - \frac{99\sqrt{2}}{646}R_{10,0}$
4	4	1	7	6	4	$-\frac{14\sqrt{5}}{715}R_{44} + \frac{27\sqrt{13}}{286}R_{64} - \frac{27\sqrt{187}}{4199}R_{84} - \frac{3\sqrt{715}}{190}R_{10,4}$
4	4	2	4	4	2	$R_{00} + \frac{289\sqrt{5}}{1540}R_{20} + \frac{243}{2002}R_{40} + \frac{\sqrt{13}}{2860}R_{60}$ $+\frac{1568\sqrt{17}}{12155}R_{80}$
4	4	2	5	4	1	$\frac{27\sqrt{2}}{143}R_{44} - \frac{6\sqrt{130}}{143}R_{64} + \frac{21\sqrt{1870}}{4862}R_{84}$
4	4	2	5	4	2	$-\frac{18\sqrt{10}}{143}R_{44} - \frac{54\sqrt{26}}{715}R_{64} - \frac{441\sqrt{374}}{24310}R_{84}$
4	4	2	5	4	3	$\frac{\sqrt{30}}{55}R_{20} + \frac{27\sqrt{6}}{286}R_{40} + \frac{28\sqrt{78}}{715}R_{60} + \frac{441\sqrt{102}}{12155}R_{80}$
4	4	2	4	5	1	$-\frac{9\sqrt{110}}{286}R_{54} - \frac{28\sqrt{110}}{715}R_{74}$
4	4	2	4	5	2	$\frac{\sqrt{3}}{30}R_{10} + \frac{27\sqrt{7}}{385}R_{30} + \frac{27\sqrt{11}}{286}R_{50} + \frac{196\sqrt{15}}{2145}R_{70}$
4	4	2	5	5	1	$\frac{2\sqrt{3}}{13}R_{54} + \frac{15\sqrt{3}}{442}R_{74} - \frac{14\sqrt{741}}{4199}R_{94}$
4	4	2	5	5	2	$-\frac{\sqrt{15}}{170}R_{74} - \frac{42\sqrt{3705}}{4199}R_{94}$
4	4	2	5	5	3	$\frac{8\sqrt{33}}{55}R_{10} + \frac{361\sqrt{77}}{10010}R_{30} + \frac{1}{13}R_{50} + \frac{7\sqrt{165}}{12155}R_{70}$ $+\frac{1764\sqrt{209}}{46189}R_{90}$
4	4	2	6	5	1	$-\frac{4\sqrt{15}}{65}R_{54} - \frac{45\sqrt{15}}{442}R_{74} + \frac{7\sqrt{3705}}{1615}R_{94}$
4	4	2	6	5	2	$-\frac{12\sqrt{11}}{143}R_{54} - \frac{441\sqrt{11}}{4862}R_{74} - \frac{21\sqrt{2717}}{4199}R_{94}$
4	4	2	6	5	3	$\frac{35}{286}R_{30} + \frac{4\sqrt{77}}{143}R_{50} + \frac{81\sqrt{105}}{2431}R_{70} + \frac{126\sqrt{133}}{4199}R_{90}$
4	4	2	5	6	1	$\frac{9\sqrt{15}}{143}R_{44} - \frac{10\sqrt{39}}{143}R_{64} + \frac{35\sqrt{561}}{4862}R_{84}$

Table B164: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 19 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	5	6	2	$-\frac{30\sqrt{3}}{143}R_{44} - \frac{18\sqrt{195}}{715}R_{64} - \frac{147\sqrt{2805}}{24310}R_{84}$
4	4	2	5	6	3	$\frac{1}{11}R_{20} + \frac{27\sqrt{5}}{286}R_{40} + \frac{28\sqrt{65}}{715}R_{60} + \frac{441\sqrt{85}}{12155}R_{80}$
4	4	2	6	6	1	$\frac{3\sqrt{15015}}{715}R_{44} + \frac{5\sqrt{231}}{1309}R_{64} + \frac{5\sqrt{4641}}{3458}R_{84} - \frac{24\sqrt{105}}{1615}R_{10,4}$
4	4	2	6	6	2	$\frac{6\sqrt{91}}{143}R_{44} + \frac{3\sqrt{35}}{187}R_{64} - \frac{129\sqrt{85085}}{646646}R_{84} - \frac{24\sqrt{77}}{323}R_{10,4}$
4	4	2	6	6	3	$\frac{14\sqrt{65}}{143}R_{20} + \frac{21\sqrt{13}}{286}R_{40} + \frac{10}{187}R_{60} + \frac{45\sqrt{221}}{46189}R_{80}$ $+ \frac{144\sqrt{273}}{4199}R_{10,0}$
4	4	2	7	6	1	$\frac{18\sqrt{1785}}{1615}R_{88} - \frac{63\sqrt{85}}{1615}R_{10,8}$
4	4	2	7	6	2	$-\frac{6\sqrt{1155}}{715}R_{44} - \frac{207\sqrt{3003}}{34034}R_{64} - \frac{423\sqrt{357}}{29393}R_{84} + \frac{27\sqrt{1365}}{3230}R_{10,4}$
4	4	2	7	6	3	$\frac{2\sqrt{105}}{143}R_{44} - \frac{45\sqrt{273}}{4862}R_{64} - \frac{99\sqrt{3927}}{29393}R_{84} - \frac{\sqrt{15015}}{646}R_{10,4}$
4	4	2	7	6	4	$\frac{14\sqrt{2}}{143}R_{40} + \frac{243\sqrt{26}}{4862}R_{60} + \frac{243\sqrt{34}}{4199}R_{80} + \frac{33\sqrt{42}}{646}R_{10,0}$
5	4	1	5	4	1	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80}$
5	4	1	5	4	2	$\frac{7\sqrt{4862}}{2431}R_{88}$
5	4	1	5	4	3	$\frac{18\sqrt{3}}{143}R_{44} - \frac{4\sqrt{195}}{143}R_{64} + \frac{7\sqrt{2805}}{2431}R_{84}$
5	4	1	4	5	1	$\frac{126\sqrt{92378}}{46189}R_{98}$
5	4	1	4	5	2	$\frac{6\sqrt{22}}{143}R_{54} - \frac{140\sqrt{22}}{2431}R_{74} + \frac{63\sqrt{5434}}{46189}R_{94}$
5	4	1	5	5	1	$-\frac{\sqrt{22}}{22}R_{10} + \frac{2\sqrt{462}}{143}R_{30} - \frac{\sqrt{6}}{13}R_{50} + \frac{14\sqrt{110}}{2431}R_{70}$ $- \frac{21\sqrt{1254}}{92378}R_{90}$
5	4	1	5	5	2	$-\frac{21\sqrt{12597}}{4199}R_{98}$
5	4	1	5	5	3	$\frac{3\sqrt{2}}{13}R_{54} - \frac{70\sqrt{2}}{221}R_{74} + \frac{63\sqrt{494}}{8398}R_{94}$
5	4	1	6	5	1	$\frac{\sqrt{110}}{22}R_{10} - \frac{2\sqrt{2310}}{143}R_{30} + \frac{\sqrt{30}}{13}R_{50} - \frac{70\sqrt{22}}{2431}R_{70}$ $+ \frac{21\sqrt{6270}}{92378}R_{90}$
5	4	1	6	5	2	$\frac{21\sqrt{230945}}{46189}R_{98}$
5	4	1	6	5	3	$\frac{3\sqrt{154}}{143}R_{54} - \frac{70\sqrt{154}}{2431}R_{74} + \frac{63\sqrt{38038}}{92378}R_{94}$
5	4	1	5	6	1	$\frac{5\sqrt{6}}{286}R_{20} - \frac{2\sqrt{30}}{143}R_{40} + \frac{7\sqrt{390}}{2431}R_{60} - \frac{42\sqrt{510}}{46189}R_{80}$ $+ \frac{3\sqrt{70}}{8398}R_{10,0}$

Table B165: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 20 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	1	5	6	2	$-\frac{84\sqrt{36465}}{46189}R_{88} + \frac{9\sqrt{85085}}{4199}R_{10,8}$
5	4	1	5	6	3	$-\frac{2\sqrt{10}}{143}R_{44} + \frac{105\sqrt{26}}{2431}R_{64} - \frac{630\sqrt{374}}{46189}R_{84} + \frac{21\sqrt{1430}}{8398}R_{10,4}$
5	4	1	6	6	1	$-\frac{5\sqrt{6006}}{2002}R_{20} + \frac{2\sqrt{30030}}{1001}R_{40} - \frac{\sqrt{2310}}{187}R_{60} + \frac{6\sqrt{510510}}{46189}R_{80}$ $-\frac{3\sqrt{1430}}{8398}R_{10,0}$
5	4	1	6	6	2	$\frac{12\sqrt{6545}}{3553}R_{88} - \frac{3\sqrt{2805}}{323}R_{10,8}$
5	4	1	6	6	3	$-\frac{2\sqrt{26}}{143}R_{44} + \frac{21\sqrt{10}}{187}R_{64} - \frac{126\sqrt{24310}}{46189}R_{84} + \frac{21\sqrt{22}}{646}R_{10,4}$
5	4	1	7	6	1	0
5	4	1	7	6	2	$\frac{15\sqrt{462}}{1001}R_{20} - \frac{12\sqrt{2310}}{1001}R_{40} + \frac{6\sqrt{30030}}{2431}R_{60} - \frac{36\sqrt{39270}}{46189}R_{80}$ $+\frac{9\sqrt{110}}{4199}R_{10,0}$
5	4	1	7	6	3	$-\frac{24\sqrt{51051}}{46189}R_{88} + \frac{18\sqrt{2431}}{4199}R_{10,8}$
5	4	1	7	6	4	$-\frac{8}{143}R_{44} + \frac{84\sqrt{65}}{2431}R_{64} - \frac{504\sqrt{935}}{46189}R_{84} + \frac{42\sqrt{143}}{4199}R_{10,4}$
5	4	2	5	4	2	$R_{00} + \frac{4\sqrt{5}}{165}R_{20} - \frac{54}{143}R_{40} - \frac{116\sqrt{13}}{2145}R_{60}$ $+\frac{511\sqrt{17}}{12155}R_{80}$
5	4	2	5	4	3	$\frac{18\sqrt{15}}{143}R_{44} + \frac{4\sqrt{39}}{165}R_{64} - \frac{7\sqrt{561}}{12155}R_{84}$
5	4	2	4	5	1	$-\frac{4\sqrt{3}}{495}R_{10} + \frac{12\sqrt{7}}{715}R_{30} + \frac{6\sqrt{11}}{143}R_{50} - \frac{7448\sqrt{15}}{109395}R_{70}$ $+\frac{1134\sqrt{19}}{46189}R_{90}$
5	4	2	4	5	2	$\frac{28\sqrt{110}}{2805}R_{74} + \frac{189\sqrt{27170}}{46189}R_{94}$
5	4	2	5	5	1	$-\frac{21\sqrt{12597}}{4199}R_{98}$
5	4	2	5	5	2	$\frac{3\sqrt{22}}{110}R_{10} + \frac{2\sqrt{462}}{195}R_{30} - \frac{\sqrt{6}}{39}R_{50} - \frac{42\sqrt{110}}{1105}R_{70}$ $+\frac{567\sqrt{1254}}{92378}R_{90}$
5	4	2	5	5	3	$-\frac{\sqrt{10}}{13}R_{54} - \frac{126\sqrt{10}}{1105}R_{74} - \frac{63\sqrt{2470}}{8398}R_{94}$
5	4	2	6	5	1	$-\frac{7\sqrt{62985}}{20995}R_{98}$
5	4	2	6	5	2	$\frac{3\sqrt{30}}{22}R_{10} - \frac{2\sqrt{70}}{143}R_{30} - \frac{5\sqrt{110}}{143}R_{50} - \frac{126\sqrt{6}}{2431}R_{70}$ $+\frac{1113\sqrt{190}}{92378}R_{90}$
5	4	2	6	5	3	$\frac{\sqrt{770}}{65}R_{54} + \frac{18\sqrt{770}}{2431}R_{74} + \frac{21\sqrt{190190}}{461890}R_{94}$
5	4	2	5	6	1	$-\frac{84\sqrt{36465}}{46189}R_{88} + \frac{9\sqrt{85085}}{4199}R_{10,8}$

Table B166: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 21 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	2	5	6	2	$-\frac{\sqrt{6}}{858}R_{20} + \frac{2\sqrt{30}}{143}R_{40} + \frac{203\sqrt{390}}{36465}R_{60} - \frac{3066\sqrt{510}}{230945}R_{80}$ $+ \frac{135\sqrt{70}}{8398}R_{10,0}$
5	4	2	5	6	3	$-\frac{10\sqrt{2}}{143}R_{44} - \frac{7\sqrt{130}}{935}R_{64} + \frac{126\sqrt{1870}}{230945}R_{84} + \frac{315\sqrt{286}}{8398}R_{10,4}$
5	4	2	6	6	1	$-\frac{4\sqrt{1785}}{323}R_{88} - \frac{63\sqrt{85}}{1615}R_{10,8}$
5	4	2	6	6	2	$\frac{27\sqrt{182}}{2002}R_{20} + \frac{6\sqrt{910}}{1001}R_{40} - \frac{3\sqrt{70}}{187}R_{60} - \frac{138\sqrt{15470}}{46189}R_{80}$ $+ \frac{99\sqrt{390}}{8398}R_{10,0}$
5	4	2	6	6	3	$\frac{14\sqrt{130}}{715}R_{44} - \frac{15\sqrt{2}}{187}R_{64} - \frac{210\sqrt{4862}}{46189}R_{84} - \frac{117\sqrt{110}}{3230}R_{10,4}$
5	4	2	7	6	1	$-\frac{8\sqrt{15015}}{2145}R_{44} + \frac{6\sqrt{231}}{187}R_{64} - \frac{12\sqrt{4641}}{4199}R_{84} + \frac{14\sqrt{105}}{4845}R_{10,4}$
5	4	2	7	6	2	$-\frac{48\sqrt{23205}}{20995}R_{88} - \frac{98\sqrt{1105}}{20995}R_{10,8}$
5	4	2	7	6	3	$\frac{45\sqrt{210}}{1001}R_{20} - \frac{92\sqrt{42}}{3003}R_{40} - \frac{36\sqrt{546}}{2431}R_{60} - \frac{144\sqrt{714}}{46189}R_{80}$ $+ \frac{473\sqrt{2}}{4199}R_{10,0}$
5	4	2	7	6	4	$-\frac{224\sqrt{5}}{2145}R_{44} + \frac{18\sqrt{13}}{187}R_{64} + \frac{756\sqrt{187}}{46189}R_{84} + \frac{32\sqrt{715}}{20995}R_{10,4}$
5	4	3	5	4	3	$R_{00} + \frac{12\sqrt{5}}{55}R_{20} + \frac{36}{143}R_{40} + \frac{16\sqrt{13}}{715}R_{60}$ $-\frac{98\sqrt{17}}{12155}R_{80}$
5	4	3	4	5	1	$-\frac{2\sqrt{165}}{143}R_{54} - \frac{392\sqrt{165}}{36465}R_{74} + \frac{126\sqrt{40755}}{46189}R_{94}$
5	4	3	4	5	2	$-\frac{2\sqrt{2}}{165}R_{10} - \frac{38\sqrt{42}}{5005}R_{30} - \frac{\sqrt{66}}{143}R_{50} + \frac{392\sqrt{10}}{36465}R_{70}$ $+ \frac{2646\sqrt{114}}{46189}R_{90}$
5	4	3	5	5	1	$-\frac{3\sqrt{2}}{13}R_{54} + \frac{70\sqrt{2}}{221}R_{74} - \frac{63\sqrt{494}}{8398}R_{94}$
5	4	3	5	5	2	$\frac{\sqrt{10}}{13}R_{54} + \frac{126\sqrt{10}}{1105}R_{74} + \frac{63\sqrt{2470}}{8398}R_{94}$
5	4	3	5	5	3	$\frac{\sqrt{22}}{110}R_{10} + \frac{14\sqrt{462}}{2145}R_{30} + \frac{4\sqrt{6}}{39}R_{50} + \frac{392\sqrt{110}}{12155}R_{70}$ $+ \frac{441\sqrt{1254}}{46189}R_{90}$
5	4	3	6	5	1	$-\frac{9\sqrt{10}}{65}R_{54} - \frac{10\sqrt{10}}{221}R_{74} + \frac{147\sqrt{2470}}{41990}R_{94}$
5	4	3	6	5	2	$\frac{\sqrt{66}}{143}R_{54} - \frac{6\sqrt{66}}{2431}R_{74} - \frac{49\sqrt{16302}}{92378}R_{94}$
5	4	3	6	5	3	$\frac{5\sqrt{14}}{22}R_{10} + \frac{70\sqrt{6}}{429}R_{30} + \frac{4\sqrt{462}}{429}R_{50} + \frac{16\sqrt{70}}{2431}R_{70}$ $-\frac{63\sqrt{798}}{46189}R_{90}$
5	4	3	5	6	1	$-\frac{2\sqrt{10}}{143}R_{44} + \frac{105\sqrt{26}}{2431}R_{64} - \frac{630\sqrt{374}}{46189}R_{84} + \frac{21\sqrt{1430}}{8398}R_{10,4}$

Table B167: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 22 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	4	3	5	6	2	$-\frac{10\sqrt{2}}{143}R_{44} - \frac{7\sqrt{130}}{935}R_{64} + \frac{126\sqrt{1870}}{230945}R_{84} + \frac{315\sqrt{286}}{8398}R_{10,4}$
5	4	3	5	6	3	$-\frac{3\sqrt{6}}{286}R_{20} - \frac{4\sqrt{30}}{429}R_{40} - \frac{28\sqrt{390}}{12155}R_{60} + \frac{588\sqrt{510}}{230945}R_{80}$ $+ \frac{315\sqrt{70}}{4199}R_{10,0}$
5	4	3	6	6	1	$-\frac{2\sqrt{10010}}{715}R_{44} + \frac{15\sqrt{154}}{1309}R_{64} + \frac{30\sqrt{3094}}{4199}R_{84} - \frac{93\sqrt{70}}{3230}R_{10,4}$
5	4	3	6	6	2	$\frac{2\sqrt{546}}{143}R_{44} + \frac{29\sqrt{210}}{1309}R_{64} + \frac{2\sqrt{510510}}{4199}R_{84} + \frac{9\sqrt{462}}{646}R_{10,4}$
5	4	3	6	6	3	$\frac{\sqrt{390}}{286}R_{20} + \frac{8\sqrt{78}}{429}R_{40} + \frac{20\sqrt{6}}{187}R_{60} + \frac{420\sqrt{1326}}{46189}R_{80}$ $+ \frac{99\sqrt{182}}{4199}R_{10,0}$
5	4	3	7	6	1	$-\frac{12\sqrt{1190}}{1615}R_{88} + \frac{14\sqrt{510}}{1615}R_{10,8}$
5	4	3	7	6	2	$-\frac{16\sqrt{770}}{715}R_{44} - \frac{111\sqrt{2002}}{17017}R_{64} + \frac{6\sqrt{238}}{4199}R_{84} + \frac{118\sqrt{910}}{20995}R_{10,4}$
5	4	3	7	6	3	$-\frac{8\sqrt{70}}{143}R_{44} - \frac{15\sqrt{182}}{1309}R_{64} - \frac{6\sqrt{2618}}{2717}R_{84} - \frac{4\sqrt{10010}}{4199}R_{10,4}$
5	4	3	7	6	4	$\frac{30\sqrt{15}}{143}R_{20} + \frac{8\sqrt{3}}{39}R_{40} + \frac{6\sqrt{39}}{221}R_{60} + \frac{252\sqrt{51}}{46189}R_{80}$ $- \frac{66\sqrt{7}}{4199}R_{10,0}$
4	5	1	4	5	1	$R_{00} - \frac{14\sqrt{5}}{165}R_{20} - \frac{63}{143}R_{40} + \frac{136\sqrt{13}}{2145}R_{60}$ $- \frac{56\sqrt{17}}{12155}R_{80}$
4	5	1	4	5	2	$\frac{21\sqrt{10}}{143}R_{44} + \frac{8\sqrt{26}}{715}R_{64} - \frac{84\sqrt{374}}{12155}R_{84}$
4	5	1	5	5	1	$-\frac{14\sqrt{663}}{663}R_{88}$
4	5	1	5	5	2	$\frac{2\sqrt{330}}{165}R_{20} + \frac{\sqrt{66}}{143}R_{40} - \frac{28\sqrt{858}}{2145}R_{60} + \frac{63\sqrt{1122}}{12155}R_{80}$
4	5	1	5	5	3	$\frac{3\sqrt{110}}{143}R_{44} - \frac{28\sqrt{286}}{2145}R_{64} - \frac{77\sqrt{34}}{1105}R_{84}$
4	5	1	6	5	1	$\frac{98\sqrt{3315}}{12597}R_{88} + \frac{216\sqrt{7735}}{20995}R_{10,8}$
4	5	1	6	5	2	$-\frac{2\sqrt{2}}{143}R_{20} + \frac{3\sqrt{10}}{143}R_{40} + \frac{28\sqrt{130}}{2431}R_{60} - \frac{1029\sqrt{170}}{46189}R_{80}$ $+ \frac{36\sqrt{210}}{4199}R_{10,0}$
4	5	1	6	5	3	$\frac{3\sqrt{70}}{715}R_{44} - \frac{100\sqrt{182}}{7293}R_{64} - \frac{175\sqrt{2618}}{46189}R_{84} + \frac{108\sqrt{10010}}{20995}R_{10,4}$
4	5	1	5	6	1	$-\frac{28\sqrt{692835}}{138567}R_{98}$
4	5	1	5	6	2	$\frac{12\sqrt{10}}{55}R_{10} - \frac{49\sqrt{210}}{2145}R_{30} - \frac{8\sqrt{330}}{429}R_{50} + \frac{399\sqrt{2}}{2431}R_{70}$ $- \frac{42\sqrt{570}}{46189}R_{90}$
4	5	1	5	6	3	$\frac{40\sqrt{22}}{429}R_{54} + \frac{63\sqrt{22}}{2431}R_{74} - \frac{70\sqrt{5434}}{46189}R_{94}$

Table B168: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 23 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	1	6	6	1	$-\frac{4\sqrt{33915}}{4845}R_{98}$
4	5	1	6	6	2	$\frac{3\sqrt{130}}{143}R_{30} - \frac{3\sqrt{546}}{187}R_{70} + \frac{6\sqrt{17290}}{4199}R_{90}$
4	5	1	6	6	3	$\frac{16\sqrt{1430}}{2145}R_{54} - \frac{9\sqrt{1430}}{2431}R_{74} - \frac{14\sqrt{2090}}{1615}R_{94}$
4	5	1	7	6	1	$-\frac{4\sqrt{1365}}{1105}R_{54} + \frac{15\sqrt{1365}}{4199}R_{74} - \frac{2\sqrt{1995}}{1615}R_{94} + \frac{3\sqrt{483}}{7429}R_{11,4}$
4	5	1	7	6	2	$\frac{12\sqrt{440895}}{20995}R_{98} + \frac{18\sqrt{3380195}}{37145}R_{11,8}$
4	5	1	7	6	3	$-\frac{4\sqrt{6}}{429}R_{30} + \frac{28\sqrt{462}}{7293}R_{50} + \frac{675\sqrt{70}}{46189}R_{70} - \frac{46\sqrt{798}}{4199}R_{90}$ $+ \frac{33\sqrt{966}}{7429}R_{11,0}$
4	5	1	7	6	4	$\frac{92\sqrt{55}}{12155}R_{54} - \frac{1125\sqrt{55}}{46189}R_{74} - \frac{42\sqrt{13585}}{20995}R_{94} + \frac{63\sqrt{3289}}{7429}R_{11,4}$
4	5	2	4	5	2	$R_{00} + \frac{34\sqrt{5}}{165}R_{20} + \frac{27}{143}R_{40} - \frac{8\sqrt{13}}{2145}R_{60}$ $- \frac{392\sqrt{17}}{12155}R_{80}$
4	5	2	5	5	1	$-\frac{6\sqrt{33}}{143}R_{44} + \frac{4\sqrt{2145}}{429}R_{64} - \frac{7\sqrt{255}}{663}R_{84}$
4	5	2	5	5	2	$\frac{4\sqrt{165}}{143}R_{44} + \frac{12\sqrt{429}}{715}R_{64} + \frac{49\sqrt{51}}{1105}R_{84}$
4	5	2	5	5	3	$\frac{2\sqrt{55}}{165}R_{20} + \frac{9\sqrt{11}}{143}R_{40} + \frac{56\sqrt{143}}{2145}R_{60} + \frac{294\sqrt{187}}{12155}R_{80}$
4	5	2	6	5	1	$\frac{6\sqrt{165}}{715}R_{44} + \frac{20\sqrt{429}}{7293}R_{64} - \frac{35\sqrt{51}}{741}R_{84} + \frac{252\sqrt{195}}{20995}R_{10,4}$
4	5	2	6	5	2	$\frac{12}{143}R_{44} + \frac{28\sqrt{65}}{2431}R_{64} + \frac{301\sqrt{935}}{46189}R_{84} + \frac{252\sqrt{143}}{4199}R_{10,4}$
4	5	2	6	5	3	$-\frac{2\sqrt{35}}{429}R_{20} - \frac{3\sqrt{7}}{143}R_{40} - \frac{40\sqrt{91}}{7293}R_{60} + \frac{210\sqrt{119}}{46189}R_{80}$ $+ \frac{1512\sqrt{3}}{4199}R_{10,0}$
4	5	2	5	6	1	$-\frac{16\sqrt{165}}{429}R_{54} + \frac{45\sqrt{165}}{2431}R_{74} - \frac{14\sqrt{40755}}{138567}R_{94}$
4	5	2	5	6	2	$-\frac{3\sqrt{33}}{187}R_{74} - \frac{70\sqrt{8151}}{46189}R_{94}$
4	5	2	5	6	3	$\frac{12\sqrt{15}}{55}R_{10} + \frac{133\sqrt{35}}{2145}R_{30} + \frac{8\sqrt{55}}{429}R_{50} - \frac{42\sqrt{3}}{2431}R_{70}$ $- \frac{588\sqrt{95}}{46189}R_{90}$
4	5	2	6	6	1	$\frac{8\sqrt{1365}}{1365}R_{54} + \frac{15\sqrt{1365}}{1547}R_{74} - \frac{26\sqrt{1995}}{4845}R_{94}$
4	5	2	6	6	2	$\frac{8\sqrt{1001}}{1001}R_{54} + \frac{21\sqrt{1001}}{2431}R_{74} + \frac{2\sqrt{1463}}{323}R_{94}$
4	5	2	6	6	3	$\frac{5\sqrt{91}}{429}R_{30} + \frac{8\sqrt{143}}{429}R_{50} + \frac{54\sqrt{195}}{2431}R_{70} + \frac{84\sqrt{247}}{4199}R_{90}$
4	5	2	7	6	1	$-\frac{4\sqrt{33915}}{1615}R_{98} + \frac{18\sqrt{260015}}{37145}R_{11,8}$
4	5	2	7	6	2	$\frac{36\sqrt{105}}{7735}R_{54} - \frac{135\sqrt{105}}{29393}R_{74} - \frac{46\sqrt{25935}}{20995}R_{94} + \frac{21\sqrt{6279}}{7429}R_{11,4}$

Table B169: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 24 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	5	2	7	6	3	$\frac{4\sqrt{1155}}{1309}R_{54} + \frac{15\sqrt{1155}}{3553}R_{74} + \frac{2\sqrt{285285}}{4199}R_{94} + \frac{21\sqrt{69069}}{7429}R_{11,4}$
4	5	2	7	6	4	$-\frac{4\sqrt{14}}{429}R_{30} - \frac{92\sqrt{22}}{7293}R_{50} - \frac{405\sqrt{30}}{46189}R_{70} + \frac{42\sqrt{38}}{4199}R_{90}$ $+ \frac{693\sqrt{46}}{7429}R_{11,0}$
5	5	1	5	5	1	$R_{00} - \frac{9\sqrt{5}}{26}R_{20} + \frac{4}{13}R_{40} - \frac{3\sqrt{13}}{221}R_{60}$ $- \frac{7\sqrt{17}}{4199}R_{80} + \frac{5\sqrt{21}}{8398}R_{10,0}$
5	5	1	5	5	2	$-\frac{7\sqrt{4862}}{4199}R_{88} + \frac{15\sqrt{102102}}{8398}R_{10,8}$
5	5	1	5	5	3	$-\frac{4\sqrt{3}}{39}R_{44} + \frac{3\sqrt{195}}{221}R_{64} + \frac{7\sqrt{2805}}{4199}R_{84} - \frac{35\sqrt{429}}{8398}R_{10,4}$
5	5	1	6	5	1	$-\frac{5}{26}R_{20} + \frac{2\sqrt{5}}{13}R_{40} - \frac{7\sqrt{65}}{221}R_{60} + \frac{42\sqrt{85}}{4199}R_{80}$ $- \frac{11\sqrt{105}}{8398}R_{10,0}$
5	5	1	6	5	2	$\frac{14\sqrt{6630}}{4199}R_{88} - \frac{33\sqrt{15470}}{8398}R_{10,8}$
5	5	1	6	5	3	$\frac{2\sqrt{231}}{429}R_{44} - \frac{7\sqrt{15015}}{2431}R_{64} + \frac{42\sqrt{1785}}{4199}R_{84} - \frac{77\sqrt{273}}{8398}R_{10,4}$
5	5	1	5	6	1	$-\frac{\sqrt{165}}{66}R_{10} + \frac{2\sqrt{385}}{143}R_{30} - \frac{\sqrt{5}}{13}R_{50} + \frac{70\sqrt{33}}{7293}R_{70}$ $- \frac{21\sqrt{1045}}{92378}R_{90}$
5	5	1	5	6	2	$-\frac{21\sqrt{41990}}{8398}R_{98}$
5	5	1	5	6	3	$-\frac{\sqrt{15}}{13}R_{54} + \frac{70\sqrt{15}}{663}R_{74} - \frac{21\sqrt{3705}}{8398}R_{94}$
5	5	1	6	6	1	$\frac{\sqrt{1365}}{78}R_{10} - \frac{\sqrt{65}}{13}R_{30} + \frac{\sqrt{5005}}{221}R_{50} - \frac{40\sqrt{273}}{12597}R_{70}$ $- \frac{9\sqrt{8645}}{58786}R_{90} + \frac{33\sqrt{10465}}{676039}R_{11,0}$
5	5	1	6	6	2	$-\frac{3\sqrt{67830}}{4522}R_{98} + \frac{33\sqrt{520030}}{52003}R_{11,8}$
5	5	1	6	6	3	$-\frac{7\sqrt{39}}{221}R_{54} + \frac{280\sqrt{39}}{12597}R_{74} + \frac{9\sqrt{57}}{646}R_{94} - \frac{33\sqrt{345}}{7429}R_{11,4}$
5	5	1	7	6	1	0
5	5	1	7	6	2	$-\frac{\sqrt{5}}{13}R_{30} + \frac{4\sqrt{385}}{221}R_{50} - \frac{270\sqrt{21}}{4199}R_{70} + \frac{132\sqrt{665}}{29393}R_{90}$ $- \frac{33\sqrt{805}}{52003}R_{11,0}$
5	5	1	7	6	3	$\frac{44\sqrt{58786}}{29393}R_{98} - \frac{11\sqrt{4056234}}{52003}R_{11,8}$
5	5	1	7	6	4	$\frac{28\sqrt{6}}{663}R_{54} - \frac{630\sqrt{6}}{4199}R_{74} + \frac{44\sqrt{1482}}{4199}R_{94} - \frac{11\sqrt{8970}}{7429}R_{11,4}$
5	5	2	5	5	2	$R_{00} + \frac{3\sqrt{5}}{130}R_{20} - \frac{4}{13}R_{40} - \frac{29\sqrt{13}}{1105}R_{60}$ $- \frac{511\sqrt{17}}{20995}R_{80} + \frac{225\sqrt{21}}{8398}R_{10,0}$

Table B170: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 25 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	5	5	3	$-\frac{4\sqrt{15}}{39}R_{44} - \frac{\sqrt{39}}{85}R_{64} - \frac{7\sqrt{561}}{20995}R_{84} - \frac{105\sqrt{2145}}{8398}R_{10,4}$
5	5	2	6	5	1	$-\frac{14\sqrt{24310}}{4199}R_{88} - \frac{21\sqrt{510510}}{41990}R_{10,8}$
5	5	2	6	5	2	$\frac{9\sqrt{33}}{286}R_{20} + \frac{2\sqrt{165}}{143}R_{40} - \frac{7\sqrt{2145}}{2431}R_{60} - \frac{322\sqrt{2805}}{46189}R_{80}$ $+ \frac{99\sqrt{385}}{8398}R_{10,0}$
5	5	2	6	5	3	$-\frac{14\sqrt{1155}}{2145}R_{44} + \frac{5\sqrt{3003}}{2431}R_{64} + \frac{70\sqrt{357}}{4199}R_{84} + \frac{33\sqrt{1365}}{3230}R_{10,4}$
5	5	2	5	6	1	$-\frac{21\sqrt{41990}}{8398}R_{98}$
5	5	2	5	6	2	$\frac{\sqrt{165}}{110}R_{10} + \frac{2\sqrt{385}}{195}R_{30} - \frac{\sqrt{5}}{39}R_{50} - \frac{14\sqrt{33}}{221}R_{70}$ $+ \frac{567\sqrt{1045}}{92378}R_{90}$
5	5	2	5	6	3	$\frac{5\sqrt{3}}{39}R_{54} + \frac{42\sqrt{3}}{221}R_{74} + \frac{105\sqrt{741}}{8398}R_{94}$
5	5	2	6	6	1	$\frac{3\sqrt{248710}}{22610}R_{98} + \frac{9\sqrt{17160990}}{52003}R_{11,8}$
5	5	2	6	6	2	$\frac{3\sqrt{5005}}{286}R_{10} - \frac{\sqrt{2145}}{429}R_{30} - \frac{5\sqrt{1365}}{663}R_{50} - \frac{72\sqrt{1001}}{46189}R_{70}$ $- \frac{159\sqrt{285285}}{646646}R_{90} + \frac{165\sqrt{345345}}{676039}R_{11,0}$
5	5	2	6	6	3	$-\frac{77\sqrt{195}}{3315}R_{54} - \frac{24\sqrt{195}}{4199}R_{74} + \frac{3\sqrt{285}}{3230}R_{94} - \frac{495\sqrt{69}}{7429}R_{11,4}$
5	5	2	7	6	1	$-\frac{4\sqrt{10010}}{1105}R_{54} + \frac{15\sqrt{10010}}{4199}R_{74} - \frac{2\sqrt{14630}}{1615}R_{94} + \frac{3\sqrt{3542}}{7429}R_{11,4}$
5	5	2	7	6	2	$-\frac{16\sqrt{3233230}}{146965}R_{98} - \frac{3\sqrt{223092870}}{260015}R_{11,8}$
5	5	2	7	6	3	$\frac{9\sqrt{11}}{143}R_{30} + \frac{12\sqrt{7}}{221}R_{50} - \frac{240\sqrt{1155}}{46189}R_{70} - \frac{264\sqrt{1463}}{29393}R_{90}$ $+ \frac{297\sqrt{1771}}{52003}R_{11,0}$
5	5	2	7	6	4	$-\frac{56\sqrt{30}}{1105}R_{54} + \frac{15\sqrt{30}}{4199}R_{74} + \frac{66\sqrt{7410}}{20995}R_{94} + \frac{66\sqrt{1794}}{7429}R_{11,4}$
5	5	3	5	5	3	$R_{00} + \frac{27\sqrt{5}}{130}R_{20} + \frac{8}{39}R_{40} + \frac{12\sqrt{13}}{1105}R_{60}$ $+ \frac{98\sqrt{17}}{20995}R_{80} + \frac{525\sqrt{21}}{4199}R_{10,0}$
5	5	3	6	5	1	$\frac{14\sqrt{15}}{195}R_{44} - \frac{5\sqrt{39}}{221}R_{64} - \frac{70\sqrt{561}}{4199}R_{84} + \frac{217\sqrt{2145}}{41990}R_{10,4}$
5	5	3	6	5	2	$-\frac{14\sqrt{11}}{143}R_{44} - \frac{29\sqrt{715}}{2431}R_{64} - \frac{154\sqrt{85}}{4199}R_{84} - \frac{693\sqrt{13}}{8398}R_{10,4}$
5	5	3	6	5	3	$\frac{\sqrt{385}}{286}R_{20} + \frac{8\sqrt{77}}{429}R_{40} + \frac{20\sqrt{1001}}{2431}R_{60} + \frac{420\sqrt{1309}}{46189}R_{80}$ $+ \frac{231\sqrt{33}}{4199}R_{10,0}$
5	5	3	5	6	1	$\frac{\sqrt{15}}{13}R_{54} - \frac{70\sqrt{15}}{663}R_{74} + \frac{21\sqrt{3705}}{8398}R_{94}$
5	5	3	5	6	2	$-\frac{5\sqrt{3}}{39}R_{54} - \frac{42\sqrt{3}}{221}R_{74} - \frac{105\sqrt{741}}{8398}R_{94}$

Table B171: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 26 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	5	6	3	$\frac{\sqrt{165}}{330}R_{10} + \frac{14\sqrt{385}}{2145}R_{30} + \frac{4\sqrt{5}}{39}R_{50} + \frac{392\sqrt{33}}{7293}R_{70}$ $+ \frac{441\sqrt{1045}}{46189}R_{90}$
5	5	3	6	6	1	$\frac{3\sqrt{15015}}{1105}R_{54} + \frac{40\sqrt{15015}}{88179}R_{74} + \frac{3\sqrt{21945}}{3230}R_{94} - \frac{15\sqrt{5313}}{7429}R_{11,4}$
5	5	3	6	6	2	$-\frac{\sqrt{91}}{221}R_{54} + \frac{24\sqrt{91}}{29393}R_{74} - \frac{3\sqrt{133}}{646}R_{94} - \frac{165\sqrt{805}}{7429}R_{11,4}$
5	5	3	6	6	3	$\frac{35\sqrt{429}}{858}R_{10} + \frac{5\sqrt{1001}}{429}R_{30} + \frac{28\sqrt{13}}{663}R_{50} + \frac{64\sqrt{2145}}{138567}R_{70}$ $+ \frac{27\sqrt{2717}}{46189}R_{90} + \frac{990\sqrt{3289}}{96577}R_{11,0}$
5	5	3	7	6	1	$\frac{4\sqrt{373065}}{4845}R_{98} - \frac{6\sqrt{2860165}}{37145}R_{11,8}$
5	5	3	7	6	2	$-\frac{8\sqrt{1155}}{3315}R_{54} - \frac{15\sqrt{1155}}{1729}R_{74} - \frac{2\sqrt{285285}}{3705}R_{94} + \frac{8\sqrt{69069}}{7429}R_{11,4}$
5	5	3	7	6	3	$-\frac{16\sqrt{105}}{663}R_{54} - \frac{795\sqrt{105}}{29393}R_{74} - \frac{22\sqrt{25935}}{12597}R_{94} - \frac{22\sqrt{6279}}{7429}R_{11,4}$
5	5	3	7	6	4	$\frac{\sqrt{154}}{143}R_{30} + \frac{28\sqrt{2}}{221}R_{50} + \frac{675\sqrt{330}}{46189}R_{70} + \frac{66\sqrt{418}}{4199}R_{90}$ $+ \frac{99\sqrt{506}}{7429}R_{11,0}$
6	5	1	6	5	1	$R_{00} - \frac{5\sqrt{5}}{26}R_{20} - \frac{4}{13}R_{40} + \frac{25\sqrt{13}}{221}R_{60}$ $- \frac{175\sqrt{17}}{4199}R_{80} + \frac{49\sqrt{21}}{8398}R_{10,0}$
6	5	1	6	5	2	$\frac{35\sqrt{1326}}{4199}R_{88} + \frac{3\sqrt{3094}}{8398}R_{10,8}$
6	5	1	6	5	3	$\frac{4\sqrt{1155}}{429}R_{44} - \frac{15\sqrt{3003}}{2431}R_{64} - \frac{35\sqrt{357}}{4199}R_{84} + \frac{35\sqrt{1365}}{8398}R_{10,4}$
6	5	1	5	6	1	$-\frac{\sqrt{33}}{858}R_{10} + \frac{\sqrt{77}}{143}R_{30} - \frac{25}{221}R_{50} + \frac{980\sqrt{165}}{138567}R_{70}$ $- \frac{225\sqrt{209}}{92378}R_{90} + \frac{33\sqrt{253}}{96577}R_{11,0}$
6	5	1	5	6	2	$\frac{15\sqrt{8398}}{8398}R_{98} + \frac{99\sqrt{579462}}{96577}R_{11,8}$
6	5	1	5	6	3	$\frac{15\sqrt{3}}{221}R_{54} + \frac{700\sqrt{3}}{12597}R_{74} - \frac{105\sqrt{741}}{8398}R_{94} + \frac{231\sqrt{4485}}{96577}R_{11,4}$
6	5	1	6	6	1	$-\frac{5\sqrt{273}}{546}R_{10} + \frac{15\sqrt{1001}}{1547}R_{50} - \frac{110\sqrt{1365}}{12597}R_{70} + \frac{15\sqrt{1729}}{4522}R_{90}$ $- \frac{330\sqrt{2093}}{676039}R_{11,0}$
6	5	1	6	6	2	$-\frac{15\sqrt{13566}}{4522}R_{98} - \frac{66\sqrt{104006}}{52003}R_{11,8}$
6	5	1	6	6	3	$\frac{5\sqrt{195}}{221}R_{54} - \frac{70\sqrt{195}}{12597}R_{74} - \frac{15\sqrt{285}}{646}R_{94} + \frac{198\sqrt{69}}{7429}R_{11,4}$
6	5	1	7	6	1	0
6	5	1	7	6	2	$\frac{12\sqrt{21}}{91}R_{10} - \frac{7}{13}R_{30} - \frac{20\sqrt{77}}{1547}R_{50} + \frac{150\sqrt{105}}{4199}R_{70}$ $- \frac{480\sqrt{133}}{29393}R_{90} + \frac{1749\sqrt{161}}{676039}R_{11,0}$

Table B172: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 27 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	1	7	6	3	$\frac{16\sqrt{293930}}{29393}R_{98} + \frac{11\sqrt{20281170}}{676039}R_{11,8}$
6	5	1	7	6	4	$\frac{44\sqrt{30}}{663}R_{54} - \frac{210\sqrt{30}}{4199}R_{74} - \frac{8\sqrt{7410}}{4199}R_{94} + \frac{319\sqrt{1794}}{96577}R_{11,4}$
6	5	2	6	5	2	$R_{00} + \frac{25\sqrt{5}}{286}R_{20} - \frac{36}{143}R_{40} - \frac{215\sqrt{13}}{2431}R_{60}$ $- \frac{35\sqrt{17}}{2431}R_{80} + \frac{15\sqrt{21}}{442}R_{10,0}$
6	5	2	6	5	3	$\frac{28\sqrt{7}}{143}R_{44} + \frac{25\sqrt{455}}{2431}R_{64} + \frac{35\sqrt{6545}}{46189}R_{84} - \frac{9\sqrt{1001}}{8398}R_{10,4}$
6	5	2	5	6	1	$-\frac{75\sqrt{277134}}{92378}R_{98} + \frac{33\sqrt{2124694}}{96577}R_{11,8}$
6	5	2	5	6	2	$-\frac{3}{286}R_{10} + \frac{\sqrt{21}}{429}R_{30} + \frac{125\sqrt{33}}{7293}R_{50} + \frac{1764\sqrt{5}}{46189}R_{70}$ $- \frac{3975\sqrt{57}}{92378}R_{90} + \frac{1815\sqrt{69}}{96577}R_{11,0}$
6	5	2	5	6	3	$-\frac{5\sqrt{55}}{2431}R_{54} + \frac{84\sqrt{55}}{46189}R_{74} + \frac{105\sqrt{13585}}{92378}R_{94} + \frac{1155\sqrt{3289}}{96577}R_{11,4}$
6	5	2	6	6	1	$-\frac{15\sqrt{13566}}{4522}R_{98} - \frac{66\sqrt{104006}}{52003}R_{11,8}$
6	5	2	6	6	2	$\frac{\sqrt{273}}{182}R_{10} + \frac{8\sqrt{13}}{143}R_{30} + \frac{5\sqrt{1001}}{1547}R_{50} - \frac{250\sqrt{1365}}{46189}R_{70}$ $- \frac{465\sqrt{1729}}{58786}R_{90} + \frac{3630\sqrt{2093}}{676039}R_{11,0}$
6	5	2	6	6	3	$-\frac{35\sqrt{143}}{2431}R_{54} - \frac{1050\sqrt{143}}{46189}R_{74} - \frac{15\sqrt{209}}{646}R_{94} - \frac{66\sqrt{1265}}{7429}R_{11,4}$
6	5	2	7	6	1	$-\frac{4\sqrt{546}}{221}R_{54} + \frac{75\sqrt{546}}{4199}R_{74} - \frac{2\sqrt{798}}{323}R_{94} + \frac{3\sqrt{4830}}{7429}R_{11,4}$
6	5	2	7	6	2	$-\frac{4\sqrt{176358}}{29393}R_{98} - \frac{45\sqrt{1352078}}{676039}R_{11,8}$
6	5	2	7	6	3	$\frac{12\sqrt{35}}{91}R_{10} + \frac{\sqrt{15}}{143}R_{30} - \frac{148\sqrt{1155}}{17017}R_{50} - \frac{4800\sqrt{7}}{46189}R_{70}$ $- \frac{12\sqrt{1995}}{29393}R_{90} + \frac{2013\sqrt{2415}}{676039}R_{11,0}$
6	5	2	7	6	4	$\frac{224\sqrt{22}}{2431}R_{54} + \frac{2625\sqrt{22}}{46189}R_{74} + \frac{6\sqrt{5434}}{4199}R_{94} - \frac{6\sqrt{32890}}{96577}R_{11,4}$
6	5	3	6	5	3	$R_{00} + \frac{5\sqrt{5}}{22}R_{20} + \frac{128}{429}R_{40} + \frac{100\sqrt{13}}{2431}R_{60}$ $+ \frac{350\sqrt{17}}{46189}R_{80} - \frac{3\sqrt{21}}{323}R_{10,0}$
6	5	3	5	6	1	$-\frac{5\sqrt{1155}}{2431}R_{54} + \frac{980\sqrt{1155}}{138567}R_{74} - \frac{45\sqrt{285285}}{92378}R_{94} + \frac{33\sqrt{69069}}{96577}R_{11,4}$
6	5	3	5	6	2	$-\frac{5\sqrt{231}}{663}R_{54} - \frac{420\sqrt{231}}{46189}R_{74} - \frac{15\sqrt{57057}}{92378}R_{94} + \frac{99\sqrt{345345}}{96577}R_{11,4}$
6	5	3	5	6	3	$-\frac{\sqrt{105}}{858}R_{10} - \frac{7\sqrt{5}}{429}R_{30} - \frac{20\sqrt{385}}{7293}R_{50} - \frac{1120\sqrt{21}}{138567}R_{70}$ $+ \frac{135\sqrt{665}}{46189}R_{90} + \frac{2178\sqrt{805}}{96577}R_{11,0}$
6	5	3	6	6	1	$-\frac{5\sqrt{195}}{221}R_{54} + \frac{70\sqrt{195}}{12597}R_{74} + \frac{15\sqrt{285}}{646}R_{94} - \frac{198\sqrt{69}}{7429}R_{11,4}$
6	5	3	6	6	2	$\frac{35\sqrt{143}}{2431}R_{54} + \frac{1050\sqrt{143}}{46189}R_{74} + \frac{15\sqrt{209}}{646}R_{94} + \frac{66\sqrt{1265}}{7429}R_{11,4}$

Table B173: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 28 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	5	3	6	6	3	$\frac{\sqrt{273}}{546}R_{10} + \frac{4\sqrt{13}}{143}R_{30} + \frac{100\sqrt{1001}}{17017}R_{50} + \frac{1000\sqrt{1365}}{138567}R_{70}$ $+ \frac{225\sqrt{1729}}{29393}R_{90} + \frac{4356\sqrt{2093}}{676039}R_{11,0}$
6	5	3	7	6	1	$-\frac{4\sqrt{4845}}{969}R_{98} + \frac{6\sqrt{37145}}{7429}R_{11,8}$
6	5	3	7	6	2	$-\frac{64\sqrt{15}}{663}R_{54} - \frac{315\sqrt{15}}{4199}R_{74} - \frac{2\sqrt{3705}}{12597}R_{94} + \frac{488\sqrt{897}}{96577}R_{11,4}$
6	5	3	7	6	3	$\frac{56\sqrt{165}}{7293}R_{54} + \frac{105\sqrt{165}}{46189}R_{74} - \frac{2\sqrt{40755}}{12597}R_{94} - \frac{62\sqrt{9867}}{96577}R_{11,4}$
6	5	3	7	6	4	$\frac{12\sqrt{42}}{91}R_{10} + \frac{43\sqrt{2}}{143}R_{30} + \frac{20\sqrt{154}}{1001}R_{50} + \frac{375\sqrt{210}}{46189}R_{70}$ $+ \frac{30\sqrt{266}}{29393}R_{90} - \frac{99\sqrt{322}}{39767}R_{11,0}$
5	6	1	5	6	1	$R_{00} - \frac{105\sqrt{5}}{286}R_{20} + \frac{56}{143}R_{40} - \frac{75\sqrt{13}}{2431}R_{60}$ $+ \frac{175\sqrt{17}}{46189}R_{80} - \frac{\sqrt{21}}{8398}R_{10,0}$
5	6	1	5	6	2	$\frac{175\sqrt{4862}}{46189}R_{88} - \frac{3\sqrt{102102}}{8398}R_{10,8}$
5	6	1	5	6	3	$\frac{56\sqrt{3}}{429}R_{44} - \frac{75\sqrt{195}}{2431}R_{64} + \frac{175\sqrt{2805}}{46189}R_{84} - \frac{7\sqrt{429}}{8398}R_{10,4}$
5	6	1	6	6	1	$-\frac{5\sqrt{5005}}{2002}R_{20} + \frac{10\sqrt{1001}}{1001}R_{40} - \frac{5\sqrt{77}}{187}R_{60} + \frac{30\sqrt{17017}}{46189}R_{80}$ $-\frac{5\sqrt{429}}{8398}R_{10,0}$
5	6	1	6	6	2	$\frac{10\sqrt{7854}}{3553}R_{88} - \frac{15\sqrt{374}}{646}R_{10,8}$
5	6	1	6	6	3	$-\frac{2\sqrt{195}}{429}R_{44} + \frac{35\sqrt{3}}{187}R_{64} - \frac{210\sqrt{7293}}{46189}R_{84} + \frac{7\sqrt{165}}{646}R_{10,4}$
5	6	1	7	6	1	$\frac{66\sqrt{572033}}{37145}R_{12,12}$
5	6	1	7	6	2	$-\frac{2\sqrt{385}}{5005}R_{20} + \frac{135\sqrt{77}}{17017}R_{40} - \frac{200\sqrt{1001}}{46189}R_{60} + \frac{150\sqrt{1309}}{46189}R_{80}$ $-\frac{810\sqrt{33}}{96577}R_{10,0} + \frac{33\sqrt{77}}{37145}R_{12,0}$
5	6	1	7	6	3	$\frac{10\sqrt{170170}}{46189}R_{88} - \frac{162\sqrt{72930}}{96577}R_{10,8} + \frac{11\sqrt{1939938}}{37145}R_{12,8}$
5	6	1	7	6	4	$\frac{3\sqrt{30}}{2431}R_{44} - \frac{1400\sqrt{78}}{138567}R_{64} + \frac{350\sqrt{1122}}{46189}R_{84} - \frac{378\sqrt{4290}}{96577}R_{10,4}$ $+ \frac{154\sqrt{429}}{37145}R_{12,4}$
5	6	2	5	6	2	$R_{00} + \frac{7\sqrt{5}}{286}R_{20} - \frac{56}{143}R_{40} - \frac{145\sqrt{13}}{2431}R_{60}$ $+ \frac{2555\sqrt{17}}{46189}R_{80} - \frac{45\sqrt{21}}{8398}R_{10,0}$
5	6	2	5	6	3	$\frac{56\sqrt{15}}{429}R_{44} + \frac{5\sqrt{39}}{187}R_{64} - \frac{35\sqrt{561}}{46189}R_{84} - \frac{21\sqrt{2145}}{8398}R_{10,4}$
5	6	2	6	6	1	$-\frac{10\sqrt{238}}{323}R_{88} - \frac{21\sqrt{102}}{646}R_{10,8}$

Table B174: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 29 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	6	2	6	6	2	$\frac{9\sqrt{1365}}{2002}R_{20} + \frac{10\sqrt{273}}{1001}R_{40} - \frac{5\sqrt{21}}{187}R_{60} - \frac{230\sqrt{4641}}{46189}R_{80}$ $+ \frac{495\sqrt{13}}{8398}R_{10,0}$
5	6	2	6	6	3	$\frac{14\sqrt{39}}{429}R_{44} - \frac{5\sqrt{15}}{187}R_{64} - \frac{70\sqrt{36465}}{46189}R_{84} - \frac{39\sqrt{33}}{646}R_{10,4}$
5	6	2	7	6	1	$\frac{3\sqrt{2002}}{2431}R_{44} - \frac{20\sqrt{770}}{3553}R_{64} + \frac{5\sqrt{15470}}{4199}R_{84} - \frac{126\sqrt{14}}{7429}R_{10,4}$ $+ \frac{66\sqrt{35}}{37145}R_{12,4}$
5	6	2	7	6	2	$\frac{20\sqrt{3094}}{4199}R_{88} + \frac{882\sqrt{1326}}{96577}R_{10,8} + \frac{33\sqrt{881790}}{37145}R_{12,8}$
5	6	2	7	6	3	$-\frac{6\sqrt{7}}{1001}R_{20} + \frac{69\sqrt{35}}{17017}R_{40} + \frac{240\sqrt{455}}{46189}R_{60} + \frac{120\sqrt{595}}{46189}R_{80}$ $-\frac{8514\sqrt{15}}{96577}R_{10,0} + \frac{1089\sqrt{35}}{37145}R_{12,0}$
5	6	2	7	6	4	$\frac{28\sqrt{6}}{2431}R_{44} - \frac{20\sqrt{390}}{3553}R_{64} - \frac{105\sqrt{5610}}{46189}R_{84} - \frac{288\sqrt{858}}{96577}R_{10,4}$ $+ \frac{462\sqrt{2145}}{37145}R_{12,4}$
5	6	3	5	6	3	$R_{00} + \frac{63\sqrt{5}}{286}R_{20} + \frac{112}{429}R_{40} + \frac{60\sqrt{13}}{2431}R_{60}$ $-\frac{490\sqrt{17}}{46189}R_{80} - \frac{105\sqrt{21}}{4199}R_{10,0}$
5	6	3	6	6	1	$-\frac{2\sqrt{3003}}{429}R_{44} + \frac{5\sqrt{1155}}{1309}R_{64} + \frac{10\sqrt{23205}}{4199}R_{84} - \frac{31\sqrt{21}}{646}R_{10,4}$
5	6	3	6	6	2	$\frac{2\sqrt{455}}{143}R_{44} + \frac{145\sqrt{7}}{1309}R_{64} + \frac{10\sqrt{17017}}{4199}R_{84} + \frac{9\sqrt{385}}{646}R_{10,4}$
5	6	3	6	6	3	$\frac{5\sqrt{13}}{286}R_{20} + \frac{8\sqrt{65}}{429}R_{40} + \frac{20\sqrt{5}}{187}R_{60} + \frac{420\sqrt{1105}}{46189}R_{80}$ $+ \frac{33\sqrt{1365}}{4199}R_{10,0}$
5	6	3	7	6	1	$\frac{10\sqrt{357}}{969}R_{88} - \frac{756\sqrt{17}}{7429}R_{10,8} + \frac{66\sqrt{11305}}{37145}R_{12,8}$
5	6	3	7	6	2	$\frac{12\sqrt{231}}{2431}R_{44} + \frac{740\sqrt{15015}}{969969}R_{64} - \frac{5\sqrt{1785}}{12597}R_{84} - \frac{2124\sqrt{273}}{96577}R_{10,4}$ $+ \frac{154\sqrt{2730}}{37145}R_{12,4}$
5	6	3	7	6	3	$\frac{30\sqrt{21}}{2431}R_{44} + \frac{100\sqrt{1365}}{74613}R_{64} + \frac{5\sqrt{19635}}{8151}R_{84} + \frac{360\sqrt{3003}}{96577}R_{10,4}$ $+ \frac{154\sqrt{30030}}{37145}R_{12,4}$
5	6	3	7	6	4	$-\frac{2\sqrt{2}}{143}R_{20} - \frac{3\sqrt{10}}{221}R_{40} - \frac{20\sqrt{130}}{4199}R_{60} - \frac{105\sqrt{170}}{46189}R_{80}$ $+ \frac{594\sqrt{210}}{96577}R_{10,0} + \frac{7623\sqrt{10}}{37145}R_{12,0}$
6	6	1	6	6	1	$R_{00} - \frac{13\sqrt{5}}{70}R_{20} - \frac{32}{119}R_{40} + \frac{25\sqrt{13}}{323}R_{60}$ $-\frac{25\sqrt{17}}{2261}R_{80} - \frac{91\sqrt{21}}{14858}R_{10,0} + \frac{2376}{260015}R_{12,0}$
6	6	1	6	6	2	$\frac{5\sqrt{1326}}{2261}R_{88} - \frac{39\sqrt{3094}}{104006}R_{10,8} + \frac{792\sqrt{41990}}{260015}R_{12,8}$

Table B175: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 30 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	6	6	3	$-\frac{32\sqrt{1155}}{3927}R_{44} + \frac{15\sqrt{3003}}{3553}R_{64} + \frac{5\sqrt{357}}{2261}R_{84} + \frac{65\sqrt{1365}}{14858}R_{10,4}$ $-\frac{1584\sqrt{546}}{260015}R_{12,4}$
6	6	1	7	6	1	$\frac{66\sqrt{96577}}{37145}R_{12,12}$
6	6	1	7	6	2	$-\frac{2\sqrt{65}}{91}R_{20} + \frac{45\sqrt{13}}{1547}R_{40} + \frac{80}{323}R_{60} - \frac{690\sqrt{221}}{29393}R_{80}$ $+\frac{990\sqrt{273}}{96577}R_{10,0} - \frac{429\sqrt{13}}{52003}R_{12,0}$
6	6	1	7	6	3	$\frac{50\sqrt{170}}{2261}R_{88} - \frac{198\sqrt{3570}}{52003}R_{10,8} - \frac{143\sqrt{1938}}{15295}R_{12,8}$
6	6	1	7	6	4	$\frac{9\sqrt{30030}}{17017}R_{44} - \frac{160\sqrt{462}}{10659}R_{64} + \frac{10\sqrt{9282}}{29393}R_{84} + \frac{198\sqrt{210}}{7429}R_{10,4}$ $-\frac{11726\sqrt{21}}{260015}R_{12,4}$
6	6	2	6	6	2	$R_{00} + \frac{13\sqrt{5}}{154}R_{20} - \frac{288}{1309}R_{40} - \frac{215\sqrt{13}}{3553}R_{60}$ $-\frac{5\sqrt{17}}{1309}R_{80} - \frac{195\sqrt{21}}{5474}R_{10,0} + \frac{8712}{52003}R_{12,0}$
6	6	2	6	6	3	$-\frac{32\sqrt{7}}{187}R_{44} - \frac{25\sqrt{455}}{3553}R_{64} - \frac{5\sqrt{6545}}{24871}R_{84} - \frac{117\sqrt{1001}}{104006}R_{10,4}$ $-\frac{1584\sqrt{10010}}{260015}R_{12,4}$
6	6	2	7	6	1	$\frac{3\sqrt{66}}{187}R_{44} - \frac{20\sqrt{4290}}{3553}R_{64} + \frac{5\sqrt{510}}{323}R_{84} - \frac{126\sqrt{78}}{7429}R_{10,4}$ $+\frac{66\sqrt{195}}{37145}R_{12,4}$
6	6	2	7	6	2	$-\frac{100\sqrt{102}}{2261}R_{88} - \frac{1206\sqrt{238}}{52003}R_{10,8} - \frac{1287\sqrt{3230}}{260015}R_{12,8}$
6	6	2	7	6	3	$\frac{2\sqrt{39}}{91}R_{20} + \frac{237\sqrt{195}}{17017}R_{40} + \frac{40\sqrt{15}}{3553}R_{60} - \frac{120\sqrt{3315}}{29393}R_{80}$ $-\frac{9306\sqrt{455}}{676039}R_{10,0} + \frac{4719\sqrt{195}}{260015}R_{12,0}$
6	6	2	7	6	4	$-\frac{36\sqrt{182}}{2431}R_{44} + \frac{20\sqrt{70}}{3553}R_{64} + \frac{15\sqrt{170170}}{29393}R_{84} + \frac{1332\sqrt{154}}{52003}R_{10,4}$ $+\frac{858\sqrt{385}}{52003}R_{12,4}$
6	6	3	6	6	3	$R_{00} + \frac{169\sqrt{5}}{770}R_{20} + \frac{1024}{3927}R_{40} + \frac{100\sqrt{13}}{3553}R_{60}$ $+\frac{50\sqrt{17}}{24871}R_{80} + \frac{507\sqrt{21}}{52003}R_{10,0} + \frac{156816}{260015}R_{12,0}$
6	6	3	7	6	1	$-\frac{10\sqrt{23205}}{6783}R_{88} + \frac{108\sqrt{1105}}{7429}R_{10,8} - \frac{66\sqrt{29393}}{52003}R_{12,8}$
6	6	3	7	6	2	$\frac{36\sqrt{15015}}{17017}R_{44} + \frac{20\sqrt{231}}{10659}R_{64} - \frac{335\sqrt{4641}}{88179}R_{84} - \frac{216\sqrt{105}}{7429}R_{10,4}$ $+\frac{10582\sqrt{42}}{260015}R_{12,4}$
6	6	3	7	6	3	$-\frac{18\sqrt{1365}}{2431}R_{44} - \frac{620\sqrt{21}}{10659}R_{64} - \frac{115\sqrt{51051}}{88179}R_{84} - \frac{468\sqrt{1155}}{52003}R_{10,4}$ $-\frac{3146\sqrt{462}}{260015}R_{12,4}$

Table B176: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = E$, and total spin $S = 1$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 31 of 31.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	3	7	6	4	$\frac{2\sqrt{130}}{455}R_{20} + \frac{405\sqrt{26}}{17017}R_{40} + \frac{500\sqrt{2}}{3553}R_{60} + \frac{375\sqrt{442}}{29393}R_{80}$ $+ \frac{8910\sqrt{546}}{676039}R_{10,0} + \frac{14157\sqrt{26}}{260015}R_{12,0}$
7	6	1	7	6	1	$R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40} - \frac{20\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} + \frac{33}{37145}R_{12,0}$
7	6	1	7	6	2	$\frac{66\sqrt{7429}}{37145}R_{12,12}$
7	6	1	7	6	3	$\frac{9\sqrt{1430}}{2431}R_{44} - \frac{300\sqrt{22}}{3553}R_{64} + \frac{75\sqrt{442}}{4199}R_{84} - \frac{378\sqrt{10}}{7429}R_{10,4}$ $+ \frac{198}{7429}R_{12,4}$
7	6	1	7	6	4	$\frac{5\sqrt{3570}}{2261}R_{88} - \frac{162\sqrt{170}}{7429}R_{10,8} + \frac{99\sqrt{4522}}{52003}R_{12,8}$
7	6	2	7	6	2	$R_{00} - \frac{38\sqrt{5}}{455}R_{20} - \frac{711}{1547}R_{40} + \frac{100\sqrt{13}}{4199}R_{60}$ $+ \frac{2075\sqrt{17}}{29393}R_{80} - \frac{4194\sqrt{21}}{96577}R_{10,0} + \frac{10329}{260015}R_{12,0}$
7	6	2	7	6	3	$\frac{225\sqrt{2210}}{29393}R_{88} + \frac{18\sqrt{46410}}{39767}R_{10,8} - \frac{33\sqrt{25194}}{260015}R_{12,8}$
7	6	2	7	6	4	$\frac{135\sqrt{2310}}{17017}R_{44} - \frac{140\sqrt{6006}}{46189}R_{64} - \frac{305\sqrt{714}}{29393}R_{84} - \frac{54\sqrt{2730}}{96577}R_{10,4}$ $+ \frac{2178\sqrt{273}}{260015}R_{12,4}$
7	6	3	7	6	3	$R_{00} + \frac{58\sqrt{5}}{455}R_{20} - \frac{2241}{17017}R_{40} - \frac{3940\sqrt{13}}{46189}R_{60}$ $- \frac{1555\sqrt{17}}{29393}R_{80} + \frac{2862\sqrt{21}}{676039}R_{10,0} + \frac{35211}{260015}R_{12,0}$
7	6	3	7	6	4	$\frac{90\sqrt{210}}{2431}R_{44} + \frac{40\sqrt{546}}{3553}R_{64} + \frac{40\sqrt{7854}}{29393}R_{84} + \frac{72\sqrt{30030}}{676039}R_{10,4}$ $- \frac{198\sqrt{3003}}{260015}R_{12,4}$
7	6	4	7	6	4	$R_{00} + \frac{106\sqrt{5}}{455}R_{20} + \frac{5589}{17017}R_{40} + \frac{2500\sqrt{13}}{46189}R_{60}$ $+ \frac{625\sqrt{17}}{29393}R_{80} + \frac{486\sqrt{21}}{676039}R_{10,0} - \frac{11979}{260015}R_{12,0}$

Table B177: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{1}{2}$	0	1	0
$\frac{1}{2}$	0	1	$\frac{3}{2}$	0	1	0
$\frac{1}{2}$	0	1	$\frac{1}{2}$	1	1	0
$\frac{1}{2}$	0	1	$\frac{3}{2}$	1	1	0
$\frac{1}{2}$	0	1	$\frac{5}{2}$	1	1	0
$\frac{1}{2}$	0	1	$\frac{1}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{3}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{5}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	2	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	2	2	0
$\frac{1}{2}$	0	1	$\frac{3}{2}$	3	1	0
$\frac{1}{2}$	0	1	$\frac{5}{2}$	3	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	3	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	3	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	3	3	0
$\frac{1}{2}$	0	1	$\frac{5}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	3	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	4	1	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	4	2	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	4	3	0

Table B178: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	5	1	0
$\frac{1}{2}$	0	1	$\frac{7}{2}$	5	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	3	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	1	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	2	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	3	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	5	1	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	5	2	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	5	3	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	6	2	0
$\frac{1}{2}$	0	1	$\frac{9}{2}$	6	3	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	2	0
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	3	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	2	0
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	3	0
$\frac{1}{2}$	0	1	$\frac{15}{2}$	6	1	0
$\frac{1}{2}$	0	1	$\frac{15}{2}$	6	2	0
$\frac{1}{2}$	0	1	$\frac{15}{2}$	6	3	0
$\frac{1}{2}$	0	1	$\frac{15}{2}$	6	4	0
$\frac{3}{2}$	0	1	$\frac{3}{2}$	0	1	R_{00}
$\frac{3}{2}$	0	1	$\frac{1}{2}$	1	1	$-\frac{\sqrt{3}}{3}R_{10}$

Table B179: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	1	1	$-\frac{\sqrt{15}}{15}R_{10}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	1	1	$\frac{\sqrt{15}}{5}R_{10}$
$\frac{3}{2}$	0	1	$\frac{1}{2}$	2	1	$\frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	2	1	$-\frac{\sqrt{105}}{35}R_{20}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	2	1	$\frac{3\sqrt{70}}{35}R_{20}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	2	2	0
$\frac{3}{2}$	0	1	$\frac{3}{2}$	3	1	$\frac{3\sqrt{35}}{35}R_{30}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{210}}{35}R_{30}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{42}}{21}R_{30}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	3	2	0
$\frac{3}{2}$	0	1	$\frac{9}{2}$	3	1	0
$\frac{3}{2}$	0	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{210}}{21}R_{30}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	3	3	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	4	1	$\frac{\sqrt{14}}{7}R_{40}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{70}}{21}R_{40}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{35}}{15}R_{44}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	1	$\frac{2\sqrt{22}}{11}R_{44}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{110}}{33}R_{40}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	3	$-\frac{4\sqrt{22}}{33}R_{44}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	1	$\frac{\sqrt{33}}{11}R_{44}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	2	$\frac{\sqrt{55}}{11}R_{40}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	3	$\frac{\sqrt{165}}{55}R_{44}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{330}}{33}R_{50}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	5	2	$\frac{2\sqrt{165}}{55}R_{54}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{33}}{11}R_{54}$

Table B180: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{165}}{33}R_{50}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{33}}{11}R_{54}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	1	$\frac{7\sqrt{143}}{143}R_{54}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	2	$-\frac{\sqrt{2145}}{143}R_{50}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	3	$-\frac{17\sqrt{715}}{715}R_{54}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	1	$\frac{\sqrt{65}}{13}R_{54}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	2	$\frac{3\sqrt{1001}}{143}R_{50}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	3	$\frac{\sqrt{2145}}{143}R_{54}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	1	$\frac{\sqrt{715}}{143}R_{64}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	2	$\frac{3\sqrt{715}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	3	$\frac{3\sqrt{715}}{143}R_{64}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	1	$-\frac{19\sqrt{1001}}{1001}R_{64}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	2	$-\frac{\sqrt{3003}}{143}R_{60}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	3	$\frac{5\sqrt{5005}}{1001}R_{64}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{715}}{65}R_{64}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{455}}{65}R_{60}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{195}}{65}R_{64}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	1	$\frac{3\sqrt{10010}}{455}R_{64}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	2	$\frac{2\sqrt{455}}{65}R_{60}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	3	$\frac{\sqrt{30030}}{455}R_{64}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	4	0
$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	R_{00}
$\frac{1}{2}$	1	1	$\frac{3}{2}$	1	1	$\frac{1}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	1	1	$-\frac{3}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{1}{2}$	2	1	$-\frac{\sqrt{3}}{3}R_{10}$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	2	1	$\frac{\sqrt{3}}{3}R_{10}$

Table B181: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	2	1	$\frac{\sqrt{3}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	2	1	$-\frac{3\sqrt{2}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	2	2	0
$\frac{1}{2}$	1	1	$\frac{3}{2}$	3	1	$-\frac{3}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{\sqrt{6}}{5}R_{20}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{\sqrt{6}}{9}R_{40}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{3}}{9}R_{44}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{6}}{3}R_{44}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{30}}{9}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	3	3	$-\frac{\sqrt{6}}{9}R_{44}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	4	1	$-\frac{3\sqrt{2}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	1	$\frac{\sqrt{10}}{7}R_{30}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	2	0
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{2}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{10}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	3	$\frac{3\sqrt{2}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	4	1	$-\frac{5\sqrt{3}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	4	2	$-\frac{3\sqrt{5}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	4	3	$-\frac{\sqrt{15}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{30}}{9}R_{40}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	5	2	$-\frac{2\sqrt{15}}{9}R_{44}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{3}}{3}R_{44}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{15}}{9}R_{40}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{3}}{9}R_{44}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{\sqrt{5}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{\sqrt{15}}{13}R_{60}$

Table B182: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{5}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	5	1	$-\frac{3\sqrt{11}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	5	2	$-\frac{3\sqrt{7}}{13}R_{60}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	5	3	$-\frac{3\sqrt{3}}{13}R_{64}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	6	1	$-\frac{3}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	6	2	$-\frac{3\sqrt{5}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	6	3	$-\frac{9}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{\sqrt{35}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	2	$\frac{\sqrt{21}}{11}R_{50}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{7}}{11}R_{54}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	1	$\frac{1}{5}R_{74}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{\sqrt{21}}{15}R_{70}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{\sqrt{33}}{15}R_{74}$
$\frac{1}{2}$	1	1	$\frac{15}{2}$	6	1	$-\frac{\sqrt{14}}{5}R_{74}$
$\frac{1}{2}$	1	1	$\frac{15}{2}$	6	2	$-\frac{2\sqrt{21}}{15}R_{70}$
$\frac{1}{2}$	1	1	$\frac{15}{2}$	6	3	$-\frac{\sqrt{42}}{15}R_{74}$
$\frac{1}{2}$	1	1	$\frac{15}{2}$	6	4	0
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	$R_{00} - \frac{4\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	1	1	$-\frac{3\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	1	1	$\frac{1}{2}$	2	1	$-\frac{\sqrt{15}}{15}R_{10}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	1	$-\frac{4\sqrt{15}}{75}R_{10} + \frac{9\sqrt{35}}{175}R_{30}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	1	$\frac{3\sqrt{35}}{25}R_{10} - \frac{16\sqrt{15}}{175}R_{30}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	2	1	$-\frac{3\sqrt{10}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	2	2	0
$\frac{3}{2}$	1	1	$\frac{3}{2}$	3	1	$-\frac{3\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{8\sqrt{30}}{175}R_{20} + \frac{\sqrt{6}}{7}R_{40}$

Table B183: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{9\sqrt{6}}{35}R_{20} - \frac{4\sqrt{30}}{63}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{8\sqrt{15}}{45}R_{44}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	1	$\frac{2\sqrt{30}}{15}R_{44}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{6}}{9}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	3	$-\frac{4\sqrt{30}}{45}R_{44}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	4	1	$-\frac{3\sqrt{10}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	1	$-\frac{4\sqrt{2}}{21}R_{30} + \frac{\sqrt{154}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{77}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	1	$-\frac{8\sqrt{10}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{154}}{21}R_{30} - \frac{8\sqrt{2}}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	3	$\frac{8\sqrt{10}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	1	$\frac{7\sqrt{15}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	2	$-\frac{3}{11}R_{50}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	3	$-\frac{17\sqrt{3}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{6}}{9}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	5	2	$\frac{14\sqrt{3}}{45}R_{44}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{32\sqrt{15}}{165}R_{44} + \frac{3\sqrt{39}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{16\sqrt{3}}{99}R_{40} + \frac{9\sqrt{39}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	3	$-\frac{64\sqrt{15}}{495}R_{44} + \frac{9\sqrt{39}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{3\sqrt{65}}{55}R_{44} - \frac{76}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{\sqrt{39}}{11}R_{40} - \frac{28\sqrt{3}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{3\sqrt{13}}{55}R_{44} + \frac{20\sqrt{5}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{3\sqrt{55}}{65}R_{64}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	2	$-\frac{3\sqrt{35}}{65}R_{60}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	3	$-\frac{9\sqrt{15}}{65}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	6	1	$-\frac{9\sqrt{5}}{55}R_{54}$

Table B184: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	6	2	$-\frac{3}{11}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	6	3	$\frac{9\sqrt{5}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{28\sqrt{7}}{143}R_{54} + \frac{33\sqrt{7}}{455}R_{74}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{105}}{143}R_{50} + \frac{3\sqrt{77}}{65}R_{70}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	3	$-\frac{68\sqrt{35}}{715}R_{54} + \frac{33\sqrt{35}}{455}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	1	$\frac{3\sqrt{5}}{13}R_{54} - \frac{16\sqrt{5}}{65}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{9\sqrt{77}}{143}R_{50} - \frac{32\sqrt{105}}{975}R_{70}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{3\sqrt{165}}{143}R_{54} + \frac{16\sqrt{165}}{975}R_{74}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{70}}{35}R_{74}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	2	$-\frac{2\sqrt{105}}{75}R_{70}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	3	$-\frac{19\sqrt{210}}{525}R_{74}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	4	0
$\frac{5}{2}$	1	1	$\frac{5}{2}$	1	1	$R_{00} + \frac{4\sqrt{5}}{25}R_{20}$
$\frac{5}{2}$	1	1	$\frac{1}{2}$	2	1	$\frac{3\sqrt{35}}{35}R_{30}$
$\frac{5}{2}$	1	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{15}}{25}R_{10} - \frac{12\sqrt{35}}{175}R_{30}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	2	1	$-\frac{3\sqrt{35}}{175}R_{10} - \frac{12\sqrt{15}}{175}R_{30}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	2	1	$\frac{2\sqrt{210}}{35}R_{10} + \frac{3\sqrt{10}}{35}R_{30}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	2	2	0
$\frac{5}{2}$	1	1	$\frac{3}{2}$	3	1	$\frac{3\sqrt{5}}{175}R_{20} + \frac{4}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{6\sqrt{30}}{175}R_{20} - \frac{\sqrt{6}}{7}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{6}}{35}R_{20} - \frac{\sqrt{30}}{21}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{15}}{15}R_{44}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{30}}{15}R_{44}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{30}}{7}R_{20} + \frac{2\sqrt{6}}{21}R_{40}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	3	$-\frac{\sqrt{30}}{15}R_{44}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	4	1	$\frac{2\sqrt{10}}{105}R_{30} + \frac{5\sqrt{770}}{231}R_{50}$

Table B185: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{2}}{7}R_{30} - \frac{2\sqrt{154}}{77}R_{50}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	4	2	$\frac{4\sqrt{77}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	4	1	$\frac{9\sqrt{10}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{154}}{77}R_{30} - \frac{2\sqrt{2}}{11}R_{50}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	4	3	$\frac{\sqrt{10}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	1	$-\frac{\sqrt{15}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	2	$\frac{20\sqrt{77}}{231}R_{30} + \frac{7}{33}R_{50}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	3	$-\frac{9\sqrt{3}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{6}}{33}R_{40} + \frac{10\sqrt{78}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	2	$-\frac{14\sqrt{3}}{165}R_{44} + \frac{4\sqrt{195}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{14\sqrt{15}}{165}R_{44} - \frac{9\sqrt{39}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{4\sqrt{3}}{33}R_{40} - \frac{7\sqrt{39}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	3	$\frac{14\sqrt{15}}{165}R_{44} + \frac{\sqrt{39}}{11}R_{64}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{48\sqrt{65}}{715}R_{44} + \frac{63}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{39}}{143}R_{40} - \frac{21\sqrt{3}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	3	$-\frac{72\sqrt{13}}{715}R_{44} - \frac{9\sqrt{5}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{5\sqrt{143}}{143}R_{44} + \frac{6\sqrt{55}}{715}R_{64}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	2	$\frac{5\sqrt{455}}{143}R_{40} + \frac{24\sqrt{35}}{715}R_{60}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	3	$\frac{5\sqrt{39}}{143}R_{44} - \frac{38\sqrt{15}}{715}R_{64}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	6	1	$-\frac{54\sqrt{5}}{715}R_{54} + \frac{\sqrt{5}}{13}R_{74}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	6	2	$\frac{12}{143}R_{50} + \frac{7\sqrt{165}}{143}R_{70}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	6	3	$-\frac{6\sqrt{5}}{715}R_{54} + \frac{3\sqrt{5}}{13}R_{74}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{27\sqrt{7}}{1001}R_{54} - \frac{12\sqrt{7}}{65}R_{74}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	2	$-\frac{3\sqrt{105}}{143}R_{50} - \frac{24\sqrt{77}}{715}R_{70}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	3	$\frac{243\sqrt{35}}{5005}R_{54} + \frac{36\sqrt{35}}{455}R_{74}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	1	$\frac{3\sqrt{5}}{13}R_{54} + \frac{2\sqrt{5}}{13}R_{74}$

Table B186: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{77}}{143}R_{50} - \frac{8\sqrt{105}}{325}R_{70}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	3	$-\frac{5\sqrt{165}}{143}R_{54} - \frac{6\sqrt{165}}{325}R_{74}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	1	$\frac{6\sqrt{70}}{91}R_{54} + \frac{\sqrt{70}}{65}R_{74}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	2	$\frac{12\sqrt{77}}{143}R_{50} + \frac{6\sqrt{105}}{325}R_{70}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	3	$\frac{2\sqrt{210}}{91}R_{54} - \frac{23\sqrt{210}}{2275}R_{74}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	4	0
$\frac{1}{2}$	2	1	$\frac{1}{2}$	2	1	R_{00}
$\frac{1}{2}$	2	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{5}}{5}R_{20}$
$\frac{1}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{\sqrt{105}}{35}R_{20}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	2	1	$\frac{\sqrt{14}}{7}R_{40}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{2\sqrt{7}}{7}R_{44}$
$\frac{1}{2}$	2	1	$\frac{3}{2}$	3	1	$\frac{\sqrt{15}}{5}R_{10}$
$\frac{1}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{210}}{35}R_{30}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{42}}{21}R_{30}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	3	2	0
$\frac{1}{2}$	2	1	$\frac{9}{2}$	3	1	$\frac{\sqrt{66}}{33}R_{54}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{330}}{33}R_{50}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	3	3	$\frac{\sqrt{66}}{11}R_{54}$
$\frac{1}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{3\sqrt{70}}{35}R_{20}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{70}}{21}R_{40}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{35}}{21}R_{44}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{22}}{11}R_{44}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{110}}{33}R_{40}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{\sqrt{22}}{33}R_{44}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	4	1	$\frac{\sqrt{2145}}{143}R_{64}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	4	2	$\frac{3\sqrt{715}}{143}R_{60}$

Table B187: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	4	3	$\frac{5\sqrt{429}}{143}R_{64}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{210}}{21}R_{30}$
$\frac{1}{2}$	2	1	$\frac{7}{2}$	5	2	0
$\frac{1}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{33}}{33}R_{54}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{165}}{33}R_{50}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	5	3	$-\frac{\sqrt{33}}{11}R_{54}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	5	1	$-\frac{5\sqrt{143}}{143}R_{54}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{\sqrt{2145}}{143}R_{50}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	5	3	$-\frac{\sqrt{715}}{143}R_{54}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	5	1	$\frac{3\sqrt{65}}{65}R_{74}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	5	2	$\frac{\sqrt{1365}}{65}R_{70}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	5	3	$\frac{\sqrt{2145}}{65}R_{74}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{3\sqrt{11}}{11}R_{44}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	6	2	$\frac{\sqrt{55}}{11}R_{40}$
$\frac{1}{2}$	2	1	$\frac{9}{2}$	6	3	$\frac{\sqrt{11}}{11}R_{44}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	6	1	$-\frac{\sqrt{1001}}{143}R_{64}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{\sqrt{3003}}{143}R_{60}$
$\frac{1}{2}$	2	1	$\frac{11}{2}$	6	3	$-\frac{\sqrt{5005}}{143}R_{64}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{715}}{65}R_{64}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{455}}{65}R_{60}$
$\frac{1}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{\sqrt{195}}{65}R_{64}$
$\frac{1}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{1190}}{85}R_{84}$
$\frac{1}{2}$	2	1	$\frac{15}{2}$	6	2	$\frac{2\sqrt{595}}{85}R_{80}$
$\frac{1}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{\sqrt{3570}}{85}R_{84}$
$\frac{1}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{1190}}{85}R_{88}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	R_{00}

Table B188: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{\sqrt{105}}{49}R_{20} + \frac{4\sqrt{21}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	2	1	$-\frac{6\sqrt{70}}{245}R_{20} - \frac{5\sqrt{14}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{2\sqrt{7}}{7}R_{44}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	3	1	$-\frac{\sqrt{15}}{25}R_{10} - \frac{12\sqrt{35}}{175}R_{30}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	1	$\frac{6\sqrt{10}}{25}R_{10} - \frac{\sqrt{210}}{175}R_{30}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{42}}{63}R_{30} + \frac{5\sqrt{66}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{33}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	3	1	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{210}}{63}R_{30} - \frac{2\sqrt{330}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	3	3	$\frac{2\sqrt{66}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	4	1	$-\frac{6\sqrt{70}}{245}R_{20} - \frac{5\sqrt{14}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{9\sqrt{14}}{49}R_{20} - \frac{2\sqrt{70}}{147}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{4\sqrt{35}}{105}R_{44}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{14\sqrt{22}}{121}R_{44} + \frac{6\sqrt{1430}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{7\sqrt{110}}{363}R_{40} + \frac{18\sqrt{1430}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{28\sqrt{22}}{363}R_{44} + \frac{18\sqrt{1430}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{4\sqrt{33}}{121}R_{44} - \frac{19\sqrt{2145}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{55}}{121}R_{40} - \frac{21\sqrt{715}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	3	$-\frac{4\sqrt{165}}{605}R_{44} + \frac{25\sqrt{429}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{210}}{63}R_{30} - \frac{2\sqrt{330}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	5	2	$-\frac{4\sqrt{165}}{165}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{33}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{4\sqrt{105}}{63}R_{30} - \frac{\sqrt{165}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{33}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{56\sqrt{143}}{1859}R_{54} + \frac{3\sqrt{143}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{8\sqrt{2145}}{1859}R_{50} + \frac{21\sqrt{13}}{169}R_{70}$

Table B189: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	3	$-\frac{136\sqrt{715}}{9295}R_{54} + \frac{3\sqrt{715}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	1	$-\frac{5\sqrt{65}}{169}R_{54} - \frac{12\sqrt{65}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	2	$-\frac{15\sqrt{1001}}{1859}R_{50} - \frac{8\sqrt{1365}}{845}R_{70}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{5\sqrt{2145}}{1859}R_{54} + \frac{4\sqrt{2145}}{845}R_{74}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{24\sqrt{11}}{121}R_{44} - \frac{7\sqrt{715}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	2	$-\frac{4\sqrt{55}}{121}R_{40} - \frac{21\sqrt{715}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	3	$-\frac{16\sqrt{11}}{121}R_{44} - \frac{21\sqrt{715}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{3\sqrt{385}}{121}R_{44} - \frac{76\sqrt{1001}}{11011}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{5\sqrt{231}}{121}R_{40} - \frac{4\sqrt{3003}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{3\sqrt{77}}{121}R_{44} + \frac{20\sqrt{5005}}{11011}R_{64}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{3\sqrt{715}}{325}R_{64} + \frac{12\sqrt{85}}{425}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{455}}{325}R_{60} + \frac{8\sqrt{595}}{425}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{9\sqrt{195}}{325}R_{64} + \frac{4\sqrt{2805}}{425}R_{84}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	1	$-\frac{6\sqrt{10010}}{2275}R_{64} - \frac{7\sqrt{1190}}{425}R_{84}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{455}}{325}R_{60} - \frac{6\sqrt{595}}{425}R_{80}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	3	$-\frac{2\sqrt{30030}}{2275}R_{64} + \frac{\sqrt{3570}}{425}R_{84}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{1190}}{85}R_{88}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} + \frac{4\sqrt{5}}{49}R_{20} - \frac{16}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	1	$-\frac{6\sqrt{30}}{245}R_{20} - \frac{5\sqrt{6}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{2\sqrt{3}}{7}R_{44}$
$\frac{5}{2}$	2	1	$\frac{3}{2}$	3	1	$-\frac{3\sqrt{35}}{175}R_{10} - \frac{12\sqrt{15}}{175}R_{30}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{8\sqrt{210}}{1225}R_{10} - \frac{34\sqrt{10}}{525}R_{30} + \frac{25\sqrt{770}}{1617}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	1	$\frac{6\sqrt{42}}{49}R_{10} + \frac{\sqrt{2}}{21}R_{30} - \frac{40\sqrt{154}}{1617}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{16\sqrt{77}}{231}R_{54}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	3	1	$\frac{3\sqrt{154}}{77}R_{54}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{10}}{21}R_{30} - \frac{2\sqrt{770}}{231}R_{50}$

Table B190: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	3	3	$\frac{\sqrt{154}}{231}R_{54}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	4	1	$-\frac{6\sqrt{30}}{245}R_{20} - \frac{5\sqrt{6}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{8\sqrt{6}}{147}R_{20} - \frac{19\sqrt{30}}{539}R_{40} + \frac{10\sqrt{390}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{38\sqrt{15}}{385}R_{44} + \frac{20\sqrt{39}}{429}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{462}}{847}R_{44} - \frac{24\sqrt{30030}}{11011}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{5\sqrt{462}}{147}R_{20} + \frac{2\sqrt{2310}}{5929}R_{40} - \frac{8\sqrt{30030}}{4719}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{\sqrt{462}}{847}R_{44} + \frac{8\sqrt{30030}}{2541}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	1	$\frac{48\sqrt{77}}{847}R_{44} + \frac{9\sqrt{5005}}{1573}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{1155}}{847}R_{40} - \frac{3\sqrt{15015}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	3	$-\frac{72\sqrt{385}}{4235}R_{44} - \frac{45\sqrt{1001}}{11011}R_{64}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{10}}{21}R_{30} - \frac{2\sqrt{770}}{231}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	5	2	$\frac{4\sqrt{385}}{165}R_{54}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{6\sqrt{77}}{143}R_{54} + \frac{15\sqrt{77}}{1001}R_{74}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{16\sqrt{5}}{231}R_{30} - \frac{4\sqrt{385}}{429}R_{50} + \frac{15\sqrt{21}}{143}R_{70}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{2\sqrt{77}}{429}R_{54} + \frac{45\sqrt{77}}{1001}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{\sqrt{3003}}{13013}R_{54} - \frac{16\sqrt{3003}}{1859}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{20\sqrt{65}}{231}R_{30} - \frac{\sqrt{5005}}{5577}R_{50} - \frac{32\sqrt{273}}{1859}R_{70}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	3	$\frac{9\sqrt{15015}}{65065}R_{54} + \frac{48\sqrt{15015}}{13013}R_{74}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	1	$\frac{15\sqrt{1365}}{1183}R_{54} + \frac{10\sqrt{1365}}{1183}R_{74}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	2	$-\frac{15\sqrt{429}}{1859}R_{50} - \frac{24\sqrt{65}}{845}R_{70}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{75\sqrt{5005}}{13013}R_{54} - \frac{18\sqrt{5005}}{5915}R_{74}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{2\sqrt{231}}{121}R_{44} - \frac{27\sqrt{15015}}{11011}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	2	$-\frac{4\sqrt{1155}}{847}R_{40} - \frac{3\sqrt{15015}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	3	$\frac{2\sqrt{231}}{121}R_{44} + \frac{3\sqrt{15015}}{847}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{64\sqrt{165}}{1573}R_{44} + \frac{23\sqrt{429}}{1573}R_{64} + \frac{44\sqrt{51}}{1547}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{80\sqrt{11}}{1573}R_{40} - \frac{23\sqrt{143}}{1573}R_{60} + \frac{8\sqrt{187}}{221}R_{80}$

Table B191: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	3	$-\frac{96\sqrt{33}}{1573}R_{44} - \frac{23\sqrt{2145}}{11011}R_{64} + \frac{44\sqrt{255}}{1547}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{25\sqrt{231}}{1001}R_{44} - \frac{2\sqrt{15015}}{25025}R_{64} - \frac{464\sqrt{1785}}{38675}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{25\sqrt{15}}{143}R_{40} - \frac{8\sqrt{195}}{3575}R_{60} - \frac{96\sqrt{255}}{5525}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{75\sqrt{7}}{1001}R_{44} + \frac{38\sqrt{455}}{25025}R_{64} + \frac{176\sqrt{6545}}{38675}R_{84}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{4290}}{325}R_{64} + \frac{31\sqrt{510}}{2975}R_{84}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{195}}{325}R_{60} - \frac{6\sqrt{255}}{425}R_{80}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	3	$-\frac{2\sqrt{1430}}{175}R_{64} - \frac{59\sqrt{170}}{2975}R_{84}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{510}}{85}R_{88}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	1	$R_{00} + \frac{10\sqrt{5}}{49}R_{20} + \frac{9}{49}R_{40}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{\sqrt{2}}{7}R_{44}$
$\frac{7}{2}$	2	1	$\frac{3}{2}$	3	1	$\frac{2\sqrt{10}}{105}R_{30} + \frac{5\sqrt{770}}{231}R_{50}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{3\sqrt{35}}{245}R_{10} - \frac{2\sqrt{15}}{35}R_{30} - \frac{5\sqrt{1155}}{539}R_{50}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{7}}{49}R_{10} - \frac{2\sqrt{3}}{21}R_{30} - \frac{25\sqrt{231}}{1617}R_{50}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{5\sqrt{462}}{231}R_{54}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	3	1	$-\frac{4\sqrt{231}}{231}R_{54}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{35}}{7}R_{10} + \frac{2\sqrt{15}}{21}R_{30} + \frac{\sqrt{1155}}{231}R_{50}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	3	3	$-\frac{2\sqrt{231}}{231}R_{54}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{\sqrt{5}}{245}R_{20} + \frac{50}{539}R_{40} + \frac{25\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{5}{49}R_{20} - \frac{54\sqrt{5}}{539}R_{40} - \frac{5\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	2	$-\frac{6\sqrt{10}}{77}R_{44} + \frac{15\sqrt{26}}{143}R_{64}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{36\sqrt{77}}{847}R_{44} + \frac{60\sqrt{5005}}{11011}R_{64}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{77}}{539}R_{20} - \frac{54\sqrt{385}}{5929}R_{40} - \frac{5\sqrt{5005}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	3	$\frac{48\sqrt{77}}{847}R_{44} + \frac{30\sqrt{5005}}{11011}R_{64}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{20\sqrt{462}}{847}R_{44} - \frac{\sqrt{30030}}{1573}R_{64}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	2	$\frac{5\sqrt{154}}{77}R_{20} + \frac{10\sqrt{770}}{847}R_{40} + \frac{2\sqrt{10010}}{1573}R_{60}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	3	$-\frac{8\sqrt{2310}}{847}R_{44} - \frac{25\sqrt{6006}}{11011}R_{64}$

Table B192: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 16 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{15}}{231}R_{30} + \frac{10\sqrt{1155}}{3003}R_{50} + \frac{35\sqrt{7}}{143}R_{70}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	5	2	$-\frac{2\sqrt{2310}}{429}R_{54} + \frac{\sqrt{2310}}{143}R_{74}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{8\sqrt{462}}{429}R_{54} - \frac{15\sqrt{462}}{1001}R_{74}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{5\sqrt{30}}{231}R_{30} - \frac{2\sqrt{2310}}{429}R_{50} - \frac{10\sqrt{14}}{143}R_{70}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{4\sqrt{462}}{429}R_{54} + \frac{25\sqrt{462}}{1001}R_{74}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{60\sqrt{2002}}{13013}R_{54} + \frac{15\sqrt{2002}}{1859}R_{74}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{390}}{1001}R_{30} - \frac{2\sqrt{30030}}{1859}R_{50} - \frac{30\sqrt{182}}{1859}R_{70}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	3	$\frac{24\sqrt{10010}}{13013}R_{54} + \frac{3\sqrt{10010}}{13013}R_{74}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	1	$-\frac{10\sqrt{910}}{1183}R_{54} - \frac{3\sqrt{910}}{5915}R_{74}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	2	$\frac{25\sqrt{182}}{429}R_{30} + \frac{100\sqrt{286}}{5577}R_{50} + \frac{54\sqrt{390}}{9295}R_{70}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{30\sqrt{30030}}{13013}R_{54} - \frac{61\sqrt{30030}}{65065}R_{74}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{6\sqrt{154}}{1573}R_{44} - \frac{24\sqrt{10010}}{11011}R_{64} + \frac{\sqrt{1190}}{221}R_{84}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	2	$\frac{9\sqrt{770}}{11011}R_{40} + \frac{2\sqrt{10010}}{1573}R_{60} + \frac{14\sqrt{13090}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	3	$-\frac{8\sqrt{154}}{1573}R_{44} - \frac{12\sqrt{10010}}{11011}R_{64} + \frac{3\sqrt{1190}}{221}R_{84}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{30\sqrt{110}}{1573}R_{44} + \frac{18\sqrt{286}}{1573}R_{64} - \frac{111\sqrt{34}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{25\sqrt{66}}{1573}R_{40} - \frac{12\sqrt{858}}{1573}R_{60} - \frac{18\sqrt{1122}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{60\sqrt{22}}{1573}R_{44} + \frac{90\sqrt{1430}}{11011}R_{64} + \frac{57\sqrt{170}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{30\sqrt{154}}{1001}R_{44} + \frac{18\sqrt{10010}}{5005}R_{64} + \frac{67\sqrt{1190}}{7735}R_{84}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{5\sqrt{10}}{143}R_{40} - \frac{12\sqrt{130}}{715}R_{60} - \frac{18\sqrt{170}}{1105}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{40\sqrt{42}}{1001}R_{44} - \frac{2\sqrt{2730}}{5005}R_{64} - \frac{3\sqrt{39270}}{7735}R_{84}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{15\sqrt{11}}{143}R_{44} - \frac{2\sqrt{715}}{715}R_{64} + \frac{33\sqrt{85}}{7735}R_{84}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	2	$\frac{35\sqrt{10}}{143}R_{40} + \frac{18\sqrt{130}}{715}R_{60} + \frac{9\sqrt{170}}{1105}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{5\sqrt{33}}{143}R_{44} - \frac{34\sqrt{2145}}{5005}R_{64} - \frac{67\sqrt{255}}{7735}R_{84}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{85}}{85}R_{88}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	2	2	$R_{00} - \frac{2\sqrt{5}}{7}R_{20} + \frac{1}{7}R_{40}$
$\frac{7}{2}$	2	2	$\frac{3}{2}$	3	1	$\frac{2\sqrt{385}}{77}R_{54}$

Table B193: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 17 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	3	1	$\frac{\sqrt{2310}}{77} R_{54}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	3	1	$\frac{5\sqrt{462}}{231} R_{54}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	3	2	$\frac{\sqrt{7}}{7} R_{10} - \frac{2\sqrt{3}}{9} R_{30} + \frac{5\sqrt{231}}{693} R_{50}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	3	1	0
$\frac{7}{2}$	2	2	$\frac{9}{2}$	3	2	$\frac{\sqrt{2310}}{231} R_{54}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	3	3	$\frac{\sqrt{14}}{7} R_{10} - \frac{2\sqrt{6}}{9} R_{30} + \frac{5\sqrt{462}}{693} R_{50}$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	4	1	$-\frac{10\sqrt{2}}{77} R_{44} + \frac{5\sqrt{130}}{143} R_{64}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{6\sqrt{10}}{77} R_{44} + \frac{15\sqrt{26}}{143} R_{64}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	4	2	$\frac{1}{7} R_{20} - \frac{6\sqrt{5}}{77} R_{40} + \frac{\sqrt{65}}{143} R_{60}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	4	1	0
$\frac{7}{2}$	2	2	$\frac{9}{2}$	4	2	$-\frac{6\sqrt{770}}{847} R_{44} + \frac{15\sqrt{2002}}{1573} R_{64}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	4	3	$\frac{\sqrt{770}}{77} R_{20} - \frac{30\sqrt{154}}{847} R_{40} + \frac{5\sqrt{2002}}{1573} R_{60}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	1	0
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{385}}{847} R_{44} + \frac{10\sqrt{1001}}{1573} R_{64}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	3	$\frac{2\sqrt{231}}{77} R_{20} - \frac{12\sqrt{1155}}{847} R_{40} + \frac{2\sqrt{15015}}{1573} R_{60}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{2310}}{429} R_{54} + \frac{\sqrt{2310}}{143} R_{74}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	5	2	$\frac{\sqrt{15}}{99} R_{30} - \frac{2\sqrt{1155}}{1287} R_{50} + \frac{\sqrt{7}}{143} R_{70}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	5	1	0
$\frac{7}{2}$	2	2	$\frac{9}{2}$	5	2	$-\frac{4\sqrt{1155}}{429} R_{54} + \frac{2\sqrt{1155}}{143} R_{74}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	5	3	$\frac{10\sqrt{3}}{99} R_{30} - \frac{20\sqrt{231}}{1287} R_{50} + \frac{2\sqrt{35}}{143} R_{70}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	1	0
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{15015}}{1859} R_{54} + \frac{6\sqrt{15015}}{1859} R_{74}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	3	$\frac{6\sqrt{65}}{143} R_{30} - \frac{12\sqrt{5005}}{1859} R_{50} + \frac{18\sqrt{273}}{1859} R_{70}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	1	0
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	2	$-\frac{20\sqrt{143}}{1859} R_{54} + \frac{30\sqrt{143}}{1859} R_{74}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	3	$\frac{10\sqrt{195}}{429} R_{30} - \frac{20\sqrt{15015}}{5577} R_{50} + \frac{30\sqrt{91}}{1859} R_{70}$

Table B194: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 18 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	6	1	$\frac{2\sqrt{15470}}{221}R_{88}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	6	2	$\frac{2\sqrt{385}}{1573}R_{44} - \frac{12\sqrt{1001}}{1573}R_{64} + \frac{6\sqrt{119}}{221}R_{84}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	6	3	$\frac{10\sqrt{77}}{1573}R_{40} - \frac{4\sqrt{1001}}{1573}R_{60} + \frac{2\sqrt{1309}}{2431}R_{80}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{6\sqrt{442}}{221}R_{88}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	2	$\frac{10\sqrt{33}}{1573}R_{44} - \frac{12\sqrt{2145}}{1573}R_{64} + \frac{6\sqrt{255}}{221}R_{84}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	3	$\frac{90\sqrt{11}}{1573}R_{40} - \frac{36\sqrt{143}}{1573}R_{60} + \frac{18\sqrt{187}}{2431}R_{80}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	1	$\frac{2\sqrt{15470}}{1105}R_{88}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	2	$\frac{2\sqrt{5}}{143}R_{44} - \frac{12\sqrt{13}}{143}R_{64} + \frac{6\sqrt{187}}{221}R_{84}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{10\sqrt{21}}{143}R_{40} - \frac{4\sqrt{273}}{143}R_{60} + \frac{2\sqrt{357}}{221}R_{80}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	1	$\frac{2\sqrt{1105}}{1105}R_{88}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	2	$\frac{\sqrt{5}}{143}R_{44} - \frac{6\sqrt{13}}{143}R_{64} + \frac{3\sqrt{187}}{221}R_{84}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	3	$\frac{5\sqrt{66}}{143}R_{40} - \frac{2\sqrt{858}}{143}R_{60} + \frac{\sqrt{1122}}{221}R_{80}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	4	$\frac{15\sqrt{143}}{143}R_{44} - \frac{2\sqrt{55}}{55}R_{64} + \frac{\sqrt{1105}}{1105}R_{84}$
$\frac{3}{2}$	3	1	$\frac{3}{2}$	3	1	$R_{00} + \frac{4\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	3	1	$\frac{5}{2}$	3	1	$-\frac{6\sqrt{30}}{175}R_{20} - \frac{\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{6}}{35}R_{20} - \frac{\sqrt{30}}{21}R_{40}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{15}}{15}R_{44}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{2\sqrt{30}}{55}R_{44} + \frac{10\sqrt{78}}{429}R_{64}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{6}}{33}R_{40} + \frac{10\sqrt{78}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	3	$\frac{4\sqrt{30}}{165}R_{44} + \frac{10\sqrt{78}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{5}{2}$	4	1	$\frac{2\sqrt{210}}{35}R_{10} + \frac{3\sqrt{10}}{35}R_{30}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{2}}{7}R_{30} - \frac{2\sqrt{154}}{77}R_{50}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{12\sqrt{77}}{385}R_{54}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{6\sqrt{10}}{55}R_{54}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{154}}{77}R_{30} - \frac{2\sqrt{2}}{11}R_{50}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	4	3	$\frac{6\sqrt{10}}{55}R_{54}$

Table B195: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 19 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	1	$-\frac{28\sqrt{15}}{715}R_{54} + \frac{\sqrt{15}}{13}R_{74}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	2	$\frac{12}{143}R_{50} + \frac{7\sqrt{165}}{143}R_{70}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	3	$\frac{68\sqrt{3}}{715}R_{54} + \frac{5\sqrt{3}}{13}R_{74}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{30}}{7}R_{20} + \frac{2\sqrt{6}}{21}R_{40}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	5	2	$-\frac{4\sqrt{3}}{15}R_{44}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	1	$\frac{8\sqrt{15}}{55}R_{44} - \frac{7\sqrt{39}}{429}R_{64}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{4\sqrt{3}}{33}R_{40} - \frac{7\sqrt{39}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{16\sqrt{15}}{165}R_{44} - \frac{7\sqrt{39}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{12\sqrt{65}}{715}R_{44} - \frac{57}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{39}}{143}R_{40} - \frac{21\sqrt{3}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{12\sqrt{13}}{715}R_{44} + \frac{15\sqrt{5}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{\sqrt{55}}{65}R_{64} + \frac{12\sqrt{1105}}{1105}R_{84}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	2	$\frac{\sqrt{35}}{65}R_{60} + \frac{8\sqrt{7735}}{1105}R_{80}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	3	$\frac{3\sqrt{15}}{65}R_{64} + \frac{4\sqrt{36465}}{1105}R_{84}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	6	1	$\frac{7\sqrt{5}}{55}R_{54}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	6	2	$\frac{20\sqrt{77}}{231}R_{30} + \frac{7}{33}R_{50}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	6	3	$-\frac{7\sqrt{5}}{55}R_{54}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{21\sqrt{7}}{143}R_{54} - \frac{24\sqrt{7}}{455}R_{74}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{3\sqrt{105}}{143}R_{50} - \frac{24\sqrt{77}}{715}R_{70}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	3	$-\frac{51\sqrt{35}}{715}R_{54} - \frac{24\sqrt{35}}{455}R_{74}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{5}}{13}R_{54} - \frac{12\sqrt{5}}{65}R_{74}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{77}}{143}R_{50} - \frac{8\sqrt{105}}{325}R_{70}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{\sqrt{165}}{143}R_{54} + \frac{4\sqrt{165}}{325}R_{74}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	1	$-\frac{6\sqrt{70}}{595}R_{74} + \frac{\sqrt{17290}}{323}R_{94}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	2	$\frac{4\sqrt{105}}{425}R_{70} + \frac{18\sqrt{133}}{323}R_{90}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	3	$\frac{38\sqrt{210}}{2975}R_{74} + \frac{\sqrt{51870}}{323}R_{94}$

Table B196: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 20 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{4522}}{323}R_{98}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} + \frac{22\sqrt{5}}{175}R_{20} - \frac{1}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{13}{105}R_{20} - \frac{6\sqrt{5}}{77}R_{40} + \frac{25\sqrt{65}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{6\sqrt{10}}{55}R_{44} + \frac{25\sqrt{26}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	1	$\frac{9\sqrt{5}}{55}R_{44} - \frac{15\sqrt{13}}{143}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{5}}{21}R_{20} - \frac{18}{77}R_{40} - \frac{35\sqrt{13}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	3	$\frac{9\sqrt{5}}{55}R_{44} + \frac{5\sqrt{13}}{33}R_{64}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	4	1	$-\frac{3\sqrt{35}}{245}R_{10} - \frac{2\sqrt{15}}{35}R_{30} - \frac{5\sqrt{1155}}{539}R_{50}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	1	$\frac{15\sqrt{7}}{49}R_{10} + \frac{2\sqrt{3}}{21}R_{30} - \frac{17\sqrt{231}}{1617}R_{50}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{17\sqrt{462}}{1155}R_{54}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{57\sqrt{15}}{715}R_{54} + \frac{5\sqrt{15}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{23\sqrt{231}}{2541}R_{30} - \frac{38\sqrt{3}}{429}R_{50} + \frac{105\sqrt{55}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	3	$\frac{19\sqrt{15}}{2145}R_{54} + \frac{15\sqrt{15}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	1	$\frac{18\sqrt{10}}{715}R_{54} - \frac{21\sqrt{10}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	2	$-\frac{5\sqrt{462}}{847}R_{30} - \frac{14\sqrt{6}}{143}R_{50} - \frac{42\sqrt{110}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	3	$\frac{162\sqrt{2}}{715}R_{54} + \frac{45\sqrt{2}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{5}}{21}R_{20} - \frac{18}{77}R_{40} - \frac{35\sqrt{13}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	2	$\frac{18\sqrt{2}}{55}R_{44} - \frac{7\sqrt{130}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{3\sqrt{10}}{55}R_{44} - \frac{6\sqrt{26}}{143}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{5\sqrt{10}}{21}R_{20} + \frac{6\sqrt{2}}{77}R_{40} - \frac{14\sqrt{26}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{3\sqrt{10}}{55}R_{44} + \frac{2\sqrt{26}}{33}R_{64}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{212\sqrt{390}}{9295}R_{44} + \frac{14\sqrt{6}}{143}R_{64} + \frac{5\sqrt{14586}}{2873}R_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{53\sqrt{26}}{1859}R_{40} - \frac{14\sqrt{2}}{143}R_{60} + \frac{70\sqrt{442}}{2873}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{318\sqrt{78}}{9295}R_{44} - \frac{2\sqrt{30}}{143}R_{64} + \frac{5\sqrt{72930}}{2873}R_{84}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{5\sqrt{858}}{1859}R_{44} - \frac{3\sqrt{330}}{715}R_{64} - \frac{87\sqrt{6630}}{14365}R_{84}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{5\sqrt{2730}}{1859}R_{40} - \frac{12\sqrt{210}}{715}R_{60} - \frac{18\sqrt{46410}}{14365}R_{80}$

Table B197: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 21 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{15\sqrt{26}}{1859}R_{44} + \frac{57\sqrt{10}}{715}R_{64} + \frac{33\sqrt{24310}}{14365}R_{84}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	6	1	$\frac{63\sqrt{30}}{715}R_{54} - \frac{2\sqrt{30}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	6	2	$-\frac{5\sqrt{462}}{847}R_{30} - \frac{14\sqrt{6}}{143}R_{50} - \frac{42\sqrt{110}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	6	3	$\frac{7\sqrt{30}}{715}R_{54} - \frac{6\sqrt{30}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{42}}{1001}R_{54} - \frac{31\sqrt{42}}{715}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{25\sqrt{110}}{363}R_{30} + \frac{4\sqrt{70}}{429}R_{50} - \frac{62\sqrt{462}}{7865}R_{70}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	3	$-\frac{36\sqrt{210}}{5005}R_{54} + \frac{93\sqrt{210}}{5005}R_{74}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{30}}{13}R_{54} + \frac{7\sqrt{30}}{221}R_{74} + \frac{\sqrt{7410}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{462}}{143}R_{50} - \frac{84\sqrt{70}}{5525}R_{70} + \frac{6\sqrt{798}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{5\sqrt{110}}{143}R_{54} - \frac{63\sqrt{110}}{5525}R_{74} + \frac{\sqrt{27170}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	1	$-\frac{\sqrt{105}}{91}R_{54} - \frac{18\sqrt{105}}{1105}R_{74} - \frac{\sqrt{25935}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{\sqrt{462}}{143}R_{50} - \frac{162\sqrt{70}}{5525}R_{70} - \frac{3\sqrt{798}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{\sqrt{35}}{91}R_{54} + \frac{1242\sqrt{35}}{38675}R_{74} + \frac{\sqrt{8645}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{6783}}{323}R_{98}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} + \frac{10\sqrt{5}}{63}R_{20} - \frac{3}{77}R_{40} - \frac{100\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	2	$-\frac{\sqrt{2}}{33}R_{44} + \frac{20\sqrt{130}}{429}R_{64}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{4}{11}R_{44} + \frac{20\sqrt{65}}{429}R_{64}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	2	$-\frac{5}{63}R_{20} - \frac{6\sqrt{5}}{77}R_{40} - \frac{35\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	3	$\frac{16}{33}R_{44} + \frac{10\sqrt{65}}{429}R_{64}$
$\frac{7}{2}$	3	1	$\frac{5}{2}$	4	1	$-\frac{\sqrt{7}}{49}R_{10} - \frac{2\sqrt{3}}{21}R_{30} - \frac{25\sqrt{231}}{1617}R_{50}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{4\sqrt{35}}{441}R_{10} - \frac{3\sqrt{15}}{77}R_{30} - \frac{30\sqrt{1155}}{7007}R_{50} + \frac{245\sqrt{7}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{6\sqrt{2310}}{1001}R_{54} + \frac{7\sqrt{2310}}{1287}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{12\sqrt{3}}{143}R_{54} - \frac{80\sqrt{3}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{55}}{9}R_{10} + \frac{6\sqrt{1155}}{847}R_{30} - \frac{3\sqrt{15}}{143}R_{50} - \frac{1120\sqrt{11}}{14157}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	3	$\frac{6\sqrt{3}}{143}R_{54} + \frac{400\sqrt{3}}{1287}R_{74}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	1	$\frac{20\sqrt{2}}{143}R_{54} + \frac{35\sqrt{2}}{143}R_{74}$

Table B198: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 22 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	2	$-\frac{5\sqrt{2310}}{2541}R_{30} - \frac{14\sqrt{30}}{429}R_{50} - \frac{70\sqrt{22}}{1573}R_{70}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	3	$\frac{8\sqrt{10}}{143}R_{54} + \frac{\sqrt{10}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{5}{63}R_{20} - \frac{6\sqrt{5}}{77}R_{40} - \frac{35\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	2	$-\frac{2\sqrt{10}}{33}R_{44} + \frac{35\sqrt{26}}{429}R_{64}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{34\sqrt{2}}{143}R_{44} + \frac{8\sqrt{130}}{429}R_{64} + \frac{7\sqrt{1870}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{40\sqrt{2}}{693}R_{20} - \frac{51\sqrt{10}}{1001}R_{40} - \frac{14\sqrt{130}}{1287}R_{60} + \frac{98\sqrt{170}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	3	$\frac{136\sqrt{2}}{429}R_{44} + \frac{4\sqrt{130}}{429}R_{64} + \frac{21\sqrt{1870}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{60\sqrt{78}}{1859}R_{44} + \frac{7\sqrt{30}}{429}R_{64} - \frac{148\sqrt{72930}}{94809}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{5\sqrt{26}}{33}R_{20} + \frac{30\sqrt{130}}{1859}R_{40} - \frac{14\sqrt{10}}{429}R_{60} - \frac{168\sqrt{2210}}{31603}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{24\sqrt{390}}{1859}R_{44} + \frac{25\sqrt{6}}{429}R_{64} + \frac{380\sqrt{14586}}{94809}R_{84}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{10\sqrt{4290}}{1859}R_{44} + \frac{6\sqrt{66}}{143}R_{64} + \frac{67\sqrt{1326}}{8619}R_{84}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{25\sqrt{546}}{5577}R_{40} - \frac{4\sqrt{42}}{143}R_{60} - \frac{6\sqrt{9282}}{2873}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{40\sqrt{130}}{1859}R_{44} - \frac{2\sqrt{2}}{143}R_{64} - \frac{3\sqrt{4862}}{2873}R_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	6	1	$\frac{56\sqrt{6}}{429}R_{54} - \frac{15\sqrt{6}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	6	2	$-\frac{5\sqrt{2310}}{2541}R_{30} - \frac{14\sqrt{30}}{429}R_{50} - \frac{70\sqrt{22}}{1573}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	6	3	$\frac{28\sqrt{6}}{429}R_{54} + \frac{25\sqrt{6}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{38\sqrt{210}}{3003}R_{54} + \frac{30\sqrt{210}}{2431}R_{74} + \frac{11\sqrt{51870}}{12597}R_{94}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{100\sqrt{22}}{4719}R_{30} - \frac{19\sqrt{14}}{429}R_{50} - \frac{60\sqrt{2310}}{26741}R_{70} + \frac{42\sqrt{2926}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{76\sqrt{42}}{3003}R_{54} + \frac{30\sqrt{42}}{17017}R_{74} + \frac{55\sqrt{10374}}{12597}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{6}}{39}R_{54} + \frac{7\sqrt{6}}{1105}R_{74} - \frac{8\sqrt{1482}}{663}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{175\sqrt{30}}{1287}R_{30} + \frac{4\sqrt{2310}}{1287}R_{50} - \frac{378\sqrt{14}}{12155}R_{70} - \frac{16\sqrt{3990}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{6\sqrt{22}}{143}R_{54} + \frac{427\sqrt{22}}{12155}R_{74} + \frac{24\sqrt{5434}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	1	$\frac{23\sqrt{21}}{273}R_{54} + \frac{86\sqrt{21}}{1105}R_{74} + \frac{\sqrt{5187}}{323}R_{94}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{\sqrt{2310}}{429}R_{50} - \frac{54\sqrt{14}}{1105}R_{70} - \frac{\sqrt{3990}}{323}R_{90}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{11\sqrt{7}}{91}R_{54} - \frac{398\sqrt{7}}{7735}R_{74} - \frac{\sqrt{1729}}{323}R_{94}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{33915}}{969}R_{98}$

Table B199: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 23 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	2	$R_{00} - \frac{2\sqrt{5}}{9}R_{20} - \frac{1}{33}R_{40} + \frac{20\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	3	1	0
$\frac{7}{2}$	3	2	$\frac{9}{2}$	3	2	$-\frac{2\sqrt{10}}{33}R_{44} + \frac{35\sqrt{26}}{429}R_{64}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	3	3	$\frac{\sqrt{10}}{9}R_{20} - \frac{10\sqrt{2}}{33}R_{40} + \frac{35\sqrt{26}}{1287}R_{60}$
$\frac{7}{2}$	3	2	$\frac{5}{2}$	4	1	$\frac{5\sqrt{462}}{231}R_{54}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	1	$\frac{6\sqrt{2310}}{1001}R_{54} + \frac{7\sqrt{2310}}{1287}R_{74}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{4\sqrt{35}}{63}R_{10} - \frac{\sqrt{15}}{11}R_{30} + \frac{2\sqrt{1155}}{1001}R_{50} + \frac{7\sqrt{7}}{1287}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	1	0
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	2	$-\frac{3\sqrt{30}}{143}R_{54} + \frac{112\sqrt{30}}{1287}R_{74}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	3	$\frac{\sqrt{22}}{9}R_{10} - \frac{2\sqrt{462}}{121}R_{30} - \frac{5\sqrt{6}}{143}R_{50} + \frac{112\sqrt{110}}{14157}R_{70}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	1	0
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	2	$-\frac{28\sqrt{15}}{429}R_{54} + \frac{14\sqrt{15}}{143}R_{74}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	3	$\frac{2\sqrt{385}}{121}R_{30} - \frac{28\sqrt{5}}{143}R_{50} + \frac{42\sqrt{33}}{1573}R_{70}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{10}}{33}R_{44} + \frac{35\sqrt{26}}{429}R_{64}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	5	2	$\frac{1}{9}R_{20} - \frac{2\sqrt{5}}{33}R_{40} + \frac{7\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	1	$\frac{14\sqrt{24310}}{2431}R_{88}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	2	$-\frac{34\sqrt{5}}{429}R_{44} + \frac{28\sqrt{13}}{429}R_{64} + \frac{42\sqrt{187}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	3	$\frac{16\sqrt{5}}{99}R_{20} - \frac{170}{429}R_{40} + \frac{28\sqrt{13}}{1287}R_{60} + \frac{14\sqrt{17}}{2431}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	1	$\frac{56\sqrt{5610}}{7293}R_{88}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	2	$-\frac{12\sqrt{65}}{1859}R_{44} - \frac{70}{429}R_{64} + \frac{280\sqrt{2431}}{31603}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{2\sqrt{39}}{33}R_{20} - \frac{36\sqrt{195}}{1859}R_{40} - \frac{14\sqrt{15}}{429}R_{60} + \frac{56\sqrt{3315}}{31603}R_{80}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	1	$\frac{14\sqrt{102}}{663}R_{88}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	2	$\frac{10\sqrt{273}}{5577}R_{44} - \frac{4\sqrt{105}}{143}R_{64} + \frac{2\sqrt{255255}}{2873}R_{84}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	3	$\frac{70\sqrt{65}}{1859}R_{40} - \frac{28\sqrt{5}}{143}R_{60} + \frac{14\sqrt{1105}}{2873}R_{80}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	6	1	0
$\frac{7}{2}$	3	2	$\frac{9}{2}$	6	2	$-\frac{28\sqrt{15}}{429}R_{54} + \frac{14\sqrt{15}}{143}R_{74}$

Table B200: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 24 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	6	3	$\frac{10\sqrt{231}}{1089}R_{30} - \frac{140\sqrt{3}}{1287}R_{50} + \frac{14\sqrt{55}}{1573}R_{70}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	1	$\frac{22\sqrt{176358}}{12597}R_{98}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	2	$-\frac{38\sqrt{7}}{429}R_{54} + \frac{180\sqrt{7}}{2431}R_{74} + \frac{22\sqrt{1729}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{280\sqrt{33}}{4719}R_{30} - \frac{38\sqrt{21}}{429}R_{50} + \frac{108\sqrt{385}}{26741}R_{70} + \frac{2\sqrt{4389}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{112\sqrt{125970}}{62985}R_{98}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{4\sqrt{1155}}{2145}R_{54} - \frac{14\sqrt{1155}}{2431}R_{74} + \frac{16\sqrt{285285}}{20995}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{50\sqrt{7}}{429}R_{30} - \frac{28\sqrt{11}}{429}R_{50} - \frac{98\sqrt{15}}{2431}R_{70} + \frac{112\sqrt{19}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	1	$\frac{2\sqrt{440895}}{4845}R_{98}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	2	$\frac{\sqrt{1155}}{715}R_{54} - \frac{2\sqrt{1155}}{221}R_{74} + \frac{\sqrt{285285}}{1615}R_{94}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	3	$\frac{\sqrt{14}}{13}R_{50} - \frac{2\sqrt{2310}}{221}R_{70} + \frac{\sqrt{2926}}{323}R_{90}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	4	$\frac{\sqrt{273}}{39}R_{54} - \frac{2\sqrt{273}}{221}R_{74} + \frac{\sqrt{399}}{969}R_{94}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	1	$R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{5}}{11}R_{44} - \frac{25\sqrt{13}}{429}R_{64}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	3	0
$\frac{9}{2}$	3	1	$\frac{5}{2}$	4	1	$-\frac{15\sqrt{231}}{1001}R_{54} + \frac{5\sqrt{231}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	4	1	$\frac{12\sqrt{1155}}{1001}R_{54} - \frac{4\sqrt{1155}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	4	2	0
$\frac{9}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{11}}{11}R_{10} + \frac{3\sqrt{231}}{121}R_{30} - \frac{15\sqrt{3}}{143}R_{50} + \frac{7\sqrt{55}}{1573}R_{70}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{15\sqrt{15}}{143}R_{54} + \frac{35\sqrt{15}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	4	3	0
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	1	$\frac{2\sqrt{66}}{33}R_{10} - \frac{6\sqrt{154}}{121}R_{30} + \frac{30\sqrt{2}}{143}R_{50} - \frac{14\sqrt{330}}{4719}R_{70}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	2	$\frac{6\sqrt{30}}{143}R_{54} - \frac{14\sqrt{30}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	3	0
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{4\sqrt{5}}{143}R_{44} - \frac{28\sqrt{13}}{429}R_{64} + \frac{28\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	2	$\frac{56\sqrt{2431}}{2431}R_{88}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{10}}{33}R_{20} - \frac{15\sqrt{2}}{143}R_{40} + \frac{7\sqrt{26}}{429}R_{60} - \frac{7\sqrt{34}}{2431}R_{80}$

Table B201: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 25 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{5\sqrt{10}}{143}R_{44} + \frac{35\sqrt{26}}{429}R_{64} - \frac{35\sqrt{374}}{2431}R_{84}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{14\sqrt{12155}}{2431}R_{88}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{2\sqrt{390}}{143}R_{20} + \frac{90\sqrt{78}}{1859}R_{40} - \frac{14\sqrt{6}}{143}R_{60} + \frac{42\sqrt{1326}}{31603}R_{80}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{18\sqrt{130}}{1859}R_{44} - \frac{42\sqrt{2}}{143}R_{64} + \frac{126\sqrt{4862}}{31603}R_{84}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	3	$\frac{28\sqrt{561}}{2431}R_{88}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{5\sqrt{858}}{429}R_{20} - \frac{15\sqrt{4290}}{1859}R_{40} + \frac{7\sqrt{330}}{429}R_{60} - \frac{7\sqrt{72930}}{31603}R_{80}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{5\sqrt{546}}{1859}R_{44} + \frac{7\sqrt{210}}{429}R_{64} - \frac{7\sqrt{510510}}{31603}R_{84}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{14\sqrt{187}}{2431}R_{88}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{462}}{4719}R_{30} + \frac{7\sqrt{6}}{429}R_{50} - \frac{63\sqrt{110}}{26741}R_{70} + \frac{7\sqrt{1254}}{46189}R_{90}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	6	2	$\frac{7\sqrt{30}}{429}R_{54} - \frac{105\sqrt{30}}{2431}R_{74} + \frac{7\sqrt{7410}}{4199}R_{94}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	6	3	$\frac{14\sqrt{62985}}{4199}R_{98}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{330}}{1573}R_{30} - \frac{2\sqrt{210}}{143}R_{50} + \frac{270\sqrt{154}}{26741}R_{70} - \frac{6\sqrt{43890}}{46189}R_{90}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{6\sqrt{14}}{143}R_{54} + \frac{270\sqrt{14}}{2431}R_{74} - \frac{18\sqrt{3458}}{4199}R_{94}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	3	$-\frac{4\sqrt{440895}}{4199}R_{98}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{5\sqrt{462}}{429}R_{30} + \frac{7\sqrt{6}}{39}R_{50} - \frac{63\sqrt{110}}{2431}R_{70} + \frac{7\sqrt{1254}}{4199}R_{90}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{7\sqrt{2310}}{2145}R_{54} - \frac{21\sqrt{2310}}{2431}R_{74} + \frac{7\sqrt{570570}}{20995}R_{94}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	3	$\frac{14\sqrt{230945}}{20995}R_{98}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	1	$\frac{20\sqrt{33}}{429}R_{30} - \frac{4\sqrt{21}}{39}R_{50} + \frac{36\sqrt{385}}{2431}R_{70} - \frac{4\sqrt{4389}}{4199}R_{90}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{2310}}{2145}R_{54} + \frac{12\sqrt{2310}}{2431}R_{74} - \frac{4\sqrt{570570}}{20995}R_{94}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{293930}}{20995}R_{98}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	4	0
$\frac{9}{2}$	3	2	$\frac{9}{2}$	3	2	$R_{00} + \frac{2\sqrt{5}}{9}R_{20} + \frac{3}{11}R_{40} + \frac{40\sqrt{13}}{1287}R_{60}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	3	3	$\frac{5\sqrt{5}}{33}R_{44} - \frac{5\sqrt{13}}{429}R_{64}$
$\frac{9}{2}$	3	2	$\frac{5}{2}$	4	1	$\frac{\sqrt{15}}{231}R_{30} + \frac{10\sqrt{1155}}{3003}R_{50} + \frac{35\sqrt{7}}{143}R_{70}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	4	1	$-\frac{\sqrt{7}}{63}R_{10} - \frac{6\sqrt{3}}{77}R_{30} - \frac{15\sqrt{231}}{1001}R_{50} - \frac{56\sqrt{35}}{1287}R_{70}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	4	2	$-\frac{15\sqrt{462}}{1001}R_{54} + \frac{28\sqrt{462}}{1287}R_{74}$

Table B202: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 26 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{15\sqrt{15}}{143}R_{54} + \frac{35\sqrt{15}}{429}R_{74}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	4	2	$-\frac{\sqrt{11}}{99}R_{10} - \frac{6\sqrt{231}}{847}R_{30} - \frac{15\sqrt{3}}{143}R_{50} - \frac{392\sqrt{55}}{14157}R_{70}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	4	3	$\frac{15\sqrt{15}}{143}R_{54} + \frac{7\sqrt{15}}{117}R_{74}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	1	$-\frac{14\sqrt{10}}{143}R_{54} - \frac{5\sqrt{10}}{143}R_{74}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	2	$\frac{2\sqrt{22}}{11}R_{10} + \frac{7\sqrt{462}}{363}R_{30} + \frac{40\sqrt{6}}{429}R_{50} + \frac{14\sqrt{110}}{1573}R_{70}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	3	$-\frac{10\sqrt{2}}{143}R_{54} - \frac{\sqrt{2}}{13}R_{74}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	5	1	$\frac{\sqrt{5}}{693}R_{20} + \frac{30}{1001}R_{40} + \frac{49\sqrt{13}}{1287}R_{60} + \frac{392\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	5	2	$\frac{10\sqrt{2}}{429}R_{44} - \frac{49\sqrt{130}}{2145}R_{64} + \frac{84\sqrt{1870}}{12155}R_{84}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{10}}{143}R_{44} + \frac{35\sqrt{26}}{429}R_{64} - \frac{35\sqrt{374}}{2431}R_{84}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{10}}{99}R_{20} - \frac{15\sqrt{2}}{143}R_{40} - \frac{56\sqrt{26}}{1287}R_{60} - \frac{98\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	3	$-\frac{25\sqrt{10}}{429}R_{44} + \frac{7\sqrt{26}}{429}R_{64} + \frac{63\sqrt{374}}{2431}R_{84}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{36\sqrt{390}}{1859}R_{44} + \frac{10\sqrt{6}}{429}R_{64} + \frac{245\sqrt{14586}}{94809}R_{84}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{130}}{429}R_{20} - \frac{45\sqrt{26}}{1859}R_{40} - \frac{56\sqrt{2}}{429}R_{60} - \frac{294\sqrt{442}}{31603}R_{80}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{90\sqrt{78}}{1859}R_{44} + \frac{118\sqrt{30}}{2145}R_{64} + \frac{161\sqrt{72930}}{474045}R_{84}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	1	$-\frac{35\sqrt{858}}{1859}R_{44} - \frac{2\sqrt{330}}{143}R_{64} - \frac{4\sqrt{6630}}{8619}R_{84}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	2	$\frac{5\sqrt{546}}{143}R_{20} + \frac{40\sqrt{2730}}{5577}R_{40} + \frac{2\sqrt{210}}{143}R_{60} + \frac{12\sqrt{46410}}{31603}R_{80}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	3	$-\frac{175\sqrt{26}}{1859}R_{44} - \frac{10\sqrt{10}}{143}R_{64} - \frac{24\sqrt{24310}}{31603}R_{84}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	6	1	$\frac{7\sqrt{30}}{429}R_{54} - \frac{105\sqrt{30}}{2431}R_{74} + \frac{7\sqrt{7410}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	6	2	$\frac{10\sqrt{462}}{33033}R_{30} + \frac{7\sqrt{6}}{429}R_{50} + \frac{392\sqrt{110}}{26741}R_{70} + \frac{882\sqrt{1254}}{46189}R_{90}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	6	3	$-\frac{7\sqrt{30}}{429}R_{54} - \frac{7\sqrt{30}}{221}R_{74} + \frac{21\sqrt{7410}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	1	$\frac{14\sqrt{42}}{429}R_{54} + \frac{675\sqrt{42}}{17017}R_{74} - \frac{46\sqrt{10374}}{12597}R_{94}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	2	$-\frac{35\sqrt{110}}{4719}R_{30} - \frac{8\sqrt{70}}{429}R_{50} - \frac{270\sqrt{462}}{26741}R_{70} - \frac{84\sqrt{14630}}{46189}R_{90}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{2\sqrt{210}}{429}R_{54} + \frac{27\sqrt{210}}{1547}R_{74} + \frac{2\sqrt{51870}}{969}R_{94}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{\sqrt{30}}{195}R_{54} + \frac{10\sqrt{30}}{221}R_{74} + \frac{196\sqrt{7410}}{62985}R_{94}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{35\sqrt{6}}{1287}R_{30} - \frac{8\sqrt{462}}{1287}R_{50} - \frac{54\sqrt{70}}{2431}R_{70} - \frac{28\sqrt{798}}{4199}R_{90}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{3\sqrt{110}}{143}R_{54} + \frac{2\sqrt{110}}{143}R_{74}$

Table B203: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 27 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	1	$-\frac{7\sqrt{105}}{195}R_{54} - \frac{22\sqrt{105}}{1547}R_{74} + \frac{\sqrt{25935}}{20995}R_{94}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	2	$\frac{140\sqrt{6}}{429}R_{30} + \frac{7\sqrt{462}}{429}R_{50} + \frac{54\sqrt{70}}{2431}R_{70} + \frac{11\sqrt{798}}{4199}R_{90}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	3	$-\frac{\sqrt{35}}{13}R_{54} - \frac{62\sqrt{35}}{1547}R_{74} - \frac{5\sqrt{8645}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	4	$\frac{2\sqrt{6783}}{969}R_{98}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	3	3	$R_{00} - \frac{\sqrt{5}}{9}R_{20} - \frac{1}{3}R_{40} + \frac{5\sqrt{13}}{117}R_{60}$
$\frac{9}{2}$	3	3	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{231}}{3003}R_{54} + \frac{5\sqrt{231}}{143}R_{74}$
$\frac{9}{2}$	3	3	$\frac{7}{2}$	4	1	$\frac{6\sqrt{1155}}{1001}R_{54} + \frac{20\sqrt{1155}}{1287}R_{74}$
$\frac{9}{2}$	3	3	$\frac{7}{2}$	4	2	$-\frac{\sqrt{70}}{315}R_{10} + \frac{2\sqrt{30}}{55}R_{30} - \frac{5\sqrt{2310}}{1001}R_{50} + \frac{28\sqrt{14}}{1287}R_{70}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	4	1	0
$\frac{9}{2}$	3	3	$\frac{9}{2}$	4	2	$\frac{15\sqrt{15}}{143}R_{54} + \frac{7\sqrt{15}}{117}R_{74}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	4	3	$\frac{7\sqrt{11}}{99}R_{10} + \frac{\sqrt{231}}{121}R_{30} - \frac{35\sqrt{3}}{143}R_{50} + \frac{329\sqrt{55}}{14157}R_{70}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	4	1	0
$\frac{9}{2}$	3	3	$\frac{11}{2}$	4	2	$\frac{2\sqrt{30}}{33}R_{54}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	4	3	$\frac{2\sqrt{330}}{55}R_{10} - \frac{8\sqrt{770}}{605}R_{30} - \frac{10\sqrt{10}}{143}R_{50} + \frac{28\sqrt{66}}{1573}R_{70}$
$\frac{9}{2}$	3	3	$\frac{7}{2}$	5	1	$-\frac{16\sqrt{5}}{429}R_{44} - \frac{14\sqrt{13}}{429}R_{64} + \frac{84\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	3	3	$\frac{7}{2}$	5	2	$-\frac{\sqrt{2}}{99}R_{20} + \frac{10\sqrt{10}}{429}R_{40} - \frac{49\sqrt{130}}{6435}R_{60} + \frac{28\sqrt{170}}{12155}R_{80}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	5	1	$-\frac{14\sqrt{12155}}{2431}R_{88}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	5	2	$-\frac{25\sqrt{10}}{429}R_{44} + \frac{7\sqrt{26}}{429}R_{64} + \frac{63\sqrt{374}}{2431}R_{84}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	5	3	$\frac{\sqrt{10}}{99}R_{20} + \frac{5\sqrt{2}}{39}R_{40} - \frac{7\sqrt{26}}{117}R_{60} + \frac{49\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	5	1	$-\frac{56\sqrt{2805}}{7293}R_{88}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	5	2	$-\frac{36\sqrt{130}}{1859}R_{44} + \frac{98\sqrt{2}}{429}R_{64} + \frac{112\sqrt{4862}}{31603}R_{84}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	5	3	$\frac{14\sqrt{78}}{429}R_{20} - \frac{14\sqrt{30}}{195}R_{60} + \frac{28\sqrt{6630}}{12155}R_{80}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	5	1	$-\frac{14\sqrt{51}}{663}R_{88}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	5	2	$-\frac{35\sqrt{546}}{5577}R_{44} + \frac{3\sqrt{210}}{143}R_{64} + \frac{\sqrt{510510}}{31603}R_{84}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	5	3	$\frac{15\sqrt{26}}{143}R_{20} - \frac{5\sqrt{130}}{143}R_{40} - \frac{7\sqrt{10}}{143}R_{60} + \frac{7\sqrt{2210}}{2431}R_{80}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	6	1	$\frac{14\sqrt{62985}}{4199}R_{98}$

Table B204: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 28 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	6	2	$-\frac{7\sqrt{30}}{429}R_{54} - \frac{7\sqrt{30}}{221}R_{74} + \frac{21\sqrt{7410}}{4199}R_{94}$
$\frac{9}{2}$	3	3	$\frac{9}{2}$	6	3	$-\frac{5\sqrt{462}}{14157}R_{30} + \frac{49\sqrt{6}}{1287}R_{50} - \frac{329\sqrt{110}}{26741}R_{70} + \frac{63\sqrt{1254}}{46189}R_{90}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{88179}}{12597}R_{98}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	6	2	$-\frac{2\sqrt{14}}{33}R_{54} + \frac{2\sqrt{3458}}{247}R_{94}$
$\frac{9}{2}$	3	3	$\frac{11}{2}$	6	3	$\frac{40\sqrt{66}}{4719}R_{30} + \frac{10\sqrt{42}}{429}R_{50} - \frac{324\sqrt{770}}{26741}R_{70} + \frac{70\sqrt{8778}}{46189}R_{90}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	6	1	$-\frac{14\sqrt{62985}}{12597}R_{98}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	6	2	$-\frac{\sqrt{2310}}{165}R_{54} + \frac{\sqrt{2310}}{187}R_{74} + \frac{7\sqrt{570570}}{20995}R_{94}$
$\frac{9}{2}$	3	3	$\frac{13}{2}$	6	3	$\frac{35\sqrt{14}}{429}R_{30} - \frac{7\sqrt{22}}{429}R_{50} - \frac{161\sqrt{30}}{2431}R_{70} + \frac{7\sqrt{38}}{221}R_{90}$
$\frac{9}{2}$	3	3	$\frac{15}{2}$	6	1	$-\frac{2\sqrt{881790}}{12597}R_{98}$
$\frac{9}{2}$	3	3	$\frac{15}{2}$	6	2	$-\frac{3\sqrt{2310}}{715}R_{54} + \frac{14\sqrt{2310}}{2431}R_{74} + \frac{\sqrt{570570}}{20995}R_{94}$
$\frac{9}{2}$	3	3	$\frac{15}{2}$	6	3	$\frac{20\sqrt{11}}{143}R_{30} - \frac{2\sqrt{7}}{13}R_{50} - \frac{8\sqrt{1155}}{2431}R_{70} + \frac{14\sqrt{1463}}{4199}R_{90}$
$\frac{9}{2}$	3	3	$\frac{15}{2}$	6	4	$\frac{\sqrt{546}}{39}R_{54} - \frac{2\sqrt{546}}{221}R_{74} + \frac{\sqrt{798}}{969}R_{94}$
$\frac{5}{2}$	4	1	$\frac{5}{2}$	4	1	$R_{00} + \frac{10\sqrt{5}}{49}R_{20} + \frac{9}{49}R_{40}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	1	$-\frac{5}{49}R_{20} - \frac{54\sqrt{5}}{539}R_{40} - \frac{5\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{54\sqrt{10}}{385}R_{44} - \frac{5\sqrt{26}}{143}R_{64}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	1	$\frac{27\sqrt{77}}{847}R_{44} - \frac{45\sqrt{5005}}{11011}R_{64}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{77}}{539}R_{20} - \frac{54\sqrt{385}}{5929}R_{40} - \frac{5\sqrt{5005}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{27\sqrt{77}}{847}R_{44} + \frac{5\sqrt{5005}}{847}R_{64}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{36\sqrt{462}}{11011}R_{44} - \frac{2\sqrt{30030}}{1573}R_{64} + \frac{\sqrt{3570}}{221}R_{84}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{9\sqrt{770}}{11011}R_{40} + \frac{2\sqrt{10010}}{1573}R_{60} + \frac{14\sqrt{13090}}{2431}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{54\sqrt{2310}}{55055}R_{44} + \frac{10\sqrt{6006}}{11011}R_{64} + \frac{5\sqrt{714}}{221}R_{84}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{35}}{7}R_{10} + \frac{2\sqrt{15}}{21}R_{30} + \frac{\sqrt{1155}}{231}R_{50}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	5	2	$-\frac{\sqrt{2310}}{165}R_{54}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	5	1	$\frac{3\sqrt{462}}{143}R_{54} - \frac{10\sqrt{462}}{3003}R_{74}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{5\sqrt{30}}{231}R_{30} - \frac{2\sqrt{2310}}{429}R_{50} - \frac{10\sqrt{14}}{143}R_{70}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{462}}{429}R_{54} - \frac{10\sqrt{462}}{1001}R_{74}$

Table B205: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 29 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{18\sqrt{2002}}{13013}R_{54} - \frac{15\sqrt{2002}}{1859}R_{74}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{390}}{1001}R_{30} - \frac{2\sqrt{30030}}{1859}R_{50} - \frac{30\sqrt{182}}{1859}R_{70}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{162\sqrt{10010}}{65065}R_{54} + \frac{45\sqrt{10010}}{13013}R_{74}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	1	$-\frac{3\sqrt{910}}{1183}R_{54} - \frac{125\sqrt{910}}{20111}R_{74} + \frac{3\sqrt{1330}}{323}R_{94}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	2	$\frac{3\sqrt{286}}{1859}R_{50} + \frac{20\sqrt{390}}{2873}R_{70} + \frac{126\sqrt{494}}{4199}R_{90}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{5\sqrt{30030}}{13013}R_{54} + \frac{15\sqrt{30030}}{20111}R_{74} + \frac{\sqrt{43890}}{323}R_{94}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{154}}{121}R_{44} + \frac{18\sqrt{10010}}{11011}R_{64}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{5\sqrt{154}}{77}R_{20} + \frac{10\sqrt{770}}{847}R_{40} + \frac{2\sqrt{10010}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	3	$-\frac{5\sqrt{154}}{121}R_{44} - \frac{2\sqrt{10010}}{847}R_{64}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{60\sqrt{110}}{1573}R_{44} + \frac{36\sqrt{286}}{1573}R_{64} - \frac{27\sqrt{34}}{1547}R_{84}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{25\sqrt{66}}{1573}R_{40} - \frac{12\sqrt{858}}{1573}R_{60} - \frac{18\sqrt{1122}}{2431}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{90\sqrt{22}}{1573}R_{44} - \frac{36\sqrt{1430}}{11011}R_{64} - \frac{27\sqrt{170}}{1547}R_{84}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{5\sqrt{154}}{1001}R_{44} - \frac{3\sqrt{10010}}{5005}R_{64} - \frac{87\sqrt{1190}}{7735}R_{84}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{5\sqrt{10}}{143}R_{40} - \frac{12\sqrt{130}}{715}R_{60} - \frac{18\sqrt{170}}{1105}R_{80}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{5\sqrt{42}}{1001}R_{44} + \frac{19\sqrt{2730}}{5005}R_{64} + \frac{11\sqrt{39270}}{7735}R_{84}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{3\sqrt{715}}{1105}R_{64} - \frac{186\sqrt{85}}{11305}R_{84} + \frac{35\sqrt{13}}{323}R_{10,4}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	2	$\frac{3\sqrt{130}}{1105}R_{60} + \frac{18\sqrt{170}}{1615}R_{80} + \frac{15\sqrt{210}}{323}R_{10,0}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	3	$\frac{\sqrt{2145}}{595}R_{64} + \frac{118\sqrt{255}}{11305}R_{84} + \frac{35\sqrt{39}}{323}R_{10,4}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{12\sqrt{85}}{323}R_{88} + \frac{2\sqrt{1785}}{323}R_{10,8}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} + \frac{26\sqrt{5}}{147}R_{20} + \frac{27}{539}R_{40} - \frac{20\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{2}}{77}R_{44} + \frac{4\sqrt{130}}{143}R_{64}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{180\sqrt{385}}{11011}R_{44} + \frac{68\sqrt{1001}}{11011}R_{64} + \frac{28\sqrt{119}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$-\frac{71\sqrt{385}}{17787}R_{20} - \frac{1350\sqrt{77}}{77077}R_{40} - \frac{17\sqrt{1001}}{4719}R_{60} + \frac{392\sqrt{1309}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{240\sqrt{385}}{11011}R_{44} + \frac{34\sqrt{1001}}{11011}R_{64} + \frac{84\sqrt{119}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{54\sqrt{2310}}{11011}R_{44} + \frac{4\sqrt{6006}}{1573}R_{64} - \frac{37\sqrt{714}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	2	$-\frac{2\sqrt{770}}{847}R_{20} - \frac{135\sqrt{154}}{11011}R_{40} - \frac{8\sqrt{2002}}{1573}R_{60} - \frac{126\sqrt{2618}}{26741}R_{80}$

Table B206: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 30 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{108\sqrt{462}}{11011}R_{44} + \frac{20\sqrt{30030}}{11011}R_{64} + \frac{19\sqrt{3570}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{7}}{63}R_{10} - \frac{6\sqrt{3}}{77}R_{30} - \frac{15\sqrt{231}}{1001}R_{50} - \frac{56\sqrt{35}}{1287}R_{70}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	5	2	$\frac{3\sqrt{462}}{143}R_{54} - \frac{8\sqrt{462}}{1287}R_{74}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{2310}}{231}R_{74}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{14}}{9}R_{10} + \frac{9\sqrt{6}}{77}R_{30} - \frac{2\sqrt{70}}{99}R_{70}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	3	$\frac{5\sqrt{2310}}{693}R_{74}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{10010}}{1183}R_{54} + \frac{48\sqrt{10010}}{31603}R_{74} + \frac{7\sqrt{14630}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	2	$-\frac{410\sqrt{78}}{39039}R_{30} - \frac{\sqrt{6006}}{507}R_{50} - \frac{96\sqrt{910}}{31603}R_{70} + \frac{294\sqrt{10374}}{54587}R_{90}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{4\sqrt{2002}}{1183}R_{54} + \frac{48\sqrt{2002}}{221221}R_{74} + \frac{35\sqrt{2926}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	1	$\frac{12\sqrt{182}}{1183}R_{54} + \frac{45\sqrt{182}}{20111}R_{74} - \frac{6\sqrt{266}}{221}R_{94}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	2	$-\frac{5\sqrt{910}}{1859}R_{30} - \frac{8\sqrt{1430}}{1859}R_{50} - \frac{810\sqrt{78}}{31603}R_{70} - \frac{252\sqrt{2470}}{54587}R_{90}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{36\sqrt{6006}}{13013}R_{54} + \frac{915\sqrt{6006}}{221221}R_{74} + \frac{18\sqrt{8778}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{18\sqrt{770}}{1573}R_{44} + \frac{96\sqrt{2002}}{11011}R_{64} - \frac{9\sqrt{238}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{2\sqrt{770}}{847}R_{20} - \frac{135\sqrt{154}}{11011}R_{40} - \frac{8\sqrt{2002}}{1573}R_{60} - \frac{126\sqrt{2618}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	3	$\frac{24\sqrt{770}}{1573}R_{44} + \frac{48\sqrt{2002}}{11011}R_{64} - \frac{27\sqrt{238}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{120\sqrt{22}}{1573}R_{44} + \frac{\sqrt{1430}}{1573}R_{64} - \frac{370\sqrt{170}}{17017}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{35\sqrt{66}}{363}R_{20} + \frac{20\sqrt{330}}{1573}R_{40} - \frac{2\sqrt{4290}}{4719}R_{60} - \frac{60\sqrt{5610}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{48\sqrt{110}}{1573}R_{44} + \frac{25\sqrt{286}}{11011}R_{64} + \frac{950\sqrt{34}}{17017}R_{84}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{62\sqrt{770}}{5005}R_{44} + \frac{108\sqrt{2002}}{17017}R_{64} + \frac{201\sqrt{238}}{29393}R_{84} + \frac{14\sqrt{910}}{1615}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{31\sqrt{2}}{429}R_{40} - \frac{72\sqrt{26}}{2431}R_{60} - \frac{54\sqrt{34}}{4199}R_{80} + \frac{28\sqrt{42}}{323}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{248\sqrt{210}}{15015}R_{44} - \frac{12\sqrt{546}}{17017}R_{64} - \frac{9\sqrt{7854}}{29393}R_{84} + \frac{14\sqrt{30030}}{4845}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{55}}{715}R_{44} + \frac{9\sqrt{143}}{2431}R_{64} - \frac{594\sqrt{17}}{29393}R_{84} - \frac{91\sqrt{65}}{1615}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{28\sqrt{2}}{429}R_{40} - \frac{81\sqrt{26}}{2431}R_{60} - \frac{162\sqrt{34}}{4199}R_{80} - \frac{11\sqrt{42}}{323}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{165}}{2145}R_{44} + \frac{9\sqrt{429}}{1001}R_{64} + \frac{1206\sqrt{51}}{29393}R_{84} + \frac{7\sqrt{195}}{285}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{36\sqrt{17}}{323}R_{88} + \frac{6\sqrt{357}}{323}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	2	$R_{00} - \frac{26\sqrt{5}}{105}R_{20} + \frac{3}{77}R_{40} + \frac{4\sqrt{13}}{429}R_{60}$

Table B207: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 31 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	1	$\frac{56\sqrt{1547}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	2	$-\frac{150\sqrt{154}}{11011}R_{44} + \frac{17\sqrt{10010}}{7865}R_{64} + \frac{84\sqrt{1190}}{12155}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	3	$\frac{71\sqrt{154}}{2541}R_{20} - \frac{150\sqrt{770}}{11011}R_{40} + \frac{17\sqrt{10010}}{23595}R_{60} + \frac{28\sqrt{13090}}{133705}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	1	$\frac{14\sqrt{9282}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	2	$\frac{54\sqrt{77}}{11011}R_{44} - \frac{8\sqrt{5005}}{1573}R_{64} + \frac{42\sqrt{595}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	3	$-\frac{4\sqrt{1155}}{4235}R_{20} + \frac{162\sqrt{231}}{11011}R_{40} - \frac{8\sqrt{3003}}{1573}R_{60} + \frac{42\sqrt{3927}}{26741}R_{80}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	5	1	$\frac{3\sqrt{462}}{143}R_{54} - \frac{8\sqrt{462}}{1287}R_{74}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	5	2	$\frac{\sqrt{7}}{9}R_{10} - \frac{2\sqrt{3}}{11}R_{30} + \frac{\sqrt{231}}{143}R_{50} - \frac{8\sqrt{35}}{6435}R_{70}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	1	0
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{2\sqrt{231}}{99}R_{74}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	3	$\frac{4\sqrt{35}}{45}R_{10} - \frac{6\sqrt{15}}{55}R_{30} + \frac{2\sqrt{7}}{99}R_{70}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{14\sqrt{49742}}{4199}R_{98}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{3003}}{507}R_{54} + \frac{96\sqrt{3003}}{31603}R_{74} + \frac{14\sqrt{4389}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	3	$\frac{164\sqrt{13}}{1859}R_{30} - \frac{2\sqrt{1001}}{169}R_{50} + \frac{288\sqrt{1365}}{158015}R_{70} + \frac{42\sqrt{1729}}{54587}R_{90}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	1	$\frac{84\sqrt{22610}}{20995}R_{98}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	2	$\frac{24\sqrt{715}}{9295}R_{54} - \frac{450\sqrt{715}}{31603}R_{74} + \frac{252\sqrt{1045}}{20995}R_{94}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	3	$-\frac{10\sqrt{39}}{1859}R_{30} + \frac{8\sqrt{3003}}{1859}R_{50} - \frac{450\sqrt{455}}{31603}R_{70} + \frac{84\sqrt{5187}}{54587}R_{90}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{18\sqrt{3094}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	6	2	$-\frac{30\sqrt{77}}{1573}R_{44} + \frac{48\sqrt{5005}}{7865}R_{64} - \frac{54\sqrt{595}}{12155}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	6	3	$\frac{4\sqrt{77}}{121}R_{20} - \frac{30\sqrt{385}}{1573}R_{40} + \frac{16\sqrt{5005}}{7865}R_{60} - \frac{18\sqrt{6545}}{133705}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	1	$\frac{20\sqrt{2210}}{2431}R_{88}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{8\sqrt{165}}{1573}R_{44} - \frac{10\sqrt{429}}{4719}R_{64} + \frac{100\sqrt{51}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{14\sqrt{11}}{121}R_{20} - \frac{72\sqrt{55}}{1573}R_{40} - \frac{2\sqrt{715}}{1573}R_{60} + \frac{60\sqrt{935}}{26741}R_{80}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{6\sqrt{3094}}{4199}R_{88} + \frac{28\sqrt{1326}}{1615}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{62}{2145}R_{44} - \frac{72\sqrt{65}}{2431}R_{64} + \frac{18\sqrt{935}}{4199}R_{84} + \frac{28\sqrt{143}}{1615}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{62\sqrt{105}}{2145}R_{40} - \frac{24\sqrt{1365}}{2431}R_{60} + \frac{6\sqrt{1785}}{4199}R_{80} + \frac{28\sqrt{5}}{1615}R_{10,0}$

Table B208: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 32 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	1	$-\frac{36\sqrt{221}}{4199}R_{88} + \frac{14\sqrt{4641}}{1615}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	2	$-\frac{4}{2145}R_{44} + \frac{27\sqrt{65}}{2431}R_{64} - \frac{54\sqrt{935}}{4199}R_{84} + \frac{49\sqrt{143}}{1615}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{330}}{2145}R_{40} + \frac{9\sqrt{4290}}{2431}R_{60} - \frac{18\sqrt{5610}}{4199}R_{80} + \frac{7\sqrt{770}}{1615}R_{10,0}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{715}}{715}R_{44} + \frac{9\sqrt{11}}{187}R_{64} - \frac{18\sqrt{221}}{4199}R_{84} + \frac{7\sqrt{5}}{1615}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} - \frac{35\sqrt{5}}{121}R_{20} + \frac{189}{1573}R_{40} + \frac{19\sqrt{13}}{1573}R_{60}$ $-\frac{112\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{63\sqrt{5}}{1573}R_{44} + \frac{95\sqrt{13}}{1573}R_{64} - \frac{560\sqrt{187}}{26741}R_{84}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	3	$-\frac{112\sqrt{24310}}{26741}R_{88}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{6\sqrt{30}}{121}R_{20} + \frac{270\sqrt{6}}{1573}R_{40} - \frac{42\sqrt{78}}{1573}R_{60} + \frac{126\sqrt{102}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{54\sqrt{10}}{1573}R_{44} - \frac{126\sqrt{26}}{1573}R_{64} + \frac{378\sqrt{374}}{26741}R_{84}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{84\sqrt{7293}}{26741}R_{88}$
$\frac{9}{2}$	4	1	$\frac{7}{2}$	5	1	$\frac{12\sqrt{15}}{143}R_{54} - \frac{28\sqrt{15}}{429}R_{74}$
$\frac{9}{2}$	4	1	$\frac{7}{2}$	5	2	0
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{8\sqrt{22}}{121}R_{10} + \frac{27\sqrt{462}}{1573}R_{30} - \frac{9\sqrt{6}}{143}R_{50} + \frac{35\sqrt{110}}{26741}R_{70}$ $+\frac{63\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{9\sqrt{30}}{143}R_{54} + \frac{175\sqrt{30}}{7293}R_{74} + \frac{63\sqrt{7410}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	3	$\frac{126\sqrt{62985}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{858}}{121}R_{10} - \frac{222\sqrt{2002}}{20449}R_{30} + \frac{30\sqrt{26}}{1859}R_{50} + \frac{406\sqrt{4290}}{347633}R_{70}$ $-\frac{2520\sqrt{5434}}{6605027}R_{90}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{6\sqrt{390}}{1859}R_{54} + \frac{406\sqrt{390}}{31603}R_{74} - \frac{504\sqrt{570}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	3	$-\frac{1680\sqrt{323}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	1	$-\frac{15\sqrt{910}}{1859}R_{30} + \frac{21\sqrt{1430}}{1859}R_{50} - \frac{945\sqrt{78}}{31603}R_{70} + \frac{63\sqrt{2470}}{54587}R_{90}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	2	$\frac{21\sqrt{182}}{1859}R_{54} - \frac{945\sqrt{182}}{31603}R_{74} + \frac{63\sqrt{266}}{4199}R_{94}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{42\sqrt{969}}{4199}R_{98}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	1	$\frac{3\sqrt{10}}{121}R_{20} - \frac{135\sqrt{2}}{1573}R_{40} + \frac{21\sqrt{26}}{1573}R_{60} - \frac{63\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{45\sqrt{10}}{1573}R_{44} + \frac{105\sqrt{26}}{1573}R_{64} - \frac{315\sqrt{374}}{26741}R_{84}$

Table B209: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 33 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	3	$-\frac{126\sqrt{12155}}{26741}R_{88}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{120\sqrt{14}}{1573}R_{20} + \frac{6\sqrt{70}}{121}R_{40} - \frac{174\sqrt{910}}{26741}R_{60} + \frac{18\sqrt{1190}}{39083}R_{80}$ $+ \frac{6\sqrt{30}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{2\sqrt{42}}{121}R_{44} - \frac{174\sqrt{2730}}{26741}R_{64} + \frac{18\sqrt{39270}}{39083}R_{84} + \frac{6\sqrt{6006}}{4199}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	3	$\frac{12\sqrt{85085}}{39083}R_{88} + \frac{12\sqrt{36465}}{4199}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{15\sqrt{10}}{143}R_{20} - \frac{3\sqrt{2}}{11}R_{40} + \frac{21\sqrt{26}}{2431}R_{60} + \frac{63\sqrt{34}}{3553}R_{80}$ $- \frac{24\sqrt{42}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{770}}{605}R_{44} + \frac{21\sqrt{2002}}{26741}R_{64} + \frac{63\sqrt{238}}{3553}R_{84} - \frac{168\sqrt{910}}{20995}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	3	$\frac{42\sqrt{3315}}{17765}R_{88} - \frac{144\sqrt{7735}}{20995}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{12\sqrt{7}}{143}R_{40} + \frac{108\sqrt{91}}{2431}R_{60} - \frac{108\sqrt{119}}{4199}R_{80} + \frac{12\sqrt{3}}{323}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{770}}{7865}R_{44} + \frac{108\sqrt{2002}}{26741}R_{64} - \frac{108\sqrt{238}}{4199}R_{84} + \frac{12\sqrt{910}}{1615}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{36\sqrt{510510}}{230945}R_{88} + \frac{36\sqrt{24310}}{17765}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	4	0
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} + \frac{70\sqrt{5}}{363}R_{20} + \frac{189}{1573}R_{40} - \frac{152\sqrt{13}}{4719}R_{60}$ $- \frac{1568\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	3	$\frac{105\sqrt{5}}{1573}R_{44} + \frac{19\sqrt{13}}{1573}R_{64} + \frac{1008\sqrt{187}}{26741}R_{84}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	1	$-\frac{108\sqrt{30}}{1573}R_{44} + \frac{10\sqrt{78}}{1573}R_{64} + \frac{245\sqrt{1122}}{26741}R_{84}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	2	$-\frac{2\sqrt{10}}{121}R_{20} - \frac{135\sqrt{2}}{1573}R_{40} - \frac{56\sqrt{26}}{1573}R_{60} - \frac{882\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{270\sqrt{6}}{1573}R_{44} + \frac{118\sqrt{390}}{7865}R_{64} + \frac{161\sqrt{5610}}{133705}R_{84}$
$\frac{9}{2}$	4	2	$\frac{7}{2}$	5	1	$-\frac{\sqrt{11}}{99}R_{10} - \frac{6\sqrt{231}}{847}R_{30} - \frac{15\sqrt{3}}{143}R_{50} - \frac{392\sqrt{55}}{14157}R_{70}$
$\frac{9}{2}$	4	2	$\frac{7}{2}$	5	2	$-\frac{15\sqrt{6}}{143}R_{54} + \frac{196\sqrt{6}}{1287}R_{74}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{9\sqrt{30}}{143}R_{54} + \frac{175\sqrt{30}}{7293}R_{74} + \frac{63\sqrt{7410}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	2	$-\frac{8\sqrt{22}}{1089}R_{10} - \frac{54\sqrt{462}}{11011}R_{30} - \frac{9\sqrt{6}}{143}R_{50} - \frac{1960\sqrt{110}}{240669}R_{70}$ $+ \frac{7938\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	3	$\frac{9\sqrt{30}}{143}R_{54} + \frac{35\sqrt{30}}{1989}R_{74} + \frac{189\sqrt{7410}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{14\sqrt{130}}{1859}R_{54} + \frac{435\sqrt{130}}{31603}R_{74} - \frac{1288\sqrt{190}}{46189}R_{94}$

Table B210: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 34 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{6\sqrt{286}}{121}R_{10} + \frac{259\sqrt{6006}}{61347}R_{30} + \frac{40\sqrt{78}}{5577}R_{50} - \frac{1218\sqrt{1430}}{347633}R_{70}$ $- \frac{11760\sqrt{16302}}{6605027}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{10\sqrt{26}}{1859}R_{54} + \frac{87\sqrt{26}}{2873}R_{74} + \frac{280\sqrt{38}}{3553}R_{94}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	1	$\frac{3\sqrt{286}}{1859}R_{54} + \frac{450\sqrt{286}}{31603}R_{74} + \frac{588\sqrt{418}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	2	$-\frac{35\sqrt{1430}}{20449}R_{30} - \frac{8\sqrt{910}}{1859}R_{50} - \frac{810\sqrt{6006}}{347633}R_{70} - \frac{252\sqrt{190190}}{600457}R_{90}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	3	$\frac{45\sqrt{78}}{1859}R_{54} + \frac{30\sqrt{78}}{1859}R_{74}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{45\sqrt{10}}{1573}R_{44} + \frac{105\sqrt{26}}{1573}R_{64} - \frac{315\sqrt{374}}{26741}R_{84}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	2	$-\frac{2\sqrt{10}}{121}R_{20} - \frac{135\sqrt{2}}{1573}R_{40} - \frac{56\sqrt{26}}{1573}R_{60} - \frac{882\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	3	$-\frac{75\sqrt{10}}{1573}R_{44} + \frac{21\sqrt{26}}{1573}R_{64} + \frac{567\sqrt{374}}{26741}R_{84}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{12\sqrt{14}}{121}R_{44} + \frac{290\sqrt{910}}{187187}R_{64} + \frac{35\sqrt{13090}}{39083}R_{84} + \frac{18\sqrt{2002}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{40\sqrt{42}}{4719}R_{20} - \frac{\sqrt{210}}{121}R_{40} - \frac{232\sqrt{2730}}{80223}R_{60} - \frac{42\sqrt{3570}}{39083}R_{80}$ $+ \frac{756\sqrt{10}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{6\sqrt{70}}{121}R_{44} + \frac{3422\sqrt{182}}{187187}R_{64} + \frac{23\sqrt{2618}}{39083}R_{84} + \frac{18\sqrt{10010}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{7\sqrt{10}}{55}R_{44} - \frac{18\sqrt{26}}{2431}R_{64} + \frac{12\sqrt{374}}{3553}R_{84} - \frac{2632\sqrt{1430}}{230945}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{45\sqrt{770}}{1573}R_{20} + \frac{8\sqrt{154}}{363}R_{40} + \frac{18\sqrt{2002}}{26741}R_{60} - \frac{108\sqrt{2618}}{39083}R_{80}$ $- \frac{112\sqrt{66}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	3	$-\frac{7\sqrt{330}}{363}R_{44} - \frac{30\sqrt{858}}{26741}R_{64} + \frac{72\sqrt{102}}{3553}R_{84} + \frac{280\sqrt{390}}{12597}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	1	$\frac{32\sqrt{35}}{715}R_{44} + \frac{387\sqrt{91}}{17017}R_{64} + \frac{378\sqrt{1309}}{46189}R_{84} + \frac{53\sqrt{5005}}{17765}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	2	$-\frac{28\sqrt{154}}{4719}R_{40} - \frac{81\sqrt{2002}}{26741}R_{60} - \frac{162\sqrt{2618}}{46189}R_{80} - \frac{7\sqrt{66}}{323}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{8\sqrt{105}}{429}R_{44} + \frac{45\sqrt{273}}{17017}R_{64} + \frac{18\sqrt{3927}}{46189}R_{84} - \frac{5\sqrt{15015}}{10659}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{36\sqrt{1309}}{3553}R_{88} + \frac{42\sqrt{561}}{3553}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	4	3	$R_{00} - \frac{35\sqrt{5}}{363}R_{20} - \frac{21}{143}R_{40} - \frac{19\sqrt{13}}{429}R_{60}$ $+ \frac{784\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	4	1	$-\frac{56\sqrt{36465}}{26741}R_{88}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	4	2	$-\frac{108\sqrt{10}}{1573}R_{44} + \frac{98\sqrt{26}}{1573}R_{64} + \frac{336\sqrt{374}}{26741}R_{84}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	4	3	$\frac{14\sqrt{6}}{121}R_{20} - \frac{14\sqrt{390}}{715}R_{60} + \frac{84\sqrt{510}}{10285}R_{80}$

Table B211: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 35 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{7}{2}$	5	1	$\frac{6\sqrt{15}}{143}R_{54} + \frac{140\sqrt{15}}{1287}R_{74}$
$\frac{9}{2}$	4	3	$\frac{7}{2}$	5	2	$-\frac{\sqrt{110}}{495}R_{10} + \frac{2\sqrt{2310}}{605}R_{30} - \frac{5\sqrt{30}}{143}R_{50} + \frac{196\sqrt{22}}{14157}R_{70}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	1	$\frac{126\sqrt{62985}}{46189}R_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	2	$\frac{9\sqrt{30}}{143}R_{54} + \frac{35\sqrt{30}}{1989}R_{74} + \frac{189\sqrt{7410}}{46189}R_{94}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	3	$\frac{56\sqrt{22}}{1089}R_{10} + \frac{9\sqrt{462}}{1573}R_{30} - \frac{21\sqrt{6}}{143}R_{50} + \frac{1645\sqrt{110}}{240669}R_{70}$ $+ \frac{567\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	1	$-\frac{112\sqrt{1615}}{46189}R_{98}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	2	$\frac{2\sqrt{390}}{429}R_{54} + \frac{56\sqrt{570}}{2717}R_{94}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	3	$\frac{6\sqrt{4290}}{605}R_{10} - \frac{296\sqrt{10010}}{102245}R_{30} - \frac{10\sqrt{130}}{1859}R_{50} - \frac{2436\sqrt{858}}{347633}R_{70}$ $+ \frac{5880\sqrt{27170}}{6605027}R_{90}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	5	1	$-\frac{210\sqrt{3553}}{46189}R_{98}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	5	2	$-\frac{3\sqrt{182}}{143}R_{54} + \frac{45\sqrt{182}}{2431}R_{74} + \frac{63\sqrt{266}}{4199}R_{94}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	5	3	$\frac{35\sqrt{30030}}{20449}R_{30} - \frac{7\sqrt{390}}{1859}R_{50} - \frac{7245\sqrt{286}}{347633}R_{70} + \frac{21\sqrt{81510}}{31603}R_{90}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	6	1	$-\frac{126\sqrt{12155}}{26741}R_{88}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	6	2	$-\frac{75\sqrt{10}}{1573}R_{44} + \frac{21\sqrt{26}}{1573}R_{64} + \frac{567\sqrt{374}}{26741}R_{84}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	6	3	$\frac{\sqrt{10}}{121}R_{20} + \frac{15\sqrt{2}}{143}R_{40} - \frac{7\sqrt{26}}{143}R_{60} + \frac{441\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	1	$-\frac{40\sqrt{17017}}{39083}R_{88} + \frac{36\sqrt{7293}}{4199}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{42}}{121}R_{44} + \frac{406\sqrt{2730}}{80223}R_{64} + \frac{16\sqrt{39270}}{39083}R_{84} + \frac{18\sqrt{6006}}{4199}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	3	$\frac{56\sqrt{70}}{1573}R_{20} - \frac{58\sqrt{182}}{2431}R_{60} + \frac{156\sqrt{238}}{39083}R_{80} + \frac{90\sqrt{6}}{4199}R_{10,0}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	1	$\frac{42\sqrt{12155}}{17765}R_{88} + \frac{16\sqrt{255255}}{46189}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	2	$-\frac{7\sqrt{770}}{1815}R_{44} + \frac{27\sqrt{2002}}{26741}R_{64} - \frac{9\sqrt{238}}{3553}R_{84} + \frac{328\sqrt{910}}{20995}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	3	$\frac{45\sqrt{330}}{1573}R_{20} - \frac{13\sqrt{66}}{363}R_{40} - \frac{21\sqrt{858}}{26741}R_{60} - \frac{273\sqrt{1122}}{39083}R_{80}$ $+ \frac{56\sqrt{154}}{4199}R_{10,0}$
$\frac{9}{2}$	4	3	$\frac{15}{2}$	6	1	$\frac{144\sqrt{170170}}{230945}R_{88} - \frac{2\sqrt{72930}}{3553}R_{10,8}$
$\frac{9}{2}$	4	3	$\frac{15}{2}$	6	2	$\frac{32\sqrt{770}}{23595}R_{44} - \frac{189\sqrt{2002}}{26741}R_{64} + \frac{54\sqrt{238}}{4199}R_{84} + \frac{13\sqrt{910}}{1615}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{15}{2}$	6	3	$\frac{28\sqrt{21}}{429}R_{40} - \frac{18\sqrt{273}}{2431}R_{60} - \frac{72\sqrt{357}}{4199}R_{80} + \frac{62}{323}R_{10,0}$

Table B212: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 36 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{182}}{143}R_{44} + \frac{9\sqrt{70}}{187}R_{64} - \frac{18\sqrt{170170}}{46189}R_{84} + \frac{7\sqrt{154}}{3553}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	1	$R_{00} - \frac{20\sqrt{5}}{121}R_{20} - \frac{486}{1573}R_{40} + \frac{124\sqrt{13}}{1573}R_{60}$ $-\frac{427\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{126\sqrt{15}}{1573}R_{44} - \frac{4\sqrt{39}}{121}R_{64} - \frac{7\sqrt{561}}{1573}R_{84}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{63\sqrt{4862}}{26741}R_{88}$
$\frac{11}{2}$	4	1	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{10}}{143}R_{54} - \frac{196\sqrt{10}}{2431}R_{74} + \frac{21\sqrt{2470}}{4199}R_{94}$
$\frac{11}{2}$	4	1	$\frac{7}{2}$	5	2	$\frac{42\sqrt{8398}}{4199}R_{98}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{33}}{363}R_{10} + \frac{24\sqrt{77}}{1573}R_{30} - \frac{30}{143}R_{50} + \frac{784\sqrt{165}}{80223}R_{70}$ $-\frac{945\sqrt{209}}{508079}R_{90}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	5	2	$\frac{14\sqrt{5}}{143}R_{54} + \frac{280\sqrt{5}}{2431}R_{74} - \frac{483\sqrt{1235}}{46189}R_{94}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	5	3	$-\frac{21\sqrt{41990}}{46189}R_{98}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{27\sqrt{143}}{1573}R_{10} - \frac{12\sqrt{3003}}{20449}R_{30} + \frac{114\sqrt{39}}{1859}R_{50} - \frac{3780\sqrt{715}}{347633}R_{70}$ $+\frac{4977\sqrt{8151}}{6605027}R_{90}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	2	$-\frac{90\sqrt{65}}{1859}R_{54} - \frac{84\sqrt{65}}{31603}R_{74} + \frac{1323\sqrt{95}}{46189}R_{94}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	3	$-\frac{189\sqrt{1938}}{46189}R_{98}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	1	$\frac{\sqrt{65}}{13}R_{10} - \frac{24\sqrt{1365}}{1859}R_{30} - \frac{6\sqrt{2145}}{1859}R_{50} + \frac{2240\sqrt{13}}{31603}R_{70}$ $-\frac{63\sqrt{3705}}{54587}R_{90}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	2	$\frac{38\sqrt{273}}{1859}R_{54} - \frac{280\sqrt{273}}{31603}R_{74} - \frac{21\sqrt{399}}{4199}R_{94}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{21\sqrt{646}}{4199}R_{98}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	1	$\frac{3\sqrt{15}}{1573}R_{20} - \frac{40\sqrt{3}}{1573}R_{40} + \frac{294\sqrt{39}}{26741}R_{60} - \frac{3024\sqrt{51}}{508079}R_{80}$ $+\frac{15\sqrt{7}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{16\sqrt{15}}{1573}R_{44} - \frac{70\sqrt{39}}{26741}R_{64} - \frac{5880\sqrt{561}}{508079}R_{84} + \frac{21\sqrt{2145}}{4199}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	3	$\frac{672\sqrt{72930}}{508079}R_{88} + \frac{9\sqrt{170170}}{4199}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{75\sqrt{21}}{11011}R_{20} + \frac{108\sqrt{105}}{11011}R_{40} - \frac{186\sqrt{1365}}{26741}R_{60} + \frac{2196\sqrt{1785}}{508079}R_{80}$ $-\frac{81\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{60\sqrt{7}}{1573}R_{44} + \frac{18\sqrt{455}}{2057}R_{64} + \frac{108\sqrt{6545}}{29887}R_{84} - \frac{45\sqrt{1001}}{4199}R_{10,4}$

Table B213: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 37 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{324\sqrt{510510}}{508079}R_{88} - \frac{9\sqrt{24310}}{4199}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{9\sqrt{15}}{143}R_{20} + \frac{8\sqrt{3}}{143}R_{40} + \frac{126\sqrt{39}}{2431}R_{60} - \frac{2016\sqrt{51}}{46189}R_{80}$ $+ \frac{129\sqrt{7}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{32\sqrt{1155}}{7865}R_{44} - \frac{14\sqrt{3003}}{2057}R_{64} - \frac{168\sqrt{357}}{46189}R_{84} + \frac{147\sqrt{1365}}{20995}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	3	$\frac{336\sqrt{2210}}{46189}R_{88} - \frac{3\sqrt{46410}}{20995}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	1	$\frac{3\sqrt{210}}{91}R_{20} - \frac{76\sqrt{42}}{1001}R_{40} - \frac{6\sqrt{546}}{2431}R_{60} + \frac{36\sqrt{714}}{4199}R_{80}$ $- \frac{213\sqrt{2}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{24\sqrt{1155}}{7865}R_{44} + \frac{164\sqrt{3003}}{26741}R_{64} - \frac{24\sqrt{357}}{4199}R_{84} - \frac{54\sqrt{1365}}{20995}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{24\sqrt{85085}}{46189}R_{88} + \frac{6\sqrt{36465}}{13585}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	4	0
$\frac{11}{2}$	4	2	$\frac{11}{2}$	4	2	$R_{00} + \frac{28\sqrt{5}}{121}R_{20} + \frac{504}{1573}R_{40} + \frac{80\sqrt{13}}{1573}R_{60}$ $+ \frac{490\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{378\sqrt{3}}{1573}R_{44} + \frac{4\sqrt{195}}{1573}R_{64} - \frac{35\sqrt{2805}}{26741}R_{84}$
$\frac{11}{2}$	4	2	$\frac{7}{2}$	5	1	$\frac{10\sqrt{462}}{33033}R_{30} + \frac{7\sqrt{6}}{429}R_{50} + \frac{392\sqrt{110}}{26741}R_{70} + \frac{882\sqrt{1254}}{46189}R_{90}$
$\frac{11}{2}$	4	2	$\frac{7}{2}$	5	2	$\frac{14\sqrt{3}}{429}R_{54} - \frac{392\sqrt{3}}{2431}R_{74} + \frac{42\sqrt{741}}{4199}R_{94}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{6\sqrt{15}}{143}R_{54} + \frac{784\sqrt{15}}{7293}R_{74} - \frac{189\sqrt{3705}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{11}}{121}R_{10} - \frac{28\sqrt{231}}{4719}R_{30} - \frac{40\sqrt{3}}{429}R_{50} - \frac{784\sqrt{55}}{26741}R_{70}$ $- \frac{4410\sqrt{627}}{508079}R_{90}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	5	3	$-\frac{2\sqrt{15}}{33}R_{54} + \frac{21\sqrt{3705}}{2717}R_{94}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{90\sqrt{65}}{1859}R_{54} - \frac{84\sqrt{65}}{31603}R_{74} + \frac{1323\sqrt{95}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	2	$-\frac{3\sqrt{143}}{1573}R_{10} - \frac{28\sqrt{3003}}{20449}R_{30} - \frac{40\sqrt{39}}{1859}R_{50} - \frac{2352\sqrt{715}}{347633}R_{70}$ $- \frac{13230\sqrt{8151}}{6605027}R_{90}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	3	$\frac{162\sqrt{13}}{1859}R_{54} + \frac{252\sqrt{13}}{2873}R_{74} + \frac{1323\sqrt{19}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	1	$-\frac{42\sqrt{143}}{1859}R_{54} - \frac{580\sqrt{143}}{31603}R_{74} - \frac{147\sqrt{209}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	2	$\frac{\sqrt{15015}}{143}R_{10} + \frac{336\sqrt{715}}{20449}R_{30} + \frac{24\sqrt{455}}{1859}R_{50} + \frac{1000\sqrt{3003}}{347633}R_{70}$ $+ \frac{126\sqrt{95095}}{600457}R_{90}$

Table B214: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 38 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	3	$-\frac{14\sqrt{39}}{1859}R_{54} - \frac{540\sqrt{39}}{31603}R_{74} - \frac{49\sqrt{57}}{4199}R_{94}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{8\sqrt{5}}{1573}R_{44} + \frac{882\sqrt{13}}{26741}R_{64} - \frac{9072\sqrt{187}}{508079}R_{84} + \frac{21\sqrt{715}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	2	$\frac{\sqrt{5}}{1573}R_{20} + \frac{20}{1573}R_{40} + \frac{392\sqrt{13}}{26741}R_{60} + \frac{21168\sqrt{17}}{508079}R_{80}$ $+ \frac{630\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	3	$\frac{16\sqrt{5}}{1573}R_{44} - \frac{686\sqrt{13}}{26741}R_{64} - \frac{8064\sqrt{187}}{508079}R_{84} + \frac{63\sqrt{715}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{60\sqrt{7}}{1573}R_{44} + \frac{18\sqrt{455}}{2057}R_{64} + \frac{108\sqrt{6545}}{29887}R_{84} - \frac{45\sqrt{1001}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{15\sqrt{21}}{1573}R_{20} - \frac{16\sqrt{105}}{1573}R_{40} - \frac{120\sqrt{1365}}{26741}R_{60} - \frac{2520\sqrt{1785}}{508079}R_{80}$ $- \frac{378\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	3	$-\frac{36\sqrt{35}}{1573}R_{44} - \frac{90\sqrt{91}}{26741}R_{64} + \frac{2700\sqrt{1309}}{508079}R_{84} + \frac{27\sqrt{5005}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{112\sqrt{5}}{715}R_{44} - \frac{6\sqrt{13}}{187}R_{64} + \frac{588\sqrt{187}}{46189}R_{84} + \frac{2121\sqrt{715}}{230945}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{385}}{1573}R_{20} - \frac{16\sqrt{77}}{1573}R_{40} - \frac{120\sqrt{1001}}{26741}R_{60} - \frac{2520\sqrt{1309}}{508079}R_{80}$ $- \frac{126\sqrt{33}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{224\sqrt{165}}{7865}R_{44} + \frac{398\sqrt{429}}{26741}R_{64} + \frac{1372\sqrt{51}}{46189}R_{84} + \frac{63\sqrt{195}}{20995}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	1	$-\frac{48\sqrt{70}}{715}R_{44} - \frac{57\sqrt{182}}{2431}R_{64} - \frac{138\sqrt{2618}}{46189}R_{84} - \frac{16\sqrt{10010}}{230945}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	2	$\frac{6\sqrt{385}}{143}R_{20} + \frac{72\sqrt{77}}{1573}R_{40} + \frac{210\sqrt{1001}}{26741}R_{60} + \frac{180\sqrt{1309}}{46189}R_{80}$ $+ \frac{42\sqrt{33}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{24\sqrt{210}}{715}R_{44} - \frac{23\sqrt{546}}{2431}R_{64} - \frac{82\sqrt{7854}}{46189}R_{84} - \frac{118\sqrt{30030}}{230945}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{12\sqrt{2618}}{3553}R_{88} + \frac{14\sqrt{1122}}{3553}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	4	3	$R_{00} - \frac{4\sqrt{5}}{605}R_{20} - \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{49\sqrt{17}}{1573}R_{80}$
$\frac{11}{2}$	4	3	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{2}}{143}R_{54} - \frac{28\sqrt{2}}{2431}R_{74} + \frac{105\sqrt{494}}{4199}R_{94}$
$\frac{11}{2}$	4	3	$\frac{7}{2}$	5	2	$-\frac{4\sqrt{77}}{1573}R_{30} + \frac{14}{143}R_{50} - \frac{1176\sqrt{165}}{133705}R_{70} + \frac{126\sqrt{209}}{46189}R_{90}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	5	1	$-\frac{315\sqrt{8398}}{46189}R_{98}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	5	2	$\frac{10}{143}R_{54} + \frac{56}{221}R_{74} + \frac{105\sqrt{247}}{3553}R_{94}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	5	3	$-\frac{\sqrt{165}}{605}R_{10} + \frac{32\sqrt{385}}{7865}R_{30} + \frac{10\sqrt{5}}{143}R_{50} - \frac{1568\sqrt{33}}{26741}R_{70}$ $+ \frac{2205\sqrt{1045}}{508079}R_{90}$

Table B215: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 39 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	1	$-\frac{189\sqrt{1938}}{46189}R_{98}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	2	$\frac{162\sqrt{13}}{1859}R_{54} + \frac{252\sqrt{13}}{2873}R_{74} + \frac{1323\sqrt{19}}{46189}R_{94}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	3	$\frac{21\sqrt{143}}{1573}R_{10} + \frac{84\sqrt{3003}}{20449}R_{30} - \frac{42\sqrt{39}}{1859}R_{50} - \frac{21084\sqrt{715}}{1738165}R_{70}$ $+ \frac{14301\sqrt{8151}}{6605027}R_{90}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	1	$\frac{21\sqrt{106590}}{230945}R_{98}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	2	$\frac{98\sqrt{1365}}{9295}R_{54} + \frac{80\sqrt{1365}}{31603}R_{74} - \frac{21\sqrt{1995}}{20995}R_{94}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	3	$\frac{5\sqrt{429}}{143}R_{10} - \frac{120\sqrt{1001}}{20449}R_{30} - \frac{174\sqrt{13}}{1859}R_{50} - \frac{280\sqrt{2145}}{347633}R_{70}$ $+ \frac{1323\sqrt{2717}}{600457}R_{90}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	6	1	$-\frac{1008\sqrt{14586}}{508079}R_{88} + \frac{15\sqrt{34034}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	6	2	$-\frac{40\sqrt{3}}{1573}R_{44} - \frac{826\sqrt{195}}{133705}R_{64} - \frac{3864\sqrt{2805}}{2540395}R_{84} + \frac{105\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	6	3	$-\frac{7\sqrt{3}}{1573}R_{20} + \frac{98\sqrt{195}}{12155}R_{60} - \frac{2016\sqrt{255}}{195415}R_{80} + \frac{45\sqrt{35}}{4199}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	1	$-\frac{324\sqrt{510510}}{508079}R_{88} - \frac{9\sqrt{24310}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	2	$-\frac{36\sqrt{35}}{1573}R_{44} - \frac{90\sqrt{91}}{26741}R_{64} + \frac{2700\sqrt{1309}}{508079}R_{84} + \frac{27\sqrt{5005}}{4199}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	3	$\frac{3\sqrt{21}}{11011}R_{20} + \frac{12\sqrt{105}}{1001}R_{40} + \frac{6\sqrt{1365}}{2431}R_{60} - \frac{252\sqrt{1785}}{29887}R_{80}$ $+ \frac{315\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	1	$-\frac{168\sqrt{14586}}{46189}R_{88} - \frac{321\sqrt{34034}}{230945}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	2	$-\frac{112\sqrt{231}}{7865}R_{44} + \frac{46\sqrt{15015}}{26741}R_{64} + \frac{336\sqrt{1785}}{46189}R_{84} + \frac{183\sqrt{273}}{20995}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	3	$\frac{105\sqrt{11}}{1573}R_{20} + \frac{168\sqrt{55}}{7865}R_{40} - \frac{210\sqrt{715}}{26741}R_{60} - \frac{4536\sqrt{935}}{508079}R_{80}$ $+ \frac{123\sqrt{1155}}{20995}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	1	$-\frac{48\sqrt{51051}}{46189}R_{88} - \frac{186\sqrt{2431}}{230945}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	2	$-\frac{96\sqrt{231}}{7865}R_{44} + \frac{74\sqrt{15015}}{26741}R_{64} + \frac{12\sqrt{1785}}{4199}R_{84} - \frac{36\sqrt{273}}{20995}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	3	$\frac{15\sqrt{14}}{91}R_{20} - \frac{12\sqrt{70}}{385}R_{40} - \frac{24\sqrt{910}}{2431}R_{60} + \frac{21\sqrt{30}}{1105}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	4	$-\frac{8\sqrt{1365}}{715}R_{44} + \frac{18\sqrt{21}}{187}R_{64} - \frac{36\sqrt{51051}}{46189}R_{84} + \frac{14\sqrt{1155}}{17765}R_{10,4}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	1	$R_{00} + \frac{2\sqrt{5}}{9}R_{20} + \frac{3}{11}R_{40} + \frac{40\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	2	$\frac{7\sqrt{2}}{33}R_{44} - \frac{8\sqrt{130}}{429}R_{64}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	1	$-\frac{14\sqrt{10}}{143}R_{44} + \frac{32\sqrt{26}}{429}R_{64} - \frac{7\sqrt{374}}{2431}R_{84}$

Table B216: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 40 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{10}}{99}R_{20} - \frac{15\sqrt{2}}{143}R_{40} - \frac{56\sqrt{26}}{1287}R_{60} - \frac{98\sqrt{34}}{2431}R_{80}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	3	$\frac{56\sqrt{10}}{429}R_{44} + \frac{16\sqrt{26}}{429}R_{64} - \frac{21\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	1	$\frac{18\sqrt{390}}{1859}R_{44} + \frac{28\sqrt{6}}{429}R_{64} - \frac{259\sqrt{14586}}{94809}R_{84}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{130}}{429}R_{20} - \frac{45\sqrt{26}}{1859}R_{40} - \frac{56\sqrt{2}}{429}R_{60} - \frac{294\sqrt{442}}{31603}R_{80}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{36\sqrt{78}}{1859}R_{44} + \frac{20\sqrt{30}}{429}R_{64} + \frac{133\sqrt{72930}}{94809}R_{84}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{2\sqrt{858}}{1859}R_{44} - \frac{12\sqrt{330}}{2431}R_{64} - \frac{469\sqrt{6630}}{163761}R_{84} + \frac{42\sqrt{6}}{323}R_{10,4}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{\sqrt{2730}}{5577}R_{40} + \frac{8\sqrt{210}}{2431}R_{60} + \frac{42\sqrt{46410}}{54587}R_{80} + \frac{252\sqrt{130}}{4199}R_{10,0}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{8\sqrt{26}}{1859}R_{44} + \frac{4\sqrt{10}}{2431}R_{64} + \frac{21\sqrt{24310}}{54587}R_{84} + \frac{42\sqrt{22}}{323}R_{10,4}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{32\sqrt{30}}{429}R_{54} + \frac{3\sqrt{30}}{143}R_{74}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	6	2	$\frac{2\sqrt{22}}{11}R_{10} + \frac{7\sqrt{462}}{363}R_{30} + \frac{40\sqrt{6}}{429}R_{50} + \frac{14\sqrt{110}}{1573}R_{70}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	6	3	$-\frac{16\sqrt{30}}{429}R_{54} - \frac{5\sqrt{30}}{143}R_{74}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{80\sqrt{42}}{3003}R_{54} + \frac{135\sqrt{42}}{2431}R_{74} - \frac{10\sqrt{10374}}{12597}R_{94}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	2	$-\frac{35\sqrt{110}}{4719}R_{30} - \frac{8\sqrt{70}}{429}R_{50} - \frac{270\sqrt{462}}{26741}R_{70} - \frac{84\sqrt{14630}}{46189}R_{90}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	3	$\frac{32\sqrt{210}}{3003}R_{54} + \frac{27\sqrt{210}}{17017}R_{74} - \frac{10\sqrt{51870}}{12597}R_{94}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{30}}{195}R_{54} + \frac{\sqrt{30}}{221}R_{74} - \frac{14\sqrt{7410}}{3315}R_{94}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{35\sqrt{6}}{1287}R_{30} - \frac{8\sqrt{462}}{1287}R_{50} - \frac{54\sqrt{70}}{2431}R_{70} - \frac{28\sqrt{798}}{4199}R_{90}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{12\sqrt{110}}{715}R_{54} + \frac{61\sqrt{110}}{2431}R_{74} + \frac{42\sqrt{27170}}{20995}R_{94}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	1	$-\frac{92\sqrt{105}}{23205}R_{54} - \frac{43\sqrt{105}}{4199}R_{74} - \frac{2\sqrt{25935}}{1615}R_{94} + \frac{35\sqrt{6279}}{7429}R_{11,4}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{4\sqrt{462}}{7293}R_{50} + \frac{27\sqrt{70}}{4199}R_{70} + \frac{2\sqrt{798}}{323}R_{90} + \frac{165\sqrt{966}}{7429}R_{11,0}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{44\sqrt{35}}{7735}R_{54} + \frac{199\sqrt{35}}{29393}R_{74} + \frac{2\sqrt{8645}}{1615}R_{94} + \frac{105\sqrt{2093}}{7429}R_{11,4}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{6783}}{969}R_{98} + \frac{6\sqrt{52003}}{7429}R_{11,8}$
$\frac{7}{2}$	5	2	$\frac{7}{2}$	5	2	$R_{00} - \frac{14\sqrt{5}}{45}R_{20} + \frac{7}{33}R_{40} - \frac{8\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	5	1	$-\frac{14\sqrt{4862}}{2431}R_{88}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	5	2	$-\frac{70}{429}R_{44} + \frac{112\sqrt{65}}{2145}R_{64} - \frac{42\sqrt{935}}{12155}R_{84}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	5	3	$\frac{28}{99}R_{20} - \frac{70\sqrt{5}}{429}R_{40} + \frac{112\sqrt{65}}{6435}R_{60} - \frac{14\sqrt{85}}{12155}R_{80}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	1	$\frac{98\sqrt{1122}}{7293}R_{88}$

Table B217: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 41 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	2	$\frac{18\sqrt{13}}{1859}R_{44} - \frac{56\sqrt{5}}{429}R_{64} + \frac{98\sqrt{12155}}{31603}R_{84}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{195}}{2145}R_{20} + \frac{54\sqrt{39}}{1859}R_{40} - \frac{56\sqrt{3}}{429}R_{60} + \frac{98\sqrt{663}}{31603}R_{80}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	1	$-\frac{98\sqrt{510}}{12597}R_{88} + \frac{36\sqrt{1190}}{1615}R_{10,8}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{2\sqrt{1365}}{27885}R_{44} + \frac{40\sqrt{21}}{2431}R_{64} - \frac{70\sqrt{51051}}{54587}R_{84} + \frac{12\sqrt{1155}}{1615}R_{10,4}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	3	$-\frac{14\sqrt{13}}{1859}R_{40} + \frac{280}{2431}R_{60} - \frac{490\sqrt{221}}{54587}R_{80} + \frac{12\sqrt{273}}{4199}R_{10,0}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	6	1	0
$\frac{7}{2}$	5	2	$\frac{9}{2}$	6	2	$\frac{80\sqrt{3}}{429}R_{54} - \frac{14\sqrt{3}}{143}R_{74}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	6	3	$\frac{4\sqrt{55}}{55}R_{10} - \frac{98\sqrt{1155}}{5445}R_{30} + \frac{80\sqrt{15}}{1287}R_{50} - \frac{14\sqrt{11}}{1573}R_{70}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{881790}}{12597}R_{98}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	2	$-\frac{16\sqrt{35}}{429}R_{54} + \frac{162\sqrt{35}}{2431}R_{74} - \frac{4\sqrt{8645}}{4199}R_{94}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	3	$\frac{98\sqrt{165}}{4719}R_{30} - \frac{16\sqrt{105}}{429}R_{50} + \frac{486\sqrt{77}}{26741}R_{70} - \frac{4\sqrt{21945}}{46189}R_{90}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{196\sqrt{25194}}{62985}R_{98}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{8\sqrt{231}}{2145}R_{54} - \frac{50\sqrt{231}}{2431}R_{74} + \frac{28\sqrt{57057}}{20995}R_{94}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	3	$-\frac{2\sqrt{35}}{429}R_{30} + \frac{56\sqrt{55}}{2145}R_{50} - \frac{350\sqrt{3}}{2431}R_{70} + \frac{196\sqrt{95}}{20995}R_{90}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{88179}}{4845}R_{98} + \frac{6\sqrt{676039}}{7429}R_{11,8}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{231}}{12155}R_{54} + \frac{25\sqrt{231}}{4199}R_{74} - \frac{2\sqrt{57057}}{1615}R_{94} + \frac{3\sqrt{345345}}{7429}R_{11,4}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{70}}{1105}R_{50} + \frac{25\sqrt{462}}{4199}R_{70} - \frac{2\sqrt{14630}}{1615}R_{90} + \frac{3\sqrt{17710}}{7429}R_{11,0}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{1365}}{3315}R_{54} + \frac{5\sqrt{1365}}{4199}R_{74} - \frac{2\sqrt{1995}}{4845}R_{94} + \frac{\sqrt{483}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} - \frac{10\sqrt{5}}{33}R_{20} + \frac{24}{143}R_{40} + \frac{2\sqrt{13}}{429}R_{60}$ $-\frac{7\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{8\sqrt{5}}{143}R_{44} + \frac{10\sqrt{13}}{429}R_{64} - \frac{35\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	3	$-\frac{7\sqrt{24310}}{2431}R_{88}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{37\sqrt{195}}{1859}R_{20} + \frac{120\sqrt{39}}{1859}R_{40} - \frac{266\sqrt{3}}{2431}R_{60} + \frac{336\sqrt{663}}{600457}R_{80}$ $+\frac{45\sqrt{91}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{24\sqrt{65}}{1859}R_{44} - \frac{798}{2431}R_{64} + \frac{1008\sqrt{2431}}{600457}R_{84} + \frac{63\sqrt{55}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{112\sqrt{1122}}{46189}R_{88} + \frac{45\sqrt{2618}}{4199}R_{10,8}$

Table B218: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 42 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{5\sqrt{429}}{5577}R_{20} + \frac{6\sqrt{2145}}{1859}R_{40} - \frac{140\sqrt{165}}{7293}R_{60} + \frac{490\sqrt{36465}}{600457}R_{80}$ $-\frac{27\sqrt{5005}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{2\sqrt{273}}{1859}R_{44} - \frac{140\sqrt{105}}{7293}R_{64} + \frac{490\sqrt{255255}}{600457}R_{84} - \frac{63\sqrt{231}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{490\sqrt{374}}{46189}R_{88} - \frac{27\sqrt{7854}}{4199}R_{10,8}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{9\sqrt{11}}{121}R_{10} + \frac{98\sqrt{231}}{4719}R_{30} - \frac{40\sqrt{3}}{429}R_{50} + \frac{126\sqrt{55}}{26741}R_{70}$ $-\frac{35\sqrt{627}}{508079}R_{90}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	6	2	$-\frac{40\sqrt{15}}{429}R_{54} + \frac{210\sqrt{15}}{2431}R_{74} - \frac{35\sqrt{3705}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	6	3	$-\frac{35\sqrt{125970}}{46189}R_{98}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{3\sqrt{385}}{121}R_{10} - \frac{64\sqrt{165}}{1573}R_{30} + \frac{2\sqrt{105}}{143}R_{50} + \frac{120\sqrt{77}}{26741}R_{70}$ $-\frac{69\sqrt{21945}}{508079}R_{90}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{6\sqrt{7}}{143}R_{54} + \frac{120\sqrt{7}}{2431}R_{74} - \frac{207\sqrt{1729}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{23\sqrt{881790}}{46189}R_{98}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{7\sqrt{231}}{429}R_{30} + \frac{154\sqrt{3}}{663}R_{50} - \frac{1260\sqrt{55}}{46189}R_{70} + \frac{2\sqrt{627}}{4199}R_{90}$ $+\frac{3\sqrt{759}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{14\sqrt{1155}}{3315}R_{54} - \frac{420\sqrt{1155}}{46189}R_{74} + \frac{2\sqrt{285285}}{20995}R_{94} + \frac{3\sqrt{69069}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{2\sqrt{461890}}{20995}R_{98} + \frac{3\sqrt{31870410}}{37145}R_{11,8}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	1	$-\frac{\sqrt{66}}{429}R_{30} + \frac{16\sqrt{42}}{663}R_{50} - \frac{450\sqrt{770}}{46189}R_{70} + \frac{8\sqrt{8778}}{4199}R_{90}$ $-\frac{3\sqrt{10626}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{32\sqrt{1155}}{36465}R_{54} - \frac{300\sqrt{1155}}{46189}R_{74} + \frac{16\sqrt{285285}}{20995}R_{94} - \frac{6\sqrt{69069}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{16\sqrt{146965}}{20995}R_{98} - \frac{6\sqrt{10140585}}{37145}R_{11,8}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	4	0
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} + \frac{20\sqrt{5}}{99}R_{20} + \frac{24}{143}R_{40} - \frac{16\sqrt{13}}{1287}R_{60}$ $-\frac{98\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	3	$\frac{40\sqrt{5}}{429}R_{44} + \frac{2\sqrt{13}}{429}R_{64} + \frac{63\sqrt{187}}{2431}R_{84}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{48\sqrt{195}}{1859}R_{44} + \frac{190\sqrt{3}}{7293}R_{64} + \frac{1960\sqrt{7293}}{1801371}R_{84} + \frac{63\sqrt{165}}{4199}R_{10,4}$

Table B219: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 43 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$-\frac{37\sqrt{65}}{5577}R_{20} - \frac{60\sqrt{13}}{1859}R_{40} - \frac{1064}{7293}R_{60} - \frac{2352\sqrt{221}}{600457}R_{80}$ $+\frac{1890\sqrt{273}}{54587}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{120\sqrt{39}}{1859}R_{44} + \frac{2242\sqrt{15}}{36465}R_{64} + \frac{1288\sqrt{36465}}{9006855}R_{84} + \frac{315\sqrt{33}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	1	$\frac{14\sqrt{429}}{1859}R_{44} + \frac{40\sqrt{165}}{2431}R_{64} + \frac{280\sqrt{3315}}{163761}R_{84} - \frac{987\sqrt{3}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{5\sqrt{273}}{1859}R_{20} - \frac{16\sqrt{1365}}{5577}R_{40} - \frac{40\sqrt{105}}{2431}R_{60} - \frac{840\sqrt{23205}}{600457}R_{80}$ $-\frac{1386\sqrt{65}}{54587}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	3	$\frac{70\sqrt{13}}{1859}R_{44} + \frac{200\sqrt{5}}{2431}R_{64} + \frac{1680\sqrt{12155}}{600457}R_{84} + \frac{525\sqrt{11}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	6	1	$-\frac{40\sqrt{15}}{429}R_{54} + \frac{210\sqrt{15}}{2431}R_{74} - \frac{35\sqrt{3705}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	6	2	$-\frac{\sqrt{11}}{121}R_{10} - \frac{28\sqrt{231}}{4719}R_{30} - \frac{40\sqrt{3}}{429}R_{50} - \frac{784\sqrt{55}}{26741}R_{70}$ $-\frac{4410\sqrt{627}}{508079}R_{90}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	6	3	$\frac{40\sqrt{15}}{429}R_{54} + \frac{14\sqrt{15}}{221}R_{74} - \frac{105\sqrt{3705}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{14\sqrt{21}}{429}R_{54} + \frac{300\sqrt{21}}{17017}R_{74} - \frac{529\sqrt{5187}}{138567}R_{94}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{3\sqrt{1155}}{121}R_{10} + \frac{224\sqrt{55}}{4719}R_{30} + \frac{8\sqrt{35}}{429}R_{50} - \frac{120\sqrt{231}}{26741}R_{70}$ $-\frac{966\sqrt{7315}}{508079}R_{90}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{2\sqrt{105}}{429}R_{54} + \frac{12\sqrt{105}}{1547}R_{74} + \frac{23\sqrt{25935}}{10659}R_{94}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{22\sqrt{15}}{3315}R_{54} + \frac{200\sqrt{15}}{4199}R_{74} + \frac{56\sqrt{3705}}{62985}R_{94} + \frac{63\sqrt{897}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{49\sqrt{3}}{1287}R_{30} - \frac{16\sqrt{231}}{1989}R_{50} - \frac{1080\sqrt{35}}{46189}R_{70} - \frac{8\sqrt{399}}{4199}R_{90}$ $+\frac{198\sqrt{483}}{7429}R_{11,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{6\sqrt{55}}{221}R_{54} + \frac{40\sqrt{55}}{2717}R_{74} + \frac{63\sqrt{3289}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	1	$\frac{28\sqrt{210}}{3315}R_{54} + \frac{275\sqrt{210}}{29393}R_{74} - \frac{2\sqrt{51870}}{20995}R_{94} - \frac{28\sqrt{12558}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	2	$-\frac{14\sqrt{3}}{429}R_{30} - \frac{56\sqrt{231}}{7293}R_{50} - \frac{1350\sqrt{35}}{46189}R_{70} - \frac{44\sqrt{399}}{4199}R_{90}$ $-\frac{66\sqrt{483}}{7429}R_{11,0}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	3	$\frac{4\sqrt{70}}{221}R_{54} + \frac{775\sqrt{70}}{29393}R_{74} + \frac{10\sqrt{17290}}{4199}R_{94} + \frac{42\sqrt{4186}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{13566}}{969}R_{98} + \frac{6\sqrt{104006}}{7429}R_{11,8}$
$\frac{9}{2}$	5	3	$\frac{9}{2}$	5	3	$R_{00} - \frac{10\sqrt{5}}{99}R_{20} - \frac{8}{39}R_{40} - \frac{2\sqrt{13}}{117}R_{60}$ $+\frac{49\sqrt{17}}{2431}R_{80}$

Table B220: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 44 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	1	$-\frac{224\sqrt{5610}}{138567}R_{88} + \frac{27\sqrt{13090}}{4199}R_{10,8}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	2	$-\frac{48\sqrt{65}}{1859}R_{44} + \frac{1862}{7293}R_{64} + \frac{896\sqrt{2431}}{600457}R_{84} + \frac{189\sqrt{55}}{4199}R_{10,4}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	3	$\frac{259\sqrt{39}}{5577}R_{20} - \frac{266\sqrt{15}}{3315}R_{60} + \frac{224\sqrt{3315}}{230945}R_{80} + \frac{135\sqrt{455}}{54587}R_{10,0}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	5	1	$\frac{490\sqrt{102}}{12597}R_{88} + \frac{45\sqrt{238}}{4199}R_{10,8}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	5	2	$\frac{14\sqrt{273}}{5577}R_{44} - \frac{60\sqrt{105}}{2431}R_{64} - \frac{70\sqrt{255255}}{600457}R_{84} + \frac{123\sqrt{231}}{4199}R_{10,4}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	5	3	$-\frac{15\sqrt{13}}{1859}R_{20} + \frac{2\sqrt{65}}{143}R_{40} + \frac{140\sqrt{5}}{2431}R_{60} - \frac{490\sqrt{1105}}{46189}R_{80}$ $+ \frac{231\sqrt{1365}}{54587}R_{10,0}$
$\frac{9}{2}$	5	3	$\frac{9}{2}$	6	1	$-\frac{35\sqrt{125970}}{46189}R_{98}$
$\frac{9}{2}$	5	3	$\frac{9}{2}$	6	2	$\frac{40\sqrt{15}}{429}R_{54} + \frac{14\sqrt{15}}{221}R_{74} - \frac{105\sqrt{3705}}{46189}R_{94}$
$\frac{9}{2}$	5	3	$\frac{9}{2}$	6	3	$\frac{7\sqrt{11}}{121}R_{10} + \frac{98\sqrt{231}}{14157}R_{30} - \frac{280\sqrt{3}}{1287}R_{50} + \frac{658\sqrt{55}}{26741}R_{70}$ $- \frac{315\sqrt{627}}{508079}R_{90}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	1	$-\frac{23\sqrt{176358}}{138567}R_{98}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{2\sqrt{7}}{33}R_{54} + \frac{23\sqrt{1729}}{2717}R_{94}$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{9\sqrt{77}}{121}R_{10} - \frac{256\sqrt{33}}{4719}R_{30} - \frac{10\sqrt{21}}{429}R_{50} - \frac{144\sqrt{385}}{26741}R_{70}$ $+ \frac{805\sqrt{4389}}{508079}R_{90}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{125970}}{12597}R_{98} + \frac{27\sqrt{965770}}{37145}R_{11,8}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{1155}}{255}R_{54} + \frac{20\sqrt{1155}}{3553}R_{74} + \frac{2\sqrt{285285}}{20995}R_{94} + \frac{9\sqrt{69069}}{7429}R_{11,4}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{49\sqrt{7}}{429}R_{30} - \frac{14\sqrt{11}}{663}R_{50} - \frac{3220\sqrt{15}}{46189}R_{70} + \frac{2\sqrt{19}}{221}R_{90}$ $+ \frac{99\sqrt{23}}{7429}R_{11,0}$
$\frac{9}{2}$	5	3	$\frac{15}{2}$	6	1	$\frac{8\sqrt{440895}}{12597}R_{98} + \frac{6\sqrt{3380195}}{37145}R_{11,8}$
$\frac{9}{2}$	5	3	$\frac{15}{2}$	6	2	$\frac{24\sqrt{1155}}{12155}R_{54} - \frac{350\sqrt{1155}}{46189}R_{74} - \frac{4\sqrt{285285}}{20995}R_{94} + \frac{12\sqrt{69069}}{7429}R_{11,4}$
$\frac{9}{2}$	5	3	$\frac{15}{2}$	6	3	$-\frac{\sqrt{22}}{143}R_{30} + \frac{8\sqrt{14}}{221}R_{50} + \frac{100\sqrt{2310}}{46189}R_{70} - \frac{28\sqrt{2926}}{4199}R_{90}$ $+ \frac{21\sqrt{3542}}{7429}R_{11,0}$
$\frac{9}{2}$	5	3	$\frac{15}{2}$	6	4	$-\frac{8\sqrt{273}}{663}R_{54} + \frac{50\sqrt{273}}{4199}R_{74} - \frac{4\sqrt{399}}{969}R_{94} + \frac{2\sqrt{2415}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} - \frac{280\sqrt{5}}{1859}R_{20} - \frac{378}{1859}R_{40} + \frac{124\sqrt{13}}{31603}R_{60}$ $+ \frac{18361\sqrt{17}}{600457}R_{80} - \frac{540\sqrt{21}}{54587}R_{10,0}$

Table B221: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 45 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{98\sqrt{15}}{1859}R_{44} - \frac{4\sqrt{39}}{2431}R_{64} + \frac{301\sqrt{561}}{35321}R_{84} - \frac{420\sqrt{2145}}{54587}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	3	$-\frac{2709\sqrt{4862}}{600457}R_{88} - \frac{60\sqrt{102102}}{54587}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{135\sqrt{11}}{1859}R_{20} + \frac{24\sqrt{55}}{1859}R_{40} + \frac{378\sqrt{715}}{31603}R_{60} - \frac{6048\sqrt{935}}{600457}R_{80}$ $+ \frac{129\sqrt{1155}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{96\sqrt{7}}{1859}R_{44} - \frac{42\sqrt{455}}{2431}R_{64} - \frac{504\sqrt{6545}}{600457}R_{84} + \frac{441\sqrt{1001}}{54587}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{1680\sqrt{14586}}{600457}R_{88} - \frac{9\sqrt{34034}}{54587}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{\sqrt{429}}{1573}R_{10} + \frac{72\sqrt{1001}}{20449}R_{30} - \frac{90\sqrt{13}}{1859}R_{50} + \frac{784\sqrt{2145}}{347633}R_{70}$ $-\frac{2835\sqrt{2717}}{6605027}R_{90}$
$\frac{11}{2}$	5	1	$\frac{9}{2}$	6	2	$\frac{42\sqrt{65}}{1859}R_{54} + \frac{840\sqrt{65}}{31603}R_{74} - \frac{1449\sqrt{95}}{46189}R_{94}$
$\frac{11}{2}$	5	1	$\frac{9}{2}$	6	3	$-\frac{63\sqrt{3230}}{46189}R_{98}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{36\sqrt{15015}}{20449}R_{10} - \frac{25\sqrt{715}}{20449}R_{30} + \frac{532\sqrt{455}}{31603}R_{50} - \frac{26550\sqrt{3003}}{6605027}R_{70}$ $+ \frac{1896\sqrt{95095}}{46235189}R_{90} + \frac{363\sqrt{115115}}{8788507}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	2	$-\frac{700\sqrt{273}}{31603}R_{54} - \frac{590\sqrt{273}}{600457}R_{74} + \frac{120\sqrt{399}}{46189}R_{94} + \frac{363\sqrt{2415}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{72\sqrt{22610}}{323323}R_{98} + \frac{363\sqrt{1560090}}{676039}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	1	$\frac{5\sqrt{429}}{169}R_{10} - \frac{24\sqrt{1001}}{1859}R_{30} - \frac{66\sqrt{13}}{2873}R_{50} - \frac{448\sqrt{2145}}{600457}R_{70}$ $+ \frac{9\sqrt{2717}}{2873}R_{90} - \frac{1296\sqrt{3289}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{38\sqrt{5005}}{14365}R_{54} + \frac{168\sqrt{5005}}{600457}R_{74} + \frac{3\sqrt{7315}}{1105}R_{94} - \frac{768\sqrt{1771}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	3	$-\frac{\sqrt{106590}}{1105}R_{98} - \frac{48\sqrt{817190}}{96577}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	1	$-\frac{27\sqrt{286}}{1859}R_{30} + \frac{36\sqrt{182}}{2873}R_{50} + \frac{54\sqrt{30030}}{35321}R_{70} - \frac{36\sqrt{38038}}{22477}R_{90}$ $+ \frac{279\sqrt{46046}}{676039}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{424\sqrt{5005}}{158015}R_{54} - \frac{2916\sqrt{5005}}{600457}R_{74} - \frac{24\sqrt{7315}}{20995}R_{94} + \frac{42\sqrt{1771}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{296\sqrt{33915}}{146965}R_{98} + \frac{6\sqrt{260015}}{52003}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	4	0
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} + \frac{392\sqrt{5}}{1859}R_{20} + \frac{392}{1859}R_{40} + \frac{80\sqrt{13}}{31603}R_{60}$ $-\frac{21070\sqrt{17}}{600457}R_{80} - \frac{2520\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{294\sqrt{3}}{1859}R_{44} + \frac{4\sqrt{195}}{31603}R_{64} + \frac{1505\sqrt{2805}}{600457}R_{84} + \frac{1260\sqrt{429}}{54587}R_{10,4}$

Table B222: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 46 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	1	$-\frac{112\sqrt{33}}{1859}R_{44} - \frac{6\sqrt{2145}}{2431}R_{64} + \frac{588\sqrt{255}}{54587}R_{84} + \frac{2121\sqrt{39}}{54587}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{15\sqrt{21}}{1859}R_{20} - \frac{16\sqrt{105}}{1859}R_{40} - \frac{120\sqrt{1365}}{31603}R_{60} - \frac{2520\sqrt{1785}}{600457}R_{80}$ $-\frac{4158\sqrt{5}}{54587}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	3	$\frac{672}{1859}R_{44} + \frac{1194\sqrt{65}}{31603}R_{64} + \frac{4116\sqrt{935}}{600457}R_{84} + \frac{189\sqrt{143}}{54587}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{9}{2}$	6	1	$-\frac{18\sqrt{195}}{1859}R_{54} + \frac{784\sqrt{195}}{31603}R_{74} - \frac{567\sqrt{285}}{46189}R_{94}$
$\frac{11}{2}$	5	2	$\frac{9}{2}$	6	2	$-\frac{3\sqrt{143}}{1573}R_{10} - \frac{28\sqrt{3003}}{20449}R_{30} - \frac{40\sqrt{39}}{1859}R_{50} - \frac{2352\sqrt{715}}{347633}R_{70}$ $-\frac{13230\sqrt{8151}}{6605027}R_{90}$
$\frac{11}{2}$	5	2	$\frac{9}{2}$	6	3	$-\frac{2\sqrt{195}}{143}R_{54} + \frac{63\sqrt{285}}{2717}R_{94}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{700\sqrt{273}}{31603}R_{54} - \frac{590\sqrt{273}}{600457}R_{74} + \frac{120\sqrt{399}}{46189}R_{94} + \frac{363\sqrt{2415}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{15015}}{20449}R_{10} - \frac{175\sqrt{715}}{61347}R_{30} - \frac{560\sqrt{455}}{94809}R_{50} - \frac{16520\sqrt{3003}}{6605027}R_{70}$ $-\frac{720\sqrt{95095}}{6605027}R_{90} + \frac{2178\sqrt{115115}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	3	$\frac{252\sqrt{1365}}{31603}R_{54} + \frac{354\sqrt{1365}}{54587}R_{74} + \frac{24\sqrt{1995}}{46189}R_{94} + \frac{1815\sqrt{483}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{154\sqrt{195}}{14365}R_{54} + \frac{116\sqrt{195}}{54587}R_{74} + \frac{7\sqrt{285}}{1105}R_{94} - \frac{4704\sqrt{69}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{15\sqrt{91}}{169}R_{10} + \frac{112\sqrt{39}}{1859}R_{30} + \frac{8\sqrt{3003}}{2873}R_{50} - \frac{600\sqrt{455}}{600457}R_{70}$ $-\frac{6\sqrt{5187}}{2873}R_{90} - \frac{3168\sqrt{6279}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	3	$-\frac{14\sqrt{715}}{14365}R_{54} + \frac{324\sqrt{715}}{600457}R_{74} + \frac{7\sqrt{1045}}{1105}R_{94} + \frac{2688\sqrt{253}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{16\sqrt{2730}}{14365}R_{54} + \frac{99\sqrt{2730}}{54587}R_{74} + \frac{82\sqrt{3990}}{20995}R_{94} + \frac{48\sqrt{966}}{7429}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	2	$-\frac{14\sqrt{39}}{1859}R_{30} - \frac{56\sqrt{3003}}{31603}R_{50} - \frac{4050\sqrt{455}}{600457}R_{70} - \frac{132\sqrt{5187}}{54587}R_{90}$ $-\frac{198\sqrt{6279}}{96577}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	3	$\frac{8\sqrt{910}}{1105}R_{54} + \frac{27\sqrt{910}}{4199}R_{74} + \frac{62\sqrt{1330}}{20995}R_{94} - \frac{6\sqrt{322}}{7429}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{176358}}{4199}R_{98} + \frac{18\sqrt{1352078}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	3	$R_{00} - \frac{56\sqrt{5}}{9295}R_{20} - \frac{42}{169}R_{40} - \frac{4\sqrt{13}}{2873}R_{60}$ $-\frac{2107\sqrt{17}}{35321}R_{80} + \frac{2100\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	1	$-\frac{504\sqrt{2210}}{54587}R_{88} - \frac{321\sqrt{46410}}{272935}R_{10,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	2	$-\frac{336\sqrt{35}}{9295}R_{44} + \frac{690\sqrt{91}}{31603}R_{64} + \frac{5040\sqrt{1309}}{600457}R_{84} + \frac{549\sqrt{5005}}{272935}R_{10,4}$

Table B223: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 47 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	3	$\frac{105\sqrt{15}}{1859}R_{20} + \frac{168\sqrt{3}}{1859}R_{40} - \frac{1050\sqrt{39}}{31603}R_{60} - \frac{22680\sqrt{51}}{600457}R_{80}$ $+ \frac{4059\sqrt{7}}{54587}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{9}{2}$	6	1	$-\frac{945\sqrt{646}}{46189}R_{98}$
$\frac{11}{2}$	5	3	$\frac{9}{2}$	6	2	$\frac{30\sqrt{13}}{1859}R_{54} + \frac{168\sqrt{13}}{2873}R_{74} + \frac{315\sqrt{19}}{3553}R_{94}$
$\frac{11}{2}$	5	3	$\frac{9}{2}$	6	3	$-\frac{3\sqrt{2145}}{7865}R_{10} + \frac{96\sqrt{5005}}{102245}R_{30} + \frac{30\sqrt{65}}{1859}R_{50} - \frac{4704\sqrt{429}}{347633}R_{70}$ $+ \frac{6615\sqrt{13585}}{6605027}R_{90}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	1	$-\frac{72\sqrt{22610}}{323323}R_{98} + \frac{363\sqrt{1560090}}{676039}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{252\sqrt{1365}}{31603}R_{54} + \frac{354\sqrt{1365}}{54587}R_{74} + \frac{24\sqrt{1995}}{46189}R_{94} + \frac{1815\sqrt{483}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{28\sqrt{15015}}{20449}R_{10} + \frac{175\sqrt{715}}{20449}R_{30} - \frac{196\sqrt{455}}{31603}R_{50} - \frac{29618\sqrt{3003}}{6605027}R_{70}$ $+ \frac{5448\sqrt{95095}}{46235189}R_{90} + \frac{1815\sqrt{115115}}{8788507}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	1	$-\frac{3\sqrt{646}}{1105}R_{98} - \frac{48\sqrt{44574}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	2	$\frac{98\sqrt{1001}}{14365}R_{54} - \frac{240\sqrt{1001}}{600457}R_{74} + \frac{3\sqrt{1463}}{1105}R_{94} + \frac{480\sqrt{8855}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{15\sqrt{65}}{169}R_{10} - \frac{8\sqrt{1365}}{1859}R_{30} - \frac{58\sqrt{2145}}{14365}R_{50} + \frac{840\sqrt{13}}{600457}R_{70}$ $- \frac{63\sqrt{3705}}{14365}R_{90} + \frac{3696\sqrt{4485}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	1	$-\frac{48\sqrt{2261}}{7735}R_{98} - \frac{30\sqrt{156009}}{52003}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	2	$-\frac{1376\sqrt{1001}}{158015}R_{54} + \frac{2430\sqrt{1001}}{600457}R_{74} + \frac{12\sqrt{1463}}{1615}R_{94} + \frac{12\sqrt{8855}}{7429}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	3	$\frac{7\sqrt{4290}}{1859}R_{30} + \frac{28\sqrt{2730}}{14365}R_{50} - \frac{3240\sqrt{2002}}{600457}R_{70} - \frac{576\sqrt{570570}}{1910545}R_{90}$ $+ \frac{159\sqrt{690690}}{676039}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	4	$-\frac{72\sqrt{35}}{1105}R_{54} + \frac{270\sqrt{35}}{4199}R_{74} - \frac{36\sqrt{8645}}{20995}R_{94} + \frac{54\sqrt{2093}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	1	$R_{00} - \frac{10\sqrt{5}}{169}R_{20} - \frac{72}{169}R_{40} + \frac{10\sqrt{13}}{2873}R_{60}$ $+ \frac{2765\sqrt{17}}{54587}R_{80} - \frac{864\sqrt{21}}{54587}R_{10,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{36\sqrt{385}}{1859}R_{44} - \frac{10\sqrt{1001}}{2431}R_{64} - \frac{945\sqrt{119}}{54587}R_{84} - \frac{126\sqrt{455}}{54587}R_{10,4}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{175\sqrt{6630}}{54587}R_{88} + \frac{36\sqrt{15470}}{54587}R_{10,8}$
$\frac{13}{2}$	5	1	$\frac{9}{2}$	6	1	$\frac{\sqrt{455}}{1859}R_{30} - \frac{70\sqrt{715}}{31603}R_{50} + \frac{8820\sqrt{39}}{600457}R_{70} - \frac{90\sqrt{1235}}{54587}R_{90}$ $+ \frac{33\sqrt{1495}}{96577}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{9}{2}$	6	2	$-\frac{10\sqrt{143}}{31603}R_{54} - \frac{4200\sqrt{143}}{600457}R_{74} - \frac{840\sqrt{209}}{46189}R_{94} + \frac{63\sqrt{1265}}{7429}R_{11,4}$

Table B224: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 48 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	1	$\frac{9}{2}$	6	3	$\frac{150\sqrt{7106}}{46189}R_{98} + \frac{9\sqrt{490314}}{7429}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{\sqrt{273}}{1183}R_{10} + \frac{36\sqrt{13}}{1859}R_{30} + \frac{450\sqrt{1001}}{221221}R_{50} - \frac{4480\sqrt{1365}}{600457}R_{70}$ $+ \frac{2025\sqrt{1729}}{382109}R_{90} - \frac{10692\sqrt{2093}}{8788507}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{30\sqrt{15015}}{31603}R_{54} + \frac{1160\sqrt{15015}}{600457}R_{74} + \frac{45\sqrt{21945}}{46189}R_{94} - \frac{504\sqrt{5313}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{135\sqrt{49742}}{323323}R_{98} - \frac{36\sqrt{3432198}}{676039}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{9\sqrt{195}}{845}R_{10} - \frac{6\sqrt{455}}{845}R_{30} + \frac{24\sqrt{715}}{2873}R_{50} + \frac{1890\sqrt{39}}{54587}R_{70}$ $-\frac{489\sqrt{1235}}{54587}R_{90} + \frac{15312\sqrt{1495}}{6277505}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{100\sqrt{91}}{2873}R_{54} - \frac{1050\sqrt{91}}{54587}R_{74} + \frac{45\sqrt{133}}{4199}R_{94} + \frac{3894\sqrt{805}}{482885}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	3	$-\frac{15\sqrt{1938}}{4199}R_{98} - \frac{132\sqrt{14858}}{96577}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	1	$\frac{6\sqrt{2730}}{455}R_{10} - \frac{23\sqrt{130}}{845}R_{30} - \frac{4\sqrt{10010}}{1183}R_{50} + \frac{210\sqrt{546}}{54587}R_{70}$ $+ \frac{498\sqrt{17290}}{382109}R_{90} - \frac{99\sqrt{20930}}{198835}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{120\sqrt{91}}{2873}R_{54} - \frac{300\sqrt{91}}{54587}R_{74} - \frac{60\sqrt{133}}{4199}R_{94} - \frac{66\sqrt{805}}{37145}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{20\sqrt{74613}}{29393}R_{98} + \frac{6\sqrt{572033}}{52003}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	4	0
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	2	$R_{00} + \frac{40\sqrt{5}}{169}R_{20} + \frac{648}{1859}R_{40} + \frac{2000\sqrt{13}}{31603}R_{60}$ $+ \frac{1750\sqrt{17}}{54587}R_{80} + \frac{648\sqrt{21}}{54587}R_{10,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	3	$\frac{84\sqrt{105}}{1859}R_{44} + \frac{210\sqrt{273}}{31603}R_{64} - \frac{35\sqrt{3927}}{54587}R_{84} - \frac{30\sqrt{15015}}{54587}R_{10,4}$
$\frac{13}{2}$	5	2	$\frac{9}{2}$	6	1	$-\frac{70\sqrt{91}}{31603}R_{54} + \frac{8820\sqrt{91}}{600457}R_{74} - \frac{90\sqrt{133}}{4199}R_{94} + \frac{33\sqrt{805}}{7429}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{9}{2}$	6	2	$\frac{7\sqrt{715}}{61347}R_{30} + \frac{80\sqrt{455}}{94809}R_{50} + \frac{7560\sqrt{3003}}{6605027}R_{70} + \frac{360\sqrt{95095}}{600457}R_{90}$ $+ \frac{198\sqrt{115115}}{96577}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{9}{2}$	6	3	$\frac{10\sqrt{91}}{2431}R_{54} - \frac{420\sqrt{91}}{46189}R_{74} - \frac{90\sqrt{133}}{4199}R_{94} + \frac{99\sqrt{805}}{7429}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{570\sqrt{65}}{31603}R_{54} + \frac{11760\sqrt{65}}{600457}R_{74} + \frac{135\sqrt{95}}{4199}R_{94} - \frac{6336\sqrt{23}}{96577}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	2	$-\frac{3\sqrt{143}}{1859}R_{10} - \frac{24\sqrt{3003}}{20449}R_{30} - \frac{600\sqrt{39}}{31603}R_{50} - \frac{42000\sqrt{715}}{6605027}R_{70}$ $-\frac{1350\sqrt{8151}}{600457}R_{90} - \frac{2376\sqrt{9867}}{1255501}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{1470\sqrt{13}}{31603}R_{54} - \frac{16800\sqrt{13}}{600457}R_{74} + \frac{135\sqrt{19}}{4199}R_{94} + \frac{3960\sqrt{115}}{96577}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{100\sqrt{91}}{2873}R_{54} - \frac{1050\sqrt{91}}{54587}R_{74} + \frac{45\sqrt{133}}{4199}R_{94} + \frac{3894\sqrt{805}}{482885}R_{11,4}$

Table B225: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 49 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{\sqrt{195}}{845}R_{10} - \frac{24\sqrt{455}}{9295}R_{30} - \frac{120\sqrt{715}}{31603}R_{50} - \frac{14000\sqrt{39}}{600457}R_{70}$ $-\frac{270\sqrt{1235}}{54587}R_{90} - \frac{26136\sqrt{1495}}{6277505}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{140\sqrt{3003}}{31603}R_{54} + \frac{3290\sqrt{3003}}{600457}R_{74} + \frac{15\sqrt{4389}}{4199}R_{94} + \frac{198\sqrt{26565}}{482885}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{120\sqrt{26}}{2873}R_{54} - \frac{2625\sqrt{26}}{54587}R_{74} - \frac{100\sqrt{38}}{4199}R_{94} - \frac{36\sqrt{230}}{37145}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	2	$\frac{4\sqrt{195}}{65}R_{10} + \frac{18\sqrt{455}}{845}R_{30} + \frac{360\sqrt{715}}{31603}R_{50} + \frac{1750\sqrt{39}}{54587}R_{70}$ $+\frac{180\sqrt{1235}}{54587}R_{90} + \frac{594\sqrt{1495}}{482885}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	3	$-\frac{35\sqrt{78}}{4199}R_{74} - \frac{40\sqrt{114}}{4199}R_{94} - \frac{6\sqrt{690}}{2185}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{41990}}{4199}R_{98} + \frac{6\sqrt{2897310}}{96577}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	5	3	$R_{00} + \frac{10\sqrt{5}}{169}R_{20} - \frac{552}{1859}R_{40} - \frac{2270\sqrt{13}}{31603}R_{60}$ $+\frac{245\sqrt{17}}{54587}R_{80} + \frac{1176\sqrt{21}}{54587}R_{10,0}$
$\frac{13}{2}$	5	3	$\frac{9}{2}$	6	1	$-\frac{30\sqrt{1938}}{4199}R_{98} + \frac{33\sqrt{14858}}{7429}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{9}{2}$	6	2	$-\frac{150\sqrt{39}}{31603}R_{54} - \frac{280\sqrt{39}}{35321}R_{74} + \frac{231\sqrt{345}}{7429}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{9}{2}$	6	3	$-\frac{7\sqrt{15015}}{61347}R_{30} + \frac{70\sqrt{195}}{94809}R_{50} + \frac{67620\sqrt{143}}{6605027}R_{70} - \frac{30\sqrt{40755}}{31603}R_{90}$ $+\frac{33\sqrt{49335}}{96577}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	1	$-\frac{45\sqrt{67830}}{29393}R_{98} - \frac{396\sqrt{520030}}{676039}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{30\sqrt{455}}{31603}R_{54} + \frac{3240\sqrt{455}}{600457}R_{74} + \frac{45\sqrt{665}}{4199}R_{94} + \frac{3168\sqrt{161}}{96577}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	3	$-\frac{3\sqrt{5005}}{13013}R_{10} + \frac{12\sqrt{2145}}{20449}R_{30} + \frac{870\sqrt{1365}}{221221}R_{50} + \frac{8400\sqrt{1001}}{6605027}R_{70}$ $-\frac{405\sqrt{285285}}{600457}R_{90} + \frac{396\sqrt{345345}}{1255501}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	1	$-\frac{15\sqrt{1938}}{4199}R_{98} - \frac{132\sqrt{14858}}{96577}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	2	$\frac{140\sqrt{3003}}{31603}R_{54} + \frac{3290\sqrt{3003}}{600457}R_{74} + \frac{15\sqrt{4389}}{4199}R_{94} + \frac{198\sqrt{26565}}{482885}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{7\sqrt{195}}{845}R_{10} + \frac{98\sqrt{455}}{9295}R_{30} + \frac{56\sqrt{715}}{31603}R_{50} - \frac{24710\sqrt{39}}{600457}R_{70}$ $-\frac{321\sqrt{1235}}{54587}R_{90} + \frac{31944\sqrt{1495}}{6277505}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	1	$\frac{20\sqrt{6783}}{29393}R_{98} + \frac{6\sqrt{52003}}{52003}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	2	$\frac{240\sqrt{3003}}{31603}R_{54} + \frac{10\sqrt{3003}}{3211}R_{74} - \frac{12\sqrt{26565}}{37145}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	3	$\frac{2\sqrt{30030}}{455}R_{10} - \frac{\sqrt{1430}}{845}R_{30} - \frac{212\sqrt{910}}{20111}R_{50} - \frac{140\sqrt{6006}}{54587}R_{70}$ $+\frac{6\sqrt{190190}}{54587}R_{90} + \frac{87\sqrt{230230}}{482885}R_{11,0}$

Table B226: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 50 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	4	$-\frac{8\sqrt{105}}{221}R_{54} + \frac{150\sqrt{105}}{4199}R_{74} - \frac{4\sqrt{25935}}{4199}R_{94} + \frac{30\sqrt{6279}}{96577}R_{11,4}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	1	$R_{00} - \frac{42\sqrt{5}}{121}R_{20} + \frac{504}{1573}R_{40} - \frac{30\sqrt{13}}{1573}R_{60}$ $+ \frac{35\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	2	$\frac{168\sqrt{5}}{1573}R_{44} - \frac{150\sqrt{13}}{1573}R_{64} + \frac{175\sqrt{187}}{26741}R_{84}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	3	$\frac{35\sqrt{24310}}{26741}R_{88}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	1	$-\frac{135\sqrt{7}}{1573}R_{20} + \frac{96\sqrt{35}}{1573}R_{40} - \frac{270\sqrt{455}}{26741}R_{60} + \frac{1080\sqrt{595}}{508079}R_{80}$ $-\frac{3\sqrt{15}}{4199}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{32\sqrt{21}}{1573}R_{44} - \frac{270\sqrt{1365}}{26741}R_{64} + \frac{1080\sqrt{19635}}{508079}R_{84} - \frac{3\sqrt{3003}}{4199}R_{10,4}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	3	$\frac{360\sqrt{170170}}{508079}R_{88} - \frac{3\sqrt{72930}}{4199}R_{10,8}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{5}}{143}R_{20} + \frac{18}{143}R_{40} - \frac{140\sqrt{13}}{2431}R_{60} + \frac{1470\sqrt{17}}{46189}R_{80}$ $-\frac{27\sqrt{21}}{4199}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{6\sqrt{385}}{7865}R_{44} - \frac{140\sqrt{1001}}{26741}R_{64} + \frac{1470\sqrt{119}}{46189}R_{84} - \frac{189\sqrt{455}}{20995}R_{10,4}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{98\sqrt{6630}}{46189}R_{88} - \frac{81\sqrt{15470}}{20995}R_{10,8}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{9\sqrt{14}}{2431}R_{40} - \frac{240\sqrt{182}}{46189}R_{60} + \frac{30\sqrt{238}}{4199}R_{80} - \frac{216\sqrt{6}}{7429}R_{10,0}$ $+\frac{33\sqrt{14}}{7429}R_{12,0}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{6\sqrt{385}}{133705}R_{44} - \frac{480\sqrt{1001}}{508079}R_{64} + \frac{60\sqrt{119}}{4199}R_{84} - \frac{432\sqrt{455}}{37145}R_{10,4}$ $+\frac{66\sqrt{182}}{7429}R_{12,4}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{4\sqrt{255255}}{46189}R_{88} - \frac{1296\sqrt{12155}}{408595}R_{10,8} + \frac{6\sqrt{323323}}{7429}R_{12,8}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{66\sqrt{520030}}{37145}R_{12,12}$
$\frac{9}{2}$	6	2	$\frac{9}{2}$	6	2	$R_{00} + \frac{28\sqrt{5}}{121}R_{20} + \frac{504}{1573}R_{40} + \frac{80\sqrt{13}}{1573}R_{60}$ $+\frac{490\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	2	$\frac{9}{2}$	6	3	$\frac{280\sqrt{5}}{1573}R_{44} - \frac{30\sqrt{13}}{1573}R_{64} - \frac{315\sqrt{187}}{26741}R_{84}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	1	$-\frac{192\sqrt{7}}{1573}R_{44} + \frac{450\sqrt{455}}{187187}R_{64} + \frac{2100\sqrt{6545}}{508079}R_{84} - \frac{9\sqrt{1001}}{4199}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	2	$-\frac{15\sqrt{21}}{1573}R_{20} - \frac{16\sqrt{105}}{1573}R_{40} - \frac{120\sqrt{1365}}{26741}R_{60} - \frac{2520\sqrt{1785}}{508079}R_{80}$ $-\frac{378\sqrt{5}}{4199}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{96\sqrt{35}}{1573}R_{44} + \frac{5310\sqrt{91}}{187187}R_{64} + \frac{1380\sqrt{1309}}{508079}R_{84} - \frac{9\sqrt{5005}}{4199}R_{10,4}$

Table B227: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 51 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	1	$\frac{42\sqrt{5}}{715}R_{44} + \frac{120\sqrt{13}}{2431}R_{64} + \frac{280\sqrt{187}}{46189}R_{84} - \frac{2961\sqrt{715}}{230945}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{385}}{1573}R_{20} - \frac{16\sqrt{77}}{1573}R_{40} - \frac{120\sqrt{1001}}{26741}R_{60} - \frac{2520\sqrt{1309}}{508079}R_{80}$ $-\frac{126\sqrt{33}}{4199}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{14\sqrt{165}}{1573}R_{44} + \frac{200\sqrt{429}}{26741}R_{64} + \frac{1680\sqrt{51}}{46189}R_{84} + \frac{105\sqrt{195}}{4199}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{24\sqrt{70}}{12155}R_{44} - \frac{860\sqrt{182}}{323323}R_{64} - \frac{105\sqrt{2618}}{46189}R_{84} - \frac{954\sqrt{10010}}{408595}R_{10,4}$ $+\frac{84\sqrt{1001}}{7429}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	2	$\frac{14\sqrt{77}}{26741}R_{40} + \frac{360\sqrt{1001}}{508079}R_{60} + \frac{90\sqrt{1309}}{46189}R_{80} + \frac{252\sqrt{33}}{7429}R_{10,0}$ $+\frac{594\sqrt{77}}{7429}R_{12,0}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{2\sqrt{210}}{2431}R_{44} - \frac{100\sqrt{546}}{323323}R_{64} - \frac{5\sqrt{7854}}{46189}R_{84} + \frac{30\sqrt{30030}}{81719}R_{10,4}$ $+\frac{84\sqrt{3003}}{7429}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{10\sqrt{2618}}{3553}R_{88} - \frac{756\sqrt{1122}}{81719}R_{10,8} + \frac{6\sqrt{746130}}{37145}R_{12,8}$
$\frac{9}{2}$	6	3	$\frac{9}{2}$	6	3	$R_{00} - \frac{14\sqrt{5}}{121}R_{20} - \frac{56}{143}R_{40} + \frac{10\sqrt{13}}{143}R_{60}$ $-\frac{245\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	3	$\frac{11}{2}$	6	1	$-\frac{1200\sqrt{34034}}{508079}R_{88} - \frac{9\sqrt{14586}}{4199}R_{10,8}$
$\frac{9}{2}$	6	3	$\frac{11}{2}$	6	2	$-\frac{64\sqrt{21}}{1573}R_{44} + \frac{210\sqrt{1365}}{26741}R_{64} + \frac{960\sqrt{19635}}{508079}R_{84} - \frac{9\sqrt{3003}}{4199}R_{10,4}$
$\frac{9}{2}$	6	3	$\frac{11}{2}$	6	3	$\frac{63\sqrt{35}}{1573}R_{20} - \frac{90\sqrt{91}}{2431}R_{60} + \frac{720\sqrt{119}}{39083}R_{80} - \frac{45\sqrt{3}}{4199}R_{10,0}$
$\frac{9}{2}$	6	3	$\frac{13}{2}$	6	1	$\frac{98\sqrt{24310}}{46189}R_{88} + \frac{9\sqrt{510510}}{46189}R_{10,8}$
$\frac{9}{2}$	6	3	$\frac{13}{2}$	6	2	$\frac{14\sqrt{385}}{7865}R_{44} - \frac{180\sqrt{1001}}{26741}R_{64} - \frac{210\sqrt{119}}{46189}R_{84} + \frac{369\sqrt{455}}{20995}R_{10,4}$
$\frac{9}{2}$	6	3	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{165}}{1573}R_{20} + \frac{2\sqrt{33}}{121}R_{40} + \frac{140\sqrt{429}}{26741}R_{60} - \frac{490\sqrt{561}}{39083}R_{80}$ $+\frac{63\sqrt{77}}{4199}R_{10,0}$
$\frac{9}{2}$	6	3	$\frac{15}{2}$	6	1	$-\frac{16\sqrt{85085}}{46189}R_{88} + \frac{72\sqrt{36465}}{81719}R_{10,8} + \frac{6\sqrt{969969}}{7429}R_{12,8}$
$\frac{9}{2}$	6	3	$\frac{15}{2}$	6	2	$-\frac{16\sqrt{385}}{133705}R_{44} + \frac{840\sqrt{1001}}{508079}R_{64} - \frac{30\sqrt{119}}{4199}R_{84} - \frac{468\sqrt{455}}{37145}R_{10,4}$ $+\frac{198\sqrt{182}}{7429}R_{12,4}$
$\frac{9}{2}$	6	3	$\frac{15}{2}$	6	3	$-\frac{7\sqrt{42}}{2431}R_{40} + \frac{40\sqrt{546}}{46189}R_{60} + \frac{20\sqrt{714}}{4199}R_{80} - \frac{1116\sqrt{2}}{7429}R_{10,0}$ $+\frac{99\sqrt{42}}{7429}R_{12,0}$

Table B228: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 52 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{6\sqrt{91}}{2431}R_{44} - \frac{40\sqrt{35}}{3553}R_{64} + \frac{10\sqrt{85085}}{46189}R_{84} - \frac{252\sqrt{77}}{81719}R_{10,4}$ $+ \frac{6\sqrt{770}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} - \frac{1700\sqrt{5}}{11011}R_{20} - \frac{2538}{11011}R_{40} + \frac{620\sqrt{13}}{26741}R_{60}$ $+ \frac{9455\sqrt{17}}{508079}R_{80} - \frac{216\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{94\sqrt{15}}{1573}R_{44} - \frac{20\sqrt{39}}{2057}R_{64} + \frac{155\sqrt{561}}{29887}R_{84} - \frac{24\sqrt{2145}}{4199}R_{10,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	3	$-\frac{1395\sqrt{4862}}{508079}R_{88} - \frac{24\sqrt{102102}}{29393}R_{10,8}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{477\sqrt{7}}{5005}R_{20} + \frac{276\sqrt{35}}{17017}R_{40} + \frac{630\sqrt{455}}{46189}R_{60} - \frac{2880\sqrt{595}}{323323}R_{80}$ $+ \frac{129\sqrt{15}}{96577}R_{10,0} + \frac{4356\sqrt{35}}{1300075}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{1104\sqrt{11}}{26741}R_{44} - \frac{490\sqrt{715}}{39083}R_{64} - \frac{240\sqrt{85}}{46189}R_{84} + \frac{441\sqrt{13}}{96577}R_{10,4}$ $+ \frac{2904\sqrt{130}}{185725}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{800\sqrt{9282}}{323323}R_{88} - \frac{9\sqrt{442}}{96577}R_{10,8} + \frac{1452\sqrt{293930}}{1300075}R_{12,8}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	1	$-\frac{6\sqrt{2}}{455}R_{20} + \frac{513\sqrt{10}}{17017}R_{40} + \frac{120\sqrt{130}}{46189}R_{60} - \frac{90\sqrt{170}}{4199}R_{80}$ $+ \frac{11502\sqrt{210}}{676039}R_{10,0} - \frac{3861\sqrt{10}}{185725}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{162\sqrt{11}}{26741}R_{44} - \frac{3280\sqrt{715}}{508079}R_{64} + \frac{60\sqrt{85}}{4199}R_{84} + \frac{8748\sqrt{13}}{96577}R_{10,4}$ $- \frac{4818\sqrt{130}}{185725}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{100\sqrt{7293}}{46189}R_{88} - \frac{972\sqrt{17017}}{437437}R_{10,8} - \frac{174\sqrt{230945}}{185725}R_{12,8}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{198\sqrt{14858}}{37145}R_{12,12}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} + \frac{340\sqrt{5}}{1573}R_{20} + \frac{376}{1573}R_{40} + \frac{400\sqrt{13}}{26741}R_{60}$ $- \frac{10850\sqrt{17}}{508079}R_{80} - \frac{144\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{282\sqrt{3}}{1573}R_{44} + \frac{20\sqrt{195}}{26741}R_{64} + \frac{775\sqrt{2805}}{508079}R_{84} + \frac{72\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{184\sqrt{21}}{2431}R_{44} - \frac{10\sqrt{1365}}{3553}R_{64} + \frac{40\sqrt{19635}}{46189}R_{84} + \frac{303\sqrt{3003}}{1062347}R_{10,4}$ $+ \frac{264\sqrt{30030}}{185725}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{53\sqrt{33}}{7865}R_{20} - \frac{184\sqrt{165}}{26741}R_{40} - \frac{1400\sqrt{2145}}{508079}R_{60} - \frac{1200\sqrt{2805}}{508079}R_{80}$ $- \frac{54\sqrt{385}}{96577}R_{10,0} + \frac{8712\sqrt{165}}{185725}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{1104\sqrt{77}}{26741}R_{44} + \frac{1990\sqrt{5005}}{508079}R_{64} + \frac{280\sqrt{595}}{46189}R_{84} + \frac{27\sqrt{91}}{96577}R_{10,4}$ $+ \frac{2904\sqrt{910}}{185725}R_{12,4}$

Table B229: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 53 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	1	$\frac{108\sqrt{6}}{2431}R_{44} + \frac{20\sqrt{390}}{2431}R_{64} + \frac{115\sqrt{5610}}{46189}R_{84} + \frac{864\sqrt{858}}{1062347}R_{10,4}$ $- \frac{84\sqrt{2145}}{9775}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{33}}{715}R_{20} - \frac{162\sqrt{165}}{26741}R_{40} - \frac{1400\sqrt{2145}}{508079}R_{60} - \frac{150\sqrt{2805}}{46189}R_{80}$ $- \frac{972\sqrt{385}}{96577}R_{10,0} - \frac{2574\sqrt{165}}{185725}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{162\sqrt{2}}{2431}R_{44} + \frac{460\sqrt{130}}{46189}R_{64} + \frac{205\sqrt{1870}}{46189}R_{84} + \frac{19116\sqrt{286}}{1062347}R_{10,4}$ $+ \frac{2604\sqrt{715}}{185725}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{10\sqrt{5610}}{3553}R_{88} - \frac{324\sqrt{13090}}{81719}R_{10,8} + \frac{18\sqrt{7106}}{7429}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	3	$R_{00} - \frac{68\sqrt{5}}{11011}R_{20} - \frac{282}{1001}R_{40} - \frac{20\sqrt{13}}{2431}R_{60}$ $- \frac{1085\sqrt{17}}{29887}R_{80} + \frac{120\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	1	$-\frac{240\sqrt{170170}}{323323}R_{88} - \frac{321\sqrt{72930}}{5311735}R_{10,8} + \frac{132\sqrt{1939938}}{260015}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	2	$-\frac{3864\sqrt{55}}{133705}R_{44} + \frac{8050\sqrt{143}}{508079}R_{64} + \frac{2400\sqrt{17}}{46189}R_{84} + \frac{549\sqrt{65}}{482885}R_{10,4}$ $+ \frac{2904\sqrt{26}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	3	$\frac{53\sqrt{1155}}{7865}R_{20} + \frac{276\sqrt{231}}{26741}R_{40} - \frac{1750\sqrt{3003}}{508079}R_{60} - \frac{10800\sqrt{3927}}{3556553}R_{80}$ $+ \frac{369\sqrt{11}}{96577}R_{10,0} + \frac{1452\sqrt{231}}{260015}R_{12,0}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	1	$\frac{120\sqrt{12155}}{46189}R_{88} + \frac{10044\sqrt{255255}}{37182145}R_{10,8} + \frac{6\sqrt{138567}}{37145}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	2	$\frac{648\sqrt{55}}{133705}R_{44} - \frac{7400\sqrt{143}}{508079}R_{64} - \frac{150\sqrt{17}}{4199}R_{84} + \frac{5832\sqrt{65}}{482885}R_{10,4}$ $+ \frac{3102\sqrt{26}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	3	$-\frac{2\sqrt{30}}{455}R_{20} + \frac{27\sqrt{6}}{1309}R_{40} + \frac{800\sqrt{78}}{46189}R_{60} - \frac{486\sqrt{14}}{5083}R_{80}$ $+ \frac{3003\sqrt{6}}{37145}R_{10,0}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{54\sqrt{13}}{2431}R_{44} - \frac{360\sqrt{5}}{3553}R_{64} + \frac{90\sqrt{12155}}{46189}R_{84} - \frac{2268\sqrt{11}}{81719}R_{10,4}$ $+ \frac{54\sqrt{110}}{37145}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{18\sqrt{5}}{325}R_{20} - \frac{72}{221}R_{40} + \frac{6\sqrt{13}}{4199}R_{60}$ $- \frac{79\sqrt{17}}{4199}R_{80} + \frac{4320\sqrt{21}}{96577}R_{10,0} - \frac{14256}{185725}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{36\sqrt{385}}{2431}R_{44} - \frac{6\sqrt{1001}}{3553}R_{64} + \frac{27\sqrt{119}}{4199}R_{84} + \frac{630\sqrt{455}}{96577}R_{10,4}$ $- \frac{1056\sqrt{182}}{37145}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	3	$-\frac{5\sqrt{6630}}{4199}R_{88} - \frac{180\sqrt{15470}}{96577}R_{10,8} - \frac{528\sqrt{8398}}{185725}R_{12,8}$

Table B230: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 54 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	1	$-\frac{54\sqrt{70}}{2275}R_{20} - \frac{27\sqrt{14}}{1547}R_{40} + \frac{84\sqrt{182}}{4199}R_{60} + \frac{258\sqrt{238}}{29393}R_{80}$ $-\frac{12078\sqrt{6}}{96577}R_{10,0} + \frac{35607\sqrt{14}}{1300075}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{18\sqrt{385}}{2431}R_{44} - \frac{424\sqrt{1001}}{46189}R_{64} - \frac{84\sqrt{119}}{4199}R_{84} + \frac{396\sqrt{455}}{96577}R_{10,4}$ $+\frac{594\sqrt{182}}{37145}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{20\sqrt{255255}}{29393}R_{88} + \frac{36\sqrt{12155}}{96577}R_{10,8} - \frac{198\sqrt{323323}}{1300075}R_{12,8}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{66\sqrt{520030}}{185725}R_{12,12}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{72\sqrt{5}}{325}R_{20} + \frac{648}{2431}R_{40} + \frac{1200\sqrt{13}}{46189}R_{60}$ $-\frac{50\sqrt{17}}{4199}R_{80} - \frac{3240\sqrt{21}}{96577}R_{10,0} - \frac{34848}{185725}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{84\sqrt{105}}{2431}R_{44} + \frac{126\sqrt{273}}{46189}R_{64} + \frac{\sqrt{3927}}{4199}R_{84} + \frac{150\sqrt{15015}}{96577}R_{10,4}$ $+\frac{1056\sqrt{6006}}{185725}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{72\sqrt{110}}{2431}R_{44} - \frac{504\sqrt{286}}{46189}R_{64} + \frac{11\sqrt{34}}{4199}R_{84} + \frac{1764\sqrt{130}}{96577}R_{10,4}$ $+\frac{396\sqrt{13}}{7429}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{5}}{325}R_{20} - \frac{162}{2431}R_{40} - \frac{1400\sqrt{13}}{46189}R_{60} - \frac{150\sqrt{17}}{4199}R_{80}$ $-\frac{3564\sqrt{21}}{96577}R_{10,0} - \frac{28314}{185725}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{42\sqrt{330}}{2431}R_{44} + \frac{448\sqrt{858}}{46189}R_{64} + \frac{103\sqrt{102}}{4199}R_{84} + \frac{744\sqrt{390}}{96577}R_{10,4}$ $+\frac{396\sqrt{39}}{185725}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{10\sqrt{34}}{323}R_{88} - \frac{108\sqrt{714}}{7429}R_{10,8} + \frac{66\sqrt{9690}}{37145}R_{12,8}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	3	$R_{00} + \frac{18\sqrt{5}}{325}R_{20} - \frac{552}{2431}R_{40} - \frac{1362\sqrt{13}}{46189}R_{60}$ $-\frac{7\sqrt{17}}{4199}R_{80} - \frac{5880\sqrt{21}}{96577}R_{10,0} + \frac{40656}{185725}R_{12,0}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	1	$-\frac{80\sqrt{23205}}{29393}R_{88} - \frac{36\sqrt{1105}}{4199}R_{10,8} - \frac{66\sqrt{29393}}{56525}R_{12,8}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	2	$-\frac{48\sqrt{105}}{2431}R_{44} + \frac{368\sqrt{273}}{46189}R_{64} + \frac{18\sqrt{3927}}{4199}R_{84} + \frac{192\sqrt{15015}}{96577}R_{10,4}$ $+\frac{198\sqrt{6006}}{185725}R_{12,4}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	3	$\frac{2\sqrt{770}}{325}R_{20} + \frac{3\sqrt{154}}{187}R_{40} - \frac{28\sqrt{2002}}{46189}R_{60} - \frac{12\sqrt{2618}}{2261}R_{80}$ $-\frac{1878\sqrt{66}}{96577}R_{10,0} + \frac{20163\sqrt{154}}{1300075}R_{12,0}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{6\sqrt{3003}}{2431}R_{44} - \frac{40\sqrt{1155}}{3553}R_{64} + \frac{10\sqrt{23205}}{4199}R_{84} - \frac{252\sqrt{21}}{7429}R_{10,4}$ $+\frac{66\sqrt{210}}{37145}R_{12,4}$

Table B231: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_1$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 55 of 55.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	1	$R_{00} + \frac{2\sqrt{5}}{175}R_{20} - \frac{603}{1547}R_{40} - \frac{236\sqrt{13}}{4199}R_{60}$ $+ \frac{149\sqrt{17}}{4199}R_{80} + \frac{1458\sqrt{21}}{52003}R_{10,0} - \frac{12969}{185725}R_{12,0}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{9\sqrt{110}}{221}R_{44} - \frac{12\sqrt{286}}{4199}R_{64} - \frac{137\sqrt{34}}{4199}R_{84} - \frac{90\sqrt{130}}{7429}R_{10,4}$ $- \frac{198\sqrt{13}}{37145}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{5\sqrt{72930}}{4199}R_{88} + \frac{18\sqrt{170170}}{52003}R_{10,8} + \frac{33\sqrt{92378}}{185725}R_{12,8}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{66\sqrt{37145}}{185725}R_{12,12}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	2	$R_{00} + \frac{6\sqrt{5}}{25}R_{20} + \frac{81}{221}R_{40} + \frac{300\sqrt{13}}{4199}R_{60}$ $+ \frac{175\sqrt{17}}{4199}R_{80} + \frac{162\sqrt{21}}{7429}R_{10,0} + \frac{7623}{185725}R_{12,0}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{6\sqrt{330}}{221}R_{44} + \frac{24\sqrt{858}}{4199}R_{64} + \frac{4\sqrt{102}}{4199}R_{84} - \frac{24\sqrt{390}}{7429}R_{10,4}$ $- \frac{1782\sqrt{39}}{185725}R_{12,4}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{5\sqrt{34}}{323}R_{88} - \frac{54\sqrt{714}}{7429}R_{10,8} + \frac{33\sqrt{9690}}{37145}R_{12,8}$
$\frac{15}{2}$	6	3	$\frac{15}{2}$	6	3	$R_{00} + \frac{18\sqrt{5}}{175}R_{20} - \frac{303}{1547}R_{40} - \frac{348\sqrt{13}}{4199}R_{60}$ $- \frac{7\sqrt{17}}{221}R_{80} + \frac{6\sqrt{21}}{391}R_{10,0} + \frac{13629}{185725}R_{12,0}$
$\frac{15}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{3\sqrt{78}}{221}R_{44} - \frac{20\sqrt{30}}{323}R_{64} + \frac{5\sqrt{72930}}{4199}R_{84} - \frac{126\sqrt{66}}{7429}R_{10,4}$ $+ \frac{66\sqrt{165}}{37145}R_{12,4}$
$\frac{15}{2}$	6	4	$\frac{15}{2}$	6	4	$R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40} - \frac{20\sqrt{13}}{323}R_{60}$ $+ \frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} + \frac{33}{37145}R_{12,0}$

Table B232: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	0	1	R_{00}
$\frac{3}{2}$	0	1	$\frac{3}{2}$	1	1	$\frac{\sqrt{15}}{5} R_{10}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	1	1	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	1	2	$\frac{\sqrt{10}}{5} R_{10}$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	2	1	$\frac{\sqrt{5}}{5} R_{20}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	2	1	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	2	2	$\frac{3\sqrt{70}}{35} R_{20}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	2	1	0
$\frac{3}{2}$	0	1	$\frac{7}{2}$	2	2	$\frac{\sqrt{14}}{7} R_{20}$
$\frac{3}{2}$	0	1	$\frac{3}{2}$	3	1	$\frac{\sqrt{35}}{35} R_{30}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	3	1	0
$\frac{3}{2}$	0	1	$\frac{5}{2}$	3	2	$\frac{3\sqrt{35}}{35} R_{30}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	3	1	0
$\frac{3}{2}$	0	1	$\frac{7}{2}$	3	2	$\frac{\sqrt{210}}{21} R_{30}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	3	1	0
$\frac{3}{2}$	0	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{105}}{21} R_{30}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	4	1	$\frac{\sqrt{6}}{3} R_{44}$
$\frac{3}{2}$	0	1	$\frac{5}{2}$	4	2	$\frac{\sqrt{21}}{21} R_{40}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	4	1	$\frac{2\sqrt{15}}{15} R_{44}$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	4	2	$\frac{\sqrt{14}}{7} R_{40}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{66}}{33} R_{44}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{55}}{11} R_{40}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	1	$\frac{\sqrt{165}}{165} R_{44}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	2	$\frac{\sqrt{231}}{33} R_{40}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	4	3	R_{44}
$\frac{3}{2}$	0	1	$\frac{7}{2}$	5	1	$\frac{2\sqrt{385}}{55} R_{54}$

Table B233: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	0	1	$\frac{7}{2}$	5	2	$\frac{\sqrt{66}}{33} R_{50}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{11}}{11} R_{54}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{330}}{33} R_{50}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	1	$\frac{9\sqrt{715}}{715} R_{54}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	2	$\frac{3\sqrt{1001}}{143} R_{50}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	5	3	$\frac{\sqrt{39}}{13} R_{54}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	1	0
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	2	$\frac{\sqrt{286}}{143} R_{54}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	3	$\frac{2\sqrt{1001}}{143} R_{50}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	5	4	$\frac{\sqrt{130}}{13} R_{54}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	1	$\frac{2\sqrt{2145}}{143} R_{64}$
$\frac{3}{2}$	0	1	$\frac{9}{2}$	6	2	$\frac{\sqrt{1430}}{143} R_{60}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	1	$\frac{9\sqrt{5005}}{1001} R_{64}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	2	$\frac{3\sqrt{715}}{143} R_{60}$
$\frac{3}{2}$	0	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{273}}{91} R_{64}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	1	0
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	2	$\frac{\sqrt{26}}{13} R_{64}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	3	$\frac{2\sqrt{455}}{65} R_{60}$
$\frac{3}{2}$	0	1	$\frac{13}{2}$	6	4	$\frac{\sqrt{1430}}{65} R_{64}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	1	0
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	2	$\frac{\sqrt{182}}{91} R_{64}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	3	$\frac{2\sqrt{195}}{65} R_{60}$
$\frac{3}{2}$	0	1	$\frac{15}{2}$	6	4	$\frac{\sqrt{770}}{35} R_{64}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	$R_{00} + \frac{4\sqrt{5}}{25} R_{20}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	1	1	0
$\frac{3}{2}$	1	1	$\frac{5}{2}$	1	2	$\frac{3\sqrt{30}}{25} R_{20}$

Table B234: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	1	$\frac{4\sqrt{15}}{25}R_{10} + \frac{3\sqrt{35}}{175}R_{30}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	1	0
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	2	$\frac{\sqrt{210}}{25}R_{10} + \frac{24\sqrt{10}}{175}R_{30}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	2	1	0
$\frac{3}{2}$	1	1	$\frac{7}{2}$	2	2	$\frac{3\sqrt{2}}{7}R_{30}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	3	1	$\frac{3\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{\sqrt{14}}{7}R_{44}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	2	$\frac{48\sqrt{5}}{175}R_{20} + \frac{1}{7}R_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{8\sqrt{35}}{105}R_{44}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{3\sqrt{30}}{35}R_{20} + \frac{4\sqrt{6}}{21}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	1	$\frac{\sqrt{10}}{15}R_{44}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{3}}{3}R_{40}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	4	1	0
$\frac{3}{2}$	1	1	$\frac{5}{2}$	4	2	$\frac{3\sqrt{15}}{35}R_{30}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	1	$\frac{14\sqrt{33}}{165}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	2	$\frac{4\sqrt{10}}{21}R_{30} + \frac{\sqrt{770}}{165}R_{50}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	1	$\frac{16\sqrt{30}}{165}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{77}}{21}R_{30} + \frac{16}{33}R_{50}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	1	$\frac{9\sqrt{3}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	2	$\frac{3\sqrt{105}}{55}R_{50}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	4	3	$\frac{3\sqrt{55}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	5	1	$\frac{2\sqrt{7}}{15}R_{44}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	5	2	$\frac{\sqrt{30}}{15}R_{40}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{16\sqrt{5}}{165}R_{44} + \frac{18\sqrt{13}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{8\sqrt{6}}{33}R_{40} + \frac{3\sqrt{78}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$\frac{\sqrt{13}}{55}R_{44} + \frac{36\sqrt{5}}{143}R_{64}$

Table B235: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$\frac{\sqrt{455}}{55}R_{40} + \frac{12\sqrt{35}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{\sqrt{2145}}{55}R_{44} + \frac{4\sqrt{33}}{143}R_{64}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	1	0
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	2	$\frac{3\sqrt{2}}{13}R_{64}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	3	$\frac{6\sqrt{35}}{65}R_{60}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	5	4	$\frac{3\sqrt{110}}{65}R_{64}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	6	1	$\frac{6\sqrt{15}}{55}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	6	2	$\frac{3\sqrt{2}}{11}R_{50}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{36\sqrt{35}}{715}R_{54} + \frac{33\sqrt{35}}{455}R_{74}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	2	$\frac{84}{143}R_{50} + \frac{\sqrt{165}}{65}R_{70}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	3	$\frac{4\sqrt{231}}{143}R_{54} + \frac{\sqrt{231}}{455}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	1	0
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{3\sqrt{22}}{143}R_{54} + \frac{8\sqrt{22}}{65}R_{74}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{6\sqrt{77}}{143}R_{50} + \frac{16\sqrt{105}}{325}R_{70}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	4	$\frac{3\sqrt{10}}{13}R_{54} + \frac{24\sqrt{10}}{325}R_{74}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	1	0
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	2	$\frac{\sqrt{154}}{35}R_{74}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	3	$\frac{6\sqrt{5}}{25}R_{70}$
$\frac{3}{2}$	1	1	$\frac{15}{2}$	6	4	$\frac{3\sqrt{910}}{175}R_{74}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	1	1	$R_{00} - \frac{\sqrt{5}}{5}R_{20}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	1	2	0
$\frac{5}{2}$	1	1	$\frac{3}{2}$	2	1	0
$\frac{5}{2}$	1	1	$\frac{5}{2}$	2	1	$-\frac{3\sqrt{35}}{35}R_{10} + \frac{3\sqrt{15}}{35}R_{30}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	2	2	0
$\frac{5}{2}$	1	1	$\frac{7}{2}$	2	1	$\frac{2\sqrt{105}}{35}R_{10} - \frac{6\sqrt{5}}{35}R_{30}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	2	2	0

Table B236: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{3}{2}$	3	1	$\frac{4\sqrt{21}}{21}R_{44}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	3	1	$\frac{3\sqrt{30}}{70}R_{20} - \frac{\sqrt{6}}{14}R_{40}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	3	2	$-\frac{\sqrt{21}}{7}R_{44}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	1	$-\frac{2\sqrt{3}}{7}R_{20} + \frac{2\sqrt{15}}{21}R_{40}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{14}}{21}R_{44}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	1	$\frac{\sqrt{42}}{14}R_{20} - \frac{\sqrt{210}}{42}R_{40}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{7}}{21}R_{44}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	4	1	$-\frac{\sqrt{10}}{42}R_{30} + \frac{\sqrt{770}}{462}R_{50}$
$\frac{5}{2}$	1	1	$\frac{5}{2}$	4	2	$\frac{\sqrt{55}}{11}R_{54}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	4	1	$\frac{2}{7}R_{30} - \frac{2\sqrt{77}}{77}R_{50}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{330}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{110}}{22}R_{30} + \frac{\sqrt{70}}{22}R_{50}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{21}}{11}R_{54}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	1	$\frac{4\sqrt{11}}{33}R_{30} - \frac{4\sqrt{7}}{33}R_{50}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{5}}{55}R_{54}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	4	3	0
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{3}}{33}R_{40} + \frac{2\sqrt{39}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{7}{2}$	5	2	$-\frac{2\sqrt{70}}{165}R_{44} + \frac{6\sqrt{182}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{105}}{33}R_{40} - \frac{\sqrt{1365}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{14}}{33}R_{44} - \frac{3\sqrt{910}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{4\sqrt{273}}{143}R_{40} + \frac{12\sqrt{21}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{195}}{715}R_{44} + \frac{36\sqrt{3}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	5	3	0
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	1	$\frac{\sqrt{165}}{11}R_{44} - \frac{\sqrt{429}}{143}R_{64}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	2	$\frac{\sqrt{2730}}{143}R_{40} - \frac{3\sqrt{210}}{143}R_{60}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	3	$\frac{\sqrt{195}}{429}R_{44} - \frac{15\sqrt{3}}{143}R_{64}$

Table B237: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	5	4	0
$\frac{5}{2}$	1	1	$\frac{9}{2}$	6	1	$-\frac{3\sqrt{35}}{143}R_{50} + \frac{\sqrt{231}}{143}R_{70}$
$\frac{5}{2}$	1	1	$\frac{9}{2}$	6	2	$-\frac{3\sqrt{42}}{143}R_{54} + \frac{\sqrt{42}}{13}R_{74}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{12\sqrt{15}}{143}R_{50} - \frac{12\sqrt{11}}{143}R_{70}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	2	$\frac{36\sqrt{21}}{1001}R_{54} - \frac{12\sqrt{21}}{91}R_{74}$
$\frac{5}{2}$	1	1	$\frac{11}{2}$	6	3	0
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{39}}{13}R_{54} + \frac{\sqrt{39}}{65}R_{74}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	2	$-\frac{3\sqrt{462}}{143}R_{50} + \frac{3\sqrt{70}}{65}R_{70}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{33}}{143}R_{54} + \frac{\sqrt{33}}{13}R_{74}$
$\frac{5}{2}$	1	1	$\frac{13}{2}$	6	4	0
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{39}}{13}R_{54} - \frac{2\sqrt{39}}{65}R_{74}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	2	$\frac{6\sqrt{66}}{143}R_{50} - \frac{6\sqrt{10}}{65}R_{70}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	3	$\frac{6\sqrt{77}}{1001}R_{54} - \frac{2\sqrt{77}}{91}R_{74}$
$\frac{5}{2}$	1	1	$\frac{15}{2}$	6	4	0
$\frac{5}{2}$	1	2	$\frac{5}{2}$	1	2	$R_{00} + \frac{\sqrt{5}}{25}R_{20}$
$\frac{5}{2}$	1	2	$\frac{3}{2}$	2	1	$-\frac{\sqrt{10}}{25}R_{10} + \frac{6\sqrt{210}}{175}R_{30}$
$\frac{5}{2}$	1	2	$\frac{5}{2}$	2	1	0
$\frac{5}{2}$	1	2	$\frac{5}{2}$	2	2	$\frac{9\sqrt{35}}{175}R_{10} + \frac{3\sqrt{15}}{25}R_{30}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	2	1	0
$\frac{5}{2}$	1	2	$\frac{7}{2}$	2	2	$\frac{2\sqrt{7}}{7}R_{10}$
$\frac{5}{2}$	1	2	$\frac{3}{2}$	3	1	$-\frac{3\sqrt{30}}{175}R_{20} + \frac{2\sqrt{6}}{21}R_{40}$
$\frac{5}{2}$	1	2	$\frac{5}{2}$	3	1	$-\frac{\sqrt{21}}{7}R_{44}$
$\frac{5}{2}$	1	2	$\frac{5}{2}$	3	2	$-\frac{3\sqrt{30}}{350}R_{20} + \frac{3\sqrt{6}}{14}R_{40}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	3	1	$-\frac{4\sqrt{210}}{105}R_{44}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	3	2	$\frac{6\sqrt{5}}{35}R_{20} + \frac{8}{21}R_{40}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	3	1	$-\frac{\sqrt{15}}{15}R_{44}$

Table B238: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	3	2	$\frac{3\sqrt{10}}{14}R_{20} - \frac{\sqrt{2}}{42}R_{40}$
$\frac{5}{2}$	1	2	$\frac{5}{2}$	4	1	$\frac{\sqrt{55}}{11}R_{54}$
$\frac{5}{2}$	1	2	$\frac{5}{2}$	4	2	$-\frac{\sqrt{10}}{30}R_{30} + \frac{5\sqrt{770}}{462}R_{50}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{22}}{55}R_{54}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	4	2	$\frac{6\sqrt{1155}}{385}R_{50}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	4	1	$-\frac{\sqrt{5}}{5}R_{54}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	4	2	$\frac{3\sqrt{462}}{154}R_{30} + \frac{3\sqrt{6}}{22}R_{50}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	4	1	$-\frac{\sqrt{2}}{5}R_{54}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	4	2	$\frac{2\sqrt{110}}{33}R_{30} - \frac{\sqrt{70}}{165}R_{50}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	4	3	$\frac{\sqrt{330}}{55}R_{54}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	5	1	$\frac{4\sqrt{42}}{165}R_{44} + \frac{2\sqrt{2730}}{143}R_{64}$
$\frac{5}{2}$	1	2	$\frac{7}{2}$	5	2	$-\frac{8\sqrt{5}}{165}R_{40} + \frac{6\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	5	1	$\frac{7\sqrt{30}}{165}R_{44} + \frac{\sqrt{78}}{143}R_{64}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	5	2	$\frac{1}{33}R_{40} + \frac{21\sqrt{13}}{143}R_{60}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	5	1	$\frac{16\sqrt{78}}{715}R_{44} - \frac{9\sqrt{30}}{143}R_{64}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	5	2	$\frac{6\sqrt{2730}}{715}R_{40} + \frac{3\sqrt{210}}{143}R_{60}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	5	3	$-\frac{12\sqrt{1430}}{715}R_{44} + \frac{9\sqrt{22}}{143}R_{64}$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	5	1	0
$\frac{5}{2}$	1	2	$\frac{13}{2}$	5	2	$\frac{\sqrt{195}}{143}R_{44} - \frac{23\sqrt{3}}{143}R_{64}$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	5	3	$\frac{5\sqrt{2730}}{429}R_{40} - \frac{3\sqrt{210}}{715}R_{60}$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	5	4	$\frac{5\sqrt{429}}{143}R_{44} + \frac{17\sqrt{165}}{715}R_{64}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	6	1	$\frac{3\sqrt{10}}{65}R_{54} + \frac{3\sqrt{10}}{13}R_{74}$
$\frac{5}{2}$	1	2	$\frac{9}{2}$	6	2	$-\frac{9\sqrt{3}}{143}R_{50} + \frac{7\sqrt{55}}{143}R_{70}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	6	1	$\frac{9\sqrt{210}}{455}R_{54} + \frac{6\sqrt{210}}{455}R_{74}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	6	2	$\frac{3\sqrt{6}}{143}R_{50} + \frac{36\sqrt{110}}{715}R_{70}$
$\frac{5}{2}$	1	2	$\frac{11}{2}$	6	3	$-\frac{27\sqrt{154}}{1001}R_{54} + \frac{6\sqrt{154}}{455}R_{74}$

Table B239: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	6	1	0
$\frac{5}{2}$	1	2	$\frac{13}{2}$	6	2	$\frac{7\sqrt{33}}{143}R_{54} - \frac{3\sqrt{33}}{65}R_{74}$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	6	3	$\frac{3\sqrt{462}}{143}R_{50} + \frac{11\sqrt{70}}{325}R_{70}$
$\frac{5}{2}$	1	2	$\frac{13}{2}$	6	4	$-\frac{\sqrt{15}}{13}R_{54} + \frac{31\sqrt{15}}{325}R_{74}$
$\frac{5}{2}$	1	2	$\frac{15}{2}$	6	1	0
$\frac{5}{2}$	1	2	$\frac{15}{2}$	6	2	$\frac{10\sqrt{231}}{1001}R_{54} - \frac{8\sqrt{231}}{455}R_{74}$
$\frac{5}{2}$	1	2	$\frac{15}{2}$	6	3	$\frac{18\sqrt{22}}{143}R_{50} - \frac{4\sqrt{30}}{325}R_{70}$
$\frac{5}{2}$	1	2	$\frac{15}{2}$	6	4	$\frac{2\sqrt{1365}}{91}R_{54} + \frac{16\sqrt{1365}}{2275}R_{74}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	R_{00}
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$\frac{4}{7}R_{44}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	2	$\frac{3\sqrt{70}}{49}R_{20} + \frac{2\sqrt{14}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	2	1	$\frac{2\sqrt{3}}{7}R_{44}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	2	2	$-\frac{2\sqrt{14}}{49}R_{20} + \frac{3\sqrt{70}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	3	1	$\frac{3\sqrt{15}}{25}R_{10} - \frac{4\sqrt{35}}{175}R_{30}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	1	0
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	2	$\frac{4\sqrt{15}}{25}R_{10} + \frac{3\sqrt{35}}{175}R_{30}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{77}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	2	$\frac{2\sqrt{210}}{63}R_{30} + \frac{\sqrt{330}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	3	1	$\frac{4\sqrt{22}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{105}}{63}R_{30} + \frac{4\sqrt{165}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{6}}{21}R_{44}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	4	2	$\frac{12\sqrt{105}}{245}R_{20} - \frac{5\sqrt{21}}{147}R_{40}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{4\sqrt{15}}{105}R_{44}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{70}}{49}R_{20} + \frac{2\sqrt{14}}{49}R_{40}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{7\sqrt{66}}{363}R_{44} + \frac{12\sqrt{4290}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{7\sqrt{55}}{121}R_{40} + \frac{12\sqrt{715}}{1573}R_{60}$

Table B240: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{4\sqrt{165}}{1815}R_{44} + \frac{45\sqrt{429}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{231}}{363}R_{40} + \frac{15\sqrt{3003}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	4	3	$-\frac{4}{11}R_{44} + \frac{3\sqrt{65}}{143}R_{64}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{385}}{165}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	5	2	$\frac{5\sqrt{42}}{63}R_{30} - \frac{2\sqrt{66}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{11}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{210}}{63}R_{30} + \frac{\sqrt{330}}{99}R_{50}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{72\sqrt{715}}{9295}R_{54} + \frac{3\sqrt{715}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{24\sqrt{1001}}{1859}R_{50} + \frac{\sqrt{1365}}{169}R_{70}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	3	$\frac{8\sqrt{39}}{169}R_{54} + \frac{\sqrt{39}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	1	0
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	2	$-\frac{5\sqrt{286}}{1859}R_{54} + \frac{6\sqrt{286}}{169}R_{74}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{10\sqrt{1001}}{1859}R_{50} + \frac{12\sqrt{1365}}{845}R_{70}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	5	4	$-\frac{5\sqrt{130}}{169}R_{54} + \frac{18\sqrt{130}}{845}R_{74}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{4\sqrt{33}}{121}R_{44} - \frac{14\sqrt{2145}}{1573}R_{64}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	6	2	$\frac{6\sqrt{110}}{121}R_{40} - \frac{7\sqrt{1430}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{\sqrt{77}}{121}R_{44} + \frac{36\sqrt{5005}}{11011}R_{64}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{7\sqrt{55}}{121}R_{40} + \frac{12\sqrt{715}}{1573}R_{60}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{\sqrt{105}}{11}R_{44} + \frac{4\sqrt{273}}{1001}R_{64}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{238}}{85}R_{88}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{3\sqrt{26}}{65}R_{64} + \frac{2\sqrt{374}}{85}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{6\sqrt{455}}{325}R_{60} + \frac{4\sqrt{595}}{425}R_{80}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	4	$\frac{3\sqrt{1430}}{325}R_{64} + \frac{2\sqrt{170}}{425}R_{84}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{238}}{85}R_{88}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{2\sqrt{182}}{455}R_{64} + \frac{\sqrt{2618}}{85}R_{84}$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{195}}{325}R_{60} + \frac{14\sqrt{255}}{425}R_{80}$

Table B241: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{15}{2}$	6	4	$-\frac{2\sqrt{770}}{175}R_{64} + \frac{\sqrt{15470}}{425}R_{84}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} - \frac{5\sqrt{5}}{49}R_{20} - \frac{8}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	2	$-\frac{8\sqrt{14}}{49}R_{44}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	1	$-\frac{6\sqrt{15}}{49}R_{20} + \frac{10\sqrt{3}}{49}R_{40}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{2\sqrt{70}}{49}R_{44}$
$\frac{5}{2}$	2	1	$\frac{3}{2}$	3	1	0
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{8\sqrt{210}}{245}R_{10} + \frac{17\sqrt{10}}{210}R_{30} + \frac{5\sqrt{770}}{3234}R_{50}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	2	$\frac{5\sqrt{55}}{77}R_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	1	$\frac{6\sqrt{21}}{49}R_{10} - \frac{2}{21}R_{30} - \frac{40\sqrt{77}}{1617}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{8\sqrt{330}}{231}R_{54}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	3	1	$-\frac{5\sqrt{14}}{42}R_{30} + \frac{5\sqrt{22}}{66}R_{50}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{165}}{33}R_{54}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{3\sqrt{30}}{98}R_{20} - \frac{5\sqrt{6}}{98}R_{40}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	4	2	$-\frac{5\sqrt{21}}{49}R_{44}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{40\sqrt{3}}{147}R_{20} + \frac{38\sqrt{15}}{539}R_{40} + \frac{2\sqrt{195}}{429}R_{60}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{38\sqrt{14}}{539}R_{44} + \frac{2\sqrt{910}}{143}R_{64}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{330}}{42}R_{20} - \frac{5\sqrt{66}}{1694}R_{40} - \frac{40\sqrt{858}}{4719}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{55}}{847}R_{44} - \frac{80\sqrt{143}}{1573}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	1	$-\frac{4\sqrt{165}}{121}R_{40} + \frac{12\sqrt{2145}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{4\sqrt{231}}{847}R_{44} + \frac{36\sqrt{15015}}{11011}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	4	3	0
$\frac{5}{2}$	2	1	$\frac{7}{2}$	5	1	$\frac{2\sqrt{5}}{21}R_{30} - \frac{2\sqrt{385}}{231}R_{50}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	5	2	$-\frac{2\sqrt{66}}{33}R_{54}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{40\sqrt{7}}{231}R_{30} + \frac{35\sqrt{11}}{429}R_{50} + \frac{3\sqrt{15}}{143}R_{70}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{7\sqrt{330}}{429}R_{54} + \frac{3\sqrt{330}}{143}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{4\sqrt{455}}{231}R_{30} + \frac{4\sqrt{715}}{5577}R_{50} - \frac{80\sqrt{39}}{1859}R_{70}$

Table B242: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{4\sqrt{1001}}{13013}R_{54} - \frac{240\sqrt{1001}}{13013}R_{74}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	3	0
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	1	$-\frac{15\sqrt{7}}{91}R_{54} + \frac{3\sqrt{7}}{91}R_{74}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	2	$-\frac{45\sqrt{286}}{1859}R_{50} + \frac{3\sqrt{390}}{169}R_{70}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{45\sqrt{1001}}{13013}R_{54} + \frac{15\sqrt{1001}}{1183}R_{74}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	5	4	0
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{5\sqrt{33}}{121}R_{40} - \frac{15\sqrt{429}}{1573}R_{60}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	6	2	$\frac{\sqrt{110}}{121}R_{44} - \frac{45\sqrt{286}}{1573}R_{64}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$-\frac{80\sqrt{77}}{1573}R_{40} + \frac{92\sqrt{1001}}{11011}R_{60} + \frac{4\sqrt{1309}}{1547}R_{80}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{16\sqrt{55}}{1573}R_{44} + \frac{276\sqrt{143}}{11011}R_{64} + \frac{132\sqrt{17}}{1547}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{4\sqrt{102102}}{1547}R_{88}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{15\sqrt{5005}}{1001}R_{44} + \frac{\sqrt{77}}{385}R_{64} - \frac{8\sqrt{1547}}{7735}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{15\sqrt{10}}{143}R_{40} + \frac{3\sqrt{130}}{715}R_{60} - \frac{24\sqrt{170}}{1105}R_{80}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{5\sqrt{35}}{1001}R_{44} + \frac{3\sqrt{91}}{1001}R_{64} - \frac{24\sqrt{1309}}{1547}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	4	$-\frac{16\sqrt{1105}}{1105}R_{88}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	1	$-\frac{2\sqrt{77}}{35}R_{64} + \frac{2\sqrt{1547}}{595}R_{84}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	2	$-\frac{6\sqrt{910}}{455}R_{60} + \frac{6\sqrt{1190}}{595}R_{80}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	3	$-\frac{2\sqrt{39}}{91}R_{64} + \frac{2\sqrt{561}}{119}R_{84}$
$\frac{5}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{4\sqrt{595}}{595}R_{88}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	2	2	$R_{00} + \frac{\sqrt{5}}{49}R_{20} + \frac{24}{49}R_{40}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	2	1	$-\frac{4\sqrt{42}}{49}R_{44}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	2	2	$\frac{18}{49}R_{20} + \frac{8\sqrt{5}}{49}R_{40}$
$\frac{5}{2}$	2	2	$\frac{3}{2}$	3	1	$-\frac{\sqrt{210}}{175}R_{10} + \frac{18\sqrt{10}}{175}R_{30}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	1	$\frac{5\sqrt{55}}{77}R_{54}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	2	$\frac{24\sqrt{210}}{1225}R_{10} + \frac{17\sqrt{10}}{150}R_{30} + \frac{25\sqrt{770}}{3234}R_{50}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	1	$-\frac{8\sqrt{22}}{231}R_{54}$

Table B243: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	2	$\frac{6\sqrt{35}}{49}R_{10} + \frac{8\sqrt{1155}}{539}R_{50}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	3	1	$-\frac{\sqrt{77}}{21}R_{54}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	3	2	$\frac{\sqrt{30}}{14}R_{30} + \frac{\sqrt{2310}}{154}R_{50}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{21}}{49}R_{44}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	4	2	$-\frac{3\sqrt{30}}{490}R_{20} + \frac{15\sqrt{6}}{98}R_{40}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{76\sqrt{210}}{2695}R_{44} + \frac{10\sqrt{546}}{429}R_{64}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	2	$\frac{8\sqrt{5}}{49}R_{20} + \frac{152}{539}R_{40} + \frac{10\sqrt{13}}{143}R_{60}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	1	$-\frac{\sqrt{231}}{847}R_{44} + \frac{16\sqrt{15015}}{33033}R_{64}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	2	$\frac{5\sqrt{154}}{98}R_{20} - \frac{\sqrt{770}}{11858}R_{40} + \frac{8\sqrt{10010}}{1573}R_{60}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	4	1	$\frac{16\sqrt{2310}}{4235}R_{44} - \frac{45\sqrt{6006}}{11011}R_{64}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	4	2	$\frac{6\sqrt{66}}{121}R_{40} + \frac{15\sqrt{858}}{1573}R_{60}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	4	3	$-\frac{12\sqrt{14}}{77}R_{44} + \frac{9\sqrt{910}}{1001}R_{64}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	5	1	$-\frac{2\sqrt{110}}{165}R_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	5	2	$\frac{2\sqrt{231}}{77}R_{50}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	1	$-\frac{\sqrt{154}}{39}R_{54} + \frac{45\sqrt{154}}{1001}R_{74}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	2	$\frac{8\sqrt{15}}{77}R_{30} + \frac{\sqrt{1155}}{143}R_{50} + \frac{15\sqrt{7}}{143}R_{70}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	1	$\frac{\sqrt{10010}}{5915}R_{54} + \frac{24\sqrt{10010}}{13013}R_{74}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	2	$\frac{10\sqrt{182}}{231}R_{30} + \frac{\sqrt{286}}{5577}R_{50} + \frac{48\sqrt{390}}{1859}R_{70}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	3	$-\frac{\sqrt{546}}{1183}R_{54} + \frac{8\sqrt{546}}{1183}R_{74}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	5	1	0
$\frac{5}{2}$	2	2	$\frac{13}{2}$	5	2	$\frac{15\sqrt{1001}}{1859}R_{54} - \frac{9\sqrt{1001}}{1183}R_{74}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	5	3	$\frac{45\sqrt{286}}{1859}R_{50} + \frac{11\sqrt{390}}{845}R_{70}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	5	4	$-\frac{15\sqrt{455}}{1183}R_{54} + \frac{93\sqrt{455}}{5915}R_{74}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	6	1	$\frac{\sqrt{462}}{121}R_{44} + \frac{3\sqrt{30030}}{11011}R_{64}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	6	2	$\frac{\sqrt{385}}{847}R_{40} + \frac{9\sqrt{5005}}{1573}R_{60}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{64\sqrt{22}}{1573}R_{44} - \frac{69\sqrt{1430}}{11011}R_{64} + \frac{66\sqrt{170}}{1547}R_{84}$

Table B244: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	2	$\frac{24\sqrt{770}}{1573}R_{40} + \frac{23\sqrt{10010}}{11011}R_{60} + \frac{4\sqrt{13090}}{1547}R_{80}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	3	$-\frac{16\sqrt{30}}{143}R_{44} + \frac{23\sqrt{78}}{1001}R_{64} + \frac{2\sqrt{1122}}{1547}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	1	$-\frac{16\sqrt{17}}{85}R_{88}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	2	$\frac{15\sqrt{35}}{1001}R_{44} + \frac{23\sqrt{91}}{5005}R_{64} + \frac{8\sqrt{1309}}{1105}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{25\sqrt{10}}{143}R_{40} + \frac{3\sqrt{130}}{3575}R_{60} + \frac{216\sqrt{170}}{5525}R_{80}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	4	$\frac{75\sqrt{77}}{1001}R_{44} - \frac{17\sqrt{5005}}{25025}R_{64} + \frac{376\sqrt{595}}{38675}R_{84}$
$\frac{5}{2}$	2	2	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{17}}{85}R_{88}$
$\frac{5}{2}$	2	2	$\frac{15}{2}$	6	2	$\frac{38\sqrt{13}}{455}R_{64} - \frac{8\sqrt{187}}{595}R_{84}$
$\frac{5}{2}$	2	2	$\frac{15}{2}$	6	3	$\frac{18\sqrt{2730}}{2275}R_{60} + \frac{12\sqrt{3570}}{2975}R_{80}$
$\frac{5}{2}$	2	2	$\frac{15}{2}$	6	4	$-\frac{2\sqrt{55}}{175}R_{64} + \frac{32\sqrt{1105}}{2975}R_{84}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	1	$R_{00} - \frac{2\sqrt{5}}{49}R_{20} - \frac{13}{49}R_{40}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	2	2	$\frac{\sqrt{210}}{49}R_{44}$
$\frac{7}{2}$	2	1	$\frac{3}{2}$	3	1	$\frac{2\sqrt{165}}{33}R_{54}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{3\sqrt{70}}{490}R_{10} + \frac{2\sqrt{30}}{35}R_{30} - \frac{5\sqrt{2310}}{1078}R_{50}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	3	2	$-\frac{\sqrt{165}}{77}R_{54}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{5\sqrt{7}}{49}R_{10} - \frac{10\sqrt{3}}{63}R_{30} + \frac{115\sqrt{231}}{4851}R_{50}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{5\sqrt{110}}{231}R_{54}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	3	1	$\frac{\sqrt{2}}{2}R_{10} - \frac{2\sqrt{42}}{63}R_{30} - \frac{5\sqrt{66}}{198}R_{50}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	3	2	$\frac{\sqrt{55}}{33}R_{54}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	4	1	$\frac{\sqrt{10}}{98}R_{20} - \frac{50\sqrt{2}}{539}R_{40} + \frac{5\sqrt{26}}{286}R_{60}$
$\frac{7}{2}$	2	1	$\frac{5}{2}$	4	2	$\frac{40\sqrt{7}}{539}R_{44} + \frac{5\sqrt{455}}{143}R_{64}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	1	$\frac{1}{49}R_{20} + \frac{78\sqrt{5}}{539}R_{40} - \frac{5\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	4	2	$-\frac{30\sqrt{42}}{539}R_{44} - \frac{\sqrt{2730}}{143}R_{64}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{5\sqrt{110}}{154}R_{20} - \frac{30\sqrt{22}}{847}R_{40} + \frac{5\sqrt{286}}{242}R_{60}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{24\sqrt{165}}{847}R_{44} - \frac{5\sqrt{429}}{1573}R_{64}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	1	$\frac{2\sqrt{11}}{11}R_{20} - \frac{4\sqrt{55}}{121}R_{40} - \frac{10\sqrt{715}}{1573}R_{60}$

Table B245: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	2	$-\frac{20\sqrt{77}}{847}R_{44} + \frac{2\sqrt{5005}}{847}R_{64}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	4	3	0
$\frac{7}{2}$	2	1	$\frac{7}{2}$	5	1	$\frac{5\sqrt{15}}{693}R_{30} - \frac{46\sqrt{1155}}{9009}R_{50} + \frac{7\sqrt{7}}{143}R_{70}$
$\frac{7}{2}$	2	1	$\frac{7}{2}$	5	2	$\frac{10\sqrt{22}}{429}R_{54} + \frac{21\sqrt{22}}{143}R_{74}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{10\sqrt{21}}{693}R_{30} + \frac{70\sqrt{33}}{1287}R_{50} - \frac{20\sqrt{5}}{143}R_{70}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{14\sqrt{110}}{429}R_{54} - \frac{6\sqrt{110}}{143}R_{74}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	1	$-\frac{10\sqrt{1365}}{1001}R_{30} - \frac{4\sqrt{2145}}{1859}R_{50} + \frac{174\sqrt{13}}{1859}R_{70}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{100\sqrt{3003}}{13013}R_{54} + \frac{6\sqrt{3003}}{13013}R_{74}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	5	3	0
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	1	$\frac{10\sqrt{21}}{91}R_{54} - \frac{2\sqrt{21}}{91}R_{74}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	2	$\frac{10\sqrt{546}}{429}R_{30} - \frac{50\sqrt{858}}{5577}R_{50} - \frac{24\sqrt{130}}{1859}R_{70}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	3	$-\frac{190\sqrt{3003}}{39039}R_{54} + \frac{30\sqrt{3003}}{13013}R_{74}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	5	4	0
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	1	$\frac{10\sqrt{11}}{1573}R_{40} - \frac{2\sqrt{143}}{121}R_{60} + \frac{28\sqrt{187}}{2431}R_{80}$
$\frac{7}{2}$	2	1	$\frac{9}{2}$	6	2	$-\frac{4\sqrt{330}}{1573}R_{44} + \frac{2\sqrt{858}}{1573}R_{64} + \frac{14\sqrt{102}}{221}R_{84}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{231}}{1573}R_{40} + \frac{60\sqrt{3003}}{11011}R_{60} - \frac{90\sqrt{3927}}{17017}R_{80}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{10\sqrt{165}}{1573}R_{44} - \frac{12\sqrt{429}}{847}R_{64} - \frac{6\sqrt{51}}{91}R_{84}$
$\frac{7}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{6\sqrt{34034}}{1547}R_{88}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{4\sqrt{15015}}{1001}R_{44} - \frac{2\sqrt{231}}{77}R_{64} + \frac{2\sqrt{4641}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{10\sqrt{30}}{143}R_{40} - \frac{2\sqrt{390}}{715}R_{60} + \frac{16\sqrt{510}}{1105}R_{80}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{8\sqrt{105}}{1001}R_{44} + \frac{2\sqrt{273}}{77}R_{64} + \frac{2\sqrt{3927}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{13}{2}$	6	4	$-\frac{8\sqrt{3315}}{1105}R_{88}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{15015}}{143}R_{44} + \frac{2\sqrt{231}}{77}R_{64} - \frac{3\sqrt{4641}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	2	$\frac{5\sqrt{210}}{143}R_{40} - \frac{2\sqrt{2730}}{385}R_{60} - \frac{\sqrt{3570}}{455}R_{80}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	3	$\frac{3\sqrt{5}}{143}R_{44} - \frac{82\sqrt{13}}{1001}R_{64} + \frac{11\sqrt{187}}{1547}R_{84}$
$\frac{7}{2}$	2	1	$\frac{15}{2}$	6	4	$\frac{2\sqrt{1785}}{595}R_{88}$

Table B246: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	2	2	$R_{00} + \frac{6\sqrt{5}}{49}R_{20} - \frac{3}{49}R_{40}$
$\frac{7}{2}$	2	2	$\frac{3}{2}$	3	1	$-\frac{2\sqrt{2}}{21}R_{30} + \frac{5\sqrt{154}}{231}R_{50}$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	3	1	$-\frac{15\sqrt{11}}{77}R_{54}$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	3	2	$-\frac{\sqrt{42}}{98}R_{10} + \frac{45\sqrt{154}}{1078}R_{50}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	3	1	$-\frac{5\sqrt{110}}{231}R_{54}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	3	2	$\frac{3\sqrt{7}}{49}R_{10} + \frac{2\sqrt{3}}{9}R_{30} + \frac{85\sqrt{231}}{4851}R_{50}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	3	1	$\frac{\sqrt{385}}{231}R_{54}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	3	2	$\frac{3\sqrt{14}}{14}R_{10} + \frac{4\sqrt{6}}{63}R_{30} - \frac{5\sqrt{462}}{1386}R_{50}$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	4	1	$-\frac{20\sqrt{105}}{1617}R_{44} + \frac{5\sqrt{273}}{143}R_{64}$
$\frac{7}{2}$	2	2	$\frac{5}{2}$	4	2	$-\frac{\sqrt{6}}{98}R_{20} - \frac{40\sqrt{30}}{1617}R_{40} + \frac{5\sqrt{390}}{286}R_{60}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{30\sqrt{42}}{539}R_{44} - \frac{\sqrt{2730}}{143}R_{64}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	4	2	$-\frac{3}{49}R_{20} + \frac{18\sqrt{5}}{539}R_{40} + \frac{9\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	4	1	$-\frac{12\sqrt{1155}}{847}R_{44} - \frac{5\sqrt{3003}}{847}R_{64}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	4	2	$\frac{9\sqrt{770}}{1078}R_{20} + \frac{180\sqrt{154}}{5929}R_{40} + \frac{15\sqrt{2002}}{3146}R_{60}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	1	$-\frac{40\sqrt{462}}{2541}R_{44} - \frac{\sqrt{30030}}{11011}R_{64}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	2	$\frac{\sqrt{66}}{11}R_{20} + \frac{2\sqrt{330}}{363}R_{40} - \frac{2\sqrt{4290}}{1573}R_{60}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	4	3	$-\frac{4\sqrt{70}}{77}R_{44} + \frac{15\sqrt{182}}{1001}R_{64}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	5	1	$\frac{10\sqrt{22}}{429}R_{54} + \frac{21\sqrt{22}}{143}R_{74}$
$\frac{7}{2}$	2	2	$\frac{7}{2}$	5	2	$-\frac{\sqrt{15}}{99}R_{30} - \frac{34\sqrt{1155}}{9009}R_{50} + \frac{21\sqrt{7}}{143}R_{70}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{770}}{429}R_{54} - \frac{6\sqrt{770}}{1001}R_{74}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	5	2	$-\frac{20\sqrt{3}}{693}R_{30} + \frac{10\sqrt{231}}{1287}R_{50} + \frac{12\sqrt{35}}{143}R_{70}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	1	$-\frac{120\sqrt{2002}}{13013}R_{54} - \frac{93\sqrt{2002}}{13013}R_{74}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	2	$\frac{9\sqrt{910}}{1001}R_{30} + \frac{18\sqrt{1430}}{1859}R_{50} + \frac{38\sqrt{78}}{1859}R_{70}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	5	3	$-\frac{12\sqrt{2730}}{1183}R_{54} + \frac{5\sqrt{2730}}{1183}R_{74}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	1	0
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	2	$-\frac{10\sqrt{5005}}{1859}R_{54} - \frac{12\sqrt{5005}}{13013}R_{74}$

Table B247: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 16 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	3	$\frac{10\sqrt{910}}{429}R_{30} + \frac{10\sqrt{1430}}{5577}R_{50} - \frac{18\sqrt{78}}{1859}R_{70}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	5	4	$\frac{10\sqrt{91}}{1183}R_{54} + \frac{24\sqrt{91}}{1183}R_{74}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	6	1	$\frac{2\sqrt{2310}}{1573}R_{44} + \frac{2\sqrt{6006}}{847}R_{64} + \frac{6\sqrt{714}}{221}R_{84}$
$\frac{7}{2}$	2	2	$\frac{9}{2}$	6	2	$-\frac{60\sqrt{77}}{11011}R_{40} - \frac{6\sqrt{1001}}{1573}R_{60} + \frac{28\sqrt{1309}}{2431}R_{80}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{20\sqrt{110}}{1573}R_{44} + \frac{18\sqrt{286}}{11011}R_{64} - \frac{9\sqrt{34}}{1547}R_{84}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{154}}{1573}R_{40} + \frac{36\sqrt{2002}}{11011}R_{60} + \frac{162\sqrt{2618}}{17017}R_{80}$
$\frac{7}{2}$	2	2	$\frac{11}{2}$	6	3	$\frac{10\sqrt{6}}{143}R_{44} - \frac{18\sqrt{390}}{1001}R_{64} + \frac{3\sqrt{5610}}{1547}R_{84}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	1	$\frac{4\sqrt{85}}{85}R_{88}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	2	$\frac{60\sqrt{7}}{1001}R_{44} - \frac{74\sqrt{455}}{5005}R_{64} - \frac{4\sqrt{6545}}{1105}R_{84}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{30\sqrt{2}}{143}R_{40} + \frac{10\sqrt{26}}{143}R_{60} + \frac{6\sqrt{34}}{221}R_{80}$
$\frac{7}{2}$	2	2	$\frac{13}{2}$	6	4	$-\frac{24\sqrt{385}}{1001}R_{44} - \frac{10\sqrt{1001}}{1001}R_{64} + \frac{40\sqrt{119}}{1547}R_{84}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	1	$\frac{2\sqrt{85}}{85}R_{88}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	2	$\frac{15}{143}R_{44} - \frac{18\sqrt{65}}{385}R_{64} - \frac{23\sqrt{935}}{7735}R_{84}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	3	$\frac{15\sqrt{42}}{143}R_{40} + \frac{2\sqrt{546}}{1001}R_{60} - \frac{5\sqrt{714}}{1547}R_{80}$
$\frac{7}{2}$	2	2	$\frac{15}{2}$	6	4	$\frac{3\sqrt{715}}{143}R_{44} + \frac{6\sqrt{11}}{77}R_{64} + \frac{\sqrt{221}}{91}R_{84}$
$\frac{3}{2}$	3	1	$\frac{3}{2}$	3	1	$R_{00} - \frac{4\sqrt{5}}{25}R_{20}$
$\frac{3}{2}$	3	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{14}}{7}R_{44}$
$\frac{3}{2}$	3	1	$\frac{5}{2}$	3	2	$\frac{36\sqrt{5}}{175}R_{20} - \frac{1}{7}R_{40}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	3	1	$\frac{2\sqrt{35}}{35}R_{44}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	3	2	$-\frac{2\sqrt{30}}{105}R_{20} + \frac{\sqrt{6}}{7}R_{40}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{10}}{55}R_{44} + \frac{20\sqrt{26}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	3	2	$-\frac{\sqrt{3}}{11}R_{40} + \frac{20\sqrt{39}}{429}R_{60}$
$\frac{3}{2}$	3	1	$\frac{5}{2}$	4	1	0
$\frac{3}{2}$	3	1	$\frac{5}{2}$	4	2	$\frac{4\sqrt{35}}{35}R_{10} - \frac{3\sqrt{15}}{35}R_{30}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{4\sqrt{33}}{55}R_{54}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{\sqrt{10}}{7}R_{30} - \frac{2\sqrt{770}}{385}R_{50}$

Table B248: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 17 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{4\sqrt{30}}{55}R_{54}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{\sqrt{77}}{77}R_{30} + \frac{4}{11}R_{50}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	1	$-\frac{36\sqrt{3}}{715}R_{54} + \frac{5\sqrt{3}}{13}R_{74}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	2	$-\frac{12\sqrt{105}}{715}R_{50} + \frac{5\sqrt{77}}{143}R_{70}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	4	3	$-\frac{12\sqrt{55}}{715}R_{54} + \frac{\sqrt{55}}{143}R_{74}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{4\sqrt{7}}{35}R_{44}$
$\frac{3}{2}$	3	1	$\frac{7}{2}$	5	2	$\frac{5\sqrt{6}}{21}R_{20} - \frac{2\sqrt{30}}{35}R_{40}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	1	$\frac{4\sqrt{5}}{55}R_{44} - \frac{14\sqrt{13}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{2\sqrt{6}}{11}R_{40} - \frac{7\sqrt{78}}{429}R_{60}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{4\sqrt{13}}{715}R_{44} + \frac{27\sqrt{5}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{4\sqrt{455}}{715}R_{40} + \frac{9\sqrt{35}}{143}R_{60}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{2145}}{715}R_{44} + \frac{3\sqrt{33}}{143}R_{64}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{4\sqrt{3094}}{221}R_{88}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{\sqrt{2}}{13}R_{64} + \frac{2\sqrt{4862}}{221}R_{84}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{2\sqrt{35}}{65}R_{60} + \frac{4\sqrt{7735}}{1105}R_{80}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	5	4	$-\frac{\sqrt{110}}{65}R_{64} + \frac{2\sqrt{2210}}{1105}R_{84}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	6	1	$-\frac{14\sqrt{15}}{165}R_{54}$
$\frac{3}{2}$	3	1	$\frac{9}{2}$	6	2	$\frac{10\sqrt{154}}{231}R_{30} - \frac{7\sqrt{2}}{33}R_{50}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{27\sqrt{35}}{715}R_{54} - \frac{24\sqrt{35}}{455}R_{74}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{63}{143}R_{50} - \frac{8\sqrt{165}}{715}R_{70}$
$\frac{3}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{3\sqrt{231}}{143}R_{54} - \frac{8\sqrt{231}}{5005}R_{74}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	1	0
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{\sqrt{22}}{143}R_{54} + \frac{6\sqrt{22}}{65}R_{74}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{2\sqrt{77}}{143}R_{50} + \frac{12\sqrt{105}}{325}R_{70}$
$\frac{3}{2}$	3	1	$\frac{13}{2}$	6	4	$-\frac{\sqrt{10}}{13}R_{54} + \frac{18\sqrt{10}}{325}R_{74}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{22610}}{323}R_{98}$

Table B249: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 18 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{6\sqrt{154}}{595}R_{74} + \frac{\sqrt{38038}}{323}R_{94}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{36\sqrt{5}}{425}R_{70} + \frac{14\sqrt{57}}{323}R_{90}$
$\frac{3}{2}$	3	1	$\frac{15}{2}$	6	4	$-\frac{18\sqrt{910}}{2975}R_{74} + \frac{\sqrt{1330}}{323}R_{94}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$R_{00} - \frac{11\sqrt{5}}{70}R_{20} - \frac{1}{14}R_{40}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	2	$-\frac{\sqrt{14}}{14}R_{44}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{13\sqrt{2}}{42}R_{20} + \frac{6\sqrt{10}}{77}R_{40} + \frac{5\sqrt{130}}{858}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	2	$\frac{4\sqrt{21}}{77}R_{44} + \frac{5\sqrt{1365}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{\sqrt{7}}{42}R_{20} + \frac{9\sqrt{35}}{154}R_{40} - \frac{5\sqrt{455}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{3\sqrt{42}}{154}R_{44} - \frac{5\sqrt{2730}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	4	1	$-\frac{3\sqrt{35}}{49}R_{10} + \frac{\sqrt{15}}{14}R_{30} - \frac{\sqrt{1155}}{1078}R_{50}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	4	2	$-\frac{3\sqrt{330}}{154}R_{54}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	1	$\frac{15\sqrt{14}}{98}R_{10} - \frac{2\sqrt{6}}{21}R_{30} - \frac{17\sqrt{462}}{3234}R_{50}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{17\sqrt{55}}{385}R_{54}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{23\sqrt{165}}{726}R_{30} + \frac{19\sqrt{105}}{858}R_{50} + \frac{15\sqrt{77}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{19\sqrt{14}}{286}R_{54} + \frac{15\sqrt{14}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	1	$-\frac{\sqrt{66}}{121}R_{30} + \frac{8\sqrt{42}}{143}R_{50} - \frac{15\sqrt{770}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	2	$\frac{24\sqrt{30}}{715}R_{54} - \frac{15\sqrt{30}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	4	3	0
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	1	$-\frac{5\sqrt{10}}{42}R_{20} + \frac{18\sqrt{2}}{77}R_{40} - \frac{7\sqrt{26}}{858}R_{60}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	5	2	$\frac{12\sqrt{105}}{385}R_{44} - \frac{7\sqrt{273}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$\frac{5\sqrt{14}}{42}R_{20} - \frac{3\sqrt{70}}{154}R_{40} - \frac{2\sqrt{910}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{21}}{77}R_{44} - \frac{4\sqrt{1365}}{429}R_{64}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{53\sqrt{182}}{1859}R_{40} + \frac{8\sqrt{14}}{143}R_{60} + \frac{5\sqrt{3094}}{2873}R_{80}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{53\sqrt{130}}{9295}R_{44} + \frac{24\sqrt{2}}{143}R_{64} + \frac{15\sqrt{4862}}{2873}R_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	3	$\frac{10\sqrt{357}}{221}R_{88}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{3\sqrt{110}}{143}R_{44} + \frac{3\sqrt{286}}{286}R_{64} - \frac{3\sqrt{34}}{442}R_{84}$

Table B250: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 19 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{6\sqrt{455}}{1859}R_{40} + \frac{9\sqrt{35}}{143}R_{60} - \frac{9\sqrt{7735}}{2873}R_{80}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{\sqrt{130}}{1859}R_{44} + \frac{45\sqrt{2}}{286}R_{64} - \frac{45\sqrt{4862}}{5746}R_{84}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	5	4	$-\frac{3\sqrt{1190}}{221}R_{88}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{330}}{242}R_{30} + \frac{7\sqrt{210}}{286}R_{50} - \frac{6\sqrt{154}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	6	2	$\frac{21\sqrt{7}}{143}R_{54} - \frac{12\sqrt{7}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{5\sqrt{770}}{363}R_{30} - \frac{16\sqrt{10}}{429}R_{50} - \frac{31\sqrt{66}}{1573}R_{70}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{16\sqrt{14}}{1001}R_{54} - \frac{93\sqrt{14}}{1001}R_{74}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	3	0
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{26}}{13}R_{54} + \frac{21\sqrt{26}}{2210}R_{74} + \frac{\sqrt{38}}{646}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{77}}{143}R_{50} + \frac{21\sqrt{105}}{1105}R_{70} + \frac{3\sqrt{133}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{22}}{143}R_{54} + \frac{21\sqrt{22}}{442}R_{74} + \frac{3\sqrt{5434}}{646}R_{94}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	4	$\frac{\sqrt{58786}}{323}R_{98}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	1	$-\frac{\sqrt{26}}{26}R_{54} + \frac{54\sqrt{26}}{1105}R_{74} - \frac{7\sqrt{38}}{646}R_{94}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{3\sqrt{11}}{143}R_{50} + \frac{108\sqrt{15}}{1105}R_{70} - \frac{21\sqrt{19}}{323}R_{90}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{\sqrt{462}}{2002}R_{54} + \frac{18\sqrt{462}}{1547}R_{74} - \frac{\sqrt{114114}}{646}R_{94}$
$\frac{5}{2}$	3	1	$\frac{15}{2}$	6	4	$-\frac{7\sqrt{646}}{323}R_{98}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	3	2	$R_{00} + \frac{11\sqrt{5}}{350}R_{20} + \frac{3}{14}R_{40}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	1	$-\frac{24\sqrt{35}}{385}R_{44} + \frac{25\sqrt{91}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	2	$\frac{13\sqrt{30}}{210}R_{20} + \frac{8\sqrt{6}}{77}R_{40} + \frac{25\sqrt{78}}{858}R_{60}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	3	1	$\frac{9\sqrt{10}}{110}R_{44} + \frac{5\sqrt{26}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	3	2	$-\frac{\sqrt{15}}{42}R_{20} + \frac{3\sqrt{3}}{154}R_{40} + \frac{35\sqrt{39}}{429}R_{60}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	4	1	$-\frac{3\sqrt{330}}{154}R_{54}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	4	2	$\frac{9\sqrt{35}}{245}R_{10} + \frac{\sqrt{15}}{10}R_{30} - \frac{5\sqrt{1155}}{1078}R_{50}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	1	$-\frac{17\sqrt{33}}{1155}R_{54}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{5\sqrt{210}}{98}R_{10} + \frac{51\sqrt{770}}{5390}R_{50}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{19\sqrt{30}}{390}R_{54} + \frac{15\sqrt{30}}{143}R_{74}$

Table B251: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 20 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{69\sqrt{77}}{1694}R_{30} + \frac{57}{286}R_{50} + \frac{35\sqrt{165}}{1573}R_{70}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	4	1	$\frac{12\sqrt{3}}{65}R_{54} + \frac{15\sqrt{3}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	4	2	$-\frac{\sqrt{165}}{121}R_{30} + \frac{4\sqrt{105}}{715}R_{50} + \frac{90\sqrt{77}}{1573}R_{70}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	4	3	$-\frac{36\sqrt{55}}{715}R_{54} + \frac{3\sqrt{55}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	5	1	$-\frac{72\sqrt{7}}{385}R_{44} - \frac{7\sqrt{455}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	5	2	$\frac{5\sqrt{6}}{42}R_{20} + \frac{24\sqrt{30}}{385}R_{40} - \frac{7\sqrt{390}}{858}R_{60}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{3\sqrt{5}}{55}R_{44} + \frac{4\sqrt{13}}{429}R_{64}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{5\sqrt{30}}{42}R_{20} - \frac{\sqrt{6}}{154}R_{40} + \frac{14\sqrt{78}}{429}R_{60}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	1	$\frac{424\sqrt{13}}{9295}R_{44} - \frac{12\sqrt{5}}{143}R_{64} + \frac{15\sqrt{12155}}{2873}R_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{159\sqrt{455}}{9295}R_{40} + \frac{4\sqrt{35}}{143}R_{60} + \frac{10\sqrt{7735}}{2873}R_{80}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	3	$-\frac{106\sqrt{2145}}{9295}R_{44} + \frac{4\sqrt{33}}{143}R_{64} + \frac{5\sqrt{663}}{2873}R_{84}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	5	1	$-\frac{3\sqrt{3094}}{221}R_{88}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	5	2	$-\frac{3\sqrt{130}}{1859}R_{44} + \frac{69\sqrt{2}}{286}R_{64} + \frac{21\sqrt{4862}}{5746}R_{84}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	5	3	$-\frac{10\sqrt{455}}{1859}R_{40} + \frac{9\sqrt{35}}{715}R_{60} + \frac{81\sqrt{7735}}{14365}R_{80}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	5	4	$-\frac{15\sqrt{286}}{1859}R_{44} - \frac{51\sqrt{110}}{1430}R_{64} + \frac{141\sqrt{2210}}{28730}R_{84}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	6	1	$-\frac{7\sqrt{15}}{65}R_{54} - \frac{12\sqrt{15}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	6	2	$\frac{45\sqrt{154}}{1694}R_{30} + \frac{63\sqrt{2}}{286}R_{50} - \frac{14\sqrt{330}}{1573}R_{70}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{8\sqrt{35}}{455}R_{54} + \frac{93\sqrt{35}}{5005}R_{74}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{25\sqrt{77}}{363}R_{30} - \frac{8}{429}R_{50} + \frac{186\sqrt{165}}{7865}R_{70}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{8\sqrt{231}}{1001}R_{54} + \frac{31\sqrt{231}}{5005}R_{74}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{\sqrt{22610}}{323}R_{98}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	2	$\frac{7\sqrt{22}}{143}R_{54} - \frac{63\sqrt{22}}{2210}R_{74} + \frac{5\sqrt{5434}}{646}R_{94}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{6\sqrt{77}}{143}R_{50} + \frac{77\sqrt{105}}{5525}R_{70} + \frac{9\sqrt{133}}{323}R_{90}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	4	$-\frac{\sqrt{10}}{13}R_{54} + \frac{651\sqrt{10}}{11050}R_{74} + \frac{\sqrt{2470}}{646}R_{94}$
$\frac{5}{2}$	3	2	$\frac{15}{2}$	6	1	$-\frac{\sqrt{22610}}{323}R_{98}$
$\frac{5}{2}$	3	2	$\frac{15}{2}$	6	2	$-\frac{5\sqrt{154}}{2002}R_{54} + \frac{216\sqrt{154}}{7735}R_{74} + \frac{\sqrt{38038}}{646}R_{94}$

Table B252: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 21 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{15}{2}$	6	3	$-\frac{3\sqrt{33}}{143}R_{50} + \frac{216\sqrt{5}}{5525}R_{70} + \frac{21\sqrt{57}}{323}R_{90}$
$\frac{5}{2}$	3	2	$\frac{15}{2}$	6	4	$-\frac{\sqrt{910}}{182}R_{54} - \frac{432\sqrt{910}}{38675}R_{74} + \frac{5\sqrt{1330}}{646}R_{94}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$R_{00} - \frac{2\sqrt{5}}{63}R_{20} + \frac{13}{231}R_{40} - \frac{100\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	2	$-\frac{\sqrt{210}}{231}R_{44} - \frac{20\sqrt{546}}{1287}R_{64}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	1	$-\frac{5\sqrt{70}}{126}R_{20} - \frac{10\sqrt{14}}{231}R_{40} + \frac{5\sqrt{182}}{198}R_{60}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{8\sqrt{105}}{231}R_{44} - \frac{5\sqrt{273}}{1287}R_{64}$
$\frac{7}{2}$	3	1	$\frac{5}{2}$	4	1	$-\frac{\sqrt{14}}{98}R_{10} + \frac{2\sqrt{6}}{21}R_{30} - \frac{25\sqrt{462}}{3234}R_{50}$
$\frac{7}{2}$	3	1	$\frac{5}{2}$	4	2	$-\frac{5\sqrt{33}}{231}R_{54}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{20\sqrt{35}}{441}R_{10} - \frac{5\sqrt{15}}{77}R_{30} + \frac{46\sqrt{1155}}{7007}R_{50} + \frac{49\sqrt{7}}{1287}R_{70}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{30\sqrt{22}}{1001}R_{54} + \frac{49\sqrt{22}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{\sqrt{154}}{18}R_{10} - \frac{2\sqrt{66}}{121}R_{30} + \frac{5\sqrt{42}}{286}R_{50} - \frac{160\sqrt{770}}{14157}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{3\sqrt{35}}{143}R_{54} - \frac{32\sqrt{35}}{429}R_{74}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	1	$-\frac{10\sqrt{165}}{363}R_{30} - \frac{4\sqrt{105}}{429}R_{50} + \frac{58\sqrt{77}}{1573}R_{70}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	2	$\frac{100\sqrt{3}}{429}R_{54} + \frac{2\sqrt{3}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	4	3	0
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{1}{63}R_{20} + \frac{26\sqrt{5}}{231}R_{40} - \frac{35\sqrt{65}}{1287}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	5	2	$-\frac{10\sqrt{42}}{231}R_{44} - \frac{7\sqrt{2730}}{1287}R_{64}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{40\sqrt{35}}{693}R_{20} - \frac{170\sqrt{7}}{3003}R_{40} + \frac{2\sqrt{91}}{99}R_{60} + \frac{28\sqrt{119}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{68\sqrt{210}}{3003}R_{44} - \frac{2\sqrt{546}}{1287}R_{64} + \frac{14\sqrt{7854}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{2\sqrt{91}}{33}R_{20} - \frac{12\sqrt{455}}{1859}R_{40} + \frac{10\sqrt{35}}{429}R_{60} - \frac{120\sqrt{7735}}{31603}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{60\sqrt{13}}{1859}R_{44} - \frac{2\sqrt{5}}{33}R_{64} - \frac{8\sqrt{12155}}{1859}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	3	$\frac{8\sqrt{3570}}{663}R_{88}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	1	$\frac{20\sqrt{11}}{143}R_{44} - \frac{2\sqrt{715}}{143}R_{64} + \frac{2\sqrt{85}}{221}R_{84}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	2	$-\frac{50\sqrt{182}}{1859}R_{40} - \frac{2\sqrt{14}}{143}R_{60} + \frac{16\sqrt{3094}}{2873}R_{80}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{40\sqrt{13}}{1859}R_{44} + \frac{2\sqrt{5}}{11}R_{64} + \frac{2\sqrt{12155}}{2873}R_{84}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	5	4	$-\frac{8\sqrt{119}}{221}R_{88}$

Table B253: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 22 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	6	1	$\frac{10\sqrt{33}}{1089}R_{30} + \frac{70\sqrt{21}}{1287}R_{50} - \frac{20\sqrt{385}}{1573}R_{70}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	6	2	$-\frac{14\sqrt{70}}{429}R_{54} - \frac{6\sqrt{70}}{143}R_{74}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	1	$-\frac{200\sqrt{77}}{4719}R_{30} - \frac{38}{429}R_{50} + \frac{348\sqrt{165}}{26741}R_{70} + \frac{42\sqrt{209}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{190\sqrt{35}}{3003}R_{54} + \frac{36\sqrt{35}}{17017}R_{74} + \frac{22\sqrt{8645}}{4199}R_{94}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{14\sqrt{277134}}{12597}R_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	1	$\frac{2\sqrt{65}}{65}R_{54} + \frac{14\sqrt{65}}{1105}R_{74} - \frac{8\sqrt{95}}{1615}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{70\sqrt{10}}{429}R_{30} - \frac{2\sqrt{770}}{429}R_{50} + \frac{56\sqrt{42}}{2431}R_{70} - \frac{40\sqrt{1330}}{4199}R_{90}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	3	$-\frac{38\sqrt{55}}{2145}R_{54} - \frac{42\sqrt{55}}{2431}R_{74} - \frac{88\sqrt{13585}}{20995}R_{94}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	4	$\frac{16\sqrt{146965}}{20995}R_{98}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{65}}{65}R_{54} - \frac{58\sqrt{65}}{1105}R_{74} + \frac{21\sqrt{95}}{1615}R_{94}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	2	$-\frac{5\sqrt{110}}{143}R_{50} - \frac{2\sqrt{6}}{221}R_{70} + \frac{7\sqrt{190}}{323}R_{90}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{53\sqrt{1155}}{15015}R_{54} + \frac{18\sqrt{1155}}{1547}R_{74} + \frac{\sqrt{285285}}{4845}R_{94}$
$\frac{7}{2}$	3	1	$\frac{15}{2}$	6	4	$-\frac{14\sqrt{1615}}{1615}R_{98}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	2	$R_{00} + \frac{2\sqrt{5}}{21}R_{20} + \frac{1}{77}R_{40} + \frac{20\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	3	1	$-\frac{4\sqrt{15}}{33}R_{44} - \frac{5\sqrt{39}}{99}R_{64}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	3	2	$\frac{\sqrt{10}}{14}R_{20} + \frac{20\sqrt{2}}{77}R_{40} + \frac{35\sqrt{26}}{858}R_{60}$
$\frac{7}{2}$	3	2	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{55}}{77}R_{54}$
$\frac{7}{2}$	3	2	$\frac{5}{2}$	4	2	$-\frac{\sqrt{210}}{294}R_{10} + \frac{15\sqrt{770}}{1078}R_{50}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	1	$-\frac{30\sqrt{22}}{1001}R_{54} + \frac{49\sqrt{22}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{4\sqrt{35}}{147}R_{10} + \frac{\sqrt{15}}{11}R_{30} + \frac{34\sqrt{1155}}{7007}R_{50} + \frac{49\sqrt{7}}{429}R_{70}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{3\sqrt{5}}{143}R_{54} - \frac{32\sqrt{5}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{\sqrt{22}}{6}R_{10} + \frac{4\sqrt{462}}{847}R_{30} + \frac{5\sqrt{6}}{286}R_{50} + \frac{224\sqrt{110}}{4719}R_{70}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	1	$-\frac{40\sqrt{2}}{143}R_{54} - \frac{31\sqrt{2}}{143}R_{74}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	2	$\frac{3\sqrt{110}}{121}R_{30} + \frac{6\sqrt{70}}{143}R_{50} + \frac{38\sqrt{462}}{4719}R_{70}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	4	3	$-\frac{4\sqrt{330}}{143}R_{54} + \frac{5\sqrt{330}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	5	1	$-\frac{10\sqrt{42}}{231}R_{44} - \frac{7\sqrt{2730}}{1287}R_{64}$

Table B254: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 23 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	5	2	$-\frac{1}{21}R_{20} + \frac{2\sqrt{5}}{77}R_{40} + \frac{7\sqrt{65}}{143}R_{60}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{34\sqrt{30}}{429}R_{44} - \frac{2\sqrt{78}}{99}R_{64} + \frac{42\sqrt{1122}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{8\sqrt{5}}{77}R_{20} + \frac{340}{1001}R_{40} + \frac{14\sqrt{13}}{429}R_{60} + \frac{196\sqrt{17}}{2431}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{40\sqrt{78}}{1859}R_{44} + \frac{\sqrt{30}}{429}R_{64} - \frac{4\sqrt{72930}}{31603}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{\sqrt{546}}{33}R_{20} + \frac{2\sqrt{2730}}{1859}R_{40} + \frac{2\sqrt{210}}{429}R_{60} + \frac{72\sqrt{46410}}{31603}R_{80}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	3	$-\frac{12\sqrt{1430}}{1859}R_{44} - \frac{5\sqrt{22}}{143}R_{64} + \frac{20\sqrt{442}}{2873}R_{84}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	1	$\frac{4\sqrt{4641}}{663}R_{88}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	2	$\frac{20\sqrt{195}}{1859}R_{44} - \frac{74\sqrt{3}}{429}R_{64} - \frac{28\sqrt{7293}}{8619}R_{84}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	3	$\frac{10\sqrt{2730}}{1859}R_{40} + \frac{10\sqrt{210}}{429}R_{60} + \frac{2\sqrt{46410}}{2873}R_{80}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	5	4	$-\frac{40\sqrt{429}}{1859}R_{44} - \frac{10\sqrt{165}}{429}R_{64} + \frac{40\sqrt{3315}}{8619}R_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	6	1	$-\frac{14\sqrt{10}}{429}R_{54} - \frac{6\sqrt{10}}{143}R_{74}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	6	2	$-\frac{20\sqrt{231}}{7623}R_{30} + \frac{70\sqrt{3}}{1287}R_{50} + \frac{84\sqrt{55}}{1573}R_{70}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{76\sqrt{210}}{3003}R_{54} - \frac{186\sqrt{210}}{17017}R_{74} + \frac{11\sqrt{51870}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{20\sqrt{462}}{1573}R_{30} + \frac{19\sqrt{6}}{143}R_{50} + \frac{228\sqrt{110}}{26741}R_{70} + \frac{42\sqrt{1254}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	3	$-\frac{38\sqrt{154}}{1001}R_{54} + \frac{150\sqrt{154}}{17017}R_{74} + \frac{\sqrt{38038}}{4199}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	1	$-\frac{16\sqrt{33915}}{4845}R_{98}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{14\sqrt{33}}{429}R_{54} + \frac{28\sqrt{33}}{2431}R_{74} + \frac{8\sqrt{8151}}{12597}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{350\sqrt{6}}{1287}R_{30} + \frac{2\sqrt{462}}{1287}R_{50} + \frac{126\sqrt{70}}{12155}R_{70} + \frac{72\sqrt{798}}{4199}R_{90}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	4	$\frac{2\sqrt{15}}{195}R_{54} - \frac{56\sqrt{15}}{1105}R_{74} + \frac{232\sqrt{3705}}{62985}R_{94}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	1	$\frac{2\sqrt{33915}}{4845}R_{98}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	2	$\frac{43\sqrt{231}}{3003}R_{54} - \frac{22\sqrt{231}}{1547}R_{74} - \frac{\sqrt{57057}}{969}R_{94}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	3	$\frac{9\sqrt{22}}{143}R_{50} + \frac{66\sqrt{30}}{1105}R_{70} + \frac{7\sqrt{38}}{323}R_{90}$
$\frac{7}{2}$	3	2	$\frac{15}{2}$	6	4	$-\frac{\sqrt{1365}}{105}R_{54} - \frac{2\sqrt{1365}}{595}R_{74} + \frac{31\sqrt{1995}}{4845}R_{94}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	1	$R_{00} + \frac{\sqrt{5}}{18}R_{20} - \frac{17}{66}R_{40} - \frac{50\sqrt{13}}{1287}R_{60}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	3	2	$\frac{5\sqrt{30}}{66}R_{44} + \frac{20\sqrt{78}}{1287}R_{64}$
$\frac{9}{2}$	3	1	$\frac{5}{2}$	4	1	$\frac{5\sqrt{21}}{462}R_{30} - \frac{25\sqrt{33}}{858}R_{50} + \frac{7\sqrt{5}}{143}R_{70}$

Table B255: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 24 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	1	$\frac{5}{2}$	4	2	$\frac{5\sqrt{462}}{546}R_{54} + \frac{5\sqrt{462}}{143}R_{74}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{10}}{90}R_{10} + \frac{2\sqrt{210}}{385}R_{30} + \frac{5\sqrt{330}}{286}R_{50} - \frac{280\sqrt{2}}{1287}R_{70}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{15\sqrt{77}}{1001}R_{54} - \frac{8\sqrt{77}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	4	1	$-\frac{5\sqrt{11}}{99}R_{10} - \frac{5\sqrt{231}}{242}R_{30} - \frac{5\sqrt{3}}{286}R_{50} + \frac{602\sqrt{55}}{14157}R_{70}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{15\sqrt{10}}{286}R_{54} - \frac{28\sqrt{10}}{429}R_{74}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	1	$\frac{4\sqrt{110}}{55}R_{10} - \frac{\sqrt{2310}}{1815}R_{30} - \frac{20\sqrt{30}}{429}R_{50} - \frac{35\sqrt{22}}{1573}R_{70}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	2	$\frac{20\sqrt{42}}{429}R_{54} + \frac{3\sqrt{42}}{143}R_{74}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	4	3	0
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	1	$\frac{5\sqrt{14}}{1386}R_{20} + \frac{10\sqrt{70}}{3003}R_{40} - \frac{7\sqrt{910}}{990}R_{60} + \frac{56\sqrt{1190}}{12155}R_{80}$
$\frac{9}{2}$	3	1	$\frac{7}{2}$	5	2	$\frac{20\sqrt{3}}{429}R_{44} + \frac{7\sqrt{195}}{495}R_{64} + \frac{168\sqrt{2805}}{12155}R_{84}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{10}}{198}R_{20} + \frac{85\sqrt{2}}{858}R_{40} + \frac{70\sqrt{26}}{1287}R_{60} - \frac{140\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{25\sqrt{15}}{429}R_{44} - \frac{56\sqrt{39}}{1287}R_{64} - \frac{28\sqrt{561}}{2431}R_{84}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	1	$-\frac{20\sqrt{26}}{429}R_{20} - \frac{45\sqrt{130}}{1859}R_{40} + \frac{28\sqrt{10}}{2145}R_{60} + \frac{987\sqrt{2210}}{158015}R_{80}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{45\sqrt{182}}{1859}R_{44} + \frac{4\sqrt{70}}{2145}R_{64} - \frac{49\sqrt{170170}}{158015}R_{84}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	5	3	$\frac{14\sqrt{255}}{663}R_{88}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	1	$-\frac{5\sqrt{154}}{143}R_{44} + \frac{\sqrt{10010}}{286}R_{64} - \frac{\sqrt{1190}}{442}R_{84}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	2	$\frac{12\sqrt{65}}{143}R_{20} - \frac{50\sqrt{13}}{1859}R_{40} - \frac{35}{143}R_{60} - \frac{175\sqrt{221}}{31603}R_{80}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	3	$-\frac{35\sqrt{182}}{1859}R_{44} + \frac{7\sqrt{70}}{286}R_{64} + \frac{19\sqrt{170170}}{63206}R_{84}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	5	4	$-\frac{7\sqrt{34}}{221}R_{88}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	6	1	$\frac{25\sqrt{462}}{28314}R_{30} + \frac{7\sqrt{6}}{2574}R_{50} - \frac{602\sqrt{110}}{26741}R_{70} + \frac{252\sqrt{1254}}{46189}R_{90}$
$\frac{9}{2}$	3	1	$\frac{9}{2}$	6	2	$\frac{7\sqrt{5}}{429}R_{54} + \frac{168\sqrt{5}}{2431}R_{74} + \frac{84\sqrt{1235}}{4199}R_{94}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{5\sqrt{22}}{4719}R_{30} + \frac{20\sqrt{14}}{429}R_{50} + \frac{135\sqrt{2310}}{26741}R_{70} - \frac{300\sqrt{2926}}{46189}R_{90}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	2	$-\frac{28\sqrt{10}}{429}R_{54} - \frac{243\sqrt{10}}{2431}R_{74} - \frac{28\sqrt{2470}}{4199}R_{94}$
$\frac{9}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{8\sqrt{969969}}{12597}R_{98}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{910}}{65}R_{54} - \frac{5\sqrt{910}}{442}R_{74} + \frac{7\sqrt{1330}}{3230}R_{94}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	2	$-\frac{20\sqrt{35}}{429}R_{30} - \frac{14\sqrt{55}}{429}R_{50} + \frac{7\sqrt{3}}{143}R_{70} + \frac{7\sqrt{95}}{247}R_{90}$

Table B256: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 25 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	3	$\frac{29\sqrt{770}}{2145}R_{54} + \frac{21\sqrt{770}}{4862}R_{74} - \frac{7\sqrt{190190}}{41990}R_{94}$
$\frac{9}{2}$	3	1	$\frac{13}{2}$	6	4	$-\frac{7\sqrt{41990}}{20995}R_{98}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{910}}{130}R_{54} + \frac{2\sqrt{910}}{221}R_{74} - \frac{9\sqrt{1330}}{3230}R_{94}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	2	$\frac{40\sqrt{5}}{143}R_{30} - \frac{\sqrt{385}}{143}R_{50} - \frac{124\sqrt{21}}{2431}R_{70} - \frac{11\sqrt{665}}{4199}R_{90}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	3	$-\frac{7\sqrt{330}}{390}R_{54} + \frac{18\sqrt{330}}{2431}R_{74} + \frac{49\sqrt{81510}}{125970}R_{94}$
$\frac{9}{2}$	3	1	$\frac{15}{2}$	6	4	$-\frac{\sqrt{22610}}{1615}R_{98}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	3	2	$R_{00} + \frac{\sqrt{5}}{6}R_{20} + \frac{1}{22}R_{40} - \frac{10\sqrt{13}}{429}R_{60}$
$\frac{9}{2}$	3	2	$\frac{5}{2}$	4	1	$-\frac{5\sqrt{110}}{286}R_{54} + \frac{7\sqrt{110}}{143}R_{74}$
$\frac{9}{2}$	3	2	$\frac{5}{2}$	4	2	$-\frac{3\sqrt{5}}{154}R_{30} - \frac{15\sqrt{385}}{2002}R_{50} + \frac{35\sqrt{21}}{429}R_{70}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	4	1	$-\frac{15\sqrt{11}}{143}R_{54} - \frac{56\sqrt{11}}{429}R_{74}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	4	2	$-\frac{\sqrt{70}}{210}R_{10} - \frac{4\sqrt{30}}{385}R_{30} + \frac{5\sqrt{2310}}{2002}R_{50} + \frac{56\sqrt{14}}{429}R_{70}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{15\sqrt{10}}{286}R_{54} - \frac{28\sqrt{10}}{429}R_{74}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{\sqrt{11}}{33}R_{10} + \frac{31\sqrt{231}}{1694}R_{30} + \frac{5\sqrt{3}}{26}R_{50} + \frac{98\sqrt{55}}{4719}R_{70}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	1	$\frac{20}{143}R_{54} + \frac{9}{143}R_{74}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	2	$\frac{4\sqrt{1155}}{165}R_{10} + \frac{21\sqrt{55}}{605}R_{30} - \frac{2\sqrt{231}}{363}R_{70}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	4	3	$-\frac{4\sqrt{165}}{143}R_{54} + \frac{5\sqrt{165}}{429}R_{74}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	5	1	$-\frac{40\sqrt{21}}{3003}R_{44} + \frac{7\sqrt{1365}}{6435}R_{64} + \frac{56\sqrt{19635}}{12155}R_{84}$
$\frac{9}{2}$	3	2	$\frac{7}{2}$	5	2	$-\frac{\sqrt{2}}{154}R_{20} - \frac{20\sqrt{10}}{1001}R_{40} - \frac{49\sqrt{130}}{4290}R_{60} + \frac{392\sqrt{170}}{12155}R_{80}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	1	$-\frac{25\sqrt{15}}{429}R_{44} - \frac{56\sqrt{39}}{1287}R_{64} - \frac{28\sqrt{561}}{2431}R_{84}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{10}}{66}R_{20} - \frac{5\sqrt{2}}{286}R_{40} + \frac{14\sqrt{26}}{429}R_{60} + \frac{196\sqrt{34}}{2431}R_{80}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{120\sqrt{39}}{1859}R_{44} - \frac{172\sqrt{15}}{2145}R_{64} - \frac{203\sqrt{36465}}{158015}R_{84}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{4\sqrt{273}}{429}R_{20} + \frac{15\sqrt{1365}}{1859}R_{40} + \frac{64\sqrt{105}}{2145}R_{60} + \frac{126\sqrt{23205}}{158015}R_{80}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{18\sqrt{715}}{1859}R_{44} - \frac{20\sqrt{11}}{143}R_{64} + \frac{35\sqrt{221}}{2873}R_{84}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	1	$-\frac{\sqrt{9282}}{663}R_{88}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	2	$-\frac{35\sqrt{390}}{1859}R_{44} - \frac{5\sqrt{6}}{858}R_{64} + \frac{25\sqrt{14586}}{189618}R_{84}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	3	$\frac{20\sqrt{273}}{429}R_{20} + \frac{10\sqrt{1365}}{1859}R_{40} - \frac{\sqrt{105}}{429}R_{60} - \frac{\sqrt{23205}}{1859}R_{80}$

Table B257: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 26 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	5	4	$-\frac{35\sqrt{858}}{1859}R_{44} - \frac{\sqrt{330}}{858}R_{64} + \frac{31\sqrt{6630}}{17238}R_{84}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	6	1	$\frac{7\sqrt{5}}{429}R_{54} + \frac{168\sqrt{5}}{2431}R_{74} + \frac{84\sqrt{1235}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{9}{2}$	6	2	$-\frac{155\sqrt{462}}{198198}R_{30} - \frac{7\sqrt{6}}{234}R_{50} - \frac{294\sqrt{110}}{26741}R_{70} + \frac{588\sqrt{1254}}{46189}R_{90}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{4\sqrt{105}}{429}R_{54} - \frac{243\sqrt{105}}{17017}R_{74} - \frac{4\sqrt{25935}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{231}}{1573}R_{30} + \frac{54\sqrt{55}}{2057}R_{70} + \frac{840\sqrt{627}}{46189}R_{90}$
$\frac{9}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{4\sqrt{77}}{143}R_{54} - \frac{675\sqrt{77}}{17017}R_{74} + \frac{4\sqrt{19019}}{4199}R_{94}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{7\sqrt{67830}}{4845}R_{98}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	2	$-\frac{19\sqrt{66}}{429}R_{54} - \frac{197\sqrt{66}}{4862}R_{74} - \frac{49\sqrt{16302}}{25194}R_{94}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	3	$\frac{140\sqrt{3}}{1287}R_{30} + \frac{2\sqrt{231}}{99}R_{50} + \frac{9\sqrt{35}}{187}R_{70} + \frac{21\sqrt{399}}{4199}R_{90}$
$\frac{9}{2}$	3	2	$\frac{13}{2}$	6	4	$-\frac{11\sqrt{30}}{195}R_{54} - \frac{25\sqrt{30}}{442}R_{74} + \frac{343\sqrt{7410}}{125970}R_{94}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	1	$\frac{\sqrt{67830}}{4845}R_{98}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	2	$-\frac{17\sqrt{462}}{858}R_{54} - \frac{76\sqrt{462}}{17017}R_{74} - \frac{\sqrt{114114}}{25194}R_{94}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	3	$\frac{40\sqrt{7}}{143}R_{30} + \frac{7\sqrt{11}}{143}R_{50} - \frac{24\sqrt{15}}{2431}R_{70} - \frac{77\sqrt{19}}{4199}R_{90}$
$\frac{9}{2}$	3	2	$\frac{15}{2}$	6	4	$-\frac{\sqrt{2730}}{390}R_{54} + \frac{4\sqrt{2730}}{1547}R_{74} + \frac{\sqrt{3990}}{510}R_{94}$
$\frac{5}{2}$	4	1	$\frac{5}{2}$	4	1	$R_{00} - \frac{25\sqrt{5}}{98}R_{20} + \frac{9}{98}R_{40}$
$\frac{5}{2}$	4	1	$\frac{5}{2}$	4	2	$\frac{9\sqrt{14}}{98}R_{44}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	1	$-\frac{25\sqrt{2}}{98}R_{20} + \frac{54\sqrt{10}}{539}R_{40} - \frac{\sqrt{130}}{286}R_{60}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{36\sqrt{21}}{539}R_{44} - \frac{\sqrt{1365}}{143}R_{64}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{\sqrt{55}}{154}R_{20} + \frac{135\sqrt{11}}{1694}R_{40} - \frac{25\sqrt{143}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{9\sqrt{330}}{1694}R_{44} - \frac{25\sqrt{858}}{1573}R_{64}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	1	$\frac{9\sqrt{110}}{1573}R_{40} - \frac{8\sqrt{1430}}{1573}R_{60} + \frac{7\sqrt{1870}}{2431}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{9\sqrt{154}}{11011}R_{44} - \frac{24\sqrt{10010}}{11011}R_{64} + \frac{3\sqrt{1190}}{221}R_{84}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{14\sqrt{36465}}{2431}R_{88}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	5	1	$\frac{\sqrt{70}}{14}R_{10} - \frac{2\sqrt{30}}{21}R_{30} + \frac{\sqrt{2310}}{462}R_{50}$
$\frac{5}{2}$	4	1	$\frac{7}{2}$	5	2	$\frac{\sqrt{11}}{11}R_{54}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{25\sqrt{42}}{462}R_{30} + \frac{35\sqrt{66}}{858}R_{50} - \frac{2\sqrt{10}}{143}R_{70}$

Table B258: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 27 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	5	2	$\frac{7\sqrt{55}}{143}R_{54} - \frac{4\sqrt{55}}{143}R_{74}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{\sqrt{2730}}{1001}R_{30} + \frac{8\sqrt{4290}}{1859}R_{50} - \frac{75\sqrt{26}}{1859}R_{70}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{24\sqrt{6006}}{13013}R_{54} - \frac{75\sqrt{6006}}{13013}R_{74}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	5	3	0
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	1	$\frac{\sqrt{42}}{91}R_{54} - \frac{25\sqrt{42}}{3094}R_{74} + \frac{\sqrt{10374}}{8398}R_{94}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	2	$\frac{6\sqrt{429}}{1859}R_{50} - \frac{75\sqrt{65}}{2873}R_{70} + \frac{21\sqrt{741}}{4199}R_{90}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{3\sqrt{6006}}{13013}R_{54} - \frac{125\sqrt{6006}}{40222}R_{74} + \frac{3\sqrt{8778}}{646}R_{94}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	5	4	$\frac{7\sqrt{1938}}{323}R_{98}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	1	$\frac{\sqrt{110}}{22}R_{20} - \frac{25\sqrt{22}}{242}R_{40} + \frac{10\sqrt{286}}{1573}R_{60}$
$\frac{5}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{5\sqrt{165}}{363}R_{44} + \frac{20\sqrt{429}}{1573}R_{64}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{25\sqrt{462}}{1573}R_{40} + \frac{48\sqrt{6006}}{11011}R_{60} - \frac{9\sqrt{7854}}{17017}R_{80}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{330}}{1573}R_{44} + \frac{144\sqrt{858}}{11011}R_{64} - \frac{27\sqrt{102}}{1547}R_{84}$
$\frac{5}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{54\sqrt{17017}}{17017}R_{88}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{30030}}{1001}R_{44} + \frac{\sqrt{462}}{154}R_{64} - \frac{\sqrt{9282}}{3094}R_{84}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{15}}{143}R_{40} + \frac{3\sqrt{195}}{143}R_{60} - \frac{3\sqrt{255}}{221}R_{80}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{\sqrt{210}}{3003}R_{44} + \frac{15\sqrt{546}}{2002}R_{64} - \frac{15\sqrt{7854}}{3094}R_{84}$
$\frac{5}{2}$	4	1	$\frac{13}{2}$	6	4	$-\frac{\sqrt{6630}}{221}R_{88}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	1	$\frac{\sqrt{462}}{238}R_{64} - \frac{2\sqrt{9282}}{2261}R_{84} + \frac{\sqrt{210}}{646}R_{10,4}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	2	$\frac{3\sqrt{1365}}{1547}R_{60} - \frac{12\sqrt{1785}}{2261}R_{80} + \frac{21\sqrt{5}}{323}R_{10,0}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	3	$\frac{15\sqrt{26}}{3094}R_{64} - \frac{30\sqrt{374}}{2261}R_{84} + \frac{7\sqrt{1430}}{646}R_{10,4}$
$\frac{5}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{3570}}{2261}R_{88} + \frac{21\sqrt{170}}{323}R_{10,8}$
$\frac{5}{2}$	4	2	$\frac{5}{2}$	4	2	$R_{00} + \frac{5\sqrt{5}}{98}R_{20} - \frac{27}{98}R_{40}$
$\frac{5}{2}$	4	2	$\frac{7}{2}$	4	1	$-\frac{216\sqrt{35}}{2695}R_{44} - \frac{5\sqrt{91}}{143}R_{64}$
$\frac{5}{2}$	4	2	$\frac{7}{2}$	4	2	$\frac{5\sqrt{30}}{98}R_{20} + \frac{72\sqrt{6}}{539}R_{40} - \frac{5\sqrt{78}}{286}R_{60}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	4	1	$\frac{27\sqrt{154}}{1694}R_{44} + \frac{5\sqrt{10010}}{11011}R_{64}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{231}}{1078}R_{20} + \frac{9\sqrt{1155}}{11858}R_{40} + \frac{5\sqrt{15015}}{1573}R_{60}$

Table B259: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 28 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	4	1	$-\frac{72\sqrt{385}}{55055}R_{44} + \frac{60\sqrt{1001}}{11011}R_{64} + \frac{15\sqrt{119}}{221}R_{84}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	4	2	$-\frac{27\sqrt{11}}{1573}R_{40} - \frac{20\sqrt{143}}{1573}R_{60} + \frac{70\sqrt{187}}{2431}R_{80}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{18\sqrt{21}}{1001}R_{44} - \frac{4\sqrt{1365}}{1001}R_{64} + \frac{\sqrt{19635}}{2431}R_{84}$
$\frac{5}{2}$	4	2	$\frac{7}{2}$	5	1	$\frac{\sqrt{165}}{165}R_{54}$
$\frac{5}{2}$	4	2	$\frac{7}{2}$	5	2	$\frac{5\sqrt{42}}{42}R_{10} - \frac{3\sqrt{154}}{154}R_{50}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{\sqrt{231}}{39}R_{54} - \frac{20\sqrt{231}}{1001}R_{74}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{15\sqrt{10}}{154}R_{30} + \frac{3\sqrt{770}}{286}R_{50} - \frac{10\sqrt{42}}{429}R_{70}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{12\sqrt{15015}}{5915}R_{54} + \frac{15\sqrt{15015}}{13013}R_{74}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{273}}{1001}R_{30} + \frac{4\sqrt{429}}{1859}R_{50} + \frac{90\sqrt{65}}{1859}R_{70}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{36\sqrt{91}}{1183}R_{54} + \frac{15\sqrt{91}}{1183}R_{74}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	5	1	$\frac{7\sqrt{125970}}{4199}R_{98}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	5	2	$-\frac{\sqrt{6006}}{1859}R_{54} + \frac{75\sqrt{6006}}{40222}R_{74} + \frac{5\sqrt{8778}}{646}R_{94}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	5	3	$-\frac{6\sqrt{429}}{1859}R_{50} - \frac{55\sqrt{65}}{2873}R_{70} + \frac{63\sqrt{741}}{4199}R_{90}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	5	4	$\frac{\sqrt{2730}}{1183}R_{54} - \frac{155\sqrt{2730}}{40222}R_{74} + \frac{\sqrt{3990}}{646}R_{94}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{77}}{121}R_{44} - \frac{4\sqrt{5005}}{11011}R_{64}$
$\frac{5}{2}$	4	2	$\frac{9}{2}$	6	2	$\frac{5\sqrt{462}}{154}R_{20} - \frac{5\sqrt{2310}}{5082}R_{40} - \frac{2\sqrt{30030}}{1573}R_{60}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	6	1	$\frac{40\sqrt{33}}{1573}R_{44} - \frac{72\sqrt{2145}}{11011}R_{64} - \frac{27\sqrt{255}}{1547}R_{84}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{15\sqrt{1155}}{1573}R_{40} + \frac{24\sqrt{15015}}{11011}R_{60} - \frac{18\sqrt{19635}}{17017}R_{80}$
$\frac{5}{2}$	4	2	$\frac{11}{2}$	6	3	$-\frac{30\sqrt{5}}{143}R_{44} + \frac{72\sqrt{13}}{1001}R_{64} - \frac{27\sqrt{187}}{17017}R_{84}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{\sqrt{102}}{17}R_{88}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{\sqrt{210}}{1001}R_{44} + \frac{23\sqrt{546}}{2002}R_{64} + \frac{\sqrt{7854}}{442}R_{84}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	6	3	$-\frac{10\sqrt{15}}{429}R_{40} + \frac{3\sqrt{195}}{715}R_{60} + \frac{27\sqrt{255}}{1105}R_{80}$
$\frac{5}{2}$	4	2	$\frac{13}{2}$	6	4	$-\frac{5\sqrt{462}}{1001}R_{44} - \frac{17\sqrt{30030}}{10010}R_{64} + \frac{47\sqrt{3570}}{15470}R_{84}$
$\frac{5}{2}$	4	2	$\frac{15}{2}$	6	1	$\frac{8\sqrt{102}}{323}R_{88} + \frac{15\sqrt{238}}{323}R_{10,8}$
$\frac{5}{2}$	4	2	$\frac{15}{2}$	6	2	$-\frac{19\sqrt{78}}{3094}R_{64} + \frac{8\sqrt{1122}}{2261}R_{84} + \frac{7\sqrt{4290}}{646}R_{10,4}$
$\frac{5}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{27\sqrt{455}}{7735}R_{60} - \frac{72\sqrt{595}}{11305}R_{80} + \frac{35\sqrt{15}}{323}R_{10,0}$

Table B260: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 29 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	4	2	$\frac{15}{2}$	6	4	$\frac{\sqrt{330}}{1190}R_{64} - \frac{32\sqrt{6630}}{11305}R_{84} + \frac{35\sqrt{6}}{646}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} - \frac{26\sqrt{5}}{735}R_{20} - \frac{39}{539}R_{40} - \frac{20\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{210}}{539}R_{44} - \frac{4\sqrt{546}}{429}R_{64}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{355\sqrt{22}}{5082}R_{20} - \frac{150\sqrt{110}}{11011}R_{40} + \frac{17\sqrt{1430}}{3630}R_{60} + \frac{392\sqrt{1870}}{133705}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{600\sqrt{33}}{11011}R_{44} - \frac{17\sqrt{2145}}{23595}R_{64} + \frac{392\sqrt{255}}{12155}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{4\sqrt{55}}{605}R_{20} + \frac{54\sqrt{11}}{1573}R_{40} + \frac{40\sqrt{143}}{1573}R_{60} - \frac{630\sqrt{187}}{26741}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{54\sqrt{385}}{11011}R_{44} - \frac{8\sqrt{1001}}{847}R_{64} - \frac{6\sqrt{119}}{143}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{14\sqrt{14586}}{2431}R_{88}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	5	1	$-\frac{5\sqrt{7}}{63}R_{10} - \frac{10\sqrt{3}}{77}R_{30} + \frac{23\sqrt{231}}{1001}R_{50} - \frac{56\sqrt{35}}{6435}R_{70}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	5	2	$-\frac{3\sqrt{110}}{143}R_{54} - \frac{56\sqrt{110}}{2145}R_{74}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	1	$\frac{14\sqrt{5}}{45}R_{10} - \frac{6\sqrt{105}}{385}R_{30} - \frac{20}{99}R_{70}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{2\sqrt{22}}{33}R_{74}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{820\sqrt{273}}{39039}R_{30} - \frac{2\sqrt{429}}{507}R_{50} + \frac{2784\sqrt{65}}{158015}R_{70} + \frac{294\sqrt{741}}{54587}R_{90}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{10\sqrt{15015}}{3549}R_{54} + \frac{96\sqrt{15015}}{1106105}R_{74} + \frac{14\sqrt{21945}}{4199}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{98\sqrt{646}}{4199}R_{98}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	1	$-\frac{12\sqrt{105}}{455}R_{54} + \frac{30\sqrt{105}}{1547}R_{74} - \frac{6\sqrt{25935}}{20995}R_{94}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	2	$-\frac{2\sqrt{2730}}{1859}R_{30} + \frac{4\sqrt{4290}}{1859}R_{50} + \frac{1800\sqrt{26}}{31603}R_{70} - \frac{210\sqrt{7410}}{54587}R_{90}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{76\sqrt{15015}}{65065}R_{54} - \frac{450\sqrt{15015}}{221221}R_{74} - \frac{66\sqrt{21945}}{20995}R_{94}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	5	4	$\frac{84\sqrt{4845}}{20995}R_{98}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{10\sqrt{11}}{121}R_{20} - \frac{30\sqrt{55}}{1573}R_{40} + \frac{8\sqrt{715}}{605}R_{60} - \frac{252\sqrt{935}}{133705}R_{80}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{60\sqrt{66}}{1573}R_{44} - \frac{8\sqrt{4290}}{7865}R_{64} - \frac{126\sqrt{510}}{12155}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$\frac{14\sqrt{231}}{363}R_{20} - \frac{8\sqrt{1155}}{1573}R_{40} + \frac{10\sqrt{15015}}{33033}R_{60} - \frac{300\sqrt{19635}}{187187}R_{80}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{40\sqrt{33}}{1573}R_{44} - \frac{2\sqrt{2145}}{2541}R_{64} - \frac{20\sqrt{255}}{1001}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	3	$\frac{20\sqrt{170170}}{17017}R_{88}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{124\sqrt{3003}}{15015}R_{44} - \frac{12\sqrt{1155}}{1309}R_{64} + \frac{6\sqrt{23205}}{29393}R_{84} + \frac{14\sqrt{21}}{4845}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{62\sqrt{6}}{429}R_{40} - \frac{12\sqrt{78}}{2431}R_{60} + \frac{48\sqrt{102}}{4199}R_{80} + \frac{14\sqrt{14}}{323}R_{10,0}$

Table B261: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 30 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{248\sqrt{21}}{15015}R_{44} + \frac{12\sqrt{1365}}{1309}R_{64} + \frac{6\sqrt{19635}}{29393}R_{84} + \frac{14\sqrt{3003}}{1615}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	4	$-\frac{24\sqrt{663}}{4199}R_{88} + \frac{28\sqrt{1547}}{1615}R_{10,8}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{3003}}{2145}R_{44} - \frac{9\sqrt{1155}}{1309}R_{64} + \frac{54\sqrt{23205}}{29393}R_{84} - \frac{83\sqrt{21}}{4845}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{42}}{429}R_{40} + \frac{9\sqrt{546}}{1309}R_{60} + \frac{18\sqrt{714}}{1729}R_{80} - \frac{77\sqrt{2}}{323}R_{10,0}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{4}{715}R_{44} + \frac{369\sqrt{65}}{17017}R_{64} - \frac{198\sqrt{935}}{29393}R_{84} - \frac{63\sqrt{143}}{1615}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{36\sqrt{357}}{2261}R_{88} + \frac{14\sqrt{17}}{1615}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	2	$R_{00} + \frac{26\sqrt{5}}{245}R_{20} - \frac{9}{539}R_{40} + \frac{12\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	1	$-\frac{300\sqrt{231}}{11011}R_{44} - \frac{17\sqrt{15015}}{12705}R_{64} + \frac{168\sqrt{1785}}{12155}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	2	$\frac{213\sqrt{154}}{11858}R_{20} + \frac{900\sqrt{770}}{77077}R_{40} + \frac{17\sqrt{10010}}{15730}R_{60} + \frac{392\sqrt{13090}}{133705}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	1	$\frac{36\sqrt{2310}}{11011}R_{44} + \frac{4\sqrt{6006}}{11011}R_{64} - \frac{3\sqrt{714}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	2	$-\frac{2\sqrt{330}}{605}R_{20} - \frac{9\sqrt{66}}{1573}R_{40} + \frac{8\sqrt{858}}{1573}R_{60} + \frac{378\sqrt{1122}}{26741}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{54\sqrt{14}}{1001}R_{44} - \frac{12\sqrt{910}}{1001}R_{64} + \frac{3\sqrt{13090}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	5	1	$-\frac{3\sqrt{110}}{143}R_{54} - \frac{56\sqrt{110}}{2145}R_{74}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	5	2	$\frac{\sqrt{7}}{21}R_{10} + \frac{2\sqrt{3}}{11}R_{30} + \frac{17\sqrt{231}}{1001}R_{50} - \frac{56\sqrt{35}}{2145}R_{70}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{154}}{231}R_{74}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{2\sqrt{35}}{15}R_{10} + \frac{12\sqrt{15}}{385}R_{30} + \frac{4\sqrt{7}}{33}R_{70}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{4\sqrt{10010}}{1183}R_{54} - \frac{1488\sqrt{10010}}{1106105}R_{74} + \frac{21\sqrt{14630}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{246\sqrt{182}}{13013}R_{30} + \frac{3\sqrt{286}}{169}R_{50} + \frac{608\sqrt{390}}{158015}R_{70} + \frac{882\sqrt{494}}{54587}R_{90}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{22\sqrt{546}}{1183}R_{54} + \frac{80\sqrt{546}}{20111}R_{74} + \frac{7\sqrt{798}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	1	$-\frac{84\sqrt{20995}}{20995}R_{98}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	2	$\frac{12\sqrt{1001}}{1859}R_{54} + \frac{900\sqrt{1001}}{221221}R_{74} + \frac{6\sqrt{1463}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	3	$-\frac{10\sqrt{182}}{1859}R_{30} - \frac{4\sqrt{286}}{1859}R_{50} + \frac{270\sqrt{390}}{31603}R_{70} + \frac{1134\sqrt{494}}{54587}R_{90}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	5	4	$-\frac{12\sqrt{455}}{5915}R_{54} - \frac{360\sqrt{455}}{20111}R_{74} + \frac{174\sqrt{665}}{20995}R_{94}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{30\sqrt{462}}{1573}R_{44} - \frac{8\sqrt{30030}}{4235}R_{64} - \frac{54\sqrt{3570}}{12155}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	6	2	$\frac{18\sqrt{77}}{847}R_{20} + \frac{180\sqrt{385}}{11011}R_{40} + \frac{24\sqrt{5005}}{7865}R_{60} - \frac{252\sqrt{6545}}{133705}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{80\sqrt{22}}{1573}R_{44} + \frac{\sqrt{1430}}{11011}R_{64} - \frac{30\sqrt{170}}{17017}R_{84}$

Table B262: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 31 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{7\sqrt{154}}{121}R_{20} + \frac{4\sqrt{770}}{1573}R_{40} + \frac{2\sqrt{10010}}{11011}R_{60} + \frac{540\sqrt{13090}}{187187}R_{80}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	3	$-\frac{8\sqrt{30}}{143}R_{44} - \frac{5\sqrt{78}}{1001}R_{64} + \frac{50\sqrt{1122}}{17017}R_{84}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{12\sqrt{17}}{323}R_{88} + \frac{28\sqrt{357}}{1615}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{124\sqrt{35}}{5005}R_{44} - \frac{444\sqrt{91}}{17017}R_{64} - \frac{12\sqrt{1309}}{4199}R_{84} + \frac{14\sqrt{5005}}{1615}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{62\sqrt{10}}{715}R_{40} + \frac{60\sqrt{130}}{2431}R_{60} + \frac{18\sqrt{170}}{4199}R_{80} + \frac{42\sqrt{210}}{1615}R_{10,0}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	4	$-\frac{248\sqrt{77}}{5005}R_{44} - \frac{60\sqrt{5005}}{17017}R_{64} + \frac{120\sqrt{595}}{29393}R_{84} + \frac{14\sqrt{91}}{1615}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	1	$-\frac{36\sqrt{17}}{323}R_{88} - \frac{46\sqrt{357}}{1615}R_{10,8}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	2	$-\frac{4\sqrt{5}}{715}R_{44} + \frac{81\sqrt{13}}{1309}R_{64} + \frac{414\sqrt{187}}{29393}R_{84} + \frac{7\sqrt{715}}{1615}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	3	$-\frac{4\sqrt{210}}{715}R_{40} - \frac{9\sqrt{2730}}{17017}R_{60} + \frac{90\sqrt{3570}}{29393}R_{80} + \frac{231\sqrt{10}}{1615}R_{10,0}$
$\frac{7}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{4\sqrt{143}}{715}R_{44} - \frac{27\sqrt{55}}{1309}R_{64} - \frac{18\sqrt{1105}}{1729}R_{84} + \frac{427}{1615}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} + \frac{35\sqrt{5}}{726}R_{20} - \frac{357}{3146}R_{40} + \frac{190\sqrt{13}}{4719}R_{60}$ $-\frac{2240\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$\frac{105\sqrt{30}}{3146}R_{44} - \frac{76\sqrt{78}}{4719}R_{64} - \frac{224\sqrt{1122}}{26741}R_{84}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	1	$-\frac{20\sqrt{2}}{121}R_{20} - \frac{135\sqrt{10}}{1573}R_{40} + \frac{28\sqrt{130}}{7865}R_{60} + \frac{2961\sqrt{170}}{133705}R_{80}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{135\sqrt{14}}{1573}R_{44} + \frac{4\sqrt{910}}{7865}R_{64} - \frac{147\sqrt{13090}}{133705}R_{84}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{14\sqrt{3315}}{2431}R_{88}$
$\frac{9}{2}$	4	1	$\frac{7}{2}$	5	1	$-\frac{\sqrt{770}}{990}R_{10} + \frac{2\sqrt{330}}{605}R_{30} + \frac{5\sqrt{210}}{286}R_{50} - \frac{280\sqrt{154}}{14157}R_{70}$
$\frac{9}{2}$	4	1	$\frac{7}{2}$	5	2	$-\frac{15}{143}R_{54} - \frac{56}{429}R_{74}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{40\sqrt{22}}{1089}R_{10} - \frac{45\sqrt{462}}{3146}R_{30} - \frac{3\sqrt{6}}{286}R_{50} + \frac{3010\sqrt{110}}{240669}R_{70}$ $+\frac{2268\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{9\sqrt{5}}{143}R_{54} - \frac{280\sqrt{5}}{7293}R_{74} + \frac{756\sqrt{1235}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	1	$\frac{12\sqrt{1430}}{605}R_{10} - \frac{37\sqrt{30030}}{306735}R_{30} - \frac{20\sqrt{390}}{5577}R_{50} + \frac{3045\sqrt{286}}{347633}R_{70}$ $-\frac{8400\sqrt{81510}}{6605027}R_{90}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{20\sqrt{546}}{5577}R_{54} - \frac{261\sqrt{546}}{31603}R_{74} - \frac{560\sqrt{798}}{46189}R_{94}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{224\sqrt{17765}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	1	$\frac{3\sqrt{462}}{143}R_{54} - \frac{75\sqrt{462}}{4862}R_{74} + \frac{21\sqrt{114114}}{92378}R_{94}$

Table B263: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}_{\Lambda_B S a})}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 32 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	2	$-\frac{100\sqrt{3003}}{20449}R_{30} - \frac{70\sqrt{39}}{1859}R_{50} + \frac{63\sqrt{715}}{20449}R_{70} + \frac{105\sqrt{8151}}{35321}R_{90}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{29\sqrt{546}}{1859}R_{54} + \frac{315\sqrt{546}}{63206}R_{74} - \frac{21\sqrt{798}}{8398}R_{94}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	5	4	$-\frac{21\sqrt{21318}}{46189}R_{98}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	1	$-\frac{\sqrt{10}}{242}R_{20} + \frac{255\sqrt{2}}{3146}R_{40} + \frac{70\sqrt{26}}{1573}R_{60} - \frac{1260\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	6	2	$-\frac{75\sqrt{15}}{1573}R_{44} - \frac{56\sqrt{39}}{1573}R_{64} - \frac{252\sqrt{561}}{26741}R_{84}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{80\sqrt{210}}{4719}R_{20} - \frac{5\sqrt{42}}{121}R_{40} + \frac{116\sqrt{546}}{80223}R_{60} + \frac{141\sqrt{714}}{39083}R_{80}$ $+ \frac{540\sqrt{2}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{7\sqrt{30}}{121}R_{44} + \frac{116\sqrt{78}}{80223}R_{64} - \frac{49\sqrt{1122}}{39083}R_{84} + \frac{36\sqrt{4290}}{4199}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	3	$\frac{10\sqrt{1547}}{3553}R_{88} + \frac{72\sqrt{663}}{4199}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{2730}}{165}R_{44} + \frac{3\sqrt{42}}{374}R_{64} + \frac{3\sqrt{102102}}{7106}R_{84} - \frac{56\sqrt{2310}}{53295}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{180\sqrt{33}}{1573}R_{20} - \frac{2\sqrt{165}}{363}R_{40} - \frac{21\sqrt{2145}}{26741}R_{60} + \frac{105\sqrt{2805}}{39083}R_{80}$ $-\frac{80\sqrt{385}}{4199}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{7\sqrt{2310}}{1815}R_{44} + \frac{21\sqrt{6006}}{53482}R_{64} - \frac{3\sqrt{714}}{374}R_{84} - \frac{8\sqrt{2730}}{1105}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	4	$\frac{21\sqrt{72930}}{17765}R_{88} + \frac{16\sqrt{170170}}{13585}R_{10,8}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	1	$\frac{16\sqrt{2730}}{2145}R_{44} + \frac{9\sqrt{42}}{374}R_{64} - \frac{54\sqrt{102102}}{46189}R_{84} + \frac{259\sqrt{2310}}{106590}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	2	$-\frac{40\sqrt{1155}}{4719}R_{40} - \frac{45\sqrt{15015}}{26741}R_{60} + \frac{36\sqrt{19635}}{46189}R_{80} + \frac{11\sqrt{55}}{323}R_{10,0}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{56\sqrt{110}}{7865}R_{44} + \frac{1143\sqrt{286}}{53482}R_{64} + \frac{126\sqrt{34}}{4199}R_{84} - \frac{9\sqrt{130}}{3230}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{36\sqrt{39270}}{17765}R_{88} - \frac{83\sqrt{1870}}{17765}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} + \frac{35\sqrt{5}}{242}R_{20} + \frac{63}{3146}R_{40} + \frac{38\sqrt{13}}{1573}R_{60}$ $+ \frac{3136\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	1	$-\frac{360\sqrt{3}}{1573}R_{44} - \frac{172\sqrt{195}}{7865}R_{64} - \frac{609\sqrt{2805}}{133705}R_{84}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	2	$\frac{4\sqrt{21}}{121}R_{20} + \frac{45\sqrt{105}}{1573}R_{40} + \frac{64\sqrt{1365}}{7865}R_{60} + \frac{378\sqrt{1785}}{133705}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{54\sqrt{55}}{1573}R_{44} - \frac{60\sqrt{143}}{1573}R_{64} + \frac{105\sqrt{17}}{2431}R_{84}$
$\frac{9}{2}$	4	2	$\frac{7}{2}$	5	1	$-\frac{15\sqrt{7}}{143}R_{54} - \frac{56\sqrt{7}}{429}R_{74}$
$\frac{9}{2}$	4	2	$\frac{7}{2}$	5	2	$-\frac{\sqrt{110}}{330}R_{10} - \frac{4\sqrt{2310}}{4235}R_{30} + \frac{5\sqrt{30}}{286}R_{50} + \frac{392\sqrt{22}}{4719}R_{70}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{9\sqrt{5}}{143}R_{54} - \frac{280\sqrt{5}}{7293}R_{74} + \frac{756\sqrt{1235}}{46189}R_{94}$

Table B264: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 33 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{8\sqrt{22}}{363}R_{10} + \frac{279\sqrt{462}}{22022}R_{30} + \frac{3\sqrt{6}}{26}R_{50} + \frac{490\sqrt{110}}{80223}R_{70}$ $+ \frac{5292\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{20\sqrt{13}}{1859}R_{54} - \frac{783\sqrt{13}}{31603}R_{74} - \frac{1680\sqrt{19}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{4\sqrt{15015}}{605}R_{10} + \frac{777\sqrt{715}}{102245}R_{30} + \frac{58\sqrt{3003}}{26741}R_{70} + \frac{10080\sqrt{95095}}{6605027}R_{90}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{4\sqrt{2145}}{1859}R_{54} - \frac{145\sqrt{2145}}{31603}R_{74} + \frac{112\sqrt{3135}}{46189}R_{94}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	1	$\frac{21\sqrt{646646}}{46189}R_{98}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	2	$-\frac{57\sqrt{130}}{1859}R_{54} - \frac{1773\sqrt{130}}{63206}R_{74} - \frac{147\sqrt{190}}{8398}R_{94}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	3	$\frac{140\sqrt{715}}{20449}R_{30} + \frac{2\sqrt{455}}{143}R_{50} + \frac{135\sqrt{3003}}{26741}R_{70} + \frac{189\sqrt{95095}}{600457}R_{90}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	5	4	$-\frac{3\sqrt{286}}{169}R_{54} - \frac{1125\sqrt{286}}{63206}R_{74} + \frac{1029\sqrt{418}}{92378}R_{94}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{75\sqrt{15}}{1573}R_{44} - \frac{56\sqrt{39}}{1573}R_{64} - \frac{252\sqrt{561}}{26741}R_{84}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	6	2	$-\frac{3\sqrt{10}}{242}R_{20} - \frac{45\sqrt{2}}{3146}R_{40} + \frac{42\sqrt{26}}{1573}R_{60} + \frac{1764\sqrt{34}}{26741}R_{80}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{8\sqrt{35}}{121}R_{44} - \frac{4988\sqrt{91}}{187187}R_{64} - \frac{87\sqrt{1309}}{39083}R_{84} + \frac{36\sqrt{5005}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$\frac{112\sqrt{5}}{1573}R_{20} + \frac{35}{121}R_{40} + \frac{1856\sqrt{13}}{26741}R_{60} + \frac{378\sqrt{17}}{39083}R_{80}$ $+ \frac{360\sqrt{21}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{2\sqrt{231}}{121}R_{44} - \frac{580\sqrt{15015}}{187187}R_{64} + \frac{5\sqrt{1785}}{3553}R_{84} + \frac{12\sqrt{273}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{39\sqrt{13090}}{17765}R_{88} - \frac{112\sqrt{5610}}{17765}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{7\sqrt{22}}{121}R_{44} - \frac{3\sqrt{1430}}{53482}R_{64} - \frac{15\sqrt{170}}{7106}R_{84} - \frac{56\sqrt{26}}{4199}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{60\sqrt{385}}{1573}R_{20} + \frac{2\sqrt{77}}{121}R_{40} - \frac{3\sqrt{1001}}{26741}R_{60} + \frac{9\sqrt{1309}}{2299}R_{80}$ $+ \frac{336\sqrt{33}}{4199}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	4	$-\frac{7\sqrt{10}}{55}R_{44} - \frac{3\sqrt{26}}{4862}R_{64} - \frac{93\sqrt{374}}{7106}R_{84} + \frac{1288\sqrt{1430}}{230945}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	1	$\frac{72\sqrt{13090}}{17765}R_{88} + \frac{49\sqrt{5610}}{17765}R_{10,8}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	2	$\frac{16\sqrt{154}}{1573}R_{44} - \frac{999\sqrt{10010}}{374374}R_{64} - \frac{36\sqrt{1190}}{4199}R_{84} - \frac{11\sqrt{182}}{646}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	3	$\frac{56\sqrt{33}}{1573}R_{40} + \frac{387\sqrt{429}}{26741}R_{60} + \frac{504\sqrt{561}}{46189}R_{80} + \frac{3\sqrt{77}}{323}R_{10,0}$
$\frac{9}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{8\sqrt{910}}{715}R_{44} - \frac{243\sqrt{14}}{2618}R_{64} - \frac{36\sqrt{34034}}{46189}R_{84} + \frac{313\sqrt{770}}{35530}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	1	$R_{00} + \frac{68\sqrt{5}}{605}R_{20} - \frac{18}{121}R_{40} - \frac{100\sqrt{13}}{1573}R_{60}$ $- \frac{35\sqrt{17}}{2057}R_{80}$

Table B265: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 34 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	2	$\frac{126\sqrt{35}}{1573}R_{44} + \frac{36\sqrt{91}}{1573}R_{64} + \frac{63\sqrt{1309}}{26741}R_{84}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	4	3	$\frac{7\sqrt{1326}}{2431}R_{88}$
$\frac{11}{2}$	4	1	$\frac{7}{2}$	5	1	$\frac{20\sqrt{33}}{4719}R_{30} + \frac{2\sqrt{21}}{429}R_{50} - \frac{1624\sqrt{385}}{133705}R_{70} + \frac{126\sqrt{4389}}{46189}R_{90}$
$\frac{11}{2}$	4	1	$\frac{7}{2}$	5	2	$\frac{4\sqrt{10}}{143}R_{54} + \frac{868\sqrt{10}}{12155}R_{74} + \frac{63\sqrt{2470}}{4199}R_{94}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{55}}{605}R_{10} + \frac{4\sqrt{1155}}{23595}R_{30} + \frac{20\sqrt{15}}{429}R_{50} + \frac{1960\sqrt{11}}{26741}R_{70}$ $-\frac{3150\sqrt{3135}}{508079}R_{90}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{10\sqrt{2}}{143}R_{54} - \frac{252\sqrt{2}}{2431}R_{74} - \frac{315\sqrt{494}}{46189}R_{94}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{15\sqrt{143}}{1573}R_{10} - \frac{100\sqrt{3003}}{20449}R_{30} - \frac{58\sqrt{39}}{1859}R_{50} + \frac{6972\sqrt{715}}{1738165}R_{70}$ $+\frac{19089\sqrt{8151}}{6605027}R_{90}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	2	$-\frac{6\sqrt{1365}}{1859}R_{54} - \frac{756\sqrt{1365}}{158015}R_{74} - \frac{189\sqrt{1995}}{46189}R_{94}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{189\sqrt{7106}}{46189}R_{98}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	1	$-\frac{8\sqrt{1155}}{715}R_{54} + \frac{20\sqrt{1155}}{2431}R_{74} - \frac{28\sqrt{285285}}{230945}R_{94}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	2	$\frac{3\sqrt{1430}}{143}R_{10} + \frac{12\sqrt{30030}}{20449}R_{30} - \frac{18\sqrt{390}}{1859}R_{50} - \frac{4200\sqrt{286}}{347633}R_{70}$ $-\frac{105\sqrt{81510}}{600457}R_{90}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	3	$\frac{84\sqrt{1365}}{9295}R_{54} + \frac{180\sqrt{1365}}{31603}R_{74} + \frac{42\sqrt{1995}}{20995}R_{94}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	5	4	$-\frac{98\sqrt{53295}}{230945}R_{98}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	1	$\frac{10}{1573}R_{20} + \frac{20\sqrt{5}}{1573}R_{40} - \frac{196\sqrt{65}}{133705}R_{60} - \frac{71064\sqrt{85}}{2540395}R_{80}$ $+\frac{90\sqrt{105}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{9}{2}$	6	2	$\frac{80\sqrt{6}}{4719}R_{44} + \frac{602\sqrt{390}}{133705}R_{64} + \frac{7308\sqrt{5610}}{2540395}R_{84} + \frac{105\sqrt{858}}{4199}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{51\sqrt{21}}{11011}R_{20} + \frac{4\sqrt{105}}{847}R_{40} + \frac{150\sqrt{1365}}{26741}R_{60} + \frac{180\sqrt{1785}}{39083}R_{80}$ $-\frac{675\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	2	$-\frac{140\sqrt{3}}{1573}R_{44} - \frac{378\sqrt{195}}{26741}R_{64} - \frac{2268\sqrt{2805}}{508079}R_{84} - \frac{45\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{108\sqrt{15470}}{46189}R_{88} + \frac{27\sqrt{6630}}{4199}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{8\sqrt{273}}{715}R_{44} + \frac{8\sqrt{105}}{187}R_{64} - \frac{28\sqrt{255255}}{46189}R_{84} + \frac{84\sqrt{231}}{17765}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{15\sqrt{330}}{1573}R_{20} - \frac{4\sqrt{66}}{121}R_{40} - \frac{126\sqrt{858}}{26741}R_{60} + \frac{168\sqrt{1122}}{39083}R_{80}$ $+\frac{81\sqrt{154}}{4199}R_{10,0}$

Table B266: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 35 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	3	$\frac{448\sqrt{231}}{23595}R_{44} + \frac{12\sqrt{15015}}{26741}R_{64} - \frac{84\sqrt{1785}}{46189}R_{84} - \frac{174\sqrt{273}}{20995}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{13}{2}$	6	4	$\frac{224\sqrt{7293}}{46189}R_{88} + \frac{162\sqrt{17017}}{230945}R_{10,8}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	1	$-\frac{24\sqrt{273}}{715}R_{44} + \frac{2\sqrt{105}}{187}R_{64} + \frac{20\sqrt{255255}}{46189}R_{84} - \frac{98\sqrt{231}}{17765}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	2	$\frac{15\sqrt{2310}}{1001}R_{20} + \frac{12\sqrt{462}}{11011}R_{40} - \frac{72\sqrt{6006}}{26741}R_{60} - \frac{96\sqrt{7854}}{46189}R_{80}$ $-\frac{33\sqrt{22}}{4199}R_{10,0}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	3	$-\frac{672\sqrt{11}}{7865}R_{44} + \frac{210\sqrt{715}}{26741}R_{64} + \frac{84\sqrt{85}}{4199}R_{84} + \frac{508\sqrt{13}}{20995}R_{10,4}$
$\frac{11}{2}$	4	1	$\frac{15}{2}$	6	4	$-\frac{16\sqrt{3927}}{3553}R_{88} - \frac{138\sqrt{187}}{17765}R_{10,8}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	4	2	$R_{00} + \frac{116\sqrt{5}}{605}R_{20} + \frac{216}{1573}R_{40} - \frac{16\sqrt{13}}{1573}R_{60}$ $-\frac{518\sqrt{17}}{26741}R_{80}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	4	3	$\frac{18\sqrt{231}}{1573}R_{44} - \frac{4\sqrt{15015}}{1573}R_{64} + \frac{7\sqrt{1785}}{2431}R_{84}$
$\frac{11}{2}$	4	2	$\frac{7}{2}$	5	1	$-\frac{10\sqrt{15}}{429}R_{54} - \frac{56\sqrt{15}}{12155}R_{74} + \frac{42\sqrt{3705}}{4199}R_{94}$
$\frac{11}{2}$	4	2	$\frac{7}{2}$	5	2	$-\frac{6\sqrt{22}}{1573}R_{30} - \frac{3\sqrt{14}}{143}R_{50} - \frac{1064\sqrt{2310}}{401115}R_{70} + \frac{378\sqrt{2926}}{46189}R_{90}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	5	1	$-\frac{20\sqrt{21}}{429}R_{54} - \frac{168\sqrt{21}}{2431}R_{74} - \frac{210\sqrt{5187}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{2310}}{1815}R_{10} - \frac{42\sqrt{110}}{7865}R_{30} + \frac{56\sqrt{462}}{6171}R_{70} + \frac{1890\sqrt{14630}}{508079}R_{90}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	1	$-\frac{6\sqrt{1365}}{1859}R_{54} - \frac{756\sqrt{1365}}{158015}R_{74} - \frac{189\sqrt{1995}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{9\sqrt{143}}{1573}R_{10} + \frac{76\sqrt{3003}}{20449}R_{30} + \frac{8\sqrt{39}}{169}R_{50} + \frac{1008\sqrt{715}}{102245}R_{70}$ $+\frac{378\sqrt{8151}}{388531}R_{90}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	5	3	$\frac{18\sqrt{1001}}{1859}R_{54} - \frac{420\sqrt{1001}}{31603}R_{74} + \frac{189\sqrt{1463}}{46189}R_{94}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	1	$-\frac{28\sqrt{1385670}}{230945}R_{98}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	2	$\frac{14\sqrt{546}}{1859}R_{54} + \frac{150\sqrt{546}}{31603}R_{74} + \frac{7\sqrt{798}}{4199}R_{94}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	3	$\frac{10\sqrt{143}}{143}R_{10} + \frac{120\sqrt{3003}}{20449}R_{30} + \frac{24\sqrt{39}}{1859}R_{50} - \frac{700\sqrt{715}}{347633}R_{70}$ $-\frac{504\sqrt{8151}}{600457}R_{90}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	5	4	$-\frac{2\sqrt{30030}}{845}R_{54} - \frac{10\sqrt{30030}}{31603}R_{74} + \frac{7\sqrt{43890}}{12155}R_{94}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	1	$-\frac{20\sqrt{7}}{1573}R_{44} - \frac{28\sqrt{455}}{133705}R_{64} + \frac{3528\sqrt{6545}}{2540395}R_{84} + \frac{90\sqrt{1001}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{9}{2}$	6	2	$-\frac{\sqrt{42}}{1573}R_{20} - \frac{10\sqrt{210}}{4719}R_{40} - \frac{224\sqrt{2730}}{133705}R_{60} - \frac{4536\sqrt{3570}}{2540395}R_{80}$ $+\frac{630\sqrt{10}}{4199}R_{10,0}$

Table B267: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 36 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{140\sqrt{3}}{1573}R_{44} - \frac{378\sqrt{195}}{26741}R_{64} - \frac{2268\sqrt{2805}}{508079}R_{84} - \frac{45\sqrt{429}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{87\sqrt{21}}{11011}R_{20} - \frac{48\sqrt{105}}{11011}R_{40} + \frac{24\sqrt{1365}}{26741}R_{60} + \frac{2664\sqrt{1785}}{508079}R_{80}$ $+ \frac{810\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{11}{2}$	6	3	$-\frac{12\sqrt{55}}{1573}R_{44} + \frac{630\sqrt{143}}{26741}R_{64} - \frac{3780\sqrt{17}}{46189}R_{84} + \frac{63\sqrt{65}}{4199}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	1	$-\frac{28\sqrt{1122}}{3553}R_{88} + \frac{108\sqrt{2618}}{17765}R_{10,8}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{56\sqrt{2310}}{7865}R_{44} - \frac{94\sqrt{6006}}{26741}R_{64} - \frac{434\sqrt{714}}{46189}R_{84} - \frac{81\sqrt{2730}}{20995}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{30\sqrt{33}}{1573}R_{20} + \frac{424\sqrt{165}}{23595}R_{40} + \frac{168\sqrt{2145}}{26741}R_{60} + \frac{2268\sqrt{2805}}{508079}R_{80}$ $+ \frac{72\sqrt{385}}{20995}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{13}{2}$	6	4	$\frac{32\sqrt{42}}{715}R_{44} - \frac{10\sqrt{2730}}{2431}R_{64} - \frac{70\sqrt{39270}}{46189}R_{84} + \frac{609\sqrt{6006}}{230945}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	1	$-\frac{28\sqrt{1122}}{3553}R_{88} - \frac{6\sqrt{2618}}{17765}R_{10,8}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	2	$-\frac{168\sqrt{330}}{7865}R_{44} - \frac{7\sqrt{858}}{26741}R_{64} + \frac{14\sqrt{102}}{4199}R_{84} + \frac{22\sqrt{390}}{20995}R_{10,4}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	3	$\frac{90\sqrt{77}}{1001}R_{20} + \frac{744\sqrt{385}}{55055}R_{40} + \frac{18\sqrt{5005}}{26741}R_{60} - \frac{36\sqrt{6545}}{46189}R_{80}$ $- \frac{118\sqrt{165}}{20995}R_{10,0}$
$\frac{11}{2}$	4	2	$\frac{15}{2}$	6	4	$-\frac{48\sqrt{78}}{715}R_{44} - \frac{7\sqrt{30}}{187}R_{64} + \frac{14\sqrt{72930}}{46189}R_{84} + \frac{224\sqrt{66}}{17765}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	4	3	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60}$ $+ \frac{7\sqrt{17}}{2431}R_{80}$
$\frac{11}{2}$	4	3	$\frac{7}{2}$	5	1	$\frac{42\sqrt{646646}}{46189}R_{98}$
$\frac{11}{2}$	4	3	$\frac{7}{2}$	5	2	$\frac{2\sqrt{66}}{143}R_{54} - \frac{140\sqrt{66}}{7293}R_{74} + \frac{21\sqrt{16302}}{46189}R_{94}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	5	1	$\frac{42\sqrt{461890}}{46189}R_{98}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	5	2	$\frac{2\sqrt{330}}{143}R_{54} - \frac{140\sqrt{330}}{7293}R_{74} + \frac{21\sqrt{81510}}{46189}R_{94}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	1	$\frac{189\sqrt{7106}}{46189}R_{98}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	2	$\frac{18\sqrt{1001}}{1859}R_{54} - \frac{420\sqrt{1001}}{31603}R_{74} + \frac{189\sqrt{1463}}{46189}R_{94}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	5	3	$\frac{3\sqrt{143}}{143}R_{10} - \frac{12\sqrt{3003}}{1859}R_{30} + \frac{6\sqrt{39}}{169}R_{50} - \frac{84\sqrt{715}}{31603}R_{70}$ $+ \frac{63\sqrt{8151}}{600457}R_{90}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	1	0
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	2	$\frac{42\sqrt{17765}}{46189}R_{98}$

Table B268: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 37 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	3	$\frac{12\sqrt{1001}}{1859}R_{54} - \frac{280\sqrt{1001}}{31603}R_{74} + \frac{126\sqrt{1463}}{46189}R_{94}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	5	4	$\frac{\sqrt{4290}}{143}R_{10} - \frac{12\sqrt{10010}}{1859}R_{30} + \frac{6\sqrt{130}}{169}R_{50} - \frac{140\sqrt{858}}{31603}R_{70}$ $+ \frac{63\sqrt{27170}}{600457}R_{90}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	6	1	$-\frac{168\sqrt{6630}}{46189}R_{88} + \frac{18\sqrt{15470}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{9}{2}$	6	2	$-\frac{4\sqrt{110}}{1573}R_{44} + \frac{210\sqrt{286}}{26741}R_{64} - \frac{1260\sqrt{34}}{46189}R_{84} + \frac{21\sqrt{130}}{4199}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	1	$-\frac{108\sqrt{15470}}{46189}R_{88} + \frac{27\sqrt{6630}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	2	$-\frac{12\sqrt{55}}{1573}R_{44} + \frac{630\sqrt{143}}{26741}R_{64} - \frac{3780\sqrt{17}}{46189}R_{84} + \frac{63\sqrt{65}}{4199}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{11}{2}$	6	3	$\frac{15\sqrt{21}}{1001}R_{20} - \frac{12\sqrt{105}}{1001}R_{40} + \frac{6\sqrt{1365}}{2431}R_{60} - \frac{36\sqrt{1785}}{46189}R_{80}$ $+ \frac{9\sqrt{5}}{4199}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	1	0
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	2	$-\frac{168\sqrt{2431}}{46189}R_{88} + \frac{6\sqrt{51051}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	3	$-\frac{8\sqrt{35}}{715}R_{44} + \frac{84\sqrt{91}}{2431}R_{64} - \frac{504\sqrt{1309}}{46189}R_{84} + \frac{42\sqrt{5005}}{20995}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{13}{2}$	6	4	$\frac{3\sqrt{110}}{143}R_{20} - \frac{12\sqrt{22}}{143}R_{40} + \frac{42\sqrt{286}}{2431}R_{60} - \frac{252\sqrt{374}}{46189}R_{80}$ $+ \frac{3\sqrt{462}}{4199}R_{10,0}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	1	0
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	2	$-\frac{24\sqrt{17017}}{46189}R_{88} + \frac{6\sqrt{7293}}{4199}R_{10,8}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	3	$-\frac{8\sqrt{15}}{715}R_{44} + \frac{84\sqrt{39}}{2431}R_{64} - \frac{504\sqrt{561}}{46189}R_{84} + \frac{42\sqrt{2145}}{20995}R_{10,4}$
$\frac{11}{2}$	4	3	$\frac{15}{2}$	6	4	$\frac{3\sqrt{10010}}{1001}R_{20} - \frac{12\sqrt{2002}}{1001}R_{40} + \frac{6\sqrt{154}}{187}R_{60} - \frac{36\sqrt{34034}}{46189}R_{80}$ $+ \frac{3\sqrt{858}}{4199}R_{10,0}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	1	$R_{00} - \frac{2\sqrt{5}}{45}R_{20} - \frac{13}{33}R_{40} + \frac{40\sqrt{13}}{1287}R_{60}$
$\frac{7}{2}$	5	1	$\frac{7}{2}$	5	2	$\frac{\sqrt{210}}{33}R_{44} + \frac{8\sqrt{546}}{1287}R_{64}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	1	$-\frac{10\sqrt{7}}{99}R_{20} - \frac{10\sqrt{35}}{429}R_{40} + \frac{8\sqrt{455}}{495}R_{60} - \frac{28\sqrt{595}}{12155}R_{80}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{20\sqrt{42}}{429}R_{44} - \frac{8\sqrt{2730}}{6435}R_{64} - \frac{14\sqrt{39270}}{12155}R_{84}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{4\sqrt{455}}{2145}R_{20} + \frac{18\sqrt{91}}{1859}R_{40} + \frac{40\sqrt{7}}{429}R_{60} - \frac{210\sqrt{1547}}{31603}R_{80}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{18\sqrt{65}}{1859}R_{44} - \frac{8}{33}R_{64} - \frac{14\sqrt{2431}}{1859}R_{84}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{14\sqrt{714}}{663}R_{88}$

Table B269: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 38 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{4\sqrt{55}}{715}R_{44} + \frac{20\sqrt{143}}{2431}R_{64} - \frac{70\sqrt{17}}{4199}R_{84} + \frac{42\sqrt{65}}{20995}R_{10,4}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{2\sqrt{910}}{1859}R_{40} + \frac{4\sqrt{70}}{2431}R_{60} - \frac{112\sqrt{15470}}{54587}R_{80} + \frac{42\sqrt{390}}{4199}R_{10,0}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{8\sqrt{65}}{9295}R_{44} - \frac{20}{187}R_{64} - \frac{70\sqrt{2431}}{54587}R_{84} + \frac{126\sqrt{55}}{1615}R_{10,4}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	5	4	$\frac{56\sqrt{595}}{4199}R_{88} + \frac{84\sqrt{255}}{1615}R_{10,8}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	6	1	$\frac{2\sqrt{385}}{55}R_{10} - \frac{98\sqrt{165}}{5445}R_{30} - \frac{40\sqrt{105}}{1287}R_{50} + \frac{20\sqrt{77}}{1573}R_{70}$
$\frac{7}{2}$	5	1	$\frac{9}{2}$	6	2	$\frac{40\sqrt{14}}{429}R_{54} + \frac{6\sqrt{14}}{143}R_{74}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{70\sqrt{385}}{4719}R_{30} - \frac{16\sqrt{5}}{429}R_{50} + \frac{1566\sqrt{33}}{26741}R_{70} - \frac{84\sqrt{1045}}{46189}R_{90}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{400\sqrt{7}}{3003}R_{54} + \frac{162\sqrt{7}}{17017}R_{74} - \frac{20\sqrt{1729}}{4199}R_{94}$
$\frac{7}{2}$	5	1	$\frac{11}{2}$	6	3	$-\frac{28\sqrt{1385670}}{138567}R_{98}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{4\sqrt{13}}{65}R_{54} + \frac{10\sqrt{13}}{221}R_{74} - \frac{14\sqrt{19}}{1615}R_{94}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{14\sqrt{2}}{429}R_{30} + \frac{4\sqrt{154}}{429}R_{50} + \frac{40\sqrt{210}}{2431}R_{70} - \frac{70\sqrt{266}}{4199}R_{90}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{76\sqrt{11}}{2145}R_{54} - \frac{150\sqrt{11}}{2431}R_{74} - \frac{154\sqrt{2717}}{20995}R_{94}$
$\frac{7}{2}$	5	1	$\frac{13}{2}$	6	4	$\frac{28\sqrt{29393}}{20995}R_{98}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{13}}{1105}R_{54} + \frac{145\sqrt{13}}{4199}R_{74} - \frac{42\sqrt{19}}{1615}R_{94} + \frac{21\sqrt{115}}{7429}R_{11,4}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{20\sqrt{22}}{2431}R_{50} + \frac{5\sqrt{30}}{4199}R_{70} - \frac{14\sqrt{38}}{323}R_{90} + \frac{231\sqrt{46}}{7429}R_{11,0}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{212\sqrt{231}}{255255}R_{54} - \frac{225\sqrt{231}}{29393}R_{74} - \frac{2\sqrt{57057}}{4845}R_{94} + \frac{7\sqrt{345345}}{7429}R_{11,4}$
$\frac{7}{2}$	5	1	$\frac{15}{2}$	6	4	$\frac{28\sqrt{323}}{1615}R_{98} + \frac{42\sqrt{22287}}{7429}R_{11,8}$
$\frac{7}{2}$	5	2	$\frac{7}{2}$	5	2	$R_{00} + \frac{2\sqrt{5}}{15}R_{20} - \frac{1}{11}R_{40} - \frac{8\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	5	1	$-\frac{70\sqrt{6}}{429}R_{44} - \frac{8\sqrt{390}}{495}R_{64} - \frac{42\sqrt{5610}}{12155}R_{84}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	5	2	$\frac{2}{11}R_{20} + \frac{20\sqrt{5}}{143}R_{40} + \frac{56\sqrt{65}}{2145}R_{60} - \frac{196\sqrt{85}}{12155}R_{80}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	1	$\frac{12\sqrt{390}}{1859}R_{44} + \frac{4\sqrt{6}}{429}R_{64} - \frac{7\sqrt{14586}}{31603}R_{84}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	2	$-\frac{2\sqrt{2730}}{2145}R_{20} - \frac{3\sqrt{546}}{1859}R_{40} + \frac{8\sqrt{42}}{429}R_{60} + \frac{126\sqrt{9282}}{31603}R_{80}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{18\sqrt{286}}{1859}R_{44} - \frac{4\sqrt{110}}{143}R_{64} + \frac{7\sqrt{2210}}{2873}R_{84}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	1	$-\frac{28\sqrt{23205}}{12597}R_{88} + \frac{252\sqrt{1105}}{20995}R_{10,8}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{4\sqrt{39}}{1859}R_{44} + \frac{148\sqrt{15}}{7293}R_{64} + \frac{196\sqrt{36465}}{163761}R_{84} + \frac{42\sqrt{33}}{323}R_{10,4}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	3	$-\frac{2\sqrt{546}}{1859}R_{40} - \frac{100\sqrt{42}}{7293}R_{60} - \frac{70\sqrt{9282}}{54587}R_{80} + \frac{378\sqrt{26}}{4199}R_{10,0}$

Table B270: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 39 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	5	4	$\frac{8\sqrt{2145}}{9295}R_{44} + \frac{100\sqrt{33}}{7293}R_{64} - \frac{1400\sqrt{663}}{163761}R_{84} + \frac{42\sqrt{15}}{1615}R_{10,4}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	6	1	$\frac{40\sqrt{2}}{429}R_{54} + \frac{6\sqrt{2}}{143}R_{74}$
$\frac{7}{2}$	5	2	$\frac{9}{2}$	6	2	$\frac{6\sqrt{55}}{55}R_{10} + \frac{28\sqrt{1155}}{5445}R_{30} - \frac{40\sqrt{15}}{1287}R_{50} - \frac{84\sqrt{11}}{1573}R_{70}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{160\sqrt{42}}{3003}R_{54} - \frac{837\sqrt{42}}{17017}R_{74} - \frac{10\sqrt{10374}}{4199}R_{94}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{7\sqrt{2310}}{1573}R_{30} + \frac{8\sqrt{30}}{143}R_{50} + \frac{1026\sqrt{22}}{26741}R_{70} - \frac{84\sqrt{6270}}{46189}R_{90}$
$\frac{7}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{16\sqrt{770}}{1001}R_{54} + \frac{135\sqrt{770}}{17017}R_{74} - \frac{2\sqrt{190190}}{46189}R_{94}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{28\sqrt{6783}}{4845}R_{98}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{28\sqrt{165}}{2145}R_{54} + \frac{20\sqrt{165}}{2431}R_{74} + \frac{14\sqrt{40755}}{62985}R_{94}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	3	$-\frac{14\sqrt{30}}{1287}R_{30} - \frac{4\sqrt{2310}}{6435}R_{50} + \frac{90\sqrt{14}}{2431}R_{70} + \frac{126\sqrt{3990}}{20995}R_{90}$
$\frac{7}{2}$	5	2	$\frac{13}{2}$	6	4	$-\frac{4\sqrt{3}}{195}R_{54} - \frac{40\sqrt{3}}{221}R_{74} + \frac{406\sqrt{741}}{62985}R_{94}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{6783}}{4845}R_{98} + \frac{18\sqrt{52003}}{7429}R_{11,8}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	2	$-\frac{172\sqrt{1155}}{255255}R_{54} + \frac{55\sqrt{1155}}{29393}R_{74} + \frac{2\sqrt{285285}}{4845}R_{94} + \frac{21\sqrt{69069}}{7429}R_{11,4}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	3	$-\frac{36\sqrt{110}}{12155}R_{50} - \frac{165\sqrt{6}}{4199}R_{70} - \frac{14\sqrt{190}}{1615}R_{90} + \frac{231\sqrt{230}}{7429}R_{11,0}$
$\frac{7}{2}$	5	2	$\frac{15}{2}$	6	4	$\frac{4\sqrt{273}}{1785}R_{54} + \frac{5\sqrt{273}}{2261}R_{74} - \frac{62\sqrt{399}}{4845}R_{94} + \frac{21\sqrt{2415}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$R_{00} + \frac{5\sqrt{5}}{99}R_{20} - \frac{68}{429}R_{40} + \frac{20\sqrt{13}}{1287}R_{60}$ $-\frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$\frac{20\sqrt{30}}{429}R_{44} - \frac{8\sqrt{78}}{1287}R_{64} - \frac{14\sqrt{1122}}{2431}R_{84}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{370\sqrt{13}}{5577}R_{20} - \frac{60\sqrt{65}}{1859}R_{40} + \frac{532\sqrt{5}}{36465}R_{60} + \frac{7896\sqrt{1105}}{3002285}R_{80}$ $+\frac{270\sqrt{1365}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{60\sqrt{91}}{1859}R_{44} + \frac{76\sqrt{35}}{36465}R_{64} - \frac{392\sqrt{85085}}{3002285}R_{84} + \frac{270\sqrt{77}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	3	$\frac{56\sqrt{510}}{12597}R_{88} + \frac{54\sqrt{1190}}{4199}R_{10,8}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	1	$\frac{2\sqrt{77}}{143}R_{44} - \frac{10\sqrt{5005}}{2431}R_{64} + \frac{35\sqrt{595}}{4199}R_{84} - \frac{21\sqrt{91}}{4199}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	2	$-\frac{6\sqrt{130}}{1859}R_{20} + \frac{10\sqrt{26}}{1859}R_{40} + \frac{350\sqrt{2}}{2431}R_{60} + \frac{6125\sqrt{442}}{600457}R_{80}$ $-\frac{825\sqrt{546}}{54587}R_{10,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{14\sqrt{91}}{1859}R_{44} - \frac{70\sqrt{35}}{2431}R_{64} - \frac{35\sqrt{85085}}{31603}R_{84} - \frac{9\sqrt{77}}{221}R_{10,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	5	4	$\frac{490\sqrt{17}}{4199}R_{88} + \frac{6\sqrt{357}}{247}R_{10,8}$

Table B271: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 40 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{5\sqrt{11}}{121}R_{10} - \frac{245\sqrt{231}}{14157}R_{30} - \frac{20\sqrt{3}}{1287}R_{50} + \frac{1204\sqrt{55}}{26741}R_{70}$ $-\frac{1260\sqrt{627}}{508079}R_{90}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	6	2	$-\frac{20\sqrt{10}}{429}R_{54} - \frac{168\sqrt{10}}{2431}R_{74} - \frac{210\sqrt{2470}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{6\sqrt{231}}{121}R_{10} - \frac{32\sqrt{11}}{4719}R_{30} - \frac{20\sqrt{7}}{429}R_{50} + \frac{60\sqrt{1155}}{26741}R_{70}$ $-\frac{3450\sqrt{1463}}{508079}R_{90}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{28\sqrt{5}}{429}R_{54} - \frac{108\sqrt{5}}{2431}R_{74} - \frac{322\sqrt{1235}}{46189}R_{94}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	3	$\frac{46\sqrt{1939938}}{138567}R_{98}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	1	$\frac{22\sqrt{455}}{1105}R_{54} - \frac{50\sqrt{455}}{4199}R_{74} + \frac{\sqrt{665}}{1615}R_{94} + \frac{9\sqrt{161}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{14\sqrt{70}}{429}R_{30} - \frac{14\sqrt{110}}{663}R_{50} + \frac{70\sqrt{6}}{2717}R_{70} + \frac{\sqrt{190}}{247}R_{90}$ $+\frac{99\sqrt{230}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{58\sqrt{385}}{3315}R_{54} + \frac{210\sqrt{385}}{46189}R_{74} - \frac{\sqrt{95095}}{20995}R_{94} + \frac{27\sqrt{23023}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	4	$-\frac{2\sqrt{20995}}{20995}R_{98} + \frac{18\sqrt{1448655}}{37145}R_{11,8}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{455}}{1105}R_{54} - \frac{50\sqrt{455}}{4199}R_{74} + \frac{18\sqrt{665}}{1615}R_{94} - \frac{48\sqrt{161}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	2	$-\frac{2\sqrt{10}}{143}R_{30} + \frac{4\sqrt{770}}{2431}R_{50} + \frac{1550\sqrt{42}}{46189}R_{70} + \frac{22\sqrt{1330}}{4199}R_{90}$ $-\frac{66\sqrt{1610}}{7429}R_{11,0}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{28\sqrt{165}}{3315}R_{54} - \frac{450\sqrt{165}}{46189}R_{74} - \frac{98\sqrt{40755}}{62985}R_{94} - \frac{28\sqrt{9867}}{7429}R_{11,4}$
$\frac{9}{2}$	5	1	$\frac{15}{2}$	6	4	$\frac{4\sqrt{11305}}{1615}R_{98} + \frac{12\sqrt{780045}}{37145}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$R_{00} + \frac{5\sqrt{5}}{33}R_{20} + \frac{4}{143}R_{40} + \frac{4\sqrt{13}}{429}R_{60}$ $+\frac{196\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$-\frac{80\sqrt{78}}{1859}R_{44} - \frac{1634\sqrt{30}}{36465}R_{64} - \frac{812\sqrt{72930}}{3002285}R_{84} + \frac{315\sqrt{66}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$\frac{37\sqrt{546}}{5577}R_{20} + \frac{10\sqrt{2730}}{1859}R_{40} + \frac{608\sqrt{210}}{36465}R_{60} + \frac{504\sqrt{46410}}{3002285}R_{80}$ $+\frac{1890\sqrt{130}}{54587}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{12\sqrt{1430}}{1859}R_{44} - \frac{190\sqrt{22}}{2431}R_{64} + \frac{140\sqrt{442}}{54587}R_{84} + \frac{63\sqrt{10}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	1	$\frac{70\sqrt{4641}}{12597}R_{88} - \frac{126\sqrt{221}}{4199}R_{10,8}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	2	$\frac{14\sqrt{195}}{1859}R_{44} + \frac{50\sqrt{3}}{7293}R_{64} - \frac{875\sqrt{7293}}{1801371}R_{84} - \frac{21\sqrt{165}}{4199}R_{10,4}$

Table B272: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 41 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	3	$-\frac{10\sqrt{546}}{5577}R_{20} - \frac{2\sqrt{2730}}{1859}R_{40} + \frac{10\sqrt{210}}{7293}R_{60} + \frac{35\sqrt{46410}}{35321}R_{80}$ $+ \frac{2079\sqrt{130}}{54587}R_{10,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	5	4	$\frac{14\sqrt{429}}{1859}R_{44} + \frac{10\sqrt{165}}{7293}R_{64} - \frac{1085\sqrt{3315}}{163761}R_{84} + \frac{483\sqrt{3}}{4199}R_{10,4}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	6	1	$-\frac{20\sqrt{10}}{429}R_{54} - \frac{168\sqrt{10}}{2431}R_{74} - \frac{210\sqrt{2470}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	6	2	$\frac{3\sqrt{11}}{121}R_{10} + \frac{217\sqrt{231}}{14157}R_{30} + \frac{20\sqrt{3}}{117}R_{50} + \frac{588\sqrt{55}}{26741}R_{70}$ $- \frac{2940\sqrt{627}}{508079}R_{90}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	1	$\frac{2\sqrt{210}}{429}R_{54} - \frac{54\sqrt{210}}{17017}R_{74} - \frac{23\sqrt{51870}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{21\sqrt{22}}{121}R_{10} + \frac{16\sqrt{462}}{1573}R_{30} + \frac{12\sqrt{110}}{2057}R_{70} + \frac{4830\sqrt{1254}}{508079}R_{90}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{2\sqrt{154}}{143}R_{54} - \frac{150\sqrt{154}}{17017}R_{74} + \frac{23\sqrt{38038}}{46189}R_{94}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{2\sqrt{33915}}{4845}R_{98} + \frac{18\sqrt{260015}}{37145}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{38\sqrt{33}}{663}R_{54} - \frac{1970\sqrt{33}}{46189}R_{74} - \frac{7\sqrt{8151}}{12597}R_{94} + \frac{21\sqrt{49335}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{98\sqrt{6}}{1287}R_{30} + \frac{2\sqrt{462}}{153}R_{50} + \frac{90\sqrt{70}}{3553}R_{70} + \frac{3\sqrt{798}}{4199}R_{90}$ $+ \frac{99\sqrt{966}}{7429}R_{11,0}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	4	$-\frac{242\sqrt{15}}{3315}R_{54} - \frac{250\sqrt{15}}{4199}R_{74} + \frac{49\sqrt{3705}}{62985}R_{94} + \frac{21\sqrt{897}}{7429}R_{11,4}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{4\sqrt{33915}}{4845}R_{98} - \frac{36\sqrt{260015}}{37145}R_{11,8}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	2	$\frac{4\sqrt{231}}{429}R_{54} + \frac{100\sqrt{231}}{17017}R_{74} + \frac{2\sqrt{57057}}{12597}R_{94}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	3	$-\frac{2\sqrt{14}}{143}R_{30} - \frac{28\sqrt{22}}{2431}R_{50} + \frac{300\sqrt{30}}{46189}R_{70} + \frac{154\sqrt{38}}{4199}R_{90}$ $+ \frac{462\sqrt{46}}{7429}R_{11,0}$
$\frac{9}{2}$	5	2	$\frac{15}{2}$	6	4	$\frac{4\sqrt{1365}}{3315}R_{54} - \frac{100\sqrt{1365}}{29393}R_{74} - \frac{2\sqrt{1995}}{255}R_{94} + \frac{84\sqrt{483}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$R_{00} + \frac{952\sqrt{5}}{9295}R_{20} - \frac{14}{143}R_{40} - \frac{100\sqrt{13}}{31603}R_{60}$ $+ \frac{1505\sqrt{17}}{46189}R_{80} - \frac{4500\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$\frac{98\sqrt{35}}{1859}R_{44} + \frac{36\sqrt{91}}{31603}R_{64} - \frac{2709\sqrt{1309}}{600457}R_{84} - \frac{180\sqrt{5005}}{54587}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	3	$-\frac{301\sqrt{1326}}{54587}R_{88} + \frac{540\sqrt{3094}}{54587}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	1	$-\frac{24\sqrt{5005}}{9295}R_{44} + \frac{120\sqrt{77}}{2431}R_{64} - \frac{420\sqrt{1547}}{54587}R_{84} + \frac{252\sqrt{35}}{20995}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	2	$-\frac{225\sqrt{2}}{1859}R_{20} - \frac{12\sqrt{10}}{143}R_{40} - \frac{378\sqrt{130}}{31603}R_{60} + \frac{504\sqrt{170}}{46189}R_{80}$ $+ \frac{891\sqrt{210}}{54587}R_{10,0}$

Table B273: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 42 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{448\sqrt{35}}{9295}R_{44} + \frac{180\sqrt{91}}{31603}R_{64} - \frac{1260\sqrt{1309}}{600457}R_{84} - \frac{522\sqrt{5005}}{272935}R_{10,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	5	4	$\frac{672\sqrt{1105}}{54587}R_{88} + \frac{162\sqrt{23205}}{272935}R_{10,8}$
$\frac{11}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{6\sqrt{715}}{7865}R_{10} + \frac{4\sqrt{15015}}{102245}R_{30} + \frac{20\sqrt{195}}{1859}R_{50} + \frac{5880\sqrt{143}}{347633}R_{70}$ $-\frac{9450\sqrt{40755}}{6605027}R_{90}$
$\frac{11}{2}$	5	1	$\frac{9}{2}$	6	2	$-\frac{30\sqrt{26}}{1859}R_{54} - \frac{756\sqrt{26}}{31603}R_{74} - \frac{945\sqrt{38}}{46189}R_{94}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	1	$-\frac{20\sqrt{15015}}{20449}R_{10} - \frac{625\sqrt{715}}{61347}R_{30} - \frac{812\sqrt{455}}{94809}R_{50} + \frac{9794\sqrt{3003}}{6605027}R_{70}$ $+\frac{7272\sqrt{95095}}{46235189}R_{90} + \frac{5445\sqrt{115115}}{8788507}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	2	$-\frac{980\sqrt{13}}{31603}R_{54} - \frac{22302\sqrt{13}}{600457}R_{74} - \frac{360\sqrt{19}}{46189}R_{94} + \frac{5445\sqrt{115}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	3	$\frac{24\sqrt{746130}}{323323}R_{98} + \frac{99\sqrt{5720330}}{676039}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{88\sqrt{7}}{1105}R_{54} - \frac{60\sqrt{7}}{4199}R_{74} + \frac{4\sqrt{1729}}{1105}R_{94} - \frac{48\sqrt{10465}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	2	$\frac{15\sqrt{78}}{169}R_{10} + \frac{12\sqrt{182}}{1859}R_{30} - \frac{18\sqrt{286}}{2873}R_{50} + \frac{840\sqrt{390}}{600457}R_{70}$ $+\frac{15\sqrt{494}}{2873}R_{90} - \frac{19800\sqrt{598}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	3	$\frac{84\sqrt{1001}}{14365}R_{54} - \frac{540\sqrt{1001}}{600457}R_{74} - \frac{6\sqrt{1463}}{1105}R_{94} - \frac{288\sqrt{8855}}{96577}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	4	$\frac{14\sqrt{323}}{1105}R_{98} + \frac{336\sqrt{22287}}{96577}R_{11,8}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	1	$\frac{8\sqrt{7}}{65}R_{54} + \frac{270\sqrt{7}}{4199}R_{74} - \frac{172\sqrt{1729}}{20995}R_{94} + \frac{6\sqrt{10465}}{5681}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	2	$-\frac{75\sqrt{26}}{1859}R_{30} - \frac{180\sqrt{2002}}{31603}R_{50} - \frac{1080\sqrt{2730}}{600457}R_{70} + \frac{1056\sqrt{3458}}{382109}R_{90}$ $+\frac{99\sqrt{4186}}{29393}R_{11,0}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{224\sqrt{429}}{14365}R_{54} + \frac{4410\sqrt{429}}{600457}R_{74} - \frac{4\sqrt{627}}{20995}R_{94} - \frac{12\sqrt{3795}}{7429}R_{11,4}$
$\frac{11}{2}$	5	1	$\frac{15}{2}$	6	4	$\frac{16\sqrt{29393}}{146965}R_{98} - \frac{30\sqrt{2028117}}{676039}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$R_{00} + \frac{1624\sqrt{5}}{9295}R_{20} + \frac{168}{1859}R_{40} - \frac{16\sqrt{13}}{31603}R_{60}$ $+\frac{22274\sqrt{17}}{600457}R_{80} + \frac{5400\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	3	$\frac{14\sqrt{231}}{1859}R_{44} - \frac{4\sqrt{15015}}{31603}R_{64} - \frac{301\sqrt{1785}}{54587}R_{84} + \frac{420\sqrt{273}}{54587}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	1	$-\frac{84\sqrt{170}}{4199}R_{88} + \frac{108\sqrt{3570}}{20995}R_{10,8}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	2	$-\frac{168\sqrt{14}}{1859}R_{44} - \frac{282\sqrt{910}}{31603}R_{64} - \frac{1302\sqrt{13090}}{600457}R_{84} - \frac{243\sqrt{2002}}{54587}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	3	$\frac{90\sqrt{5}}{1859}R_{20} + \frac{424}{1859}R_{40} + \frac{2520\sqrt{13}}{31603}R_{60} + \frac{34020\sqrt{17}}{600457}R_{80}$ $+\frac{792\sqrt{21}}{54587}R_{10,0}$

Table B274: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 43 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	5	4	$\frac{96\sqrt{770}}{9295}R_{44} - \frac{150\sqrt{2002}}{31603}R_{64} - \frac{1050\sqrt{238}}{54587}R_{84} + \frac{1827\sqrt{910}}{272935}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{9}{2}$	6	1	$-\frac{20\sqrt{273}}{1859}R_{54} - \frac{504\sqrt{273}}{31603}R_{74} - \frac{630\sqrt{399}}{46189}R_{94}$
$\frac{11}{2}$	5	2	$\frac{9}{2}$	6	2	$-\frac{\sqrt{30030}}{7865}R_{10} - \frac{126\sqrt{1430}}{102245}R_{30} + \frac{56\sqrt{6006}}{26741}R_{70} + \frac{5670\sqrt{190190}}{6605027}R_{90}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{980\sqrt{13}}{31603}R_{54} - \frac{22302\sqrt{13}}{600457}R_{74} - \frac{360\sqrt{19}}{46189}R_{94} + \frac{5445\sqrt{115}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	2	$\frac{12\sqrt{15015}}{20449}R_{10} + \frac{475\sqrt{715}}{61347}R_{30} + \frac{112\sqrt{455}}{8619}R_{50} + \frac{1416\sqrt{3003}}{388531}R_{70}$ $+ \frac{144\sqrt{95095}}{2719717}R_{90} + \frac{10890\sqrt{115115}}{8788507}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	3	$\frac{196\sqrt{2145}}{31603}R_{54} - \frac{4130\sqrt{2145}}{600457}R_{74} + \frac{24\sqrt{3135}}{46189}R_{94} + \frac{165\sqrt{759}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	1	$\frac{4\sqrt{8398}}{1105}R_{98} - \frac{48\sqrt{579462}}{96577}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	2	$\frac{14\sqrt{10010}}{14365}R_{54} - \frac{90\sqrt{10010}}{600457}R_{74} - \frac{\sqrt{14630}}{1105}R_{94} - \frac{240\sqrt{3542}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	3	$\frac{10\sqrt{195}}{169}R_{10} + \frac{24\sqrt{455}}{1859}R_{30} + \frac{24\sqrt{715}}{14365}R_{50} + \frac{700\sqrt{39}}{600457}R_{70}$ $+ \frac{72\sqrt{1235}}{14365}R_{90} + \frac{14256\sqrt{1495}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	4	$-\frac{242\sqrt{182}}{14365}R_{54} + \frac{30\sqrt{182}}{54587}R_{74} - \frac{19\sqrt{266}}{1105}R_{94} + \frac{480\sqrt{1610}}{96577}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	1	$\frac{4\sqrt{8398}}{1235}R_{98} + \frac{30\sqrt{579462}}{96577}R_{11,8}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	2	$-\frac{1288\sqrt{1430}}{158015}R_{54} - \frac{4725\sqrt{1430}}{600457}R_{74} - \frac{122\sqrt{2090}}{20995}R_{94} - \frac{66\sqrt{506}}{7429}R_{11,4}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	3	$\frac{18\sqrt{195}}{1859}R_{30} + \frac{24\sqrt{15015}}{12155}R_{50} + \frac{1350\sqrt{91}}{46189}R_{70} + \frac{132\sqrt{25935}}{100555}R_{90}$ $+ \frac{198\sqrt{31395}}{676039}R_{11,0}$
$\frac{11}{2}$	5	2	$\frac{15}{2}$	6	4	$-\frac{112\sqrt{2}}{1105}R_{54} - \frac{945\sqrt{2}}{4199}R_{74} - \frac{146\sqrt{494}}{20995}R_{94} + \frac{384\sqrt{2990}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	3	$R_{00} - \frac{56\sqrt{5}}{169}R_{20} + \frac{42}{169}R_{40} - \frac{4\sqrt{13}}{2873}R_{60}$ $- \frac{301\sqrt{17}}{54587}R_{80} + \frac{60\sqrt{21}}{54587}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	1	0
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	2	$-\frac{168\sqrt{3315}}{54587}R_{88} + \frac{198\sqrt{7735}}{54587}R_{10,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	3	$-\frac{8\sqrt{231}}{1859}R_{44} + \frac{84\sqrt{15015}}{31603}R_{64} - \frac{504\sqrt{1785}}{54587}R_{84} + \frac{462\sqrt{273}}{54587}R_{10,4}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	5	4	$\frac{15\sqrt{6}}{169}R_{20} - \frac{12\sqrt{30}}{169}R_{40} + \frac{42\sqrt{390}}{2873}R_{60} - \frac{252\sqrt{510}}{54587}R_{80}$ $+ \frac{99\sqrt{70}}{54587}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{9}{2}$	6	1	$\frac{126\sqrt{35530}}{46189}R_{98}$
$\frac{11}{2}$	5	3	$\frac{9}{2}$	6	2	$\frac{6\sqrt{4290}}{1859}R_{54} - \frac{140\sqrt{4290}}{31603}R_{74} + \frac{63\sqrt{6270}}{46189}R_{94}$

Table B275: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 44 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	1	$\frac{24\sqrt{746130}}{323323}R_{98} + \frac{99\sqrt{5720330}}{676039}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	2	$\frac{196\sqrt{2145}}{31603}R_{54} - \frac{4130\sqrt{2145}}{600457}R_{74} + \frac{24\sqrt{3135}}{46189}R_{94} + \frac{165\sqrt{759}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	3	$\frac{4\sqrt{15015}}{1859}R_{10} - \frac{25\sqrt{715}}{1859}R_{30} + \frac{28\sqrt{455}}{2873}R_{50} - \frac{590\sqrt{3003}}{600457}R_{70}$ $+ \frac{24\sqrt{95095}}{4203199}R_{90} + \frac{33\sqrt{115115}}{8788507}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	1	0
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{969}}{221}R_{98} + \frac{528\sqrt{7429}}{96577}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{44\sqrt{1365}}{14365}R_{54} + \frac{56\sqrt{1365}}{54587}R_{74} - \frac{6\sqrt{1995}}{1105}R_{94} + \frac{528\sqrt{483}}{96577}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	4	$\frac{15\sqrt{26}}{169}R_{10} - \frac{4\sqrt{546}}{169}R_{30} + \frac{22\sqrt{858}}{2873}R_{50} + \frac{84\sqrt{130}}{54587}R_{70}$ $- \frac{3\sqrt{1482}}{2873}R_{90} + \frac{264\sqrt{1794}}{1255501}R_{11,0}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	1	0
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	2	$-\frac{88\sqrt{6783}}{29393}R_{98} + \frac{66\sqrt{52003}}{52003}R_{11,8}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	3	$-\frac{168\sqrt{65}}{14365}R_{54} + \frac{2268\sqrt{65}}{54587}R_{74} - \frac{792\sqrt{95}}{20995}R_{94} + \frac{198\sqrt{23}}{7429}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{15}{2}$	6	4	$\frac{\sqrt{6}}{13}R_{30} - \frac{4\sqrt{462}}{221}R_{50} + \frac{162\sqrt{70}}{4199}R_{70} - \frac{132\sqrt{798}}{29393}R_{90}$ $+ \frac{33\sqrt{966}}{52003}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	1	$R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60}$ $+ \frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	2	$\frac{6\sqrt{2002}}{1859}R_{44} - \frac{30\sqrt{770}}{2431}R_{64} + \frac{105\sqrt{15470}}{54587}R_{84} - \frac{63\sqrt{14}}{4199}R_{10,4}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	3	$\frac{35\sqrt{170}}{4199}R_{88} - \frac{9\sqrt{3570}}{4199}R_{10,8}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	5	4	0
$\frac{13}{2}$	5	1	$\frac{9}{2}$	6	1	$-\frac{10\sqrt{231}}{2431}R_{54} + \frac{350\sqrt{231}}{46189}R_{74} - \frac{15\sqrt{57057}}{46189}R_{94} + \frac{3\sqrt{345345}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{9}{2}$	6	2	$-\frac{30\sqrt{323323}}{46189}R_{98} + \frac{6\sqrt{22309287}}{96577}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	1	$\frac{120\sqrt{11}}{2431}R_{54} - \frac{4200\sqrt{11}}{46189}R_{74} + \frac{180\sqrt{2717}}{46189}R_{94} - \frac{36\sqrt{16445}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	2	$\frac{180\sqrt{646646}}{323323}R_{98} - \frac{36\sqrt{44618574}}{676039}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{11}{2}$	6	3	0
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	1	$-\frac{\sqrt{195}}{65}R_{10} + \frac{\sqrt{455}}{65}R_{30} - \frac{2\sqrt{715}}{221}R_{50} + \frac{70\sqrt{39}}{4199}R_{70}$ $- \frac{3\sqrt{1235}}{4199}R_{90} + \frac{33\sqrt{1495}}{482885}R_{11,0}$

Table B276: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 45 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{70}}{221}R_{54} + \frac{210\sqrt{70}}{4199}R_{74} - \frac{9\sqrt{17290}}{4199}R_{94} + \frac{99\sqrt{4186}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	3	$-\frac{15\sqrt{8398}}{4199}R_{98} + \frac{33\sqrt{579462}}{96577}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{13}{2}$	6	4	0
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	1	$\frac{2\sqrt{195}}{65}R_{10} - \frac{2\sqrt{455}}{65}R_{30} + \frac{4\sqrt{715}}{221}R_{50} - \frac{140\sqrt{39}}{4199}R_{70}$ $+ \frac{6\sqrt{1235}}{4199}R_{90} - \frac{66\sqrt{1495}}{482885}R_{11,0}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	2	$\frac{12\sqrt{10}}{221}R_{54} - \frac{420\sqrt{10}}{4199}R_{74} + \frac{18\sqrt{2470}}{4199}R_{94} - \frac{198\sqrt{598}}{96577}R_{11,4}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	3	$\frac{10\sqrt{176358}}{29393}R_{98} - \frac{66\sqrt{1352078}}{676039}R_{11,8}$
$\frac{13}{2}$	5	1	$\frac{15}{2}$	6	4	0
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	2	$R_{00} + \frac{25\sqrt{5}}{169}R_{20} - \frac{6}{143}R_{40} - \frac{1850\sqrt{13}}{31603}R_{60}$ $- \frac{175\sqrt{17}}{4199}R_{80} - \frac{375\sqrt{21}}{54587}R_{10,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	3	$\frac{252\sqrt{14}}{1859}R_{44} + \frac{280\sqrt{910}}{31603}R_{64} + \frac{70\sqrt{13090}}{54587}R_{84} + \frac{72\sqrt{2002}}{54587}R_{10,4}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	5	4	$\frac{525\sqrt{442}}{54587}R_{88} - \frac{21\sqrt{9282}}{54587}R_{10,8}$
$\frac{13}{2}$	5	2	$\frac{9}{2}$	6	1	$\frac{10\sqrt{6006}}{61347}R_{30} + \frac{350\sqrt{78}}{94809}R_{50} - \frac{294\sqrt{1430}}{388531}R_{70} - \frac{75\sqrt{16302}}{35321}R_{90}$ $+ \frac{165\sqrt{19734}}{96577}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{9}{2}$	6	2	$\frac{190\sqrt{65}}{31603}R_{54} + \frac{8274\sqrt{65}}{600457}R_{74} + \frac{105\sqrt{95}}{4199}R_{94} + \frac{1155\sqrt{23}}{7429}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	1	$-\frac{3\sqrt{6006}}{13013}R_{10} - \frac{18\sqrt{286}}{20449}R_{30} + \frac{1350\sqrt{182}}{221221}R_{50} + \frac{8400\sqrt{30030}}{6605027}R_{70}$ $+ \frac{3375\sqrt{38038}}{4203199}R_{90} - \frac{14850\sqrt{46046}}{8788507}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	2	$-\frac{210\sqrt{130}}{31603}R_{54} - \frac{6300\sqrt{130}}{600457}R_{74} - \frac{45\sqrt{190}}{4199}R_{94} - \frac{1980\sqrt{46}}{96577}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{11}{2}$	6	3	$-\frac{450\sqrt{74613}}{323323}R_{98} + \frac{396\sqrt{572033}}{676039}R_{11,8}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	1	$-\frac{6\sqrt{70}}{221}R_{54} + \frac{210\sqrt{70}}{4199}R_{74} - \frac{9\sqrt{17290}}{4199}R_{94} + \frac{99\sqrt{4186}}{96577}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	2	$-\frac{\sqrt{195}}{169}R_{10} - \frac{19\sqrt{455}}{1859}R_{30} - \frac{278\sqrt{715}}{31603}R_{50} - \frac{350\sqrt{39}}{31603}R_{70}$ $+ \frac{267\sqrt{1235}}{54587}R_{90} + \frac{363\sqrt{1495}}{66079}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	3	$-\frac{28\sqrt{10010}}{31603}R_{54} - \frac{840\sqrt{10010}}{600457}R_{74} - \frac{6\sqrt{14630}}{4199}R_{94} - \frac{264\sqrt{3542}}{96577}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{13}{2}$	6	4	$\frac{27\sqrt{3230}}{4199}R_{98} + \frac{33\sqrt{222870}}{96577}R_{11,8}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	1	$-\frac{12\sqrt{70}}{221}R_{54} + \frac{30\sqrt{70}}{4199}R_{74} + \frac{6\sqrt{17290}}{4199}R_{94} - \frac{108\sqrt{4186}}{96577}R_{11,4}$

Table B277: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 46 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	2	$\frac{2\sqrt{1365}}{91}R_{10} + \frac{4\sqrt{65}}{169}R_{30} - \frac{332\sqrt{5005}}{221221}R_{50} - \frac{700\sqrt{273}}{54587}R_{70}$ $- \frac{606\sqrt{8645}}{382109}R_{90} - \frac{132\sqrt{10465}}{676039}R_{11,0}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	3	$\frac{168\sqrt{4290}}{31603}R_{54} + \frac{210\sqrt{4290}}{54587}R_{74} + \frac{8\sqrt{6270}}{4199}R_{94} + \frac{12\sqrt{1518}}{7429}R_{11,4}$
$\frac{13}{2}$	5	2	$\frac{15}{2}$	6	4	$- \frac{6\sqrt{293930}}{29393}R_{98} - \frac{12\sqrt{20281170}}{676039}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	5	3	$R_{00} + \frac{35\sqrt{5}}{169}R_{20} + \frac{378}{1859}R_{40} + \frac{250\sqrt{13}}{31603}R_{60}$ $- \frac{875\sqrt{17}}{54587}R_{80} - \frac{837\sqrt{21}}{54587}R_{10,0}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	5	4	$\frac{18\sqrt{770}}{1859}R_{44} - \frac{230\sqrt{2002}}{31603}R_{64} - \frac{245\sqrt{238}}{54587}R_{84} + \frac{189\sqrt{910}}{54587}R_{10,4}$
$\frac{13}{2}$	5	3	$\frac{9}{2}$	6	1	$- \frac{290\sqrt{273}}{94809}R_{54} - \frac{1470\sqrt{273}}{600457}R_{74} + \frac{15\sqrt{399}}{4199}R_{94} + \frac{99\sqrt{2415}}{7429}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{9}{2}$	6	2	$- \frac{14\sqrt{1430}}{61347}R_{30} - \frac{10\sqrt{910}}{7293}R_{50} - \frac{630\sqrt{6006}}{508079}R_{70} - \frac{135\sqrt{190190}}{600457}R_{90}$ $+ \frac{99\sqrt{230230}}{96577}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	1	$- \frac{1260\sqrt{13}}{31603}R_{54} - \frac{37800\sqrt{13}}{600457}R_{74} - \frac{270\sqrt{19}}{4199}R_{94} - \frac{2376\sqrt{115}}{96577}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	2	$- \frac{2\sqrt{15015}}{13013}R_{10} - \frac{36\sqrt{715}}{20449}R_{30} - \frac{360\sqrt{455}}{221221}R_{50} + \frac{7000\sqrt{3003}}{6605027}R_{70}$ $+ \frac{3240\sqrt{95095}}{4203199}R_{90} + \frac{10692\sqrt{115115}}{8788507}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{11}{2}$	6	3	$- \frac{60\sqrt{2145}}{31603}R_{54} + \frac{3920\sqrt{2145}}{600457}R_{74} - \frac{270\sqrt{3135}}{46189}R_{94} + \frac{396\sqrt{759}}{96577}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	1	$- \frac{15\sqrt{8398}}{4199}R_{98} + \frac{33\sqrt{579462}}{96577}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	2	$- \frac{28\sqrt{10010}}{31603}R_{54} - \frac{840\sqrt{10010}}{600457}R_{74} - \frac{6\sqrt{14630}}{4199}R_{94} - \frac{264\sqrt{3542}}{96577}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	3	$\frac{3\sqrt{195}}{845}R_{10} + \frac{67\sqrt{455}}{9295}R_{30} + \frac{290\sqrt{715}}{31603}R_{50} + \frac{26250\sqrt{39}}{600457}R_{70}$ $+ \frac{315\sqrt{1235}}{54587}R_{90} + \frac{7623\sqrt{1495}}{6277505}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{13}{2}$	6	4	$\frac{70\sqrt{182}}{2873}R_{54} - \frac{630\sqrt{182}}{54587}R_{74} - \frac{75\sqrt{266}}{4199}R_{94} + \frac{2211\sqrt{1610}}{482885}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	1	$- \frac{10\sqrt{8398}}{4199}R_{98} - \frac{6\sqrt{579462}}{96577}R_{11,8}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	2	$\frac{168\sqrt{1430}}{31603}R_{54} + \frac{210\sqrt{1430}}{54587}R_{74} + \frac{8\sqrt{2090}}{4199}R_{94} + \frac{12\sqrt{506}}{7429}R_{11,4}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	3	$\frac{18\sqrt{455}}{455}R_{10} + \frac{22\sqrt{195}}{845}R_{30} + \frac{20\sqrt{15015}}{17017}R_{50} - \frac{10\sqrt{25935}}{22477}R_{90}$ $- \frac{66\sqrt{31395}}{177905}R_{11,0}$
$\frac{13}{2}$	5	3	$\frac{15}{2}$	6	4	$- \frac{60\sqrt{2}}{221}R_{54} - \frac{630\sqrt{2}}{4199}R_{74} + \frac{10\sqrt{494}}{4199}R_{94} + \frac{786\sqrt{2990}}{482885}R_{11,4}$
$\frac{13}{2}$	5	4	$\frac{13}{2}$	5	4	$R_{00} - \frac{35\sqrt{5}}{169}R_{20} - \frac{42}{169}R_{40} + \frac{290\sqrt{13}}{2873}R_{60}$ $- \frac{2065\sqrt{17}}{54587}R_{80} + \frac{291\sqrt{21}}{54587}R_{10,0}$

Table B278: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 47 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	5	4	$\frac{9}{2}$	6	1	$\frac{30\sqrt{10659}}{46189}R_{98} + \frac{18\sqrt{81719}}{7429}R_{11,8}$
$\frac{13}{2}$	5	4	$\frac{9}{2}$	6	2	$\frac{10\sqrt{143}}{2873}R_{54} + \frac{5250\sqrt{143}}{600457}R_{74} - \frac{735\sqrt{209}}{46189}R_{94} + \frac{21\sqrt{1265}}{7429}R_{11,4}$
$\frac{13}{2}$	5	4	$\frac{11}{2}$	6	1	$\frac{90\sqrt{24871}}{46189}R_{98} + \frac{36\sqrt{1716099}}{96577}R_{11,8}$
$\frac{13}{2}$	5	4	$\frac{11}{2}$	6	2	$\frac{30\sqrt{286}}{2873}R_{54} + \frac{2100\sqrt{286}}{600457}R_{74} - \frac{45\sqrt{418}}{2431}R_{94} + \frac{360\sqrt{2530}}{96577}R_{11,4}$
$\frac{13}{2}$	5	4	$\frac{11}{2}$	6	3	$-\frac{3\sqrt{2002}}{13013}R_{10} + \frac{6\sqrt{858}}{1859}R_{30} - \frac{150\sqrt{546}}{20111}R_{50} + \frac{840\sqrt{10010}}{600457}R_{70}$ $-\frac{675\sqrt{114114}}{4203199}R_{90} + \frac{198\sqrt{138138}}{8788507}R_{11,0}$
$\frac{13}{2}$	5	4	$\frac{13}{2}$	6	1	0
$\frac{13}{2}$	5	4	$\frac{13}{2}$	6	2	$\frac{27\sqrt{3230}}{4199}R_{98} + \frac{33\sqrt{222870}}{96577}R_{11,8}$
$\frac{13}{2}$	5	4	$\frac{13}{2}$	6	3	$\frac{70\sqrt{182}}{2873}R_{54} - \frac{630\sqrt{182}}{54587}R_{74} - \frac{75\sqrt{266}}{4199}R_{94} + \frac{2211\sqrt{1610}}{482885}R_{11,4}$
$\frac{13}{2}$	5	4	$\frac{13}{2}$	6	4	$\frac{11\sqrt{195}}{845}R_{10} - \frac{\sqrt{455}}{845}R_{30} - \frac{2\sqrt{715}}{169}R_{50} + \frac{3010\sqrt{39}}{54587}R_{70}$ $-\frac{231\sqrt{1235}}{54587}R_{90} + \frac{231\sqrt{1495}}{369265}R_{11,0}$
$\frac{13}{2}$	5	4	$\frac{15}{2}$	6	1	0
$\frac{13}{2}$	5	4	$\frac{15}{2}$	6	2	$\frac{6\sqrt{22610}}{4199}R_{98}$
$\frac{13}{2}$	5	4	$\frac{15}{2}$	6	3	$\frac{100\sqrt{78}}{2873}R_{54} - \frac{1680\sqrt{78}}{54587}R_{74} - \frac{30\sqrt{114}}{4199}R_{94} + \frac{132\sqrt{690}}{37145}R_{11,4}$
$\frac{13}{2}$	5	4	$\frac{15}{2}$	6	4	$\frac{2\sqrt{105}}{35}R_{10} - \frac{16\sqrt{5}}{65}R_{30} - \frac{4\sqrt{385}}{1547}R_{50} + \frac{280\sqrt{21}}{4199}R_{70}$ $-\frac{186\sqrt{665}}{29393}R_{90} + \frac{264\sqrt{805}}{260015}R_{11,0}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	1	$R_{00} + \frac{7\sqrt{5}}{121}R_{20} - \frac{476}{1573}R_{40} - \frac{100\sqrt{13}}{1573}R_{60}$ $+\frac{700\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	1	$\frac{9}{2}$	6	2	$\frac{140\sqrt{30}}{1573}R_{44} + \frac{40\sqrt{78}}{1573}R_{64} + \frac{70\sqrt{1122}}{26741}R_{84}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	1	$-\frac{30\sqrt{105}}{1573}R_{20} - \frac{80\sqrt{21}}{1573}R_{40} + \frac{60\sqrt{273}}{26741}R_{60} + \frac{8460\sqrt{357}}{508079}R_{80}$ $-\frac{270}{4199}R_{10,0}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{112\sqrt{15}}{1573}R_{44} + \frac{60\sqrt{39}}{26741}R_{64} - \frac{2940\sqrt{561}}{508079}R_{84} - \frac{18\sqrt{2145}}{4199}R_{10,4}$
$\frac{9}{2}$	6	1	$\frac{11}{2}$	6	3	$\frac{300\sqrt{3094}}{46189}R_{88} - \frac{18\sqrt{1326}}{4199}R_{10,8}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	1	$\frac{2\sqrt{1365}}{715}R_{44} - \frac{10\sqrt{21}}{187}R_{64} + \frac{35\sqrt{51051}}{46189}R_{84} - \frac{21\sqrt{1155}}{17765}R_{10,4}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{66}}{1573}R_{20} + \frac{2\sqrt{330}}{1573}R_{40} + \frac{70\sqrt{4290}}{26741}R_{60} + \frac{1225\sqrt{5610}}{508079}R_{80}$ $-\frac{45\sqrt{770}}{4199}R_{10,0}$

Table B279: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 48 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{14\sqrt{1155}}{7865}R_{44} - \frac{70\sqrt{3003}}{26741}R_{64} - \frac{35\sqrt{357}}{2431}R_{84} - \frac{9\sqrt{1365}}{1105}R_{10,4}$
$\frac{9}{2}$	6	1	$\frac{13}{2}$	6	4	$\frac{98\sqrt{36465}}{46189}R_{88} + \frac{18\sqrt{85085}}{13585}R_{10,8}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{1365}}{12155}R_{44} - \frac{20\sqrt{21}}{3553}R_{64} + \frac{30\sqrt{51051}}{46189}R_{84} - \frac{1554\sqrt{1155}}{408595}R_{10,4}$ $+ \frac{12\sqrt{462}}{7429}R_{12,4}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{10\sqrt{2310}}{26741}R_{40} + \frac{100\sqrt{30030}}{508079}R_{60} - \frac{10\sqrt{39270}}{46189}R_{80} - \frac{198\sqrt{110}}{7429}R_{10,0}$ $+ \frac{198\sqrt{2310}}{37145}R_{12,0}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{84\sqrt{55}}{133705}R_{44} - \frac{2540\sqrt{143}}{508079}R_{64} - \frac{70\sqrt{17}}{4199}R_{84} + \frac{162\sqrt{65}}{37145}R_{10,4}$ $+ \frac{924\sqrt{26}}{7429}R_{12,4}$
$\frac{9}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{4\sqrt{19635}}{3553}R_{88} + \frac{2988\sqrt{935}}{408595}R_{10,8} + \frac{36\sqrt{24871}}{7429}R_{12,8}$
$\frac{9}{2}$	6	2	$\frac{9}{2}$	6	2	$R_{00} + \frac{21\sqrt{5}}{121}R_{20} + \frac{84}{1573}R_{40} - \frac{60\sqrt{13}}{1573}R_{60}$ $- \frac{980\sqrt{17}}{26741}R_{80}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	1	$-\frac{64\sqrt{70}}{1573}R_{44} - \frac{3870\sqrt{182}}{187187}R_{64} - \frac{2610\sqrt{2618}}{508079}R_{84} - \frac{9\sqrt{10010}}{4199}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	2	$\frac{63\sqrt{10}}{1573}R_{20} + \frac{280\sqrt{2}}{1573}R_{40} + \frac{1440\sqrt{26}}{26741}R_{60} + \frac{11340\sqrt{34}}{508079}R_{80}$ $- \frac{90\sqrt{42}}{4199}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{16\sqrt{462}}{1573}R_{44} - \frac{450\sqrt{30030}}{187187}R_{64} + \frac{150\sqrt{3570}}{46189}R_{84} - \frac{3\sqrt{546}}{4199}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	1	$\frac{14\sqrt{6545}}{3553}R_{88} - \frac{126\sqrt{2805}}{17765}R_{10,8}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	2	$\frac{42\sqrt{11}}{1573}R_{44} + \frac{10\sqrt{715}}{26741}R_{64} - \frac{175\sqrt{85}}{46189}R_{84} - \frac{63\sqrt{13}}{4199}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	3	$-\frac{2\sqrt{770}}{1573}R_{20} - \frac{6\sqrt{154}}{1573}R_{40} + \frac{10\sqrt{2002}}{26741}R_{60} + \frac{105\sqrt{2618}}{29887}R_{80}$ $+ \frac{189\sqrt{66}}{4199}R_{10,0}$
$\frac{9}{2}$	6	2	$\frac{13}{2}$	6	4	$\frac{42\sqrt{5}}{715}R_{44} + \frac{10\sqrt{13}}{2431}R_{64} - \frac{1085\sqrt{187}}{46189}R_{84} + \frac{1449\sqrt{715}}{230945}R_{10,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{6545}}{3553}R_{88} - \frac{1764\sqrt{2805}}{408595}R_{10,8} + \frac{12\sqrt{74613}}{7429}R_{12,8}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	2	$-\frac{24\sqrt{77}}{26741}R_{44} + \frac{2220\sqrt{5005}}{3556553}R_{64} + \frac{20\sqrt{595}}{4199}R_{84} + \frac{198\sqrt{91}}{7429}R_{10,4}$ $+ \frac{924\sqrt{910}}{37145}R_{12,4}$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	3	$-\frac{42\sqrt{66}}{26741}R_{40} - \frac{860\sqrt{858}}{508079}R_{60} - \frac{140\sqrt{1122}}{46189}R_{80} - \frac{54\sqrt{154}}{7429}R_{10,0}$ $+ \frac{462\sqrt{66}}{7429}R_{12,0}$

Table B280: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 49 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{12\sqrt{455}}{12155}R_{44} + \frac{540\sqrt{7}}{24871}R_{64} + \frac{20\sqrt{17017}}{46189}R_{84} - \frac{5634\sqrt{385}}{408595}R_{10,4}$ $+ \frac{84\sqrt{154}}{7429}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$R_{00} + \frac{1156\sqrt{5}}{11011}R_{20} - \frac{94}{847}R_{40} - \frac{500\sqrt{13}}{26741}R_{60}$ $+ \frac{775\sqrt{17}}{39083}R_{80} - \frac{1800\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\frac{94\sqrt{35}}{1573}R_{44} + \frac{180\sqrt{91}}{26741}R_{64} - \frac{1395\sqrt{1309}}{508079}R_{84} - \frac{72\sqrt{5005}}{29393}R_{10,4}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	3	$-\frac{155\sqrt{1326}}{46189}R_{88} + \frac{216\sqrt{3094}}{29393}R_{10,8}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{276\sqrt{65}}{12155}R_{44} + \frac{1400}{3553}R_{64} - \frac{200\sqrt{2431}}{46189}R_{84} + \frac{252\sqrt{55}}{408595}R_{10,4}$ $+ \frac{132\sqrt{22}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{159\sqrt{154}}{11011}R_{20} - \frac{138\sqrt{770}}{14399}R_{40} - \frac{630\sqrt{10010}}{508079}R_{60} + \frac{240\sqrt{13090}}{273581}R_{80}$ $+ \frac{81\sqrt{330}}{96577}R_{10,0} + \frac{2178\sqrt{770}}{260015}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{5152\sqrt{55}}{133705}R_{44} + \frac{2100\sqrt{143}}{508079}R_{64} - \frac{600\sqrt{17}}{46189}R_{84} - \frac{522\sqrt{65}}{482885}R_{10,4}$ $+ \frac{4356\sqrt{26}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	4	$\frac{320\sqrt{85085}}{323323}R_{88} + \frac{162\sqrt{36465}}{5311735}R_{10,8} + \frac{132\sqrt{969969}}{260015}R_{12,8}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	1	$\frac{162\sqrt{65}}{12155}R_{44} - \frac{200}{3553}R_{64} - \frac{250\sqrt{2431}}{46189}R_{84} + \frac{15876\sqrt{55}}{408595}R_{10,4}$ $- \frac{654\sqrt{22}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	2	$-\frac{6\sqrt{22}}{1001}R_{20} - \frac{81\sqrt{110}}{187187}R_{40} + \frac{1440\sqrt{1430}}{508079}R_{60} + \frac{240\sqrt{1870}}{46189}R_{80}$ $+ \frac{1782\sqrt{2310}}{676039}R_{10,0} - \frac{1287\sqrt{110}}{37145}R_{12,0}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{216\sqrt{1155}}{133705}R_{44} - \frac{1000\sqrt{3003}}{508079}R_{64} - \frac{50\sqrt{357}}{4199}R_{84} - \frac{27432\sqrt{1365}}{3380195}R_{10,4}$ $- \frac{462\sqrt{546}}{37145}R_{12,4}$
$\frac{11}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{40\sqrt{935}}{3553}R_{88} + \frac{324\sqrt{19635}}{124355}R_{10,8} + \frac{6\sqrt{10659}}{1615}R_{12,8}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} + \frac{1972\sqrt{5}}{11011}R_{20} + \frac{1128}{11011}R_{40} - \frac{80\sqrt{13}}{26741}R_{60}$ $+ \frac{11470\sqrt{17}}{508079}R_{80} + \frac{2160\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{94\sqrt{231}}{11011}R_{44} - \frac{20\sqrt{15015}}{26741}R_{64} - \frac{155\sqrt{1785}}{46189}R_{84} + \frac{24\sqrt{273}}{4199}R_{10,4}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$-\frac{40\sqrt{13090}}{24871}R_{88} + \frac{108\sqrt{5610}}{408595}R_{10,8} + \frac{132\sqrt{149226}}{260015}R_{12,8}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$-\frac{1932\sqrt{22}}{26741}R_{44} - \frac{3290\sqrt{1430}}{508079}R_{64} - \frac{620\sqrt{170}}{46189}R_{84} - \frac{243\sqrt{26}}{96577}R_{10,4}$ $+ \frac{2904\sqrt{65}}{37145}R_{12,4}$

Table B281: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 50 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{318\sqrt{385}}{55055}R_{20} + \frac{4876\sqrt{77}}{187187}R_{40} + \frac{4200\sqrt{1001}}{508079}R_{60} + \frac{16200\sqrt{1309}}{3556553}R_{80}$ $+ \frac{72\sqrt{33}}{96577}R_{10,0} + \frac{13068\sqrt{77}}{260015}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	4	$\frac{1104\sqrt{10}}{12155}R_{44} - \frac{1750\sqrt{26}}{46189}R_{64} - \frac{500\sqrt{374}}{46189}R_{84} + \frac{1827\sqrt{1430}}{5311735}R_{10,4}$ $+ \frac{264\sqrt{143}}{37145}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	1	$\frac{10\sqrt{13090}}{3553}R_{88} + \frac{324\sqrt{5610}}{408595}R_{10,8} - \frac{42\sqrt{149226}}{37145}R_{12,8}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	2	$\frac{162\sqrt{154}}{26741}R_{44} + \frac{20\sqrt{10010}}{508079}R_{64} - \frac{5\sqrt{1190}}{4199}R_{84} - \frac{3564\sqrt{182}}{676039}R_{10,4}$ $- \frac{132\sqrt{455}}{37145}R_{12,4}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	3	$-\frac{12\sqrt{165}}{5005}R_{20} - \frac{1674\sqrt{33}}{187187}R_{40} - \frac{600\sqrt{429}}{508079}R_{60} + \frac{150\sqrt{561}}{46189}R_{80}$ $+ \frac{19116\sqrt{77}}{676039}R_{10,0} + \frac{2574\sqrt{33}}{37145}R_{12,0}$
$\frac{11}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{324\sqrt{910}}{85085}R_{44} + \frac{100\sqrt{14}}{3553}R_{64} - \frac{25\sqrt{34034}}{46189}R_{84} - \frac{5184\sqrt{770}}{408595}R_{10,4}$ $+ \frac{996\sqrt{77}}{37145}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	3	$R_{00} - \frac{340\sqrt{5}}{1001}R_{20} + \frac{282}{1001}R_{40} - \frac{20\sqrt{13}}{2431}R_{60}$ $- \frac{155\sqrt{17}}{46189}R_{80} + \frac{24\sqrt{21}}{29393}R_{10,0}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	1	$\frac{132\sqrt{2451570}}{185725}R_{12,12}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	2	$-\frac{80\sqrt{255255}}{323323}R_{88} + \frac{18\sqrt{12155}}{96577}R_{10,8} + \frac{132\sqrt{323323}}{260015}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	3	$-\frac{92\sqrt{3}}{2431}R_{44} + \frac{980\sqrt{195}}{46189}R_{64} - \frac{240\sqrt{2805}}{46189}R_{84} + \frac{42\sqrt{429}}{96577}R_{10,4}$ $+ \frac{132\sqrt{4290}}{185725}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	4	$\frac{53\sqrt{462}}{5005}R_{20} - \frac{138\sqrt{2310}}{17017}R_{40} + \frac{70\sqrt{30030}}{46189}R_{60} - \frac{120\sqrt{39270}}{323323}R_{80}$ $+ \frac{9\sqrt{110}}{96577}R_{10,0} + \frac{66\sqrt{2310}}{1300075}R_{12,0}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	1	$\frac{66\sqrt{2451570}}{185725}R_{12,12}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	2	$\frac{20\sqrt{36465}}{46189}R_{88} - \frac{972\sqrt{85085}}{676039}R_{10,8} + \frac{66\sqrt{46189}}{37145}R_{12,8}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	3	$\frac{54\sqrt{7}}{17017}R_{44} - \frac{240\sqrt{455}}{46189}R_{64} + \frac{180\sqrt{6545}}{46189}R_{84} - \frac{972\sqrt{1001}}{96577}R_{10,4}$ $+ \frac{198\sqrt{10010}}{185725}R_{12,4}$
$\frac{11}{2}$	6	3	$\frac{15}{2}$	6	4	$-\frac{2\sqrt{858}}{5005}R_{20} + \frac{27\sqrt{4290}}{17017}R_{40} - \frac{40\sqrt{330}}{3553}R_{60} + \frac{30\sqrt{72930}}{46189}R_{80}$ $- \frac{486\sqrt{10010}}{676039}R_{10,0} + \frac{33\sqrt{4290}}{185725}R_{12,0}$

Table B282: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 51 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{9\sqrt{5}}{25}R_{20} + \frac{6}{17}R_{40} - \frac{6\sqrt{13}}{323}R_{60}$ $- \frac{\sqrt{17}}{323}R_{80} + \frac{15\sqrt{21}}{7429}R_{10,0} - \frac{264}{185725}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{6\sqrt{2002}}{2431}R_{44} - \frac{18\sqrt{770}}{3553}R_{64} - \frac{3\sqrt{15470}}{4199}R_{84} + \frac{315\sqrt{14}}{7429}R_{10,4}$ $- \frac{1584\sqrt{35}}{185725}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	3	$- \frac{\sqrt{170}}{323}R_{88} + \frac{45\sqrt{3570}}{7429}R_{10,8} - \frac{264\sqrt{1938}}{37145}R_{12,8}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	4	$- \frac{528\sqrt{52003}}{185725}R_{12,12}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	1	$- \frac{2\sqrt{5}}{25}R_{20} + \frac{6}{17}R_{40} - \frac{28\sqrt{13}}{323}R_{60} + \frac{12\sqrt{17}}{323}R_{80}$ $- \frac{66\sqrt{21}}{7429}R_{10,0} + \frac{858}{185725}R_{12,0}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{6\sqrt{286}}{2431}R_{44} - \frac{84\sqrt{110}}{3553}R_{64} + \frac{36\sqrt{2210}}{4199}R_{84} - \frac{1386\sqrt{2}}{7429}R_{10,4}$ $+ \frac{5148\sqrt{5}}{185725}R_{12,4}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{4\sqrt{3570}}{2261}R_{88} - \frac{198\sqrt{170}}{7429}R_{10,8} + \frac{858\sqrt{4522}}{260015}R_{12,8}$
$\frac{13}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{132\sqrt{96577}}{185725}R_{12,12}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} + \frac{9\sqrt{5}}{65}R_{20} - \frac{6}{187}R_{40} - \frac{1110\sqrt{13}}{46189}R_{60}$ $+ \frac{5\sqrt{17}}{323}R_{80} + \frac{1875\sqrt{21}}{96577}R_{10,0} - \frac{2904}{7429}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	3	$\frac{252\sqrt{14}}{2431}R_{44} + \frac{168\sqrt{910}}{46189}R_{64} - \frac{2\sqrt{13090}}{4199}R_{84} - \frac{360\sqrt{2002}}{96577}R_{10,4}$ $- \frac{528\sqrt{5005}}{185725}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	4	$- \frac{15\sqrt{442}}{4199}R_{88} + \frac{105\sqrt{9282}}{96577}R_{10,8} + \frac{264\sqrt{125970}}{185725}R_{12,8}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	1	$- \frac{12\sqrt{2002}}{2431}R_{44} + \frac{36\sqrt{770}}{3553}R_{64} + \frac{6\sqrt{15470}}{4199}R_{84} - \frac{630\sqrt{14}}{7429}R_{10,4}$ $+ \frac{3168\sqrt{35}}{185725}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	2	$- \frac{2\sqrt{35}}{91}R_{20} - \frac{1500\sqrt{7}}{17017}R_{40} - \frac{980\sqrt{91}}{46189}R_{60} - \frac{60\sqrt{119}}{29393}R_{80}$ $+ \frac{10362\sqrt{3}}{96577}R_{10,0} + \frac{18876\sqrt{7}}{260015}R_{12,0}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{252\sqrt{6}}{2431}R_{44} + \frac{168\sqrt{390}}{46189}R_{64} - \frac{2\sqrt{5610}}{4199}R_{84} - \frac{360\sqrt{858}}{96577}R_{10,4}$ $- \frac{528\sqrt{2145}}{185725}R_{12,4}$
$\frac{13}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{60\sqrt{238}}{2261}R_{88} + \frac{150\sqrt{102}}{7429}R_{10,8} + \frac{132\sqrt{67830}}{1300075}R_{12,8}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	3	$R_{00} + \frac{63\sqrt{5}}{325}R_{20} + \frac{378}{2431}R_{40} + \frac{150\sqrt{13}}{46189}R_{60}$ $+ \frac{25\sqrt{17}}{4199}R_{80} + \frac{4185\sqrt{21}}{96577}R_{10,0} + \frac{78408}{185725}R_{12,0}$

Table B283: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 52 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	4	$\frac{18\sqrt{770}}{2431}R_{44} - \frac{138\sqrt{2002}}{46189}R_{64} + \frac{7\sqrt{238}}{4199}R_{84} - \frac{945\sqrt{910}}{96577}R_{10,4}$ $+ \frac{3696\sqrt{91}}{185725}R_{12,4}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	1	$-\frac{8\sqrt{170}}{323}R_{88} + \frac{18\sqrt{3570}}{7429}R_{10,8} + \frac{198\sqrt{1938}}{37145}R_{12,8}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	2	$-\frac{504\sqrt{2}}{2431}R_{44} - \frac{56\sqrt{130}}{2717}R_{64} - \frac{22\sqrt{1870}}{4199}R_{84} - \frac{72\sqrt{286}}{5681}R_{10,4}$ $- \frac{1188\sqrt{715}}{185725}R_{12,4}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	3	$\frac{18\sqrt{105}}{2275}R_{20} + \frac{666\sqrt{21}}{17017}R_{40} + \frac{700\sqrt{273}}{46189}R_{60} + \frac{400\sqrt{357}}{29393}R_{80}$ $+ \frac{17226}{96577}R_{10,0} + \frac{9438\sqrt{21}}{1300075}R_{12,0}$
$\frac{13}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{18\sqrt{1430}}{2431}R_{44} - \frac{28\sqrt{22}}{3553}R_{64} - \frac{58\sqrt{442}}{4199}R_{84} - \frac{378\sqrt{10}}{7429}R_{10,4}$ $+ \frac{36828}{185725}R_{12,4}$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	4	$R_{00} - \frac{63\sqrt{5}}{325}R_{20} - \frac{42}{221}R_{40} + \frac{174\sqrt{13}}{4199}R_{60}$ $+ \frac{59\sqrt{17}}{4199}R_{80} - \frac{1455\sqrt{21}}{96577}R_{10,0} + \frac{2904}{185725}R_{12,0}$
$\frac{13}{2}$	6	4	$\frac{15}{2}$	6	1	$-\frac{264\sqrt{52003}}{185725}R_{12,12}$
$\frac{13}{2}$	6	4	$\frac{15}{2}$	6	2	$-\frac{120\sqrt{3094}}{29393}R_{88} + \frac{726\sqrt{1326}}{96577}R_{10,8} + \frac{264\sqrt{881790}}{1300075}R_{12,8}$
$\frac{13}{2}$	6	4	$\frac{15}{2}$	6	3	$-\frac{12\sqrt{330}}{2431}R_{44} + \frac{28\sqrt{858}}{2431}R_{64} - \frac{48\sqrt{102}}{4199}R_{84} - \frac{1386\sqrt{390}}{96577}R_{10,4}$ $+ \frac{264\sqrt{39}}{9775}R_{12,4}$
$\frac{13}{2}$	6	4	$\frac{15}{2}$	6	4	$\frac{22\sqrt{455}}{2275}R_{20} - \frac{24\sqrt{91}}{1547}R_{40} - \frac{28\sqrt{7}}{323}R_{60} + \frac{264\sqrt{1547}}{29393}R_{80}$ $- \frac{2706\sqrt{39}}{96577}R_{10,0} + \frac{4224\sqrt{91}}{1300075}R_{12,0}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	1	$R_{00} - \frac{6\sqrt{5}}{25}R_{20} - \frac{3}{17}R_{40} + \frac{36\sqrt{13}}{323}R_{60}$ $- \frac{\sqrt{17}}{17}R_{80} + \frac{6\sqrt{21}}{391}R_{10,0} - \frac{1551}{185725}R_{12,0}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	2	$\frac{3\sqrt{286}}{221}R_{44} - \frac{12\sqrt{110}}{323}R_{64} + \frac{3\sqrt{2210}}{4199}R_{84} + \frac{882\sqrt{2}}{7429}R_{10,4}$ $- \frac{5346\sqrt{5}}{185725}R_{12,4}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	3	$\frac{\sqrt{3570}}{323}R_{88} - \frac{90\sqrt{170}}{7429}R_{10,8} - \frac{33\sqrt{4522}}{37145}R_{12,8}$
$\frac{15}{2}$	6	1	$\frac{15}{2}$	6	4	$\frac{66\sqrt{96577}}{185725}R_{12,12}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	2	$R_{00} + \frac{6\sqrt{5}}{35}R_{20} + \frac{69}{1547}R_{40} - \frac{180\sqrt{13}}{4199}R_{60}$ $- \frac{205\sqrt{17}}{4199}R_{80} - \frac{1374\sqrt{21}}{52003}R_{10,0} - \frac{363}{37145}R_{12,0}$

Table B284: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, 0, n)$, irrep $\Lambda_B = G_2$, and total spin $S = \frac{3}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 53 of 53.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	3	$\frac{18\sqrt{42}}{221}R_{44} + \frac{24\sqrt{2730}}{4199}R_{64} + \frac{4\sqrt{39270}}{4199}R_{84} + \frac{72\sqrt{6006}}{52003}R_{10,4}$ $+ \frac{66\sqrt{15015}}{185725}R_{12,4}$
$\frac{15}{2}$	6	2	$\frac{15}{2}$	6	4	$\frac{15\sqrt{34}}{323}R_{88} + \frac{6\sqrt{714}}{52003}R_{10,8} - \frac{99\sqrt{9690}}{185725}R_{12,8}$
$\frac{15}{2}$	6	3	$\frac{15}{2}$	6	3	$R_{00} + \frac{38\sqrt{5}}{175}R_{20} + \frac{387}{1547}R_{40} + \frac{100\sqrt{13}}{4199}R_{60}$ $- \frac{25\sqrt{17}}{4199}R_{80} - \frac{846\sqrt{21}}{52003}R_{10,0} - \frac{11253}{185725}R_{12,0}$
$\frac{15}{2}$	6	3	$\frac{15}{2}$	6	4	$\frac{3\sqrt{30030}}{1547}R_{44} - \frac{4\sqrt{462}}{323}R_{64} - \frac{9\sqrt{9282}}{4199}R_{84} + \frac{18\sqrt{210}}{7429}R_{10,4}$ $+ \frac{3234\sqrt{21}}{185725}R_{12,4}$
$\frac{15}{2}$	6	4	$\frac{15}{2}$	6	4	$R_{00} - \frac{18\sqrt{5}}{175}R_{20} - \frac{3}{7}R_{40} + \frac{12\sqrt{13}}{323}R_{60}$ $+ \frac{\sqrt{17}}{19}R_{80} - \frac{1842\sqrt{21}}{52003}R_{10,0} + \frac{363}{10925}R_{12,0}$

Table B285: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
0	0	1	0	0	1	R_{00}
0	0	1	1	1	1	$-\sqrt{2}iR_{10}$
0	0	1	2	2	1	$-2R_{20}$
0	0	1	2	2	2	$\sqrt{2}iI_{21}$
0	0	1	3	3	1	$\frac{\sqrt{5}}{2}iR_{30} - \frac{\sqrt{6}}{2}iR_{32}$
0	0	1	3	3	2	$\frac{\sqrt{3}}{2}R_{30} + \frac{\sqrt{10}}{2}R_{32}$
0	0	1	4	4	1	$\frac{4\sqrt{35}}{21}R_{40} - \frac{8\sqrt{14}}{21}R_{42}$
0	0	1	4	4	2	$\frac{2}{3}R_{40} + \frac{\sqrt{10}}{3}R_{42}$
0	0	1	4	4	3	$-4iI_{41}$
0	0	1	5	5	1	$-\frac{3\sqrt{7}}{8}iR_{50} + \frac{\sqrt{30}}{4}iR_{52} - \frac{\sqrt{10}}{8}iR_{54}$
0	0	1	5	5	2	$-\frac{\sqrt{30}}{8}iR_{50} - \frac{\sqrt{7}}{2}iR_{52} - \frac{\sqrt{21}}{4}iR_{54}$
0	0	1	5	5	3	$-\frac{\sqrt{35}}{8}R_{50} - \frac{\sqrt{6}}{4}R_{52} + \frac{9\sqrt{2}}{8}R_{54}$
0	0	1	6	6	1	$\frac{8\sqrt{30}}{15}R_{62}$
0	0	1	6	6	2	$-2\sqrt{2}R_{60} - \frac{4\sqrt{210}}{15}R_{62}$
0	0	1	6	6	3	$\frac{8\sqrt{154}}{77}iI_{61} - \frac{8\sqrt{385}}{77}iI_{63}$
0	0	1	6	6	4	$\frac{\sqrt{70}}{7}iI_{61} + \frac{2\sqrt{7}}{7}iI_{63}$
1	1	1	1	1	1	$-\frac{\sqrt{30}}{5}I_{21} + R_{00} + \frac{2\sqrt{5}}{5}R_{20}$
1	1	1	2	2	1	$-\frac{\sqrt{10}}{5}iR_{10} - \frac{3\sqrt{210}}{70}iR_{30} + \frac{3\sqrt{7}}{7}iR_{32}$
1	1	1	2	2	2	$\frac{\sqrt{30}}{5}R_{10} - \frac{3\sqrt{70}}{35}R_{30} - \frac{2\sqrt{21}}{7}R_{32}$
1	1	1	3	3	1	$\frac{\sqrt{42}}{3}I_{41} - \frac{3\sqrt{42}}{14}R_{20} - \frac{\sqrt{210}}{21}R_{40} + \frac{\sqrt{21}}{7}R_{42}$
1	1	1	3	3	2	$\frac{4\sqrt{105}}{35}iI_{21} + \frac{\sqrt{70}}{7}iI_{41} - \frac{3\sqrt{70}}{70}iR_{20} + \frac{\sqrt{14}}{7}iR_{40}$ $+ \frac{\sqrt{35}}{7}iR_{42}$
1	1	1	4	4	1	$\frac{\sqrt{30}}{9}iR_{30} - \frac{2}{3}iR_{32} + \frac{5\sqrt{2310}}{396}iR_{50} - \frac{7\sqrt{11}}{33}iR_{52}$ $+ \frac{3\sqrt{33}}{22}iR_{54}$
1	1	1	4	4	2	$\frac{8\sqrt{42}}{63}iR_{30} + \frac{4\sqrt{35}}{21}iR_{32} + \frac{10\sqrt{66}}{99}iR_{50} + \frac{2\sqrt{385}}{33}iR_{52}$
1	1	1	4	4	3	$-\frac{\sqrt{210}}{42}R_{30} + \frac{3\sqrt{7}}{7}R_{32} + \frac{\sqrt{330}}{66}R_{50} - \frac{\sqrt{231}}{11}R_{54}$

Table B286: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	5	5	1	$-\frac{6\sqrt{143}}{143}I_{61} + \frac{3\sqrt{1430}}{143}I_{63} + \frac{5\sqrt{462}}{154}R_{40} - \frac{2\sqrt{1155}}{77}R_{42}$ $+ \frac{\sqrt{6006}}{286}R_{60} - \frac{5\sqrt{1430}}{143}R_{62}$
1	1	1	5	5	2	$-\frac{4\sqrt{11}}{11}I_{41} - \frac{\sqrt{30030}}{143}I_{61} + \frac{\sqrt{55}}{11}R_{40} + \frac{\sqrt{22}}{11}R_{42}$ $- \frac{3\sqrt{715}}{143}R_{60} - \frac{2\sqrt{3003}}{143}R_{62}$
1	1	1	5	5	3	$-\frac{4\sqrt{462}}{33}iI_{41} + \frac{9\sqrt{286}}{143}iI_{63} - \frac{\sqrt{2310}}{462}iR_{40} - \frac{4\sqrt{231}}{77}iR_{42}$ $- \frac{3\sqrt{30030}}{286}iR_{60} - \frac{21\sqrt{286}}{143}iR_{62}$
1	1	1	6	6	1	$-\frac{3\sqrt{3003}}{286}iR_{50} + \frac{3\sqrt{1430}}{143}iR_{52} - \frac{\sqrt{4290}}{286}iR_{54} - \frac{7\sqrt{455}}{260}iR_{70}$ $+ \frac{3\sqrt{195}}{52}iR_{72} - \frac{\sqrt{4290}}{260}iR_{74} + \frac{\sqrt{165}}{20}iR_{76}$
1	1	1	6	6	2	$-\frac{3\sqrt{429}}{143}iR_{50} + \frac{\sqrt{30030}}{143}iR_{54} - \frac{7\sqrt{65}}{130}iR_{70} + \frac{\sqrt{30030}}{130}iR_{74}$
1	1	1	6	6	3	$\frac{3\sqrt{26}}{52}R_{50} - \frac{\sqrt{1365}}{91}R_{52} + \frac{9\sqrt{455}}{182}R_{54} - \frac{\sqrt{4290}}{260}R_{70}$ $- \frac{\sqrt{10010}}{1820}R_{72} + \frac{17\sqrt{455}}{910}R_{74} - \frac{3\sqrt{70}}{20}R_{76}$
1	1	1	6	6	4	$\frac{3\sqrt{1430}}{143}R_{50} + \frac{2\sqrt{3003}}{91}R_{52} + \frac{6\sqrt{1001}}{1001}R_{54} - \frac{\sqrt{78}}{13}R_{70}$ $- \frac{8\sqrt{182}}{91}R_{72} - \frac{2\sqrt{1001}}{91}R_{74}$
2	2	1	2	2	1	$R_{00} - \frac{4\sqrt{5}}{7}R_{20} + \frac{6}{7}R_{40} - \frac{3\sqrt{10}}{7}R_{42}$
2	2	1	2	2	2	$-\frac{2\sqrt{10}}{7}iI_{21} - \frac{4\sqrt{15}}{7}iI_{41}$
2	2	1	3	3	1	$-\frac{3\sqrt{21}}{14}iR_{10} + \frac{1}{6}iR_{30} - \frac{\sqrt{30}}{6}iR_{32} - \frac{65\sqrt{77}}{924}iR_{50}$ $+ \frac{2\sqrt{330}}{33}iR_{52} - \frac{3\sqrt{110}}{44}iR_{54}$
2	2	1	3	3	2	$\frac{3\sqrt{35}}{70}R_{10} - \frac{7\sqrt{15}}{30}R_{30} - \frac{\sqrt{2}}{2}R_{32} - \frac{5\sqrt{1155}}{924}R_{50}$ $+ \frac{5\sqrt{66}}{44}R_{54}$
2	2	1	4	4	1	$-\frac{2\sqrt{35}}{7}R_{20} + \frac{40\sqrt{7}}{231}R_{40} - \frac{4\sqrt{70}}{33}R_{42} + \frac{10\sqrt{91}}{143}R_{60}$ $+ \frac{100\sqrt{195}}{429}R_{62}$
2	2	1	4	4	2	$\frac{2}{7}R_{20} - \frac{80\sqrt{5}}{231}R_{40} - \frac{80\sqrt{2}}{231}R_{42} - \frac{20\sqrt{65}}{143}R_{60}$ $- \frac{40\sqrt{273}}{429}R_{62}$
2	2	1	4	4	3	$\frac{\sqrt{30}}{7}iI_{21} - \frac{32\sqrt{5}}{77}iI_{41} + \frac{5\sqrt{546}}{143}iI_{61} - \frac{6\sqrt{1365}}{143}iI_{63}$

Table B287: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	5	5	1	$\frac{5\sqrt{55}}{44}iR_{30} - \frac{5\sqrt{66}}{44}iR_{32} - \frac{5\sqrt{35}}{104}iR_{50} + \frac{15\sqrt{6}}{52}iR_{52}$ $- \frac{35\sqrt{2}}{104}iR_{54} + \frac{93\sqrt{231}}{2288}iR_{70} - \frac{753\sqrt{11}}{2288}iR_{72} + \frac{105\sqrt{2}}{208}iR_{74}$ $- \frac{15\sqrt{13}}{208}iR_{76}$
2	2	1	5	5	2	$-\frac{5\sqrt{462}}{924}iR_{30} - \frac{3\sqrt{385}}{154}iR_{32} + \frac{95\sqrt{6}}{312}iR_{50} + \frac{5\sqrt{35}}{26}iR_{52}$ $+ \frac{\sqrt{105}}{52}iR_{54} + \frac{21\sqrt{110}}{2288}iR_{70} + \frac{3\sqrt{2310}}{2288}iR_{72} - \frac{3\sqrt{105}}{104}iR_{74}$ $- \frac{3\sqrt{2730}}{208}iR_{76}$
2	2	1	5	5	3	$\frac{5\sqrt{11}}{132}R_{30} + \frac{7\sqrt{330}}{132}R_{32} + \frac{55\sqrt{7}}{312}R_{50} + \frac{7\sqrt{30}}{156}R_{52}$ $+ \frac{15\sqrt{10}}{104}R_{54} + \frac{15\sqrt{1155}}{2288}R_{70} - \frac{27\sqrt{55}}{2288}R_{72} - \frac{45\sqrt{10}}{208}R_{74}$ $+ \frac{27\sqrt{65}}{208}R_{76}$
2	2	1	6	6	1	$\frac{30\sqrt{910}}{1001}R_{40} - \frac{120\sqrt{91}}{1001}R_{42} + \frac{4\sqrt{70}}{55}R_{60} + \frac{152\sqrt{6}}{165}R_{62}$ $+ \frac{4\sqrt{15470}}{1105}R_{80} - \frac{12\sqrt{442}}{221}R_{82} + \frac{12\sqrt{12155}}{1105}R_{84}$
2	2	1	6	6	2	$\frac{30\sqrt{13}}{143}R_{42} - \frac{16\sqrt{42}}{165}R_{62} + \frac{14\sqrt{2210}}{1105}R_{80} - \frac{6\sqrt{85085}}{1105}R_{84}$
2	2	1	6	6	3	$-\frac{20\sqrt{429}}{143}iI_{41} + \frac{4\sqrt{770}}{385}iI_{61} - \frac{8\sqrt{77}}{77}iI_{63} + \frac{18\sqrt{72930}}{1105}iI_{81}$ $+ \frac{122\sqrt{3094}}{1547}iI_{83}$
2	2	1	6	6	4	$\frac{4\sqrt{195}}{143}iI_{41} - \frac{26\sqrt{14}}{77}iI_{61} - \frac{4\sqrt{35}}{77}iI_{63} - \frac{12\sqrt{1326}}{221}iI_{81}$ $- \frac{4\sqrt{170170}}{1547}iI_{83}$
2	2	2	2	2	2	$R_{00} + \frac{4\sqrt{5}}{7}R_{20} - \frac{4}{7}R_{40} - \frac{2\sqrt{10}}{7}R_{42}$
2	2	2	3	3	1	$\frac{\sqrt{10}}{3}R_{32} - \frac{\sqrt{110}}{33}R_{52} - \frac{2\sqrt{330}}{33}R_{54}$
2	2	2	3	3	2	$-\frac{4\sqrt{105}}{35}iR_{10} - \frac{2\sqrt{5}}{15}iR_{30} + \frac{\sqrt{6}}{3}iR_{32} + \frac{10\sqrt{385}}{231}iR_{50}$ $+ \frac{5\sqrt{66}}{33}iR_{52}$
2	2	2	4	4	1	$-\frac{8\sqrt{105}}{33}iI_{41} - \frac{20\sqrt{26}}{143}iI_{61} + \frac{16\sqrt{65}}{143}iI_{63}$
2	2	2	4	4	2	$\frac{6\sqrt{2}}{7}iI_{21} + \frac{200\sqrt{3}}{231}iI_{41} - \frac{5\sqrt{910}}{143}iI_{61} - \frac{10\sqrt{91}}{143}iI_{63}$
2	2	2	4	4	3	$-\frac{2\sqrt{15}}{7}R_{20} - \frac{20\sqrt{3}}{77}R_{40} + \frac{18\sqrt{30}}{77}R_{42} + \frac{40\sqrt{39}}{143}R_{60}$ $+ \frac{16\sqrt{455}}{143}R_{62}$
2	2	2	5	5	1	$\frac{5\sqrt{6}}{13}R_{54} - \frac{\sqrt{6}}{13}R_{74} - \frac{2\sqrt{39}}{13}R_{76}$

Table B288: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	2	5	5	2	$\frac{20\sqrt{154}}{231}R_{30} + \frac{4\sqrt{1155}}{231}R_{32} + \frac{5\sqrt{2}}{39}R_{50} - \frac{2\sqrt{105}}{39}R_{52}$ $- \frac{7\sqrt{330}}{143}R_{70} - \frac{6\sqrt{770}}{143}R_{72}$
2	2	2	5	5	3	$- \frac{4\sqrt{110}}{33}iR_{32} - \frac{10\sqrt{10}}{39}iR_{52} + \frac{7\sqrt{30}}{39}iR_{54} + \frac{6\sqrt{165}}{143}iR_{72}$ $+ \frac{3\sqrt{30}}{13}iR_{74}$
2	2	2	6	6	1	$\frac{16\sqrt{5}}{55}iI_{61} - \frac{8\sqrt{2}}{11}iI_{63} - \frac{8\sqrt{23205}}{1105}iI_{81} - \frac{8\sqrt{2431}}{221}iI_{83}$
2	2	2	6	6	2	$- \frac{40\sqrt{78}}{143}iI_{41} - \frac{4\sqrt{35}}{55}iI_{61} + \frac{4\sqrt{14}}{11}iI_{63} + \frac{84\sqrt{3315}}{1105}iI_{81}$ $+ \frac{4\sqrt{17017}}{221}iI_{83}$
2	2	2	6	6	3	$\frac{20\sqrt{715}}{1001}R_{40} - \frac{40\sqrt{286}}{1001}R_{42} - \frac{12\sqrt{55}}{55}R_{60} - \frac{8\sqrt{231}}{33}R_{62}$ $- \frac{64\sqrt{12155}}{12155}R_{80} - \frac{16\sqrt{17017}}{17017}R_{82} + \frac{16\sqrt{15470}}{1547}R_{84}$
2	2	2	6	6	4	$\frac{190\sqrt{13}}{1001}R_{40} + \frac{71\sqrt{130}}{1001}R_{42} + \frac{8}{11}R_{60} + \frac{16\sqrt{105}}{165}R_{62}$ $- \frac{8\sqrt{221}}{221}R_{80} - \frac{16\sqrt{7735}}{1547}R_{82} - \frac{4\sqrt{34034}}{1547}R_{84}$
3	3	1	3	3	1	$- \frac{\sqrt{30}}{12}I_{21} + \frac{12\sqrt{5}}{11}I_{41} - \frac{35\sqrt{546}}{1716}I_{61} + \frac{25\sqrt{1365}}{858}I_{63}$ $+ R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$ $- \frac{2\sqrt{1365}}{39}R_{62}$
3	3	1	3	3	2	$- \frac{5\sqrt{2}}{12}iI_{21} - \frac{8\sqrt{3}}{11}iI_{41} - \frac{35\sqrt{910}}{1716}iI_{61} + \frac{15\sqrt{91}}{286}iI_{63}$ $- \frac{\sqrt{3}}{3}iR_{20} - \frac{\sqrt{15}}{11}iR_{40} - \frac{\sqrt{6}}{11}iR_{42} - \frac{35\sqrt{195}}{429}iR_{60}$ $- \frac{70\sqrt{91}}{429}iR_{62}$
3	3	1	4	4	1	$- \frac{4\sqrt{3}}{9}iR_{10} - \frac{\sqrt{7}}{11}iR_{30} - \frac{5\sqrt{11}}{286}iR_{50} - \frac{\sqrt{2310}}{143}iR_{52}$ $+ \frac{7\sqrt{770}}{286}iR_{54} - \frac{1519\sqrt{15}}{10296}iR_{70} + \frac{47\sqrt{35}}{312}iR_{72} - \frac{29\sqrt{770}}{1144}iR_{74}$ $+ \frac{9\sqrt{5005}}{1144}iR_{76}$
3	3	1	4	4	2	$- \frac{\sqrt{105}}{63}iR_{10} - \frac{5\sqrt{5}}{22}iR_{30} - \frac{3\sqrt{6}}{22}iR_{32} - \frac{40\sqrt{385}}{1001}iR_{50}$ $- \frac{5\sqrt{66}}{143}iR_{52} + \frac{10\sqrt{22}}{143}iR_{54} - \frac{245\sqrt{21}}{2574}iR_{70} - \frac{140}{429}iR_{72}$ $+ \frac{35\sqrt{22}}{286}iR_{74}$
3	3	1	4	4	3	$\frac{\sqrt{21}}{6}R_{10} - \frac{21}{22}R_{30} + \frac{\sqrt{30}}{22}R_{32} + \frac{15\sqrt{77}}{286}R_{50}$ $- \frac{5\sqrt{330}}{286}R_{52} - \frac{9\sqrt{110}}{286}R_{54} - \frac{7\sqrt{105}}{858}R_{70} + \frac{7\sqrt{5}}{143}R_{72}$ $+ \frac{7\sqrt{110}}{286}R_{74} - \frac{7\sqrt{715}}{143}R_{76}$

Table B289: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	5	5	1	$\frac{105\sqrt{11}}{286}I_{41} - \frac{\sqrt{30030}}{286}I_{61} + \frac{3\sqrt{3003}}{143}I_{63} - \frac{49\sqrt{1870}}{884}I_{81}$ $- \frac{73\sqrt{714}}{884}I_{83} - \frac{5\sqrt{11}}{11}R_{20} - \frac{15\sqrt{22}}{143}R_{42} + \frac{\sqrt{3003}}{429}R_{62}$ $- \frac{42\sqrt{935}}{2431}R_{80} + \frac{63\sqrt{1309}}{2431}R_{82} - \frac{4\sqrt{1190}}{221}R_{84}$
3	3	1	5	5	2	$\frac{\sqrt{385}}{33}I_{21} - \frac{\sqrt{2310}}{286}I_{41} + \frac{28\sqrt{143}}{429}I_{61} + \frac{49\sqrt{3927}}{4862}I_{81}$ $- \frac{21\sqrt{85}}{442}I_{83} - \frac{\sqrt{2310}}{462}R_{20} - \frac{5\sqrt{462}}{1001}R_{40} - \frac{\sqrt{1155}}{91}R_{42}$ $- \frac{7\sqrt{6006}}{429}R_{60} - \frac{7\sqrt{1430}}{195}R_{62} - \frac{7\sqrt{5610}}{2431}R_{82} - \frac{14\sqrt{51}}{221}R_{84}$
3	3	1	5	5	3	$\frac{\sqrt{330}}{33}iI_{21} - \frac{3\sqrt{55}}{22}iI_{41} - \frac{\sqrt{6006}}{858}iI_{61} - \frac{\sqrt{15015}}{429}iI_{63}$ $- \frac{1323\sqrt{374}}{9724}iI_{81} - \frac{37\sqrt{3570}}{884}iI_{83} - \frac{2\sqrt{55}}{33}iR_{20} + \frac{30\sqrt{11}}{143}iR_{40}$ $- \frac{14\sqrt{143}}{429}iR_{60} - \frac{\sqrt{15015}}{195}iR_{62} + \frac{98\sqrt{187}}{2431}iR_{80} + \frac{3\sqrt{6545}}{2431}iR_{82}$ $- \frac{18\sqrt{238}}{221}iR_{84}$
3	3	1	6	6	1	$\frac{10\sqrt{910}}{429}iR_{30} - \frac{20\sqrt{273}}{429}iR_{32} + \frac{7\sqrt{1430}}{1716}iR_{50} + \frac{\sqrt{3003}}{429}iR_{52}$ $+ \frac{\sqrt{1001}}{286}iR_{54} + \frac{63\sqrt{78}}{19448}iR_{70} + \frac{57\sqrt{182}}{19448}iR_{72} - \frac{3\sqrt{1001}}{572}iR_{74}$ $+ \frac{87\sqrt{154}}{1496}iR_{76} + \frac{777\sqrt{2470}}{67184}iR_{90} - \frac{105\sqrt{5434}}{8398}iR_{92}$ $+ \frac{\sqrt{1463}}{76}iR_{94} - \frac{7\sqrt{1254}}{646}iR_{96} + \frac{21\sqrt{3553}}{2584}iR_{98}$
3	3	1	6	6	2	$\frac{25\sqrt{130}}{858}iR_{30} + \frac{15\sqrt{39}}{143}iR_{32} + \frac{7\sqrt{10010}}{3432}iR_{50} + \frac{7\sqrt{429}}{286}iR_{52}$ $+ \frac{35\sqrt{143}}{572}iR_{54} + \frac{21\sqrt{546}}{2431}iR_{70} - \frac{147\sqrt{26}}{2431}iR_{72} + \frac{84\sqrt{143}}{2431}iR_{74}$ $+ \frac{21\sqrt{22}}{187}iR_{76} + \frac{21\sqrt{17290}}{8398}iR_{90} - \frac{21\sqrt{38038}}{33592}iR_{92} - \frac{35\sqrt{209}}{646}iR_{94}$ $+ \frac{21\sqrt{8778}}{2584}iR_{96}$
3	3	1	6	6	3	$- \frac{5\sqrt{2145}}{858}R_{30} + \frac{5\sqrt{286}}{78}R_{32} + \frac{\sqrt{1365}}{78}R_{50} - \frac{7\sqrt{26}}{39}R_{52}$ $- \frac{\sqrt{78}}{78}R_{54} - \frac{45\sqrt{1001}}{4862}R_{70} + \frac{21\sqrt{429}}{884}R_{72} + \frac{15\sqrt{78}}{442}R_{74}$ $- \frac{15\sqrt{3}}{68}R_{76} + \frac{\sqrt{285285}}{8398}R_{90} - \frac{29\sqrt{5187}}{16796}R_{92} - \frac{11\sqrt{114}}{646}R_{94}$ $+ \frac{55\sqrt{133}}{1292}R_{96} - \frac{7\sqrt{13566}}{646}R_{98}$
3	3	1	6	6	4	$\frac{20\sqrt{39}}{429}R_{30} + \frac{5\sqrt{130}}{429}R_{32} - \frac{4\sqrt{3003}}{429}R_{50} - \frac{7\sqrt{1430}}{429}R_{52}$ $- \frac{2\sqrt{4290}}{429}R_{54} + \frac{36\sqrt{455}}{2431}R_{70} + \frac{126\sqrt{195}}{2431}R_{72} + \frac{30\sqrt{4290}}{2431}R_{74}$ $+ \frac{6\sqrt{165}}{187}R_{76} - \frac{4\sqrt{5187}}{4199}R_{90} - \frac{2\sqrt{285285}}{4199}R_{92} - \frac{2\sqrt{6270}}{323}R_{94}$ $- \frac{2\sqrt{7315}}{323}R_{96}$

Table B290: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	2	3	3	2	$-\frac{\sqrt{30}}{20}I_{21} - \frac{4\sqrt{5}}{11}I_{41} + \frac{25\sqrt{546}}{572}I_{61} + \frac{5\sqrt{1365}}{286}I_{63}$ $+ R_{00} + \frac{3\sqrt{5}}{5}R_{20} + \frac{1}{11}R_{40} - \frac{2\sqrt{10}}{11}R_{42}$ $- \frac{25\sqrt{13}}{143}R_{60} - \frac{10\sqrt{1365}}{429}R_{62}$
3	3	2	4	4	1	$\frac{\sqrt{105}}{33}R_{30} + \frac{2\sqrt{14}}{33}R_{32} + \frac{35\sqrt{165}}{858}R_{50} - \frac{19\sqrt{154}}{429}R_{52}$ $- \frac{37\sqrt{462}}{858}R_{54} + \frac{245}{1144}R_{70} + \frac{115\sqrt{21}}{3432}R_{72} - \frac{25\sqrt{462}}{3432}R_{74}$ $+ \frac{15\sqrt{3003}}{1144}R_{76}$
3	3	2	4	4	2	$\frac{3\sqrt{7}}{7}R_{10} + \frac{7\sqrt{3}}{66}R_{30} - \frac{17\sqrt{10}}{66}R_{32} - \frac{40\sqrt{231}}{3003}R_{50}$ $- \frac{7\sqrt{110}}{429}R_{52} + \frac{10\sqrt{330}}{429}R_{54} + \frac{35\sqrt{35}}{286}R_{70} + \frac{140\sqrt{15}}{429}R_{72}$ $+ \frac{35\sqrt{330}}{858}R_{74}$
3	3	2	4	4	3	$-\frac{\sqrt{35}}{14}iR_{10} - \frac{\sqrt{15}}{22}iR_{30} + \frac{\sqrt{2}}{2}iR_{32} - \frac{\sqrt{1155}}{2002}iR_{50}$ $+ \frac{5\sqrt{22}}{22}iR_{52} - \frac{7\sqrt{66}}{286}iR_{54} + \frac{35\sqrt{7}}{286}iR_{70} - \frac{35\sqrt{66}}{286}iR_{74}$
3	3	2	5	5	1	$-\frac{35\sqrt{165}}{286}iI_{41} - \frac{3\sqrt{2002}}{286}iI_{61} + \frac{\sqrt{5005}}{143}iI_{63} + \frac{7\sqrt{1122}}{884}iI_{81}$ $+ \frac{25\sqrt{1190}}{884}iI_{83} - \frac{10\sqrt{33}}{143}iR_{40} + \frac{4\sqrt{330}}{143}iR_{42} - \frac{7\sqrt{429}}{143}iR_{60}$ $- \frac{\sqrt{5005}}{143}iR_{62} - \frac{28\sqrt{561}}{2431}iR_{80} - \frac{\sqrt{19635}}{2431}iR_{82} + \frac{5\sqrt{714}}{221}iR_{84}$
3	3	2	5	5	2	$\frac{5\sqrt{231}}{77}iI_{21} + \frac{17\sqrt{154}}{182}iI_{41} + \frac{63\sqrt{6545}}{4862}iI_{81} + \frac{35\sqrt{51}}{442}iI_{83}$ $+ \frac{5\sqrt{154}}{154}iR_{20} + \frac{\sqrt{770}}{91}iR_{40} - \frac{43\sqrt{77}}{1001}iR_{42} - \frac{7\sqrt{858}}{429}iR_{62}$ $- \frac{14\sqrt{13090}}{2431}iR_{80} - \frac{105\sqrt{374}}{2431}iR_{82}$
3	3	2	5	5	3	$\frac{5\sqrt{22}}{33}I_{21} + \frac{47\sqrt{33}}{286}I_{41} - \frac{\sqrt{10010}}{858}I_{61} - \frac{3\sqrt{1001}}{143}I_{63}$ $- \frac{441\sqrt{5610}}{9724}I_{81} - \frac{105\sqrt{238}}{884}I_{83} - \frac{5\sqrt{33}}{33}R_{20} - \frac{4\sqrt{165}}{143}R_{40}$ $+ \frac{17\sqrt{66}}{143}R_{42} + \frac{7\sqrt{2145}}{429}R_{60} + \frac{23\sqrt{1001}}{429}R_{62} - \frac{15\sqrt{3927}}{2431}R_{82}$ $- \frac{3\sqrt{3570}}{221}R_{84}$
3	3	2	6	6	1	$-\frac{7\sqrt{858}}{572}R_{50} + \frac{\sqrt{5005}}{143}R_{52} + \frac{\sqrt{15015}}{286}R_{54} - \frac{399\sqrt{130}}{8840}R_{70}$ $+ \frac{\sqrt{2730}}{104}R_{72} - \frac{21\sqrt{15015}}{48620}R_{74} - \frac{7\sqrt{2310}}{440}R_{76} - \frac{21\sqrt{1482}}{5168}R_{90}$ $+ \frac{3\sqrt{21945}}{1292}R_{94} + \frac{7\sqrt{53295}}{2584}R_{98}$

Table B291: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	2	6	6	2	$-\frac{25\sqrt{78}}{858}R_{30} + \frac{15\sqrt{65}}{143}R_{32} - \frac{7\sqrt{6006}}{3432}R_{50} + \frac{7\sqrt{715}}{286}R_{52}$ $-\frac{7\sqrt{2145}}{572}R_{54} - \frac{63\sqrt{910}}{12155}R_{70} - \frac{49\sqrt{390}}{2431}R_{72} - \frac{84\sqrt{2145}}{12155}R_{74}$ $+\frac{7\sqrt{330}}{187}R_{76} - \frac{21\sqrt{10374}}{8398}R_{90} - \frac{7\sqrt{570570}}{33592}R_{92} + \frac{7\sqrt{3135}}{646}R_{94}$ $+\frac{21\sqrt{14630}}{2584}R_{96}$
3	3	2	6	6	3	$\frac{25\sqrt{143}}{858}iR_{30} - \frac{5\sqrt{4290}}{858}iR_{32} + \frac{\sqrt{91}}{78}iR_{50} - \frac{\sqrt{390}}{39}iR_{52}$ $+\frac{\sqrt{130}}{26}iR_{54} - \frac{\sqrt{15015}}{12155}iR_{70} - \frac{909\sqrt{715}}{48620}iR_{72} + \frac{6\sqrt{130}}{65}iR_{74}$ $+\frac{21\sqrt{5}}{340}iR_{76} - \frac{9\sqrt{19019}}{4199}iR_{90} - \frac{11\sqrt{8645}}{16796}iR_{92} + \frac{\sqrt{190}}{38}iR_{94}$ $-\frac{21\sqrt{1995}}{1292}iR_{96}$
3	3	2	6	6	4	$\frac{50\sqrt{65}}{429}iR_{30} + \frac{5\sqrt{78}}{39}iR_{32} + \frac{2\sqrt{5005}}{429}iR_{50} + \frac{\sqrt{858}}{429}iR_{52}$ $-\frac{4\sqrt{286}}{143}iR_{54} - \frac{4\sqrt{273}}{2431}iR_{70} - \frac{12\sqrt{13}}{221}iR_{72} - \frac{54\sqrt{286}}{2431}iR_{74}$ $-\frac{36\sqrt{8645}}{4199}iR_{90} - \frac{40\sqrt{19019}}{4199}iR_{92} - \frac{10\sqrt{418}}{323}iR_{94}$
4	4	1	4	4	1	$R_{00} - \frac{16\sqrt{5}}{33}R_{20} + \frac{84}{143}R_{40} - \frac{30\sqrt{10}}{143}R_{42}$ $+\frac{128\sqrt{13}}{429}R_{60} + \frac{448\sqrt{1365}}{6435}R_{62} + \frac{574\sqrt{17}}{7293}R_{80} - \frac{316\sqrt{595}}{7293}R_{82}$ $+\frac{19\sqrt{2618}}{663}R_{84}$
4	4	1	4	4	2	$\frac{40\sqrt{7}}{231}R_{20} + \frac{48\sqrt{35}}{1001}R_{40} + \frac{12\sqrt{14}}{143}R_{42} + \frac{32\sqrt{455}}{429}R_{60}$ $+\frac{256\sqrt{39}}{1287}R_{62} + \frac{112\sqrt{595}}{7293}R_{80} + \frac{280\sqrt{17}}{7293}R_{82} - \frac{112\sqrt{1870}}{7293}R_{84}$
4	4	1	4	4	3	$-\frac{2\sqrt{210}}{33}iI_{21} + \frac{36\sqrt{35}}{143}iI_{41} - \frac{2\sqrt{78}}{429}iI_{61} - \frac{4\sqrt{195}}{429}iI_{63}$ $+\frac{42\sqrt{238}}{187}iI_{81} + \frac{350\sqrt{5610}}{7293}iI_{83}$
4	4	1	5	5	1	$-\frac{3\sqrt{165}}{44}iR_{10} - \frac{\sqrt{385}}{143}iR_{30} - \frac{5\sqrt{462}}{143}iR_{32} - \frac{\sqrt{5}}{13}iR_{50}$ $+\frac{\sqrt{42}}{26}iR_{52} - \frac{2\sqrt{14}}{13}iR_{54} + \frac{35\sqrt{33}}{19448}iR_{70} - \frac{635\sqrt{77}}{19448}iR_{72}$ $+\frac{265\sqrt{14}}{1768}iR_{74} - \frac{5\sqrt{91}}{104}iR_{76} - \frac{25767\sqrt{1045}}{1478048}iR_{90}$ $+\frac{7357\sqrt{19}}{33592}iR_{92} - \frac{791\sqrt{3458}}{67184}iR_{94} + \frac{35\sqrt{741}}{1976}iR_{96}$ $-\frac{315\sqrt{8398}}{134368}iR_{98}$

Table B292: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	5	5	2	$-\frac{\sqrt{154}}{44}iR_{10} + \frac{16\sqrt{66}}{429}iR_{30} + \frac{20\sqrt{55}}{429}iR_{32} - \frac{7\sqrt{42}}{78}iR_{50}$ $-\frac{7\sqrt{5}}{39}iR_{52} + \frac{\sqrt{15}}{39}iR_{54} - \frac{203\sqrt{770}}{19448}iR_{70} - \frac{35\sqrt{330}}{58344}iR_{72}$ $+ \frac{665\sqrt{15}}{2652}iR_{74} + \frac{49\sqrt{390}}{1768}iR_{76} - \frac{2247\sqrt{8778}}{1478048}iR_{90}$ $- \frac{105\sqrt{3990}}{33592}iR_{92} - \frac{21\sqrt{3705}}{33592}iR_{94} - \frac{21\sqrt{17290}}{33592}iR_{96}$ $- \frac{63\sqrt{440895}}{67184}iR_{98}$
4	4	1	5	5	3	$\frac{19\sqrt{33}}{396}R_{10} - \frac{\sqrt{77}}{11}R_{30} - \frac{\sqrt{2310}}{143}R_{32} + \frac{2}{13}R_{50}$ $- \frac{\sqrt{210}}{26}R_{52} - \frac{\sqrt{70}}{13}R_{54} - \frac{5495\sqrt{165}}{175032}R_{70} + \frac{917\sqrt{385}}{58344}R_{72}$ $+ \frac{35\sqrt{70}}{1768}R_{74} + \frac{9\sqrt{455}}{1768}R_{76} - \frac{1701\sqrt{209}}{113696}R_{90} - \frac{21\sqrt{95}}{33592}R_{92}$ $+ \frac{147\sqrt{17290}}{67184}R_{94} - \frac{315\sqrt{3705}}{33592}R_{96} + \frac{567\sqrt{41990}}{134368}R_{98}$
4	4	1	6	6	1	$- \frac{45\sqrt{26}}{143}R_{20} + \frac{8\sqrt{130}}{429}R_{40} - \frac{8\sqrt{13}}{33}R_{42} + \frac{42\sqrt{10}}{187}R_{60}$ $+ \frac{60\sqrt{42}}{187}R_{62} - \frac{168\sqrt{2210}}{46189}R_{80} - \frac{32\sqrt{3094}}{4199}R_{82} + \frac{200\sqrt{85085}}{46189}R_{84}$ $- \frac{226\sqrt{2730}}{4199}R_{10,0} - \frac{400\sqrt{1001}}{4199}R_{10,2} - \frac{118\sqrt{77}}{323}R_{10,4}$
4	4	1	6	6	2	$\frac{5\sqrt{182}}{143}R_{20} - \frac{80\sqrt{910}}{3003}R_{40} - \frac{16\sqrt{91}}{3003}R_{42} + \frac{28\sqrt{70}}{187}R_{60}$ $+ \frac{224\sqrt{6}}{561}R_{62} - \frac{168\sqrt{15470}}{46189}R_{80} + \frac{896\sqrt{442}}{46189}R_{82} + \frac{56\sqrt{12155}}{46189}R_{84}$ $+ \frac{42\sqrt{390}}{323}R_{10,0} + \frac{1792\sqrt{143}}{4199}R_{10,2} + \frac{350\sqrt{11}}{323}R_{10,4}$
4	4	1	6	6	3	$\frac{15\sqrt{2002}}{1001}iI_{21} - \frac{8\sqrt{3003}}{3003}iI_{41} + \frac{2\sqrt{110}}{187}iI_{61} + \frac{4\sqrt{11}}{187}iI_{63}$ $+ \frac{148\sqrt{510510}}{46189}iI_{81} + \frac{348\sqrt{442}}{4199}iI_{83} - \frac{14\sqrt{26}}{247}iI_{10,1}$ $- \frac{239\sqrt{3}}{969}iI_{10,3} + \frac{509\sqrt{15}}{969}iI_{10,5}$
4	4	1	6	6	4	$\frac{4\sqrt{910}}{1001}iI_{21} + \frac{8\sqrt{1365}}{1001}iI_{41} + \frac{96\sqrt{2}}{187}iI_{61} + \frac{16\sqrt{5}}{187}iI_{63}$ $+ \frac{72\sqrt{9282}}{2717}iI_{81} + \frac{216\sqrt{24310}}{46189}iI_{83} + \frac{56\sqrt{1430}}{4199}iI_{10,1}$ $- \frac{8\sqrt{165}}{969}iI_{10,3} - \frac{80\sqrt{33}}{969}iI_{10,5}$
4	4	2	4	4	2	$R_{00} + \frac{160\sqrt{5}}{231}R_{20} + \frac{276}{1001}R_{40} - \frac{222\sqrt{10}}{1001}R_{42}$ $- \frac{80\sqrt{13}}{429}R_{60} - \frac{32\sqrt{1365}}{1287}R_{62} + \frac{980\sqrt{17}}{7293}R_{80} + \frac{280\sqrt{595}}{7293}R_{82}$ $+ \frac{70\sqrt{2618}}{7293}R_{84}$
4	4	2	4	4	3	$\frac{50\sqrt{6}}{231}iI_{21} + \frac{1692}{1001}iI_{41} - \frac{2\sqrt{2730}}{429}iI_{61} - \frac{20\sqrt{273}}{429}iI_{63}$ $- \frac{588\sqrt{170}}{2431}iI_{81} - \frac{140\sqrt{7854}}{7293}iI_{83}$

Table B293: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	5	5	1	$-\frac{25\sqrt{11}}{286}iR_{30} + \frac{5\sqrt{330}}{286}iR_{32} - \frac{11\sqrt{7}}{52}iR_{50} + \frac{\sqrt{30}}{26}iR_{52}$ $+ \frac{7\sqrt{10}}{52}iR_{54} - \frac{50\sqrt{1155}}{2431}iR_{70} + \frac{365\sqrt{55}}{9724}iR_{72} + \frac{35\sqrt{10}}{221}iR_{74}$ $- \frac{5\sqrt{65}}{884}iR_{76} - \frac{63\sqrt{1463}}{8398}iR_{90} - \frac{77\sqrt{665}}{33592}iR_{92} + \frac{175\sqrt{2470}}{16796}iR_{94}$ $- \frac{35\sqrt{25935}}{33592}iR_{96}$
4	4	2	5	5	2	$-\frac{\sqrt{110}}{11}iR_{10} - \frac{37\sqrt{2310}}{6006}iR_{30} + \frac{115\sqrt{77}}{3003}iR_{32} + \frac{\sqrt{30}}{156}iR_{50}$ $+ \frac{\sqrt{7}}{39}iR_{52} + \frac{\sqrt{21}}{78}iR_{54} + \frac{70\sqrt{22}}{2431}iR_{70} + \frac{295\sqrt{462}}{29172}iR_{72}$ $+ \frac{10\sqrt{21}}{663}iR_{74} - \frac{5\sqrt{546}}{884}iR_{76} - \frac{735\sqrt{6270}}{92378}iR_{90} - \frac{3675\sqrt{114}}{33592}iR_{92}$ $- \frac{105\sqrt{5187}}{8398}iR_{94} - \frac{735\sqrt{494}}{33592}iR_{96}$
4	4	2	5	5	3	$-\frac{2\sqrt{1155}}{99}R_{10} - \frac{\sqrt{55}}{26}R_{30} + \frac{35\sqrt{66}}{286}R_{32} - \frac{\sqrt{35}}{52}R_{50}$ $+ \frac{7\sqrt{6}}{26}R_{52} - \frac{23\sqrt{2}}{52}R_{54} - \frac{10\sqrt{231}}{1989}R_{70} - \frac{3775\sqrt{11}}{29172}R_{72}$ $- \frac{115\sqrt{2}}{221}R_{74} + \frac{45\sqrt{13}}{884}R_{76} - \frac{567\sqrt{7315}}{92378}R_{90} - \frac{105\sqrt{133}}{1768}R_{92}$ $+ \frac{105\sqrt{494}}{16796}R_{94} + \frac{315\sqrt{5187}}{33592}R_{96}$
4	4	2	6	6	1	$-\frac{80\sqrt{182}}{3003}R_{40} + \frac{64\sqrt{455}}{3003}R_{42} - \frac{60\sqrt{14}}{187}R_{60} - \frac{144\sqrt{30}}{935}R_{62}$ $- \frac{48\sqrt{3094}}{3553}R_{80} + \frac{32\sqrt{2210}}{3553}R_{82} + \frac{592\sqrt{2431}}{46189}R_{84} + \frac{280\sqrt{78}}{4199}R_{10,0}$ $+ \frac{224\sqrt{715}}{4199}R_{10,2} + \frac{56\sqrt{55}}{323}R_{10,4}$
4	4	2	6	6	2	$-\frac{10\sqrt{130}}{143}R_{20} - \frac{40\sqrt{26}}{429}R_{40} + \frac{56\sqrt{65}}{429}R_{42} + \frac{98\sqrt{2}}{187}R_{60}$ $+ \frac{436\sqrt{210}}{2805}R_{62} + \frac{168\sqrt{442}}{46189}R_{80} - \frac{112\sqrt{15470}}{46189}R_{82}$ $- \frac{296\sqrt{17017}}{46189}R_{84} - \frac{420\sqrt{546}}{4199}R_{10,0} - \frac{224\sqrt{5005}}{4199}R_{10,2}$ $- \frac{28\sqrt{385}}{323}R_{10,4}$
4	4	2	6	6	3	$-\frac{8\sqrt{2145}}{429}iI_{41} - \frac{32\sqrt{154}}{1309}iI_{61} + \frac{64\sqrt{385}}{1309}iI_{63} + \frac{124\sqrt{14586}}{4199}iI_{81}$ $+ \frac{492\sqrt{15470}}{29393}iI_{83} + \frac{8\sqrt{910}}{323}iI_{10,1} - \frac{32\sqrt{105}}{969}iI_{10,3}$ $- \frac{200\sqrt{21}}{969}iI_{10,5}$
4	4	2	6	6	4	$\frac{35\sqrt{26}}{143}iI_{21} + \frac{40\sqrt{39}}{143}iI_{41} + \frac{12\sqrt{70}}{1309}iI_{61} - \frac{232\sqrt{7}}{1309}iI_{63}$ $- \frac{648\sqrt{6630}}{46189}iI_{81} - \frac{1080\sqrt{34034}}{323323}iI_{83} + \frac{100\sqrt{2002}}{4199}iI_{10,1}$ $+ \frac{50\sqrt{231}}{969}iI_{10,3} + \frac{10\sqrt{1155}}{969}iI_{10,5}$

Table B294: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	3	4	4	3	$R_{00} - \frac{16\sqrt{5}}{77}R_{20} - \frac{54}{77}R_{40} + \frac{27\sqrt{10}}{1001}R_{42}$ $+ \frac{20\sqrt{13}}{143}R_{60} - \frac{24\sqrt{1365}}{715}R_{62} - \frac{392\sqrt{17}}{2431}R_{80} + \frac{84\sqrt{2618}}{2431}R_{84}$
4	4	3	5	5	1	$\frac{35\sqrt{66}}{286}R_{32} - \frac{7\sqrt{6}}{26}R_{52} + \frac{3\sqrt{2}}{13}R_{54} + \frac{315\sqrt{11}}{4862}R_{72}$ $- \frac{75\sqrt{2}}{442}R_{74} - \frac{45\sqrt{13}}{442}R_{76} - \frac{21\sqrt{133}}{8398}R_{92} + \frac{21\sqrt{494}}{8398}R_{94}$ $+ \frac{21\sqrt{5187}}{8398}R_{96} - \frac{21\sqrt{58786}}{4199}R_{98}$
4	4	3	5	5	2	$-\frac{\sqrt{22}}{11}R_{10} - \frac{19\sqrt{462}}{2002}R_{30} - \frac{2\sqrt{385}}{77}R_{32} - \frac{\sqrt{6}}{26}R_{50}$ $+ \frac{\sqrt{35}}{13}R_{52} + \frac{\sqrt{105}}{13}R_{54} + \frac{7\sqrt{110}}{2431}R_{70} + \frac{3\sqrt{2310}}{143}R_{72}$ $+ \frac{7\sqrt{105}}{221}R_{74} + \frac{441\sqrt{1254}}{46189}R_{90} - \frac{21\sqrt{25935}}{4199}R_{94}$
4	4	3	5	5	3	$-\frac{2\sqrt{231}}{33}iR_{10} + \frac{21\sqrt{11}}{143}iR_{30} + \frac{\sqrt{330}}{286}iR_{32} + \frac{3\sqrt{7}}{13}iR_{50}$ $+ \frac{\sqrt{30}}{26}iR_{52} - \frac{133\sqrt{1155}}{7293}iR_{70} + \frac{163\sqrt{55}}{4862}iR_{72} - \frac{\sqrt{10}}{34}iR_{74}$ $+ \frac{35\sqrt{65}}{442}iR_{76} + \frac{189\sqrt{1463}}{46189}iR_{90} - \frac{63\sqrt{665}}{8398}iR_{92} - \frac{63\sqrt{2470}}{8398}iR_{94}$ $+ \frac{63\sqrt{25935}}{8398}iR_{96}$
4	4	3	6	6	1	$-\frac{28\sqrt{182}}{143}iI_{41} + \frac{12\sqrt{15}}{187}iI_{61} - \frac{72\sqrt{6}}{187}iI_{63} + \frac{12\sqrt{7735}}{4199}iI_{81}$ $- \frac{60\sqrt{7293}}{46189}iI_{83} + \frac{42\sqrt{22}}{323}iI_{10,3} - \frac{42\sqrt{110}}{323}iI_{10,5}$
4	4	3	6	6	2	$\frac{20\sqrt{39}}{143}iI_{21} - \frac{20\sqrt{26}}{143}iI_{41} - \frac{10\sqrt{105}}{187}iI_{61} - \frac{6\sqrt{42}}{187}iI_{63}$ $- \frac{84\sqrt{1105}}{3553}iI_{81} - \frac{348\sqrt{51051}}{46189}iI_{83} - \frac{84\sqrt{3003}}{4199}iI_{10,1}$ $+ \frac{21\sqrt{154}}{323}iI_{10,3} + \frac{21\sqrt{770}}{323}iI_{10,5}$
4	4	3	6	6	3	$-\frac{10\sqrt{429}}{143}R_{20} + \frac{4\sqrt{2145}}{1001}R_{40} + \frac{6\sqrt{858}}{1001}R_{42} - \frac{2\sqrt{165}}{187}R_{60}$ $- \frac{28\sqrt{77}}{187}R_{62} - \frac{108\sqrt{36465}}{46189}R_{80} + \frac{1272\sqrt{51051}}{323323}R_{82}$ $- \frac{54\sqrt{46410}}{29393}R_{84} - \frac{216\sqrt{5005}}{4199}R_{10,0} - \frac{1280\sqrt{546}}{4199}R_{10,2}$ $- \frac{244\sqrt{42}}{323}R_{10,4}$
4	4	3	6	6	4	$\frac{2\sqrt{195}}{143}R_{20} - \frac{60\sqrt{39}}{1001}R_{40} - \frac{18\sqrt{390}}{1001}R_{42} - \frac{124\sqrt{3}}{187}R_{60}$ $- \frac{152\sqrt{35}}{935}R_{62} + \frac{360\sqrt{663}}{46189}R_{80} + \frac{96\sqrt{23205}}{29393}R_{82} + \frac{516\sqrt{102102}}{323323}R_{84}$ $+ \frac{720\sqrt{91}}{4199}R_{10,0} + \frac{64\sqrt{30030}}{4199}R_{10,2} + \frac{8\sqrt{2310}}{323}R_{10,4}$

Table B295: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	1	$-\frac{5\sqrt{30}}{208}I_{21} + \frac{6\sqrt{5}}{13}I_{41} - \frac{35\sqrt{546}}{1768}I_{61} + \frac{25\sqrt{1365}}{884}I_{63}$ $-\frac{210\sqrt{34}}{323}I_{81} - \frac{70\sqrt{39270}}{4199}I_{83} + \frac{213\sqrt{2310}}{33592}I_{10,1} - \frac{27\sqrt{5005}}{67184}I_{10,3}$ $-\frac{2043\sqrt{1001}}{67184}I_{10,5} + R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40}$ $-\frac{10\sqrt{13}}{221}R_{60} + \frac{35\sqrt{17}}{4199}R_{80} + \frac{1251\sqrt{21}}{4199}R_{10,0} + \frac{3\sqrt{770}}{221}R_{10,2}$ $+ \frac{3\sqrt{10010}}{221}R_{10,4}$
5	5	1	5	5	2	$-\frac{15\sqrt{7}}{104}I_{21} - \frac{\sqrt{42}}{13}I_{41} - \frac{3\sqrt{65}}{52}I_{61} + \frac{5\sqrt{26}}{884}I_{63}$ $-\frac{7\sqrt{1785}}{323}I_{81} + \frac{35\sqrt{187}}{4199}I_{83} - \frac{2079\sqrt{11}}{16796}I_{10,1} + \frac{1155\sqrt{858}}{67184}I_{10,3}$ $-\frac{105\sqrt{4290}}{67184}I_{10,5} + \frac{\sqrt{210}}{91}R_{40} - \frac{4\sqrt{21}}{91}R_{42} + \frac{5\sqrt{2730}}{221}R_{60}$ $+ \frac{58\sqrt{26}}{221}R_{62} + \frac{28\sqrt{3570}}{4199}R_{80} + \frac{35\sqrt{102}}{4199}R_{82} - \frac{49\sqrt{2805}}{4199}R_{84}$ $+ \frac{1386\sqrt{10}}{4199}R_{10,0} + \frac{1302\sqrt{33}}{4199}R_{10,2} + \frac{189\sqrt{429}}{4199}R_{10,4}$
5	5	1	5	5	3	$-\frac{45\sqrt{6}}{208}iI_{21} + \frac{12}{13}iI_{41} + \frac{\sqrt{2730}}{1768}iI_{61} - \frac{15\sqrt{273}}{884}iI_{63}$ $+ \frac{553\sqrt{170}}{4199}iI_{81} + \frac{35\sqrt{7854}}{4199}iI_{83} + \frac{45\sqrt{462}}{33592}iI_{10,1}$ $+ \frac{909\sqrt{1001}}{67184}iI_{10,3} - \frac{45\sqrt{5005}}{3536}iI_{10,5} - \frac{5}{13}iR_{20} - \frac{6\sqrt{2}}{13}iR_{42}$ $+ \frac{20\sqrt{273}}{663}iR_{62} - \frac{105\sqrt{85}}{4199}iR_{80} + \frac{90\sqrt{119}}{4199}iR_{82} - \frac{10\sqrt{13090}}{4199}iR_{84}$ $+ \frac{693\sqrt{105}}{4199}iR_{10,0} + \frac{1161\sqrt{154}}{4199}iR_{10,2} + \frac{18\sqrt{2002}}{323}iR_{10,4}$
5	5	1	6	6	1	$-\frac{4\sqrt{858}}{143}iR_{10} - \frac{\sqrt{2002}}{143}iR_{30} - \frac{\sqrt{15015}}{286}iR_{32} - \frac{5\sqrt{26}}{221}iR_{50}$ $-\frac{2\sqrt{1365}}{221}iR_{52} + \frac{2\sqrt{455}}{221}iR_{54} - \frac{175\sqrt{4290}}{369512}iR_{70} - \frac{45\sqrt{10010}}{369512}iR_{72}$ $-\frac{345\sqrt{455}}{16796}iR_{74} + \frac{165\sqrt{70}}{2584}iR_{76} - \frac{105\sqrt{5434}}{1478048}iR_{90}$ $-\frac{15\sqrt{2470}}{33592}iR_{92} + \frac{15\sqrt{665}}{2584}iR_{94} - \frac{3\sqrt{570}}{136}iR_{96} + \frac{63\sqrt{1615}}{5168}iR_{98}$ $-\frac{44121\sqrt{6578}}{6180928}iR_{11,0} + \frac{12441\sqrt{345}}{237728}iR_{11,2} - \frac{5577\sqrt{161}}{118864}iR_{11,4}$ $+ \frac{3531\sqrt{2346}}{475456}iR_{11,6} - \frac{231\sqrt{111435}}{237728}iR_{11,8} + \frac{165\sqrt{312018}}{475456}iR_{11,10}$

Table B296: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	6	6	2	$-\frac{\sqrt{6006}}{572}iR_{10} - \frac{21\sqrt{286}}{1144}iR_{30} - \frac{7\sqrt{2145}}{572}iR_{32} - \frac{15\sqrt{182}}{884}iR_{50}$ $- \frac{10\sqrt{195}}{221}iR_{52} - \frac{25\sqrt{65}}{442}iR_{54} - \frac{35\sqrt{30030}}{739024}iR_{70} - \frac{4935\sqrt{1430}}{739024}iR_{72}$ $- \frac{2415\sqrt{65}}{33592}iR_{74} - \frac{105\sqrt{10}}{5168}iR_{76} - \frac{885\sqrt{38038}}{739024}iR_{90}$ $+ \frac{129\sqrt{17290}}{33592}iR_{92} - \frac{63\sqrt{95}}{1292}iR_{94} - \frac{9\sqrt{3990}}{2584}iR_{96} + \frac{3\sqrt{11305}}{2584}iR_{98}$ $- \frac{3993\sqrt{46046}}{3090464}iR_{11,0} + \frac{99\sqrt{2415}}{29716}iR_{11,2} + \frac{6699\sqrt{23}}{59432}iR_{11,4}$ $- \frac{165\sqrt{16422}}{29716}iR_{11,6} + \frac{33\sqrt{780045}}{118864}iR_{11,8}$
5	5	1	6	6	3	$\frac{3\sqrt{91}}{52}R_{10} - \frac{7\sqrt{39}}{52}R_{30} + \frac{\sqrt{130}}{52}R_{32} + \frac{5\sqrt{3003}}{442}R_{50}$ $- \frac{5\sqrt{1430}}{442}R_{52} + \frac{\sqrt{4290}}{442}R_{54} - \frac{105\sqrt{455}}{8398}R_{70} + \frac{105\sqrt{195}}{4199}R_{72}$ $- \frac{35\sqrt{4290}}{8398}R_{74} - \frac{5\sqrt{165}}{323}R_{76} + \frac{15\sqrt{5187}}{16796}R_{90} - \frac{15\sqrt{285285}}{58786}R_{92}$ $+ \frac{3\sqrt{6270}}{1292}R_{94} + \frac{15\sqrt{7315}}{4522}R_{96} - \frac{5\sqrt{746130}}{9044}R_{98} - \frac{33\sqrt{6279}}{386308}R_{11,0}$ $+ \frac{33\sqrt{17710}}{208012}R_{11,2} - \frac{33\sqrt{1518}}{29716}R_{11,4} - \frac{33\sqrt{30107}}{52003}R_{11,6}$ $+ \frac{33\sqrt{5720330}}{208012}R_{11,8} - \frac{63\sqrt{81719}}{14858}R_{11,10}$
5	5	1	6	6	4	$- \frac{2\sqrt{286}}{143}R_{32} + \frac{20\sqrt{26}}{221}R_{52} + \frac{10\sqrt{78}}{221}R_{54} - \frac{840\sqrt{429}}{46189}R_{72}$ $- \frac{350\sqrt{78}}{4199}R_{74} - \frac{100\sqrt{3}}{323}R_{76} + \frac{60\sqrt{5187}}{29393}R_{92} + \frac{15\sqrt{114}}{323}R_{94}$ $+ \frac{150\sqrt{133}}{2261}R_{96} + \frac{10\sqrt{13566}}{2261}R_{98} - \frac{66\sqrt{322}}{52003}R_{11,2} - \frac{33\sqrt{690}}{7429}R_{11,4}$ $- \frac{132\sqrt{13685}}{52003}R_{11,6} - \frac{66\sqrt{104006}}{52003}R_{11,8}$
5	5	2	5	5	2	$\frac{3\sqrt{30}}{104}I_{21} + \frac{8\sqrt{5}}{13}I_{41} + \frac{\sqrt{546}}{68}I_{61} - \frac{7\sqrt{1365}}{442}I_{63}$ $- \frac{882\sqrt{34}}{4199}I_{81} - \frac{14\sqrt{39270}}{4199}I_{83} - \frac{315\sqrt{2310}}{16796}I_{10,1}$ $- \frac{315\sqrt{5005}}{33592}I_{10,3} - \frac{315\sqrt{1001}}{33592}I_{10,5} + R_{00} + \frac{8\sqrt{5}}{13}R_{20}$ $+ \frac{4}{13}R_{40} - \frac{2\sqrt{10}}{13}R_{42} + \frac{8\sqrt{13}}{221}R_{60} - \frac{8\sqrt{1365}}{663}R_{62}$ $- \frac{98\sqrt{17}}{4199}R_{80} - \frac{84\sqrt{595}}{4199}R_{82} - \frac{630\sqrt{21}}{4199}R_{10,0} - \frac{126\sqrt{770}}{4199}R_{10,2}$
5	5	2	5	5	3	$- \frac{\sqrt{35}}{312}iI_{21} + \frac{\sqrt{210}}{13}iI_{41} + \frac{287\sqrt{13}}{2652}iI_{61} - \frac{3\sqrt{130}}{68}iI_{63}$ $- \frac{301\sqrt{357}}{4199}iI_{81} - \frac{63\sqrt{935}}{4199}iI_{83} + \frac{1701\sqrt{55}}{16796}iI_{10,1}$ $+ \frac{63\sqrt{4290}}{67184}iI_{10,3} - \frac{945\sqrt{858}}{67184}iI_{10,5} - \frac{2\sqrt{210}}{39}iR_{20}$ $- \frac{5\sqrt{42}}{91}iR_{40} + \frac{4\sqrt{105}}{91}iR_{42} + \frac{\sqrt{546}}{51}iR_{60} + \frac{98\sqrt{130}}{3315}iR_{62}$ $- \frac{7\sqrt{510}}{323}iR_{82} + \frac{7\sqrt{561}}{4199}iR_{84} + \frac{126\sqrt{165}}{4199}iR_{10,2} + \frac{63\sqrt{2145}}{4199}iR_{10,4}$

Table B297: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	6	6	1	$\begin{aligned} & \frac{7\sqrt{286}}{286}iR_{32} - \frac{\sqrt{1365}}{221}iR_{50} - \frac{4\sqrt{26}}{221}iR_{52} - \frac{11\sqrt{78}}{221}iR_{54} \\ & - \frac{105\sqrt{1001}}{8398}iR_{70} + \frac{1675\sqrt{429}}{92378}iR_{72} + \frac{705\sqrt{78}}{8398}iR_{74} \\ & + \frac{65\sqrt{3}}{646}iR_{76} - \frac{3\sqrt{285285}}{5168}iR_{90} - \frac{21\sqrt{5187}}{16796}iR_{92} + \frac{105\sqrt{114}}{2584}iR_{94} \\ & - \frac{3\sqrt{133}}{68}iR_{96} - \frac{25\sqrt{13566}}{5168}iR_{98} - \frac{33\sqrt{345345}}{237728}iR_{11,0} \\ & - \frac{693\sqrt{322}}{237728}iR_{11,2} + \frac{693\sqrt{690}}{118864}iR_{11,4} + \frac{429\sqrt{13685}}{237728}iR_{11,6} \\ & + \frac{99\sqrt{104006}}{237728}iR_{11,8} + \frac{693\sqrt{37145}}{237728}iR_{11,10} \end{aligned}$
5	5	2	6	6	2	$\begin{aligned} & \frac{3\sqrt{715}}{286}iR_{10} - \frac{7\sqrt{15015}}{1716}iR_{30} + \frac{7\sqrt{2002}}{572}iR_{32} - \frac{31\sqrt{195}}{1326}iR_{50} \\ & + \frac{10\sqrt{182}}{221}iR_{52} - \frac{9\sqrt{546}}{442}iR_{54} + \frac{9345\sqrt{143}}{369512}iR_{70} + \frac{1645\sqrt{3003}}{369512}iR_{72} \\ & - \frac{495\sqrt{546}}{33592}iR_{74} + \frac{35\sqrt{21}}{2584}iR_{76} - \frac{567\sqrt{40755}}{369512}iR_{90} \\ & - \frac{301\sqrt{741}}{16796}iR_{92} - \frac{7\sqrt{798}}{1292}iR_{94} + \frac{63\sqrt{19}}{1292}iR_{96} + \frac{21\sqrt{1938}}{2584}iR_{98} \\ & - \frac{1155\sqrt{49335}}{1545232}iR_{11,0} - \frac{693\sqrt{46}}{29716}iR_{11,2} + \frac{231\sqrt{4830}}{59432}iR_{11,4} \\ & + \frac{231\sqrt{1955}}{14858}iR_{11,6} + \frac{693\sqrt{14858}}{118864}iR_{11,8} \end{aligned}$
5	5	2	6	6	3	$\begin{aligned} & \frac{\sqrt{390}}{52}R_{10} + \frac{\sqrt{910}}{156}R_{30} - \frac{\sqrt{273}}{78}R_{32} + \frac{2\sqrt{1430}}{663}R_{50} \\ & - \frac{31\sqrt{3003}}{4641}R_{52} - \frac{2\sqrt{1001}}{91}R_{54} + \frac{20\sqrt{78}}{4199}R_{70} - \frac{1065\sqrt{182}}{29393}R_{72} \\ & - \frac{240\sqrt{1001}}{29393}R_{74} + \frac{15\sqrt{154}}{323}R_{76} - \frac{9\sqrt{2470}}{8398}R_{90} - \frac{113\sqrt{5434}}{16796}R_{92} \\ & + \frac{13\sqrt{1463}}{646}R_{94} + \frac{21\sqrt{1254}}{1292}R_{96} - \frac{1089\sqrt{2990}}{193154}R_{11,0} \\ & - \frac{33\sqrt{759}}{14858}R_{11,2} + \frac{3\sqrt{8855}}{874}R_{11,4} - \frac{21\sqrt{129030}}{14858}R_{11,6} \end{aligned}$
5	5	2	6	6	4	$\begin{aligned} & \frac{5\sqrt{858}}{143}R_{10} + \frac{5\sqrt{2002}}{429}R_{30} - \frac{2\sqrt{15015}}{429}R_{32} + \frac{40\sqrt{26}}{663}R_{50} \\ & - \frac{40\sqrt{1365}}{4641}R_{52} + \frac{4\sqrt{455}}{1547}R_{54} + \frac{80\sqrt{4290}}{46189}R_{70} - \frac{564\sqrt{10010}}{323323}R_{72} \\ & - \frac{36\sqrt{455}}{29393}R_{74} - \frac{90\sqrt{5434}}{46189}R_{90} - \frac{22\sqrt{2470}}{4199}R_{92} - \frac{2\sqrt{665}}{323}R_{94} \\ & - \frac{990\sqrt{6578}}{96577}R_{11,0} - \frac{528\sqrt{345}}{7429}R_{11,2} - \frac{330\sqrt{161}}{7429}R_{11,4} \end{aligned}$

Table B298: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	5	5	3	$ \begin{aligned} & -\frac{83\sqrt{30}}{624}I_{21} - \frac{6\sqrt{5}}{13}I_{41} + \frac{7\sqrt{546}}{408}I_{61} + \frac{31\sqrt{1365}}{2652}I_{63} \\ & + \frac{756\sqrt{34}}{4199}I_{81} + \frac{28\sqrt{39270}}{4199}I_{83} + \frac{27\sqrt{2310}}{1768}I_{10,1} - \frac{783\sqrt{5005}}{67184}I_{10,3} \\ & - \frac{3375\sqrt{1001}}{67184}I_{10,5} + R_{00} + \frac{\sqrt{5}}{39}R_{20} - \frac{6}{13}R_{40} \\ & - \frac{58\sqrt{13}}{663}R_{60} - \frac{88\sqrt{1365}}{3315}R_{62} + \frac{175\sqrt{17}}{4199}R_{80} - \frac{12\sqrt{595}}{4199}R_{82} \\ & + \frac{72\sqrt{2618}}{4199}R_{84} + \frac{2835\sqrt{21}}{4199}R_{10,0} + \frac{837\sqrt{770}}{4199}R_{10,2} \\ & + \frac{135\sqrt{10010}}{4199}R_{10,4} \end{aligned} $
5	5	3	6	6	1	$ \begin{aligned} & \frac{\sqrt{10010}}{429}R_{30} + \frac{5\sqrt{3003}}{858}R_{32} + \frac{14\sqrt{130}}{663}R_{50} - \frac{10\sqrt{273}}{663}R_{52} \\ & - \frac{8\sqrt{91}}{221}R_{54} + \frac{1575\sqrt{858}}{369512}R_{70} + \frac{3045\sqrt{2002}}{369512}R_{72} - \frac{375\sqrt{91}}{16796}R_{74} \\ & - \frac{525\sqrt{14}}{2584}R_{76} + \frac{249\sqrt{27170}}{134368}R_{90} - \frac{651\sqrt{494}}{33592}R_{92} \\ & + \frac{71\sqrt{133}}{2584}R_{94} + \frac{67\sqrt{114}}{2584}R_{96} + \frac{39\sqrt{323}}{5168}R_{98} + \frac{495\sqrt{32890}}{475456}R_{11,0} \\ & - \frac{2079\sqrt{69}}{237728}R_{11,2} - \frac{1485\sqrt{805}}{118864}R_{11,4} + \frac{1287\sqrt{11730}}{475456}R_{11,6} \\ & - \frac{495\sqrt{22287}}{237728}R_{11,8} + \frac{297\sqrt{1560090}}{475456}R_{11,10} \end{aligned} $
5	5	3	6	6	2	$ \begin{aligned} & \frac{3\sqrt{30030}}{572}R_{10} - \frac{35\sqrt{1430}}{3432}R_{30} - \frac{7\sqrt{429}}{572}R_{32} - \frac{\sqrt{910}}{156}R_{50} \\ & - \frac{10\sqrt{39}}{221}R_{52} - \frac{\sqrt{13}}{442}R_{54} + \frac{6405\sqrt{6006}}{739024}R_{70} - \frac{4935\sqrt{286}}{739024}R_{72} \\ & + \frac{5145\sqrt{13}}{33592}R_{74} - \frac{105\sqrt{2}}{5168}R_{76} - \frac{249\sqrt{190190}}{739024}R_{90} \\ & + \frac{129\sqrt{3458}}{33592}R_{92} + \frac{217\sqrt{19}}{1292}R_{94} - \frac{9\sqrt{798}}{2584}R_{96} + \frac{27\sqrt{2261}}{2584}R_{98} \\ & + \frac{99\sqrt{230230}}{181792}R_{11,0} + \frac{99\sqrt{483}}{29716}R_{11,2} - \frac{3465\sqrt{115}}{59432}R_{11,4} \\ & - \frac{33\sqrt{82110}}{29716}R_{11,6} + \frac{297\sqrt{156009}}{118864}R_{11,8} \end{aligned} $
5	5	3	6	6	3	$ \begin{aligned} & -\frac{9\sqrt{455}}{364}iR_{10} + \frac{\sqrt{195}}{156}iR_{30} + \frac{\sqrt{26}}{12}iR_{32} + \frac{25\sqrt{15015}}{9282}iR_{50} \\ & + \frac{19\sqrt{286}}{1326}iR_{52} + \frac{11\sqrt{858}}{1326}iR_{54} + \frac{135\sqrt{91}}{8398}iR_{70} - \frac{315\sqrt{39}}{4199}iR_{72} \\ & + \frac{45\sqrt{858}}{8398}iR_{74} + \frac{15\sqrt{33}}{323}iR_{76} - \frac{265\sqrt{25935}}{117572}iR_{90} + \frac{5\sqrt{57057}}{2261}iR_{92} \\ & + \frac{\sqrt{1254}}{1292}iR_{94} + \frac{20\sqrt{1463}}{2261}iR_{96} - \frac{\sqrt{149226}}{1292}iR_{98} + \frac{1815\sqrt{31395}}{2704156}iR_{11,0} \\ & - \frac{783\sqrt{3542}}{208012}iR_{11,2} - \frac{99\sqrt{7590}}{29716}iR_{11,4} + \frac{165\sqrt{150535}}{104006}iR_{11,6} \\ & - \frac{27\sqrt{1144066}}{29716}iR_{11,8} \end{aligned} $

Table B299: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	6	6	4	$\begin{aligned} & \frac{18\sqrt{1001}}{1001}iR_{10} - \frac{2\sqrt{429}}{429}iR_{30} - \frac{8\sqrt{1430}}{429}iR_{32} - \frac{100\sqrt{273}}{4641}iR_{50} \\ & - \frac{4\sqrt{130}}{663}iR_{52} + \frac{22\sqrt{390}}{663}iR_{54} - \frac{108\sqrt{5005}}{46189}iR_{70} + \frac{420\sqrt{2145}}{46189}iR_{72} \\ & + \frac{90\sqrt{390}}{4199}iR_{74} - \frac{24\sqrt{15}}{323}iR_{76} + \frac{530\sqrt{57057}}{323323}iR_{90} + \frac{106\sqrt{25935}}{29393}iR_{92} \\ & + \frac{\sqrt{570}}{323}iR_{94} - \frac{32\sqrt{665}}{2261}iR_{96} - \frac{330\sqrt{69069}}{676039}iR_{11,0} - \frac{594\sqrt{1610}}{52003}iR_{11,2} \\ & - \frac{495\sqrt{138}}{7429}iR_{11,4} - \frac{660\sqrt{2737}}{52003}iR_{11,6} \end{aligned}$
6	6	1	6	6	1	$\begin{aligned} & R_{00} - \frac{24\sqrt{5}}{55}R_{20} + \frac{114}{187}R_{40} - \frac{15\sqrt{10}}{187}R_{42} \\ & + \frac{480\sqrt{13}}{3553}R_{60} + \frac{448\sqrt{1365}}{10659}R_{62} - \frac{150\sqrt{17}}{3553}R_{80} - \frac{300\sqrt{595}}{24871}R_{82} \\ & + \frac{645\sqrt{2618}}{24871}R_{84} - \frac{4656\sqrt{21}}{7429}R_{10,0} - \frac{1344\sqrt{770}}{7429}R_{10,2} \\ & - \frac{264\sqrt{10010}}{7429}R_{10,4} + \frac{30492}{37145}R_{12,0} - \frac{363\sqrt{6006}}{37145}R_{12,2} + \frac{264\sqrt{1001}}{37145}R_{12,4} \\ & - \frac{198\sqrt{2431}}{7429}R_{12,6} \end{aligned}$
6	6	1	6	6	2	$\begin{aligned} & \frac{4\sqrt{35}}{55}R_{20} + \frac{18\sqrt{70}}{187}R_{42} - \frac{128\sqrt{195}}{3553}R_{62} - \frac{80\sqrt{119}}{3553}R_{80} \\ & + \frac{120\sqrt{85}}{3553}R_{82} + \frac{120\sqrt{374}}{3553}R_{84} - \frac{1848\sqrt{3}}{7429}R_{10,0} - \frac{1344\sqrt{110}}{7429}R_{10,2} \\ & - \frac{84\sqrt{1430}}{7429}R_{10,4} - \frac{462\sqrt{858}}{37145}R_{12,2} + \frac{396\sqrt{17017}}{37145}R_{12,6} \end{aligned}$
6	6	1	6	6	3	$\begin{aligned} & - \frac{2\sqrt{385}}{55}iI_{21} + \frac{6\sqrt{2310}}{187}iI_{41} - \frac{180\sqrt{143}}{3553}iI_{61} + \frac{60\sqrt{1430}}{3553}iI_{63} \\ & - \frac{260\sqrt{3927}}{24871}iI_{81} - \frac{20\sqrt{85}}{323}iI_{83} - \frac{36\sqrt{5}}{323}iI_{10,1} - \frac{21\sqrt{390}}{7429}iI_{10,3} \\ & + \frac{699\sqrt{78}}{7429}iI_{10,5} - \frac{132\sqrt{2002}}{665}iI_{12,1} - \frac{25542\sqrt{78}}{37145}iI_{12,3} \\ & - \frac{6292\sqrt{663}}{37145}iI_{12,5} \end{aligned}$
6	6	1	6	6	4	$\begin{aligned} & - \frac{24\sqrt{42}}{187}iI_{41} - \frac{160\sqrt{65}}{3553}iI_{61} + \frac{80\sqrt{26}}{3553}iI_{63} - \frac{120\sqrt{1785}}{2261}iI_{81} \\ & - \frac{120\sqrt{187}}{3553}iI_{83} - \frac{1872\sqrt{11}}{7429}iI_{10,1} + \frac{168\sqrt{858}}{7429}iI_{10,3} \\ & + \frac{48\sqrt{4290}}{7429}iI_{10,5} + \frac{11616\sqrt{910}}{260015}iI_{12,1} + \frac{792\sqrt{4290}}{37145}iI_{12,3} \\ & + \frac{176\sqrt{36465}}{37145}iI_{12,5} \end{aligned}$
6	6	2	6	6	2	$\begin{aligned} & R_{00} - \frac{126}{187}R_{40} + \frac{21\sqrt{10}}{187}R_{42} - \frac{160\sqrt{13}}{3553}R_{60} \\ & - \frac{64\sqrt{1365}}{10659}R_{62} + \frac{630\sqrt{17}}{3553}R_{80} - \frac{60\sqrt{595}}{3553}R_{82} + \frac{45\sqrt{2618}}{3553}R_{84} \\ & + \frac{1680\sqrt{21}}{7429}R_{10,0} + \frac{672\sqrt{770}}{7429}R_{10,2} + \frac{168\sqrt{10010}}{7429}R_{10,4} \\ & + \frac{30492}{37145}R_{12,0} + \frac{231\sqrt{6006}}{37145}R_{12,2} - \frac{1848\sqrt{1001}}{37145}R_{12,4} - \frac{1386\sqrt{2431}}{37145}R_{12,6} \end{aligned}$

Table B300: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 16 of 16.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	3	$\frac{6\sqrt{55}}{55}iI_{21} - \frac{2\sqrt{330}}{187}iI_{41} - \frac{620\sqrt{1001}}{24871}iI_{61} + \frac{100\sqrt{10010}}{24871}iI_{63}$ $+ \frac{80\sqrt{561}}{3553}iI_{81} - \frac{180\sqrt{35}}{7429}iI_{10,1} - \frac{39\sqrt{2730}}{7429}iI_{10,3}$ $+ \frac{249\sqrt{546}}{7429}iI_{10,5} + \frac{23628\sqrt{286}}{37145}iI_{12,1} + \frac{858\sqrt{546}}{2185}iI_{12,3}$ $+ \frac{2684\sqrt{4641}}{37145}iI_{12,5}$
6	6	2	6	6	4	$-\frac{4}{11}iI_{21} - \frac{124\sqrt{6}}{187}iI_{41} - \frac{240\sqrt{455}}{24871}iI_{61} + \frac{1440\sqrt{182}}{24871}iI_{63}$ $+ \frac{460\sqrt{255}}{3553}iI_{81} + \frac{140\sqrt{1309}}{3553}iI_{83} - \frac{144\sqrt{77}}{7429}iI_{10,1}$ $- \frac{48\sqrt{6006}}{7429}iI_{10,3} - \frac{24\sqrt{30030}}{7429}iI_{10,5} - \frac{2904\sqrt{130}}{7429}iI_{12,1}$ $- \frac{132\sqrt{30030}}{7429}iI_{12,3} - \frac{88\sqrt{255255}}{37145}iI_{12,5}$
6	6	3	6	6	3	$R_{00} - \frac{12\sqrt{5}}{35}R_{20} - \frac{32}{119}R_{40} - \frac{16\sqrt{10}}{119}R_{42}$ $+ \frac{80\sqrt{13}}{323}R_{60} + \frac{32\sqrt{1365}}{6783}R_{62} - \frac{30\sqrt{17}}{323}R_{80} + \frac{20\sqrt{595}}{833}R_{82}$ $- \frac{145\sqrt{2618}}{15827}R_{84} + \frac{72\sqrt{21}}{52003}R_{10,0} - \frac{144\sqrt{770}}{2737}R_{10,2}$ $+ \frac{36\sqrt{10010}}{52003}R_{10,4} + \frac{91608}{260015}R_{12,0} + \frac{2418\sqrt{6006}}{260015}R_{12,2} - \frac{5808\sqrt{1001}}{260015}R_{12,4}$ $- \frac{876\sqrt{2431}}{15295}R_{12,6}$
6	6	3	6	6	4	$\frac{8\sqrt{11}}{77}R_{20} + \frac{40\sqrt{55}}{1309}R_{40} + \frac{16\sqrt{22}}{1309}R_{42} + \frac{120\sqrt{715}}{3553}R_{60}$ $+ \frac{400\sqrt{3003}}{24871}R_{62} + \frac{40\sqrt{935}}{3553}R_{80} - \frac{2760\sqrt{1309}}{174097}R_{82}$ $- \frac{300\sqrt{1190}}{15827}R_{84} - \frac{2952\sqrt{1155}}{52003}R_{10,0} - \frac{42624\sqrt{14}}{52003}R_{10,2}$ $- \frac{5076\sqrt{182}}{52003}R_{10,4} - \frac{13728\sqrt{55}}{260015}R_{12,0} - \frac{1584\sqrt{2730}}{260015}R_{12,2}$ $+ \frac{6336\sqrt{455}}{260015}R_{12,4} + \frac{1056\sqrt{1105}}{52003}R_{12,6}$
6	6	4	6	6	4	$R_{00} + \frac{60\sqrt{5}}{77}R_{20} + \frac{632}{1309}R_{40} - \frac{356\sqrt{10}}{1309}R_{42}$ $- \frac{480\sqrt{13}}{3553}R_{60} - \frac{2368\sqrt{1365}}{74613}R_{62} - \frac{60\sqrt{17}}{3553}R_{80} + \frac{40\sqrt{595}}{15827}R_{82}$ $+ \frac{1070\sqrt{2618}}{174097}R_{84} + \frac{6480\sqrt{21}}{52003}R_{10,0} + \frac{1728\sqrt{770}}{52003}R_{10,2}$ $+ \frac{216\sqrt{10010}}{52003}R_{10,4} - \frac{29040}{52003}R_{12,0} - \frac{660\sqrt{6006}}{52003}R_{12,2} - \frac{1056\sqrt{1001}}{52003}R_{12,4}$ $- \frac{264\sqrt{2431}}{52003}R_{12,6}$

Table B301: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	2	2	1	$\frac{\sqrt{30}}{7}I_{21} - \frac{8\sqrt{5}}{7}I_{41} + R_{00} - \frac{2\sqrt{5}}{7}R_{20}$ $-\frac{4}{7}R_{40} + \frac{2\sqrt{10}}{7}R_{42}$
2	2	1	3	3	1	$-\frac{\sqrt{42}}{7}iR_{10} - \frac{\sqrt{2}}{6}iR_{30} - \frac{\sqrt{15}}{3}iR_{32} + \frac{25\sqrt{154}}{462}iR_{50}$ $-\frac{2\sqrt{165}}{33}iR_{52} - \frac{\sqrt{55}}{11}iR_{54}$
2	2	1	4	4	1	$-\frac{2\sqrt{105}}{11}I_{41} + \frac{15\sqrt{26}}{143}I_{61} - \frac{18\sqrt{65}}{143}I_{63} - \frac{\sqrt{105}}{7}R_{20}$ $-\frac{2\sqrt{210}}{77}R_{42} - \frac{32\sqrt{65}}{143}R_{62}$
2	2	1	4	4	2	$-\frac{2\sqrt{10}}{7}iI_{21} + \frac{26\sqrt{15}}{77}iI_{41} + \frac{5\sqrt{182}}{143}iI_{61} - \frac{6\sqrt{455}}{143}iI_{63}$ $-\frac{\sqrt{15}}{7}iR_{20} + \frac{20\sqrt{3}}{77}iR_{40} + \frac{4\sqrt{30}}{77}iR_{42} - \frac{40\sqrt{39}}{143}iR_{60}$ $-\frac{16\sqrt{455}}{143}iR_{62}$
2	2	1	5	5	1	$\frac{5\sqrt{22}}{33}iR_{30} - \frac{2\sqrt{165}}{33}iR_{32} + \frac{5\sqrt{14}}{156}iR_{50} + \frac{\sqrt{15}}{39}iR_{52}$ $-\frac{11\sqrt{5}}{26}iR_{54} - \frac{7\sqrt{2310}}{572}iR_{70} + \frac{51\sqrt{110}}{572}iR_{72} - \frac{3\sqrt{5}}{26}iR_{74}$ $-\frac{3\sqrt{130}}{52}iR_{76}$
2	2	1	5	5	2	$-\frac{5\sqrt{66}}{66}R_{30} - \frac{\sqrt{55}}{11}R_{32} + \frac{5\sqrt{42}}{39}R_{50} + \frac{2\sqrt{5}}{13}R_{52}$ $-\frac{2\sqrt{15}}{13}R_{54} - \frac{3\sqrt{770}}{286}R_{70} - \frac{\sqrt{330}}{286}R_{72} + \frac{3\sqrt{15}}{13}R_{74}$ $+\frac{\sqrt{390}}{26}R_{76}$
2	2	1	6	6	1	$\frac{2\sqrt{165}}{55}I_{61} - \frac{\sqrt{66}}{11}I_{63} + \frac{7\sqrt{85085}}{1105}I_{81} + \frac{\sqrt{663}}{13}I_{83}$ $+\frac{15\sqrt{10010}}{2002}R_{40} - \frac{30\sqrt{1001}}{1001}R_{42} + \frac{\sqrt{770}}{55}R_{60} + \frac{16\sqrt{66}}{165}R_{62}$ $-\frac{3\sqrt{170170}}{2431}R_{80} + \frac{32\sqrt{4862}}{2431}R_{82} - \frac{19\sqrt{1105}}{1105}R_{84}$
2	2	1	6	6	2	$-\frac{20\sqrt{273}}{143}I_{41} + \frac{9\sqrt{10}}{55}I_{61} - \frac{2}{11}I_{63} - \frac{22\sqrt{46410}}{1105}I_{81}$ $-\frac{10\sqrt{4862}}{221}I_{83} + \frac{5\sqrt{546}}{143}R_{42} - \frac{8}{55}R_{62} - \frac{4\sqrt{23205}}{1105}R_{80}$ $+\frac{6\sqrt{72930}}{1105}R_{84}$
2	2	1	6	6	3	$\frac{8\sqrt{910}}{143}iI_{41} + \frac{2\sqrt{3}}{11}iI_{61} + \frac{\sqrt{30}}{11}iI_{63} - \frac{3\sqrt{1547}}{221}iI_{81}$ $+\frac{\sqrt{36465}}{221}iI_{83} + \frac{5\sqrt{182}}{154}iR_{40} + \frac{2\sqrt{455}}{1001}iR_{42} - \frac{5\sqrt{14}}{11}iR_{60}$ $-\frac{16\sqrt{30}}{55}iR_{62} + \frac{\sqrt{3094}}{221}iR_{80} - \frac{3\sqrt{2431}}{221}iR_{84}$
3	3	1	3	3	1	$R_{00} - \frac{2}{11}R_{40} + \frac{5\sqrt{10}}{11}R_{42} - \frac{60\sqrt{13}}{143}R_{60}$ $-\frac{8\sqrt{1365}}{429}R_{62}$

Table B302: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	4	4	1	$-\frac{\sqrt{2}}{2}iR_{10} - \frac{\sqrt{42}}{11}iR_{30} + \frac{5\sqrt{66}}{572}iR_{50} - \frac{6\sqrt{385}}{143}iR_{52}$ $+ \frac{5\sqrt{1155}}{286}iR_{54} + \frac{119\sqrt{10}}{572}iR_{70} - \frac{3\sqrt{210}}{52}iR_{72} - \frac{\sqrt{1155}}{286}iR_{74}$ $+ \frac{\sqrt{30030}}{572}iR_{76}$
3	3	1	4	4	2	$-\frac{3\sqrt{14}}{14}R_{10} + \frac{2\sqrt{6}}{11}R_{30} - \frac{2\sqrt{5}}{11}R_{32} - \frac{5\sqrt{462}}{364}R_{50}$ $- \frac{20\sqrt{55}}{143}R_{52} + \frac{\sqrt{165}}{286}R_{54} + \frac{21\sqrt{70}}{572}R_{70} + \frac{7\sqrt{30}}{572}R_{72}$ $- \frac{21\sqrt{165}}{286}R_{74} - \frac{7\sqrt{4290}}{572}R_{76}$
3	3	1	5	5	1	$-\frac{2\sqrt{55}}{11}R_{20} - \frac{20\sqrt{11}}{143}R_{40} + \frac{2\sqrt{110}}{143}R_{42} - \frac{14\sqrt{143}}{143}R_{60}$ $- \frac{4\sqrt{15015}}{165}R_{62} + \frac{140\sqrt{187}}{2431}R_{80} - \frac{24\sqrt{6545}}{2431}R_{82} - \frac{6\sqrt{238}}{221}R_{84}$
3	3	1	5	5	2	$-\frac{\sqrt{110}}{11}iI_{21} + \frac{16\sqrt{165}}{143}iI_{41} - \frac{\sqrt{2002}}{143}iI_{61} - \frac{2\sqrt{5005}}{143}iI_{63}$ $+ \frac{196\sqrt{1122}}{2431}iI_{81} + \frac{4\sqrt{1190}}{221}iI_{83}$
3	3	1	6	6	1	$\frac{5\sqrt{5005}}{572}iR_{30} - \frac{5\sqrt{6006}}{572}iR_{32} + \frac{7\sqrt{65}}{104}iR_{50} - \frac{\sqrt{546}}{52}iR_{52}$ $- \frac{\sqrt{182}}{104}iR_{54} - \frac{21\sqrt{429}}{2288}iR_{70} + \frac{843\sqrt{1001}}{38896}iR_{72} - \frac{183\sqrt{182}}{3536}iR_{74}$ $+ \frac{21\sqrt{7}}{272}iR_{76} - \frac{21\sqrt{13585}}{3952}iR_{90} + \frac{49\sqrt{247}}{884}iR_{92} - \frac{23\sqrt{266}}{2584}iR_{94}$ $- \frac{35\sqrt{57}}{1292}iR_{96} + \frac{21\sqrt{646}}{5168}iR_{98}$
3	3	1	6	6	2	$\frac{5\sqrt{2730}}{429}iR_{30} - \frac{7\sqrt{4290}}{1716}iR_{50} + \frac{3\sqrt{1001}}{143}iR_{52} + \frac{3\sqrt{3003}}{286}iR_{54}$ $+ \frac{903\sqrt{26}}{19448}iR_{70} + \frac{3\sqrt{546}}{104}iR_{72} - \frac{49\sqrt{3003}}{9724}iR_{74} - \frac{\sqrt{462}}{88}iR_{76}$ $- \frac{147\sqrt{7410}}{33592}iR_{90} + \frac{9\sqrt{4389}}{646}iR_{94} - \frac{7\sqrt{10659}}{1292}iR_{98}$
3	3	1	6	6	3	$-\frac{5\sqrt{91}}{132}R_{30} - \frac{35\sqrt{2730}}{1716}R_{32} + \frac{7\sqrt{143}}{312}R_{50} + \frac{\sqrt{30030}}{1716}R_{52}$ $- \frac{5\sqrt{10010}}{1144}R_{54} - \frac{553\sqrt{195}}{38896}R_{70} - \frac{1113\sqrt{455}}{38896}R_{72} - \frac{291\sqrt{10010}}{38896}R_{74}$ $+ \frac{57\sqrt{385}}{2992}R_{76} + \frac{63\sqrt{247}}{5168}R_{90} + \frac{21\sqrt{13585}}{16796}R_{92} - \frac{9\sqrt{14630}}{2584}R_{94}$ $- \frac{21\sqrt{3135}}{1292}R_{96} - \frac{21\sqrt{35530}}{5168}R_{98}$
4	4	1	4	4	1	$\frac{\sqrt{30}}{22}I_{21} - \frac{108\sqrt{5}}{143}I_{41} + \frac{7\sqrt{546}}{286}I_{61} - \frac{5\sqrt{1365}}{143}I_{63}$ $+ \frac{84\sqrt{34}}{187}I_{81} + \frac{28\sqrt{39270}}{2431}I_{83} + R_{00} - \frac{4\sqrt{5}}{11}R_{20}$ $+ \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60} - \frac{28\sqrt{17}}{221}R_{80} + \frac{96\sqrt{595}}{2431}R_{82}$ $- \frac{30\sqrt{2618}}{2431}R_{84}$

Table B303: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	4	4	2	$\begin{aligned} & \frac{\sqrt{210}}{22}iI_{21} + \frac{\sqrt{78}}{286}iI_{61} + \frac{5\sqrt{195}}{143}iI_{63} + \frac{168\sqrt{238}}{2431}iI_{81} \\ & + \frac{56\sqrt{5610}}{2431}iI_{83} - \frac{6\sqrt{35}}{77}iR_{20} - \frac{81\sqrt{70}}{1001}iR_{42} - \frac{24\sqrt{195}}{715}iR_{62} \\ & + \frac{84\sqrt{119}}{2431}iR_{80} - \frac{126\sqrt{374}}{2431}iR_{84} \end{aligned}$
4	4	1	5	5	1	$\begin{aligned} & -\frac{2\sqrt{22}}{11}iR_{10} - \frac{2\sqrt{462}}{143}iR_{30} - \frac{6\sqrt{385}}{143}iR_{32} - \frac{\sqrt{6}}{26}iR_{50} \\ & - \frac{\sqrt{105}}{13}iR_{54} - \frac{35\sqrt{110}}{19448}iR_{70} - \frac{3\sqrt{2310}}{1496}iR_{72} + \frac{37\sqrt{105}}{884}iR_{74} \\ & - \frac{25\sqrt{2730}}{1768}iR_{76} + \frac{6363\sqrt{1254}}{369512}iR_{90} - \frac{693\sqrt{570}}{16796}iR_{92} \\ & + \frac{21\sqrt{25935}}{8398}iR_{94} + \frac{63\sqrt{2470}}{16796}iR_{96} - \frac{21\sqrt{62985}}{16796}iR_{98} \end{aligned}$
4	4	1	5	5	2	$\begin{aligned} & -\frac{\sqrt{66}}{22}R_{10} + \frac{6\sqrt{154}}{143}R_{30} + \frac{2\sqrt{1155}}{143}R_{32} - \frac{3\sqrt{2}}{13}R_{50} \\ & - \frac{\sqrt{105}}{13}R_{52} + \frac{14\sqrt{330}}{2431}R_{70} + \frac{42\sqrt{770}}{2431}R_{72} - \frac{6\sqrt{910}}{221}R_{76} \\ & - \frac{63\sqrt{418}}{92378}R_{90} - \frac{63\sqrt{190}}{8398}R_{92} + \frac{63\sqrt{7410}}{8398}R_{96} + \frac{21\sqrt{20995}}{4199}R_{98} \end{aligned}$
4	4	1	6	6	1	$\begin{aligned} & -\frac{7\sqrt{858}}{286}I_{41} + \frac{9\sqrt{385}}{374}I_{61} - \frac{27\sqrt{154}}{374}I_{63} + \frac{147\sqrt{36465}}{8398}I_{81} \\ & + \frac{657\sqrt{1547}}{8398}I_{83} - \frac{9\sqrt{91}}{323}I_{10,1} - \frac{5\sqrt{42}}{1292}I_{10,3} + \frac{83\sqrt{210}}{1292}I_{10,5} \\ & - \frac{15\sqrt{858}}{286}R_{20} - \frac{4\sqrt{429}}{143}R_{42} + \frac{3\sqrt{154}}{187}R_{62} - \frac{6\sqrt{102102}}{46189}R_{82} \\ & + \frac{3\sqrt{10010}}{221}R_{10,0} + \frac{96\sqrt{273}}{4199}R_{10,2} + \frac{5\sqrt{21}}{17}R_{10,4} \end{aligned}$
4	4	1	6	6	2	$\begin{aligned} & \frac{5\sqrt{78}}{143}I_{21} - \frac{12\sqrt{13}}{143}I_{41} - \frac{\sqrt{210}}{187}I_{61} - \frac{18\sqrt{21}}{187}I_{63} \\ & + \frac{651\sqrt{2210}}{46189}I_{81} + \frac{9\sqrt{102102}}{46189}I_{83} + \frac{18\sqrt{6006}}{4199}I_{10,1} \\ & + \frac{3\sqrt{77}}{323}I_{10,3} - \frac{21\sqrt{385}}{323}I_{10,5} + \frac{15\sqrt{13}}{143}R_{20} - \frac{12\sqrt{65}}{143}R_{40} \\ & + \frac{42\sqrt{5}}{187}R_{60} - \frac{384\sqrt{1547}}{46189}R_{82} + \frac{24\sqrt{170170}}{46189}R_{84} - \frac{12\sqrt{1365}}{221}R_{10,0} \\ & - \frac{384\sqrt{2002}}{4199}R_{10,2} - \frac{78\sqrt{154}}{323}R_{10,4} \end{aligned}$
4	4	1	6	6	3	$\begin{aligned} & -\frac{12\sqrt{65}}{143}iI_{21} + \frac{\sqrt{390}}{26}iI_{41} - \frac{81\sqrt{7}}{374}iI_{61} - \frac{9\sqrt{70}}{374}iI_{63} \\ & + \frac{567\sqrt{663}}{92378}iI_{81} - \frac{9\sqrt{85085}}{7106}iI_{83} + \frac{27\sqrt{5005}}{4199}iI_{10,1} \\ & - \frac{21\sqrt{2310}}{1292}iI_{10,3} + \frac{15\sqrt{462}}{1292}iI_{10,5} - \frac{\sqrt{390}}{286}iR_{20} - \frac{4\sqrt{195}}{143}iR_{42} \\ & + \frac{37\sqrt{70}}{935}iR_{62} + \frac{504\sqrt{1326}}{46189}iR_{80} - \frac{6\sqrt{46410}}{4199}iR_{82} - \frac{216\sqrt{51051}}{46189}iR_{84} \\ & + \frac{495\sqrt{182}}{4199}iR_{10,0} + \frac{96\sqrt{15015}}{4199}iR_{10,2} + \frac{15\sqrt{1155}}{323}iR_{10,4} \end{aligned}$

Table B304: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	4	4	2	$\frac{13\sqrt{30}}{154}I_{21} + \frac{108\sqrt{5}}{1001}I_{41} - \frac{\sqrt{546}}{26}I_{61} + \frac{\sqrt{1365}}{143}I_{63}$ $+ \frac{1764\sqrt{34}}{2431}I_{81} + \frac{28\sqrt{39270}}{2431}I_{83} + R_{00} + \frac{8\sqrt{5}}{77}R_{20}$ $- \frac{54}{77}R_{40} + \frac{162\sqrt{10}}{1001}R_{42} + \frac{20\sqrt{13}}{143}R_{60} + \frac{32\sqrt{1365}}{715}R_{62}$ $+ \frac{196\sqrt{17}}{2431}R_{80} - \frac{42\sqrt{2618}}{2431}R_{84}$
4	4	2	5	5	1	$\frac{5\sqrt{66}}{143}R_{30} - \frac{20\sqrt{55}}{143}R_{32} + \frac{\sqrt{42}}{26}R_{50} + \frac{4\sqrt{5}}{13}R_{52}$ $- \frac{\sqrt{15}}{13}R_{54} - \frac{147\sqrt{770}}{19448}R_{70} + \frac{475\sqrt{330}}{19448}R_{72} - \frac{93\sqrt{15}}{884}R_{74}$ $+ \frac{5\sqrt{390}}{1768}R_{76} - \frac{63\sqrt{8778}}{33592}R_{90} + \frac{21\sqrt{3990}}{16796}R_{92} + \frac{63\sqrt{3705}}{8398}R_{94}$ $- \frac{63\sqrt{17290}}{16796}R_{96} - \frac{21\sqrt{440895}}{16796}R_{98}$
4	4	2	5	5	2	$- \frac{\sqrt{462}}{22}iR_{10} - \frac{3\sqrt{22}}{143}iR_{30} - \frac{4\sqrt{165}}{143}iR_{32} + \frac{3\sqrt{14}}{26}iR_{50}$ $- \frac{\sqrt{15}}{13}iR_{52} + \frac{3\sqrt{5}}{13}iR_{54} + \frac{32\sqrt{2310}}{2431}iR_{70} + \frac{81\sqrt{110}}{2431}iR_{72}$ $+ \frac{60\sqrt{5}}{221}iR_{74} + \frac{3\sqrt{130}}{221}iR_{76} - \frac{378\sqrt{2926}}{46189}iR_{90} - \frac{21\sqrt{1330}}{8398}iR_{92}$ $+ \frac{126\sqrt{1235}}{4199}iR_{94} + \frac{21\sqrt{51870}}{8398}iR_{96}$
4	4	2	6	6	1	$\frac{7\sqrt{6006}}{286}iI_{41} + \frac{9\sqrt{55}}{374}iI_{61} + \frac{9\sqrt{22}}{374}iI_{63} + \frac{21\sqrt{255255}}{8398}iI_{81}$ $+ \frac{45\sqrt{221}}{646}iI_{83} - \frac{21\sqrt{13}}{323}iI_{10,1} + \frac{315\sqrt{6}}{1292}iI_{10,3} - \frac{7\sqrt{30}}{68}iI_{10,5}$ $- \frac{2\sqrt{30030}}{1001}iR_{40} + \frac{8\sqrt{3003}}{1001}iR_{42} - \frac{9\sqrt{2310}}{374}iR_{60} - \frac{72\sqrt{22}}{187}iR_{62}$ $+ \frac{18\sqrt{510510}}{46189}iR_{80} - \frac{192\sqrt{14586}}{46189}iR_{82} + \frac{6\sqrt{3315}}{4199}iR_{84}$ $- \frac{147\sqrt{1430}}{4199}iR_{10,0} - \frac{1792\sqrt{39}}{4199}iR_{10,2} - \frac{21\sqrt{3}}{19}iR_{10,4}$
4	4	2	6	6	2	$- \frac{5\sqrt{546}}{143}iI_{21} + \frac{19\sqrt{30}}{187}iI_{61} - \frac{18\sqrt{3}}{187}iI_{63} - \frac{519\sqrt{15470}}{46189}iI_{81}$ $- \frac{579\sqrt{14586}}{46189}iI_{83} - \frac{126\sqrt{858}}{4199}iI_{10,1} + \frac{63\sqrt{11}}{323}iI_{10,3}$ $+ \frac{63\sqrt{55}}{323}iI_{10,5} - \frac{15\sqrt{91}}{143}iR_{20} + \frac{6\sqrt{182}}{143}iR_{42} - \frac{76\sqrt{3}}{187}iR_{62}$ $- \frac{144\sqrt{7735}}{46189}iR_{80} - \frac{168\sqrt{221}}{4199}iR_{82} + \frac{216\sqrt{24310}}{46189}iR_{84}$ $+ \frac{924\sqrt{195}}{4199}iR_{10,0} + \frac{1344\sqrt{286}}{4199}iR_{10,2} + \frac{210\sqrt{22}}{323}iR_{10,4}$

Table B305: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	6	6	3	$\begin{aligned} & \frac{4\sqrt{455}}{143}I_{21} - \frac{5\sqrt{2730}}{286}I_{41} - \frac{13}{34}I_{61} + \frac{93\sqrt{10}}{374}I_{63} \\ & + \frac{1263\sqrt{4641}}{92378}I_{81} + \frac{333\sqrt{12155}}{92378}I_{83} - \frac{63\sqrt{715}}{4199}I_{10,1} \\ & + \frac{21\sqrt{330}}{1292}I_{10,3} + \frac{105\sqrt{66}}{1292}I_{10,5} - \frac{2\sqrt{2730}}{143}R_{20} - \frac{10\sqrt{546}}{1001}R_{40} \\ & + \frac{8\sqrt{1365}}{1001}R_{42} - \frac{\sqrt{42}}{374}R_{60} - \frac{184\sqrt{10}}{935}R_{62} + \frac{18\sqrt{9282}}{3553}R_{80} \\ & + \frac{222\sqrt{7293}}{46189}R_{84} - \frac{315\sqrt{26}}{4199}R_{10,0} + \frac{21\sqrt{165}}{323}R_{10,4} \end{aligned}$
5	5	1	5	5	1	$\begin{aligned} & R_{00} - \frac{4\sqrt{5}}{13}R_{20} + \frac{4}{13}R_{40} + \frac{2\sqrt{10}}{13}R_{42} \\ & - \frac{80\sqrt{13}}{221}R_{60} - \frac{224\sqrt{1365}}{3315}R_{62} + \frac{322\sqrt{17}}{4199}R_{80} + \frac{60\sqrt{595}}{4199}R_{82} \\ & - \frac{129\sqrt{2618}}{4199}R_{84} + \frac{360\sqrt{21}}{4199}R_{10,0} + \frac{432\sqrt{770}}{4199}R_{10,2} \\ & + \frac{36\sqrt{10010}}{4199}R_{10,4} \end{aligned}$
5	5	1	5	5	2	$\begin{aligned} & \frac{2\sqrt{10}}{13}iI_{21} + \frac{4\sqrt{15}}{13}iI_{41} + \frac{4\sqrt{182}}{221}iI_{61} + \frac{8\sqrt{455}}{221}iI_{63} \\ & + \frac{742\sqrt{102}}{4199}iI_{81} + \frac{70\sqrt{13090}}{4199}iI_{83} - \frac{108\sqrt{770}}{4199}iI_{10,1} \\ & + \frac{30\sqrt{15015}}{4199}iI_{10,3} + \frac{30\sqrt{3003}}{4199}iI_{10,5} \end{aligned}$
5	5	1	6	6	1	$\begin{aligned} & -\frac{3\sqrt{195}}{52}iR_{10} - \frac{\sqrt{455}}{52}iR_{30} - \frac{\sqrt{546}}{52}iR_{32} - \frac{\sqrt{715}}{442}iR_{50} \\ & - \frac{3\sqrt{6006}}{442}iR_{52} + \frac{\sqrt{2002}}{442}iR_{54} - \frac{315\sqrt{39}}{33592}iR_{70} + \frac{615\sqrt{91}}{33592}iR_{72} \\ & - \frac{465\sqrt{2002}}{33592}iR_{74} + \frac{105\sqrt{77}}{2584}iR_{76} + \frac{3\sqrt{1235}}{134368}iR_{90} \\ & - \frac{67\sqrt{2717}}{33592}iR_{92} + \frac{35\sqrt{2926}}{5168}iR_{94} - \frac{61\sqrt{627}}{2584}iR_{96} + \frac{39\sqrt{7106}}{10336}iR_{98} \\ & + \frac{48411\sqrt{1495}}{3090464}iR_{11,0} - \frac{6135\sqrt{1518}}{237728}iR_{11,2} + \frac{453\sqrt{17710}}{118864}iR_{11,4} \\ & - \frac{9\sqrt{64515}}{237728}iR_{11,6} - \frac{3\sqrt{490314}}{10336}iR_{11,8} + \frac{9\sqrt{8580495}}{237728}iR_{11,10} \end{aligned}$
5	5	1	6	6	2	$\begin{aligned} & -\frac{3\sqrt{1430}}{286}iR_{10} + \frac{\sqrt{30030}}{858}iR_{30} - \frac{3\sqrt{1001}}{143}iR_{32} - \frac{37\sqrt{390}}{1326}iR_{50} \\ & - \frac{3\sqrt{273}}{221}iR_{54} + \frac{315\sqrt{286}}{184756}iR_{70} - \frac{105\sqrt{6006}}{14212}iR_{72} \\ & - \frac{245\sqrt{273}}{8398}iR_{74} + \frac{5\sqrt{42}}{1292}iR_{76} + \frac{441\sqrt{81510}}{739024}iR_{90} \\ & - \frac{33\sqrt{1482}}{4199}iR_{92} + \frac{21\sqrt{399}}{1292}iR_{94} - \frac{21\sqrt{38}}{323}iR_{96} - \frac{43\sqrt{969}}{2584}iR_{98} \\ & + \frac{1155\sqrt{98670}}{1545232}iR_{11,0} - \frac{99\sqrt{23}}{3496}iR_{11,2} - \frac{297\sqrt{2415}}{29716}iR_{11,4} \\ & + \frac{1155\sqrt{3910}}{118864}iR_{11,6} + \frac{99\sqrt{7429}}{59432}iR_{11,8} - \frac{99\sqrt{520030}}{118864}iR_{11,10} \end{aligned}$

Table B306: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	6	6	3	$ \begin{aligned} & -\frac{\sqrt{429}}{52}R_{10} + \frac{37\sqrt{1001}}{1716}R_{30} + \frac{\sqrt{30030}}{1716}R_{32} - \frac{95\sqrt{13}}{1326}R_{50} \\ & -\frac{5\sqrt{2730}}{1326}R_{52} - \frac{7\sqrt{910}}{442}R_{54} + \frac{2009\sqrt{2145}}{369512}R_{70} + \frac{3843\sqrt{5005}}{369512}R_{72} \\ & -\frac{21\sqrt{910}}{33592}R_{74} - \frac{243\sqrt{35}}{2584}R_{76} - \frac{495\sqrt{2717}}{134368}R_{90} + \frac{3\sqrt{1235}}{1768}R_{92} \\ & + \frac{63\sqrt{1330}}{5168}R_{94} - \frac{3\sqrt{285}}{136}R_{96} + \frac{3\sqrt{3230}}{608}R_{98} - \frac{4455\sqrt{3289}}{3090464}R_{11,0} \\ & -\frac{99\sqrt{690}}{237728}R_{11,2} + \frac{1485\sqrt{322}}{118864}R_{11,4} + \frac{495\sqrt{1173}}{237728}R_{11,6} \\ & -\frac{297\sqrt{222870}}{237728}R_{11,8} - \frac{495\sqrt{156009}}{237728}R_{11,10} \end{aligned} $
5	5	2	5	5	2	$ \begin{aligned} & R_{00} + \frac{4\sqrt{5}}{13}R_{20} - \frac{6}{13}R_{40} + \frac{3\sqrt{10}}{13}R_{42} \\ & + \frac{32\sqrt{13}}{221}R_{60} + \frac{64\sqrt{1365}}{1105}R_{62} - \frac{448\sqrt{17}}{4199}R_{80} - \frac{48\sqrt{595}}{4199}R_{82} \\ & - \frac{48\sqrt{2618}}{4199}R_{84} + \frac{1680\sqrt{21}}{4199}R_{10,0} + \frac{384\sqrt{770}}{4199}R_{10,2} \\ & + \frac{24\sqrt{10010}}{4199}R_{10,4} \end{aligned} $
5	5	2	6	6	1	$ \begin{aligned} & -\frac{\sqrt{182}}{26}R_{32} + \frac{2\sqrt{2002}}{221}R_{52} + \frac{2\sqrt{6006}}{221}R_{54} - \frac{45\sqrt{273}}{4199}R_{72} \\ & - \frac{75\sqrt{6006}}{8398}R_{74} + \frac{2\sqrt{8151}}{4199}R_{92} + \frac{\sqrt{8778}}{323}R_{94} - \frac{2\sqrt{21318}}{323}R_{98} \\ & - \frac{3\sqrt{506}}{14858}R_{11,2} - \frac{3\sqrt{53130}}{14858}R_{11,4} + \frac{9\sqrt{163438}}{7429}R_{11,8} \\ & + \frac{3\sqrt{2860165}}{7429}R_{11,10} \end{aligned} $
5	5	2	6	6	2	$ \begin{aligned} & -\frac{\sqrt{4290}}{143}R_{10} + \frac{\sqrt{10010}}{286}R_{30} - \frac{\sqrt{3003}}{143}R_{32} + \frac{4\sqrt{130}}{221}R_{50} \\ & - \frac{8\sqrt{273}}{221}R_{52} - \frac{35\sqrt{858}}{2717}R_{70} - \frac{435\sqrt{2002}}{92378}R_{72} + \frac{15\sqrt{14}}{646}R_{76} \\ & + \frac{3\sqrt{27170}}{2717}R_{90} + \frac{123\sqrt{494}}{4199}R_{92} + \frac{9\sqrt{114}}{323}R_{96} + \frac{6\sqrt{323}}{323}R_{98} \\ & - \frac{33\sqrt{32890}}{193154}R_{11,0} - \frac{198\sqrt{69}}{7429}R_{11,2} + \frac{66\sqrt{11730}}{7429}R_{11,6} \\ & + \frac{33\sqrt{22287}}{7429}R_{11,8} \end{aligned} $
5	5	2	6	6	3	$ \begin{aligned} & -\frac{12\sqrt{143}}{143}iR_{10} - \frac{2\sqrt{3003}}{429}iR_{30} + \frac{\sqrt{10010}}{286}iR_{32} + \frac{20\sqrt{39}}{663}iR_{50} \\ & - \frac{2\sqrt{910}}{221}iR_{52} + \frac{2\sqrt{2730}}{221}iR_{54} + \frac{861\sqrt{715}}{46189}iR_{70} - \frac{98\sqrt{15015}}{46189}iR_{72} \\ & + \frac{81\sqrt{2730}}{8398}iR_{74} - \frac{13\sqrt{105}}{323}iR_{76} + \frac{270\sqrt{8151}}{46189}iR_{90} + \frac{24\sqrt{3705}}{4199}iR_{92} \\ & + \frac{3\sqrt{3990}}{323}iR_{94} - \frac{6\sqrt{95}}{323}iR_{96} - \frac{495\sqrt{9867}}{96577}iR_{11,0} - \frac{99\sqrt{230}}{14858}iR_{11,2} \\ & + \frac{495\sqrt{966}}{14858}iR_{11,4} + \frac{165\sqrt{391}}{7429}iR_{11,6} \end{aligned} $

Table B307: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	6	6	1	$\begin{aligned} & \frac{\sqrt{30}}{80} I_{21} - \frac{9\sqrt{5}}{34} I_{41} + \frac{35\sqrt{546}}{2584} I_{61} - \frac{25\sqrt{1365}}{1292} I_{63} \\ & + \frac{195\sqrt{34}}{323} I_{81} + \frac{5\sqrt{39270}}{323} I_{83} - \frac{639\sqrt{2310}}{59432} I_{10,1} + \frac{81\sqrt{5005}}{118864} I_{10,3} \\ & + \frac{6129\sqrt{1001}}{118864} I_{10,5} - \frac{1551\sqrt{39}}{2185} I_{12,1} - \frac{429\sqrt{1001}}{3910} I_{12,3} \\ & - \frac{165\sqrt{34034}}{14858} I_{12,5} + R_{00} - \frac{2\sqrt{5}}{5} R_{20} + \frac{9}{17} R_{40} \\ & - \frac{20\sqrt{13}}{323} R_{60} + \frac{5\sqrt{17}}{323} R_{80} - \frac{18\sqrt{21}}{7429} R_{10,0} - \frac{23991}{37145} R_{12,0} \\ & + \frac{24\sqrt{6006}}{1955} R_{12,2} - \frac{594\sqrt{1001}}{37145} R_{12,4} + \frac{336\sqrt{2431}}{37145} R_{12,6} \end{aligned}$
6	6	1	6	6	2	$\begin{aligned} & -\frac{\sqrt{55}}{20} I_{21} + \frac{12\sqrt{330}}{187} I_{41} - \frac{25\sqrt{1001}}{7106} I_{61} + \frac{15\sqrt{10010}}{7106} I_{63} \\ & + \frac{25\sqrt{561}}{323} I_{81} + \frac{15\sqrt{595}}{323} I_{83} - \frac{927\sqrt{35}}{14858} I_{10,1} + \frac{639\sqrt{2730}}{59432} I_{10,3} \\ & + \frac{423\sqrt{546}}{59432} I_{10,5} + \frac{10824\sqrt{286}}{37145} I_{12,1} + \frac{66\sqrt{546}}{437} I_{12,3} \\ & + \frac{1364\sqrt{4641}}{37145} I_{12,5} + \frac{\sqrt{330}}{55} R_{20} + \frac{9\sqrt{165}}{187} R_{42} - \frac{20\sqrt{10010}}{3553} R_{62} \\ & + \frac{5\sqrt{39270}}{3553} R_{82} - \frac{18\sqrt{154}}{391} R_{10,0} - \frac{168\sqrt{105}}{7429} R_{10,2} - \frac{6\sqrt{1365}}{391} R_{10,4} \\ & + \frac{231\sqrt{91}}{7429} R_{12,2} - \frac{231\sqrt{1326}}{7429} R_{12,6} \end{aligned}$
6	6	1	6	6	3	$\begin{aligned} & \frac{\sqrt{66}}{16} iI_{21} + \frac{9\sqrt{11}}{374} iI_{41} + \frac{65\sqrt{30030}}{28424} iI_{61} + \frac{65\sqrt{3003}}{14212} iI_{63} \\ & + \frac{5\sqrt{1870}}{323} iI_{81} + \frac{5\sqrt{714}}{323} iI_{83} - \frac{63\sqrt{42}}{2584} iI_{10,1} + \frac{5031\sqrt{91}}{118864} iI_{10,3} \\ & - \frac{549\sqrt{455}}{118864} iI_{10,5} - \frac{33\sqrt{2145}}{1615} iI_{12,1} + \frac{891\sqrt{455}}{74290} iI_{12,3} \\ & - \frac{363\sqrt{15470}}{74290} iI_{12,5} + \frac{3\sqrt{55}}{187} iR_{40} - \frac{6\sqrt{22}}{187} iR_{42} + \frac{140\sqrt{715}}{3553} iR_{60} \\ & + \frac{320\sqrt{3003}}{10659} iR_{62} - \frac{15\sqrt{935}}{3553} iR_{80} + \frac{160\sqrt{1309}}{24871} iR_{82} \\ & + \frac{25\sqrt{1190}}{2261} iR_{84} + \frac{378\sqrt{1155}}{7429} iR_{10,0} + \frac{6912\sqrt{14}}{7429} iR_{10,2} \\ & + \frac{1278\sqrt{182}}{7429} iR_{10,4} - \frac{1287\sqrt{55}}{37145} iR_{12,0} - \frac{132\sqrt{2730}}{37145} iR_{12,2} \\ & + \frac{858\sqrt{455}}{37145} iR_{12,4} + \frac{792\sqrt{1105}}{37145} iR_{12,6} \end{aligned}$

Table B308: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = A_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 8.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	2	$\begin{aligned} & \frac{17\sqrt{30}}{110}I_{21} + \frac{60\sqrt{5}}{187}I_{41} - \frac{5\sqrt{546}}{187}I_{61} + \frac{10\sqrt{1365}}{3553}I_{63} \\ & + \frac{780\sqrt{34}}{3553}I_{81} + \frac{20\sqrt{39270}}{3553}I_{83} + \frac{3\sqrt{2310}}{323}I_{10,1} + \frac{45\sqrt{5005}}{14858}I_{10,3} \\ & - \frac{387\sqrt{1001}}{14858}I_{10,5} - \frac{2904\sqrt{39}}{1615}I_{12,1} - \frac{10692\sqrt{1001}}{37145}I_{12,3} \\ & - \frac{924\sqrt{34034}}{37145}I_{12,5} + R_{00} - \frac{2\sqrt{5}}{55}R_{20} - \frac{96}{187}R_{40} \\ & - \frac{80\sqrt{13}}{3553}R_{60} + \frac{20\sqrt{17}}{323}R_{80} + \frac{480\sqrt{595}}{24871}R_{82} - \frac{150\sqrt{2618}}{24871}R_{84} \\ & - \frac{2808\sqrt{21}}{7429}R_{10,0} - \frac{768\sqrt{770}}{7429}R_{10,2} - \frac{156\sqrt{10010}}{7429}R_{10,4} \\ & - \frac{26136}{37145}R_{12,0} - \frac{264\sqrt{6006}}{37145}R_{12,2} + \frac{1584\sqrt{1001}}{37145}R_{12,4} + \frac{1584\sqrt{2431}}{37145}R_{12,6} \end{aligned}$
6	6	2	6	6	3	$\begin{aligned} & -\frac{9}{44}iI_{21} + \frac{4\sqrt{6}}{17}iI_{41} + \frac{45\sqrt{455}}{7106}iI_{61} + \frac{25\sqrt{182}}{7106}iI_{63} \\ & + \frac{25\sqrt{255}}{3553}iI_{81} + \frac{65\sqrt{1309}}{3553}iI_{83} + \frac{1125\sqrt{77}}{14858}iI_{10,1} \\ & - \frac{165\sqrt{6006}}{59432}iI_{10,3} - \frac{3\sqrt{30030}}{3128}iI_{10,5} + \frac{8712\sqrt{130}}{37145}iI_{12,1} \\ & + \frac{594\sqrt{30030}}{37145}iI_{12,3} + \frac{132\sqrt{255255}}{37145}iI_{12,5} + \frac{3\sqrt{6}}{11}iR_{20} \\ & + \frac{23\sqrt{3}}{187}iR_{42} + \frac{20\sqrt{182}}{209}iR_{62} + \frac{20\sqrt{510}}{3553}iR_{80} + \frac{15\sqrt{714}}{2261}iR_{82} \\ & - \frac{60\sqrt{19635}}{24871}iR_{84} + \frac{198\sqrt{70}}{7429}iR_{10,0} - \frac{72\sqrt{231}}{7429}iR_{10,2} \\ & + \frac{30\sqrt{3003}}{7429}iR_{10,4} + \frac{99\sqrt{5005}}{37145}iR_{12,2} - \frac{99\sqrt{72930}}{37145}iR_{12,6} \end{aligned}$
6	6	3	6	6	3	$\begin{aligned} & -\frac{7\sqrt{30}}{176}I_{21} - \frac{245\sqrt{5}}{374}I_{41} + \frac{5\sqrt{546}}{2584}I_{61} - \frac{5\sqrt{1365}}{836}I_{63} \\ & - \frac{885\sqrt{34}}{3553}I_{81} - \frac{35\sqrt{39270}}{3553}I_{83} - \frac{9\sqrt{2310}}{59432}I_{10,1} + \frac{999\sqrt{5005}}{118864}I_{10,3} \\ & + \frac{3015\sqrt{1001}}{118864}I_{10,5} - \frac{5445\sqrt{39}}{7429}I_{12,1} - \frac{1485\sqrt{1001}}{14858}I_{12,3} \\ & - \frac{99\sqrt{34034}}{14858}I_{12,5} + R_{00} + \frac{2\sqrt{5}}{11}R_{20} - \frac{59}{187}R_{40} \\ & + \frac{28\sqrt{10}}{187}R_{42} + \frac{620\sqrt{13}}{3553}R_{60} + \frac{128\sqrt{1365}}{3553}R_{62} - \frac{355\sqrt{17}}{3553}R_{80} \\ & - \frac{30\sqrt{2618}}{3553}R_{84} - \frac{630\sqrt{21}}{7429}R_{10,0} - \frac{36\sqrt{10010}}{7429}R_{10,4} \\ & + \frac{3267}{7429}R_{12,0} - \frac{198\sqrt{1001}}{7429}R_{12,4} \end{aligned}$

Table B309: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	1	1	1	$R_{00} - \frac{4\sqrt{5}}{5}R_{20}$
1	1	1	2	2	1	$-\frac{\sqrt{30}}{5}iR_{10} + \frac{3\sqrt{70}}{35}iR_{30} - \frac{2\sqrt{21}}{7}iR_{32}$
1	1	1	3	3	1	$-\frac{6\sqrt{105}}{35}R_{20} + \frac{4\sqrt{21}}{21}R_{40} - \frac{2\sqrt{210}}{21}R_{42}$
1	1	1	3	3	2	$-\frac{\sqrt{42}}{7}iI_{21} + \frac{8\sqrt{7}}{7}iI_{41}$
1	1	1	4	4	1	$\frac{\sqrt{30}}{6}iR_{30} - iR_{32} - \frac{\sqrt{2310}}{66}iR_{50} + \frac{4\sqrt{11}}{11}iR_{52}$ $-\frac{\sqrt{33}}{11}iR_{54}$
1	1	1	4	4	2	$-\frac{\sqrt{210}}{42}R_{30} - \frac{3\sqrt{7}}{7}R_{32} + \frac{\sqrt{330}}{66}R_{50} - \frac{\sqrt{231}}{11}R_{54}$
1	1	1	5	5	1	$\frac{20\sqrt{3927}}{1309}R_{40} - \frac{8\sqrt{39270}}{1309}R_{42} + \frac{4\sqrt{51051}}{2431}R_{60} + \frac{328\sqrt{12155}}{12155}R_{62}$
1	1	1	5	5	2	$\frac{4\sqrt{77}}{11}iI_{41} - \frac{2\sqrt{4290}}{143}iI_{61} + \frac{12\sqrt{429}}{143}iI_{63}$
1	1	1	5	5	3	$-\frac{2\sqrt{2805}}{561}R_{40} - \frac{13\sqrt{1122}}{561}R_{42} + \frac{24\sqrt{36465}}{2431}R_{60} + \frac{48\sqrt{17017}}{2431}R_{62}$
1	1	1	6	6	1	$-\frac{9\sqrt{91}}{104}iR_{50} + \frac{3\sqrt{390}}{52}iR_{52} - \frac{3\sqrt{130}}{104}iR_{54} + \frac{3\sqrt{15015}}{520}iR_{70}$ $-\frac{23\sqrt{715}}{520}iR_{72} + \frac{29\sqrt{130}}{520}iR_{74} - \frac{3\sqrt{5}}{40}iR_{76}$
1	1	1	6	6	2	$\frac{3\sqrt{6006}}{572}iR_{50} + \frac{3\sqrt{715}}{143}iR_{52} - \frac{7\sqrt{2145}}{286}iR_{54} - \frac{3\sqrt{910}}{260}iR_{70}$ $+\frac{\sqrt{390}}{260}iR_{72} + \frac{3\sqrt{2145}}{130}iR_{74} - \frac{\sqrt{330}}{20}iR_{76}$
1	1	1	6	6	3	$-\frac{3\sqrt{5005}}{1144}R_{50} - \frac{\sqrt{858}}{52}R_{52} - \frac{69\sqrt{286}}{1144}R_{54} + \frac{\sqrt{273}}{104}R_{70}$ $+\frac{3\sqrt{13}}{104}R_{72} - \frac{3\sqrt{286}}{104}R_{74} - \frac{3\sqrt{11}}{8}R_{76}$
2	2	1	2	2	1	$-\frac{\sqrt{30}}{7}I_{21} + \frac{8\sqrt{5}}{7}I_{41} + R_{00} - \frac{2\sqrt{5}}{7}R_{20}$ $-\frac{4}{7}R_{40} + \frac{2\sqrt{10}}{7}R_{42}$
2	2	1	3	3	1	$-\frac{3\sqrt{70}}{35}iR_{10} - \frac{\sqrt{30}}{30}iR_{30} + \frac{1}{3}iR_{32} + \frac{5\sqrt{2310}}{462}iR_{50}$ $-\frac{10\sqrt{11}}{33}iR_{52} + \frac{5\sqrt{33}}{33}iR_{54}$
2	2	1	3	3	2	$-\frac{\sqrt{42}}{7}R_{10} + \frac{2\sqrt{2}}{3}R_{30} - \frac{5\sqrt{154}}{231}R_{50} + \frac{2\sqrt{55}}{11}R_{54}$
2	2	1	4	4	1	$\frac{2\sqrt{105}}{11}I_{41} - \frac{15\sqrt{26}}{143}I_{61} + \frac{18\sqrt{65}}{143}I_{63} - \frac{\sqrt{105}}{7}R_{20}$ $-\frac{2\sqrt{210}}{77}R_{42} - \frac{32\sqrt{65}}{143}R_{62}$
2	2	1	4	4	2	$-\frac{2\sqrt{10}}{7}iI_{21} + \frac{26\sqrt{15}}{77}iI_{41} + \frac{5\sqrt{182}}{143}iI_{61} - \frac{6\sqrt{455}}{143}iI_{63}$ $+\frac{\sqrt{15}}{7}iR_{20} - \frac{20\sqrt{3}}{77}iR_{40} - \frac{4\sqrt{30}}{77}iR_{42} + \frac{40\sqrt{39}}{143}iR_{60}$ $+\frac{16\sqrt{455}}{143}iR_{62}$

Table B310: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	5	5	1	$\frac{5\sqrt{5610}}{561}iR_{30} - \frac{10\sqrt{187}}{187}iR_{32} + \frac{5\sqrt{3570}}{2652}iR_{50} + \frac{5\sqrt{17}}{221}iR_{52}$ $+ \frac{25\sqrt{51}}{442}iR_{54} - \frac{105\sqrt{2618}}{9724}iR_{70} + \frac{15\sqrt{1122}}{572}iR_{72} - \frac{31\sqrt{51}}{442}iR_{74}$ $+ \frac{\sqrt{1326}}{52}iR_{76}$
2	2	1	5	5	2	$\frac{5\sqrt{22}}{66}R_{30} - \frac{\sqrt{165}}{11}R_{32} - \frac{5\sqrt{14}}{39}R_{50} + \frac{2\sqrt{15}}{13}R_{52}$ $+ \frac{2\sqrt{5}}{13}R_{54} + \frac{\sqrt{2310}}{286}R_{70} - \frac{3\sqrt{110}}{286}R_{72} - \frac{3\sqrt{5}}{13}R_{74}$ $+ \frac{3\sqrt{130}}{26}R_{76}$
2	2	1	5	5	3	$-\frac{20\sqrt{7854}}{3927}iR_{30} - \frac{4\sqrt{6545}}{357}iR_{32} - \frac{5\sqrt{102}}{663}iR_{50} - \frac{2\sqrt{595}}{51}iR_{52}$ $- \frac{14\sqrt{1785}}{663}iR_{54} + \frac{21\sqrt{1870}}{2431}iR_{70} - \frac{6\sqrt{1785}}{221}iR_{74}$
2	2	1	6	6	1	$-\frac{2\sqrt{165}}{55}I_{61} + \frac{\sqrt{66}}{11}I_{63} - \frac{7\sqrt{85085}}{1105}I_{81} - \frac{\sqrt{663}}{13}I_{83}$ $+ \frac{15\sqrt{10010}}{2002}R_{40} - \frac{30\sqrt{1001}}{1001}R_{42} + \frac{\sqrt{770}}{55}R_{60} + \frac{16\sqrt{66}}{165}R_{62}$ $- \frac{3\sqrt{170170}}{2431}R_{80} + \frac{32\sqrt{4862}}{2431}R_{82} - \frac{19\sqrt{1105}}{1105}R_{84}$
2	2	1	6	6	2	$-\frac{20\sqrt{273}}{143}I_{41} + \frac{9\sqrt{10}}{55}I_{61} - \frac{2}{11}I_{63} - \frac{22\sqrt{46410}}{1105}I_{81}$ $- \frac{10\sqrt{4862}}{221}I_{83} - \frac{5\sqrt{546}}{143}R_{42} + \frac{8}{55}R_{62} + \frac{4\sqrt{23205}}{1105}R_{80}$ $- \frac{6\sqrt{72930}}{1105}R_{84}$
2	2	1	6	6	3	$\frac{8\sqrt{910}}{143}iI_{41} + \frac{2\sqrt{3}}{11}iI_{61} + \frac{\sqrt{30}}{11}iI_{63} - \frac{3\sqrt{1547}}{221}iI_{81}$ $+ \frac{\sqrt{36465}}{221}iI_{83} - \frac{5\sqrt{182}}{154}iR_{40} - \frac{2\sqrt{455}}{1001}iR_{42} + \frac{5\sqrt{14}}{11}iR_{60}$ $+ \frac{16\sqrt{30}}{55}iR_{62} - \frac{\sqrt{3094}}{221}iR_{80} + \frac{3\sqrt{2431}}{221}iR_{84}$
3	3	1	3	3	1	$R_{00} - \frac{8\sqrt{5}}{15}R_{20} + \frac{6}{11}R_{40} - \frac{3\sqrt{10}}{11}R_{42}$ $+ \frac{100\sqrt{13}}{429}R_{60} + \frac{40\sqrt{1365}}{429}R_{62}$
3	3	1	3	3	2	$\frac{2\sqrt{2}}{3}iI_{21} - \frac{4\sqrt{3}}{11}iI_{41} - \frac{10\sqrt{910}}{429}iI_{61} + \frac{20\sqrt{91}}{143}iI_{63}$
3	3	1	4	4	1	$-\frac{\sqrt{30}}{6}iR_{10} - \frac{2\sqrt{21}}{11}iR_{32} - \frac{9\sqrt{110}}{572}iR_{50} + \frac{4\sqrt{231}}{143}iR_{52}$ $- \frac{21\sqrt{77}}{286}iR_{54} + \frac{35\sqrt{6}}{156}iR_{70} - \frac{155\sqrt{14}}{572}iR_{72} + \frac{25\sqrt{77}}{286}iR_{74}$ $- \frac{5\sqrt{2002}}{572}iR_{76}$
3	3	1	4	4	2	$-\frac{\sqrt{210}}{42}R_{10} + \frac{3\sqrt{10}}{11}R_{30} + \frac{4\sqrt{3}}{11}R_{32} - \frac{51\sqrt{770}}{4004}R_{50}$ $+ \frac{10\sqrt{33}}{143}R_{52} + \frac{3\sqrt{11}}{26}R_{54} - \frac{35\sqrt{42}}{1716}R_{70} + \frac{35\sqrt{2}}{572}R_{72}$ $+ \frac{35\sqrt{11}}{286}R_{74} - \frac{35\sqrt{286}}{572}R_{76}$

Table B311: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	5	5	1	$-\frac{10\sqrt{935}}{187}R_{20} + \frac{60\sqrt{187}}{2431}R_{40} - \frac{54\sqrt{1870}}{2431}R_{42} + \frac{42\sqrt{2431}}{2431}R_{60}$ $+ \frac{172\sqrt{255255}}{36465}R_{62} + \frac{252\sqrt{11}}{2431}R_{80} - \frac{8\sqrt{385}}{143}R_{82} + \frac{82\sqrt{14}}{221}R_{84}$
3	3	1	5	5	2	$-\frac{5\sqrt{22}}{33}iI_{21} + \frac{8\sqrt{33}}{143}iI_{41} - \frac{\sqrt{10010}}{429}iI_{61} + \frac{2\sqrt{1001}}{143}iI_{63}$ $-\frac{140\sqrt{5610}}{2431}iI_{81} - \frac{60\sqrt{238}}{221}iI_{83}$
3	3	1	5	5	3	$-\frac{50\sqrt{1309}}{3927}R_{20} + \frac{12\sqrt{6545}}{1309}R_{40} + \frac{114\sqrt{2618}}{17017}R_{42} - \frac{28\sqrt{85085}}{7293}R_{60}$ $-\frac{56\sqrt{7293}}{7293}R_{62} - \frac{56\sqrt{385}}{2431}R_{80} + \frac{84\sqrt{10}}{221}R_{84}$
3	3	1	6	6	1	$\frac{25\sqrt{3003}}{1716}iR_{30} - \frac{5\sqrt{10010}}{572}iR_{32} - \frac{7\sqrt{39}}{312}iR_{50} + \frac{\sqrt{910}}{52}iR_{52}$ $-\frac{\sqrt{2730}}{104}iR_{54} + \frac{1449\sqrt{715}}{194480}iR_{70} - \frac{729\sqrt{15015}}{194480}iR_{72}$ $+ \frac{177\sqrt{2730}}{17680}iR_{74} - \frac{39\sqrt{105}}{1360}iR_{76} - \frac{413\sqrt{8151}}{67184}iR_{90}$ $+ \frac{70\sqrt{3705}}{4199}iR_{92} - \frac{31\sqrt{3990}}{2584}iR_{94} + \frac{14\sqrt{95}}{323}iR_{96} - \frac{7\sqrt{9690}}{5168}iR_{98}$
3	3	1	6	6	2	$-\frac{10\sqrt{1365}}{429}iR_{32} - \frac{21\sqrt{286}}{572}iR_{50} - \frac{\sqrt{15015}}{429}iR_{52} - \frac{\sqrt{5005}}{286}iR_{54}$ $+ \frac{147\sqrt{390}}{8840}iR_{70} - \frac{831\sqrt{910}}{97240}iR_{72} - \frac{213\sqrt{5005}}{48620}iR_{74}$ $-\frac{129\sqrt{770}}{7480}iR_{76} + \frac{21\sqrt{494}}{2584}iR_{90} - \frac{7\sqrt{27170}}{8398}iR_{92} - \frac{3\sqrt{7315}}{646}iR_{94}$ $+ \frac{7\sqrt{6270}}{646}iR_{96} - \frac{7\sqrt{17765}}{1292}iR_{98}$
3	3	1	6	6	3	$-\frac{5\sqrt{1365}}{1716}R_{30} - \frac{5\sqrt{182}}{132}R_{32} + \frac{35\sqrt{2145}}{3432}R_{50} + \frac{37\sqrt{2002}}{1716}R_{52}$ $+ \frac{\sqrt{6006}}{312}R_{54} - \frac{2877\sqrt{13}}{38896}R_{70} - \frac{3\sqrt{273}}{2288}R_{72} + \frac{411\sqrt{6006}}{38896}R_{74}$ $+ \frac{3\sqrt{231}}{176}R_{76} - \frac{63\sqrt{3705}}{67184}R_{90} + \frac{5\sqrt{8778}}{2584}R_{94} - \frac{35\sqrt{21318}}{5168}R_{98}$
3	3	2	3	3	2	$R_{00} - \frac{12}{11}R_{40} + \frac{2\sqrt{10}}{11}R_{42} + \frac{80\sqrt{13}}{143}R_{60}$ $+ \frac{32\sqrt{1365}}{429}R_{62}$
3	3	2	4	4	1	$-\frac{2\sqrt{35}}{11}R_{32} + \frac{4\sqrt{385}}{143}R_{52} - \frac{\sqrt{210}}{143}R_{72} + \frac{\sqrt{30030}}{143}R_{76}$
3	3	2	4	4	2	$-\frac{2\sqrt{14}}{7}iR_{10} + \frac{\sqrt{6}}{11}iR_{30} + \frac{40\sqrt{462}}{1001}iR_{50} + \frac{8\sqrt{165}}{143}iR_{54}$ $-\frac{7\sqrt{70}}{143}iR_{70} + \frac{14\sqrt{165}}{143}iR_{74}$
3	3	2	5	5	1	$\frac{280\sqrt{561}}{2431}iI_{41} + \frac{8\sqrt{17017}}{2431}iI_{63} + \frac{28\sqrt{330}}{221}iI_{81} + \frac{164\sqrt{14}}{221}iI_{83}$
3	3	2	5	5	2	$-\frac{2\sqrt{55}}{11}R_{20} + \frac{8\sqrt{110}}{143}R_{42} - \frac{32\sqrt{15015}}{2145}R_{62} - \frac{112\sqrt{187}}{2431}R_{80}$ $+ \frac{24\sqrt{238}}{221}R_{84}$

Table B312: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	2	5	5	3	$\frac{2\sqrt{13090}}{231}iI_{21} - \frac{8\sqrt{19635}}{1547}iI_{41} - \frac{7\sqrt{4862}}{429}iI_{61} + \frac{14\sqrt{12155}}{2431}iI_{63}$ $+ \frac{504\sqrt{462}}{2431}iI_{81} + \frac{168\sqrt{10}}{221}iI_{83}$
3	3	2	6	6	1	$-\frac{\sqrt{182}}{13}R_{54} + \frac{6\sqrt{182}}{221}R_{74} - \frac{\sqrt{266}}{323}R_{94} + \frac{14\sqrt{646}}{323}R_{98}$
3	3	2	6	6	2	$\frac{20\sqrt{91}}{143}R_{32} + \frac{2\sqrt{1001}}{143}R_{52} - \frac{80\sqrt{546}}{2431}R_{72} - \frac{8\sqrt{462}}{187}R_{76}$ $+ \frac{7\sqrt{16302}}{4199}R_{92} - \frac{21\sqrt{418}}{323}R_{96}$
3	3	2	6	6	3	$\frac{40\sqrt{91}}{429}iR_{30} - \frac{14\sqrt{143}}{429}iR_{50} + \frac{\sqrt{10010}}{143}iR_{54} - \frac{140\sqrt{195}}{2431}iR_{70}$ $- \frac{6\sqrt{10010}}{2431}iR_{74} + \frac{126\sqrt{247}}{4199}iR_{90} - \frac{3\sqrt{14630}}{323}iR_{94}$
4	4	1	4	4	1	$-\frac{\sqrt{30}}{22}I_{21} + \frac{108\sqrt{5}}{143}I_{41} - \frac{7\sqrt{546}}{286}I_{61} + \frac{5\sqrt{1365}}{143}I_{63}$ $-\frac{84\sqrt{34}}{187}I_{81} - \frac{28\sqrt{39270}}{2431}I_{83} + R_{00} - \frac{4\sqrt{5}}{11}R_{20}$ $+ \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60} - \frac{28\sqrt{17}}{221}R_{80} + \frac{96\sqrt{595}}{2431}R_{82}$ $-\frac{30\sqrt{2618}}{2431}R_{84}$
4	4	1	4	4	2	$\frac{\sqrt{210}}{22}iI_{21} + \frac{\sqrt{78}}{286}iI_{61} + \frac{5\sqrt{195}}{143}iI_{63} + \frac{168\sqrt{238}}{2431}iI_{81}$ $+ \frac{56\sqrt{5610}}{2431}iI_{83} + \frac{6\sqrt{35}}{77}iR_{20} + \frac{81\sqrt{70}}{1001}iR_{42} + \frac{24\sqrt{195}}{715}iR_{62}$ $-\frac{84\sqrt{119}}{2431}iR_{80} + \frac{126\sqrt{374}}{2431}iR_{84}$
4	4	1	5	5	1	$-\frac{2\sqrt{5610}}{187}iR_{10} - \frac{6\sqrt{13090}}{2431}iR_{30} - \frac{10\sqrt{3927}}{2431}iR_{32} - \frac{3\sqrt{170}}{442}iR_{50}$ $-\frac{4\sqrt{357}}{221}iR_{52} + \frac{9\sqrt{119}}{221}iR_{54} - \frac{175\sqrt{1122}}{330616}iR_{70} + \frac{135\sqrt{2618}}{330616}iR_{72}$ $-\frac{645\sqrt{119}}{15028}iR_{74} + \frac{345\sqrt{3094}}{30056}iR_{76} + \frac{19089\sqrt{35530}}{6281704}iR_{90}$ $-\frac{10563\sqrt{646}}{285532}iR_{92} + \frac{483\sqrt{29393}}{142766}iR_{94} - \frac{861\sqrt{25194}}{285532}iR_{96}$ $+ \frac{21\sqrt{247}}{988}iR_{98}$
4	4	1	5	5	2	$-\frac{3\sqrt{22}}{22}R_{10} + \frac{6\sqrt{462}}{143}R_{30} - \frac{2\sqrt{385}}{143}R_{32} - \frac{3\sqrt{6}}{13}R_{50}$ $+ \frac{\sqrt{35}}{13}R_{52} + \frac{42\sqrt{110}}{2431}R_{70} - \frac{14\sqrt{2310}}{2431}R_{72} + \frac{2\sqrt{2730}}{221}R_{76}$ $-\frac{63\sqrt{1254}}{92378}R_{90} + \frac{21\sqrt{570}}{8398}R_{92} - \frac{63\sqrt{2470}}{8398}R_{96} + \frac{21\sqrt{62985}}{4199}R_{98}$
4	4	1	5	5	3	$\frac{\sqrt{7854}}{561}iR_{10} + \frac{9\sqrt{374}}{442}iR_{30} + \frac{25\sqrt{2805}}{2431}iR_{32} + \frac{9\sqrt{238}}{442}iR_{50}$ $+ \frac{10\sqrt{255}}{221}iR_{52} + \frac{3\sqrt{85}}{221}iR_{54} - \frac{14\sqrt{39270}}{11271}iR_{70} + \frac{1435\sqrt{1870}}{82654}iR_{72}$ $+ \frac{112\sqrt{85}}{3757}iR_{74} - \frac{35\sqrt{2210}}{7514}iR_{76} - \frac{1134\sqrt{49742}}{785213}iR_{90}$ $+ \frac{63\sqrt{22610}}{142766}iR_{92} + \frac{378\sqrt{20995}}{71383}iR_{94} - \frac{63\sqrt{881790}}{142766}iR_{96}$

Table B313: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	6	6	1	$\frac{7\sqrt{858}}{286}I_{41} - \frac{9\sqrt{385}}{374}I_{61} + \frac{27\sqrt{154}}{374}I_{63} - \frac{147\sqrt{36465}}{8398}I_{81}$ $- \frac{657\sqrt{1547}}{8398}I_{83} + \frac{9\sqrt{91}}{323}I_{10,1} + \frac{5\sqrt{42}}{1292}I_{10,3} - \frac{83\sqrt{210}}{1292}I_{10,5}$ $- \frac{15\sqrt{858}}{286}R_{20} - \frac{4\sqrt{429}}{143}R_{42} + \frac{3\sqrt{154}}{187}R_{62} - \frac{6\sqrt{102102}}{46189}R_{82}$ $+ \frac{3\sqrt{10010}}{221}R_{10,0} + \frac{96\sqrt{273}}{4199}R_{10,2} + \frac{5\sqrt{21}}{17}R_{10,4}$
4	4	1	6	6	2	$\frac{5\sqrt{78}}{143}I_{21} - \frac{12\sqrt{13}}{143}I_{41} - \frac{\sqrt{210}}{187}I_{61} - \frac{18\sqrt{21}}{187}I_{63}$ $+ \frac{651\sqrt{2210}}{46189}I_{81} + \frac{9\sqrt{102102}}{46189}I_{83} + \frac{18\sqrt{6006}}{4199}I_{10,1}$ $+ \frac{3\sqrt{77}}{323}I_{10,3} - \frac{21\sqrt{385}}{323}I_{10,5} - \frac{15\sqrt{13}}{143}R_{20} + \frac{12\sqrt{65}}{143}R_{40}$ $- \frac{42\sqrt{5}}{187}R_{60} + \frac{384\sqrt{1547}}{46189}R_{82} - \frac{24\sqrt{170170}}{46189}R_{84} + \frac{12\sqrt{1365}}{221}R_{10,0}$ $+ \frac{384\sqrt{2002}}{4199}R_{10,2} + \frac{78\sqrt{154}}{323}R_{10,4}$
4	4	1	6	6	3	$- \frac{12\sqrt{65}}{143}iI_{21} + \frac{\sqrt{390}}{26}iI_{41} - \frac{81\sqrt{7}}{374}iI_{61} - \frac{9\sqrt{70}}{374}iI_{63}$ $+ \frac{567\sqrt{663}}{92378}iI_{81} - \frac{9\sqrt{85085}}{7106}iI_{83} + \frac{27\sqrt{5005}}{4199}iI_{10,1}$ $- \frac{21\sqrt{2310}}{1292}iI_{10,3} + \frac{15\sqrt{462}}{1292}iI_{10,5} + \frac{\sqrt{390}}{286}iR_{20} + \frac{4\sqrt{195}}{143}iR_{42}$ $- \frac{37\sqrt{70}}{935}iR_{62} - \frac{504\sqrt{1326}}{46189}iR_{80} + \frac{6\sqrt{46410}}{4199}iR_{82} + \frac{216\sqrt{51051}}{46189}iR_{84}$ $- \frac{495\sqrt{182}}{4199}iR_{10,0} - \frac{96\sqrt{15015}}{4199}iR_{10,2} - \frac{15\sqrt{1155}}{323}iR_{10,4}$
4	4	2	4	4	2	$- \frac{13\sqrt{30}}{154}I_{21} - \frac{108\sqrt{5}}{1001}I_{41} + \frac{\sqrt{546}}{26}I_{61} - \frac{\sqrt{1365}}{143}I_{63}$ $- \frac{1764\sqrt{34}}{2431}I_{81} - \frac{28\sqrt{39270}}{2431}I_{83} + R_{00} + \frac{8\sqrt{5}}{77}R_{20}$ $- \frac{54}{77}R_{40} + \frac{162\sqrt{10}}{1001}R_{42} + \frac{20\sqrt{13}}{143}R_{60} + \frac{32\sqrt{1365}}{715}R_{62}$ $+ \frac{196\sqrt{17}}{2431}R_{80} - \frac{42\sqrt{2618}}{2431}R_{84}$
4	4	2	5	5	1	$- \frac{15\sqrt{1870}}{2431}R_{30} - \frac{40\sqrt{561}}{2431}R_{32} - \frac{3\sqrt{1190}}{442}R_{50} + \frac{8\sqrt{51}}{221}R_{52}$ $+ \frac{3\sqrt{17}}{17}R_{54} + \frac{735\sqrt{7854}}{330616}R_{70} - \frac{12165\sqrt{374}}{330616}R_{72} + \frac{15\sqrt{17}}{1156}R_{74}$ $+ \frac{645\sqrt{442}}{30056}R_{76} + \frac{189\sqrt{248710}}{571064}R_{90} - \frac{147\sqrt{4522}}{285532}R_{92}$ $- \frac{777\sqrt{4199}}{142766}R_{94} + \frac{147\sqrt{176358}}{285532}R_{96} - \frac{21\sqrt{1729}}{988}R_{98}$
4	4	2	5	5	2	$- \frac{\sqrt{154}}{22}iR_{10} - \frac{\sqrt{66}}{143}iR_{30} + \frac{12\sqrt{55}}{143}iR_{32} + \frac{\sqrt{42}}{26}iR_{50}$ $+ \frac{3\sqrt{5}}{13}iR_{52} + \frac{\sqrt{15}}{13}iR_{54} + \frac{32\sqrt{770}}{2431}iR_{70} - \frac{81\sqrt{330}}{2431}iR_{72}$ $+ \frac{20\sqrt{15}}{221}iR_{74} - \frac{3\sqrt{390}}{221}iR_{76} - \frac{126\sqrt{8778}}{46189}iR_{90} + \frac{21\sqrt{3990}}{8398}iR_{92}$ $+ \frac{42\sqrt{3705}}{4199}iR_{94} - \frac{63\sqrt{17290}}{8398}iR_{96}$

Table B314: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	5	5	3	$\frac{\sqrt{1122}}{33}R_{10} - \frac{237\sqrt{2618}}{34034}R_{30} - \frac{19\sqrt{19635}}{17017}R_{32} - \frac{3\sqrt{34}}{34}R_{50}$ $+ \frac{2\sqrt{1785}}{221}R_{52} - \frac{3\sqrt{595}}{221}R_{54} + \frac{70\sqrt{5610}}{9537}R_{70} + \frac{469\sqrt{13090}}{82654}R_{72}$ $- \frac{8\sqrt{595}}{3757}R_{74} + \frac{35\sqrt{15470}}{7514}R_{76} - \frac{2646\sqrt{7106}}{785213}R_{90} - \frac{441\sqrt{3230}}{142766}R_{92}$ $+ \frac{126\sqrt{146965}}{71383}R_{94} + \frac{441\sqrt{125970}}{142766}R_{96}$
4	4	2	6	6	1	$\frac{7\sqrt{6006}}{286}iI_{41} + \frac{9\sqrt{55}}{374}iI_{61} + \frac{9\sqrt{22}}{374}iI_{63} + \frac{21\sqrt{255255}}{8398}iI_{81}$ $+ \frac{45\sqrt{221}}{646}iI_{83} - \frac{21\sqrt{13}}{323}iI_{10,1} + \frac{315\sqrt{6}}{1292}iI_{10,3} - \frac{7\sqrt{30}}{68}iI_{10,5}$ $+ \frac{2\sqrt{30030}}{1001}iR_{40} - \frac{8\sqrt{3003}}{1001}iR_{42} + \frac{9\sqrt{2310}}{374}iR_{60} + \frac{72\sqrt{22}}{187}iR_{62}$ $- \frac{18\sqrt{510510}}{46189}iR_{80} + \frac{192\sqrt{14586}}{46189}iR_{82} - \frac{6\sqrt{3315}}{4199}iR_{84}$ $+ \frac{147\sqrt{1430}}{4199}iR_{10,0} + \frac{1792\sqrt{39}}{4199}iR_{10,2} + \frac{21\sqrt{3}}{19}iR_{10,4}$
4	4	2	6	6	2	$\frac{5\sqrt{546}}{143}iI_{21} - \frac{19\sqrt{30}}{187}iI_{61} + \frac{18\sqrt{3}}{187}iI_{63} + \frac{519\sqrt{15470}}{46189}iI_{81}$ $+ \frac{579\sqrt{14586}}{46189}iI_{83} + \frac{126\sqrt{858}}{4199}iI_{10,1} - \frac{63\sqrt{11}}{323}iI_{10,3}$ $- \frac{63\sqrt{55}}{323}iI_{10,5} - \frac{15\sqrt{91}}{143}iR_{20} + \frac{6\sqrt{182}}{143}iR_{42} - \frac{76\sqrt{3}}{187}iR_{62}$ $- \frac{144\sqrt{7735}}{46189}iR_{80} - \frac{168\sqrt{221}}{4199}iR_{82} + \frac{216\sqrt{24310}}{46189}iR_{84}$ $+ \frac{924\sqrt{195}}{4199}iR_{10,0} + \frac{1344\sqrt{286}}{4199}iR_{10,2} + \frac{210\sqrt{22}}{323}iR_{10,4}$
4	4	2	6	6	3	$- \frac{4\sqrt{455}}{143}I_{21} + \frac{5\sqrt{2730}}{286}I_{41} + \frac{13}{34}I_{61} - \frac{93\sqrt{10}}{374}I_{63}$ $- \frac{1263\sqrt{4641}}{92378}I_{81} - \frac{333\sqrt{12155}}{92378}I_{83} + \frac{63\sqrt{715}}{4199}I_{10,1}$ $- \frac{21\sqrt{330}}{1292}I_{10,3} - \frac{105\sqrt{66}}{1292}I_{10,5} - \frac{2\sqrt{2730}}{143}R_{20} - \frac{10\sqrt{546}}{1001}R_{40}$ $+ \frac{8\sqrt{1365}}{1001}R_{42} - \frac{\sqrt{42}}{374}R_{60} - \frac{184\sqrt{10}}{935}R_{62} + \frac{18\sqrt{9282}}{3553}R_{80}$ $+ \frac{222\sqrt{7293}}{46189}R_{84} - \frac{315\sqrt{26}}{4199}R_{10,0} + \frac{21\sqrt{165}}{323}R_{10,4}$
5	5	1	5	5	1	$R_{00} - \frac{100\sqrt{5}}{221}R_{20} + \frac{132}{221}R_{40} - \frac{30\sqrt{10}}{221}R_{42}$ $+ \frac{880\sqrt{13}}{3757}R_{60} + \frac{224\sqrt{1365}}{3757}R_{62} - \frac{3710\sqrt{17}}{71383}R_{80} - \frac{900\sqrt{595}}{71383}R_{82}$ $+ \frac{1935\sqrt{2618}}{71383}R_{84} - \frac{45624\sqrt{21}}{71383}R_{10,0} - \frac{8304\sqrt{770}}{71383}R_{10,2}$ $- \frac{2364\sqrt{10010}}{71383}R_{10,4}$
5	5	1	5	5	2	$\frac{30\sqrt{34}}{221}iI_{21} - \frac{4\sqrt{51}}{17}iI_{41} + \frac{12\sqrt{15470}}{3757}iI_{61} - \frac{40\sqrt{1547}}{3757}iI_{63}$ $- \frac{854\sqrt{30}}{4199}iI_{81} - \frac{350\sqrt{154}}{4199}iI_{83} + \frac{252\sqrt{2618}}{71383}iI_{10,1}$ $+ \frac{162\sqrt{51051}}{71383}iI_{10,3} - \frac{246\sqrt{255255}}{71383}iI_{10,5}$

Table B315: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	3	$-\frac{40\sqrt{7}}{221}R_{20} - \frac{24\sqrt{35}}{1547}R_{40} - \frac{288\sqrt{14}}{1547}R_{42} - \frac{120\sqrt{455}}{3757}R_{60}$ $-\frac{1328\sqrt{39}}{11271}R_{62} + \frac{1512\sqrt{595}}{71383}R_{80} - \frac{12040\sqrt{17}}{71383}R_{82}$ $-\frac{868\sqrt{1870}}{71383}R_{84} - \frac{27720\sqrt{15}}{71383}R_{10,0} - \frac{48384\sqrt{22}}{71383}R_{10,2}$ $-\frac{10332\sqrt{286}}{71383}R_{10,4}$
5	5	1	6	6	1	$-\frac{3\sqrt{221}}{52}iR_{10} - \frac{3\sqrt{4641}}{884}iR_{30} - \frac{5\sqrt{15470}}{884}iR_{32} - \frac{15\sqrt{7293}}{7514}iR_{50}$ $+\frac{\sqrt{170170}}{7514}iR_{52} - \frac{5\sqrt{510510}}{7514}iR_{54} - \frac{105\sqrt{1105}}{571064}iR_{70}$ $-\frac{1065\sqrt{23205}}{571064}iR_{72} + \frac{375\sqrt{510510}}{571064}iR_{74} - \frac{135\sqrt{19635}}{43928}iR_{76}$ $-\frac{225\sqrt{12597}}{2284256}iR_{90} + \frac{53\sqrt{692835}}{571064}iR_{92} - \frac{37\sqrt{746130}}{87856}iR_{94}$ $+\frac{177\sqrt{17765}}{43928}iR_{96} - \frac{41\sqrt{6270}}{10336}iR_{98} + \frac{242583\sqrt{15249}}{52537888}iR_{11,0}$ $-\frac{18933\sqrt{43010}}{4041376}iR_{11,2} + \frac{3057\sqrt{180642}}{2020688}iR_{11,4} - \frac{6471\sqrt{253}}{237728}iR_{11,6}$ $+\frac{321\sqrt{48070}}{237728}iR_{11,8} - \frac{9\sqrt{33649}}{13984}iR_{11,10}$
5	5	1	6	6	2	$-\frac{7\sqrt{14586}}{4862}iR_{10} + \frac{\sqrt{34034}}{286}iR_{30} + \frac{\sqrt{255255}}{2431}iR_{32} - \frac{35\sqrt{442}}{7514}iR_{50}$ $+\frac{20\sqrt{23205}}{3757}iR_{52} + \frac{21\sqrt{7735}}{3757}iR_{54} + \frac{2765\sqrt{72930}}{3140852}iR_{70}$ $-\frac{945\sqrt{170170}}{3140852}iR_{72} - \frac{105\sqrt{7735}}{142766}iR_{74} + \frac{225\sqrt{1190}}{21964}iR_{76}$ $-\frac{9255\sqrt{92378}}{12563408}iR_{90} + \frac{189\sqrt{41990}}{71383}iR_{92} + \frac{9\sqrt{11305}}{21964}iR_{94}$ $-\frac{9\sqrt{9690}}{5491}iR_{96} - \frac{111\sqrt{95}}{2584}iR_{98} - \frac{16797\sqrt{111826}}{26268944}iR_{11,0}$ $+\frac{1155\sqrt{5865}}{1010344}iR_{11,2} + \frac{3663\sqrt{2737}}{505172}iR_{11,4} - \frac{3663\sqrt{138}}{118864}iR_{11,6}$ $+\frac{429\sqrt{6555}}{59432}iR_{11,8} - \frac{33\sqrt{18354}}{6992}iR_{11,10}$
5	5	1	6	6	3	$-\frac{3\sqrt{12155}}{884}R_{10} + \frac{29\sqrt{255255}}{29172}R_{30} + \frac{\sqrt{34034}}{748}R_{32} - \frac{235\sqrt{3315}}{22542}R_{50}$ $-\frac{5\sqrt{3094}}{578}R_{52} + \frac{25\sqrt{9282}}{7514}R_{54} + \frac{945\sqrt{2431}}{369512}R_{70} - \frac{315\sqrt{51051}}{483208}R_{72}$ $+\frac{1505\sqrt{9282}}{571064}R_{74} + \frac{815\sqrt{357}}{43928}R_{76} + \frac{15\sqrt{692835}}{134368}R_{90}$ $-\frac{105\sqrt{12597}}{43928}R_{92} - \frac{435\sqrt{13566}}{87856}R_{94} + \frac{1455\sqrt{323}}{43928}R_{96}$ $+\frac{465\sqrt{114}}{10336}R_{98} + \frac{4983\sqrt{838695}}{52537888}R_{11,0} + \frac{6237\sqrt{782}}{4041376}R_{11,2}$ $-\frac{1221\sqrt{82110}}{2020688}R_{11,4} - \frac{3597\sqrt{115}}{237728}R_{11,6} - \frac{297\sqrt{874}}{237728}R_{11,8}$ $-\frac{99\sqrt{15295}}{13984}R_{11,10}$

Table B316: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	5	5	2	$R_{00} - \frac{4\sqrt{5}}{13}R_{20} - \frac{6}{13}R_{40} - \frac{\sqrt{10}}{13}R_{42}$ $+ \frac{32\sqrt{13}}{221}R_{60} - \frac{64\sqrt{1365}}{3315}R_{62} - \frac{560\sqrt{17}}{4199}R_{80} + \frac{144\sqrt{595}}{4199}R_{82}$ $- \frac{24\sqrt{2618}}{4199}R_{84} - \frac{3600\sqrt{21}}{4199}R_{10,0} - \frac{1152\sqrt{770}}{4199}R_{10,2}$ $- \frac{216\sqrt{10010}}{4199}R_{10,4}$
5	5	2	5	5	3	$-\frac{14\sqrt{1190}}{663}iI_{21} - \frac{4\sqrt{1785}}{221}iI_{41} + \frac{32\sqrt{442}}{867}iI_{61} - \frac{32\sqrt{1105}}{3757}iI_{63}$ $- \frac{1372\sqrt{42}}{4199}iI_{81} - \frac{756\sqrt{110}}{4199}iI_{83} - \frac{1512\sqrt{1870}}{71383}iI_{10,1}$ $+ \frac{252\sqrt{36465}}{71383}iI_{10,3} + \frac{1260\sqrt{7293}}{71383}iI_{10,5}$
5	5	2	6	6	1	$-\frac{\sqrt{546}}{26}R_{32} + \frac{2\sqrt{6006}}{221}R_{52} - \frac{2\sqrt{2002}}{221}R_{54} - \frac{135\sqrt{91}}{4199}R_{72}$ $+ \frac{75\sqrt{2002}}{8398}R_{74} + \frac{6\sqrt{2717}}{4199}R_{92} - \frac{\sqrt{2926}}{323}R_{94} + \frac{2\sqrt{7106}}{323}R_{98}$ $- \frac{3\sqrt{1518}}{14858}R_{11,2} + \frac{3\sqrt{17710}}{14858}R_{11,4} - \frac{3\sqrt{490314}}{7429}R_{11,8}$ $+ \frac{3\sqrt{8580495}}{7429}R_{11,10}$
5	5	2	6	6	2	$\frac{3\sqrt{1430}}{143}R_{10} - \frac{\sqrt{30030}}{286}R_{30} - \frac{\sqrt{1001}}{143}R_{32} - \frac{4\sqrt{390}}{221}R_{50}$ $- \frac{8\sqrt{91}}{221}R_{52} + \frac{105\sqrt{286}}{2717}R_{70} - \frac{145\sqrt{6006}}{92378}R_{72} + \frac{5\sqrt{42}}{646}R_{76}$ $- \frac{3\sqrt{81510}}{2717}R_{90} + \frac{41\sqrt{1482}}{4199}R_{92} + \frac{9\sqrt{38}}{323}R_{96} - \frac{6\sqrt{969}}{323}R_{98}$ $+ \frac{33\sqrt{98670}}{193154}R_{11,0} - \frac{198\sqrt{23}}{7429}R_{11,2} + \frac{66\sqrt{3910}}{7429}R_{11,6}$ $- \frac{99\sqrt{7429}}{7429}R_{11,8}$
5	5	2	6	6	3	$-\frac{4\sqrt{429}}{143}iR_{10} - \frac{2\sqrt{1001}}{429}iR_{30} - \frac{\sqrt{30030}}{286}iR_{32} + \frac{20\sqrt{13}}{663}iR_{50}$ $+ \frac{2\sqrt{2730}}{221}iR_{52} + \frac{2\sqrt{910}}{221}iR_{54} + \frac{287\sqrt{2145}}{46189}iR_{70} + \frac{294\sqrt{5005}}{46189}iR_{72}$ $+ \frac{81\sqrt{910}}{8398}iR_{74} + \frac{39\sqrt{35}}{323}iR_{76} + \frac{270\sqrt{2717}}{46189}iR_{90} - \frac{72\sqrt{1235}}{4199}iR_{92}$ $+ \frac{3\sqrt{1330}}{323}iR_{94} + \frac{6\sqrt{285}}{323}iR_{96} - \frac{495\sqrt{3289}}{96577}iR_{11,0} + \frac{99\sqrt{690}}{14858}iR_{11,2}$ $+ \frac{495\sqrt{322}}{14858}iR_{11,4} - \frac{165\sqrt{1173}}{7429}iR_{11,6}$
5	5	3	5	5	3	$R_{00} + \frac{164\sqrt{5}}{663}R_{20} - \frac{132}{221}R_{40} + \frac{30\sqrt{10}}{221}R_{42}$ $+ \frac{352\sqrt{13}}{11271}R_{60} + \frac{2624\sqrt{1365}}{56355}R_{62} + \frac{11564\sqrt{17}}{71383}R_{80}$ $+ \frac{1512\sqrt{595}}{71383}R_{82} - \frac{966\sqrt{2618}}{71383}R_{84} - \frac{45360\sqrt{21}}{71383}R_{10,0}$ $- \frac{12096\sqrt{770}}{71383}R_{10,2} - \frac{1512\sqrt{10010}}{71383}R_{10,4}$

Table B317: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	6	6	1	$\frac{7\sqrt{3315}}{1326}iR_{30} - \frac{7\sqrt{442}}{442}iR_{32} + \frac{37\sqrt{255255}}{45084}iR_{50} + \frac{\sqrt{4862}}{578}iR_{52}$ $- \frac{79\sqrt{14586}}{15028}iR_{54} + \frac{1305\sqrt{1547}}{285532}iR_{70} + \frac{90\sqrt{663}}{5491}iR_{72}$ $- \frac{1005\sqrt{14586}}{285532}iR_{74} - \frac{60\sqrt{561}}{5491}iR_{76} - \frac{319\sqrt{440895}}{571064}iR_{90}$ $+ \frac{419\sqrt{969969}}{571064}iR_{92} - \frac{7\sqrt{21318}}{10982}iR_{94} - \frac{89\sqrt{24871}}{43928}iR_{96}$ $+ \frac{\sqrt{8778}}{2584}iR_{98} - \frac{363\sqrt{533715}}{1010344}iR_{11,0} + \frac{117\sqrt{60214}}{252586}iR_{11,2}$ $+ \frac{735\sqrt{129030}}{505172}iR_{11,4} - \frac{39\sqrt{8855}}{7429}iR_{11,6} + \frac{27\sqrt{67298}}{59432}iR_{11,8}$
5	5	3	6	6	2	$- \frac{3\sqrt{510510}}{2431}iR_{10} + \frac{56\sqrt{7293}}{7293}iR_{32} + \frac{21\sqrt{15470}}{7514}iR_{50} - \frac{2\sqrt{663}}{11271}iR_{52}$ $+ \frac{35\sqrt{221}}{3757}iR_{54} + \frac{75\sqrt{102102}}{142766}iR_{70} - \frac{10020\sqrt{4862}}{785213}iR_{72}$ $+ \frac{465\sqrt{221}}{71383}iR_{74} - \frac{480\sqrt{34}}{5491}iR_{76} - \frac{3\sqrt{3233230}}{12716}iR_{90}$ $- \frac{415\sqrt{58786}}{285532}iR_{92} + \frac{42\sqrt{323}}{5491}iR_{94} - \frac{113\sqrt{13566}}{21964}iR_{96}$ $+ \frac{11\sqrt{133}}{646}iR_{98} + \frac{1089\sqrt{3913910}}{6567236}iR_{11,0} + \frac{198\sqrt{8211}}{126293}iR_{11,2}$ $- \frac{2079\sqrt{1955}}{126293}iR_{11,4} - \frac{66\sqrt{4830}}{7429}iR_{11,6} + \frac{99\sqrt{9177}}{14858}iR_{11,8}$
5	5	3	6	6	3	$\frac{12\sqrt{17017}}{2431}R_{10} - \frac{7\sqrt{7293}}{14586}R_{30} + \frac{49\sqrt{24310}}{14586}R_{32} - \frac{205\sqrt{4641}}{45084}R_{50}$ $+ \frac{173\sqrt{2210}}{22542}R_{52} - \frac{239\sqrt{6630}}{45084}R_{54} - \frac{93\sqrt{85085}}{184756}R_{70}$ $- \frac{1146\sqrt{36465}}{785213}R_{72} - \frac{687\sqrt{6630}}{285532}R_{74} + \frac{12\sqrt{255}}{5491}R_{76}$ $+ \frac{135\sqrt{969969}}{369512}R_{90} + \frac{27\sqrt{440895}}{30056}R_{92} + \frac{35\sqrt{9690}}{10982}R_{94}$ $+ \frac{45\sqrt{11305}}{43928}R_{96} + \frac{11\sqrt{3990}}{2584}R_{98} - \frac{2475\sqrt{1174173}}{13134472}R_{11,0}$ $- \frac{297\sqrt{27370}}{252586}R_{11,2} + \frac{3465\sqrt{2346}}{505172}R_{11,4} + \frac{495\sqrt{161}}{7429}R_{11,6}$ $+ \frac{297\sqrt{30590}}{59432}R_{11,8}$
6	6	1	6	6	1	$- \frac{\sqrt{30}}{80}I_{21} + \frac{9\sqrt{5}}{34}I_{41} - \frac{35\sqrt{546}}{2584}I_{61} + \frac{25\sqrt{1365}}{1292}I_{63}$ $- \frac{195\sqrt{34}}{323}I_{81} - \frac{5\sqrt{39270}}{323}I_{83} + \frac{639\sqrt{2310}}{59432}I_{10,1} - \frac{81\sqrt{5005}}{118864}I_{10,3}$ $- \frac{6129\sqrt{1001}}{118864}I_{10,5} + \frac{1551\sqrt{39}}{2185}I_{12,1} + \frac{429\sqrt{1001}}{3910}I_{12,3}$ $+ \frac{165\sqrt{34034}}{14858}I_{12,5} + R_{00} - \frac{2\sqrt{5}}{5}R_{20} + \frac{9}{17}R_{40}$ $- \frac{20\sqrt{13}}{323}R_{60} + \frac{5\sqrt{17}}{323}R_{80} - \frac{18\sqrt{21}}{7429}R_{10,0} - \frac{23991}{37145}R_{12,0}$ $+ \frac{24\sqrt{6006}}{1955}R_{12,2} - \frac{594\sqrt{1001}}{37145}R_{12,4} + \frac{336\sqrt{2431}}{37145}R_{12,6}$

Table B318: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	1	6	6	2	$ \begin{aligned} & -\frac{\sqrt{55}}{20}I_{21} + \frac{12\sqrt{330}}{187}I_{41} - \frac{25\sqrt{1001}}{7106}I_{61} + \frac{15\sqrt{10010}}{7106}I_{63} \\ & + \frac{25\sqrt{561}}{323}I_{81} + \frac{15\sqrt{595}}{323}I_{83} - \frac{927\sqrt{35}}{14858}I_{10,1} + \frac{639\sqrt{2730}}{59432}I_{10,3} \\ & + \frac{423\sqrt{546}}{59432}I_{10,5} + \frac{10824\sqrt{286}}{37145}I_{12,1} + \frac{66\sqrt{546}}{437}I_{12,3} \\ & + \frac{1364\sqrt{4641}}{37145}I_{12,5} - \frac{\sqrt{330}}{55}R_{20} - \frac{9\sqrt{165}}{187}R_{42} + \frac{20\sqrt{10010}}{3553}R_{62} \\ & - \frac{5\sqrt{39270}}{3553}R_{82} + \frac{18\sqrt{154}}{391}R_{10,0} + \frac{168\sqrt{105}}{7429}R_{10,2} + \frac{6\sqrt{1365}}{391}R_{10,4} \\ & - \frac{231\sqrt{91}}{7429}R_{12,2} + \frac{231\sqrt{1326}}{7429}R_{12,6} \end{aligned} $
6	6	1	6	6	3	$ \begin{aligned} & \frac{\sqrt{66}}{16}iI_{21} + \frac{9\sqrt{11}}{374}iI_{41} + \frac{65\sqrt{30030}}{28424}iI_{61} + \frac{65\sqrt{3003}}{14212}iI_{63} \\ & + \frac{5\sqrt{1870}}{323}iI_{81} + \frac{5\sqrt{714}}{323}iI_{83} - \frac{63\sqrt{42}}{2584}iI_{10,1} + \frac{5031\sqrt{91}}{118864}iI_{10,3} \\ & - \frac{549\sqrt{455}}{118864}iI_{10,5} - \frac{33\sqrt{2145}}{1615}iI_{12,1} + \frac{891\sqrt{455}}{74290}iI_{12,3} \\ & - \frac{363\sqrt{15470}}{74290}iI_{12,5} - \frac{3\sqrt{55}}{187}iR_{40} + \frac{6\sqrt{22}}{187}iR_{42} - \frac{140\sqrt{715}}{3553}iR_{60} \\ & - \frac{320\sqrt{3003}}{10659}iR_{62} + \frac{15\sqrt{935}}{3553}iR_{80} - \frac{160\sqrt{1309}}{24871}iR_{82} \\ & - \frac{25\sqrt{1190}}{2261}iR_{84} - \frac{378\sqrt{1155}}{7429}iR_{10,0} - \frac{6912\sqrt{14}}{7429}iR_{10,2} \\ & - \frac{1278\sqrt{182}}{7429}iR_{10,4} + \frac{1287\sqrt{55}}{37145}iR_{12,0} + \frac{132\sqrt{2730}}{37145}iR_{12,2} \\ & - \frac{858\sqrt{455}}{37145}iR_{12,4} - \frac{792\sqrt{1105}}{37145}iR_{12,6} \end{aligned} $
6	6	2	6	6	2	$ \begin{aligned} & -\frac{17\sqrt{30}}{110}I_{21} - \frac{60\sqrt{5}}{187}I_{41} + \frac{5\sqrt{546}}{187}I_{61} - \frac{10\sqrt{1365}}{3553}I_{63} \\ & - \frac{780\sqrt{34}}{3553}I_{81} - \frac{20\sqrt{39270}}{3553}I_{83} - \frac{3\sqrt{2310}}{323}I_{10,1} - \frac{45\sqrt{5005}}{14858}I_{10,3} \\ & + \frac{387\sqrt{1001}}{14858}I_{10,5} + \frac{2904\sqrt{39}}{1615}I_{12,1} + \frac{10692\sqrt{1001}}{37145}I_{12,3} \\ & + \frac{924\sqrt{34034}}{37145}I_{12,5} + R_{00} - \frac{2\sqrt{5}}{55}R_{20} - \frac{96}{187}R_{40} \\ & - \frac{80\sqrt{13}}{3553}R_{60} + \frac{20\sqrt{17}}{323}R_{80} + \frac{480\sqrt{595}}{24871}R_{82} - \frac{150\sqrt{2618}}{24871}R_{84} \\ & - \frac{2808\sqrt{21}}{7429}R_{10,0} - \frac{768\sqrt{770}}{7429}R_{10,2} - \frac{156\sqrt{10010}}{7429}R_{10,4} \\ & - \frac{26136}{37145}R_{12,0} - \frac{264\sqrt{6006}}{37145}R_{12,2} + \frac{1584\sqrt{1001}}{37145}R_{12,4} + \frac{1584\sqrt{2431}}{37145}R_{12,6} \end{aligned} $

Table B319: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_1$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 11.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	3	$\begin{aligned} & \frac{9}{44}iI_{21} - \frac{4\sqrt{6}}{17}iI_{41} - \frac{45\sqrt{455}}{7106}iI_{61} - \frac{25\sqrt{182}}{7106}iI_{63} \\ & - \frac{25\sqrt{255}}{3553}iI_{81} - \frac{65\sqrt{1309}}{3553}iI_{83} - \frac{1125\sqrt{77}}{14858}iI_{10,1} \\ & + \frac{165\sqrt{6006}}{59432}iI_{10,3} + \frac{3\sqrt{30030}}{3128}iI_{10,5} - \frac{8712\sqrt{130}}{37145}iI_{12,1} \\ & - \frac{594\sqrt{30030}}{37145}iI_{12,3} - \frac{132\sqrt{255255}}{37145}iI_{12,5} + \frac{3\sqrt{6}}{11}iR_{20} \\ & + \frac{23\sqrt{3}}{187}iR_{42} + \frac{20\sqrt{182}}{209}iR_{62} + \frac{20\sqrt{510}}{3553}iR_{80} + \frac{15\sqrt{714}}{2261}iR_{82} \\ & - \frac{60\sqrt{19635}}{24871}iR_{84} + \frac{198\sqrt{70}}{7429}iR_{10,0} - \frac{72\sqrt{231}}{7429}iR_{10,2} \\ & + \frac{30\sqrt{3003}}{7429}iR_{10,4} + \frac{99\sqrt{5005}}{37145}iR_{12,2} - \frac{99\sqrt{72930}}{37145}iR_{12,6} \end{aligned}$
6	6	3	6	6	3	$\begin{aligned} & \frac{7\sqrt{30}}{176}I_{21} + \frac{245\sqrt{5}}{374}I_{41} - \frac{5\sqrt{546}}{2584}I_{61} + \frac{5\sqrt{1365}}{836}I_{63} \\ & + \frac{885\sqrt{34}}{3553}I_{81} + \frac{35\sqrt{39270}}{3553}I_{83} + \frac{9\sqrt{2310}}{59432}I_{10,1} - \frac{999\sqrt{5005}}{118864}I_{10,3} \\ & - \frac{3015\sqrt{1001}}{118864}I_{10,5} + \frac{5445\sqrt{39}}{7429}I_{12,1} + \frac{1485\sqrt{1001}}{14858}I_{12,3} \\ & + \frac{99\sqrt{34034}}{14858}I_{12,5} + R_{00} + \frac{2\sqrt{5}}{11}R_{20} - \frac{59}{187}R_{40} \\ & + \frac{28\sqrt{10}}{187}R_{42} + \frac{620\sqrt{13}}{3553}R_{60} + \frac{128\sqrt{1365}}{3553}R_{62} - \frac{355\sqrt{17}}{3553}R_{80} \\ & - \frac{30\sqrt{2618}}{3553}R_{84} - \frac{630\sqrt{21}}{7429}R_{10,0} - \frac{36\sqrt{10010}}{7429}R_{10,4} \\ & + \frac{3267}{7429}R_{12,0} - \frac{198\sqrt{1001}}{7429}R_{12,4} \end{aligned}$

Table B320: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
1	1	1	1	1	1	$\frac{\sqrt{30}}{5}I_{21} + R_{00} + \frac{2\sqrt{5}}{5}R_{20}$
1	1	1	2	2	1	$-\frac{\sqrt{30}}{5}iR_{10} - \frac{9\sqrt{70}}{70}iR_{30} - \frac{\sqrt{21}}{7}iR_{32}$
1	1	1	3	3	1	$-\frac{\sqrt{42}}{3}I_{41} - \frac{3\sqrt{42}}{14}R_{20} - \frac{\sqrt{210}}{21}R_{40} + \frac{\sqrt{21}}{7}R_{42}$
1	1	1	3	3	2	$\frac{4\sqrt{105}}{35}iI_{21} + \frac{\sqrt{70}}{7}iI_{41} + \frac{3\sqrt{70}}{70}iR_{20} - \frac{\sqrt{14}}{7}iR_{40}$ $-\frac{\sqrt{35}}{7}iR_{42}$
1	1	1	4	4	1	$\frac{\sqrt{210}}{21}iR_{30} - \frac{2\sqrt{7}}{7}iR_{32} + \frac{5\sqrt{330}}{132}iR_{50} - \frac{\sqrt{77}}{11}iR_{52}$ $-\frac{\sqrt{231}}{22}iR_{54}$
1	1	1	4	4	2	$\frac{\sqrt{30}}{6}R_{30} + R_{32} - \frac{\sqrt{2310}}{66}R_{50} - \frac{4\sqrt{11}}{11}R_{52}$ $-\frac{\sqrt{33}}{11}R_{54}$
1	1	1	5	5	1	$\frac{6\sqrt{143}}{143}I_{61} - \frac{3\sqrt{1430}}{143}I_{63} + \frac{5\sqrt{462}}{154}R_{40} - \frac{2\sqrt{1155}}{77}R_{42}$ $+\frac{\sqrt{6006}}{286}R_{60} - \frac{5\sqrt{1430}}{143}R_{62}$
1	1	1	5	5	2	$-\frac{4\sqrt{462}}{33}I_{41} + \frac{9\sqrt{286}}{143}I_{63} + \frac{\sqrt{2310}}{462}R_{40} + \frac{4\sqrt{231}}{77}R_{42}$ $+\frac{3\sqrt{30030}}{286}R_{60} + \frac{21\sqrt{286}}{143}R_{62}$
1	1	1	5	5	3	$-\frac{4\sqrt{11}}{11}iI_{41} - \frac{\sqrt{30030}}{143}iI_{61} - \frac{\sqrt{55}}{11}iR_{40} - \frac{\sqrt{22}}{11}iR_{42}$ $+\frac{3\sqrt{715}}{143}iR_{60} + \frac{2\sqrt{3003}}{143}iR_{62}$
1	1	1	6	6	1	$-\frac{9\sqrt{2821}}{806}iR_{50} + \frac{3\sqrt{12090}}{403}iR_{52} - \frac{3\sqrt{4030}}{806}iR_{54} - \frac{7\sqrt{465465}}{8060}iR_{70}$ $+\frac{9\sqrt{22165}}{1612}iR_{72} - \frac{33\sqrt{4030}}{8060}iR_{74} - \frac{\sqrt{155}}{20}iR_{76}$
1	1	1	6	6	2	$-\frac{9\sqrt{155155}}{4433}iR_{50} - \frac{32\sqrt{26598}}{4433}iR_{52} - \frac{15\sqrt{8866}}{4433}iR_{54} - \frac{7\sqrt{8463}}{806}iR_{70}$ $-\frac{24\sqrt{403}}{403}iR_{72} - \frac{3\sqrt{8866}}{806}iR_{74}$
1	1	1	6	6	3	$-\frac{3\sqrt{6006}}{572}R_{50} + \frac{3\sqrt{715}}{143}R_{52} + \frac{7\sqrt{2145}}{286}R_{54} + \frac{3\sqrt{910}}{260}R_{70}$ $+\frac{\sqrt{390}}{260}R_{72} - \frac{3\sqrt{2145}}{130}R_{74} - \frac{\sqrt{330}}{20}R_{76}$
2	2	1	2	2	1	$R_{00} + \frac{4\sqrt{5}}{7}R_{20} + \frac{6}{7}R_{40} + \frac{\sqrt{10}}{7}R_{42}$
2	2	1	3	3	1	$-\frac{3\sqrt{7}}{14}iR_{10} - \frac{\sqrt{3}}{2}iR_{30} + \frac{\sqrt{10}}{6}iR_{32} - \frac{15\sqrt{231}}{308}iR_{50}$ $+\frac{\sqrt{110}}{33}iR_{52} + \frac{\sqrt{330}}{44}iR_{54}$
2	2	1	3	3	2	$\frac{\sqrt{105}}{10}R_{10} + \frac{\sqrt{5}}{30}R_{30} - \frac{\sqrt{6}}{6}R_{32} + \frac{5\sqrt{385}}{132}R_{50}$ $+\frac{5\sqrt{66}}{33}R_{52} + \frac{5\sqrt{22}}{44}R_{54}$

Table B321: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
2	2	1	4	4	1	$-\frac{2\sqrt{15}}{7}R_{20} - \frac{40\sqrt{3}}{77}R_{40} + \frac{12\sqrt{30}}{77}R_{42} - \frac{30\sqrt{39}}{143}R_{60}$ $-\frac{4\sqrt{455}}{143}R_{62}$
2	2	1	4	4	2	$\frac{\sqrt{70}}{7}iI_{21} + \frac{8\sqrt{105}}{77}iI_{41} + \frac{35\sqrt{26}}{143}iI_{61} + \frac{6\sqrt{65}}{143}iI_{63}$
2	2	1	5	5	1	$\frac{5\sqrt{165}}{132}iR_{30} - \frac{5\sqrt{22}}{44}iR_{32} + \frac{25\sqrt{105}}{312}iR_{50} - \frac{35\sqrt{2}}{52}iR_{52}$ $+\frac{5\sqrt{6}}{104}iR_{54} + \frac{159\sqrt{77}}{2288}iR_{70} - \frac{229\sqrt{33}}{2288}iR_{72} - \frac{15\sqrt{6}}{208}iR_{74}$ $+\frac{5\sqrt{39}}{208}iR_{76}$
2	2	1	5	5	2	$\frac{5\sqrt{33}}{44}iR_{30} - \frac{\sqrt{110}}{132}iR_{32} + \frac{5\sqrt{21}}{104}iR_{50} + \frac{5\sqrt{10}}{156}iR_{52}$ $+\frac{7\sqrt{30}}{104}iR_{54} + \frac{69\sqrt{385}}{2288}iR_{70} + \frac{105\sqrt{165}}{2288}iR_{72} - \frac{21\sqrt{30}}{208}iR_{74}$ $-\frac{9\sqrt{195}}{208}iR_{76}$
2	2	1	5	5	3	$\frac{5\sqrt{154}}{84}R_{30} + \frac{17\sqrt{1155}}{462}R_{32} + \frac{5\sqrt{2}}{312}R_{50} - \frac{\sqrt{105}}{78}R_{52}$ $-\frac{5\sqrt{35}}{52}R_{54} + \frac{7\sqrt{330}}{208}R_{70} + \frac{93\sqrt{770}}{2288}R_{72} + \frac{15\sqrt{35}}{104}R_{74}$ $+\frac{3\sqrt{910}}{208}R_{76}$
2	2	1	6	6	1	$\frac{30\sqrt{310310}}{31031}R_{40} - \frac{120\sqrt{31031}}{31031}R_{42} + \frac{4\sqrt{23870}}{1705}R_{60} - \frac{40\sqrt{2046}}{1023}R_{62}$ $+\frac{108\sqrt{5275270}}{376805}R_{80} - \frac{116\sqrt{150722}}{75361}R_{82} - \frac{12\sqrt{34255}}{6851}R_{84}$
2	2	1	6	6	2	$\frac{300\sqrt{5642}}{31031}R_{40} + \frac{194\sqrt{14105}}{31031}R_{42} + \frac{8\sqrt{434}}{341}R_{60} + \frac{32\sqrt{930}}{1705}R_{62}$ $+\frac{14\sqrt{95914}}{6851}R_{80} + \frac{24\sqrt{68510}}{6851}R_{82} + \frac{6\sqrt{75361}}{6851}R_{84}$
2	2	1	6	6	3	$-\frac{20\sqrt{273}}{143}iI_{41} - \frac{12\sqrt{10}}{55}iI_{61} + \frac{8}{11}iI_{63} - \frac{14\sqrt{46410}}{1105}iI_{81}$ $-\frac{2\sqrt{4862}}{221}iI_{83}$
3	3	1	3	3	1	$\frac{\sqrt{30}}{12}I_{21} - \frac{12\sqrt{5}}{11}I_{41} + \frac{35\sqrt{546}}{1716}I_{61} - \frac{25\sqrt{1365}}{858}I_{63}$ $+R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$ $-\frac{2\sqrt{1365}}{39}R_{62}$
3	3	1	3	3	2	$-\frac{5\sqrt{2}}{12}iI_{21} - \frac{8\sqrt{3}}{11}iI_{41} - \frac{35\sqrt{910}}{1716}iI_{61} + \frac{15\sqrt{91}}{286}iI_{63}$ $+\frac{\sqrt{3}}{3}iR_{20} + \frac{\sqrt{15}}{11}iR_{40} + \frac{\sqrt{6}}{11}iR_{42} + \frac{35\sqrt{195}}{429}iR_{60}$ $+\frac{70\sqrt{91}}{429}iR_{62}$

Table B322: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	4	4	1	$-\frac{4\sqrt{21}}{21}iR_{10} - \frac{3}{11}iR_{30} - \frac{2\sqrt{30}}{11}iR_{32} - \frac{15\sqrt{77}}{2002}iR_{50}$ $+ \frac{\sqrt{330}}{143}iR_{52} - \frac{27\sqrt{110}}{286}iR_{54} - \frac{217\sqrt{105}}{3432}iR_{70} + \frac{469\sqrt{5}}{1144}iR_{72}$ $- \frac{7\sqrt{110}}{1144}iR_{74} - \frac{21\sqrt{715}}{1144}iR_{76}$
3	3	1	4	4	2	$\frac{\sqrt{3}}{6}R_{10} - \frac{3\sqrt{7}}{22}R_{30} - \frac{\sqrt{210}}{22}R_{32} + \frac{15\sqrt{11}}{286}R_{50}$ $+ \frac{5\sqrt{2310}}{286}R_{52} + \frac{9\sqrt{770}}{286}R_{54} - \frac{7\sqrt{15}}{858}R_{70} - \frac{7\sqrt{35}}{143}R_{72}$ $- \frac{7\sqrt{770}}{286}R_{74} - \frac{\sqrt{5005}}{143}R_{76}$
3	3	1	5	5	1	$-\frac{105\sqrt{11}}{286}I_{41} + \frac{\sqrt{30030}}{286}I_{61} - \frac{3\sqrt{3003}}{143}I_{63} + \frac{49\sqrt{1870}}{884}I_{81}$ $+ \frac{73\sqrt{714}}{884}I_{83} - \frac{5\sqrt{11}}{11}R_{20} - \frac{15\sqrt{22}}{143}R_{42} + \frac{\sqrt{3003}}{429}R_{62}$ $- \frac{42\sqrt{935}}{2431}R_{80} + \frac{63\sqrt{1309}}{2431}R_{82} - \frac{4\sqrt{1190}}{221}R_{84}$
3	3	1	5	5	2	$\frac{\sqrt{330}}{33}I_{21} - \frac{3\sqrt{55}}{22}I_{41} - \frac{\sqrt{6006}}{858}I_{61} - \frac{\sqrt{15015}}{429}I_{63}$ $- \frac{1323\sqrt{374}}{9724}I_{81} - \frac{37\sqrt{3570}}{884}I_{83} + \frac{2\sqrt{55}}{33}R_{20} - \frac{30\sqrt{11}}{143}R_{40}$ $+ \frac{14\sqrt{143}}{429}R_{60} + \frac{\sqrt{15015}}{195}R_{62} - \frac{98\sqrt{187}}{2431}R_{80} - \frac{3\sqrt{6545}}{2431}R_{82}$ $+ \frac{18\sqrt{238}}{221}R_{84}$
3	3	1	5	5	3	$\frac{\sqrt{385}}{33}iI_{21} - \frac{\sqrt{2310}}{286}iI_{41} + \frac{28\sqrt{143}}{429}iI_{61} + \frac{49\sqrt{3927}}{4862}iI_{81}$ $- \frac{21\sqrt{85}}{442}iI_{83} + \frac{\sqrt{2310}}{462}iR_{20} + \frac{5\sqrt{462}}{1001}iR_{40} + \frac{\sqrt{1155}}{91}iR_{42}$ $+ \frac{7\sqrt{6006}}{429}iR_{60} + \frac{7\sqrt{1430}}{195}iR_{62} + \frac{7\sqrt{5610}}{2431}iR_{82} + \frac{14\sqrt{51}}{221}iR_{84}$
3	3	1	6	6	1	$\frac{10\sqrt{930930}}{13299}iR_{30} - \frac{20\sqrt{31031}}{4433}iR_{32} + \frac{7\sqrt{12090}}{4836}iR_{50} + \frac{\sqrt{2821}}{403}iR_{52}$ $- \frac{7\sqrt{8463}}{806}iR_{54} + \frac{189\sqrt{8866}}{602888}iR_{70} + \frac{57\sqrt{186186}}{602888}iR_{72}$ $+ \frac{45\sqrt{8463}}{27404}iR_{74} - \frac{105\sqrt{1302}}{4216}iR_{76} + \frac{777\sqrt{2526810}}{2082704}iR_{90}$ $- \frac{1155\sqrt{45942}}{260338}iR_{92} + \frac{9\sqrt{12369}}{2108}iR_{94} + \frac{49\sqrt{1178}}{20026}iR_{96}$ $- \frac{7\sqrt{30039}}{2584}iR_{98}$
3	3	1	6	6	2	$\frac{15\sqrt{16926}}{8866}iR_{30} + \frac{35\sqrt{14105}}{13299}iR_{32} + \frac{119\sqrt{26598}}{35464}iR_{50} + \frac{43\sqrt{155155}}{26598}iR_{52}$ $+ \frac{3\sqrt{465465}}{17732}iR_{54} + \frac{861\sqrt{4030}}{75361}iR_{70} + \frac{177\sqrt{84630}}{75361}iR_{72}$ $- \frac{24\sqrt{465465}}{75361}iR_{74} - \frac{3\sqrt{71610}}{5797}iR_{76} + \frac{483\sqrt{45942}}{260338}iR_{90}$ $+ \frac{245\sqrt{2526810}}{1041352}iR_{92} - \frac{7\sqrt{680295}}{20026}iR_{94} - \frac{63\sqrt{64790}}{80104}iR_{96}$

Table B323: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	1	6	6	3	$\frac{5\sqrt{455}}{286}R_{30} + \frac{25\sqrt{546}}{858}R_{32} - \frac{7\sqrt{715}}{286}R_{50} - \frac{\sqrt{6006}}{429}R_{52}$ $+ \frac{\sqrt{2002}}{286}R_{54} + \frac{315\sqrt{39}}{4862}R_{70} - \frac{213\sqrt{91}}{9724}R_{72} - \frac{45\sqrt{2002}}{4862}R_{74}$ $+ \frac{45\sqrt{77}}{748}R_{76} - \frac{21\sqrt{1235}}{8398}R_{90} + \frac{35\sqrt{2717}}{16796}R_{92} + \frac{3\sqrt{2926}}{646}R_{94}$ $- \frac{35\sqrt{627}}{1292}R_{96} - \frac{7\sqrt{7106}}{646}R_{98}$
3	3	2	3	3	2	$\frac{\sqrt{30}}{20}I_{21} + \frac{4\sqrt{5}}{11}I_{41} - \frac{25\sqrt{546}}{572}I_{61} - \frac{5\sqrt{1365}}{286}I_{63}$ $+ R_{00} + \frac{3\sqrt{5}}{5}R_{20} + \frac{1}{11}R_{40} - \frac{2\sqrt{10}}{11}R_{42}$ $- \frac{25\sqrt{13}}{143}R_{60} - \frac{10\sqrt{1365}}{429}R_{62}$
3	3	2	4	4	1	$- \frac{\sqrt{15}}{11}R_{30} + \frac{8\sqrt{2}}{11}R_{32} - \frac{5\sqrt{1155}}{286}R_{50} - \frac{\sqrt{22}}{143}R_{52}$ $- \frac{\sqrt{66}}{26}R_{54} - \frac{105\sqrt{7}}{1144}R_{70} - \frac{35\sqrt{3}}{1144}R_{72} + \frac{105\sqrt{66}}{1144}R_{74}$ $+ \frac{35\sqrt{429}}{1144}R_{76}$
3	3	2	4	4	2	$- \frac{\sqrt{5}}{2}iR_{10} - \frac{\sqrt{105}}{22}iR_{30} + \frac{3\sqrt{14}}{22}iR_{32} - \frac{\sqrt{165}}{286}iR_{50}$ $+ \frac{9\sqrt{154}}{286}iR_{52} + \frac{\sqrt{462}}{286}iR_{54} + \frac{245}{286}iR_{70} + \frac{40\sqrt{21}}{143}iR_{72}$ $+ \frac{5\sqrt{462}}{286}iR_{74}$
3	3	2	5	5	1	$- \frac{35\sqrt{165}}{286}iI_{41} - \frac{3\sqrt{2002}}{286}iI_{61} + \frac{\sqrt{5005}}{143}iI_{63} + \frac{7\sqrt{1122}}{884}iI_{81}$ $+ \frac{25\sqrt{1190}}{884}iI_{83} + \frac{10\sqrt{33}}{143}iR_{40} - \frac{4\sqrt{330}}{143}iR_{42} + \frac{7\sqrt{429}}{143}iR_{60}$ $+ \frac{\sqrt{5005}}{143}iR_{62} + \frac{28\sqrt{561}}{2431}iR_{80} + \frac{\sqrt{19635}}{2431}iR_{82} - \frac{5\sqrt{714}}{221}iR_{84}$
3	3	2	5	5	2	$\frac{5\sqrt{22}}{33}iI_{21} + \frac{47\sqrt{33}}{286}iI_{41} - \frac{\sqrt{10010}}{858}iI_{61} - \frac{3\sqrt{1001}}{143}iI_{63}$ $- \frac{441\sqrt{5610}}{9724}iI_{81} - \frac{105\sqrt{238}}{884}iI_{83} + \frac{5\sqrt{33}}{33}iR_{20} + \frac{4\sqrt{165}}{143}iR_{40}$ $- \frac{17\sqrt{66}}{143}iR_{42} - \frac{7\sqrt{2145}}{429}iR_{60} - \frac{23\sqrt{1001}}{429}iR_{62} + \frac{15\sqrt{3927}}{2431}iR_{82}$ $+ \frac{3\sqrt{3570}}{221}iR_{84}$
3	3	2	5	5	3	$\frac{5\sqrt{231}}{77}I_{21} + \frac{17\sqrt{154}}{182}I_{41} + \frac{63\sqrt{6545}}{4862}I_{81} + \frac{35\sqrt{51}}{442}I_{83}$ $- \frac{5\sqrt{154}}{154}R_{20} - \frac{\sqrt{770}}{91}R_{40} + \frac{43\sqrt{77}}{1001}R_{42} + \frac{7\sqrt{858}}{429}R_{62}$ $+ \frac{14\sqrt{13090}}{2431}R_{80} + \frac{105\sqrt{374}}{2431}R_{82}$

Table B324: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
3	3	2	6	6	1	$\frac{21\sqrt{806}}{1612}R_{50} - \frac{\sqrt{42315}}{403}R_{52} + \frac{5\sqrt{14105}}{806}R_{54} + \frac{399\sqrt{132990}}{274040}R_{70}$ $- \frac{3\sqrt{310310}}{3224}R_{72} - \frac{417\sqrt{14105}}{137020}R_{74} - \frac{219\sqrt{2170}}{21080}R_{76}$ $+ \frac{63\sqrt{168454}}{160208}R_{90} - \frac{83\sqrt{20615}}{40052}R_{94} + \frac{28\sqrt{17670}}{10013}R_{96}$ $+ \frac{7\sqrt{50065}}{2584}R_{98}$
3	3	2	6	6	2	$\frac{5\sqrt{28210}}{858}R_{30} + \frac{5\sqrt{8463}}{429}R_{32} + \frac{35\sqrt{44330}}{106392}R_{50} - \frac{29\sqrt{93093}}{26598}R_{52}$ $- \frac{5\sqrt{31031}}{1612}R_{54} - \frac{259\sqrt{2418}}{75361}R_{70} - \frac{213\sqrt{5642}}{75361}R_{72}$ $+ \frac{24\sqrt{31031}}{75361}R_{74} + \frac{15\sqrt{4774}}{5797}R_{76} + \frac{693\sqrt{76570}}{260338}R_{90}$ $+ \frac{105\sqrt{168454}}{33592}R_{92} + \frac{75\sqrt{45353}}{20026}R_{94} + \frac{105\sqrt{38874}}{80104}R_{96}$
3	3	2	6	6	3	$\frac{25\sqrt{273}}{858}iR_{30} - \frac{5\sqrt{910}}{286}iR_{32} + \frac{7\sqrt{429}}{858}iR_{50} - \frac{\sqrt{10010}}{143}iR_{52}$ $+ \frac{\sqrt{30030}}{286}iR_{54} - \frac{21\sqrt{65}}{12155}iR_{70} - \frac{909\sqrt{1365}}{48620}iR_{72} - \frac{2\sqrt{30030}}{12155}iR_{74}$ $- \frac{\sqrt{1155}}{340}iR_{76} - \frac{63\sqrt{741}}{4199}iR_{90} - \frac{7\sqrt{40755}}{16796}iR_{92} + \frac{3\sqrt{43890}}{646}iR_{94}$ $+ \frac{21\sqrt{1045}}{1292}iR_{96}$
4	4	1	4	4	1	$R_{00} - \frac{16\sqrt{5}}{77}R_{20} + \frac{108}{1001}R_{40} + \frac{270\sqrt{10}}{1001}R_{42}$ $- \frac{64\sqrt{13}}{143}R_{60} - \frac{64\sqrt{1365}}{715}R_{62} + \frac{490\sqrt{17}}{2431}R_{80} - \frac{84\sqrt{595}}{2431}R_{82}$ $- \frac{21\sqrt{2618}}{2431}R_{84}$
4	4	1	4	4	2	$- \frac{2\sqrt{210}}{77}iI_{21} - \frac{324\sqrt{35}}{1001}iI_{41} - \frac{14\sqrt{78}}{143}iI_{61} + \frac{4\sqrt{195}}{143}iI_{63}$ $- \frac{294\sqrt{238}}{2431}iI_{81} - \frac{14\sqrt{5610}}{2431}iI_{83}$
4	4	1	5	5	1	$- \frac{\sqrt{1155}}{44}iR_{10} - \frac{9\sqrt{55}}{143}iR_{30} - \frac{5\sqrt{66}}{143}iR_{32} - \frac{7\sqrt{6}}{26}iR_{52}$ $+ \frac{3\sqrt{2}}{13}iR_{54} - \frac{5\sqrt{231}}{1496}iR_{70} + \frac{1455\sqrt{11}}{19448}iR_{72} - \frac{885\sqrt{2}}{1768}iR_{74}$ $+ \frac{225\sqrt{13}}{1768}iR_{76} - \frac{10899\sqrt{7315}}{1478048}iR_{90} + \frac{147\sqrt{133}}{1768}iR_{92}$ $- \frac{861\sqrt{494}}{67184}iR_{94} - \frac{105\sqrt{5187}}{33592}iR_{96} + \frac{105\sqrt{58786}}{134368}iR_{98}$
4	4	1	5	5	2	$- \frac{5\sqrt{231}}{132}iR_{10} + \frac{15\sqrt{11}}{143}iR_{30} - \frac{5\sqrt{330}}{143}iR_{32} - \frac{3\sqrt{7}}{13}iR_{50}$ $- \frac{\sqrt{30}}{26}iR_{52} - \frac{353\sqrt{1155}}{58344}iR_{70} + \frac{245\sqrt{55}}{19448}iR_{72} - \frac{35\sqrt{10}}{136}iR_{74}$ $- \frac{69\sqrt{65}}{1768}iR_{76} - \frac{567\sqrt{1463}}{77792}iR_{90} + \frac{63\sqrt{665}}{33592}iR_{92} + \frac{945\sqrt{2470}}{67184}iR_{94}$ $- \frac{63\sqrt{25935}}{33592}iR_{96} - \frac{189\sqrt{293930}}{134368}iR_{98}$

Table B325: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	1	5	5	3	$\frac{3\sqrt{22}}{44}R_{10} - \frac{2\sqrt{462}}{77}R_{30} - \frac{8\sqrt{385}}{1001}R_{32} - \frac{\sqrt{6}}{26}R_{50}$ $+ \frac{\sqrt{35}}{13}R_{52} + \frac{\sqrt{105}}{13}R_{54} - \frac{945\sqrt{110}}{19448}R_{70} - \frac{229\sqrt{2310}}{19448}R_{72}$ $+ \frac{15\sqrt{105}}{884}R_{74} - \frac{11\sqrt{2730}}{1768}R_{76} - \frac{441\sqrt{1254}}{113696}R_{90} - \frac{147\sqrt{570}}{33592}R_{92}$ $+ \frac{63\sqrt{25935}}{33592}R_{94} + \frac{441\sqrt{2470}}{33592}R_{96} + \frac{147\sqrt{62985}}{67184}R_{98}$
4	4	1	6	6	1	$-\frac{15\sqrt{186186}}{4433}R_{20} - \frac{8\sqrt{930930}}{31031}R_{40} - \frac{24\sqrt{93093}}{31031}R_{42} - \frac{18\sqrt{71610}}{5797}R_{60}$ $-\frac{444\sqrt{682}}{5797}R_{62} + \frac{72\sqrt{15825810}}{1431859}R_{80} + \frac{864\sqrt{452166}}{1431859}R_{82}$ $-\frac{600\sqrt{102765}}{130169}R_{84} + \frac{210\sqrt{44330}}{130169}R_{10,0} + \frac{784\sqrt{1209}}{10013}R_{10,2}$ $+ \frac{854\sqrt{93}}{10013}R_{10,4}$
4	4	1	6	6	2	$\frac{\sqrt{84630}}{4433}R_{20} - \frac{80\sqrt{16926}}{31031}R_{40} - \frac{48\sqrt{42315}}{31031}R_{42} - \frac{180\sqrt{1302}}{5797}R_{60}$ $-\frac{1712\sqrt{310}}{28985}R_{62} - \frac{1512\sqrt{287742}}{1431859}R_{80} - \frac{96\sqrt{205530}}{110143}R_{82}$ $+ \frac{696\sqrt{226083}}{1431859}R_{84} - \frac{4410\sqrt{806}}{130169}R_{10,0} - \frac{672\sqrt{66495}}{130169}R_{10,2}$ $-\frac{42\sqrt{5115}}{10013}R_{10,4}$
4	4	1	6	6	3	$\frac{5\sqrt{546}}{143}iI_{21} - \frac{24\sqrt{91}}{143}iI_{41} + \frac{26\sqrt{30}}{187}iI_{61} - \frac{12\sqrt{3}}{187}iI_{63}$ $-\frac{84\sqrt{15470}}{2717}iI_{81} - \frac{1044\sqrt{14586}}{46189}iI_{83} + \frac{126\sqrt{858}}{4199}iI_{10,1}$ $-\frac{105\sqrt{11}}{323}iI_{10,3} - \frac{21\sqrt{55}}{323}iI_{10,5}$
4	4	2	4	4	2	$R_{00} + \frac{8\sqrt{5}}{11}R_{20} + \frac{54}{143}R_{40} - \frac{27\sqrt{10}}{143}R_{42}$ $-\frac{4\sqrt{13}}{143}R_{60} - \frac{8\sqrt{1365}}{715}R_{62} - \frac{392\sqrt{17}}{2431}R_{80} - \frac{96\sqrt{595}}{2431}R_{82}$ $-\frac{12\sqrt{2618}}{2431}R_{84}$
4	4	2	5	5	1	$\frac{5\sqrt{462}}{286}R_{32} - \frac{\sqrt{42}}{26}R_{52} - \frac{3\sqrt{14}}{13}R_{54} + \frac{45\sqrt{77}}{4862}R_{72}$ $+ \frac{75\sqrt{14}}{442}R_{74} + \frac{45\sqrt{91}}{442}R_{76} - \frac{21\sqrt{19}}{8398}R_{92} - \frac{21\sqrt{3458}}{8398}R_{94}$ $-\frac{147\sqrt{741}}{8398}R_{96} - \frac{21\sqrt{8398}}{4199}R_{98}$
4	4	2	5	5	2	$\frac{2\sqrt{33}}{33}R_{10} - \frac{3\sqrt{77}}{143}R_{30} + \frac{\sqrt{2310}}{286}R_{32} - \frac{3}{13}R_{50}$ $+ \frac{\sqrt{210}}{26}R_{52} + \frac{133\sqrt{165}}{7293}R_{70} + \frac{163\sqrt{385}}{4862}R_{72} - \frac{\sqrt{70}}{34}R_{74}$ $-\frac{5\sqrt{455}}{442}R_{76} - \frac{189\sqrt{209}}{46189}R_{90} - \frac{441\sqrt{95}}{8398}R_{92} - \frac{63\sqrt{17290}}{8398}R_{94}$ $-\frac{63\sqrt{3705}}{8398}R_{96}$

Table B326: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
4	4	2	5	5	3	$-\frac{\sqrt{154}}{11}iR_{10} - \frac{19\sqrt{66}}{286}iR_{30} + \frac{18\sqrt{55}}{143}iR_{32} - \frac{\sqrt{42}}{26}iR_{50}$ $+ \frac{3\sqrt{5}}{13}iR_{52} - \frac{\sqrt{15}}{13}iR_{54} + \frac{7\sqrt{770}}{2431}iR_{70} + \frac{49\sqrt{330}}{2431}iR_{72}$ $- \frac{7\sqrt{15}}{221}iR_{74} + \frac{441\sqrt{8778}}{46189}iR_{90} + \frac{84\sqrt{3990}}{4199}iR_{92} + \frac{21\sqrt{3705}}{4199}iR_{94}$
4	4	2	6	6	1	$-\frac{28\sqrt{26598}}{4433}iI_{41} - \frac{36\sqrt{11935}}{5797}iI_{61} + \frac{72\sqrt{4774}}{5797}iI_{63} - \frac{84\sqrt{1130415}}{130169}iI_{81}$ $+ \frac{36\sqrt{47957}}{10013}iI_{83} - \frac{96\sqrt{2821}}{10013}iI_{10,1} + \frac{146\sqrt{1302}}{10013}iI_{10,3}$ $+ \frac{30\sqrt{6510}}{10013}iI_{10,5}$
4	4	2	6	6	2	$\frac{4\sqrt{2015}}{143}iI_{21} + \frac{68\sqrt{12090}}{4433}iI_{41} + \frac{74\sqrt{217}}{5797}iI_{61} - \frac{42\sqrt{2170}}{5797}iI_{63}$ $- \frac{84\sqrt{20553}}{84227}iI_{81} - \frac{180\sqrt{2637635}}{1431859}iI_{83} - \frac{396\sqrt{155155}}{130169}iI_{10,1}$ $- \frac{27\sqrt{71610}}{10013}iI_{10,3} - \frac{15\sqrt{14322}}{10013}iI_{10,5}$
4	4	2	6	6	3	$-\frac{30\sqrt{13}}{143}R_{20} - \frac{12\sqrt{65}}{143}R_{40} + \frac{30\sqrt{26}}{143}R_{42} + \frac{42\sqrt{5}}{187}R_{60}$ $+ \frac{84\sqrt{21}}{187}R_{62} + \frac{252\sqrt{1105}}{46189}R_{80} + \frac{648\sqrt{1547}}{46189}R_{82} - \frac{30\sqrt{170170}}{46189}R_{84}$ $+ \frac{168\sqrt{1365}}{4199}R_{10,0} + \frac{192\sqrt{2002}}{4199}R_{10,2} + \frac{12\sqrt{154}}{323}R_{10,4}$
5	5	1	5	5	1	$\frac{5\sqrt{30}}{208}I_{21} - \frac{6\sqrt{5}}{13}I_{41} + \frac{35\sqrt{546}}{1768}I_{61} - \frac{25\sqrt{1365}}{884}I_{63}$ $+ \frac{210\sqrt{34}}{323}I_{81} + \frac{70\sqrt{39270}}{4199}I_{83} - \frac{213\sqrt{2310}}{33592}I_{10,1} + \frac{27\sqrt{5005}}{67184}I_{10,3}$ $+ \frac{2043\sqrt{1001}}{67184}I_{10,5} + R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40}$ $- \frac{10\sqrt{13}}{221}R_{60} + \frac{35\sqrt{17}}{4199}R_{80} + \frac{1251\sqrt{21}}{4199}R_{10,0} + \frac{3\sqrt{770}}{221}R_{10,2}$ $+ \frac{3\sqrt{10010}}{221}R_{10,4}$
5	5	1	5	5	2	$-\frac{45\sqrt{6}}{208}I_{21} + \frac{12}{13}I_{41} + \frac{\sqrt{2730}}{1768}I_{61} - \frac{15\sqrt{273}}{884}I_{63}$ $+ \frac{553\sqrt{170}}{4199}I_{81} + \frac{35\sqrt{7854}}{4199}I_{83} + \frac{45\sqrt{462}}{33592}I_{10,1} + \frac{909\sqrt{1001}}{67184}I_{10,3}$ $- \frac{45\sqrt{5005}}{3536}I_{10,5} + \frac{5}{13}R_{20} + \frac{6\sqrt{2}}{13}R_{42} - \frac{20\sqrt{273}}{663}R_{62}$ $+ \frac{105\sqrt{85}}{4199}R_{80} - \frac{90\sqrt{119}}{4199}R_{82} + \frac{10\sqrt{13090}}{4199}R_{84} - \frac{693\sqrt{105}}{4199}R_{10,0}$ $- \frac{1161\sqrt{154}}{4199}R_{10,2} - \frac{18\sqrt{2002}}{323}R_{10,4}$

Table B327: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	1	5	5	3	$-\frac{15\sqrt{7}}{104}iI_{21} - \frac{\sqrt{42}}{13}iI_{41} - \frac{3\sqrt{65}}{52}iI_{61} + \frac{5\sqrt{26}}{884}iI_{63}$ $- \frac{7\sqrt{1785}}{323}iI_{81} + \frac{35\sqrt{187}}{4199}iI_{83} - \frac{2079\sqrt{11}}{16796}iI_{10,1} + \frac{1155\sqrt{858}}{67184}iI_{10,3}$ $- \frac{105\sqrt{4290}}{67184}iI_{10,5} - \frac{\sqrt{210}}{91}iR_{40} + \frac{4\sqrt{21}}{91}iR_{42} - \frac{5\sqrt{2730}}{221}iR_{60}$ $- \frac{58\sqrt{26}}{221}iR_{62} - \frac{28\sqrt{3570}}{4199}iR_{80} - \frac{35\sqrt{102}}{4199}iR_{82} + \frac{49\sqrt{2805}}{4199}iR_{84}$ $- \frac{1386\sqrt{10}}{4199}iR_{10,0} - \frac{1302\sqrt{33}}{4199}iR_{10,2} - \frac{189\sqrt{429}}{4199}iR_{10,4}$
5	5	1	6	6	1	$- \frac{12\sqrt{806}}{403}iR_{10} - \frac{\sqrt{16926}}{403}iR_{30} - \frac{5\sqrt{14105}}{806}iR_{32} - \frac{5\sqrt{26598}}{6851}iR_{50}$ $- \frac{2\sqrt{155155}}{6851}iR_{52} - \frac{6\sqrt{465465}}{6851}iR_{54} - \frac{525\sqrt{4030}}{1041352}iR_{70}$ $- \frac{405\sqrt{84630}}{1041352}iR_{72} + \frac{15\sqrt{465465}}{30628}iR_{74} - \frac{195\sqrt{71610}}{80104}iR_{76}$ $- \frac{105\sqrt{45942}}{4165408}iR_{90} + \frac{\sqrt{2526810}}{1041352}iR_{92} - \frac{\sqrt{680295}}{4712}iR_{94}$ $+ \frac{165\sqrt{64790}}{80104}iR_{96} - \frac{65\sqrt{1652145}}{160208}iR_{98} - \frac{485331\sqrt{55614}}{191608768}iR_{11,0}$ $+ \frac{37227\sqrt{39215}}{7369568}iR_{11,2} - \frac{5097\sqrt{164703}}{3684784}iR_{11,4} + \frac{2529\sqrt{266662}}{14739136}iR_{11,6}$ $+ \frac{27\sqrt{12666445}}{433504}iR_{11,8} - \frac{15\sqrt{35466046}}{475456}iR_{11,10}$
5	5	1	6	6	2	$- \frac{3\sqrt{44330}}{17732}iR_{10} - \frac{17\sqrt{930930}}{106392}iR_{30} - \frac{7\sqrt{31031}}{17732}iR_{32} - \frac{275\sqrt{12090}}{82212}iR_{50}$ $- \frac{20\sqrt{2821}}{6851}iR_{52} + \frac{35\sqrt{8463}}{13702}iR_{54} - \frac{143955\sqrt{8866}}{22909744}iR_{70}$ $- \frac{595\sqrt{186186}}{1347632}iR_{72} + \frac{5565\sqrt{8463}}{1041352}iR_{74} + \frac{35\sqrt{1302}}{9424}iR_{76}$ $- \frac{8475\sqrt{2526810}}{22909744}iR_{90} - \frac{45\sqrt{45942}}{61256}iR_{92} + \frac{225\sqrt{12369}}{40052}iR_{94}$ $+ \frac{15\sqrt{1178}}{4712}iR_{96} - \frac{15\sqrt{30039}}{80104}iR_{98} - \frac{13431\sqrt{3058770}}{95804384}iR_{11,0}$ $- \frac{3663\sqrt{713}}{921196}iR_{11,2} + \frac{2343\sqrt{74865}}{1842392}iR_{11,4} + \frac{165\sqrt{121210}}{921196}iR_{11,6}$ $- \frac{495\sqrt{230299}}{3684784}iR_{11,8}$
5	5	1	6	6	3	$\frac{\sqrt{429}}{52}R_{10} - \frac{\sqrt{1001}}{52}R_{30} - \frac{\sqrt{30030}}{572}R_{32} + \frac{55\sqrt{13}}{442}R_{50}$ $+ \frac{5\sqrt{2730}}{442}R_{52} - \frac{3\sqrt{910}}{442}R_{54} - \frac{35\sqrt{2145}}{8398}R_{70} - \frac{315\sqrt{5005}}{46189}R_{72}$ $+ \frac{105\sqrt{910}}{8398}R_{74} + \frac{15\sqrt{35}}{323}R_{76} + \frac{15\sqrt{2717}}{16796}R_{90} + \frac{45\sqrt{1235}}{8398}R_{92}$ $- \frac{9\sqrt{1330}}{1292}R_{94} - \frac{15\sqrt{285}}{646}R_{96} + \frac{15\sqrt{3230}}{1292}R_{98} - \frac{33\sqrt{3289}}{386308}R_{11,0}$ $- \frac{33\sqrt{690}}{29716}R_{11,2} + \frac{99\sqrt{322}}{29716}R_{11,4} + \frac{33\sqrt{1173}}{7429}R_{11,6}$ $- \frac{33\sqrt{222870}}{29716}R_{11,8} - \frac{33\sqrt{156009}}{14858}R_{11,10}$

Table B328: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	5	5	2	$\frac{83\sqrt{30}}{624}I_{21} + \frac{6\sqrt{5}}{13}I_{41} - \frac{7\sqrt{546}}{408}I_{61} - \frac{31\sqrt{1365}}{2652}I_{63}$ $- \frac{756\sqrt{34}}{4199}I_{81} - \frac{28\sqrt{39270}}{4199}I_{83} - \frac{27\sqrt{2310}}{1768}I_{10,1} + \frac{783\sqrt{5005}}{67184}I_{10,3}$ $+ \frac{3375\sqrt{1001}}{67184}I_{10,5} + R_{00} + \frac{\sqrt{5}}{39}R_{20} - \frac{6}{13}R_{40}$ $- \frac{58\sqrt{13}}{663}R_{60} - \frac{88\sqrt{1365}}{3315}R_{62} + \frac{175\sqrt{17}}{4199}R_{80} - \frac{12\sqrt{595}}{4199}R_{82}$ $+ \frac{72\sqrt{2618}}{4199}R_{84} + \frac{2835\sqrt{21}}{4199}R_{10,0} + \frac{837\sqrt{770}}{4199}R_{10,2}$ $+ \frac{135\sqrt{10010}}{4199}R_{10,4}$
5	5	2	5	5	3	$\frac{\sqrt{35}}{312}iI_{21} - \frac{\sqrt{210}}{13}iI_{41} - \frac{287\sqrt{13}}{2652}iI_{61} + \frac{3\sqrt{130}}{68}iI_{63}$ $+ \frac{301\sqrt{357}}{4199}iI_{81} + \frac{63\sqrt{935}}{4199}iI_{83} - \frac{1701\sqrt{55}}{16796}iI_{10,1}$ $- \frac{63\sqrt{4290}}{67184}iI_{10,3} + \frac{945\sqrt{858}}{67184}iI_{10,5} - \frac{2\sqrt{210}}{39}iR_{20}$ $- \frac{5\sqrt{42}}{91}iR_{40} + \frac{4\sqrt{105}}{91}iR_{42} + \frac{\sqrt{546}}{51}iR_{60} + \frac{98\sqrt{130}}{3315}iR_{62}$ $- \frac{7\sqrt{510}}{323}iR_{82} + \frac{7\sqrt{561}}{4199}iR_{84} + \frac{126\sqrt{165}}{4199}iR_{10,2} + \frac{63\sqrt{2145}}{4199}iR_{10,4}$
5	5	2	6	6	1	$- \frac{\sqrt{84630}}{1209}iR_{30} + \frac{\sqrt{2821}}{62}iR_{32} - \frac{14\sqrt{132990}}{20553}iR_{50} - \frac{2\sqrt{31031}}{527}iR_{52}$ $+ \frac{16\sqrt{93093}}{6851}iR_{54} - \frac{4725\sqrt{806}}{1041352}iR_{70} + \frac{15\sqrt{16926}}{80104}iR_{72}$ $- \frac{225\sqrt{93093}}{520676}iR_{74} - \frac{75\sqrt{14322}}{80104}iR_{76} - \frac{2739\sqrt{229710}}{4165408}iR_{90}$ $+ \frac{39\sqrt{505362}}{80104}iR_{92} - \frac{39\sqrt{136059}}{80104}iR_{94} + \frac{359\sqrt{12958}}{80104}iR_{96}$ $+ \frac{89\sqrt{330429}}{160208}iR_{98} - \frac{5445\sqrt{278070}}{14739136}iR_{11,0} + \frac{7101\sqrt{7843}}{7369568}iR_{11,2}$ $+ \frac{1389\sqrt{823515}}{3684784}iR_{11,4} - \frac{6549\sqrt{1333310}}{14739136}iR_{11,6} + \frac{333\sqrt{2533289}}{7369568}iR_{11,8}$ $+ \frac{27\sqrt{177330230}}{475456}iR_{11,10}$
5	5	2	6	6	2	$- \frac{3\sqrt{8866}}{572}iR_{10} - \frac{37\sqrt{186186}}{35464}iR_{30} + \frac{\sqrt{155155}}{53196}iR_{32} - \frac{135\sqrt{2418}}{27404}iR_{50}$ $+ \frac{92\sqrt{14105}}{20553}iR_{52} + \frac{33\sqrt{42315}}{13702}iR_{54} + \frac{7791\sqrt{44330}}{22909744}iR_{70}$ $+ \frac{8871\sqrt{930930}}{22909744}iR_{72} - \frac{993\sqrt{42315}}{1041352}iR_{74} - \frac{951\sqrt{6510}}{160208}iR_{76}$ $- \frac{5325\sqrt{505362}}{22909744}iR_{90} - \frac{1063\sqrt{229710}}{1041352}iR_{92} - \frac{101\sqrt{61845}}{40052}iR_{94}$ $- \frac{243\sqrt{5890}}{80104}iR_{96} + \frac{27\sqrt{150195}}{80104}iR_{98} - \frac{62865\sqrt{611754}}{95804384}iR_{11,0}$ $- \frac{10989\sqrt{3565}}{921196}iR_{11,2} - \frac{495\sqrt{14973}}{1842392}iR_{11,4} + \frac{2475\sqrt{24242}}{921196}iR_{11,6}$ $+ \frac{891\sqrt{1151495}}{3684784}iR_{11,8}$

Table B329: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	2	6	6	3	$\begin{aligned} & \frac{9\sqrt{2145}}{572}R_{10} - \frac{\sqrt{5005}}{572}R_{30} + \frac{19\sqrt{6006}}{1716}R_{32} - \frac{25\sqrt{65}}{442}R_{50} \\ & + \frac{\sqrt{546}}{102}R_{52} - \frac{11\sqrt{182}}{442}R_{54} - \frac{945\sqrt{429}}{92378}R_{70} - \frac{75\sqrt{1001}}{3553}R_{72} \\ & - \frac{135\sqrt{182}}{8398}R_{74} - \frac{45\sqrt{7}}{323}R_{76} + \frac{795\sqrt{13585}}{184756}R_{90} - \frac{\sqrt{247}}{221}R_{92} \\ & - \frac{3\sqrt{266}}{1292}R_{94} - \frac{20\sqrt{57}}{323}R_{96} - \frac{11\sqrt{646}}{1292}R_{98} - \frac{495\sqrt{16445}}{386308}R_{11,0} \\ & + \frac{495\sqrt{138}}{29716}R_{11,2} + \frac{297\sqrt{1610}}{29716}R_{11,4} - \frac{165\sqrt{5865}}{14858}R_{11,6} \\ & - \frac{99\sqrt{44574}}{29716}R_{11,8} \end{aligned}$
5	5	3	5	5	3	$\begin{aligned} & -\frac{3\sqrt{30}}{104}I_{21} - \frac{8\sqrt{5}}{13}I_{41} - \frac{\sqrt{546}}{68}I_{61} + \frac{7\sqrt{1365}}{442}I_{63} \\ & + \frac{882\sqrt{34}}{4199}I_{81} + \frac{14\sqrt{39270}}{4199}I_{83} + \frac{315\sqrt{2310}}{16796}I_{10,1} \\ & + \frac{315\sqrt{5005}}{33592}I_{10,3} + \frac{315\sqrt{1001}}{33592}I_{10,5} + R_{00} + \frac{8\sqrt{5}}{13}R_{20} \\ & + \frac{4}{13}R_{40} - \frac{2\sqrt{10}}{13}R_{42} + \frac{8\sqrt{13}}{221}R_{60} - \frac{8\sqrt{1365}}{663}R_{62} \\ & - \frac{98\sqrt{17}}{4199}R_{80} - \frac{84\sqrt{595}}{4199}R_{82} - \frac{630\sqrt{21}}{4199}R_{10,0} - \frac{126\sqrt{770}}{4199}R_{10,2} \end{aligned}$
5	5	3	6	6	1	$\begin{aligned} & \frac{7\sqrt{2418}}{806}R_{32} + \frac{3\sqrt{155155}}{6851}R_{50} - \frac{24\sqrt{26598}}{6851}R_{52} - \frac{23\sqrt{8866}}{6851}R_{54} \\ & + \frac{1155\sqrt{8463}}{260338}R_{70} - \frac{1245\sqrt{403}}{260338}R_{72} - \frac{15\sqrt{8866}}{260338}R_{74} \\ & + \frac{705\sqrt{341}}{20026}R_{76} + \frac{99\sqrt{267995}}{160208}R_{90} + \frac{15\sqrt{589589}}{520676}R_{92} \\ & - \frac{539\sqrt{12958}}{80104}R_{94} - \frac{23\sqrt{136059}}{40052}R_{96} - \frac{53\sqrt{1542002}}{160208}R_{98} \\ & + \frac{1089\sqrt{324415}}{7369568}R_{11,0} + \frac{789\sqrt{329406}}{7369568}R_{11,2} - \frac{1407\sqrt{78430}}{3684784}R_{11,4} \\ & - \frac{45\sqrt{13999755}}{7369568}R_{11,6} + \frac{15\sqrt{106398138}}{387872}R_{11,8} + \frac{21\sqrt{37999335}}{237728}R_{11,10} \end{aligned}$
5	5	3	6	6	2	$\begin{aligned} & \frac{\sqrt{93093}}{286}R_{10} + \frac{7\sqrt{4433}}{1716}R_{30} - \frac{133\sqrt{132990}}{53196}R_{32} + \frac{25\sqrt{2821}}{41106}R_{50} \\ & - \frac{20\sqrt{12090}}{20553}R_{52} + \frac{125\sqrt{4030}}{13702}R_{54} + \frac{343\sqrt{465465}}{11454872}R_{70} \\ & + \frac{5199\sqrt{22165}}{11454872}R_{72} + \frac{531\sqrt{4030}}{1041352}R_{74} - \frac{2079\sqrt{155}}{80104}R_{76} \\ & - \frac{1935\sqrt{589589}}{11454872}R_{90} - \frac{249\sqrt{267995}}{520676}R_{92} - \frac{105\sqrt{5890}}{40052}R_{94} \\ & - \frac{15\sqrt{61845}}{40052}R_{96} + \frac{9\sqrt{700910}}{80104}R_{98} + \frac{37125\sqrt{713713}}{47902192}R_{11,0} \\ & + \frac{2871\sqrt{149730}}{921196}R_{11,2} + \frac{45045\sqrt{1426}}{1842392}R_{11,4} + \frac{495\sqrt{254541}}{460598}R_{11,6} \\ & + \frac{99\sqrt{48362790}}{3684784}R_{11,8} \end{aligned}$

Table B330: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
5	5	3	6	6	3	$ \begin{aligned} & -\frac{3\sqrt{10010}}{572}iR_{10} - \frac{7\sqrt{4290}}{1716}iR_{30} + \frac{7\sqrt{143}}{286}iR_{32} - \frac{2\sqrt{2730}}{663}iR_{50} \\ & + \frac{31\sqrt{13}}{221}iR_{52} - \frac{14\sqrt{39}}{221}iR_{54} - \frac{60\sqrt{2002}}{46189}iR_{70} + \frac{1065\sqrt{858}}{46189}iR_{72} \\ & - \frac{160\sqrt{39}}{4199}iR_{74} + \frac{55\sqrt{6}}{323}iR_{76} + \frac{9\sqrt{570570}}{92378}iR_{90} + \frac{113\sqrt{10374}}{16796}iR_{92} \\ & + \frac{21\sqrt{57}}{646}iR_{94} + \frac{33\sqrt{266}}{1292}iR_{96} + \frac{99\sqrt{690690}}{193154}iR_{11,0} \\ & + \frac{99\sqrt{161}}{14858}iR_{11,2} - \frac{693\sqrt{345}}{14858}iR_{11,4} - \frac{33\sqrt{27370}}{14858}iR_{11,6} \end{aligned} $
6	6	1	6	6	1	$ \begin{aligned} & R_{00} - \frac{56\sqrt{5}}{155}R_{20} + \frac{234}{527}R_{40} + \frac{45\sqrt{10}}{527}R_{42} \\ & - \frac{160\sqrt{13}}{589}R_{60} - \frac{448\sqrt{1365}}{10013}R_{62} + \frac{770\sqrt{17}}{10013}R_{80} + \frac{900\sqrt{595}}{70091}R_{82} \\ & - \frac{1935\sqrt{2618}}{70091}R_{84} + \frac{152496\sqrt{21}}{230299}R_{10,0} + \frac{44352\sqrt{770}}{230299}R_{10,2} \\ & + \frac{8712\sqrt{10010}}{230299}R_{10,4} + \frac{533412}{1151495}R_{12,0} - \frac{111\sqrt{6006}}{7429}R_{12,2} \\ & + \frac{29304\sqrt{1001}}{1151495}R_{12,4} + \frac{11166\sqrt{2431}}{1151495}R_{12,6} \end{aligned} $
6	6	1	6	6	2	$ \begin{aligned} & \frac{12\sqrt{11}}{341}R_{20} + \frac{96\sqrt{55}}{5797}R_{40} + \frac{78\sqrt{22}}{5797}R_{42} + \frac{4480\sqrt{715}}{110143}R_{60} \\ & + \frac{6400\sqrt{3003}}{330429}R_{62} + \frac{2160\sqrt{935}}{110143}R_{80} - \frac{920\sqrt{1309}}{771001}R_{82} \\ & - \frac{1080\sqrt{1190}}{70091}R_{84} + \frac{4392\sqrt{1155}}{230299}R_{10,0} + \frac{14976\sqrt{14}}{230299}R_{10,2} \\ & - \frac{7740\sqrt{182}}{230299}R_{10,4} + \frac{41184\sqrt{55}}{1151495}R_{12,0} + \frac{66\sqrt{2730}}{37145}R_{12,2} \\ & - \frac{23232\sqrt{455}}{1151495}R_{12,4} - \frac{1188\sqrt{1105}}{230299}R_{12,6} \end{aligned} $
6	6	1	6	6	3	$ \begin{aligned} & -\frac{2\sqrt{1705}}{155}iI_{21} - \frac{30\sqrt{10230}}{5797}iI_{41} - \frac{100\sqrt{31031}}{110143}iI_{61} - \frac{180\sqrt{310310}}{110143}iI_{63} \\ & + \frac{100\sqrt{17391}}{10013}iI_{81} + \frac{60\sqrt{18445}}{10013}iI_{83} + \frac{1908\sqrt{1085}}{230299}iI_{10,1} \\ & + \frac{63\sqrt{84630}}{230299}iI_{10,3} - \frac{2097\sqrt{16926}}{230299}iI_{10,5} + \frac{31284\sqrt{8866}}{1151495}iI_{12,1} \\ & + \frac{330\sqrt{16926}}{13547}iI_{12,3} + \frac{2684\sqrt{143871}}{1151495}iI_{12,5} \end{aligned} $
6	6	2	6	6	2	$ \begin{aligned} & R_{00} + \frac{272\sqrt{5}}{341}R_{20} + \frac{3006}{5797}R_{40} - \frac{1549\sqrt{10}}{5797}R_{42} \\ & - \frac{9760\sqrt{13}}{110143}R_{60} - \frac{3008\sqrt{1365}}{110143}R_{62} - \frac{1030\sqrt{17}}{110143}R_{80} \\ & - \frac{2460\sqrt{595}}{771001}R_{82} + \frac{2685\sqrt{2618}}{771001}R_{84} - \frac{720\sqrt{21}}{230299}R_{10,0} \\ & + \frac{288\sqrt{770}}{230299}R_{10,2} + \frac{216\sqrt{10010}}{230299}R_{10,4} + \frac{143748}{230299}R_{12,0} \\ & + \frac{99\sqrt{6006}}{7429}R_{12,2} + \frac{3960\sqrt{1001}}{230299}R_{12,4} + \frac{594\sqrt{2431}}{230299}R_{12,6} \end{aligned} $

Table B331: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = B_2$, and total spin $S = 0$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 12.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
6	6	2	6	6	3	$\begin{aligned} & \frac{18\sqrt{31}}{341}iI_{21} + \frac{754\sqrt{186}}{5797}iI_{41} + \frac{420\sqrt{14105}}{110143}iI_{61} - \frac{1180\sqrt{5642}}{110143}iI_{63} \\ & - \frac{80\sqrt{7905}}{5797}iI_{81} - \frac{640\sqrt{40579}}{110143}iI_{83} - \frac{2628\sqrt{2387}}{230299}iI_{10,1} \\ & - \frac{9\sqrt{186186}}{12121}iI_{10,3} + \frac{33\sqrt{930930}}{230299}iI_{10,5} - \frac{47916\sqrt{4030}}{1151495}iI_{12,1} \\ & - \frac{1782\sqrt{930930}}{1151495}iI_{12,3} - \frac{132\sqrt{7912905}}{1151495}iI_{12,5} \end{aligned}$
6	6	3	6	6	3	$\begin{aligned} & R_{00} + \frac{4\sqrt{5}}{55}R_{20} - \frac{96}{187}R_{40} + \frac{48\sqrt{10}}{187}R_{42} \\ & - \frac{80\sqrt{13}}{3553}R_{60} - \frac{32\sqrt{1365}}{3553}R_{62} - \frac{10\sqrt{17}}{209}R_{80} - \frac{60\sqrt{595}}{1309}R_{82} \\ & + \frac{435\sqrt{2618}}{24871}R_{84} + \frac{4056\sqrt{21}}{7429}R_{10,0} + \frac{48\sqrt{770}}{391}R_{10,2} \\ & + \frac{156\sqrt{10010}}{7429}R_{10,4} - \frac{26136}{37145}R_{12,0} - \frac{66\sqrt{6006}}{37145}R_{12,2} + \frac{1584\sqrt{1001}}{37145}R_{12,4} \\ & + \frac{396\sqrt{2431}}{37145}R_{12,6} \end{aligned}$

Table B332: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 1 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{1}{2}$	0	1	R_{00}
$\frac{1}{2}$	0	1	$\frac{1}{2}$	1	1	$-\frac{\sqrt{6}}{3}R_{10}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	1	1	$-1iR_{10}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	1	2	$\frac{\sqrt{3}}{3}R_{10}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	2	1	$-\frac{2\sqrt{5}}{5}iI_{21}$
$\frac{1}{2}$	0	1	$\frac{3}{2}$	2	2	$-\frac{2\sqrt{10}}{5}R_{20}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	2	1	$-\frac{2\sqrt{15}}{5}R_{20}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	2	2	$\frac{4\sqrt{70}}{35}iI_{21}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	2	3	$\frac{\sqrt{14}}{7}iI_{21}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{14}}{7}R_{32}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	3	2	$-\frac{\sqrt{70}}{7}R_{32}$
$\frac{1}{2}$	0	1	$\frac{5}{2}$	3	3	$-\frac{\sqrt{42}}{7}iR_{30}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	1	$\frac{\sqrt{10}}{4}iR_{30} - \frac{\sqrt{3}}{2}iR_{32}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	2	$\frac{\sqrt{70}}{28}iR_{30} - \frac{\sqrt{21}}{14}iR_{32}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	3	$\frac{3\sqrt{14}}{28}iR_{30} + \frac{\sqrt{105}}{14}iR_{32}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	3	4	$\frac{\sqrt{210}}{28}R_{30} + \frac{5\sqrt{7}}{14}R_{32}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	1	$\frac{4}{3}iI_{41}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	2	$-\frac{4\sqrt{3}}{3}iI_{41}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	3	$-\frac{4\sqrt{6}}{9}R_{42}$
$\frac{1}{2}$	0	1	$\frac{7}{2}$	4	4	$-\frac{4\sqrt{21}}{21}R_{40} + \frac{2\sqrt{210}}{63}R_{42}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	1	$\frac{4\sqrt{595}}{119}R_{40} - \frac{8\sqrt{238}}{119}R_{42}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{14}}{3}iI_{41}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	3	$\frac{2\sqrt{6}}{3}iI_{41}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	4	$\frac{8\sqrt{595}}{1071}R_{40} - \frac{16\sqrt{238}}{1071}R_{42}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	4	5	$\frac{2\sqrt{5}}{9}R_{40} + \frac{5\sqrt{2}}{9}R_{42}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{22}}{11}R_{54}$

Table B333: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 2 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{66}}{11}R_{52}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	3	$-\frac{\sqrt{154}}{11}R_{52}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	4	$-\frac{3\sqrt{22}}{11}R_{54}$
$\frac{1}{2}$	0	1	$\frac{9}{2}$	5	5	$\frac{\sqrt{110}}{11}iR_{50}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	1	$-\frac{3\sqrt{14}}{16}iR_{50} + \frac{\sqrt{15}}{4}iR_{52} - \frac{\sqrt{5}}{8}iR_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	2	$-\frac{3\sqrt{154}}{176}iR_{50} + \frac{\sqrt{165}}{44}iR_{52} - \frac{\sqrt{55}}{88}iR_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	3	$-\frac{\sqrt{2310}}{176}iR_{50} - \frac{3\sqrt{11}}{44}iR_{52} + \frac{9\sqrt{33}}{88}iR_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	4	$-\frac{3\sqrt{770}}{176}iR_{50} - \frac{3\sqrt{33}}{44}iR_{52} + \frac{27\sqrt{11}}{88}iR_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	5	$-\frac{\sqrt{1155}}{88}iR_{50} - \frac{7\sqrt{22}}{44}iR_{52} - \frac{7\sqrt{66}}{88}iR_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	5	6	$\frac{5\sqrt{33}}{88}R_{50} + \frac{\sqrt{770}}{44}R_{52} + \frac{\sqrt{2310}}{88}R_{54}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	1	$-\frac{8\sqrt{26598}}{4433}iI_{61} + \frac{8\sqrt{66495}}{4433}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	2	$\frac{4\sqrt{116870}}{11687}iI_{61} - \frac{144\sqrt{11687}}{11687}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	3	$-\frac{10\sqrt{1885}}{377}iI_{61} + \frac{6\sqrt{754}}{377}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	4	$\frac{8\sqrt{2093}}{299}R_{60} + \frac{128\sqrt{4485}}{4485}R_{62}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	5	$-\frac{20\sqrt{76245}}{5083}R_{60} - \frac{72\sqrt{35581}}{5083}R_{62}$
$\frac{1}{2}$	0	1	$\frac{11}{2}$	6	6	$-\frac{4\sqrt{3094}}{221}R_{60} + \frac{8\sqrt{6630}}{3315}R_{62}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	1	$\frac{8\sqrt{286}}{65}R_{62}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	2	$-\frac{4\sqrt{5005}}{143}R_{60} - \frac{296\sqrt{429}}{2145}R_{62}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	3	$-\frac{2\sqrt{2002}}{143}R_{60} - \frac{4\sqrt{4290}}{715}R_{62}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	4	$\frac{32\sqrt{429}}{715}iI_{61} - \frac{16\sqrt{4290}}{715}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	5	$\frac{112\sqrt{93054}}{77545}iI_{61} + \frac{88\sqrt{232635}}{77545}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	6	$\frac{3568\sqrt{55940963}}{55940963}iI_{61} + \frac{720\sqrt{559409630}}{55940963}iI_{63}$
$\frac{1}{2}$	0	1	$\frac{13}{2}$	6	7	$\frac{39\sqrt{396770}}{39677}iI_{61} + \frac{14\sqrt{39677}}{39677}iI_{63}$
$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	R_{00}
$\frac{1}{2}$	1	1	$\frac{3}{2}$	1	1	$-\frac{\sqrt{5}}{5}iI_{21} + \frac{\sqrt{30}}{5}iR_{20}$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	1	2	$\frac{\sqrt{15}}{5}I_{21} + \frac{\sqrt{10}}{5}R_{20}$

Table B334: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 3 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	2	1	$-1iR_{10}$
$\frac{1}{2}$	1	1	$\frac{3}{2}$	2	2	$\frac{\sqrt{3}}{3}R_{10}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	2	1	$\frac{\sqrt{42}}{14}R_{30} - \frac{\sqrt{35}}{7}R_{32}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	2	2	$-\frac{\sqrt{6}}{14}iR_{30} - \frac{3\sqrt{5}}{7}iR_{32}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	2	3	$-\frac{\sqrt{30}}{7}iR_{30} - \frac{2}{7}iR_{32}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{6}}{2}R_{20}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	3	2	$\frac{2\sqrt{5}}{5}I_{21} - \frac{\sqrt{30}}{10}R_{20}$
$\frac{1}{2}$	1	1	$\frac{5}{2}$	3	3	$\frac{\sqrt{10}}{5}iI_{21} + \frac{\sqrt{15}}{5}iR_{20}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{\sqrt{7}}{3}iI_{41} - \frac{2\sqrt{35}}{21}iR_{40} + \frac{4\sqrt{14}}{21}iR_{42}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{7}{3}iI_{41} - \frac{\sqrt{2}}{3}iR_{42}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	3	$-\frac{\sqrt{5}}{3}iI_{41} - \frac{2}{3}iR_{40}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	3	4	$-\frac{\sqrt{3}}{3}I_{41} - \frac{\sqrt{6}}{3}R_{42}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	1	$\frac{\sqrt{70}}{14}iR_{30} - \frac{\sqrt{21}}{7}iR_{32}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{7}}{7}iR_{32}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	3	$\frac{\sqrt{210}}{42}R_{30} + \frac{3\sqrt{7}}{7}R_{32}$
$\frac{1}{2}$	1	1	$\frac{7}{2}$	4	4	$\frac{\sqrt{6}}{3}R_{30}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	1	$-\frac{3\sqrt{13090}}{748}R_{50} + \frac{5\sqrt{561}}{187}R_{52} - \frac{13\sqrt{187}}{374}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{\sqrt{385}}{44}iR_{50} - \frac{\sqrt{66}}{22}iR_{52} - \frac{9\sqrt{22}}{44}iR_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	3	$\frac{\sqrt{165}}{44}iR_{50} - \frac{\sqrt{154}}{22}iR_{52} + \frac{\sqrt{462}}{44}iR_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	4	$-\frac{\sqrt{13090}}{1122}R_{50} - \frac{8\sqrt{561}}{561}R_{52} - \frac{9\sqrt{187}}{187}R_{54}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	4	5	$-\frac{2\sqrt{110}}{33}R_{50} - \frac{2\sqrt{231}}{33}R_{52}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{70}}{14}R_{40} - \frac{2\sqrt{7}}{7}R_{42}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{14}}{3}I_{41} + \frac{\sqrt{7}}{3}R_{42}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{6}}{3}I_{41} + \frac{\sqrt{3}}{3}R_{42}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	4	$-\frac{2\sqrt{14}}{3}I_{41} + \frac{\sqrt{70}}{42}R_{40} - \frac{2\sqrt{7}}{21}R_{42}$
$\frac{1}{2}$	1	1	$\frac{9}{2}$	5	5	$-\frac{2}{3}iI_{41} - \frac{\sqrt{5}}{3}iR_{40}$

Table B335: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 4 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{\sqrt{858}}{143}iI_{61} + \frac{\sqrt{2145}}{143}iI_{63} - \frac{2\sqrt{2145}}{65}iR_{62}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{\sqrt{78}}{13}iI_{61} + \frac{\sqrt{195}}{13}iI_{63} + \frac{\sqrt{91}}{13}iR_{60} + \frac{16\sqrt{195}}{195}iR_{62}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	3	$-\frac{3\sqrt{13}}{13}iI_{63} - \frac{2\sqrt{13}}{13}iR_{62}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	4	$-\frac{\sqrt{39}}{13}iI_{63} + \frac{\sqrt{455}}{13}iR_{60} + \frac{16\sqrt{39}}{39}iR_{62}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	5	$-\frac{\sqrt{65}}{13}iI_{61} - \frac{2\sqrt{26}}{13}iR_{62}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	5	6	$\frac{\sqrt{91}}{13}I_{61} + \frac{\sqrt{78}}{13}R_{60}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	1	$-\frac{3\sqrt{434}}{124}iR_{50} + \frac{\sqrt{465}}{31}iR_{52} - \frac{\sqrt{155}}{62}iR_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	2	$-\frac{5\sqrt{2076690}}{19778}iR_{50} - \frac{74\sqrt{9889}}{9889}iR_{52} + \frac{3\sqrt{29667}}{899}iR_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	3	$-\frac{\sqrt{33495}}{319}iR_{50} - \frac{9\sqrt{638}}{319}iR_{52} - \frac{5\sqrt{1914}}{319}iR_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	4	$-\frac{3\sqrt{3542}}{1012}R_{50} + \frac{\sqrt{3795}}{253}R_{52} + \frac{15\sqrt{1265}}{506}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	5	$-\frac{\sqrt{129030}}{4301}R_{50} + \frac{16\sqrt{30107}}{4301}R_{52} - \frac{6\sqrt{90321}}{4301}R_{54}$
$\frac{1}{2}$	1	1	$\frac{11}{2}$	6	6	$\frac{3\sqrt{1309}}{187}R_{50} - \frac{\sqrt{5610}}{187}R_{52} - \frac{\sqrt{1870}}{187}R_{54}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	1	$\frac{\sqrt{77}}{20}R_{70} - \frac{7\sqrt{33}}{60}R_{72} + \frac{7\sqrt{6}}{60}R_{74} - \frac{\sqrt{39}}{20}R_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	2	$\frac{3\sqrt{462}}{220}R_{70} - \frac{\sqrt{22}}{220}R_{72} - \frac{9}{10}R_{74} + \frac{\sqrt{26}}{20}R_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	3	$\frac{\sqrt{1155}}{165}R_{70} + \frac{\sqrt{55}}{110}R_{72} - \frac{\sqrt{10}}{5}R_{74} - \frac{\sqrt{65}}{10}R_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	4	$-\frac{\sqrt{1155}}{300}iR_{70} - \frac{\sqrt{55}}{300}iR_{72} + \frac{\sqrt{10}}{12}iR_{74} - \frac{37\sqrt{65}}{300}iR_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	5	$-\frac{151\sqrt{250530}}{357900}iR_{70} - \frac{751\sqrt{11930}}{357900}iR_{72} - \frac{19\sqrt{65615}}{7158}iR_{74}$ $-\frac{17\sqrt{1705990}}{357900}iR_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	6	$\frac{11\sqrt{150610285}}{21515755}iR_{70} - \frac{5997\sqrt{64547265}}{43031510}iR_{72} + \frac{\sqrt{1420039830}}{21515755}iR_{74}$ $+\frac{93\sqrt{9230258895}}{43031510}iR_{76}$
$\frac{1}{2}$	1	1	$\frac{13}{2}$	6	7	$-\frac{\sqrt{7221214}}{3607}iR_{70} - \frac{2\sqrt{3094806}}{10821}iR_{72} - \frac{2\sqrt{140673}}{3607}iR_{74} - \frac{10\sqrt{21642}}{10821}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	1	$-\frac{\sqrt{30}}{10}I_{21} + R_{00} - \frac{\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	1	2	$-\frac{\sqrt{10}}{10}iI_{21} + \frac{\sqrt{15}}{5}iR_{20}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	1	$-\frac{\sqrt{6}}{10}R_{10} + \frac{3\sqrt{14}}{70}R_{30} + \frac{3\sqrt{105}}{35}R_{32}$
$\frac{3}{2}$	1	1	$\frac{3}{2}$	2	2	$\frac{\sqrt{2}}{10}iR_{10} - \frac{3\sqrt{42}}{35}iR_{30} + \frac{6\sqrt{35}}{35}iR_{32}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	1	$-\frac{2\sqrt{3}}{5}iR_{10} - \frac{3\sqrt{7}}{70}iR_{30} + \frac{\sqrt{210}}{70}iR_{32}$

Table B336: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 5 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	2	$\frac{\sqrt{21}}{5}R_{10} - \frac{3}{5}R_{30} - \frac{\sqrt{30}}{35}R_{32}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	2	3	$-\frac{2\sqrt{6}}{7}R_{32}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{6}}{7}iI_{21} + \frac{1}{7}iI_{41} - \frac{3}{7}iR_{20} + \frac{\sqrt{5}}{7}iR_{40}$ $-\frac{\sqrt{2}}{2}iR_{42}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	2	$-\sqrt{5}iI_{41} + \frac{3\sqrt{5}}{35}iR_{20} + \frac{1}{7}iR_{40} - \frac{3\sqrt{10}}{14}iR_{42}$
$\frac{3}{2}$	1	1	$\frac{5}{2}$	3	3	$\frac{3\sqrt{15}}{35}I_{21} - \frac{\sqrt{10}}{7}I_{41} + \frac{3\sqrt{2}}{7}R_{40} - \frac{\sqrt{5}}{7}R_{42}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	1	$\frac{\sqrt{42}}{6}I_{41} - \frac{3\sqrt{42}}{14}R_{20} - \frac{\sqrt{21}}{21}R_{42}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	2	$\frac{3}{7}I_{21} - \frac{17\sqrt{6}}{42}I_{41} - \frac{\sqrt{30}}{21}R_{40} + \frac{4\sqrt{3}}{21}R_{42}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	3	$-\frac{6\sqrt{5}}{35}I_{21} - \frac{\sqrt{30}}{14}I_{41} - \frac{3\sqrt{30}}{70}R_{20} - \frac{\sqrt{15}}{7}R_{42}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	3	4	$\frac{3\sqrt{3}}{7}iI_{21} - \frac{3\sqrt{2}}{14}iI_{41} - \frac{3\sqrt{2}}{7}iR_{20} + \frac{\sqrt{10}}{7}iR_{40}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	1	$-\frac{\sqrt{105}}{42}R_{30} - \frac{\sqrt{14}}{42}R_{32} + \frac{\sqrt{165}}{66}R_{50} - \frac{\sqrt{154}}{33}R_{52}$ $+\frac{\sqrt{462}}{66}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	2	$-\frac{\sqrt{35}}{21}R_{30} + \frac{\sqrt{55}}{33}R_{50} - \frac{\sqrt{154}}{11}R_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	3	$-\frac{\sqrt{35}}{21}iR_{30} - \frac{2\sqrt{42}}{63}iR_{32} - \frac{\sqrt{55}}{66}iR_{50} - \frac{4\sqrt{462}}{99}iR_{52}$ $+\frac{\sqrt{154}}{22}iR_{54}$
$\frac{3}{2}$	1	1	$\frac{7}{2}$	4	4	$-\frac{1}{6}iR_{30} - \frac{\sqrt{30}}{18}iR_{32} - \frac{5\sqrt{77}}{66}iR_{50} + \frac{2\sqrt{330}}{99}iR_{52}$ $-\frac{\sqrt{110}}{22}iR_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	1	$\frac{2\sqrt{255}}{51}iR_{30} - \frac{2\sqrt{34}}{17}iR_{32} + \frac{\sqrt{19635}}{2244}iR_{50} + \frac{\sqrt{374}}{374}iR_{52}$ $+\frac{5\sqrt{1122}}{748}iR_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	2	$\frac{2}{3}R_{32} + \frac{\sqrt{11}}{33}R_{52} - \frac{2\sqrt{33}}{33}R_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	3	$\frac{\sqrt{70}}{21}R_{30} - \frac{4\sqrt{21}}{21}R_{32} - \frac{\sqrt{110}}{33}R_{50} + \frac{\sqrt{231}}{33}R_{52}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	4	$-\frac{\sqrt{255}}{102}iR_{30} - \frac{25\sqrt{34}}{306}iR_{32} + \frac{\sqrt{19635}}{561}iR_{50} - \frac{16\sqrt{374}}{1683}iR_{52}$ $-\frac{23\sqrt{1122}}{1683}iR_{54}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	4	5	$\frac{\sqrt{105}}{21}iR_{30} + \frac{13\sqrt{14}}{63}iR_{32} + \frac{\sqrt{165}}{33}iR_{50} + \frac{5\sqrt{154}}{99}iR_{52}$ $+\frac{\sqrt{462}}{99}iR_{54}$

Table B337: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 6 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	1	$\frac{2\sqrt{21}}{11}iI_{41} + \frac{3\sqrt{13}}{143}iI_{63} + \frac{2\sqrt{105}}{77}iR_{40} - \frac{4\sqrt{42}}{77}iR_{42}$ $+ \frac{3\sqrt{1365}}{286}iR_{60} + \frac{57\sqrt{13}}{143}iR_{62}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{21}}{11}iI_{41} + \frac{3\sqrt{130}}{143}iI_{61} - \frac{\sqrt{105}}{231}iR_{40} + \frac{\sqrt{42}}{42}iR_{42}$ $-\frac{3\sqrt{1365}}{143}iR_{60} - \frac{6\sqrt{13}}{13}iR_{62}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	3	$\frac{7}{11}iI_{41} + \frac{6\sqrt{273}}{143}iI_{63} - \frac{\sqrt{5}}{11}iR_{40} - \frac{5\sqrt{2}}{22}iR_{42}$ $+ \frac{3\sqrt{65}}{143}iR_{60} - \frac{6\sqrt{273}}{143}iR_{62}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	4	$\frac{9\sqrt{130}}{143}iI_{61} - \frac{45\sqrt{13}}{143}iI_{63} - \frac{4\sqrt{105}}{231}iR_{40} + \frac{\sqrt{42}}{231}iR_{42}$ $+ \frac{9\sqrt{1365}}{286}iR_{60} + \frac{75\sqrt{13}}{143}iR_{62}$
$\frac{3}{2}$	1	1	$\frac{9}{2}$	5	5	$-\frac{5\sqrt{6}}{33}I_{41} + \frac{3\sqrt{455}}{143}I_{61} - \frac{\sqrt{30}}{33}R_{40} - \frac{\sqrt{3}}{11}R_{42}$ $-\frac{9\sqrt{390}}{286}R_{60} + \frac{3\sqrt{182}}{143}R_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	1	$-\frac{3\sqrt{143}}{143}I_{61} + \frac{3\sqrt{1430}}{286}I_{63} + \frac{5\sqrt{462}}{154}R_{40} - \frac{2\sqrt{1155}}{77}R_{42}$ $+ \frac{\sqrt{6006}}{286}R_{60} + \frac{8\sqrt{1430}}{715}R_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	2	$-\frac{\sqrt{210}}{11}I_{41} + \frac{12\sqrt{13}}{143}I_{61} - \frac{15\sqrt{130}}{286}I_{63} - \frac{3\sqrt{130}}{65}R_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	3	$\frac{4\sqrt{14}}{11}I_{41} - \frac{2\sqrt{195}}{143}I_{61} + \frac{3\sqrt{78}}{286}I_{63} + \frac{\sqrt{70}}{154}R_{40}$ $-\frac{2\sqrt{7}}{77}R_{42} + \frac{9\sqrt{910}}{286}R_{60} + \frac{24\sqrt{78}}{143}R_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	4	$\frac{3\sqrt{42}}{11}I_{41} - \frac{3\sqrt{65}}{143}I_{61} - \frac{9\sqrt{26}}{286}I_{63} + \frac{2\sqrt{21}}{11}R_{42}$ $-\frac{9\sqrt{26}}{143}R_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	5	$-\frac{4\sqrt{7}}{11}I_{41} - \frac{5\sqrt{390}}{286}I_{61} - \frac{6\sqrt{39}}{143}I_{63} + \frac{\sqrt{35}}{11}R_{40}$ $-\frac{3\sqrt{455}}{143}R_{60}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	5	6	$-\frac{2\sqrt{5}}{11}iI_{41} - \frac{5\sqrt{546}}{286}iI_{61} + \frac{\sqrt{10}}{11}iR_{42} - \frac{2\sqrt{1365}}{143}iR_{62}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	1	$\frac{15\sqrt{651}}{1612}R_{50} - \frac{15\sqrt{310}}{806}R_{52} - \frac{11\sqrt{930}}{1612}R_{54} - \frac{3\sqrt{11935}}{1612}R_{70}$ $+ \frac{47\sqrt{5115}}{8060}R_{72} - \frac{67\sqrt{930}}{8060}R_{74} + \frac{11\sqrt{6045}}{8060}R_{76}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	2	$-\frac{9\sqrt{346115}}{128557}R_{50} - \frac{218\sqrt{59334}}{128557}R_{52} - \frac{153\sqrt{19778}}{128557}R_{54}$ $+ \frac{3\sqrt{18879}}{11687}R_{70} + \frac{297\sqrt{899}}{23374}R_{72} + \frac{51\sqrt{19778}}{11687}R_{74}$ $-\frac{57\sqrt{128557}}{23374}R_{76}$

Table B338: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 7 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	3	$-\frac{21\sqrt{22330}}{8294}R_{50} - \frac{35\sqrt{957}}{4147}R_{52} - \frac{9\sqrt{319}}{4147}R_{54} + \frac{7\sqrt{1218}}{754}R_{70}$ $+ \frac{21\sqrt{58}}{377}R_{72} + \frac{3\sqrt{319}}{377}R_{74} + \frac{3\sqrt{8294}}{377}R_{76}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	4	$\frac{15\sqrt{5313}}{6578}iR_{50} + \frac{9\sqrt{2530}}{3289}iR_{52} + \frac{\sqrt{7590}}{6578}iR_{54} + \frac{9\sqrt{805}}{5980}iR_{70}$ $+ \frac{19\sqrt{345}}{5980}iR_{72} - \frac{5\sqrt{7590}}{1196}iR_{74} + \frac{\sqrt{49335}}{460}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	5	$\frac{3\sqrt{21505}}{13156}iR_{50} + \frac{73\sqrt{180642}}{111826}iR_{52} + \frac{147\sqrt{60214}}{223652}iR_{54}$ $+ \frac{35\sqrt{1173}}{20332}iR_{70} - \frac{183\sqrt{2737}}{20332}iR_{72} + \frac{81\sqrt{60214}}{20332}iR_{74}$ $- \frac{9\sqrt{391391}}{20332}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{11}{2}$	6	6	$\frac{15\sqrt{935}}{2431}iR_{52} + \frac{14\sqrt{2805}}{2431}iR_{54} - \frac{3\sqrt{1190}}{170}iR_{70} + \frac{61\sqrt{510}}{2210}iR_{72}$ $+ \frac{7\sqrt{2805}}{1105}iR_{74} + \frac{3\sqrt{72930}}{2210}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	1	$-\frac{9\sqrt{70}}{130}iR_{50} + \frac{6\sqrt{3}}{13}iR_{52} - \frac{3}{13}iR_{54} - \frac{\sqrt{462}}{520}iR_{70}$ $- \frac{\sqrt{22}}{520}iR_{72} + \frac{5}{52}iR_{74} + \frac{27\sqrt{26}}{520}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	2	$-\frac{93\sqrt{105}}{2860}iR_{50} - \frac{27\sqrt{2}}{286}iR_{52} + \frac{249\sqrt{6}}{572}iR_{54} - \frac{6\sqrt{77}}{715}iR_{70}$ $- \frac{12\sqrt{33}}{715}iR_{72} + \frac{2\sqrt{6}}{13}iR_{74} + \frac{4\sqrt{39}}{65}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{42}}{286}iR_{50} - \frac{6\sqrt{5}}{143}iR_{52} - \frac{9\sqrt{15}}{143}iR_{54} - \frac{\sqrt{770}}{143}iR_{70}$ $+ \frac{37\sqrt{330}}{2860}iR_{72} + \frac{2\sqrt{15}}{65}iR_{74} - \frac{\sqrt{390}}{52}iR_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	4	$\frac{9\sqrt{42}}{260}R_{50} - \frac{9\sqrt{5}}{65}R_{52} + \frac{7\sqrt{15}}{26}R_{54} - \frac{9\sqrt{770}}{1300}R_{70}$ $+ \frac{17\sqrt{330}}{3900}R_{72} + \frac{\sqrt{15}}{78}R_{74} - \frac{9\sqrt{390}}{1300}R_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	5	$\frac{567\sqrt{275583}}{852995}R_{50} + \frac{2016\sqrt{131230}}{852995}R_{52} - \frac{19\sqrt{393690}}{170599}R_{54}$ $- \frac{567\sqrt{41755}}{387725}R_{70} - \frac{8683\sqrt{17895}}{2326350}R_{72} + \frac{19\sqrt{393690}}{46527}R_{74}$ $+ \frac{81\sqrt{2558985}}{775450}R_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	6	$\frac{3\sqrt{662685254}}{170599}R_{50} - \frac{6\sqrt{710019915}}{55940963}R_{52} + \frac{4302\sqrt{236673305}}{615350593}R_{54}$ $- \frac{\sqrt{903661710}}{77545}R_{70} + \frac{198\sqrt{43031510}}{279704815}R_{72} - \frac{1434\sqrt{236673305}}{55940963}R_{74}$ $+ \frac{6\sqrt{6153505930}}{279704815}R_{76}$
$\frac{3}{2}$	1	1	$\frac{13}{2}$	6	7	$\frac{30\sqrt{281346}}{46891}R_{52} + \frac{12\sqrt{93782}}{46891}R_{54} - \frac{36\sqrt{515801}}{46891}R_{72} - \frac{44\sqrt{93782}}{46891}R_{74}$ $- \frac{12\sqrt{3607}}{3607}R_{76}$
$\frac{3}{2}$	1	2	$\frac{3}{2}$	1	2	$\frac{\sqrt{30}}{10}I_{21} + R_{00} + \frac{\sqrt{5}}{5}R_{20}$

Table B339: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 8 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	2	$\frac{3}{2}$	2	1	$-\frac{\sqrt{2}}{10}iR_{10} - \frac{9\sqrt{42}}{70}iR_{30} - \frac{3\sqrt{35}}{35}iR_{32}$
$\frac{3}{2}$	1	2	$\frac{3}{2}$	2	2	$-\frac{\sqrt{6}}{6}R_{10}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	2	1	$-\frac{\sqrt{21}}{14}R_{30} + \frac{\sqrt{70}}{14}R_{32}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	2	2	$-\frac{3\sqrt{7}}{35}iR_{10} - \frac{2\sqrt{3}}{35}iR_{30} + \frac{6\sqrt{10}}{35}iR_{32}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	2	3	$-\frac{6\sqrt{35}}{35}iR_{10} - \frac{4\sqrt{15}}{35}iR_{30} - \frac{2\sqrt{2}}{7}iR_{32}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	3	1	$-\sqrt{3}I_{41} - \frac{\sqrt{3}}{7}R_{20} - \frac{\sqrt{15}}{7}R_{40} + \frac{3\sqrt{6}}{14}R_{42}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	3	2	$-\frac{\sqrt{10}}{35}I_{21} + \frac{\sqrt{15}}{7}I_{41} + \frac{\sqrt{15}}{7}R_{20} - \frac{\sqrt{3}}{7}R_{40}$ $-\frac{\sqrt{30}}{14}R_{42}$
$\frac{3}{2}$	1	2	$\frac{5}{2}$	3	3	$\frac{\sqrt{5}}{7}iI_{21} + \frac{\sqrt{30}}{7}iI_{41} - \frac{2\sqrt{30}}{35}iR_{20} - \frac{\sqrt{6}}{7}iR_{40}$ $-\frac{\sqrt{15}}{7}iR_{42}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	3	1	$-\frac{\sqrt{14}}{6}iI_{41} + \frac{\sqrt{70}}{21}iR_{40} - \frac{4\sqrt{7}}{21}iR_{42}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	3	2	$\frac{3\sqrt{3}}{7}iI_{21} + \frac{5\sqrt{2}}{42}iI_{41} + \frac{9\sqrt{2}}{14}iR_{20} - \frac{11}{21}iR_{42}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	3	3	$\frac{6\sqrt{15}}{35}iI_{21} - \frac{5\sqrt{10}}{42}iI_{41} - \frac{9\sqrt{10}}{35}iR_{20} - \frac{5\sqrt{2}}{21}iR_{40}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	3	4	$\frac{3}{7}I_{21} + \frac{25\sqrt{6}}{42}I_{41} + \frac{3\sqrt{6}}{14}R_{20} + \frac{\sqrt{3}}{21}R_{42}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	4	1	$\frac{\sqrt{35}}{42}iR_{30} - \frac{\sqrt{42}}{42}iR_{32} + \frac{5\sqrt{55}}{66}iR_{50} - \frac{\sqrt{462}}{33}iR_{52}$ $-\frac{\sqrt{154}}{22}iR_{54}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	4	2	$-\frac{\sqrt{14}}{7}iR_{32}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	4	3	$\frac{2\sqrt{105}}{63}R_{30} - \frac{\sqrt{14}}{21}R_{32} - \frac{7\sqrt{165}}{198}R_{50} - \frac{2\sqrt{154}}{33}R_{52}$ $-\frac{\sqrt{462}}{66}R_{54}$
$\frac{3}{2}$	1	2	$\frac{7}{2}$	4	4	$-\frac{\sqrt{3}}{18}R_{30} + \frac{\sqrt{10}}{6}R_{32} - \frac{5\sqrt{231}}{198}R_{50} - \frac{2\sqrt{110}}{33}R_{52}$ $-\frac{\sqrt{330}}{66}R_{54}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	4	1	$\frac{3\sqrt{6545}}{748}R_{50} - \frac{5\sqrt{1122}}{374}R_{52} + \frac{13\sqrt{374}}{748}R_{54}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	4	2	$\frac{\sqrt{10}}{6}iR_{30} - \frac{\sqrt{3}}{3}iR_{32} + \frac{\sqrt{770}}{132}iR_{50} - \frac{2\sqrt{33}}{33}iR_{52}$ $+\frac{\sqrt{11}}{22}iR_{54}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	4	3	$\frac{\sqrt{210}}{42}iR_{30} - \frac{\sqrt{7}}{7}iR_{32} + \frac{\sqrt{330}}{132}iR_{50} - \frac{\sqrt{231}}{22}iR_{54}$

Table B340: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 9 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	4	4	$\frac{\sqrt{85}}{18}R_{30} + \frac{\sqrt{102}}{18}R_{32} - \frac{7\sqrt{6545}}{1683}R_{50} - \frac{2\sqrt{1122}}{153}R_{52}$ $+ \frac{5\sqrt{374}}{561}R_{54}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	4	5	$\frac{\sqrt{35}}{9}R_{30} + \frac{\sqrt{42}}{9}R_{32} - \frac{\sqrt{55}}{99}R_{50} - \frac{\sqrt{462}}{99}R_{52}$ $- \frac{\sqrt{154}}{33}R_{54}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	5	1	$\frac{3\sqrt{390}}{143}I_{61} - \frac{15\sqrt{39}}{143}I_{63} + \frac{2\sqrt{35}}{77}R_{40} - \frac{4\sqrt{14}}{77}R_{42}$ $+ \frac{3\sqrt{455}}{286}R_{60} - \frac{25\sqrt{39}}{143}R_{62}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	5	2	$-\frac{13\sqrt{7}}{33}I_{41} + \frac{18\sqrt{39}}{143}I_{63} + \frac{\sqrt{35}}{77}R_{40} - \frac{5\sqrt{14}}{462}R_{42}$ $+ \frac{9\sqrt{455}}{143}R_{60} + \frac{42\sqrt{39}}{143}R_{62}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	5	3	$\frac{\sqrt{3}}{33}I_{41} + \frac{3\sqrt{910}}{143}I_{61} + \frac{\sqrt{15}}{11}R_{40} - \frac{5\sqrt{6}}{66}R_{42}$ $- \frac{3\sqrt{195}}{143}R_{60} - \frac{6\sqrt{91}}{143}R_{62}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	5	4	$\frac{10\sqrt{7}}{33}I_{41} + \frac{9\sqrt{39}}{143}I_{63} - \frac{4\sqrt{35}}{231}R_{40} + \frac{29\sqrt{14}}{231}R_{42}$ $+ \frac{9\sqrt{455}}{286}R_{60} + \frac{21\sqrt{39}}{143}R_{62}$
$\frac{3}{2}$	1	2	$\frac{9}{2}$	5	5	$-\frac{7\sqrt{2}}{33}iI_{41} - \frac{3\sqrt{1365}}{143}iI_{61} + \frac{\sqrt{10}}{33}iR_{40} - \frac{3}{11}iR_{42}$ $+ \frac{9\sqrt{130}}{286}iR_{60} + \frac{3\sqrt{546}}{143}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	1	$\frac{\sqrt{429}}{143}iI_{61} - \frac{\sqrt{4290}}{286}iI_{63} + \frac{\sqrt{4290}}{65}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	2	$-\frac{3\sqrt{70}}{11}iI_{41} - \frac{4\sqrt{39}}{143}iI_{61} + \frac{\sqrt{390}}{286}iI_{63} - \frac{15\sqrt{14}}{154}iR_{40}$ $+ \frac{6\sqrt{35}}{77}iR_{42} + \frac{19\sqrt{182}}{286}iR_{60} + \frac{152\sqrt{390}}{2145}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	3	$-\frac{6\sqrt{65}}{143}iI_{61} - \frac{3\sqrt{26}}{286}iI_{63} - \frac{2\sqrt{21}}{11}iR_{42} - \frac{\sqrt{26}}{11}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	4	$-\frac{3\sqrt{14}}{11}iI_{41} - \frac{3\sqrt{195}}{143}iI_{61} + \frac{23\sqrt{78}}{286}iI_{63} - \frac{3\sqrt{70}}{154}iR_{40}$ $+ \frac{6\sqrt{7}}{77}iR_{42} - \frac{5\sqrt{910}}{286}iR_{60} - \frac{40\sqrt{78}}{429}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	5	$\frac{5\sqrt{130}}{286}iI_{61} - \frac{18\sqrt{13}}{143}iI_{63} - \frac{\sqrt{42}}{11}iR_{42} - \frac{2\sqrt{13}}{143}iR_{62}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	5	6	$-\frac{2\sqrt{15}}{11}I_{41} + \frac{7\sqrt{182}}{286}I_{61} + \frac{5\sqrt{3}}{11}R_{40} + \frac{7\sqrt{39}}{143}R_{60}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	1	$-\frac{15\sqrt{217}}{1612}iR_{50} + \frac{5\sqrt{930}}{806}iR_{52} - \frac{5\sqrt{310}}{1612}iR_{54} - \frac{21\sqrt{35805}}{8060}iR_{70}$ $+ \frac{27\sqrt{1705}}{1612}iR_{72} - \frac{99\sqrt{310}}{8060}iR_{74} - \frac{3\sqrt{2015}}{260}iR_{76}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	2	$-\frac{25\sqrt{1038345}}{257114}iR_{50} + \frac{\sqrt{19778}}{128557}iR_{52} - \frac{579\sqrt{59334}}{257114}iR_{54}$ $- \frac{105\sqrt{6293}}{23374}iR_{70} - \frac{120\sqrt{2697}}{11687}iR_{72} - \frac{15\sqrt{59334}}{23374}iR_{74}$

Table B341: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 10 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	3	$-\frac{5\sqrt{66990}}{8294}iR_{50} - \frac{75\sqrt{319}}{4147}iR_{52} + \frac{35\sqrt{957}}{4147}iR_{54} - \frac{21\sqrt{406}}{754}iR_{70}$ $-\frac{24\sqrt{174}}{377}iR_{72} - \frac{3\sqrt{957}}{377}iR_{74}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	4	$-\frac{15\sqrt{1771}}{3289}R_{50} + \frac{10\sqrt{7590}}{3289}R_{52} + \frac{9\sqrt{2530}}{3289}R_{54} + \frac{33\sqrt{2415}}{5980}R_{70}$ $+\frac{33\sqrt{115}}{5980}R_{72} - \frac{99\sqrt{2530}}{5980}R_{74} - \frac{33\sqrt{16445}}{5980}R_{76}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	5	$-\frac{\sqrt{64515}}{20332}R_{50} - \frac{163\sqrt{60214}}{111826}R_{52} + \frac{261\sqrt{180642}}{223652}R_{54} + \frac{63\sqrt{391}}{20332}R_{70}$ $+\frac{3\sqrt{8211}}{20332}R_{72} - \frac{9\sqrt{180642}}{20332}R_{74} - \frac{3\sqrt{1174173}}{20332}R_{76}$
$\frac{3}{2}$	1	2	$\frac{11}{2}$	6	6	$-\frac{15\sqrt{2618}}{2431}R_{50} + \frac{7\sqrt{2805}}{2431}R_{52} - \frac{8\sqrt{935}}{2431}R_{54} - \frac{3\sqrt{3570}}{2210}R_{70}$ $-\frac{3\sqrt{170}}{2210}R_{72} + \frac{9\sqrt{935}}{1105}R_{74} + \frac{3\sqrt{24310}}{2210}R_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	1	$-\frac{\sqrt{154}}{40}R_{70} + \frac{7\sqrt{66}}{120}R_{72} - \frac{7\sqrt{3}}{60}R_{74} + \frac{\sqrt{78}}{40}R_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	2	$-\frac{9\sqrt{35}}{572}R_{50} + \frac{15\sqrt{6}}{286}R_{52} + \frac{105\sqrt{2}}{572}R_{54} - \frac{6\sqrt{231}}{715}R_{70}$ $+\frac{7\sqrt{11}}{715}R_{72} + \frac{18\sqrt{2}}{65}R_{74} - \frac{7\sqrt{13}}{65}R_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	3	$-\frac{27\sqrt{14}}{286}R_{50} + \frac{18\sqrt{15}}{143}R_{52} + \frac{63\sqrt{5}}{143}R_{54} + \frac{7\sqrt{2310}}{2145}R_{70}$ $+\frac{\sqrt{110}}{572}R_{72} - \frac{14\sqrt{5}}{65}R_{74} - \frac{\sqrt{130}}{52}R_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	4	$-\frac{9\sqrt{14}}{260}iR_{50} + \frac{3\sqrt{15}}{65}iR_{52} - \frac{3\sqrt{5}}{130}iR_{54} - \frac{\sqrt{2310}}{975}iR_{70}$ $+\frac{37\sqrt{110}}{1950}iR_{72} - \frac{106\sqrt{5}}{975}iR_{74} + \frac{97\sqrt{130}}{1950}iR_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	5	$-\frac{1359\sqrt{91861}}{1705990}iR_{50} + \frac{3\sqrt{393690}}{852995}iR_{52} - \frac{453\sqrt{131230}}{1705990}iR_{54}$ $-\frac{302\sqrt{125265}}{1163175}iR_{70} + \frac{4949\sqrt{5965}}{2326350}iR_{72} + \frac{1204\sqrt{131230}}{1163175}iR_{74}$ $-\frac{17\sqrt{852995}}{178950}iR_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	6	$\frac{9\sqrt{1988055762}}{55940963}iR_{50} - \frac{4314\sqrt{236673305}}{55940963}iR_{52} + \frac{6\sqrt{710019915}}{55940963}iR_{54}$ $+\frac{44\sqrt{301220570}}{279704815}iR_{70} - \frac{20337\sqrt{129094530}}{559409630}iR_{72} + \frac{4\sqrt{710019915}}{55940963}iR_{74}$ $+\frac{93\sqrt{18460517790}}{43031510}iR_{76}$
$\frac{3}{2}$	1	2	$\frac{13}{2}$	6	7	$-\frac{18\sqrt{4923555}}{46891}iR_{50} - \frac{72\sqrt{93782}}{46891}iR_{52} - \frac{30\sqrt{281346}}{46891}iR_{54}$ $-\frac{8\sqrt{3610607}}{46891}iR_{70} - \frac{28\sqrt{1547403}}{140673}iR_{72} - \frac{20\sqrt{281346}}{46891}iR_{74}$ $-\frac{20\sqrt{10821}}{10821}iR_{76}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	1	$R_{00} + \frac{2\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	2	1	$\frac{3}{2}$	2	2	$-\frac{\sqrt{10}}{5}I_{21}$

Table B342: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 11 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	1	$-\frac{2\sqrt{15}}{35}iI_{21} - \frac{4\sqrt{10}}{7}iI_{41}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	2	$-\frac{18\sqrt{70}}{245}R_{20} + \frac{2\sqrt{14}}{49}R_{40} + \frac{6\sqrt{35}}{49}R_{42}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	2	3	$\frac{6\sqrt{14}}{49}R_{20} + \frac{4\sqrt{70}}{49}R_{40} + \frac{4\sqrt{7}}{49}R_{42}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{30}}{10}iR_{10} - \frac{9\sqrt{70}}{140}iR_{30} + \frac{\sqrt{21}}{14}iR_{32}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	2	$-\frac{3\sqrt{6}}{10}iR_{10} + \frac{3\sqrt{14}}{140}iR_{30} + \frac{\sqrt{105}}{14}iR_{32}$
$\frac{3}{2}$	2	1	$\frac{5}{2}$	3	3	$\frac{2\sqrt{3}}{5}R_{10} + \frac{3\sqrt{7}}{70}R_{30} + \frac{\sqrt{210}}{70}R_{32}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{2}}{6}R_{32} + \frac{\sqrt{22}}{66}R_{52} + \frac{\sqrt{66}}{11}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{\sqrt{14}}{14}R_{32} + \frac{\sqrt{154}}{22}R_{52} + \frac{\sqrt{462}}{33}R_{54}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	3	$\frac{\sqrt{21}}{21}R_{30} - \frac{\sqrt{70}}{42}R_{32} + \frac{5\sqrt{33}}{33}R_{50} + \frac{\sqrt{770}}{66}R_{52}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	3	4	$\frac{\sqrt{35}}{21}iR_{30} - \frac{\sqrt{42}}{14}iR_{32} - \frac{\sqrt{55}}{33}iR_{50} - \frac{\sqrt{462}}{22}iR_{52}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{3\sqrt{6}}{7}R_{20} - \frac{2\sqrt{30}}{21}R_{40} + \frac{2\sqrt{3}}{7}R_{42}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	2	$\frac{3\sqrt{2}}{7}R_{20} - \frac{4}{7}R_{42}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	3	$\frac{4\sqrt{3}}{7}iI_{21} + \frac{22\sqrt{2}}{21}iI_{41}$
$\frac{3}{2}$	2	1	$\frac{7}{2}$	4	4	$\frac{2\sqrt{105}}{35}iI_{21} - \frac{2\sqrt{70}}{21}iI_{41}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	1	$\frac{4\sqrt{714}}{187}iI_{41} + \frac{36\sqrt{1105}}{2431}iI_{61} - \frac{84\sqrt{442}}{2431}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	2	$-\frac{2\sqrt{105}}{231}R_{40} - \frac{\sqrt{42}}{77}R_{42} - \frac{6\sqrt{1365}}{143}R_{60} - \frac{60\sqrt{13}}{143}R_{62}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{2\sqrt{5}}{11}R_{40} + \frac{5\sqrt{2}}{11}R_{42} + \frac{6\sqrt{65}}{143}R_{60} + \frac{12\sqrt{273}}{143}R_{62}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	4	$\frac{76\sqrt{714}}{1683}iI_{41} + \frac{42\sqrt{1105}}{2431}iI_{61} - \frac{30\sqrt{442}}{2431}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	4	5	$-\frac{20\sqrt{6}}{99}iI_{41} + \frac{6\sqrt{455}}{143}iI_{61} + \frac{6\sqrt{182}}{143}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{30}}{12}iR_{30} - \frac{1}{2}iR_{32} + \frac{5\sqrt{2310}}{528}iR_{50} - \frac{7\sqrt{11}}{44}iR_{52}$ $+ \frac{\sqrt{33}}{88}iR_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	2	$\frac{\sqrt{30}}{12}iR_{30} + \frac{1}{6}iR_{32} + \frac{\sqrt{2310}}{264}iR_{50} + \frac{5\sqrt{11}}{66}iR_{52}$ $- \frac{\sqrt{33}}{132}iR_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{5\sqrt{70}}{84}iR_{30} + \frac{\sqrt{21}}{6}iR_{32} - \frac{\sqrt{110}}{264}iR_{50} - \frac{\sqrt{231}}{66}iR_{52}$ $- \frac{3\sqrt{77}}{44}iR_{54}$

Table B343: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 12 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	4	$\frac{\sqrt{30}}{12}iR_{30} - \frac{1}{2}iR_{32} - \frac{\sqrt{2310}}{528}iR_{50} - \frac{5\sqrt{11}}{44}iR_{52}$ $+ \frac{25\sqrt{33}}{264}iR_{54}$
$\frac{3}{2}$	2	1	$\frac{9}{2}$	5	5	$\frac{\sqrt{105}}{21}R_{30} + \frac{5\sqrt{14}}{21}R_{32} + \frac{\sqrt{165}}{264}R_{50} + \frac{\sqrt{154}}{132}R_{52}$ $+ \frac{\sqrt{462}}{264}R_{54}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	1	$-\frac{\sqrt{30}}{26}R_{54} + \frac{\sqrt{30}}{130}R_{74} + \frac{3\sqrt{195}}{65}R_{76}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	2	$-\frac{7\sqrt{330}}{286}R_{54} + \frac{3\sqrt{330}}{130}R_{74} + \frac{\sqrt{2145}}{65}R_{76}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	3	$-\frac{\sqrt{66}}{143}R_{52} - \frac{9\sqrt{22}}{286}R_{54} + \frac{9}{13}R_{72} + \frac{3\sqrt{22}}{26}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	4	$-\frac{9\sqrt{22}}{143}R_{52} + \frac{17\sqrt{66}}{286}R_{54} + \frac{\sqrt{3}}{13}R_{72} + \frac{3\sqrt{66}}{26}R_{74}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	5	$-\frac{3\sqrt{770}}{286}R_{50} + \frac{\sqrt{33}}{13}R_{52} + \frac{\sqrt{42}}{26}R_{70} + \frac{9\sqrt{2}}{13}R_{72}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	5	6	$\frac{15\sqrt{22}}{286}iR_{50} - \frac{\sqrt{1155}}{143}iR_{52} + \frac{21\sqrt{30}}{130}iR_{70} + \frac{3\sqrt{70}}{65}iR_{72}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{14322}}{2387}R_{40} - \frac{8\sqrt{35805}}{2387}R_{42} + \frac{2\sqrt{186186}}{4433}R_{60} - \frac{20\sqrt{44330}}{4433}R_{62}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	2	$\frac{38\sqrt{62930}}{69223}R_{40} + \frac{716\sqrt{6293}}{69223}R_{42} + \frac{144\sqrt{818090}}{128557}R_{60} + \frac{824\sqrt{70122}}{128557}R_{62}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{50\sqrt{1015}}{2233}R_{40} + \frac{3\sqrt{406}}{203}R_{42} - \frac{12\sqrt{13195}}{4147}R_{60} - \frac{8\sqrt{1131}}{377}R_{62}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	4	$-\frac{8\sqrt{4830}}{253}iI_{41} - \frac{96\sqrt{299}}{3289}iI_{61} + \frac{36\sqrt{2990}}{3289}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	5	$\frac{116\sqrt{782}}{4301}iI_{41} + \frac{8\sqrt{533715}}{55913}iI_{61} - \frac{84\sqrt{213486}}{55913}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{11}{2}$	6	6	$\frac{4\sqrt{1785}}{187}iI_{41} - \frac{3\sqrt{442}}{221}iI_{61} + \frac{6\sqrt{1105}}{2431}iI_{63}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	1	$-\frac{8\sqrt{4290}}{3575}iI_{61} + \frac{8\sqrt{429}}{715}iI_{63} + \frac{4\sqrt{13090}}{425}iI_{81} + \frac{12\sqrt{102}}{85}iI_{83}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	2	$\frac{36\sqrt{715}}{3575}iI_{61} - \frac{28\sqrt{286}}{715}iI_{63} - \frac{116\sqrt{19635}}{4675}iI_{81} - \frac{44\sqrt{17}}{85}iI_{83}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	3	$-\frac{14\sqrt{286}}{715}iI_{61} + \frac{12\sqrt{715}}{715}iI_{63} - \frac{16\sqrt{7854}}{935}iI_{81}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	4	$\frac{8\sqrt{3003}}{975}R_{60} + \frac{224\sqrt{715}}{4875}R_{62} + \frac{32\sqrt{3927}}{4675}R_{80} + \frac{8\sqrt{2805}}{4675}R_{82}$ $-\frac{8\sqrt{102}}{75}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	5	$-\frac{1042\sqrt{651378}}{1163175}R_{60} - \frac{17476\sqrt{155090}}{5815875}R_{62} + \frac{112\sqrt{851802}}{507025}R_{80}$ $+ \frac{128\sqrt{608430}}{507025}R_{82} + \frac{848\sqrt{669273}}{1521075}R_{84}$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	6	$-\frac{44\sqrt{391586741}}{279704815}R_{60} + \frac{38504\sqrt{839114445}}{1398524075}R_{62} - \frac{1204\sqrt{512074969}}{365767835}R_{80}$ $+ \frac{17712\sqrt{365767835}}{365767835}R_{82} + \frac{1662\sqrt{1609378474}}{365767835}R_{84}$

Table B344: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 13 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	1	$\frac{13}{2}$	6	7	$\frac{4\sqrt{2777390}}{18035}R_{60} - \frac{8\sqrt{238062}}{54105}R_{62} + \frac{72\sqrt{613803190}}{2579005}R_{80}$ $+ \frac{592\sqrt{17537234}}{8768617}R_{82} + \frac{72\sqrt{3985735}}{3985735}R_{84}$
$\frac{3}{2}$	2	2	$\frac{3}{2}$	2	2	$R_{00} - \frac{2\sqrt{5}}{5}R_{20}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	2	1	$-\frac{2\sqrt{30}}{35}R_{20} + \frac{2\sqrt{6}}{7}R_{40} - \frac{2\sqrt{15}}{7}R_{42}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	2	2	$\frac{2\sqrt{35}}{245}iI_{21} - \frac{8\sqrt{210}}{49}iI_{41}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	2	3	$-\frac{10\sqrt{7}}{49}iI_{21} + \frac{4\sqrt{42}}{49}iI_{41}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	3	1	$\frac{\sqrt{7}}{7}R_{32}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	3	2	$-\frac{3\sqrt{2}}{5}R_{10} + \frac{3\sqrt{42}}{35}R_{30} - \frac{\sqrt{35}}{35}R_{32}$
$\frac{3}{2}$	2	2	$\frac{5}{2}$	3	3	$\frac{3}{5}iR_{10} + \frac{2\sqrt{21}}{35}iR_{30} + \frac{3\sqrt{70}}{35}iR_{32}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	3	1	$\frac{\sqrt{5}}{12}iR_{30} - \frac{\sqrt{6}}{12}iR_{32} - \frac{\sqrt{385}}{33}iR_{50} + \frac{4\sqrt{66}}{33}iR_{52}$ $-\frac{\sqrt{22}}{11}iR_{54}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	3	2	$-\frac{5\sqrt{35}}{84}iR_{30} - \frac{\sqrt{42}}{28}iR_{32} + \frac{\sqrt{55}}{66}iR_{50} - \frac{\sqrt{154}}{22}iR_{54}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	3	3	$-\frac{3\sqrt{7}}{28}iR_{30} - \frac{\sqrt{210}}{28}iR_{32}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	3	4	$-\frac{\sqrt{105}}{84}R_{30} + \frac{\sqrt{14}}{28}R_{32} - \frac{\sqrt{165}}{66}R_{50} + \frac{\sqrt{462}}{22}R_{54}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{2}}{3}iI_{41}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	4	2	$\frac{6}{7}iI_{21} - \frac{10\sqrt{6}}{21}iI_{41}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	4	3	$-\frac{3\sqrt{6}}{7}R_{20} + \frac{2\sqrt{30}}{21}R_{40} - \frac{2\sqrt{3}}{63}R_{42}$
$\frac{3}{2}$	2	2	$\frac{7}{2}$	4	4	$\frac{3\sqrt{210}}{35}R_{20} + \frac{4\sqrt{105}}{63}R_{42}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	4	1	$\frac{8\sqrt{1190}}{1309}R_{40} - \frac{32\sqrt{119}}{1309}R_{42} + \frac{6\sqrt{15470}}{2431}R_{60} + \frac{164\sqrt{1326}}{2431}R_{62}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	4	2	$\frac{4\sqrt{7}}{33}iI_{41} + \frac{3\sqrt{390}}{143}iI_{61} - \frac{18\sqrt{39}}{143}iI_{63}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	4	3	$\frac{20\sqrt{3}}{33}iI_{41} - \frac{3\sqrt{910}}{143}iI_{61} + \frac{18\sqrt{91}}{143}iI_{63}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	4	4	$-\frac{86\sqrt{1190}}{11781}R_{40} - \frac{370\sqrt{119}}{11781}R_{42} + \frac{24\sqrt{15470}}{2431}R_{60} + \frac{112\sqrt{1326}}{2431}R_{62}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	4	5	$-\frac{8\sqrt{10}}{99}R_{40} - \frac{16}{99}R_{42} - \frac{12\sqrt{130}}{143}R_{60} - \frac{8\sqrt{546}}{143}R_{62}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	5	1	$\frac{\sqrt{11}}{11}R_{54}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	5	2	$\frac{\sqrt{3}}{3}R_{32} + \frac{2\sqrt{33}}{33}R_{52} + \frac{2\sqrt{11}}{11}R_{54}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	5	3	$-\frac{\sqrt{210}}{21}R_{30} + \frac{\sqrt{7}}{7}R_{32} + \frac{\sqrt{330}}{33}R_{50}$

Table B345: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 14 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	5	4	$-\frac{2\sqrt{3}}{3}R_{32} + \frac{2\sqrt{33}}{33}R_{52} - \frac{\sqrt{11}}{11}R_{54}$
$\frac{3}{2}$	2	2	$\frac{9}{2}$	5	5	$-\frac{2\sqrt{35}}{21}iR_{30} + \frac{\sqrt{42}}{21}iR_{32} - \frac{\sqrt{55}}{33}iR_{50} - \frac{\sqrt{462}}{33}iR_{52}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	1	$-\frac{15\sqrt{7}}{208}iR_{50} + \frac{5\sqrt{30}}{104}iR_{52} - \frac{5\sqrt{10}}{208}iR_{54} + \frac{9\sqrt{1155}}{520}iR_{70}$ $-\frac{69\sqrt{55}}{520}iR_{72} + \frac{87\sqrt{10}}{520}iR_{74} - \frac{9\sqrt{65}}{520}iR_{76}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	2	$\frac{75\sqrt{77}}{2288}iR_{50} - \frac{\sqrt{330}}{1144}iR_{52} - \frac{71\sqrt{110}}{2288}iR_{54} - \frac{3\sqrt{105}}{260}iR_{70}$ $+\frac{3\sqrt{5}}{260}iR_{72} + \frac{9\sqrt{110}}{260}iR_{74} - \frac{3\sqrt{715}}{260}iR_{76}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	3	$\frac{19\sqrt{1155}}{2288}iR_{50} + \frac{105\sqrt{22}}{1144}iR_{52} + \frac{21\sqrt{66}}{2288}iR_{54} - \frac{3\sqrt{7}}{104}iR_{70}$ $-\frac{3\sqrt{3}}{104}iR_{72} + \frac{3\sqrt{66}}{104}iR_{74} + \frac{3\sqrt{429}}{104}iR_{76}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	4	$\frac{3\sqrt{385}}{2288}iR_{50} - \frac{21\sqrt{66}}{1144}iR_{52} + \frac{69\sqrt{22}}{2288}iR_{54} + \frac{3\sqrt{21}}{52}iR_{70}$ $-\frac{3}{52}iR_{72} - \frac{9\sqrt{22}}{52}iR_{74} + \frac{3\sqrt{143}}{52}iR_{76}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	5	$\frac{7\sqrt{2310}}{2288}iR_{50} + \frac{25\sqrt{11}}{572}iR_{52} - \frac{47\sqrt{33}}{1144}iR_{54} + \frac{3\sqrt{14}}{104}iR_{70}$ $+\frac{3\sqrt{6}}{104}iR_{72} - \frac{3\sqrt{33}}{52}iR_{74} - \frac{3\sqrt{858}}{104}iR_{76}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	5	6	$-\frac{5\sqrt{66}}{176}R_{50} - \frac{\sqrt{385}}{44}R_{52} - \frac{\sqrt{1155}}{88}R_{54}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{8\sqrt{13299}}{4433}iI_{61} - \frac{4\sqrt{132990}}{4433}iI_{63}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{37758}}{319}iI_{41} + \frac{328\sqrt{58435}}{128557}iI_{61} - \frac{324\sqrt{23374}}{128557}iI_{63}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	3	$\frac{20\sqrt{609}}{319}iI_{41} + \frac{25\sqrt{3770}}{4147}iI_{61} + \frac{114\sqrt{377}}{4147}iI_{63}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	4	$\frac{30\sqrt{322}}{1771}R_{40} - \frac{24\sqrt{805}}{1771}R_{42} - \frac{38\sqrt{4186}}{3289}R_{60} - \frac{212\sqrt{8970}}{49335}R_{62}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	5	$-\frac{14\sqrt{11730}}{4301}R_{40} + \frac{148\sqrt{1173}}{4301}R_{42} - \frac{112\sqrt{152490}}{55913}R_{60} - \frac{24\sqrt{71162}}{4301}R_{62}$
$\frac{3}{2}$	2	2	$\frac{11}{2}$	6	6	$\frac{90\sqrt{119}}{1309}R_{40} - \frac{15\sqrt{1190}}{1309}R_{42} - \frac{4\sqrt{1547}}{2431}R_{60} + \frac{296\sqrt{3315}}{36465}R_{62}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	1	$\frac{16\sqrt{143}}{325}R_{62} + \frac{16\sqrt{19635}}{4675}R_{80} - \frac{8\sqrt{561}}{187}R_{82} + \frac{16\sqrt{510}}{425}R_{84}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	2	$-\frac{2\sqrt{10010}}{715}R_{60} - \frac{196\sqrt{858}}{10725}R_{62} + \frac{24\sqrt{13090}}{4675}R_{80} - \frac{72\sqrt{85}}{425}R_{84}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{4\sqrt{1001}}{143}R_{60} + \frac{72\sqrt{2145}}{3575}R_{62} - \frac{4\sqrt{1309}}{935}R_{80} + \frac{6\sqrt{34}}{85}R_{84}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	4	$\frac{24\sqrt{858}}{3575}iI_{61} - \frac{24\sqrt{2145}}{3575}iI_{63} + \frac{28\sqrt{2618}}{425}iI_{81} + \frac{4\sqrt{510}}{25}iI_{83}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	5	$-\frac{132\sqrt{46527}}{387725}iI_{61} + \frac{116\sqrt{465270}}{387725}iI_{63} - \frac{4444\sqrt{141967}}{507025}iI_{81}$ $-\frac{524\sqrt{3346365}}{507025}iI_{83}$

Table B346: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 15 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	6	$-\frac{3466\sqrt{111881926}}{279704815}iI_{61} - \frac{7212\sqrt{279704815}}{279704815}iI_{63} + \frac{2196\sqrt{3072449814}}{365767835}iI_{81}$ $+ \frac{444\sqrt{8046892370}}{73153567}iI_{83}$
$\frac{3}{2}$	2	2	$\frac{13}{2}$	6	7	$-\frac{282\sqrt{198385}}{198385}iI_{61} - \frac{2\sqrt{79354}}{39677}iI_{63} + \frac{56\sqrt{920704785}}{3985735}iI_{81}$ $-\frac{8\sqrt{797147}}{797147}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	1	$R_{00} - \frac{16\sqrt{5}}{35}R_{20} + \frac{2}{7}R_{40} - \frac{\sqrt{10}}{7}R_{42}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	2	$-\frac{2\sqrt{210}}{35}iI_{21}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	2	3	$-\frac{4\sqrt{7}}{7}iI_{41}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	1	$-\frac{\sqrt{15}}{14}R_{10} + \frac{\sqrt{35}}{21}R_{30} - \frac{\sqrt{42}}{21}R_{32} - \frac{5\sqrt{55}}{462}R_{50}$ $+ \frac{5\sqrt{462}}{462}R_{52} - \frac{5\sqrt{154}}{154}R_{54}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	2	$\frac{3\sqrt{3}}{70}R_{10} + \frac{\sqrt{7}}{15}R_{30} + \frac{\sqrt{210}}{105}R_{32} - \frac{25\sqrt{11}}{462}R_{50}$ $+ \frac{5\sqrt{2310}}{462}R_{52} - \frac{5\sqrt{770}}{154}R_{54}$
$\frac{5}{2}$	2	1	$\frac{5}{2}$	3	3	$\frac{\sqrt{6}}{70}iR_{10} + \frac{4\sqrt{14}}{105}iR_{30} + \frac{4\sqrt{105}}{105}iR_{32} + \frac{25\sqrt{22}}{231}iR_{50}$ $-\frac{5\sqrt{1155}}{231}iR_{52}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	1	$-\frac{3\sqrt{70}}{28}iR_{10} - \frac{2}{3}iR_{32} - \frac{\sqrt{2310}}{616}iR_{50} + \frac{2\sqrt{11}}{33}iR_{52}$ $-\frac{7\sqrt{33}}{132}iR_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	2	$-\frac{3\sqrt{10}}{28}iR_{10} + \frac{\sqrt{210}}{42}iR_{30} - \frac{\sqrt{7}}{21}iR_{32} - \frac{31\sqrt{330}}{1848}iR_{50}$ $+ \frac{10\sqrt{77}}{231}iR_{52} + \frac{13\sqrt{231}}{924}iR_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	3	$\frac{3\sqrt{2}}{28}iR_{10} - \frac{\sqrt{42}}{21}iR_{30} - \frac{25\sqrt{66}}{1848}iR_{50} + \frac{5\sqrt{1155}}{308}iR_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	3	4	$\frac{\sqrt{30}}{28}R_{10} - \frac{\sqrt{70}}{14}R_{30} - \frac{\sqrt{21}}{7}R_{32} + \frac{\sqrt{110}}{616}R_{50}$ $-\frac{3\sqrt{77}}{308}R_{54}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	1	$-\frac{5\sqrt{2}}{21}iI_{21} + \frac{52\sqrt{3}}{77}iI_{41} - \frac{5\sqrt{910}}{429}iI_{61} + \frac{10\sqrt{91}}{143}iI_{63}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	2	$-\frac{\sqrt{6}}{21}iI_{21} + \frac{20}{77}iI_{41} + \frac{5\sqrt{2730}}{429}iI_{61} - \frac{10\sqrt{273}}{143}iI_{63}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	3	$-\frac{2}{21}R_{20} + \frac{12\sqrt{5}}{77}R_{40} - \frac{2\sqrt{2}}{77}R_{42} + \frac{20\sqrt{65}}{143}R_{60}$ $+ \frac{200\sqrt{273}}{1287}R_{62}$
$\frac{5}{2}$	2	1	$\frac{7}{2}$	4	4	$\frac{2\sqrt{35}}{105}R_{20} + \frac{4\sqrt{70}}{77}R_{42} - \frac{160\sqrt{195}}{1287}R_{62}$

Table B347: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 16 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	1	$-\frac{10\sqrt{357}}{119}R_{20} + \frac{8\sqrt{1785}}{1309}R_{40} - \frac{36\sqrt{714}}{1309}R_{42} + \frac{6\sqrt{23205}}{2431}R_{60}$ $+ \frac{172\sqrt{221}}{2431}R_{62}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	2	$\frac{5\sqrt{7}}{21}iI_{21} - \frac{12\sqrt{42}}{77}iI_{41} + \frac{17\sqrt{65}}{429}iI_{61} - \frac{17\sqrt{26}}{143}iI_{63}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	3	$-\frac{5\sqrt{3}}{21}iI_{21} - \frac{20\sqrt{2}}{77}iI_{41} + \frac{\sqrt{1365}}{429}iI_{61} - \frac{\sqrt{546}}{143}iI_{63}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	4	$-\frac{20\sqrt{357}}{1071}R_{20} + \frac{4\sqrt{1785}}{561}R_{40} + \frac{10\sqrt{714}}{3927}R_{42} - \frac{124\sqrt{23205}}{21879}R_{60}$ $- \frac{1016\sqrt{221}}{21879}R_{62}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	4	5	$\frac{10\sqrt{3}}{63}R_{20} - \frac{32\sqrt{15}}{231}R_{40} - \frac{32\sqrt{6}}{231}R_{42} - \frac{28\sqrt{195}}{1287}R_{60}$ $- \frac{56\sqrt{91}}{1287}R_{62}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	1	$-\frac{5\sqrt{2}}{22}R_{32} + \frac{5\sqrt{22}}{143}R_{52} - \frac{6\sqrt{66}}{143}R_{54} - \frac{5\sqrt{3}}{286}R_{72}$ $+ \frac{5\sqrt{66}}{286}R_{74} - \frac{5\sqrt{429}}{286}R_{76}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	2	$-\frac{5\sqrt{15}}{66}R_{30} - \frac{7\sqrt{2}}{66}R_{32} + \frac{5\sqrt{1155}}{429}R_{50} - \frac{\sqrt{22}}{39}R_{52}$ $- \frac{\sqrt{66}}{39}R_{54} - \frac{15\sqrt{7}}{286}R_{70} + \frac{30\sqrt{3}}{143}R_{72} - \frac{15\sqrt{66}}{286}R_{74}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	3	$\frac{3\sqrt{35}}{154}R_{30} + \frac{13\sqrt{42}}{462}R_{32} + \frac{3\sqrt{55}}{143}R_{50} + \frac{5\sqrt{462}}{429}R_{52}$ $+ \frac{5\sqrt{154}}{143}R_{54} - \frac{35\sqrt{3}}{286}R_{70} + \frac{30\sqrt{7}}{143}R_{72} - \frac{15\sqrt{154}}{286}R_{74}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	4	$-\frac{\sqrt{2}}{66}R_{32} + \frac{19\sqrt{22}}{429}R_{52} - \frac{2\sqrt{66}}{429}R_{54} - \frac{15\sqrt{3}}{286}R_{72}$ $+ \frac{15\sqrt{66}}{286}R_{74} - \frac{15\sqrt{429}}{286}R_{76}$
$\frac{5}{2}$	2	1	$\frac{9}{2}$	5	5	$-\frac{\sqrt{210}}{231}iR_{30} + \frac{\sqrt{7}}{77}iR_{32} - \frac{4\sqrt{330}}{429}iR_{50} - \frac{8\sqrt{77}}{143}iR_{52}$ $- \frac{105\sqrt{2}}{286}iR_{70} + \frac{15\sqrt{42}}{143}iR_{72}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	1	$\frac{25\sqrt{66}}{264}iR_{30} - \frac{5\sqrt{55}}{44}iR_{32} - \frac{5\sqrt{42}}{312}iR_{50} + \frac{5\sqrt{5}}{26}iR_{52}$ $- \frac{5\sqrt{15}}{52}iR_{54} + \frac{69\sqrt{770}}{22880}iR_{70} - \frac{243\sqrt{330}}{22880}iR_{72} + \frac{59\sqrt{15}}{1040}iR_{74}$ $- \frac{\sqrt{390}}{160}iR_{76}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	2	$\frac{25\sqrt{6}}{264}iR_{30} - \frac{5\sqrt{5}}{44}iR_{32} - \frac{25\sqrt{462}}{1716}iR_{50} + \frac{4\sqrt{55}}{143}iR_{52}$ $+ \frac{3\sqrt{165}}{286}iR_{54} + \frac{729\sqrt{70}}{22880}iR_{70} - \frac{1343\sqrt{30}}{22880}iR_{72} - \frac{89\sqrt{165}}{11440}iR_{74}$ $+ \frac{63\sqrt{4290}}{22880}iR_{76}$

Table B348: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 17 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	3	$\frac{5\sqrt{10}}{264}iR_{30} + \frac{35\sqrt{3}}{132}iR_{32} - \frac{\sqrt{770}}{3432}iR_{50} - \frac{35\sqrt{33}}{858}iR_{52}$ $+ \frac{27\sqrt{11}}{572}iR_{54} + \frac{119\sqrt{42}}{4576}iR_{70} - \frac{3\sqrt{2}}{4576}iR_{72} - \frac{357\sqrt{11}}{2288}iR_{74}$ $+ \frac{3\sqrt{286}}{4576}iR_{76}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	4	$\frac{5\sqrt{30}}{264}iR_{30} + \frac{35}{44}iR_{32} + \frac{\sqrt{2310}}{132}iR_{50} + \frac{14\sqrt{11}}{143}iR_{52}$ $+ \frac{\sqrt{33}}{22}iR_{54} - \frac{3\sqrt{14}}{352}iR_{70} - \frac{47\sqrt{6}}{4576}iR_{72} + \frac{3\sqrt{33}}{176}iR_{74}$ $+ \frac{47\sqrt{858}}{4576}iR_{76}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	5	$-\frac{5\sqrt{5}}{132}iR_{30} - \frac{5\sqrt{6}}{44}iR_{32} + \frac{37\sqrt{385}}{1716}iR_{50} + \frac{25\sqrt{66}}{286}iR_{52}$ $+ \frac{41\sqrt{22}}{572}iR_{54} - \frac{9\sqrt{21}}{2288}iR_{70} - \frac{27}{2288}iR_{72} + \frac{27\sqrt{22}}{2288}iR_{74}$ $+ \frac{27\sqrt{143}}{2288}iR_{76}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	5	6	$\frac{25\sqrt{7}}{924}R_{30} + \frac{5\sqrt{210}}{308}R_{32} - \frac{35\sqrt{11}}{429}R_{50} - \frac{\sqrt{2310}}{143}R_{52}$ $+ \frac{\sqrt{770}}{143}R_{54} - \frac{35\sqrt{15}}{2288}R_{70} - \frac{15\sqrt{35}}{2288}R_{72} + \frac{15\sqrt{770}}{2288}R_{74}$ $+ \frac{15\sqrt{5005}}{2288}R_{76}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	1	$\frac{20\sqrt{35805}}{4433}iI_{41} - \frac{12\sqrt{8866}}{4433}iI_{61} + \frac{16\sqrt{22165}}{4433}iI_{63} - \frac{18\sqrt{243474}}{6851}iI_{81}$ $- \frac{122\sqrt{5270}}{6851}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{6293}}{4433}iI_{41} + \frac{84\sqrt{350610}}{128557}iI_{61} - \frac{64\sqrt{35061}}{128557}iI_{63} + \frac{750\sqrt{1069810}}{198679}iI_{81}$ $+ \frac{670\sqrt{1008678}}{198679}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	3	$\frac{2\sqrt{5655}}{377}iI_{61} + \frac{2\sqrt{2262}}{377}iI_{63} - \frac{48\sqrt{17255}}{6409}iI_{81} - \frac{80\sqrt{16269}}{6409}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	4	$-\frac{160\sqrt{483}}{23023}R_{40} - \frac{76\sqrt{4830}}{23023}R_{42} + \frac{28\sqrt{6279}}{3289}R_{60} + \frac{392\sqrt{1495}}{16445}R_{62}$ $- \frac{16\sqrt{8211}}{5083}R_{80} - \frac{8\sqrt{5865}}{5083}R_{82} + \frac{32\sqrt{25806}}{5083}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	5	$-\frac{236\sqrt{1955}}{55913}R_{40} + \frac{2\sqrt{782}}{4301}R_{42} + \frac{112\sqrt{25415}}{55913}R_{60} - \frac{48\sqrt{106743}}{55913}R_{62}$ $+ \frac{28\sqrt{115}}{5083}R_{80} + \frac{240\sqrt{161}}{5083}R_{82} - \frac{54\sqrt{17710}}{5083}R_{84}$
$\frac{5}{2}$	2	1	$\frac{11}{2}$	6	6	$\frac{10\sqrt{714}}{17017}R_{40} - \frac{50\sqrt{1785}}{17017}R_{42} + \frac{12\sqrt{9282}}{2431}R_{60} + \frac{232\sqrt{2210}}{12155}R_{62}$ $+ \frac{20\sqrt{42}}{221}R_{80} - \frac{32\sqrt{30}}{221}R_{82} + \frac{4\sqrt{33}}{221}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	1	$\frac{30\sqrt{770}}{1001}R_{40} - \frac{120\sqrt{77}}{1001}R_{42} + \frac{4\sqrt{10010}}{715}R_{60} + \frac{584\sqrt{858}}{10725}R_{62}$ $+ \frac{12\sqrt{13090}}{60775}R_{80} - \frac{28\sqrt{374}}{2431}R_{82} + \frac{244\sqrt{85}}{5525}R_{84}$

Table B349: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 18 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	2	$-\frac{20\sqrt{1155}}{11011}R_{40} + \frac{30\sqrt{462}}{847}R_{42} + \frac{12\sqrt{15015}}{7865}R_{60} - \frac{72\sqrt{143}}{3025}R_{62}$ $+ \frac{12\sqrt{19635}}{60775}R_{80} + \frac{8\sqrt{561}}{2431}R_{82} - \frac{58\sqrt{510}}{5525}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	3	$\frac{100\sqrt{462}}{11011}R_{40} - \frac{10\sqrt{1155}}{11011}R_{42} - \frac{12\sqrt{6006}}{1573}R_{60} - \frac{472\sqrt{1430}}{39325}R_{62}$ $+ \frac{54\sqrt{7854}}{12155}R_{80} - \frac{8\sqrt{5610}}{2431}R_{82} - \frac{82\sqrt{51}}{1105}R_{84}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	4	$-\frac{8\sqrt{2310}}{143}iI_{41} + \frac{32\sqrt{143}}{3575}iI_{61} - \frac{56\sqrt{1430}}{3575}iI_{63} + \frac{352\sqrt{3927}}{16575}iI_{81}$ $+ \frac{672\sqrt{85}}{5525}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	5	$\frac{284\sqrt{125265}}{170599}iI_{41} - \frac{17968\sqrt{31018}}{4264975}iI_{61} - \frac{3712\sqrt{77545}}{4264975}iI_{63}$ $+ \frac{20602\sqrt{851802}}{19773975}iI_{81} + \frac{1602\sqrt{2230910}}{6591325}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	6	$\frac{560\sqrt{301220570}}{47334661}iI_{41} - \frac{129676\sqrt{167822889}}{3076752965}iI_{61} + \frac{14604\sqrt{1678228890}}{3076752965}iI_{63}$ $- \frac{272856\sqrt{512074969}}{4754981855}iI_{81} - \frac{8664\sqrt{12070338555}}{950996371}iI_{83}$
$\frac{5}{2}$	2	1	$\frac{13}{2}$	6	7	$-\frac{60\sqrt{3610607}}{515801}iI_{41} - \frac{16\sqrt{1190310}}{198385}iI_{61} - \frac{32\sqrt{119031}}{39677}iI_{63}$ $- \frac{116\sqrt{613803190}}{3985735}iI_{81} + \frac{36\sqrt{4782882}}{797147}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	2	2	$R_{00} + \frac{32\sqrt{5}}{245}R_{20} - \frac{26}{49}R_{40} + \frac{\sqrt{10}}{49}R_{42}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	2	3	$\frac{36}{49}R_{20} + \frac{4\sqrt{5}}{49}R_{40} - \frac{18\sqrt{2}}{49}R_{42}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	1	$-\frac{\sqrt{105}}{70}iR_{10} - \frac{13\sqrt{5}}{105}iR_{30} - \frac{\sqrt{6}}{7}iR_{32} + \frac{5\sqrt{385}}{924}iR_{50}$ $- \frac{5\sqrt{66}}{77}iR_{52} + \frac{5\sqrt{22}}{308}iR_{54}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	2	$\frac{9\sqrt{21}}{490}iR_{10} + \frac{41}{105}iR_{30} - \frac{\sqrt{30}}{21}iR_{32} - \frac{325\sqrt{77}}{6468}iR_{50}$ $- \frac{5\sqrt{330}}{231}iR_{52} + \frac{25\sqrt{110}}{308}iR_{54}$
$\frac{5}{2}$	2	2	$\frac{5}{2}$	3	3	$-\frac{11\sqrt{42}}{490}R_{10} - \frac{4\sqrt{2}}{105}R_{30} + \frac{4\sqrt{15}}{105}R_{32} + \frac{125\sqrt{154}}{6468}R_{50}$ $+ \frac{10\sqrt{165}}{231}R_{52} + \frac{15\sqrt{55}}{154}R_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	1	$\frac{\sqrt{7}}{3}R_{32} - \frac{\sqrt{77}}{33}R_{52} - \frac{2\sqrt{231}}{231}R_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	2	$-\frac{3\sqrt{70}}{98}R_{10} + \frac{\sqrt{30}}{21}R_{30} + \frac{1}{21}R_{32} - \frac{5\sqrt{2310}}{3234}R_{50}$ $+ \frac{8\sqrt{11}}{231}R_{52} + \frac{\sqrt{33}}{33}R_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	3	$\frac{3\sqrt{14}}{49}R_{10} + \frac{\sqrt{6}}{21}R_{30} - \frac{5\sqrt{5}}{21}R_{32} + \frac{5\sqrt{462}}{1617}R_{50}$ $- \frac{19\sqrt{55}}{231}R_{52}$

Table B350: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 19 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	3	4	$-\frac{\sqrt{210}}{14}iR_{10} + \frac{\sqrt{3}}{21}iR_{32} + \frac{3\sqrt{770}}{154}iR_{50} + \frac{2\sqrt{33}}{231}iR_{52}$ $+ \frac{5\sqrt{11}}{77}iR_{54}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	1	$-\frac{2\sqrt{21}}{21}R_{20} - \frac{4\sqrt{105}}{539}R_{40} - \frac{34\sqrt{42}}{539}R_{42} - \frac{20\sqrt{1365}}{3003}R_{60}$ $- \frac{40\sqrt{13}}{143}R_{62}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	2	$-\frac{2\sqrt{7}}{49}R_{20} - \frac{40\sqrt{35}}{539}R_{40} + \frac{48\sqrt{14}}{539}R_{42} + \frac{80\sqrt{455}}{1001}R_{60}$ $+ \frac{160\sqrt{39}}{429}R_{62}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	3	$-\frac{\sqrt{42}}{63}iI_{21} - \frac{4\sqrt{7}}{11}iI_{41} + \frac{5\sqrt{390}}{1287}iI_{61} + \frac{70\sqrt{39}}{429}iI_{63}$
$\frac{5}{2}$	2	2	$\frac{7}{2}$	4	4	$-\frac{11\sqrt{30}}{315}iI_{21} - \frac{4\sqrt{5}}{77}iI_{41} + \frac{25\sqrt{546}}{693}iI_{61} - \frac{50\sqrt{1365}}{3003}iI_{63}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	1	$-\frac{56\sqrt{51}}{187}iI_{41} - \frac{12\sqrt{15470}}{17017}iI_{61} - \frac{24\sqrt{1547}}{17017}iI_{63}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{6}}{21}R_{20} - \frac{2\sqrt{30}}{77}R_{40} + \frac{34\sqrt{3}}{77}R_{42} + \frac{\sqrt{390}}{429}R_{60}$ $+ \frac{30\sqrt{182}}{1001}R_{62}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	3	$\frac{15\sqrt{14}}{49}R_{20} - \frac{2\sqrt{70}}{539}R_{40} - \frac{30\sqrt{7}}{539}R_{42} - \frac{\sqrt{910}}{143}R_{60}$ $+ \frac{38\sqrt{78}}{429}R_{62}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	4	$-\frac{5\sqrt{34}}{63}iI_{21} + \frac{464\sqrt{51}}{3927}iI_{41} + \frac{23\sqrt{15470}}{11781}iI_{61} - \frac{10\sqrt{1547}}{1309}iI_{63}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	4	5	$\frac{110\sqrt{14}}{441}iI_{21} + \frac{200\sqrt{21}}{1617}iI_{41} - \frac{58\sqrt{130}}{1287}iI_{61} - \frac{4\sqrt{13}}{143}iI_{63}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	1	$\frac{\sqrt{105}}{44}iR_{30} - \frac{3\sqrt{14}}{44}iR_{32} + \frac{5\sqrt{165}}{286}iR_{50} + \frac{3\sqrt{154}}{1001}iR_{52}$ $-\frac{29\sqrt{462}}{2002}iR_{54} - \frac{375}{2288}iR_{70} + \frac{1445\sqrt{21}}{16016}iR_{72} - \frac{185\sqrt{462}}{16016}iR_{74}$ $-\frac{5\sqrt{3003}}{16016}iR_{76}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{105}}{231}iR_{30} - \frac{\sqrt{14}}{21}iR_{32} + \frac{7\sqrt{165}}{858}iR_{50} + \frac{100\sqrt{154}}{3003}iR_{52}$ $+ \frac{31\sqrt{462}}{2002}iR_{54} + \frac{75}{1144}iR_{70} + \frac{45\sqrt{21}}{728}iR_{72} + \frac{15\sqrt{462}}{728}iR_{74}$ $-\frac{15\sqrt{3003}}{8008}iR_{76}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	3	$-\frac{5\sqrt{5}}{77}iR_{30} + \frac{\sqrt{6}}{77}iR_{32} - \frac{19\sqrt{385}}{2002}iR_{50} - \frac{4\sqrt{66}}{143}iR_{52}$ $+ \frac{9\sqrt{22}}{286}iR_{54} + \frac{85\sqrt{21}}{1144}iR_{70} + \frac{555}{1144}iR_{72} - \frac{15\sqrt{22}}{1144}iR_{74}$ $-\frac{75\sqrt{143}}{1144}iR_{76}$

Table B351: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 20 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	4	$-\frac{3\sqrt{105}}{308}iR_{30} - \frac{13\sqrt{14}}{924}iR_{32} - \frac{7\sqrt{165}}{286}iR_{50} + \frac{95\sqrt{154}}{3003}iR_{52}$ $-\frac{25\sqrt{462}}{2002}iR_{54} + \frac{915}{2288}iR_{70} + \frac{375\sqrt{21}}{16016}iR_{72} - \frac{675\sqrt{462}}{16016}iR_{74}$ $+ \frac{15\sqrt{3003}}{2288}iR_{76}$
$\frac{5}{2}$	2	2	$\frac{9}{2}$	5	5	$-\frac{23\sqrt{30}}{924}R_{30} - \frac{95}{462}R_{32} - \frac{2\sqrt{2310}}{3003}R_{50} + \frac{2\sqrt{11}}{429}R_{52}$ $+ \frac{16\sqrt{33}}{429}R_{54} + \frac{135\sqrt{14}}{2288}R_{70} + \frac{435\sqrt{6}}{2288}R_{72} + \frac{105\sqrt{33}}{1144}R_{74}$ $+ \frac{45\sqrt{858}}{2288}R_{76}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	1	$\frac{\sqrt{105}}{13}R_{54} - \frac{\sqrt{105}}{65}R_{74} - \frac{\sqrt{2730}}{455}R_{76}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{35}}{77}R_{32} + \frac{10\sqrt{385}}{1001}R_{52} - \frac{\sqrt{1155}}{1001}R_{54} - \frac{5\sqrt{210}}{2002}R_{72}$ $+ \frac{2\sqrt{1155}}{715}R_{74} + \frac{3\sqrt{30030}}{1430}R_{76}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	3	$-\frac{5\sqrt{70}}{231}R_{30} + \frac{10\sqrt{21}}{231}R_{32} + \frac{10\sqrt{110}}{429}R_{50} + \frac{2\sqrt{231}}{273}R_{52}$ $-\frac{\sqrt{77}}{13}R_{54} - \frac{5\sqrt{6}}{143}R_{70} + \frac{27\sqrt{14}}{1001}R_{72} - \frac{3\sqrt{77}}{143}R_{74}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	4	$\frac{5\sqrt{7}}{11}R_{32} + \frac{8\sqrt{77}}{143}R_{52} - \frac{9\sqrt{231}}{1001}R_{54} - \frac{17\sqrt{42}}{286}R_{72}$ $-\frac{6\sqrt{231}}{1001}R_{74} - \frac{5\sqrt{6006}}{2002}R_{76}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	5	$\frac{5\sqrt{35}}{33}R_{30} + \frac{5\sqrt{42}}{231}R_{32} - \frac{7\sqrt{55}}{429}R_{50} - \frac{\sqrt{462}}{3003}R_{52}$ $+ \frac{10\sqrt{154}}{1001}R_{54} - \frac{42\sqrt{3}}{143}R_{70} - \frac{6\sqrt{7}}{1001}R_{72} - \frac{15\sqrt{154}}{1001}R_{74}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	5	6	$\frac{50}{231}iR_{30} + \frac{5\sqrt{30}}{77}iR_{32} + \frac{5\sqrt{77}}{429}iR_{50} - \frac{3\sqrt{330}}{143}iR_{52}$ $+ \frac{4\sqrt{105}}{715}iR_{70} - \frac{192\sqrt{5}}{715}iR_{72}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	1	$\frac{40\sqrt{1023}}{4433}R_{40} - \frac{16\sqrt{10230}}{4433}R_{42} + \frac{28\sqrt{13299}}{4433}R_{60} + \frac{72\sqrt{155155}}{31031}R_{62}$ $-\frac{8\sqrt{17391}}{6851}R_{80} + \frac{24\sqrt{608685}}{47957}R_{82} - \frac{100\sqrt{22134}}{47957}R_{84}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	2	$-\frac{796\sqrt{4495}}{899899}R_{40} - \frac{1446\sqrt{1798}}{899899}R_{42} - \frac{216\sqrt{58435}}{128557}R_{60}$ $-\frac{2272\sqrt{245427}}{899899}R_{62} - \frac{12\sqrt{76415}}{11687}R_{80} + \frac{1200\sqrt{106981}}{1390753}R_{82}$ $+ \frac{6\sqrt{11767910}}{15283}R_{84}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	3	$-\frac{310\sqrt{290}}{29029}R_{40} - \frac{706\sqrt{29}}{29029}R_{42} - \frac{20\sqrt{3770}}{4147}R_{60} + \frac{8\sqrt{15834}}{4147}R_{62}$ $+ \frac{4\sqrt{4930}}{493}R_{80} + \frac{240\sqrt{6902}}{44863}R_{82} - \frac{60\sqrt{189805}}{44863}R_{84}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	4	$-\frac{84\sqrt{345}}{3289}iI_{41} - \frac{12\sqrt{4186}}{23023}iI_{61} - \frac{128\sqrt{10465}}{23023}iI_{63} - \frac{198\sqrt{2346}}{5083}iI_{81}$ $-\frac{106\sqrt{301070}}{35581}iI_{83}$

Table B352: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 21 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	5	$-\frac{852\sqrt{2737}}{391391}iI_{41} - \frac{4\sqrt{152490}}{3289}iI_{61} + \frac{16\sqrt{15249}}{5083}iI_{63} + \frac{498\sqrt{1610}}{5083}iI_{81}$ $+ \frac{370\sqrt{1518}}{5083}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{11}{2}$	6	6	$-\frac{4\sqrt{510}}{221}iI_{41} - \frac{6\sqrt{1547}}{1001}iI_{61} + \frac{18\sqrt{15470}}{17017}iI_{63} + \frac{152\sqrt{3}}{221}iI_{81}$ $- \frac{24\sqrt{385}}{1547}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	1	$\frac{16\sqrt{15015}}{3575}iI_{61} - \frac{8\sqrt{6006}}{715}iI_{63} + \frac{72\sqrt{935}}{5525}iI_{81} + \frac{8\sqrt{357}}{1105}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	2	$-\frac{700\sqrt{33}}{1573}iI_{41} - \frac{72\sqrt{10010}}{275275}iI_{61} + \frac{912\sqrt{1001}}{55055}iI_{63} + \frac{106\sqrt{5610}}{60775}iI_{81}$ $- \frac{186\sqrt{238}}{7735}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	3	$\frac{40\sqrt{330}}{1573}iI_{41} - \frac{164\sqrt{1001}}{55055}iI_{61} + \frac{276\sqrt{10010}}{55055}iI_{63} + \frac{16\sqrt{561}}{715}iI_{81}$ $+ \frac{48\sqrt{595}}{1547}iI_{83}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	4	$\frac{10\sqrt{66}}{143}R_{40} - \frac{8\sqrt{165}}{143}R_{42} - \frac{476\sqrt{858}}{10725}R_{60} - \frac{8408\sqrt{10010}}{375375}R_{62}$ $- \frac{212\sqrt{1122}}{60775}R_{80} + \frac{556\sqrt{39270}}{1276275}R_{82} - \frac{236\sqrt{357}}{38675}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	5	$\frac{6140\sqrt{3579}}{1194193}R_{40} + \frac{4894\sqrt{35790}}{1194193}R_{42} - \frac{25252\sqrt{46527}}{12794925}R_{60}$ $- \frac{195016\sqrt{542815}}{447822375}R_{62} - \frac{4484\sqrt{60843}}{6591325}R_{80} - \frac{37208\sqrt{2129505}}{138417825}R_{82}$ $+ \frac{198\sqrt{9369822}}{3549175}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	6	$\frac{685000\sqrt{8606302}}{4307454151}R_{40} - \frac{45330\sqrt{21515755}}{4307454151}R_{42} + \frac{143268\sqrt{111881926}}{3076752965}R_{60}$ $+ \frac{883832\sqrt{11747602230}}{107686353775}R_{62} - \frac{11682\sqrt{146307134}}{365767835}R_{80} + \frac{117168\sqrt{5120749690}}{33284872985}R_{82}$ $- \frac{17502\sqrt{5632824659}}{4754981855}R_{84}$
$\frac{5}{2}$	2	2	$\frac{13}{2}$	6	7	$\frac{60\sqrt{2579005}}{3610607}R_{40} + \frac{930\sqrt{1031602}}{3610607}R_{42} + \frac{184\sqrt{198385}}{198385}R_{60}$ $+ \frac{592\sqrt{833217}}{4166085}R_{62} + \frac{744\sqrt{43843085}}{43843085}R_{80} - \frac{3488\sqrt{61380319}}{61380319}R_{82}$ $- \frac{124\sqrt{55800290}}{27900145}R_{84}$
$\frac{5}{2}$	2	3	$\frac{5}{2}$	2	3	$R_{00} + \frac{16\sqrt{5}}{49}R_{20} + \frac{12}{49}R_{40} + \frac{6\sqrt{10}}{49}R_{42}$
$\frac{5}{2}$	2	3	$\frac{5}{2}$	3	1	$-\frac{5}{21}iR_{30} + \frac{\sqrt{30}}{21}iR_{32} - \frac{5\sqrt{77}}{66}iR_{50} + \frac{5\sqrt{330}}{231}iR_{52}$ $+ \frac{5\sqrt{110}}{154}iR_{54}$
$\frac{5}{2}$	2	3	$\frac{5}{2}$	3	2	$\frac{2\sqrt{105}}{245}iR_{10} - \frac{3\sqrt{5}}{35}iR_{30} - \frac{\sqrt{6}}{7}iR_{32} - \frac{15\sqrt{385}}{1078}iR_{50}$ $- \frac{5\sqrt{66}}{77}iR_{52} - \frac{15\sqrt{22}}{154}iR_{54}$

Table B353: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 22 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	3	$\frac{5}{2}$	3	3	$\frac{3\sqrt{210}}{245}R_{10} - \frac{\sqrt{10}}{105}R_{30} - \frac{2\sqrt{3}}{7}R_{32} + \frac{5\sqrt{770}}{294}R_{50}$ $+ \frac{10\sqrt{33}}{77}R_{52} + \frac{5\sqrt{11}}{77}R_{54}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	3	1	$-\frac{4\sqrt{1155}}{231}R_{54}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	3	2	$\frac{6\sqrt{14}}{49}R_{10} - \frac{4\sqrt{6}}{21}R_{30} + \frac{2\sqrt{5}}{21}R_{32} + \frac{10\sqrt{462}}{1617}R_{50}$ $+ \frac{16\sqrt{55}}{231}R_{52}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	3	3	$\frac{6\sqrt{70}}{49}R_{10} + \frac{2\sqrt{30}}{21}R_{30} - \frac{8}{21}R_{32} + \frac{10\sqrt{2310}}{1617}R_{50}$ $+ \frac{20\sqrt{11}}{231}R_{52}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	3	4	$\frac{2\sqrt{15}}{21}iR_{32} + \frac{4\sqrt{165}}{231}iR_{52} - \frac{4\sqrt{55}}{77}iR_{54}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	4	1	$-\frac{40\sqrt{21}}{539}R_{40} + \frac{16\sqrt{210}}{539}R_{42} - \frac{200\sqrt{273}}{3003}R_{60} - \frac{16\sqrt{65}}{429}R_{62}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	4	2	$-\frac{4\sqrt{35}}{49}R_{20} + \frac{20\sqrt{7}}{539}R_{40} + \frac{26\sqrt{70}}{539}R_{42} - \frac{40\sqrt{91}}{1001}R_{60}$ $-\frac{16\sqrt{195}}{429}R_{62}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	4	3	$-\frac{4\sqrt{35}}{77}iI_{41} + \frac{40\sqrt{78}}{429}iI_{61}$
$\frac{5}{2}$	2	3	$\frac{7}{2}$	4	4	$\frac{2\sqrt{6}}{21}iI_{21} + \frac{100}{77}iI_{41} + \frac{10\sqrt{2730}}{1001}iI_{61} + \frac{20\sqrt{273}}{1001}iI_{63}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	4	1	$-\frac{120\sqrt{3094}}{17017}iI_{61} + \frac{120\sqrt{7735}}{17017}iI_{63}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	4	2	$-\frac{\sqrt{30}}{7}R_{20} - \frac{20\sqrt{6}}{77}R_{40} + \frac{12\sqrt{15}}{77}R_{42} + \frac{10\sqrt{78}}{429}R_{60}$ $+\frac{68\sqrt{910}}{3003}R_{62}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	4	3	$-\frac{5\sqrt{70}}{49}R_{20} - \frac{20\sqrt{14}}{539}R_{40} - \frac{4\sqrt{35}}{539}R_{42} - \frac{10\sqrt{182}}{143}R_{60}$ $-\frac{12\sqrt{390}}{143}R_{62}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	4	4	$\frac{4\sqrt{170}}{63}iI_{21} - \frac{8\sqrt{255}}{231}iI_{41} + \frac{610\sqrt{3094}}{153153}iI_{61} + \frac{284\sqrt{7735}}{51051}iI_{63}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	4	5	$\frac{38\sqrt{70}}{441}iI_{21} + \frac{16\sqrt{105}}{147}iI_{41} + \frac{85\sqrt{26}}{1287}iI_{61} - \frac{10\sqrt{65}}{429}iI_{63}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	5	1	$\frac{15\sqrt{33}}{286}iR_{50} - \frac{15\sqrt{770}}{1001}iR_{52} + \frac{5\sqrt{2310}}{2002}iR_{54} + \frac{27\sqrt{5}}{104}iR_{70}$ $-\frac{43\sqrt{105}}{728}iR_{72} - \frac{17\sqrt{2310}}{8008}iR_{74} + \frac{9\sqrt{15015}}{8008}iR_{76}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	5	2	$\frac{5\sqrt{21}}{154}iR_{30} - \frac{3\sqrt{70}}{154}iR_{32} - \frac{8\sqrt{770}}{1001}iR_{52} + \frac{16\sqrt{2310}}{3003}iR_{54}$ $+\frac{9\sqrt{5}}{44}iR_{70} + \frac{159\sqrt{105}}{4004}iR_{72} - \frac{45\sqrt{2310}}{4004}iR_{74} - \frac{15\sqrt{15015}}{4004}iR_{76}$

Table B354: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 23 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	5	3	$\frac{5}{154}iR_{30} + \frac{5\sqrt{30}}{462}iR_{32} + \frac{10\sqrt{77}}{1001}iR_{50} + \frac{4\sqrt{330}}{429}iR_{52}$ $+ \frac{2\sqrt{110}}{143}iR_{54} + \frac{15\sqrt{105}}{572}iR_{70} + \frac{135\sqrt{5}}{572}iR_{72} + \frac{27\sqrt{110}}{572}iR_{74}$ $+ \frac{9\sqrt{715}}{572}iR_{76}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	5	4	$-\frac{5\sqrt{21}}{231}iR_{30} + \frac{\sqrt{70}}{21}iR_{32} + \frac{35\sqrt{33}}{858}iR_{50} + \frac{29\sqrt{770}}{3003}iR_{52}$ $-\frac{31\sqrt{2310}}{6006}iR_{54} + \frac{75\sqrt{5}}{1144}iR_{70} + \frac{15\sqrt{105}}{728}iR_{72} - \frac{3\sqrt{2310}}{8008}iR_{74}$ $-\frac{3\sqrt{15015}}{1144}iR_{76}$
$\frac{5}{2}$	2	3	$\frac{9}{2}$	5	5	$\frac{25\sqrt{6}}{462}R_{30} + \frac{17\sqrt{5}}{231}R_{32} - \frac{5\sqrt{462}}{6006}R_{50} - \frac{10\sqrt{55}}{429}R_{52}$ $-\frac{17\sqrt{165}}{429}R_{54} + \frac{51\sqrt{70}}{1144}R_{70} + \frac{141\sqrt{30}}{1144}R_{72} + \frac{21\sqrt{165}}{572}R_{74}$ $+ \frac{3\sqrt{4290}}{1144}R_{76}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	1	$-\frac{2\sqrt{546}}{91}R_{76}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	2	$\frac{20\sqrt{7}}{77}R_{32} - \frac{40\sqrt{77}}{1001}R_{52} - \frac{10\sqrt{231}}{1001}R_{54} + \frac{10\sqrt{42}}{1001}R_{72}$ $+ \frac{4\sqrt{231}}{143}R_{74}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	3	$\frac{20\sqrt{14}}{231}R_{30} + \frac{20\sqrt{105}}{231}R_{32} - \frac{40\sqrt{22}}{429}R_{50} + \frac{4\sqrt{1155}}{273}R_{52}$ $+ \frac{4\sqrt{30}}{143}R_{70} + \frac{54\sqrt{70}}{1001}R_{72}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	4	$-\frac{18\sqrt{1155}}{1001}R_{54} - \frac{12\sqrt{1155}}{1001}R_{74} + \frac{2\sqrt{30030}}{1001}R_{76}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	5	$\frac{10\sqrt{210}}{231}R_{32} - \frac{2\sqrt{2310}}{3003}R_{52} - \frac{8\sqrt{770}}{1001}R_{54} - \frac{12\sqrt{35}}{1001}R_{72}$ $+ \frac{12\sqrt{770}}{1001}R_{74}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	5	6	$\frac{100\sqrt{5}}{231}iR_{30} + \frac{10\sqrt{6}}{231}iR_{32} + \frac{10\sqrt{385}}{429}iR_{50} - \frac{20\sqrt{66}}{429}iR_{52}$ $+ \frac{8\sqrt{21}}{143}iR_{70} + \frac{36}{143}iR_{72}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	1	$-\frac{16\sqrt{31031}}{2821}R_{62} + \frac{160\sqrt{86955}}{75361}R_{80} - \frac{944\sqrt{121737}}{527527}R_{82} - \frac{32\sqrt{110670}}{47957}R_{84}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	2	$\frac{240\sqrt{899}}{29029}R_{40} - \frac{96\sqrt{8990}}{29029}R_{42} - \frac{20\sqrt{11687}}{4147}R_{60} - \frac{3512\sqrt{1227135}}{4499495}R_{62}$ $+ \frac{592\sqrt{15283}}{198679}R_{80} + \frac{720\sqrt{534905}}{1390753}R_{82} - \frac{24\sqrt{2353582}}{198679}R_{84}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	3	$-\frac{20\sqrt{58}}{29029}R_{40} + \frac{828\sqrt{145}}{29029}R_{42} + \frac{108\sqrt{754}}{4147}R_{60} + \frac{72\sqrt{79170}}{20735}R_{62}$ $+ \frac{72\sqrt{986}}{6409}R_{80} + \frac{144\sqrt{34510}}{44863}R_{82} + \frac{72\sqrt{37961}}{44863}R_{84}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	4	$-\frac{24\sqrt{20930}}{23023}iI_{61} + \frac{120\sqrt{2093}}{23023}iI_{63} - \frac{88\sqrt{11730}}{5083}iI_{81} - \frac{24\sqrt{60214}}{35581}iI_{83}$

Table B355: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 24 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	5	$-\frac{152\sqrt{13685}}{17017}iI_{41} - \frac{36\sqrt{30498}}{55913}iI_{61} + \frac{128\sqrt{76245}}{55913}iI_{63}$ $-\frac{396\sqrt{322}}{5083}iI_{81} - \frac{44\sqrt{7590}}{5083}iI_{83}$
$\frac{5}{2}$	2	3	$\frac{11}{2}$	6	6	$-\frac{20\sqrt{102}}{2431}iI_{41} + \frac{90\sqrt{7735}}{17017}iI_{61} - \frac{86\sqrt{3094}}{17017}iI_{63} + \frac{24\sqrt{15}}{221}iI_{81}$ $+\frac{40\sqrt{77}}{1547}iI_{83}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	1	$-\frac{16\sqrt{187}}{221}iI_{81} - \frac{32\sqrt{1785}}{1105}iI_{83}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	2	$-\frac{96\sqrt{2002}}{11011}iI_{61} + \frac{96\sqrt{5005}}{11011}iI_{63} + \frac{160\sqrt{1122}}{2431}iI_{81} + \frac{384\sqrt{1190}}{7735}iI_{83}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	3	$-\frac{40\sqrt{66}}{143}iI_{41} - \frac{272\sqrt{5005}}{55055}iI_{61} + \frac{48\sqrt{2002}}{11011}iI_{63} - \frac{324\sqrt{2805}}{12155}iI_{81}$ $-\frac{108\sqrt{119}}{1547}iI_{83}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	4	$-\frac{48\sqrt{2002}}{2275}R_{62} - \frac{144\sqrt{5610}}{60775}R_{80} - \frac{8\sqrt{7854}}{3003}R_{82} + \frac{2336\sqrt{1785}}{116025}R_{84}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	5	$\frac{1500\sqrt{17895}}{1194193}R_{40} - \frac{3000\sqrt{7158}}{1194193}R_{42} + \frac{304\sqrt{232635}}{170599}R_{60}$ $+\frac{67744\sqrt{108563}}{29854825}R_{62} + \frac{1392\sqrt{304215}}{6591325}R_{80} - \frac{592\sqrt{425901}}{5536713}R_{82}$ $-\frac{9224\sqrt{46849110}}{138417825}R_{84}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	6	$-\frac{73120\sqrt{43031510}}{4307454151}R_{40} + \frac{1962680\sqrt{4303151}}{4307454151}R_{42} - \frac{14604\sqrt{559409630}}{3076752965}R_{60}$ $+\frac{357416\sqrt{2349520446}}{21537270755}R_{62} - \frac{324\sqrt{731535670}}{4754981855}R_{80} + \frac{28368\sqrt{1024149938}}{6656974597}R_{82}$ $+\frac{8244\sqrt{28164123295}}{4754981855}R_{84}$
$\frac{5}{2}$	2	3	$\frac{13}{2}$	6	7	$\frac{4170\sqrt{515801}}{3610607}R_{40} + \frac{285\sqrt{5158010}}{3610607}R_{42} + \frac{32\sqrt{39677}}{39677}R_{60}$ $-\frac{832\sqrt{4166085}}{4166085}R_{62} + \frac{648\sqrt{8768617}}{8768617}R_{80} + \frac{976\sqrt{306901595}}{61380319}R_{82}$ $+\frac{4\sqrt{11160058}}{5580029}R_{84}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	1	$\frac{\sqrt{30}}{14}I_{21} - \frac{4\sqrt{5}}{7}I_{41} + R_{00} - \frac{2\sqrt{5}}{7}R_{20}$ $+\frac{1}{7}R_{40}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	2	$-\frac{3\sqrt{6}}{14}I_{21} - \frac{2}{7}I_{41} + \frac{\sqrt{5}}{7}R_{40} - \frac{2\sqrt{2}}{7}R_{42}$
$\frac{5}{2}$	3	1	$\frac{5}{2}$	3	3	$-\frac{\sqrt{3}}{7}iI_{21} - \frac{3\sqrt{2}}{7}iI_{41} + \frac{3\sqrt{2}}{7}iR_{20} + \frac{3}{7}iR_{42}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	1	$-\frac{\sqrt{35}}{21}iI_{21} + \frac{\sqrt{210}}{77}iI_{41} - \frac{5\sqrt{13}}{429}iI_{61} + \frac{\sqrt{210}}{84}iR_{20}$ $-\frac{5\sqrt{42}}{154}iR_{40} + \frac{\sqrt{105}}{22}iR_{42} - \frac{25\sqrt{546}}{858}iR_{60} - \frac{59\sqrt{130}}{429}iR_{62}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	2	$-\frac{10\sqrt{91}}{143}iI_{61} + \frac{5\sqrt{910}}{143}iI_{63} + \frac{\sqrt{30}}{28}iR_{20} - \frac{5\sqrt{6}}{154}iR_{40}$ $-\frac{\sqrt{15}}{154}iR_{42} + \frac{85\sqrt{78}}{858}iR_{60} + \frac{25\sqrt{910}}{429}iR_{62}$

Table B356: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 25 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	3	$-\frac{5\sqrt{6}}{11}iI_{41} - \frac{5\sqrt{182}}{143}iI_{63} - \frac{\sqrt{6}}{84}iR_{20} + \frac{5\sqrt{30}}{154}iR_{40}$ $+ \frac{5\sqrt{3}}{154}iR_{42} + \frac{25\sqrt{390}}{858}iR_{60} - \frac{5\sqrt{182}}{143}iR_{62}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	3	4	$-\frac{\sqrt{15}}{21}I_{21} + \frac{10\sqrt{10}}{77}I_{41} - \frac{5\sqrt{273}}{429}I_{61} - \frac{\sqrt{10}}{28}R_{20}$ $+ \frac{25\sqrt{2}}{154}R_{40} + \frac{13\sqrt{5}}{154}R_{42} + \frac{5\sqrt{26}}{286}R_{60} + \frac{3\sqrt{2730}}{143}R_{62}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	1	$-\frac{6}{7}iR_{10} - \frac{\sqrt{21}}{21}iR_{30} - \frac{2\sqrt{70}}{21}iR_{32} - \frac{5\sqrt{33}}{924}iR_{50}$ $+ \frac{\sqrt{770}}{462}iR_{52} - \frac{3\sqrt{2310}}{308}iR_{54}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	2	$-\frac{\sqrt{3}}{14}iR_{10} - \frac{\sqrt{7}}{14}iR_{30} - \frac{\sqrt{210}}{42}iR_{32} + \frac{5\sqrt{11}}{77}iR_{50}$ $- \frac{5\sqrt{2310}}{462}iR_{52}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	3	$\frac{3\sqrt{3}}{14}R_{10} - \frac{\sqrt{7}}{7}R_{30} - \frac{\sqrt{210}}{63}R_{32} + \frac{5\sqrt{11}}{154}R_{50}$ $+ \frac{5\sqrt{2310}}{1386}R_{52} + \frac{3\sqrt{770}}{154}R_{54}$
$\frac{5}{2}$	3	1	$\frac{7}{2}$	4	4	$-\frac{2\sqrt{6}}{9}R_{32} + \frac{5\sqrt{66}}{99}R_{52}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	1	$\frac{5\sqrt{51}}{374}R_{30} - \frac{\sqrt{170}}{34}R_{32} - \frac{5\sqrt{3927}}{2431}R_{50} + \frac{2\sqrt{1870}}{187}R_{52}$ $- \frac{7\sqrt{5610}}{2431}R_{54} + \frac{9\sqrt{595}}{4862}R_{70} - \frac{\sqrt{255}}{68}R_{72} + \frac{21\sqrt{5610}}{4862}R_{74}$ $- \frac{9\sqrt{36465}}{9724}R_{76}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{6}}{132}iR_{30} - \frac{7\sqrt{5}}{66}iR_{32} - \frac{5\sqrt{462}}{1716}iR_{50} + \frac{4\sqrt{55}}{429}iR_{52}$ $- \frac{9\sqrt{165}}{286}iR_{54} - \frac{111\sqrt{70}}{2288}iR_{70} + \frac{207\sqrt{30}}{2288}iR_{72} + \frac{15\sqrt{165}}{1144}iR_{74}$ $- \frac{15\sqrt{4290}}{2288}iR_{76}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	3	$\frac{5\sqrt{14}}{308}iR_{30} + \frac{\sqrt{105}}{154}iR_{32} + \frac{5\sqrt{22}}{572}iR_{50} - \frac{3\sqrt{385}}{286}iR_{54}$ $- \frac{175\sqrt{30}}{2288}iR_{70} + \frac{15\sqrt{70}}{176}iR_{72} - \frac{21\sqrt{385}}{1144}iR_{74} - \frac{3\sqrt{10010}}{2288}iR_{76}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	4	$\frac{95\sqrt{51}}{3366}R_{30} - \frac{5\sqrt{170}}{3366}R_{32} - \frac{95\sqrt{3927}}{21879}R_{50} + \frac{35\sqrt{1870}}{21879}R_{52}$ $+ \frac{35\sqrt{5610}}{7293}R_{54} + \frac{19\sqrt{595}}{4862}R_{70} - \frac{7\sqrt{255}}{2431}R_{72} - \frac{35\sqrt{5610}}{4862}R_{74}$ $- \frac{9\sqrt{36465}}{2431}R_{76}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	4	5	$-\frac{5\sqrt{21}}{99}R_{30} - \frac{10\sqrt{70}}{693}R_{32} + \frac{70\sqrt{33}}{1287}R_{50} + \frac{20\sqrt{770}}{1287}R_{52}$ $+ \frac{2\sqrt{2310}}{429}R_{54} - \frac{7\sqrt{5}}{143}R_{70} - \frac{4\sqrt{105}}{143}R_{72} - \frac{\sqrt{2310}}{143}R_{74}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{105}}{11}I_{41} + \frac{15\sqrt{26}}{286}I_{61} - \frac{9\sqrt{65}}{143}I_{63} - \frac{\sqrt{105}}{7}R_{20}$ $- \frac{2\sqrt{210}}{77}R_{42} + \frac{\sqrt{65}}{143}R_{62}$

Table B357: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 26 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	2	$\frac{5\sqrt{70}}{84}I_{21} - \frac{6\sqrt{105}}{77}I_{41} - \frac{35\sqrt{26}}{1716}I_{61} + \frac{3\sqrt{65}}{286}I_{63}$ $+ \frac{\sqrt{105}}{21}R_{20} - \frac{10\sqrt{21}}{77}R_{40} + \frac{5\sqrt{273}}{429}R_{60}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{3\sqrt{30}}{28}I_{21} + \frac{10\sqrt{5}}{77}I_{41} - \frac{5\sqrt{546}}{572}I_{61} - \frac{\sqrt{1365}}{286}I_{63}$ $-\frac{10}{77}R_{40} + \frac{4\sqrt{10}}{77}R_{42} - \frac{35\sqrt{13}}{143}R_{60} - \frac{16\sqrt{1365}}{429}R_{62}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	4	$\frac{\sqrt{70}}{42}I_{21} - \frac{\sqrt{105}}{77}I_{41} + \frac{10\sqrt{26}}{429}I_{61} - \frac{8\sqrt{65}}{143}I_{63}$ $+ \frac{\sqrt{65}}{13}R_{62}$
$\frac{5}{2}$	3	1	$\frac{9}{2}$	5	5	$\frac{5\sqrt{5}}{42}iI_{21} + \frac{\sqrt{30}}{77}iI_{41} + \frac{25\sqrt{91}}{858}iI_{61} - \frac{\sqrt{910}}{286}iI_{63}$ $+ \frac{\sqrt{30}}{42}iR_{20} + \frac{10\sqrt{15}}{77}iR_{42} - \frac{5\sqrt{910}}{429}iR_{62}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{5\sqrt{462}}{143}iI_{41} + \frac{\sqrt{286}}{143}iI_{63} - \frac{\sqrt{17}}{221}iI_{83} - \frac{5\sqrt{2310}}{2002}iR_{40}$ $+ \frac{10\sqrt{231}}{1001}iR_{42} - \frac{\sqrt{30030}}{572}iR_{60} - \frac{19\sqrt{286}}{286}iR_{62} + \frac{\sqrt{39270}}{4862}iR_{80}$ $+ \frac{37\sqrt{1122}}{4862}iR_{82} - \frac{\sqrt{255}}{26}iR_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	2	$-\frac{11\sqrt{1785}}{221}iI_{81} - \frac{42\sqrt{187}}{221}iI_{83} - \frac{10\sqrt{210}}{1001}iR_{40} + \frac{45\sqrt{21}}{2002}iR_{42}$ $+ \frac{7\sqrt{2730}}{572}iR_{60} + \frac{37\sqrt{26}}{286}iR_{62} - \frac{\sqrt{3570}}{221}iR_{80} - \frac{3\sqrt{102}}{442}iR_{82}$ $+ \frac{4\sqrt{2805}}{221}iR_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	3	$\frac{6\sqrt{39}}{143}iI_{61} - \frac{3\sqrt{390}}{143}iI_{63} + \frac{66\sqrt{119}}{221}iI_{81} + \frac{9\sqrt{2805}}{221}iI_{83}$ $-\frac{15\sqrt{14}}{2002}iR_{40} - \frac{29\sqrt{35}}{1001}iR_{42} + \frac{19\sqrt{182}}{572}iR_{60} + \frac{7\sqrt{390}}{286}iR_{62}$ $-\frac{\sqrt{238}}{442}iR_{80} + \frac{15\sqrt{170}}{442}iR_{82} - \frac{15\sqrt{187}}{442}iR_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	4	$-\frac{3\sqrt{210}}{143}iI_{41} + \frac{12\sqrt{13}}{143}iI_{61} - \frac{\sqrt{357}}{221}iI_{81} + \frac{15\sqrt{42}}{1001}iR_{40}$ $-\frac{17\sqrt{105}}{2002}iR_{42} - \frac{5\sqrt{546}}{572}iR_{60} + \frac{\sqrt{130}}{1430}iR_{62} - \frac{\sqrt{714}}{221}iR_{80}$ $-\frac{3\sqrt{510}}{442}iR_{82} + \frac{8\sqrt{561}}{221}iR_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	5	$-\frac{5\sqrt{35}}{143}iI_{41} + \frac{7\sqrt{78}}{143}iI_{61} - \frac{3\sqrt{238}}{221}iI_{81} + \frac{50\sqrt{7}}{1001}iR_{40}$ $+ \frac{51\sqrt{70}}{2002}iR_{42} - \frac{\sqrt{91}}{286}iR_{60} - \frac{\sqrt{195}}{715}iR_{62} - \frac{5\sqrt{119}}{221}iR_{80}$ $+ \frac{15\sqrt{85}}{221}iR_{82} - \frac{3\sqrt{374}}{442}iR_{84}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	5	6	$-\frac{35}{143}I_{41} - \frac{4\sqrt{273}}{143}I_{63} + \frac{\sqrt{7854}}{221}I_{83} - \frac{5\sqrt{5}}{143}R_{40}$ $-\frac{10\sqrt{2}}{143}R_{42} - \frac{7\sqrt{65}}{286}R_{60} - \frac{\sqrt{273}}{143}R_{62} - \frac{14\sqrt{85}}{221}R_{80}$ $+ \frac{9\sqrt{119}}{221}R_{82}$

Table B358: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 27 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	1	$\frac{10\sqrt{5115}}{1023}iR_{30} - \frac{10\sqrt{682}}{341}iR_{32} + \frac{5\sqrt{3255}}{2418}iR_{50} + \frac{5\sqrt{62}}{403}iR_{52}$ $- \frac{35\sqrt{186}}{806}iR_{54} + \frac{9\sqrt{2387}}{35464}iR_{70} + \frac{19\sqrt{1023}}{35464}iR_{72} + \frac{15\sqrt{186}}{3224}iR_{74}$ $- \frac{35\sqrt{1209}}{3224}iR_{76}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	2	$\frac{190\sqrt{899}}{29667}iR_{30} + \frac{5\sqrt{26970}}{2697}iR_{32} + \frac{1585\sqrt{69223}}{1542684}iR_{50} + \frac{317\sqrt{296670}}{771342}iR_{52}$ $+ \frac{137\sqrt{98890}}{514228}iR_{54} + \frac{27\sqrt{94395}}{128557}iR_{70} + \frac{141\sqrt{4495}}{23374}iR_{72}$ $- \frac{144\sqrt{98890}}{128557}iR_{74} + \frac{21\sqrt{642785}}{257114}iR_{76}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	3	$\frac{65\sqrt{58}}{3828}iR_{30} + \frac{5\sqrt{435}}{638}iR_{32} + \frac{115\sqrt{4466}}{24882}iR_{50} + \frac{25\sqrt{4785}}{4147}iR_{52}$ $+ \frac{5\sqrt{1595}}{4147}iR_{54} + \frac{17\sqrt{6090}}{4147}iR_{70} + \frac{81\sqrt{290}}{16588}iR_{72} + \frac{12\sqrt{1595}}{4147}iR_{74}$ $- \frac{9\sqrt{41470}}{16588}iR_{76}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	4	$\frac{25\sqrt{345}}{1518}R_{30} + \frac{5\sqrt{46}}{46}R_{32} - \frac{25\sqrt{26565}}{9867}R_{50} - \frac{40\sqrt{506}}{3289}R_{52}$ $+ \frac{15\sqrt{1518}}{3289}R_{54} + \frac{75\sqrt{161}}{6578}R_{70} - \frac{\sqrt{69}}{1196}R_{72} - \frac{45\sqrt{1518}}{6578}R_{74}$ $+ \frac{35\sqrt{9867}}{13156}R_{76}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	5	$\frac{5\sqrt{2737}}{759}R_{30} - \frac{5\sqrt{82110}}{90321}R_{32} - \frac{70\sqrt{4301}}{9867}R_{50} + \frac{10\sqrt{903210}}{167739}R_{52}$ $+ \frac{2\sqrt{301070}}{55913}R_{54} + \frac{7\sqrt{5865}}{3289}R_{70} - \frac{18\sqrt{13685}}{55913}R_{72} - \frac{3\sqrt{301070}}{55913}R_{74}$ $- \frac{18\sqrt{1956955}}{55913}R_{76}$
$\frac{5}{2}$	3	1	$\frac{11}{2}$	6	6	$\frac{5\sqrt{17}}{187}R_{32} - \frac{70\sqrt{187}}{2431}R_{52} + \frac{20\sqrt{561}}{2431}R_{54} + \frac{63\sqrt{102}}{2431}R_{72}$ $- \frac{30\sqrt{561}}{2431}R_{74} - \frac{5\sqrt{14586}}{2431}R_{76}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	1	$- \frac{3\sqrt{14}}{104}R_{50} + \frac{\sqrt{15}}{26}R_{52} - \frac{37\sqrt{5}}{260}R_{54} + \frac{3\sqrt{2310}}{884}R_{70}$ $- \frac{141\sqrt{110}}{4420}R_{72} + \frac{69\sqrt{5}}{442}R_{74} - \frac{33\sqrt{130}}{4420}R_{76} - \frac{3\sqrt{2926}}{2584}R_{90}$ $+ \frac{69\sqrt{1330}}{12920}R_{92} - \frac{13\sqrt{1235}}{1615}R_{94} + \frac{11\sqrt{51870}}{12920}R_{96} - \frac{\sqrt{146965}}{6460}R_{98}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{3\sqrt{21}}{286}R_{50} - \frac{15\sqrt{10}}{143}R_{52} - \frac{3\sqrt{30}}{1430}R_{54} - \frac{9\sqrt{385}}{2431}R_{70}$ $+ \frac{227\sqrt{165}}{24310}R_{72} + \frac{3\sqrt{30}}{221}R_{74} + \frac{21\sqrt{195}}{2210}R_{76} + \frac{3\sqrt{4389}}{7106}R_{90}$ $+ \frac{7\sqrt{1995}}{6460}R_{92} - \frac{3\sqrt{7410}}{3230}R_{94} - \frac{21\sqrt{8645}}{6460}R_{96} + \frac{\sqrt{881790}}{3230}R_{98}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	3	$- \frac{3\sqrt{210}}{286}R_{50} + \frac{7}{143}R_{52} + \frac{3\sqrt{3}}{143}R_{54} + \frac{45\sqrt{154}}{2431}R_{70}$ $- \frac{42\sqrt{66}}{2431}R_{72} - \frac{30\sqrt{3}}{221}R_{74} + \frac{6\sqrt{78}}{221}R_{76} - \frac{3\sqrt{43890}}{7106}R_{90}$ $+ \frac{\sqrt{798}}{323}R_{92} + \frac{3\sqrt{741}}{323}R_{94} - \frac{3\sqrt{3458}}{323}R_{96} - \frac{\sqrt{88179}}{323}R_{98}$

Table B359: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 28 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	4	$\frac{\sqrt{210}}{130}iR_{50} + \frac{6}{65}iR_{52} - \frac{37\sqrt{3}}{195}iR_{54} + \frac{9\sqrt{154}}{2210}iR_{70}$ $+ \frac{19\sqrt{66}}{2210}iR_{72} + \frac{113\sqrt{3}}{1105}iR_{74} - \frac{73\sqrt{78}}{2210}iR_{76} + \frac{\sqrt{43890}}{25840}iR_{90}$ $+ \frac{3\sqrt{798}}{6460}iR_{92} - \frac{37\sqrt{741}}{19380}iR_{94} + \frac{39\sqrt{3458}}{6460}iR_{96} - \frac{7\sqrt{88179}}{7752}iR_{98}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	5	$\frac{227\sqrt{1377915}}{1705990}iR_{50} + \frac{1656\sqrt{26246}}{852995}iR_{52} + \frac{4051\sqrt{78738}}{5117970}iR_{54}$ $+ \frac{7011\sqrt{8351}}{5273060}iR_{70} + \frac{40801\sqrt{3579}}{5273060}iR_{72} + \frac{8557\sqrt{78738}}{5273060}iR_{74}$ $+ \frac{703\sqrt{511797}}{5273060}iR_{76} + \frac{301\sqrt{2380035}}{15413560}iR_{90} - \frac{4\sqrt{5236077}}{101405}iR_{92}$ $+ \frac{3133\sqrt{19448286}}{23120340}iR_{94} + \frac{12\sqrt{22689667}}{1926695}iR_{96} - \frac{\sqrt{2314346034}}{544008}iR_{98}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	6	$\frac{6453\sqrt{3313426270}}{4922804744}iR_{50} + \frac{10799\sqrt{142003983}}{1230701186}iR_{52} + \frac{3633\sqrt{47334661}}{223763852}iR_{54}$ $+ \frac{60659\sqrt{180732342}}{3803985484}iR_{70} + \frac{312027\sqrt{8606302}}{3803985484}iR_{72} - \frac{609\sqrt{47334661}}{111881926}iR_{74}$ $+ \frac{32757\sqrt{1230701186}}{3803985484}iR_{76} - \frac{37557\sqrt{5723190830}}{11119342184}iR_{90} + \frac{90357\sqrt{12591019826}}{11119342184}iR_{92}$ $- \frac{18\sqrt{11691661267}}{4303151}iR_{94} - \frac{1365\sqrt{491049773214}}{11119342184}iR_{96} + \frac{1395\sqrt{1391307690773}}{5559671092}iR_{98}$
$\frac{5}{2}$	3	1	$\frac{13}{2}$	6	7	$\frac{9\sqrt{328237}}{93782}iR_{50} + \frac{\sqrt{1406730}}{46891}iR_{52} - \frac{\sqrt{468910}}{7214}iR_{54} + \frac{30\sqrt{54159105}}{797147}iR_{70}$ $+ \frac{81\sqrt{2579005}}{797147}iR_{72} - \frac{18\sqrt{468910}}{61319}iR_{74} - \frac{147\sqrt{18035}}{61319}iR_{76}$ $+ \frac{87\sqrt{68601533}}{1165061}iR_{90} - \frac{91\sqrt{31182515}}{2330122}iR_{92} - \frac{165\sqrt{685330}}{1165061}iR_{94}$ $- \frac{145\sqrt{7195965}}{2330122}iR_{96} - \frac{25\sqrt{81554270}}{1165061}iR_{98}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	3	2	$-\frac{\sqrt{30}}{10}I_{21} + R_{00} + \frac{2\sqrt{5}}{35}R_{20} - \frac{3}{7}R_{40}$
$\frac{5}{2}$	3	2	$\frac{5}{2}$	3	3	$\frac{3\sqrt{15}}{35}iI_{21} - \frac{\sqrt{10}}{7}iI_{41} + \frac{9\sqrt{10}}{35}iR_{20} - \frac{\sqrt{5}}{7}iR_{42}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	1	$-\frac{10\sqrt{65}}{143}iI_{61} + \frac{25\sqrt{26}}{143}iI_{63} - \frac{\sqrt{42}}{28}iR_{20} - \frac{\sqrt{210}}{154}iR_{40}$ $- \frac{5\sqrt{21}}{154}iR_{42} - \frac{5\sqrt{2730}}{858}iR_{60} - \frac{115\sqrt{26}}{429}iR_{62}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	2	$\frac{1}{21}iI_{21} + \frac{13\sqrt{6}}{77}iI_{41} - \frac{5\sqrt{455}}{429}iI_{61} - \frac{\sqrt{6}}{84}iR_{20}$ $+ \frac{\sqrt{30}}{14}iR_{40} - \frac{3\sqrt{3}}{14}iR_{42} - \frac{5\sqrt{390}}{78}iR_{60} - \frac{5\sqrt{182}}{39}iR_{62}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	3	$\frac{11\sqrt{5}}{105}iI_{21} + \frac{2\sqrt{30}}{77}iI_{41} - \frac{25\sqrt{91}}{429}iI_{61} + \frac{19\sqrt{30}}{420}iR_{20}$ $+ \frac{5\sqrt{6}}{154}iR_{40} + \frac{13\sqrt{15}}{154}iR_{42} + \frac{25\sqrt{78}}{858}iR_{60} + \frac{5\sqrt{910}}{429}iR_{62}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	3	4	$\frac{7\sqrt{2}}{11}I_{41} - \frac{5\sqrt{546}}{143}I_{63} - \frac{5\sqrt{2}}{28}R_{20} - \frac{\sqrt{10}}{22}R_{40}$ $- \frac{3}{154}R_{42} + \frac{25\sqrt{130}}{286}R_{60} + \frac{25\sqrt{546}}{429}R_{62}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	1	$\frac{\sqrt{14}}{7}iR_{32} - \frac{\sqrt{165}}{44}iR_{50} + \frac{3\sqrt{154}}{154}iR_{52} - \frac{13\sqrt{462}}{924}iR_{54}$

Table B360: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 29 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	2	$\frac{3\sqrt{15}}{14}iR_{10} - \frac{\sqrt{35}}{14}iR_{30} - \frac{\sqrt{42}}{42}iR_{32} - \frac{\sqrt{55}}{77}iR_{50}$ $- \frac{5\sqrt{462}}{462}iR_{52} - \frac{2\sqrt{154}}{77}iR_{54}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	3	$\frac{3\sqrt{15}}{14}R_{10} - \frac{2\sqrt{42}}{21}R_{32} - \frac{9\sqrt{55}}{154}R_{50} - \frac{\sqrt{462}}{462}R_{52}$ $+ \frac{\sqrt{154}}{154}R_{54}$
$\frac{5}{2}$	3	2	$\frac{7}{2}$	4	4	$-\frac{\sqrt{330}}{33}R_{52}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	1	$-\frac{3\sqrt{255}}{374}R_{30} + \frac{9\sqrt{34}}{374}R_{32} - \frac{3\sqrt{19635}}{2431}R_{50} + \frac{6\sqrt{374}}{2431}R_{52}$ $+ \frac{\sqrt{1122}}{221}R_{54} + \frac{105\sqrt{119}}{4862}R_{70} - \frac{675\sqrt{51}}{9724}R_{72} + \frac{45\sqrt{1122}}{4862}R_{74}$ $- \frac{5\sqrt{7293}}{572}R_{76}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	2	$-\frac{\sqrt{30}}{44}iR_{30} + \frac{1}{22}iR_{32} + \frac{\sqrt{2310}}{572}iR_{50} - \frac{20\sqrt{11}}{143}iR_{52}$ $+ \frac{17\sqrt{33}}{858}iR_{54} - \frac{135\sqrt{14}}{2288}iR_{70} + \frac{15\sqrt{6}}{2288}iR_{72} + \frac{135\sqrt{33}}{1144}iR_{74}$ $- \frac{15\sqrt{858}}{2288}iR_{76}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	3	$-\frac{5\sqrt{70}}{308}iR_{30} + \frac{\sqrt{21}}{462}iR_{32} - \frac{\sqrt{110}}{52}iR_{50} + \frac{8\sqrt{231}}{429}iR_{52}$ $+ \frac{\sqrt{77}}{286}iR_{54} + \frac{105\sqrt{6}}{2288}iR_{70} - \frac{45\sqrt{14}}{2288}iR_{72} - \frac{45\sqrt{77}}{1144}iR_{74}$ $+ \frac{45\sqrt{2002}}{2288}iR_{76}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	4	$\frac{5\sqrt{255}}{374}R_{30} + \frac{\sqrt{34}}{3366}R_{32} + \frac{5\sqrt{19635}}{2431}R_{50} + \frac{335\sqrt{374}}{21879}R_{52}$ $+ \frac{19\sqrt{1122}}{1989}R_{54} - \frac{175\sqrt{119}}{4862}R_{70} - \frac{80\sqrt{51}}{2431}R_{72} + \frac{95\sqrt{1122}}{4862}R_{74}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	4	5	$\frac{\sqrt{105}}{77}R_{30} + \frac{38\sqrt{14}}{693}R_{32} + \frac{2\sqrt{165}}{143}R_{50} - \frac{4\sqrt{154}}{1287}R_{52}$ $- \frac{2\sqrt{462}}{117}R_{54} - \frac{35}{143}R_{70} - \frac{20\sqrt{21}}{143}R_{72} - \frac{5\sqrt{462}}{143}R_{74}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	1	$\frac{3\sqrt{21}}{11}I_{41} + \frac{3\sqrt{130}}{286}I_{61} - \frac{3\sqrt{13}}{143}I_{63} + \frac{3\sqrt{13}}{13}R_{62}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	2	$-\frac{5\sqrt{14}}{28}I_{21} - \frac{10\sqrt{21}}{77}I_{41} + \frac{23\sqrt{130}}{572}I_{61} - \frac{17\sqrt{13}}{286}I_{63}$ $- \frac{2\sqrt{105}}{77}R_{40} + \frac{4\sqrt{42}}{77}R_{42} + \frac{\sqrt{1365}}{429}R_{60} + \frac{16\sqrt{13}}{429}R_{62}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	3	$-\frac{5\sqrt{6}}{84}I_{21} - \frac{122}{77}I_{41} + \frac{\sqrt{2730}}{1716}I_{61} + \frac{3\sqrt{273}}{286}I_{63}$ $+ \frac{5}{7}R_{20} - \frac{2\sqrt{5}}{77}R_{40} - \frac{7\sqrt{65}}{143}R_{60}$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	4	$\frac{5\sqrt{14}}{42}I_{21} - \frac{5\sqrt{21}}{77}I_{41} - \frac{2\sqrt{130}}{429}I_{61} + \frac{2\sqrt{13}}{143}I_{63}$ $- \frac{5\sqrt{21}}{21}R_{20} + \frac{6\sqrt{42}}{77}R_{42} - \frac{31\sqrt{13}}{429}R_{62}$

Table B361: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 30 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{9}{2}$	5	5	$\frac{25}{42}iI_{21} - \frac{23\sqrt{6}}{77}iI_{41} - \frac{\sqrt{455}}{78}iI_{61} - \frac{5\sqrt{182}}{286}iI_{63}$ $+ \frac{5\sqrt{6}}{42}iR_{20} + \frac{2\sqrt{3}}{7}iR_{42} + \frac{\sqrt{182}}{39}iR_{62}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	1	$-\frac{5\sqrt{3927}}{221}iI_{81} - \frac{42\sqrt{85}}{221}iI_{83} + \frac{15\sqrt{462}}{2002}iR_{40} - \frac{6\sqrt{1155}}{1001}iR_{42}$ $+ \frac{3\sqrt{6006}}{572}iR_{60} + \frac{\sqrt{1430}}{110}iR_{62} - \frac{\sqrt{7854}}{442}iR_{80} + \frac{3\sqrt{5610}}{442}iR_{82}$ $-\frac{29\sqrt{51}}{442}iR_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	2	$\frac{3\sqrt{210}}{143}iI_{41} + \frac{5\sqrt{130}}{143}iI_{63} - \frac{\sqrt{935}}{221}iI_{83} - \frac{10\sqrt{42}}{1001}iR_{40}$ $-\frac{19\sqrt{105}}{2002}iR_{42} + \frac{7\sqrt{546}}{572}iR_{60} + \frac{137\sqrt{130}}{1430}iR_{62} + \frac{3\sqrt{714}}{221}iR_{80}$ $+ \frac{\sqrt{510}}{442}iR_{82} - \frac{8\sqrt{561}}{221}iR_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{7\sqrt{14}}{143}iI_{41} + \frac{4\sqrt{195}}{143}iI_{61} - \frac{3\sqrt{595}}{221}iI_{81} - \frac{47\sqrt{70}}{2002}iR_{40}$ $+ \frac{3\sqrt{7}}{1001}iR_{42} - \frac{5\sqrt{910}}{572}iR_{60} - \frac{25\sqrt{78}}{286}iR_{62} - \frac{\sqrt{1190}}{442}iR_{80}$ $+ \frac{15\sqrt{34}}{442}iR_{82} + \frac{9\sqrt{935}}{442}iR_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	4	$-\frac{6\sqrt{65}}{143}iI_{61} + \frac{15\sqrt{26}}{143}iI_{63} + \frac{22\sqrt{1785}}{221}iI_{81} + \frac{45\sqrt{187}}{221}iI_{83}$ $+ \frac{3\sqrt{210}}{1001}iR_{40} - \frac{45\sqrt{21}}{2002}iR_{42} - \frac{\sqrt{2730}}{572}iR_{60} - \frac{15\sqrt{26}}{286}iR_{62}$ $-\frac{\sqrt{3570}}{221}iR_{80} + \frac{5\sqrt{102}}{442}iR_{82} + \frac{4\sqrt{2805}}{221}iR_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	5	$-\frac{27\sqrt{7}}{143}iI_{41} - \frac{4\sqrt{39}}{143}iI_{63} - \frac{5\sqrt{1122}}{221}iI_{83} - \frac{34\sqrt{35}}{1001}iR_{40}$ $+ \frac{59\sqrt{14}}{2002}iR_{42} - \frac{9\sqrt{455}}{286}iR_{60} - \frac{\sqrt{39}}{11}iR_{62} + \frac{3\sqrt{595}}{221}iR_{80}$ $+ \frac{15\sqrt{17}}{221}iR_{82} - \frac{3\sqrt{1870}}{442}iR_{84}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	5	6	$-\frac{17\sqrt{5}}{143}I_{41} - \frac{\sqrt{546}}{143}I_{61} + \frac{21\sqrt{34}}{221}I_{81} - \frac{5}{143}R_{40}$ $+ \frac{12\sqrt{10}}{143}R_{42} - \frac{7\sqrt{13}}{286}R_{60} - \frac{\sqrt{1365}}{143}R_{62} - \frac{14\sqrt{17}}{221}R_{80}$ $-\frac{3\sqrt{595}}{221}R_{82}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	1	$\frac{6\sqrt{930}}{403}iR_{54} + \frac{3\sqrt{11935}}{1240}iR_{70} - \frac{7\sqrt{5115}}{1240}iR_{72} + \frac{43\sqrt{930}}{16120}iR_{74}$ $-\frac{3\sqrt{6045}}{1240}iR_{76}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{5\sqrt{5394}}{319}iR_{32} + \frac{9\sqrt{346115}}{16588}iR_{50} + \frac{\sqrt{59334}}{8294}iR_{52} - \frac{1311\sqrt{19778}}{514228}iR_{54}$ $-\frac{7\sqrt{18879}}{11687}iR_{70} - \frac{1743\sqrt{899}}{257114}iR_{72} - \frac{24\sqrt{19778}}{11687}iR_{74}$ $-\frac{237\sqrt{128557}}{257114}iR_{76}$

Table B362: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 31 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{5\sqrt{290}}{132}iR_{30} - \frac{5\sqrt{87}}{1914}iR_{32} + \frac{17\sqrt{22330}}{24882}iR_{50} + \frac{5\sqrt{957}}{957}iR_{52}$ $+ \frac{\sqrt{319}}{377}iR_{54} - \frac{27\sqrt{1218}}{4147}iR_{70} - \frac{63\sqrt{58}}{1276}iR_{72} - \frac{36\sqrt{319}}{4147}iR_{74}$ $+ \frac{27\sqrt{8294}}{16588}iR_{76}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	4	$-\frac{25\sqrt{69}}{506}R_{30} + \frac{15\sqrt{230}}{506}R_{32} + \frac{5\sqrt{5313}}{6578}R_{50} + \frac{21\sqrt{2530}}{3289}R_{52}$ $- \frac{3\sqrt{7590}}{598}R_{54} + \frac{27\sqrt{805}}{3289}R_{70} - \frac{301\sqrt{345}}{65780}R_{72} - \frac{16\sqrt{7590}}{16445}R_{74}$ $+ \frac{3\sqrt{49335}}{2860}R_{76}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	5	$-\frac{5\sqrt{13685}}{12903}R_{30} - \frac{655\sqrt{16422}}{90321}R_{32} + \frac{7\sqrt{21505}}{167739}R_{50} - \frac{124\sqrt{180642}}{167739}R_{52}$ $- \frac{\sqrt{60214}}{5083}R_{54} + \frac{42\sqrt{1173}}{55913}R_{70} + \frac{348\sqrt{2737}}{55913}R_{72} - \frac{42\sqrt{60214}}{55913}R_{74}$
$\frac{5}{2}$	3	2	$\frac{11}{2}$	6	6	$-\frac{25\sqrt{102}}{561}R_{30} - \frac{5\sqrt{85}}{187}R_{32} + \frac{5\sqrt{7854}}{7293}R_{50} - \frac{4\sqrt{935}}{221}R_{52}$ $- \frac{2\sqrt{2805}}{221}R_{54} + \frac{18\sqrt{1190}}{2431}R_{70} - \frac{62\sqrt{510}}{12155}R_{72} + \frac{2\sqrt{2805}}{1105}R_{74}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	1	$\frac{9\sqrt{70}}{520}R_{50} - \frac{3\sqrt{3}}{26}R_{52} + \frac{3}{52}R_{54} + \frac{33\sqrt{462}}{4420}R_{70}$ $- \frac{123\sqrt{22}}{4420}R_{72} - \frac{201}{2210}R_{74} + \frac{57\sqrt{26}}{4420}R_{76} - \frac{27\sqrt{14630}}{12920}R_{90}$ $+ \frac{77\sqrt{266}}{2584}R_{92} - \frac{7\sqrt{247}}{323}R_{94} + \frac{3\sqrt{10374}}{2584}R_{96} - \frac{5\sqrt{29393}}{1292}R_{98}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	2	$\frac{3\sqrt{105}}{715}R_{50} - \frac{6\sqrt{2}}{143}R_{52} + \frac{\sqrt{6}}{143}R_{54} + \frac{6\sqrt{77}}{1105}R_{70}$ $+ \frac{681\sqrt{33}}{24310}R_{72} - \frac{24\sqrt{6}}{1105}R_{74} - \frac{209\sqrt{39}}{2210}R_{76} - \frac{9\sqrt{21945}}{17765}R_{90}$ $+ \frac{11\sqrt{399}}{1292}R_{92} + \frac{3\sqrt{1482}}{646}R_{94} - \frac{33\sqrt{1729}}{1292}R_{96}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	3	$-\frac{3\sqrt{42}}{143}R_{50} + \frac{\sqrt{5}}{143}R_{52} - \frac{2\sqrt{15}}{143}R_{54} - \frac{6\sqrt{770}}{1105}R_{70}$ $+ \frac{12\sqrt{330}}{715}R_{72} + \frac{48\sqrt{15}}{1105}R_{74} + \frac{9\sqrt{8778}}{3553}R_{90} - \frac{3\sqrt{3705}}{323}R_{94}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	4	$\frac{2\sqrt{15}}{65}iR_{54} - \frac{3\sqrt{770}}{425}iR_{70} + \frac{7\sqrt{330}}{425}iR_{72} - \frac{554\sqrt{15}}{5525}iR_{74}$ $- \frac{\sqrt{390}}{425}iR_{76} + \frac{13\sqrt{8778}}{5168}iR_{90} - \frac{13\sqrt{3990}}{19380}iR_{92} - \frac{137\sqrt{3705}}{19380}iR_{94}$ $+ \frac{29\sqrt{17290}}{6460}iR_{96} - \frac{13\sqrt{440895}}{12920}iR_{98}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	5	$-\frac{15\sqrt{275583}}{170599}iR_{50} - \frac{15\sqrt{131230}}{170599}iR_{52} + \frac{177\sqrt{393690}}{852995}iR_{54}$ $- \frac{29337\sqrt{41755}}{26365300}iR_{70} - \frac{40747\sqrt{17895}}{26365300}iR_{72} + \frac{8969\sqrt{393690}}{26365300}iR_{74}$ $+ \frac{11\sqrt{2558985}}{26365300}iR_{76} + \frac{1573\sqrt{476007}}{3082712}iR_{90} + \frac{446\sqrt{26180385}}{5780085}iR_{92}$ $- \frac{667\sqrt{97241430}}{23120340}iR_{94} - \frac{118\sqrt{113448335}}{1926695}iR_{96} + \frac{\sqrt{11571730170}}{906680}iR_{98}$

Table B363: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 32 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	6	$-\frac{54039\sqrt{662685254}}{4922804744}iR_{50} + \frac{179\sqrt{710019915}}{94669322}iR_{52} - \frac{453\sqrt{236673305}}{2461402372}iR_{54}$ $-\frac{12009\sqrt{903661710}}{19019927420}iR_{70} + \frac{4707\sqrt{43031510}}{292614268}iR_{72} + \frac{41031\sqrt{236673305}}{1901992742}iR_{74}$ $+\frac{32301\sqrt{6153505930}}{19019927420}iR_{76} + \frac{75087\sqrt{1144638166}}{11119342184}iR_{90} + \frac{17865\sqrt{62955099130}}{11119342184}iR_{92}$ $+\frac{72\sqrt{58458306335}}{73153567}iR_{94} - \frac{297\sqrt{2455248866070}}{11119342184}iR_{96} - \frac{837\sqrt{6956538453865}}{5559671092}iR_{98}$
$\frac{5}{2}$	3	2	$\frac{13}{2}$	6	7	$-\frac{3\sqrt{1641185}}{93782}iR_{50} - \frac{37\sqrt{281346}}{46891}iR_{52} - \frac{61\sqrt{93782}}{93782}iR_{54}$ $+\frac{54\sqrt{10831821}}{797147}iR_{70} + \frac{21\sqrt{515801}}{46891}iR_{72} + \frac{222\sqrt{93782}}{797147}iR_{74}$ $+\frac{81\sqrt{3607}}{61319}iR_{76} + \frac{15\sqrt{343007665}}{1165061}iR_{90} + \frac{25\sqrt{6236503}}{137066}iR_{92}$ $+\frac{1255\sqrt{137066}}{1165061}iR_{94} + \frac{635\sqrt{1439193}}{2330122}iR_{96} + \frac{75\sqrt{16310854}}{1165061}iR_{98}$
$\frac{5}{2}$	3	3	$\frac{5}{2}$	3	3	$\frac{\sqrt{30}}{35}I_{21} + \frac{4\sqrt{5}}{7}I_{41} + R_{00} + \frac{8\sqrt{5}}{35}R_{20}$ $+\frac{2}{7}R_{40}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	3	1	$-\frac{3\sqrt{21}}{11}I_{41} - \frac{10\sqrt{13}}{143}I_{63} - \frac{\sqrt{21}}{42}R_{20} - \frac{\sqrt{105}}{77}R_{40}$ $+\frac{\sqrt{42}}{154}R_{42} - \frac{5\sqrt{1365}}{429}R_{60} + \frac{30\sqrt{13}}{143}R_{62}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	3	2	$\frac{\sqrt{3}}{11}I_{41} - \frac{10\sqrt{91}}{143}I_{63} + \frac{3\sqrt{3}}{14}R_{20} - \frac{3\sqrt{15}}{77}R_{40}$ $-\frac{17\sqrt{6}}{154}R_{42} - \frac{5\sqrt{195}}{143}R_{60} - \frac{10\sqrt{91}}{143}R_{62}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	3	3	$-\frac{\sqrt{10}}{15}I_{21} - \frac{\sqrt{15}}{11}I_{41} - \frac{25\sqrt{182}}{429}I_{61} + \frac{\sqrt{15}}{210}R_{20}$ $+\frac{5\sqrt{3}}{77}R_{40} - \frac{9\sqrt{30}}{154}R_{42} + \frac{25\sqrt{39}}{429}R_{60} + \frac{10\sqrt{455}}{429}R_{62}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	3	4	$-\frac{\sqrt{6}}{21}iI_{21} - \frac{1}{77}iI_{41} + \frac{5\sqrt{2730}}{429}iI_{61} + \frac{3}{14}iR_{20}$ $+\frac{9\sqrt{5}}{77}iR_{40} - \frac{37\sqrt{2}}{154}iR_{42} + \frac{15\sqrt{65}}{143}iR_{60} + \frac{10\sqrt{273}}{143}iR_{62}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	4	1	$-\frac{\sqrt{210}}{42}R_{30} + \frac{5\sqrt{7}}{21}R_{32} - \frac{\sqrt{330}}{132}R_{50} - \frac{5\sqrt{77}}{231}R_{52}$ $+\frac{\sqrt{231}}{462}R_{54}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	4	2	$-\frac{\sqrt{30}}{14}R_{10} + \frac{\sqrt{70}}{14}R_{30} - \frac{\sqrt{21}}{21}R_{32} - \frac{2\sqrt{110}}{77}R_{50}$ $-\frac{5\sqrt{231}}{231}R_{52} + \frac{2\sqrt{77}}{77}R_{54}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	4	3	$-\frac{\sqrt{30}}{14}iR_{10} - \frac{\sqrt{70}}{42}iR_{30} + \frac{\sqrt{21}}{21}iR_{32} - \frac{5\sqrt{110}}{462}iR_{50}$ $-\frac{\sqrt{231}}{231}iR_{52} - \frac{\sqrt{77}}{33}iR_{54}$
$\frac{5}{2}$	3	3	$\frac{7}{2}$	4	4	$-\frac{\sqrt{42}}{7}iR_{10} - \frac{\sqrt{2}}{3}iR_{30} - \frac{5\sqrt{154}}{231}iR_{50} + \frac{2\sqrt{55}}{33}iR_{54}$

Table B364: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 33 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	4	1	$\frac{\sqrt{510}}{374}iR_{30} - \frac{3\sqrt{17}}{187}iR_{32} + \frac{2\sqrt{39270}}{2431}iR_{50} - \frac{24\sqrt{187}}{2431}iR_{52}$ $- \frac{4\sqrt{561}}{187}iR_{54} + \frac{315\sqrt{238}}{9724}iR_{70} - \frac{150\sqrt{102}}{2431}iR_{72} + \frac{5\sqrt{561}}{374}iR_{74}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	4	2	$\frac{\sqrt{15}}{33}R_{30} + \frac{\sqrt{2}}{33}R_{32} - \frac{7\sqrt{1155}}{858}R_{50} - \frac{2\sqrt{22}}{429}R_{52}$ $- \frac{5\sqrt{66}}{858}R_{54} - \frac{75\sqrt{7}}{1144}R_{70} - \frac{45\sqrt{3}}{1144}R_{72} + \frac{75\sqrt{66}}{1144}R_{74}$ $+ \frac{45\sqrt{429}}{1144}R_{76}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	4	3	$-\frac{\sqrt{35}}{77}R_{30} + \frac{3\sqrt{42}}{77}R_{32} - \frac{5\sqrt{55}}{286}R_{50} + \frac{2\sqrt{462}}{143}R_{52}$ $- \frac{9\sqrt{154}}{286}R_{54} - \frac{35\sqrt{3}}{1144}R_{70} + \frac{15\sqrt{7}}{1144}R_{72} + \frac{15\sqrt{154}}{1144}R_{74}$ $- \frac{15\sqrt{1001}}{1144}R_{76}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	4	4	$\frac{\sqrt{510}}{1683}iR_{30} + \frac{164\sqrt{17}}{1683}iR_{32} + \frac{4\sqrt{39270}}{21879}iR_{50} + \frac{734\sqrt{187}}{21879}iR_{52}$ $- \frac{4\sqrt{561}}{2431}iR_{54} + \frac{35\sqrt{238}}{4862}iR_{70} + \frac{80\sqrt{102}}{2431}iR_{72} + \frac{45\sqrt{561}}{2431}iR_{74}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	4	5	$\frac{4\sqrt{210}}{693}iR_{30} - \frac{10\sqrt{7}}{693}iR_{32} + \frac{16\sqrt{330}}{1287}iR_{50} + \frac{8\sqrt{77}}{1287}iR_{52}$ $+ \frac{70\sqrt{2}}{143}iR_{70} + \frac{20\sqrt{42}}{143}iR_{72}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	5	1	$-\frac{\sqrt{42}}{11}iI_{41} - \frac{3\sqrt{65}}{143}iI_{61} + \frac{6\sqrt{26}}{143}iI_{63} + \frac{2\sqrt{210}}{77}iR_{40}$ $- \frac{8\sqrt{21}}{77}iR_{42} + \frac{3\sqrt{2730}}{286}iR_{60} + \frac{24\sqrt{26}}{143}iR_{62}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	5	2	$\frac{5\sqrt{7}}{42}iI_{21} + \frac{8\sqrt{42}}{77}iI_{41} + \frac{17\sqrt{65}}{858}iI_{61} - \frac{3\sqrt{26}}{26}iI_{63}$ $+ \frac{5\sqrt{42}}{42}iR_{20} - \frac{6\sqrt{21}}{77}iR_{42} - \frac{34\sqrt{26}}{429}iR_{62}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	5	3	$\frac{5\sqrt{3}}{14}iI_{21} + \frac{16\sqrt{2}}{77}iI_{41} + \frac{3\sqrt{1365}}{286}iI_{61} - \frac{\sqrt{546}}{286}iI_{63}$ $+ \frac{5\sqrt{2}}{14}iR_{20} + \frac{10}{77}iR_{42} + \frac{2\sqrt{546}}{429}iR_{62}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	5	4	$\frac{5\sqrt{7}}{21}iI_{21} - \frac{5\sqrt{42}}{77}iI_{41} + \frac{8\sqrt{65}}{429}iI_{61} + \frac{3\sqrt{26}}{143}iI_{63}$ $+ \frac{2\sqrt{210}}{77}iR_{40} - \frac{8\sqrt{21}}{77}iR_{42} - \frac{\sqrt{2730}}{66}iR_{60} - \frac{8\sqrt{26}}{33}iR_{62}$
$\frac{5}{2}$	3	3	$\frac{9}{2}$	5	5	$\frac{5\sqrt{2}}{14}I_{21} + \frac{34\sqrt{3}}{77}I_{41} - \frac{\sqrt{910}}{286}I_{61} + \frac{5\sqrt{91}}{143}I_{63}$ $- \frac{10\sqrt{3}}{21}R_{20} - \frac{8\sqrt{15}}{77}R_{40} - \frac{7\sqrt{195}}{429}R_{60}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	1	$\frac{3\sqrt{286}}{143}I_{61} - \frac{3\sqrt{715}}{143}I_{63} + \frac{2\sqrt{7854}}{221}I_{81} + \frac{9\sqrt{170}}{221}I_{83}$ $+ \frac{5\sqrt{231}}{1001}R_{40} - \frac{2\sqrt{2310}}{1001}R_{42} + \frac{\sqrt{3003}}{286}R_{60} - \frac{3\sqrt{715}}{715}R_{62}$ $+ \frac{19\sqrt{3927}}{2431}R_{80} - \frac{31\sqrt{2805}}{2431}R_{82} + \frac{9\sqrt{102}}{442}R_{84}$

Table B365: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 34 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	2	$\frac{3\sqrt{26}}{143}I_{61} - \frac{3\sqrt{65}}{143}I_{63} + \frac{22\sqrt{714}}{221}I_{81} + \frac{9\sqrt{1870}}{221}I_{83}$ $- \frac{20\sqrt{21}}{1001}R_{40} + \frac{51\sqrt{210}}{2002}R_{42} + \frac{7\sqrt{273}}{286}R_{60} + \frac{63\sqrt{65}}{715}R_{62}$ $+ \frac{2\sqrt{357}}{221}R_{80} + \frac{\sqrt{255}}{221}R_{82} - \frac{2\sqrt{1122}}{221}R_{84}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	3	$\frac{38\sqrt{7}}{143}I_{41} - \frac{7\sqrt{39}}{143}I_{63} - \frac{5\sqrt{1122}}{221}I_{83} + \frac{31\sqrt{35}}{1001}R_{40}$ $- \frac{\sqrt{14}}{77}R_{42} - \frac{7\sqrt{455}}{286}R_{60} - \frac{9\sqrt{39}}{143}R_{62} + \frac{\sqrt{595}}{221}R_{80}$ $+ \frac{15\sqrt{17}}{221}R_{82} + \frac{3\sqrt{1870}}{442}R_{84}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	4	$- \frac{2\sqrt{21}}{13}I_{41} + \frac{\sqrt{13}}{13}I_{63} - \frac{5\sqrt{374}}{221}I_{83} + \frac{6\sqrt{105}}{1001}R_{40}$ $- \frac{31\sqrt{42}}{2002}R_{42} - \frac{\sqrt{1365}}{286}R_{60} - \frac{25\sqrt{13}}{143}R_{62} + \frac{2\sqrt{1785}}{221}R_{80}$ $+ \frac{5\sqrt{51}}{221}R_{82} - \frac{2\sqrt{5610}}{221}R_{84}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	5	$\frac{\sqrt{14}}{143}I_{41} - \frac{\sqrt{195}}{143}I_{61} - \frac{6\sqrt{595}}{221}I_{81} - \frac{8\sqrt{70}}{1001}R_{40}$ $+ \frac{3\sqrt{7}}{77}R_{42} + \frac{5\sqrt{910}}{286}R_{60} + \frac{19\sqrt{78}}{143}R_{62} + \frac{\sqrt{1190}}{221}R_{80}$ $+ \frac{15\sqrt{34}}{221}R_{82} + \frac{3\sqrt{935}}{221}R_{84}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	5	6	$- \frac{9\sqrt{10}}{143}iI_{41} - \frac{3\sqrt{273}}{143}iI_{61} - \frac{42\sqrt{17}}{221}iI_{81} + \frac{5\sqrt{2}}{143}iR_{40}$ $+ \frac{2\sqrt{5}}{143}iR_{42} + \frac{7\sqrt{26}}{286}iR_{60} - \frac{\sqrt{2730}}{143}iR_{62} + \frac{14\sqrt{34}}{221}iR_{80}$ $+ \frac{3\sqrt{1190}}{221}iR_{82}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	1	$\frac{15\sqrt{1302}}{1612}R_{50} - \frac{15\sqrt{155}}{403}R_{52} + \frac{\sqrt{465}}{62}R_{54} + \frac{9\sqrt{23870}}{16120}R_{70}$ $+ \frac{3\sqrt{10230}}{16120}R_{72} - \frac{7\sqrt{465}}{620}R_{74} - \frac{17\sqrt{12090}}{16120}R_{76}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	2	$\frac{5\sqrt{8990}}{957}R_{30} - \frac{511\sqrt{692230}}{1542684}R_{50} + \frac{215\sqrt{29667}}{128557}R_{52} - \frac{683\sqrt{9889}}{257114}R_{54}$ $+ \frac{111\sqrt{37758}}{128557}R_{70} + \frac{27\sqrt{1798}}{11687}R_{72} - \frac{336\sqrt{9889}}{128557}R_{74}$ $+ \frac{3\sqrt{257114}}{11687}R_{76}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	3	$\frac{95\sqrt{145}}{1914}R_{30} + \frac{5\sqrt{174}}{66}R_{32} + \frac{4\sqrt{11165}}{12441}R_{50} - \frac{190\sqrt{1914}}{12441}R_{52}$ $- \frac{48\sqrt{638}}{4147}R_{54} - \frac{2\sqrt{609}}{4147}R_{70} + \frac{255\sqrt{29}}{8294}R_{72} + \frac{72\sqrt{638}}{4147}R_{74}$ $+ \frac{9\sqrt{4147}}{8294}R_{76}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	4	$\frac{25\sqrt{138}}{1518}iR_{30} - \frac{5\sqrt{115}}{253}iR_{32} + \frac{35\sqrt{10626}}{39468}iR_{50} - \frac{29\sqrt{1265}}{3289}iR_{52}$ $+ \frac{43\sqrt{3795}}{6578}iR_{54} + \frac{21\sqrt{1610}}{16445}iR_{70} - \frac{153\sqrt{690}}{13156}iR_{72}$ $- \frac{28\sqrt{3795}}{16445}iR_{74} - \frac{\sqrt{98670}}{5980}iR_{76}$

Table B366: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 35 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	5	$\frac{50\sqrt{27370}}{90321}iR_{30} - \frac{80\sqrt{8211}}{12903}iR_{32} + \frac{35\sqrt{43010}}{167739}iR_{50} - \frac{188\sqrt{90321}}{167739}iR_{52}$ $- \frac{162\sqrt{30107}}{55913}iR_{54} + \frac{28\sqrt{2346}}{55913}iR_{70} - \frac{465\sqrt{5474}}{111826}iR_{72}$ $- \frac{108\sqrt{30107}}{55913}iR_{74} + \frac{3\sqrt{782782}}{10166}iR_{76}$
$\frac{5}{2}$	3	3	$\frac{11}{2}$	6	6	$- \frac{50\sqrt{51}}{561}iR_{30} + \frac{5\sqrt{170}}{187}iR_{32} - \frac{35\sqrt{3927}}{7293}iR_{50} - \frac{\sqrt{1870}}{2431}iR_{52}$ $- \frac{9\sqrt{5610}}{2431}iR_{54} - \frac{84\sqrt{595}}{12155}iR_{70} - \frac{6\sqrt{255}}{2431}iR_{72} - \frac{6\sqrt{5610}}{2431}iR_{74}$ $- \frac{2\sqrt{36465}}{1105}iR_{76}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	1	$- \frac{3\sqrt{35}}{260}iR_{50} + \frac{\sqrt{6}}{26}iR_{52} - \frac{\sqrt{2}}{52}iR_{54} - \frac{12\sqrt{231}}{1105}iR_{70}$ $+ \frac{66\sqrt{11}}{1105}iR_{72} - \frac{12\sqrt{2}}{1105}iR_{74} - \frac{30\sqrt{13}}{221}iR_{76} - \frac{9\sqrt{7315}}{1615}iR_{90}$ $+ \frac{77\sqrt{133}}{1292}iR_{92} - \frac{7\sqrt{494}}{646}iR_{94} + \frac{3\sqrt{5187}}{1292}iR_{96}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	2	$- \frac{9\sqrt{210}}{2860}iR_{50} + \frac{9}{143}iR_{52} - \frac{43\sqrt{3}}{286}iR_{54} - \frac{108\sqrt{154}}{12155}iR_{70}$ $+ \frac{201\sqrt{66}}{24310}iR_{72} - \frac{212\sqrt{3}}{1105}iR_{74} + \frac{3\sqrt{78}}{442}iR_{76} - \frac{27\sqrt{43890}}{17765}iR_{90}$ $+ \frac{\sqrt{798}}{1292}iR_{92} + \frac{9\sqrt{741}}{323}iR_{94} - \frac{3\sqrt{3458}}{1292}iR_{96}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	3	$- \frac{\sqrt{21}}{143}iR_{50} - \frac{9\sqrt{10}}{143}iR_{52} + \frac{5\sqrt{30}}{143}iR_{54} - \frac{48\sqrt{385}}{12155}iR_{70}$ $- \frac{201\sqrt{165}}{12155}iR_{72} + \frac{36\sqrt{30}}{1105}iR_{74} - \frac{3\sqrt{195}}{221}iR_{76} - \frac{12\sqrt{4389}}{3553}iR_{90}$ $- \frac{\sqrt{1995}}{646}iR_{92} + \frac{2\sqrt{7410}}{323}iR_{94} + \frac{3\sqrt{8645}}{646}iR_{96}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	4	$- \frac{2\sqrt{21}}{65}R_{50} + \frac{4\sqrt{10}}{65}R_{52} + \frac{81\sqrt{385}}{11050}R_{70} + \frac{27\sqrt{165}}{11050}R_{72}$ $- \frac{71\sqrt{30}}{850}R_{74} + \frac{11\sqrt{195}}{2210}R_{76} + \frac{13\sqrt{4389}}{12920}R_{90} + \frac{13\sqrt{1995}}{9690}R_{92}$ $- \frac{13\sqrt{7410}}{19380}R_{94} + \frac{3\sqrt{8645}}{3230}R_{96} + \frac{37\sqrt{881790}}{38760}R_{98}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	5	$- \frac{683\sqrt{551166}}{3411980}R_{50} - \frac{67\sqrt{65615}}{852995}R_{52} + \frac{235\sqrt{196845}}{341198}R_{54}$ $+ \frac{11637\sqrt{83510}}{26365300}R_{70} - \frac{7521\sqrt{35790}}{26365300}R_{72} - \frac{3461\sqrt{196845}}{13182650}R_{74}$ $- \frac{883\sqrt{5117970}}{5273060}R_{76} + \frac{2563\sqrt{952014}}{15413560}R_{90} + \frac{533\sqrt{52360770}}{11560170}R_{92}$ $+ \frac{667\sqrt{48620715}}{11560170}R_{94} + \frac{123\sqrt{226896670}}{3853390}R_{96} + \frac{\sqrt{5785865085}}{1360020}R_{98}$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	6	$\frac{10623\sqrt{331342627}}{2461402372}R_{50} + \frac{2129\sqrt{1420039830}}{1230701186}R_{52} - \frac{19491\sqrt{473346610}}{2461402372}R_{54}$ $- \frac{29551\sqrt{451830855}}{1901992742}R_{70} + \frac{322719\sqrt{21515755}}{9509963710}R_{72} - \frac{15099\sqrt{473346610}}{1901992742}R_{74}$ $+ \frac{32529\sqrt{3076752965}}{9509963710}R_{76} + \frac{2799\sqrt{572319083}}{292614268}R_{90} + \frac{17853\sqrt{31477549565}}{5559671092}R_{92}$ $+ \frac{2211\sqrt{116916612670}}{1389917773}R_{94} - \frac{15\sqrt{1227624433035}}{292614268}R_{96} - \frac{279\sqrt{13913076907730}}{5559671092}R_{98}$

Table B367: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 36 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{5}{2}$	3	3	$\frac{13}{2}$	6	7	$\frac{9\sqrt{3282370}}{93782}R_{50} + \frac{16\sqrt{140673}}{46891}R_{52} + \frac{3\sqrt{46891}}{46891}R_{54} - \frac{6\sqrt{21663642}}{797147}R_{70}$ $- \frac{405\sqrt{1031602}}{797147}R_{72} - \frac{252\sqrt{46891}}{797147}R_{74} - \frac{33\sqrt{7214}}{61319}R_{76}$ $+ \frac{21\sqrt{686015330}}{1165061}R_{90} + \frac{455\sqrt{12473006}}{2330122}R_{92} + \frac{1130\sqrt{68533}}{1165061}R_{94}$ $+ \frac{245\sqrt{2878386}}{2330122}R_{96} + \frac{50\sqrt{8155427}}{1165061}R_{98}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	1	$- \frac{\sqrt{30}}{24}I_{21} + \frac{6\sqrt{5}}{11}I_{41} - \frac{35\sqrt{546}}{3432}I_{61} + \frac{25\sqrt{1365}}{1716}I_{63}$ $+ R_{00} - \frac{\sqrt{5}}{3}R_{20} + \frac{3}{11}R_{40} - \frac{5\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	2	$- \frac{5\sqrt{210}}{168}I_{21} + \frac{9\sqrt{35}}{77}I_{41} + \frac{5\sqrt{78}}{264}I_{61} - \frac{35\sqrt{195}}{1716}I_{63}$ $- \frac{2\sqrt{195}}{39}R_{62}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	3	$\frac{5\sqrt{42}}{168}I_{21} + \frac{12\sqrt{7}}{77}I_{41} + \frac{35\sqrt{390}}{3432}I_{61} - \frac{15\sqrt{39}}{572}I_{63}$ $+ \frac{3\sqrt{35}}{77}R_{40} - \frac{6\sqrt{14}}{77}R_{42} + \frac{5\sqrt{455}}{143}R_{60} + \frac{80\sqrt{39}}{429}R_{62}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	3	4	$- \frac{3\sqrt{70}}{56}iI_{21} - \frac{3\sqrt{105}}{77}iI_{41} - \frac{25\sqrt{26}}{1144}iI_{61} - \frac{5\sqrt{65}}{572}iI_{63}$ $- \frac{\sqrt{105}}{21}iR_{20} - \frac{3\sqrt{210}}{77}iR_{42} + \frac{10\sqrt{65}}{429}iR_{62}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	1	$- \frac{\sqrt{42}}{36}R_{10} + \frac{7\sqrt{2}}{44}R_{30} + \frac{\sqrt{15}}{22}R_{32} - \frac{5\sqrt{154}}{572}R_{50}$ $- \frac{5\sqrt{165}}{286}R_{52} + \frac{15\sqrt{55}}{286}R_{54} + \frac{7\sqrt{210}}{5148}R_{70} + \frac{7\sqrt{10}}{286}R_{72}$ $- \frac{35\sqrt{55}}{858}R_{74} + \frac{7\sqrt{1430}}{858}R_{76}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	2	$\frac{\sqrt{5}}{11}R_{32} - \frac{5\sqrt{55}}{143}R_{52} + \frac{7\sqrt{30}}{429}R_{72} - \frac{7\sqrt{4290}}{429}R_{76}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	3	$\frac{\sqrt{14}}{84}iR_{10} + \frac{7\sqrt{6}}{132}iR_{30} + \frac{\sqrt{5}}{22}iR_{32} + \frac{95\sqrt{462}}{6006}iR_{50}$ $- \frac{5\sqrt{55}}{286}iR_{52} - \frac{7\sqrt{70}}{1144}iR_{70} + \frac{1085\sqrt{30}}{10296}iR_{72} - \frac{7\sqrt{165}}{132}iR_{74}$ $+ \frac{35\sqrt{4290}}{10296}iR_{76}$
$\frac{7}{2}$	3	1	$\frac{7}{2}$	4	4	$\frac{\sqrt{210}}{132}iR_{30} - \frac{\sqrt{7}}{22}iR_{32} + \frac{35\sqrt{330}}{3432}iR_{50} + \frac{5\sqrt{77}}{286}iR_{52}$ $- \frac{15\sqrt{231}}{572}iR_{54} + \frac{1435\sqrt{2}}{3432}iR_{70} - \frac{1085\sqrt{42}}{10296}iR_{72} + \frac{35\sqrt{231}}{1716}iR_{74}$ $- \frac{35\sqrt{6006}}{10296}iR_{76}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	1	$- \frac{4\sqrt{102}}{51}iR_{10} - \frac{3\sqrt{238}}{187}iR_{30} - \frac{\sqrt{1785}}{187}iR_{32} - \frac{15\sqrt{374}}{4862}iR_{50}$ $- \frac{4\sqrt{19635}}{2431}iR_{52} + \frac{9\sqrt{6545}}{2431}iR_{54} - \frac{35\sqrt{510}}{116688}iR_{70} + \frac{9\sqrt{1190}}{38896}iR_{72}$ $- \frac{43\sqrt{6545}}{19448}iR_{74} + \frac{23\sqrt{170170}}{38896}iR_{76}$

Table B368: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 37 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	2	$\frac{5\sqrt{3}}{18}R_{10} - \frac{5\sqrt{7}}{22}R_{30} + \frac{25\sqrt{11}}{286}R_{50} - \frac{3\sqrt{770}}{286}R_{54}$ $- \frac{35\sqrt{15}}{2574}R_{70} + \frac{7\sqrt{770}}{858}R_{74} - \frac{2\sqrt{5005}}{429}R_{76}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	3	$-\frac{\sqrt{7}}{6}R_{10} + \frac{7\sqrt{3}}{22}R_{30} - \frac{\sqrt{10}}{11}R_{32} - \frac{5\sqrt{231}}{286}R_{50}$ $+ \frac{5\sqrt{110}}{143}R_{52} - \frac{3\sqrt{330}}{286}R_{54} + \frac{7\sqrt{35}}{858}R_{70} - \frac{14\sqrt{15}}{429}R_{72}$ $+ \frac{7\sqrt{330}}{858}R_{74}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	4	$\frac{19\sqrt{102}}{1836}iR_{10} + \frac{13\sqrt{238}}{1122}iR_{30} + \frac{5\sqrt{1785}}{561}iR_{32} - \frac{125\sqrt{374}}{58344}iR_{50}$ $+ \frac{20\sqrt{19635}}{7293}iR_{52} + \frac{25\sqrt{6545}}{9724}iR_{54} - \frac{763\sqrt{510}}{65637}iR_{70}$ $+ \frac{287\sqrt{1190}}{43758}iR_{72} + \frac{70\sqrt{6545}}{21879}iR_{74} - \frac{7\sqrt{170170}}{43758}iR_{76}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	4	5	$-\frac{\sqrt{42}}{54}iR_{10} - \frac{31\sqrt{2}}{132}iR_{30} - \frac{5\sqrt{15}}{66}iR_{32} - \frac{5\sqrt{154}}{156}iR_{50}$ $- \frac{10\sqrt{165}}{429}iR_{52} + \frac{5\sqrt{55}}{286}iR_{54} - \frac{49\sqrt{210}}{3861}iR_{70} - \frac{287\sqrt{10}}{5148}iR_{72}$ $+ \frac{28\sqrt{55}}{1287}iR_{74} + \frac{7\sqrt{1430}}{5148}iR_{76}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	1	$-\frac{2\sqrt{15}}{33}iI_{21} + \frac{9\sqrt{10}}{143}iI_{41} - \frac{2\sqrt{273}}{429}iI_{61} + \frac{7\sqrt{17}}{2431}iI_{81}$ $- \frac{\sqrt{10}}{44}iR_{20} + \frac{45\sqrt{2}}{572}iR_{40} - \frac{63\sqrt{5}}{572}iR_{42} + \frac{35\sqrt{26}}{286}iR_{60}$ $+ \frac{59\sqrt{2730}}{2145}iR_{62} - \frac{189\sqrt{34}}{9724}iR_{80} - \frac{23\sqrt{1190}}{4862}iR_{82} + \frac{181\sqrt{1309}}{9724}iR_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{15}}{33}iI_{21} + \frac{15\sqrt{10}}{143}iI_{41} - \frac{7\sqrt{273}}{429}iI_{61} + \frac{42\sqrt{17}}{2431}iI_{81}$ $+ \frac{5\sqrt{10}}{132}iR_{20} - \frac{15\sqrt{2}}{143}iR_{40} - \frac{3\sqrt{5}}{143}iR_{42} + \frac{7\sqrt{26}}{66}iR_{60}$ $+ \frac{17\sqrt{2730}}{2145}iR_{62} - \frac{7\sqrt{34}}{4862}iR_{80} + \frac{27\sqrt{1190}}{2431}iR_{82} - \frac{81\sqrt{1309}}{4862}iR_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	3	$-\frac{14\sqrt{13}}{143}iI_{61} + \frac{7\sqrt{130}}{143}iI_{63} - \frac{28\sqrt{357}}{221}iI_{81} - \frac{126\sqrt{935}}{2431}iI_{83}$ $- \frac{5\sqrt{210}}{924}iR_{20} + \frac{30\sqrt{42}}{1001}iR_{40} + \frac{12\sqrt{105}}{1001}iR_{42} + \frac{7\sqrt{546}}{858}iR_{60}$ $+ \frac{49\sqrt{130}}{2145}iR_{62} - \frac{49\sqrt{714}}{4862}iR_{80} + \frac{63\sqrt{510}}{2431}iR_{82} - \frac{49\sqrt{561}}{4862}iR_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	4	$\frac{105\sqrt{17}}{221}iI_{81} + \frac{42\sqrt{19635}}{2431}iI_{83} + \frac{5\sqrt{10}}{132}iR_{20} - \frac{45\sqrt{2}}{572}iR_{40}$ $+ \frac{3\sqrt{5}}{44}iR_{42} + \frac{49\sqrt{26}}{858}iR_{60} + \frac{19\sqrt{2730}}{2145}iR_{62} - \frac{287\sqrt{34}}{9724}iR_{80}$ $- \frac{21\sqrt{1190}}{4862}iR_{82} + \frac{21\sqrt{1309}}{884}iR_{84}$
$\frac{7}{2}$	3	1	$\frac{9}{2}$	5	5	$-\frac{15\sqrt{35}}{143}I_{41} - \frac{14\sqrt{195}}{429}I_{63} + \frac{7\sqrt{5610}}{2431}I_{83} - \frac{\sqrt{35}}{231}R_{20}$ $+ \frac{75\sqrt{7}}{2002}R_{40} + \frac{27\sqrt{70}}{4004}R_{42} + \frac{14\sqrt{91}}{429}R_{60} + \frac{28\sqrt{195}}{2145}R_{62}$ $+ \frac{245\sqrt{119}}{4862}R_{80} - \frac{147\sqrt{85}}{2431}R_{82} + \frac{21\sqrt{374}}{9724}R_{84}$

Table B369: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 38 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	1	$\frac{105\sqrt{11}}{572}I_{41} - \frac{\sqrt{30030}}{572}I_{61} + \frac{3\sqrt{3003}}{286}I_{63} - \frac{49\sqrt{1870}}{1768}I_{81}$ $- \frac{73\sqrt{714}}{1768}I_{83} - \frac{5\sqrt{11}}{11}R_{20} - \frac{15\sqrt{22}}{143}R_{42} + \frac{\sqrt{3003}}{429}R_{62}$ $- \frac{\sqrt{1309}}{2431}R_{82}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	2	$\frac{5\sqrt{6}}{132}I_{21} + \frac{15}{52}I_{41} - \frac{\sqrt{2730}}{858}I_{61} - \frac{\sqrt{273}}{143}I_{63}$ $+ \frac{2149\sqrt{170}}{19448}I_{81} + \frac{19\sqrt{7854}}{1496}I_{83} - \frac{42\sqrt{85}}{2431}R_{80} + \frac{64\sqrt{119}}{2431}R_{82}$ $- \frac{4\sqrt{13090}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	3	$- \frac{5\sqrt{10}}{33}I_{21} + \frac{95\sqrt{15}}{572}I_{41} - \frac{\sqrt{182}}{156}I_{61} - \frac{\sqrt{455}}{286}I_{63}$ $+ \frac{1099\sqrt{102}}{19448}I_{81} + \frac{15\sqrt{13090}}{19448}I_{83} + \frac{\sqrt{455}}{65}R_{62} - \frac{84\sqrt{51}}{2431}R_{80}$ $- \frac{3\sqrt{1785}}{2431}R_{82} + \frac{18\sqrt{7854}}{2431}R_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	4	$- \frac{7\sqrt{30}}{132}I_{21} + \frac{105\sqrt{5}}{572}I_{41} + \frac{\sqrt{546}}{858}I_{61} + \frac{\sqrt{1365}}{143}I_{63}$ $+ \frac{1281\sqrt{34}}{19448}I_{81} + \frac{47\sqrt{39270}}{19448}I_{83} + \frac{2\sqrt{5}}{11}R_{20} - \frac{90}{143}R_{40}$ $+ \frac{14\sqrt{13}}{143}R_{60} - \frac{42\sqrt{17}}{2431}R_{80}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	5	$\frac{7\sqrt{5}}{33}I_{21} - \frac{35\sqrt{30}}{572}I_{41} + \frac{35\sqrt{91}}{858}I_{61} + \frac{\sqrt{910}}{286}I_{63}$ $+ \frac{35\sqrt{51}}{748}I_{81} + \frac{27\sqrt{6545}}{9724}I_{83} - \frac{\sqrt{30}}{66}R_{20} - \frac{15\sqrt{15}}{143}R_{42}$ $+ \frac{7\sqrt{910}}{429}R_{62} - \frac{7\sqrt{3570}}{2431}R_{82}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	5	6	$\frac{5\sqrt{7}}{66}iI_{21} - \frac{5\sqrt{42}}{572}iI_{41} + \frac{14\sqrt{65}}{429}iI_{61} + \frac{49\sqrt{1785}}{9724}iI_{81}$ $- \frac{105\sqrt{187}}{9724}iI_{83} - \frac{5\sqrt{210}}{1001}iR_{40} + \frac{20\sqrt{21}}{1001}iR_{42} - \frac{7\sqrt{2730}}{429}iR_{60}$ $- \frac{112\sqrt{26}}{429}iR_{62} - \frac{14\sqrt{2805}}{2431}iR_{84}$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	1	$- \frac{5\sqrt{23870}}{17732}R_{30} - \frac{5\sqrt{7161}}{2046}R_{32} + \frac{7\sqrt{310}}{1612}R_{50} - \frac{\sqrt{651}}{1209}R_{52}$ $+ \frac{7\sqrt{217}}{806}R_{54} - \frac{315\sqrt{2046}}{301444}R_{70} + \frac{1425\sqrt{4774}}{602888}R_{72}$ $- \frac{315\sqrt{217}}{13702}R_{74} + \frac{135\sqrt{5642}}{54808}R_{76} + \frac{21\sqrt{64790}}{520676}R_{90}$ $- \frac{161\sqrt{1178}}{80104}R_{92} + \frac{231\sqrt{53599}}{260338}R_{94} - \frac{1155\sqrt{45942}}{1041352}R_{96}$ $+ \frac{77\sqrt{130169}}{260338}R_{98}$

Table B370: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 39 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	2	$ \begin{aligned} & -\frac{5\sqrt{37758}}{8866}R_{30} - \frac{5\sqrt{31465}}{128557}R_{32} + \frac{7\sqrt{59334}}{8866}R_{50} + \frac{7\sqrt{346115}}{128557}R_{52} \\ & + \frac{35\sqrt{1038345}}{385671}R_{54} - \frac{189\sqrt{8990}}{150722}R_{70} - \frac{189\sqrt{188790}}{2185469}R_{72} \\ & - \frac{525\sqrt{1038345}}{2185469}R_{74} - \frac{9\sqrt{26996970}}{128557}R_{76} + \frac{21\sqrt{102486}}{260338}R_{90} \\ & + \frac{21\sqrt{5636730}}{3774901}R_{92} + \frac{35\sqrt{256471215}}{3774901}R_{94} + \frac{21\sqrt{24425830}}{222053}R_{96} \\ & - \frac{7\sqrt{622858665}}{198679}R_{98} \end{aligned} $
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	3	$ \begin{aligned} & -\frac{35\sqrt{2030}}{24882}R_{32} + \frac{49\sqrt{22330}}{24882}R_{52} + \frac{7\sqrt{66990}}{12441}R_{54} - \frac{441\sqrt{3045}}{70499}R_{72} \\ & - \frac{105\sqrt{66990}}{70499}R_{74} - \frac{9\sqrt{435435}}{70499}R_{76} + \frac{49\sqrt{90915}}{121771}R_{92} \\ & + \frac{7\sqrt{16546530}}{121771}R_{94} + \frac{21\sqrt{393965}}{121771}R_{96} + \frac{14\sqrt{40184430}}{121771}R_{98} \end{aligned} $
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{10\sqrt{1610}}{3289}iR_{30} - \frac{35\sqrt{483}}{3289}iR_{32} - \frac{7\sqrt{2530}}{3289}iR_{50} - \frac{15\sqrt{5313}}{3289}iR_{52} \\ & - \frac{24\sqrt{1771}}{3289}iR_{54} - \frac{1575\sqrt{138}}{447304}iR_{70} + \frac{555\sqrt{322}}{447304}iR_{72} \\ & - \frac{2505\sqrt{1771}}{223652}iR_{74} - \frac{15\sqrt{46046}}{34408}iR_{76} - \frac{147\sqrt{4370}}{1545232}iR_{90} \\ & - \frac{147\sqrt{9614}}{386308}iR_{92} + \frac{7\sqrt{437437}}{20332}iR_{94} - \frac{301\sqrt{374946}}{386308}iR_{96} \\ & + \frac{105\sqrt{1062347}}{772616}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	5	$ \begin{aligned} & -\frac{95\sqrt{2346}}{111826}iR_{30} - \frac{305\sqrt{1955}}{167739}iR_{32} - \frac{21\sqrt{180642}}{111826}iR_{50} \\ & - \frac{203\sqrt{21505}}{167739}iR_{52} - \frac{7\sqrt{64515}}{9867}iR_{54} + \frac{9723\sqrt{27370}}{15208336}iR_{70} \\ & - \frac{46935\sqrt{11730}}{15208336}iR_{72} - \frac{1827\sqrt{64515}}{7604168}iR_{74} - \frac{105\sqrt{1677390}}{894608}iR_{76} \\ & - \frac{4809\sqrt{312018}}{26268944}iR_{90} + \frac{777\sqrt{17160990}}{6567236}iR_{92} - \frac{1379\sqrt{15935205}}{6567236}iR_{94} \\ & + \frac{21\sqrt{74364290}}{386308}iR_{96} - \frac{49\sqrt{6561555}}{772616}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	1	$\frac{11}{2}$	6	6	$ \begin{aligned} & -\frac{5\sqrt{595}}{9724}iR_{30} + \frac{5\sqrt{714}}{9724}iR_{32} - \frac{7\sqrt{935}}{4862}iR_{50} - \frac{3\sqrt{7854}}{2431}iR_{52} \\ & + \frac{\sqrt{2618}}{286}iR_{54} + \frac{1995\sqrt{51}}{165308}iR_{70} - \frac{1875\sqrt{119}}{82654}iR_{72} - \frac{555\sqrt{2618}}{165308}iR_{74} \\ & + \frac{15\sqrt{17017}}{4862}iR_{76} + \frac{231\sqrt{1615}}{15028}iR_{90} - \frac{896\sqrt{3553}}{71383}iR_{92} \\ & - \frac{7\sqrt{646646}}{142766}iR_{94} + \frac{49\sqrt{5434}}{16796}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{20\sqrt{231}}{429}iR_{30} - \frac{4\sqrt{770}}{143}iR_{32} + \frac{7\sqrt{3}}{78}iR_{50} + \frac{\sqrt{70}}{65}iR_{52} \\ & - \frac{\sqrt{210}}{130}iR_{54} + \frac{189\sqrt{55}}{48620}iR_{70} + \frac{57\sqrt{1155}}{48620}iR_{72} - \frac{27\sqrt{210}}{4420}iR_{74} \\ & + \frac{3\sqrt{1365}}{340}iR_{76} + \frac{7\sqrt{627}}{67184}iR_{90} + \frac{21\sqrt{285}}{83980}iR_{92} + \frac{9\sqrt{51870}}{167960}iR_{94} \\ & - \frac{287\sqrt{1235}}{83980}iR_{96} + \frac{217\sqrt{125970}}{335920}iR_{98} \end{aligned} $

Table B371: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 40 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	2	$\frac{35\sqrt{154}}{1573}iR_{30} + \frac{73\sqrt{1155}}{4719}iR_{32} + \frac{7\sqrt{2}}{52}iR_{50} + \frac{83\sqrt{105}}{2145}iR_{52}$ $+ \frac{9\sqrt{35}}{110}iR_{54} + \frac{8253\sqrt{330}}{2139280}iR_{70} + \frac{1467\sqrt{770}}{2139280}iR_{72}$ $+ \frac{171\sqrt{35}}{7480}iR_{74} + \frac{9\sqrt{910}}{880}iR_{76} + \frac{189\sqrt{418}}{369512}iR_{90} + \frac{329\sqrt{190}}{83980}iR_{92}$ $- \frac{77\sqrt{8645}}{41990}iR_{94} + \frac{7\sqrt{7410}}{4940}iR_{96} + \frac{49\sqrt{20995}}{83980}iR_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	3	$\frac{10\sqrt{385}}{4719}iR_{30} + \frac{20\sqrt{462}}{4719}iR_{32} + \frac{7\sqrt{5}}{312}iR_{50} + \frac{53\sqrt{42}}{1716}iR_{52}$ $+ \frac{71\sqrt{14}}{1144}iR_{54} + \frac{189\sqrt{33}}{53482}iR_{70} - \frac{72\sqrt{77}}{26741}iR_{72} + \frac{27\sqrt{14}}{286}iR_{74}$ $+ \frac{36\sqrt{91}}{2431}iR_{76} + \frac{2163\sqrt{1045}}{369512}iR_{90} - \frac{2163\sqrt{19}}{33592}iR_{92}$ $+ \frac{371\sqrt{741}}{33592}iR_{96} - \frac{21\sqrt{8398}}{33592}iR_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	4	$-\frac{7\sqrt{385}}{858}R_{30} + \frac{\sqrt{462}}{22}R_{32} + \frac{49\sqrt{5}}{390}R_{50} - \frac{8\sqrt{42}}{65}R_{52}$ $-\frac{\sqrt{14}}{130}R_{54} - \frac{147\sqrt{33}}{4862}R_{70} + \frac{2259\sqrt{77}}{48620}R_{72} + \frac{9\sqrt{14}}{442}R_{74}$ $-\frac{15\sqrt{91}}{884}R_{76} + \frac{49\sqrt{1045}}{41990}R_{90} - \frac{147\sqrt{19}}{6460}R_{92} - \frac{33\sqrt{3458}}{41990}R_{94}$ $+ \frac{385\sqrt{741}}{50388}R_{96} - \frac{63\sqrt{8398}}{41990}R_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	5	$\frac{\sqrt{83510}}{858}R_{30} + \frac{63\sqrt{25053}}{170599}R_{32} - \frac{7\sqrt{131230}}{4290}R_{50} - \frac{441\sqrt{275583}}{852995}R_{52}$ $-\frac{151\sqrt{91861}}{852995}R_{54} + \frac{21\sqrt{7158}}{4862}R_{70} + \frac{35721\sqrt{16702}}{14500915}R_{72}$ $+ \frac{1359\sqrt{91861}}{2900183}R_{74} - \frac{285\sqrt{2388386}}{2900183}R_{76} - \frac{7\sqrt{226670}}{41990}R_{90}$ $-\frac{3969\sqrt{498674}}{25047035}R_{92} - \frac{453\sqrt{22689667}}{25047035}R_{94} + \frac{35\sqrt{19448286}}{790959}R_{96}$ $+ \frac{567\sqrt{55103477}}{25047035}R_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	6	$\frac{5\sqrt{60244114}}{511797}R_{32} - \frac{7\sqrt{662685254}}{511797}R_{52} + \frac{2\sqrt{1988055762}}{55940963}R_{54}$ $+ \frac{126\sqrt{90366171}}{2900183}R_{72} - \frac{90\sqrt{1988055762}}{950996371}R_{74} + \frac{21510\sqrt{12922362453}}{10460960081}R_{76}$ $-\frac{14\sqrt{2698075677}}{5009407}R_{92} + \frac{66\sqrt{491049773214}}{18068931049}R_{94} - \frac{50190\sqrt{11691661267}}{18068931049}R_{96}$ $+ \frac{28\sqrt{1192549449234}}{18068931049}R_{98}$
$\frac{7}{2}$	3	1	$\frac{13}{2}$	6	7	$-\frac{4\sqrt{4923555}}{46891}R_{54} + \frac{180\sqrt{4923555}}{797147}R_{74} + \frac{12\sqrt{757470}}{61319}R_{76}$ $-\frac{132\sqrt{7195965}}{1165061}R_{94} - \frac{308\sqrt{685330}}{1165061}R_{96} - \frac{56\sqrt{17475915}}{1165061}R_{98}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	2	$\frac{19\sqrt{30}}{168}I_{21} + \frac{12\sqrt{5}}{77}I_{41} - \frac{25\sqrt{546}}{3432}I_{61} - \frac{5\sqrt{1365}}{1716}I_{63}$ $+ R_{00} - \frac{\sqrt{5}}{21}R_{20} - \frac{39}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$

Table B372: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 41 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	3	$-\frac{5\sqrt{6}}{56}I_{21} + \frac{69}{77}I_{41} - \frac{5\sqrt{2730}}{1144}I_{61} - \frac{5\sqrt{273}}{572}I_{63}$ $+\frac{5}{7}R_{20} + \frac{3\sqrt{2}}{77}R_{42} + \frac{10\sqrt{273}}{429}R_{62}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	3	4	$-\frac{25\sqrt{10}}{168}iI_{21} - \frac{6\sqrt{15}}{77}iI_{41} - \frac{5\sqrt{182}}{3432}iI_{61} + \frac{5\sqrt{455}}{572}iI_{63}$ $-\frac{15\sqrt{3}}{77}iR_{40} + \frac{6\sqrt{30}}{77}iR_{42} + \frac{35\sqrt{39}}{429}iR_{60} + \frac{16\sqrt{455}}{429}iR_{62}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	1	$\frac{5\sqrt{6}}{252}R_{10} + \frac{5\sqrt{14}}{308}R_{30} + \frac{3\sqrt{105}}{154}R_{32} - \frac{115\sqrt{22}}{4004}R_{50}$ $+\frac{15\sqrt{1155}}{2002}R_{52} + \frac{15\sqrt{385}}{2002}R_{54} + \frac{49\sqrt{30}}{5148}R_{70} - \frac{35\sqrt{70}}{858}R_{72}$ $+\frac{7\sqrt{385}}{286}R_{74} + \frac{7\sqrt{10010}}{858}R_{76}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	2	$-\frac{5\sqrt{2}}{42}R_{10} - \frac{5\sqrt{42}}{154}R_{30} + \frac{115\sqrt{66}}{2002}R_{50} + \frac{5\sqrt{1155}}{1001}R_{54}$ $-\frac{49\sqrt{10}}{858}R_{70} + \frac{7\sqrt{1155}}{429}R_{74}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	3	$-\frac{25\sqrt{2}}{252}iR_{10} - \frac{25\sqrt{42}}{924}iR_{30} - \frac{3\sqrt{35}}{154}iR_{32} - \frac{5\sqrt{66}}{1092}iR_{50}$ $+\frac{45\sqrt{385}}{2002}iR_{52} + \frac{5\sqrt{1155}}{2002}iR_{54} + \frac{1127\sqrt{10}}{10296}iR_{70} + \frac{217\sqrt{210}}{10296}iR_{72}$ $-\frac{49\sqrt{1155}}{5148}iR_{74} + \frac{7\sqrt{30030}}{10296}iR_{76}$
$\frac{7}{2}$	3	2	$\frac{7}{2}$	4	4	$\frac{\sqrt{70}}{126}iR_{10} - \frac{\sqrt{30}}{132}iR_{30} + \frac{9}{22}iR_{32} + \frac{5\sqrt{2310}}{2184}iR_{50}$ $+\frac{15\sqrt{11}}{286}iR_{52} + \frac{5\sqrt{33}}{572}iR_{54} + \frac{595\sqrt{14}}{10296}iR_{70} + \frac{1295\sqrt{6}}{10296}iR_{72}$ $-\frac{35\sqrt{33}}{5148}iR_{74} - \frac{175\sqrt{858}}{10296}iR_{76}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	1	$\frac{5\sqrt{255}}{187}iR_{32} - \frac{10\sqrt{2805}}{2431}iR_{52} + \frac{12\sqrt{935}}{2431}iR_{54} - \frac{\sqrt{3570}}{272}iR_{70}$ $+\frac{1121\sqrt{170}}{38896}iR_{72} - \frac{131\sqrt{935}}{19448}iR_{74} - \frac{5\sqrt{24310}}{2992}iR_{76}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	2	$\frac{\sqrt{21}}{9}R_{10} - \frac{2}{11}R_{30} + \frac{3\sqrt{30}}{22}R_{32} - \frac{5\sqrt{77}}{143}R_{50}$ $-\frac{3\sqrt{330}}{286}R_{52} + \frac{20\sqrt{105}}{1287}R_{70} - \frac{155\sqrt{5}}{1716}R_{72} - \frac{5\sqrt{715}}{1716}R_{76}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	3	$\frac{15\sqrt{70}}{154}R_{32} - \frac{3\sqrt{770}}{286}R_{52} + \frac{\sqrt{2310}}{143}R_{54} - \frac{17\sqrt{105}}{1716}R_{72}$ $+\frac{2\sqrt{2310}}{429}R_{74} + \frac{\sqrt{15015}}{1716}R_{76}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	4	$-\frac{\sqrt{714}}{36}iR_{10} - \frac{\sqrt{34}}{33}iR_{30} - \frac{8\sqrt{255}}{561}iR_{32} + \frac{25\sqrt{2618}}{3432}iR_{50}$ $+\frac{16\sqrt{2805}}{7293}iR_{52} + \frac{141\sqrt{935}}{9724}iR_{54} + \frac{31\sqrt{3570}}{21879}iR_{70}$ $+\frac{131\sqrt{170}}{7293}iR_{72} + \frac{218\sqrt{935}}{21879}iR_{74} + \frac{\sqrt{24310}}{1989}iR_{76}$

Table B373: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 42 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	4	5	$-\frac{\sqrt{6}}{18}iR_{10} - \frac{83\sqrt{14}}{924}iR_{30} - \frac{\sqrt{105}}{462}iR_{32} - \frac{95\sqrt{22}}{1716}iR_{50}$ $+ \frac{4\sqrt{1155}}{429}iR_{52} + \frac{3\sqrt{385}}{286}iR_{54} + \frac{49\sqrt{30}}{1287}iR_{70} + \frac{53\sqrt{70}}{1716}iR_{72}$ $- \frac{4\sqrt{385}}{1287}iR_{74} - \frac{7\sqrt{10010}}{5148}iR_{76}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	1	$\frac{35\sqrt{119}}{221}iI_{81} + \frac{98\sqrt{2805}}{2431}iI_{83} - \frac{5\sqrt{70}}{308}iR_{20} + \frac{45\sqrt{14}}{4004}iR_{40}$ $- \frac{171\sqrt{35}}{4004}iR_{42} + \frac{5\sqrt{182}}{286}iR_{60} + \frac{\sqrt{390}}{715}iR_{62} + \frac{21\sqrt{238}}{9724}iR_{80}$ $+ \frac{7\sqrt{170}}{286}iR_{82} - \frac{483\sqrt{187}}{9724}iR_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	2	$\frac{6\sqrt{39}}{143}iI_{61} - \frac{3\sqrt{390}}{143}iI_{63} - \frac{84\sqrt{119}}{221}iI_{81} - \frac{126\sqrt{2805}}{2431}iI_{83}$ $- \frac{5\sqrt{70}}{924}iR_{20} + \frac{15\sqrt{14}}{1001}iR_{40} - \frac{3\sqrt{35}}{77}iR_{42} - \frac{\sqrt{182}}{66}iR_{60}$ $- \frac{\sqrt{390}}{33}iR_{62} - \frac{7\sqrt{238}}{442}iR_{80} + \frac{21\sqrt{170}}{2431}iR_{82} + \frac{315\sqrt{187}}{4862}iR_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	3	$\frac{17\sqrt{5}}{231}iI_{21} - \frac{15\sqrt{30}}{1001}iI_{41} - \frac{19\sqrt{91}}{429}iI_{61} + \frac{98\sqrt{51}}{2431}iI_{81}$ $- \frac{9\sqrt{30}}{308}iR_{20} - \frac{30\sqrt{6}}{1001}iR_{40} - \frac{6\sqrt{15}}{143}iR_{42} - \frac{7\sqrt{78}}{858}iR_{60}$ $+ \frac{5\sqrt{910}}{429}iR_{62} + \frac{147\sqrt{102}}{4862}iR_{80} + \frac{7\sqrt{3570}}{2431}iR_{82} - \frac{35\sqrt{3927}}{4862}iR_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	4	$\frac{2\sqrt{105}}{231}iI_{21} + \frac{3\sqrt{70}}{91}iI_{41} - \frac{2\sqrt{39}}{39}iI_{61} + \frac{21\sqrt{119}}{2431}iI_{81}$ $- \frac{\sqrt{70}}{84}iR_{20} - \frac{15\sqrt{14}}{364}iR_{40} + \frac{75\sqrt{35}}{4004}iR_{42} + \frac{\sqrt{182}}{78}iR_{60}$ $- \frac{\sqrt{390}}{33}iR_{62} - \frac{217\sqrt{238}}{9724}iR_{80} + \frac{21\sqrt{170}}{4862}iR_{82} + \frac{735\sqrt{187}}{9724}iR_{84}$
$\frac{7}{2}$	3	2	$\frac{9}{2}$	5	5	$\frac{51\sqrt{5}}{143}I_{41} - \frac{2\sqrt{1365}}{429}I_{63} + \frac{7\sqrt{39270}}{2431}I_{83} + \frac{20\sqrt{5}}{231}R_{20}$ $+ \frac{15}{2002}R_{40} + \frac{243\sqrt{10}}{4004}R_{42} - \frac{28\sqrt{13}}{429}R_{60} - \frac{8\sqrt{1365}}{2145}R_{62}$ $+ \frac{245\sqrt{17}}{4862}R_{80} + \frac{21\sqrt{595}}{2431}R_{82} - \frac{21\sqrt{2618}}{9724}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	1	$\frac{75\sqrt{77}}{572}I_{41} - \frac{\sqrt{4290}}{572}I_{61} + \frac{5\sqrt{429}}{286}I_{63} + \frac{5\sqrt{13090}}{1768}I_{81}$ $+ \frac{7\sqrt{102}}{136}I_{83} - \frac{6\sqrt{6545}}{2431}R_{80} + \frac{64\sqrt{187}}{2431}R_{82} - \frac{4\sqrt{170}}{221}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	2	$- \frac{5\sqrt{42}}{132}I_{21} - \frac{45\sqrt{7}}{572}I_{41} - \frac{5\sqrt{390}}{858}I_{61} + \frac{8\sqrt{39}}{143}I_{63}$ $+ \frac{31\sqrt{1190}}{1496}I_{81} + \frac{263\sqrt{1122}}{19448}I_{83} - \frac{5\sqrt{7}}{11}R_{20} + \frac{15\sqrt{14}}{143}R_{42}$ $- \frac{29\sqrt{39}}{429}R_{62} + \frac{59\sqrt{17}}{2431}R_{82}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	3	$\frac{2\sqrt{70}}{33}I_{21} + \frac{45\sqrt{105}}{572}I_{41} - \frac{115\sqrt{26}}{1716}I_{61} + \frac{9\sqrt{65}}{286}I_{63}$ $+ \frac{25\sqrt{714}}{1144}I_{81} + \frac{15\sqrt{1870}}{1496}I_{83} + \frac{2\sqrt{105}}{33}R_{20} - \frac{10\sqrt{21}}{143}R_{40}$ $- \frac{10\sqrt{273}}{429}R_{60} + \frac{30\sqrt{357}}{2431}R_{80}$

Table B374: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 43 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	4	$-\frac{5\sqrt{210}}{132}I_{21} + \frac{15\sqrt{35}}{572}I_{41} + \frac{41\sqrt{78}}{858}I_{61} - \frac{2\sqrt{195}}{143}I_{63}$ $-\frac{537\sqrt{238}}{19448}I_{81} + \frac{15\sqrt{5610}}{19448}I_{83} + \frac{3\sqrt{195}}{65}R_{62} + \frac{12\sqrt{119}}{2431}R_{80}$ $+\frac{3\sqrt{85}}{2431}R_{82} - \frac{18\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	5	$\frac{5\sqrt{210}}{52}I_{41} + \frac{\sqrt{13}}{22}I_{61} - \frac{\sqrt{130}}{286}I_{63} - \frac{33\sqrt{357}}{884}I_{81}$ $-\frac{9\sqrt{935}}{572}I_{83} - \frac{25\sqrt{42}}{1001}R_{40} + \frac{20\sqrt{105}}{1001}R_{42} - \frac{\sqrt{546}}{33}R_{60}$ $-\frac{16\sqrt{130}}{165}R_{62} + \frac{2\sqrt{561}}{143}R_{84}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	5	6	$\frac{35}{66}iI_{21} - \frac{245\sqrt{6}}{572}iI_{41} - \frac{4\sqrt{455}}{429}iI_{61} - \frac{3\sqrt{182}}{143}iI_{63}$ $-\frac{7\sqrt{255}}{572}iI_{81} - \frac{3\sqrt{1309}}{748}iI_{83} - \frac{5\sqrt{6}}{66}iR_{20} - \frac{45\sqrt{3}}{143}iR_{42}$ $-\frac{\sqrt{182}}{429}iR_{62} + \frac{31\sqrt{714}}{2431}iR_{82}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	1	$-\frac{25\sqrt{3410}}{17732}R_{30} + \frac{25\sqrt{1023}}{8866}R_{32} - \frac{\sqrt{2170}}{1612}R_{50} - \frac{5\sqrt{93}}{403}R_{52}$ $+\frac{25\sqrt{31}}{806}R_{54} + \frac{435\sqrt{14322}}{301444}R_{70} - \frac{6315\sqrt{682}}{602888}R_{72}$ $+\frac{45\sqrt{31}}{13702}R_{74} + \frac{15\sqrt{806}}{4216}R_{76} - \frac{63\sqrt{453530}}{520676}R_{90} + \frac{3311\sqrt{8246}}{1041352}R_{92}$ $-\frac{1155\sqrt{7657}}{260338}R_{94} + \frac{385\sqrt{321594}}{1041352}R_{96} + \frac{7\sqrt{911183}}{8398}R_{98}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	2	$\frac{850\sqrt{5394}}{385671}R_{30} + \frac{20\sqrt{4495}}{35061}R_{32} + \frac{34\sqrt{415338}}{385671}R_{50} - \frac{677\sqrt{49445}}{385671}R_{52}$ $-\frac{10\sqrt{148335}}{128557}R_{54} - \frac{6\sqrt{62930}}{4433}R_{70} + \frac{15\sqrt{26970}}{46748}R_{72}$ $-\frac{18\sqrt{148335}}{2185469}R_{74} + \frac{3\sqrt{3856710}}{23188}R_{76} + \frac{42\sqrt{717402}}{222053}R_{90}$ $+\frac{21\sqrt{39457110}}{888212}R_{92} + \frac{42\sqrt{36638745}}{3774901}R_{94} + \frac{21\sqrt{170980810}}{520676}R_{96}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	3	$\frac{50\sqrt{87}}{12441}R_{30} + \frac{175\sqrt{290}}{24882}R_{32} + \frac{2\sqrt{6699}}{12441}R_{50} + \frac{25\sqrt{3190}}{24882}R_{52}$ $-\frac{35\sqrt{9570}}{12441}R_{54} - \frac{6\sqrt{1015}}{2431}R_{70} - \frac{1590\sqrt{435}}{70499}R_{72} - \frac{21\sqrt{9570}}{70499}R_{74}$ $+\frac{42\sqrt{11571}}{121771}R_{90} + \frac{56\sqrt{636405}}{121771}R_{92} + \frac{49\sqrt{2363790}}{121771}R_{94}$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	4	$-\frac{25\sqrt{69}}{9867}iR_{32} - \frac{85\sqrt{759}}{9867}iR_{52} - \frac{10\sqrt{253}}{3289}iR_{54} + \frac{15\sqrt{966}}{1564}iR_{70}$ $-\frac{8565\sqrt{46}}{223652}iR_{72} + \frac{315\sqrt{253}}{111826}iR_{74} - \frac{15\sqrt{6578}}{223652}iR_{76}$ $-\frac{231\sqrt{30590}}{118864}iR_{90} + \frac{21\sqrt{67298}}{386308}iR_{92} + \frac{1267\sqrt{62491}}{386308}iR_{94}$ $-\frac{21\sqrt{2624622}}{386308}iR_{96} - \frac{63\sqrt{7436429}}{772616}iR_{98}$

Table B375: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 44 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	5	$ \begin{aligned} & -\frac{125\sqrt{16422}}{102102}iR_{30} - \frac{445\sqrt{13685}}{1174173}iR_{32} + \frac{7\sqrt{25806}}{14586}iR_{50} \\ & - \frac{19\sqrt{150535}}{167739}iR_{52} + \frac{83\sqrt{451605}}{167739}iR_{54} + \frac{36183\sqrt{3910}}{15208336}iR_{70} \\ & + \frac{11043\sqrt{82110}}{15208336}iR_{72} + \frac{999\sqrt{451605}}{7604168}iR_{74} + \frac{1293\sqrt{11741730}}{15208336}iR_{76} \\ & - \frac{16317\sqrt{44574}}{26268944}iR_{90} - \frac{147\sqrt{2451570}}{3283618}iR_{92} + \frac{203\sqrt{111546435}}{6567236}iR_{94} \\ & + \frac{441\sqrt{10623470}}{3283618}iR_{96} - \frac{245\sqrt{937365}}{772616}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	2	$\frac{11}{2}$	6	6	$ \begin{aligned} & \frac{45\sqrt{85}}{9724}iR_{30} - \frac{895\sqrt{102}}{29172}iR_{32} + \frac{6\sqrt{6545}}{2431}iR_{50} + \frac{41\sqrt{1122}}{7293}iR_{52} \\ & - \frac{4\sqrt{374}}{221}iR_{54} + \frac{1065\sqrt{357}}{165308}iR_{70} + \frac{2505\sqrt{17}}{41327}iR_{72} \\ & + \frac{2265\sqrt{374}}{165308}iR_{74} + \frac{225\sqrt{2431}}{41327}iR_{76} - \frac{105\sqrt{11305}}{285532}iR_{90} \\ & - \frac{35\sqrt{24871}}{142766}iR_{92} + \frac{35\sqrt{92378}}{142766}iR_{94} + \frac{35\sqrt{969969}}{142766}iR_{96} \\ & + \frac{35\sqrt{38038}}{16796}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{\sqrt{30}}{13}iR_{54} - \frac{6\sqrt{30}}{221}iR_{74} + \frac{12\sqrt{195}}{1105}iR_{76} + \frac{\sqrt{4389}}{304}iR_{90} \\ & - \frac{3\sqrt{1995}}{380}iR_{92} + \frac{397\sqrt{7410}}{167960}iR_{94} - \frac{7\sqrt{8645}}{6460}iR_{96} - \frac{93\sqrt{881790}}{335920}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	2	$ \begin{aligned} & \frac{175\sqrt{165}}{4719}iR_{32} + \frac{10\sqrt{15}}{429}iR_{52} + \frac{8\sqrt{5}}{143}iR_{54} + \frac{9\sqrt{2310}}{2992}iR_{70} \\ & - \frac{18009\sqrt{110}}{427856}iR_{72} + \frac{747\sqrt{5}}{19448}iR_{74} - \frac{297\sqrt{130}}{17680}iR_{76} \\ & + \frac{9\sqrt{2926}}{28424}iR_{90} + \frac{29\sqrt{1330}}{41990}iR_{92} - \frac{41\sqrt{1235}}{41990}iR_{94} \\ & - \frac{29\sqrt{51870}}{41990}iR_{96} - \frac{31\sqrt{146965}}{83980}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	3	$ \begin{aligned} & \frac{35\sqrt{55}}{429}iR_{30} - \frac{35\sqrt{66}}{1573}iR_{32} - \frac{11\sqrt{35}}{312}iR_{50} - \frac{85\sqrt{6}}{572}iR_{52} \\ & + \frac{307\sqrt{2}}{1144}iR_{54} - \frac{27\sqrt{231}}{4862}iR_{70} - \frac{1998\sqrt{11}}{26741}iR_{72} - \frac{909\sqrt{2}}{4862}iR_{74} \\ & + \frac{18\sqrt{13}}{221}iR_{76} - \frac{135\sqrt{7315}}{369512}iR_{90} - \frac{45\sqrt{133}}{33592}iR_{92} + \frac{15\sqrt{494}}{4199}iR_{94} \\ & + \frac{45\sqrt{5187}}{33592}iR_{96} - \frac{15\sqrt{58786}}{33592}iR_{98} \end{aligned} $
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	4	$ \begin{aligned} & -\frac{35\sqrt{55}}{858}R_{30} + \frac{35\sqrt{66}}{858}R_{32} + \frac{5\sqrt{35}}{156}R_{50} - \frac{\sqrt{6}}{78}R_{52} \\ & - \frac{7\sqrt{2}}{52}R_{54} + \frac{30\sqrt{231}}{2431}R_{70} - \frac{2151\sqrt{11}}{48620}R_{72} + \frac{111\sqrt{2}}{1105}R_{74} \\ & - \frac{21\sqrt{13}}{340}R_{76} - \frac{25\sqrt{7315}}{16796}R_{90} + \frac{9\sqrt{133}}{1105}R_{92} + \frac{269\sqrt{494}}{41990}R_{94} \\ & - \frac{77\sqrt{5187}}{62985}R_{96} - \frac{15\sqrt{58786}}{16796}R_{98} \end{aligned} $

Table B376: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 45 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	5	$-\frac{1330\sqrt{11930}}{511797}R_{30} - \frac{2590\sqrt{3579}}{511797}R_{32} + \frac{95\sqrt{918610}}{511797}R_{50}$ $-\frac{601\sqrt{39369}}{511797}R_{52} - \frac{116\sqrt{13123}}{170599}R_{54} + \frac{2280\sqrt{50106}}{2900183}R_{70}$ $+\frac{181449\sqrt{2386}}{58003660}R_{72} + \frac{18222\sqrt{13123}}{14500915}R_{74} + \frac{3\sqrt{341198}}{3740}R_{76}$ $-\frac{25\sqrt{1586690}}{263653}R_{90} + \frac{711\sqrt{3490718}}{25047035}R_{92} + \frac{3229\sqrt{3241381}}{25047035}R_{94}$ $+\frac{\sqrt{136138002}}{62985}R_{96}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	6	$\frac{33460\sqrt{64547265}}{615350593}R_{30} - \frac{105\sqrt{8606302}}{55940963}R_{32} - \frac{2390\sqrt{4970139405}}{615350593}R_{50}$ $+\frac{24\sqrt{94669322}}{55940963}R_{52} - \frac{94112\sqrt{284007966}}{1846051779}R_{54} - \frac{516240\sqrt{30122057}}{10460960081}R_{70}$ $+\frac{576\sqrt{12909453}}{950996371}R_{72} + \frac{282006\sqrt{284007966}}{10460960081}R_{74} + \frac{35850\sqrt{8584786245}}{18068931049}R_{90}$ $-\frac{460\sqrt{18886529739}}{18068931049}R_{92} + \frac{18025\sqrt{70149967602}}{18068931049}R_{94}$
$\frac{7}{2}$	3	2	$\frac{13}{2}$	6	7	$\frac{280\sqrt{3094806}}{1547403}R_{30} + \frac{210\sqrt{2579005}}{515801}R_{32} - \frac{20\sqrt{1969422}}{140673}R_{50}$ $-\frac{48\sqrt{234455}}{46891}R_{52} + \frac{20\sqrt{703365}}{46891}R_{54} - \frac{288\sqrt{36106070}}{8768617}R_{70}$ $-\frac{576\sqrt{15474030}}{8768617}R_{72} - \frac{120\sqrt{703365}}{797147}R_{74} + \frac{100\sqrt{411609198}}{15145793}R_{90}$ $+\frac{460\sqrt{187095090}}{15145793}R_{92} + \frac{20\sqrt{1027995}}{1165061}R_{94}$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	3	3	$-\frac{5\sqrt{30}}{168}I_{21} - \frac{54\sqrt{5}}{77}I_{41} - \frac{25\sqrt{546}}{3432}I_{61} - \frac{5\sqrt{1365}}{1716}I_{63}$ $+R_{00} + \frac{5\sqrt{5}}{21}R_{20} + \frac{27}{77}R_{40} + \frac{25\sqrt{13}}{429}R_{60}$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	3	4	$\frac{5\sqrt{2}}{168}iI_{21} - \frac{3\sqrt{3}}{77}iI_{41} + \frac{5\sqrt{910}}{3432}iI_{61} - \frac{25\sqrt{91}}{572}iI_{63}$ $-\frac{10\sqrt{3}}{21}iR_{20} + \frac{12\sqrt{6}}{77}iR_{42} + \frac{10\sqrt{91}}{429}iR_{62}$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	4	1	$-\frac{\sqrt{30}}{252}R_{10} - \frac{3\sqrt{70}}{308}R_{30} - \frac{\sqrt{21}}{154}R_{32} - \frac{75\sqrt{110}}{4004}R_{50}$ $+\frac{5\sqrt{231}}{2002}R_{52} - \frac{15\sqrt{77}}{286}R_{54} - \frac{1225\sqrt{6}}{5148}R_{70} + \frac{70\sqrt{14}}{429}R_{72}$ $+\frac{35\sqrt{77}}{858}R_{74}$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	4	2	$\frac{\sqrt{7}}{7}R_{32} + \frac{5\sqrt{77}}{77}R_{52}$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	4	3	$\frac{5\sqrt{10}}{252}iR_{10} - \frac{\sqrt{210}}{84}iR_{30} + \frac{\sqrt{7}}{22}iR_{32} - \frac{20\sqrt{330}}{3003}iR_{50}$ $-\frac{5\sqrt{77}}{286}iR_{52} + \frac{5\sqrt{231}}{1001}iR_{54} + \frac{245\sqrt{2}}{936}iR_{70} + \frac{1085\sqrt{42}}{10296}iR_{72}$ $+\frac{175\sqrt{231}}{5148}iR_{74} + \frac{35\sqrt{6006}}{10296}iR_{76}$

Table B377: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 46 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	3	$\frac{7}{2}$	4	4	$-\frac{2\sqrt{14}}{63}iR_{10} + \frac{\sqrt{6}}{12}iR_{30} + \frac{\sqrt{5}}{22}iR_{32} + \frac{25\sqrt{462}}{24024}iR_{50}$ $-\frac{5\sqrt{55}}{286}iR_{52} - \frac{25\sqrt{165}}{572}iR_{54} + \frac{35\sqrt{70}}{936}iR_{70} + \frac{1085\sqrt{30}}{10296}iR_{72}$ $+\frac{175\sqrt{165}}{5148}iR_{74} + \frac{35\sqrt{4290}}{10296}iR_{76}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	4	1	$-\frac{5\sqrt{51}}{187}iR_{32} - \frac{9\sqrt{13090}}{4862}iR_{50} + \frac{40\sqrt{561}}{2431}iR_{52} + \frac{21\sqrt{187}}{2431}iR_{54}$ $-\frac{15\sqrt{714}}{3536}iR_{70} - \frac{285\sqrt{34}}{38896}iR_{72} + \frac{15\sqrt{187}}{1144}iR_{74} - \frac{15\sqrt{4862}}{2992}iR_{76}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	4	2	$-\frac{\sqrt{105}}{18}R_{10} - \frac{3\sqrt{5}}{22}R_{30} - \frac{3\sqrt{385}}{286}R_{50} + \frac{3\sqrt{66}}{143}R_{52}$ $-\frac{3\sqrt{22}}{26}R_{54} - \frac{35\sqrt{21}}{1287}R_{70} + \frac{10}{39}R_{72} - \frac{20\sqrt{22}}{429}R_{74}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	4	3	$-\frac{\sqrt{5}}{6}R_{10} - \frac{3\sqrt{105}}{154}R_{30} - \frac{5\sqrt{14}}{77}R_{32} - \frac{3\sqrt{165}}{286}R_{50}$ $-\frac{2\sqrt{154}}{143}R_{52} - \frac{3\sqrt{462}}{286}R_{54} - \frac{35}{429}R_{70} - \frac{10\sqrt{21}}{429}R_{72}$ $+\frac{10\sqrt{462}}{429}R_{74}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	4	4	$-\frac{\sqrt{3570}}{108}iR_{10} + \frac{\sqrt{170}}{66}iR_{30} + \frac{25\sqrt{51}}{561}iR_{32} - \frac{109\sqrt{13090}}{58344}iR_{50}$ $-\frac{98\sqrt{561}}{7293}iR_{52} - \frac{21\sqrt{187}}{9724}iR_{54} + \frac{565\sqrt{714}}{65637}iR_{70} + \frac{2755\sqrt{34}}{43758}iR_{72}$ $+\frac{10\sqrt{187}}{1287}iR_{74} - \frac{155\sqrt{4862}}{43758}iR_{76}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	4	5	$-\frac{7\sqrt{30}}{54}iR_{10} - \frac{17\sqrt{70}}{924}iR_{30} + \frac{65\sqrt{21}}{462}iR_{32} + \frac{7\sqrt{110}}{1716}iR_{50}$ $-\frac{2\sqrt{231}}{429}iR_{52} - \frac{15\sqrt{77}}{286}iR_{54} - \frac{35\sqrt{6}}{3861}iR_{70} + \frac{5\sqrt{14}}{5148}iR_{72}$ $+\frac{20\sqrt{77}}{1287}iR_{74} + \frac{35\sqrt{2002}}{5148}iR_{76}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	5	1	$-\frac{4\sqrt{195}}{143}iI_{61} + \frac{10\sqrt{78}}{143}iI_{63} - \frac{14\sqrt{595}}{221}iI_{81} - \frac{105\sqrt{561}}{2431}iI_{83}$ $+\frac{5\sqrt{14}}{308}iR_{20} + \frac{27\sqrt{70}}{4004}iR_{40} + \frac{27\sqrt{7}}{4004}iR_{42} + \frac{3\sqrt{910}}{286}iR_{60}$ $+\frac{5\sqrt{78}}{429}iR_{62} + \frac{147\sqrt{1190}}{9724}iR_{80} - \frac{525\sqrt{34}}{4862}iR_{82} + \frac{35\sqrt{935}}{9724}iR_{84}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	5	2	$\frac{3\sqrt{14}}{143}iI_{41} + \frac{5\sqrt{78}}{429}iI_{63} + \frac{70\sqrt{561}}{2431}iI_{83} + \frac{5\sqrt{14}}{132}iR_{20}$ $+\frac{15\sqrt{70}}{1001}iR_{40} - \frac{81\sqrt{7}}{1001}iR_{42} - \frac{\sqrt{910}}{66}iR_{60} - \frac{49\sqrt{78}}{429}iR_{62}$ $+\frac{49\sqrt{1190}}{4862}iR_{80} + \frac{105\sqrt{34}}{2431}iR_{82} - \frac{63\sqrt{935}}{4862}iR_{84}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	5	3	$-\frac{25}{231}iI_{21} - \frac{36\sqrt{6}}{1001}iI_{41} + \frac{\sqrt{455}}{429}iI_{61} + \frac{98\sqrt{255}}{2431}iI_{81}$ $-\frac{5\sqrt{6}}{132}iR_{20} - \frac{30\sqrt{30}}{1001}iR_{40} + \frac{204\sqrt{3}}{1001}iR_{42} - \frac{7\sqrt{390}}{858}iR_{60}$ $-\frac{7\sqrt{182}}{429}iR_{62} + \frac{49\sqrt{510}}{4862}iR_{80} + \frac{35\sqrt{714}}{2431}iR_{82} + \frac{7\sqrt{19635}}{4862}iR_{84}$

Table B378: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 47 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	5	4	$\frac{21\sqrt{14}}{143}iI_{41} - \frac{20\sqrt{78}}{429}iI_{63} + \frac{35\sqrt{561}}{2431}iI_{83} - \frac{65\sqrt{14}}{924}iR_{20}$ $+ \frac{69\sqrt{70}}{4004}iR_{40} + \frac{27\sqrt{7}}{572}iR_{42} + \frac{\sqrt{910}}{858}iR_{60} + \frac{\sqrt{78}}{33}iR_{62}$ $+ \frac{49\sqrt{1190}}{9724}iR_{80} + \frac{105\sqrt{34}}{4862}iR_{82} - \frac{63\sqrt{935}}{9724}iR_{84}$
$\frac{7}{2}$	3	3	$\frac{9}{2}$	5	5	$\frac{5\sqrt{6}}{77}I_{21} + \frac{243}{1001}I_{41} + \frac{\sqrt{2730}}{143}I_{61} + \frac{147\sqrt{170}}{2431}I_{81}$ $+ \frac{5}{77}R_{20} + \frac{93\sqrt{5}}{2002}R_{40} - \frac{375\sqrt{2}}{4004}R_{42} + \frac{14\sqrt{65}}{143}R_{60}$ $+ \frac{28\sqrt{273}}{429}R_{62} + \frac{147\sqrt{85}}{4862}R_{80} + \frac{105\sqrt{119}}{2431}R_{82} + \frac{21\sqrt{13090}}{9724}R_{84}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	1	$- \frac{15\sqrt{385}}{572}I_{41} - \frac{3\sqrt{858}}{572}I_{61} + \frac{\sqrt{2145}}{286}I_{63} + \frac{3\sqrt{2618}}{1768}I_{81}$ $+ \frac{25\sqrt{510}}{1768}I_{83} + \frac{\sqrt{2145}}{65}R_{62} - \frac{12\sqrt{1309}}{2431}R_{80} - \frac{3\sqrt{935}}{2431}R_{82}$ $+ \frac{18\sqrt{34}}{221}R_{84}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	2	$\frac{5\sqrt{210}}{132}I_{21} - \frac{75\sqrt{35}}{572}I_{41} + \frac{\sqrt{78}}{66}I_{61} + \frac{3\sqrt{195}}{143}I_{63}$ $+ \frac{713\sqrt{238}}{19448}I_{81} + \frac{5\sqrt{5610}}{1496}I_{83} - \frac{150\sqrt{7}}{1001}R_{40} + \frac{60\sqrt{70}}{1001}R_{42}$ $+ \frac{7\sqrt{91}}{143}R_{60} + \frac{112\sqrt{195}}{2145}R_{62} + \frac{37\sqrt{374}}{2431}R_{84}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	3	$\frac{5\sqrt{14}}{33}I_{21} + \frac{35\sqrt{21}}{572}I_{41} + \frac{67\sqrt{130}}{1716}I_{61} - \frac{23\sqrt{13}}{286}I_{63}$ $- \frac{189\sqrt{3570}}{19448}I_{81} - \frac{315\sqrt{374}}{19448}I_{83} - \frac{5\sqrt{21}}{33}R_{20} + \frac{5\sqrt{42}}{143}R_{42}$ $+ \frac{37\sqrt{13}}{429}R_{62} + \frac{115\sqrt{51}}{2431}R_{82}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	4	$\frac{5\sqrt{42}}{132}I_{21} + \frac{45\sqrt{7}}{572}I_{41} - \frac{\sqrt{390}}{858}I_{61} - \frac{3\sqrt{39}}{143}I_{63}$ $- \frac{623\sqrt{1190}}{19448}I_{81} - \frac{35\sqrt{1122}}{1144}I_{83} - \frac{60\sqrt{35}}{1001}R_{40} + \frac{120\sqrt{14}}{1001}R_{42}$ $+ \frac{5\sqrt{455}}{143}R_{60} + \frac{80\sqrt{39}}{429}R_{62} - \frac{19\sqrt{1870}}{2431}R_{84}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	5	$\frac{5\sqrt{7}}{33}I_{21} + \frac{5\sqrt{42}}{44}I_{41} + \frac{29\sqrt{65}}{858}I_{61} - \frac{25\sqrt{26}}{286}I_{63}$ $+ \frac{27\sqrt{1785}}{748}I_{81} + \frac{45\sqrt{187}}{748}I_{83} - \frac{5\sqrt{42}}{66}R_{20} - \frac{5\sqrt{21}}{143}R_{42}$ $- \frac{\sqrt{26}}{33}R_{62} - \frac{25\sqrt{102}}{2431}R_{82}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	5	6	$\frac{5\sqrt{5}}{22}iI_{21} + \frac{85\sqrt{30}}{572}iI_{41} - \frac{2\sqrt{91}}{143}iI_{61} + \frac{2\sqrt{910}}{143}iI_{63}$ $- \frac{189\sqrt{51}}{9724}iI_{81} - \frac{9\sqrt{6545}}{9724}iI_{83} + \frac{5\sqrt{30}}{33}iR_{20} + \frac{25\sqrt{6}}{143}iR_{40}$ $+ \frac{14\sqrt{78}}{429}iR_{60} + \frac{42\sqrt{102}}{2431}iR_{80}$

Table B379: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 48 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	1	$\frac{25\sqrt{682}}{17732}R_{30} - \frac{5\sqrt{5115}}{8866}R_{32} + \frac{7\sqrt{434}}{1612}R_{50} - \frac{\sqrt{465}}{403}R_{52}$ $- \frac{3\sqrt{155}}{806}R_{54} + \frac{105\sqrt{71610}}{150722}R_{70} - \frac{1575\sqrt{3410}}{602888}R_{72}$ $- \frac{30\sqrt{155}}{6851}R_{74} - \frac{15\sqrt{4030}}{1768}R_{76} + \frac{441\sqrt{90706}}{260338}R_{90} - \frac{3465\sqrt{41230}}{1041352}R_{92}$ $+ \frac{231\sqrt{38285}}{260338}R_{94} + \frac{7\sqrt{1607970}}{33592}R_{96}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	2	$\frac{125\sqrt{26970}}{771342}R_{30} - \frac{1615\sqrt{899}}{385671}R_{32} + \frac{35\sqrt{2076690}}{771342}R_{50}$ $- \frac{553\sqrt{9889}}{385671}R_{52} + \frac{37\sqrt{29667}}{128557}R_{54} + \frac{2625\sqrt{12586}}{2185469}R_{70}$ $- \frac{1770\sqrt{5394}}{2185469}R_{72} + \frac{4770\sqrt{29667}}{2185469}R_{74} + \frac{735\sqrt{3587010}}{3774901}R_{90}$ $+ \frac{700\sqrt{7891422}}{3774901}R_{92} + \frac{175\sqrt{7327749}}{3774901}R_{94}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	3	$\frac{25\sqrt{435}}{12441}R_{30} + \frac{485\sqrt{58}}{24882}R_{32} + \frac{7\sqrt{33495}}{12441}R_{50} + \frac{179\sqrt{638}}{24882}R_{52}$ $- \frac{10\sqrt{1914}}{4147}R_{54} + \frac{1050\sqrt{203}}{70499}R_{70} + \frac{2250\sqrt{87}}{70499}R_{72} - \frac{525\sqrt{1914}}{70499}R_{74}$ $+ \frac{294\sqrt{57855}}{121771}R_{90} + \frac{280\sqrt{127281}}{121771}R_{92} + \frac{35\sqrt{472758}}{121771}R_{94}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	4	$\frac{5\sqrt{345}}{9867}iR_{32} + \frac{12\sqrt{3542}}{3289}iR_{50} - \frac{31\sqrt{3795}}{9867}iR_{52} + \frac{2\sqrt{1265}}{3289}iR_{54}$ $- \frac{75\sqrt{4830}}{40664}iR_{70} - \frac{3405\sqrt{230}}{447304}iR_{72} + \frac{615\sqrt{1265}}{223652}iR_{74}$ $- \frac{315\sqrt{32890}}{447304}iR_{76} - \frac{231\sqrt{6118}}{118864}iR_{90} - \frac{77\sqrt{336490}}{386308}iR_{92}$ $+ \frac{231\sqrt{312455}}{386308}iR_{94} + \frac{77\sqrt{13123110}}{386308}iR_{96} + \frac{77\sqrt{37182145}}{772616}iR_{98}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	5	$\frac{5\sqrt{82110}}{7854}iR_{30} - \frac{95\sqrt{2737}}{23023}iR_{32} - \frac{203\sqrt{129030}}{335478}iR_{50} + \frac{\sqrt{30107}}{5083}iR_{52}$ $+ \frac{49\sqrt{90321}}{55913}iR_{54} + \frac{25305\sqrt{782}}{15208336}iR_{70} + \frac{18765\sqrt{16422}}{15208336}iR_{72}$ $+ \frac{3225\sqrt{90321}}{7604168}iR_{74} - \frac{5085\sqrt{2348346}}{15208336}iR_{76} - \frac{147\sqrt{222870}}{2020688}iR_{90}$ $- \frac{245\sqrt{490314}}{6567236}iR_{92} + \frac{105\sqrt{22309287}}{6567236}iR_{94} + \frac{735\sqrt{2124694}}{6567236}iR_{96}$ $+ \frac{245\sqrt{187473}}{772616}iR_{98}$
$\frac{7}{2}$	3	3	$\frac{11}{2}$	6	6	$\frac{25\sqrt{17}}{748}iR_{30} + \frac{5\sqrt{510}}{1716}iR_{32} - \frac{\sqrt{1309}}{4862}iR_{50} - \frac{35\sqrt{5610}}{7293}iR_{52}$ $+ \frac{5\sqrt{1870}}{4862}iR_{54} + \frac{915\sqrt{1785}}{165308}iR_{70} + \frac{2025\sqrt{85}}{82654}iR_{72}$ $- \frac{645\sqrt{1870}}{165308}iR_{74} + \frac{75\sqrt{12155}}{82654}iR_{76} + \frac{21\sqrt{2261}}{21964}iR_{90}$ $+ \frac{7\sqrt{124355}}{71383}iR_{92} - \frac{21\sqrt{461890}}{142766}iR_{94} - \frac{7\sqrt{4849845}}{71383}iR_{96}$ $- \frac{7\sqrt{190190}}{16796}iR_{98}$

Table B380: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 49 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	1	$-\frac{\sqrt{6}}{13}iR_{54} + \frac{9\sqrt{77}}{340}iR_{70} - \frac{21\sqrt{33}}{340}iR_{72} + \frac{393\sqrt{6}}{4420}iR_{74}$ $+ \frac{123\sqrt{39}}{4420}iR_{76} + \frac{3\sqrt{21945}}{5168}iR_{90} - \frac{\sqrt{399}}{1292}iR_{92} - \frac{13\sqrt{1482}}{2584}iR_{94}$ $+ \frac{3\sqrt{1729}}{1292}iR_{96} - \frac{3\sqrt{176358}}{5168}iR_{98}$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	2	$-\frac{175\sqrt{33}}{4719}iR_{32} + \frac{15\sqrt{70}}{572}iR_{50} - \frac{85\sqrt{3}}{429}iR_{52} + \frac{49}{286}iR_{54}$ $- \frac{621\sqrt{462}}{194480}iR_{70} + \frac{17577\sqrt{22}}{2139280}iR_{72} + \frac{24813}{97240}iR_{74} - \frac{8937\sqrt{26}}{194480}iR_{76}$ $+ \frac{21\sqrt{14630}}{28424}iR_{90} + \frac{43\sqrt{266}}{16796}iR_{92} - \frac{123\sqrt{247}}{8398}iR_{94}$ $- \frac{43\sqrt{10374}}{16796}iR_{96} + \frac{37\sqrt{29393}}{16796}iR_{98}$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	3	$-\frac{70\sqrt{330}}{1573}iR_{32} + \frac{15\sqrt{7}}{88}iR_{50} - \frac{15\sqrt{30}}{572}iR_{52} + \frac{57\sqrt{10}}{1144}iR_{54}$ $- \frac{9\sqrt{1155}}{1870}iR_{70} - \frac{162\sqrt{55}}{7865}iR_{72} + \frac{801\sqrt{10}}{24310}iR_{74} - \frac{18\sqrt{65}}{715}iR_{76}$ $- \frac{45\sqrt{1463}}{28424}iR_{90} - \frac{3\sqrt{665}}{1976}iR_{92} + \frac{12\sqrt{2470}}{4199}iR_{94} + \frac{3\sqrt{25935}}{1976}iR_{96}$ $+ \frac{3\sqrt{293930}}{33592}iR_{98}$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	4	$\frac{35\sqrt{11}}{858}R_{30} - \frac{7\sqrt{330}}{858}R_{32} + \frac{\sqrt{7}}{39}R_{50} - \frac{7\sqrt{30}}{195}R_{52}$ $+ \frac{3\sqrt{10}}{65}R_{54} + \frac{81\sqrt{1155}}{60775}R_{70} - \frac{7221\sqrt{55}}{243100}R_{72} + \frac{12\sqrt{10}}{221}R_{74}$ $- \frac{147\sqrt{65}}{22100}R_{76} + \frac{3\sqrt{1463}}{4199}R_{90} - \frac{649\sqrt{665}}{83980}R_{92} + \frac{201\sqrt{2470}}{41990}R_{94}$ $- \frac{613\sqrt{25935}}{251940}R_{96}$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	5	$\frac{5285\sqrt{2386}}{1023594}R_{30} - \frac{7\sqrt{17895}}{511797}R_{32} + \frac{151\sqrt{183722}}{511797}R_{50}$ $- \frac{1139\sqrt{196845}}{2558985}R_{52} - \frac{1344\sqrt{65615}}{852995}R_{54} + \frac{12231\sqrt{250530}}{72504575}R_{70}$ $- \frac{153399\sqrt{11930}}{72504575}R_{72} - \frac{4206\sqrt{65615}}{2900183}R_{74} - \frac{3\sqrt{1705990}}{29825}R_{76}$ $+ \frac{453\sqrt{317338}}{5009407}R_{90} - \frac{2467\sqrt{17453590}}{50094070}R_{92} - \frac{2559\sqrt{16206905}}{25047035}R_{94}$ $+ \frac{\sqrt{680690010}}{680010}R_{96}$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	6	$-\frac{350\sqrt{12909453}}{167822889}R_{30} + \frac{25165\sqrt{43031510}}{167822889}R_{32} - \frac{20\sqrt{994027881}}{167822889}R_{50}$ $+ \frac{17903\sqrt{473346610}}{1846051779}R_{52} + \frac{2\sqrt{1420039830}}{55940963}R_{54} - \frac{972\sqrt{150610285}}{4754981855}R_{70}$ $+ \frac{107262\sqrt{64547265}}{4754981855}R_{72} + \frac{18\sqrt{1420039830}}{4754981855}R_{74} + \frac{1674\sqrt{9230258895}}{365767835}R_{76}$ $- \frac{660\sqrt{1716957249}}{18068931049}R_{90} + \frac{10733\sqrt{94432648695}}{18068931049}R_{92} - \frac{2\sqrt{350749838010}}{950996371}R_{94}$ $- \frac{279\sqrt{409208144345}}{1389917773}R_{96}$

Table B381: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 50 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	3	$\frac{13}{2}$	6	7	$\frac{350\sqrt{15474030}}{1547403}R_{30} + \frac{280\sqrt{515801}}{515801}R_{32} + \frac{20\sqrt{9847110}}{140673}R_{50}$ $+ \frac{40\sqrt{46891}}{46891}R_{52} - \frac{20\sqrt{140673}}{46891}R_{54} + \frac{972\sqrt{7221214}}{8768617}R_{70}$ $+ \frac{948\sqrt{3094806}}{8768617}R_{72} - \frac{36\sqrt{140673}}{797147}R_{74} - \frac{120\sqrt{21642}}{61319}R_{76}$ $+ \frac{60\sqrt{2058045990}}{15145793}R_{90} + \frac{440\sqrt{37419018}}{15145793}R_{92} + \frac{20\sqrt{205599}}{61319}R_{94}$ $+ \frac{100\sqrt{959462}}{1165061}R_{96}$
$\frac{7}{2}$	3	4	$\frac{7}{2}$	3	4	$-\frac{\sqrt{30}}{24}I_{21} + \frac{85\sqrt{546}}{3432}I_{61} - \frac{5\sqrt{1365}}{572}I_{63} + R_{00}$ $+ \frac{\sqrt{5}}{7}R_{20} - \frac{9}{77}R_{40} - \frac{15\sqrt{13}}{143}R_{60}$
$\frac{7}{2}$	3	4	$\frac{7}{2}$	4	1	$-\frac{\sqrt{2}}{28}iR_{10} - \frac{\sqrt{42}}{44}iR_{30} + \frac{5\sqrt{35}}{154}iR_{32} - \frac{85\sqrt{66}}{4004}iR_{50}$ $- \frac{5\sqrt{385}}{182}iR_{52} + \frac{5\sqrt{1155}}{2002}iR_{54} + \frac{49\sqrt{10}}{572}iR_{70} - \frac{14\sqrt{210}}{429}iR_{72}$ $+ \frac{7\sqrt{1155}}{858}iR_{74}$
$\frac{7}{2}$	3	4	$\frac{7}{2}$	4	2	$-\frac{\sqrt{6}}{42}iR_{10} - \frac{\sqrt{14}}{22}iR_{30} - \frac{85\sqrt{22}}{2002}iR_{50} - \frac{15\sqrt{385}}{1001}iR_{54}$ $+ \frac{49\sqrt{30}}{858}iR_{70} - \frac{7\sqrt{385}}{143}iR_{74}$
$\frac{7}{2}$	3	4	$\frac{7}{2}$	4	3	$\frac{\sqrt{6}}{252}R_{10} - \frac{\sqrt{14}}{28}R_{30} + \frac{13\sqrt{105}}{462}R_{32} + \frac{145\sqrt{22}}{4004}R_{50}$ $- \frac{5\sqrt{1155}}{858}R_{52} - \frac{45\sqrt{385}}{2002}R_{54} - \frac{49\sqrt{30}}{936}R_{70} - \frac{245\sqrt{70}}{3432}R_{72}$ $- \frac{35\sqrt{385}}{1716}R_{74} + \frac{7\sqrt{10010}}{1144}R_{76}$
$\frac{7}{2}$	3	4	$\frac{7}{2}$	4	4	$-\frac{\sqrt{210}}{126}R_{10} + \frac{\sqrt{10}}{44}R_{30} + \frac{5\sqrt{3}}{66}R_{32} - \frac{5\sqrt{770}}{728}R_{50}$ $+ \frac{35\sqrt{33}}{858}R_{52} - \frac{15\sqrt{11}}{572}R_{54} - \frac{595\sqrt{42}}{10296}R_{70} - \frac{1015\sqrt{2}}{3432}R_{72}$ $+ \frac{35\sqrt{11}}{1716}R_{74} - \frac{35\sqrt{286}}{1144}R_{76}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	4	1	$\frac{5\sqrt{102}}{187}R_{30} + \frac{3\sqrt{85}}{187}R_{32} + \frac{5\sqrt{7854}}{2431}R_{50} - \frac{6\sqrt{935}}{2431}R_{52}$ $- \frac{30\sqrt{2805}}{2431}R_{54} + \frac{45\sqrt{1190}}{38896}R_{70} + \frac{167\sqrt{510}}{38896}R_{72} + \frac{35\sqrt{2805}}{19448}R_{74}$ $- \frac{7\sqrt{72930}}{38896}R_{76}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	4	2	$\frac{5\sqrt{10}}{22}iR_{32} + \frac{17\sqrt{110}}{286}iR_{52} + \frac{\sqrt{330}}{143}iR_{54} - \frac{25\sqrt{15}}{1716}iR_{72}$ $+ \frac{2\sqrt{330}}{429}iR_{74} + \frac{3\sqrt{2145}}{572}iR_{76}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	4	3	$\frac{\sqrt{3}}{3}iR_{10} + \frac{4\sqrt{7}}{77}iR_{30} - \frac{\sqrt{210}}{154}iR_{32} - \frac{5\sqrt{11}}{143}iR_{50}$ $- \frac{\sqrt{2310}}{286}iR_{52} - \frac{28\sqrt{15}}{429}iR_{70} + \frac{29\sqrt{35}}{572}iR_{72} + \frac{3\sqrt{5005}}{572}iR_{76}$

Table B382: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 51 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	4	4	$-\frac{\sqrt{238}}{36}R_{10} + \frac{26\sqrt{102}}{561}R_{30} + \frac{2\sqrt{85}}{561}R_{32} + \frac{5\sqrt{7854}}{5304}R_{50}$ $-\frac{106\sqrt{935}}{7293}R_{52} + \frac{73\sqrt{2805}}{29172}R_{54} - \frac{73\sqrt{1190}}{21879}R_{70} - \frac{32\sqrt{510}}{7293}R_{72}$ $+\frac{10\sqrt{2805}}{7293}R_{74} - \frac{20\sqrt{72930}}{21879}R_{76}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	4	5	$\frac{11\sqrt{2}}{18}R_{10} + \frac{\sqrt{42}}{84}R_{30} - \frac{29\sqrt{35}}{462}R_{32} - \frac{25\sqrt{66}}{1716}R_{50}$ $-\frac{4\sqrt{385}}{429}R_{52} - \frac{\sqrt{1155}}{858}R_{54} + \frac{7\sqrt{10}}{117}R_{70} + \frac{43\sqrt{210}}{1716}R_{72}$ $+\frac{4\sqrt{1155}}{429}R_{74} + \frac{7\sqrt{30030}}{5148}R_{76}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	5	1	$\frac{9\sqrt{210}}{143}I_{41} + \frac{4\sqrt{130}}{143}I_{63} - \frac{7\sqrt{935}}{2431}I_{83} - \frac{3\sqrt{210}}{308}R_{20}$ $-\frac{45\sqrt{42}}{4004}R_{40} - \frac{45\sqrt{105}}{4004}R_{42} - \frac{5\sqrt{546}}{286}R_{60} - \frac{27\sqrt{130}}{715}R_{62}$ $+\frac{7\sqrt{714}}{748}R_{80} - \frac{7\sqrt{510}}{286}R_{82} + \frac{147\sqrt{561}}{9724}R_{84}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	5	2	$-\frac{\sqrt{35}}{231}I_{21} + \frac{12\sqrt{210}}{1001}I_{41} + \frac{47\sqrt{13}}{429}I_{61} - \frac{42\sqrt{357}}{2431}I_{81}$ $-\frac{5\sqrt{210}}{308}R_{20} - \frac{15\sqrt{42}}{1001}R_{40} + \frac{15\sqrt{105}}{1001}R_{42} + \frac{\sqrt{546}}{66}R_{60}$ $-\frac{\sqrt{130}}{165}R_{62} + \frac{21\sqrt{714}}{4862}R_{80} - \frac{21\sqrt{510}}{2431}R_{82} - \frac{147\sqrt{561}}{4862}R_{84}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	5	3	$\frac{27\sqrt{10}}{143}I_{41} - \frac{\sqrt{2730}}{143}I_{63} - \frac{14\sqrt{19635}}{2431}I_{83} + \frac{15\sqrt{10}}{308}R_{20}$ $+\frac{90\sqrt{2}}{1001}R_{40} - \frac{18\sqrt{5}}{1001}R_{42} + \frac{7\sqrt{26}}{286}R_{60} - \frac{3\sqrt{2730}}{715}R_{62}$ $-\frac{49\sqrt{34}}{4862}R_{80} - \frac{21\sqrt{1190}}{2431}R_{82} - \frac{63\sqrt{1309}}{4862}R_{84}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	5	4	$-\frac{4\sqrt{13}}{143}I_{61} + \frac{2\sqrt{130}}{143}I_{63} + \frac{42\sqrt{357}}{221}I_{81} + \frac{189\sqrt{935}}{2431}I_{83}$ $-\frac{5\sqrt{210}}{924}R_{20} + \frac{15\sqrt{42}}{364}R_{40} - \frac{51\sqrt{105}}{4004}R_{42} - \frac{\sqrt{546}}{78}R_{60}$ $-\frac{149\sqrt{130}}{2145}R_{62} - \frac{7\sqrt{714}}{572}R_{80} - \frac{21\sqrt{510}}{4862}R_{82} + \frac{21\sqrt{561}}{748}R_{84}$
$\frac{7}{2}$	3	4	$\frac{9}{2}$	5	5	$-\frac{13\sqrt{10}}{231}iI_{21} - \frac{45\sqrt{15}}{1001}iI_{41} - \frac{\sqrt{182}}{429}iI_{61} + \frac{147\sqrt{102}}{2431}iI_{81}$ $-\frac{2\sqrt{15}}{231}iR_{20} + \frac{15\sqrt{3}}{2002}iR_{40} - \frac{69\sqrt{30}}{4004}iR_{42} - \frac{28\sqrt{39}}{429}iR_{60}$ $-\frac{8\sqrt{455}}{165}iR_{62} + \frac{245\sqrt{51}}{4862}iR_{80} + \frac{21\sqrt{1785}}{2431}iR_{82} - \frac{21\sqrt{7854}}{9724}iR_{84}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	1	$-\frac{45\sqrt{231}}{572}iI_{41} - \frac{3\sqrt{1430}}{572}iI_{61} + \frac{3\sqrt{143}}{286}iI_{63} - \frac{3\sqrt{39270}}{1768}iI_{81}$ $-\frac{3\sqrt{34}}{136}iI_{83} - \frac{10\sqrt{1155}}{1001}iR_{40} + \frac{20\sqrt{462}}{1001}iR_{42} - \frac{\sqrt{15015}}{143}iR_{60}$ $-\frac{16\sqrt{143}}{143}iR_{62} - \frac{\sqrt{510}}{221}iR_{84}$

Table B383: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 52 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	2	$-\frac{5\sqrt{14}}{44}iI_{21} + \frac{35\sqrt{21}}{572}iI_{41} - \frac{5\sqrt{130}}{286}iI_{61} + \frac{6\sqrt{13}}{143}iI_{63}$ $+ \frac{227\sqrt{3570}}{19448}iI_{81} + \frac{309\sqrt{374}}{19448}iI_{83} + \frac{3\sqrt{13}}{13}iR_{62} + \frac{12\sqrt{1785}}{2431}iR_{80}$ $+ \frac{15\sqrt{51}}{2431}iR_{82} - \frac{18\sqrt{5610}}{2431}iR_{84}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	3	$\frac{95\sqrt{35}}{572}iI_{41} - \frac{\sqrt{78}}{572}iI_{61} - \frac{\sqrt{195}}{26}iI_{63} - \frac{87\sqrt{238}}{1768}iI_{81}$ $- \frac{15\sqrt{5610}}{1768}iI_{83} - \frac{100\sqrt{7}}{1001}iR_{40} + \frac{40\sqrt{70}}{1001}iR_{42} + \frac{\sqrt{91}}{143}iR_{60}$ $+ \frac{16\sqrt{195}}{2145}iR_{62} + \frac{3\sqrt{374}}{2431}iR_{84}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	4	$\frac{3\sqrt{70}}{44}iI_{21} + \frac{15\sqrt{105}}{572}iI_{41} - \frac{15\sqrt{26}}{286}iI_{61} + \frac{375\sqrt{714}}{19448}iI_{81}$ $+ \frac{333\sqrt{1870}}{19448}iI_{83} - \frac{\sqrt{105}}{11}iR_{20} + \frac{5\sqrt{210}}{143}iR_{42} + \frac{5\sqrt{65}}{143}iR_{62}$ $- \frac{41\sqrt{255}}{2431}iR_{82}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	5	$\frac{2\sqrt{105}}{33}iI_{21} + \frac{5\sqrt{70}}{572}iI_{41} - \frac{17\sqrt{39}}{858}iI_{61} + \frac{3\sqrt{390}}{286}iI_{63}$ $- \frac{633\sqrt{119}}{9724}iI_{81} - \frac{129\sqrt{2805}}{9724}iI_{83} + \frac{\sqrt{70}}{11}iR_{20} + \frac{5\sqrt{14}}{143}iR_{40}$ $- \frac{2\sqrt{182}}{143}iR_{60} - \frac{54\sqrt{238}}{2431}iR_{80}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	5	6	$-\frac{5\sqrt{3}}{22}I_{21} - \frac{185\sqrt{2}}{572}I_{41} + \frac{\sqrt{546}}{143}I_{63} + \frac{21\sqrt{85}}{9724}I_{81}$ $- \frac{57\sqrt{3927}}{9724}I_{83} + \frac{5\sqrt{2}}{22}R_{20} + \frac{5}{11}R_{42} + \frac{7\sqrt{546}}{429}R_{62}$ $+ \frac{3\sqrt{238}}{187}R_{82}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	1	$\frac{15\sqrt{10230}}{17732}iR_{30} - \frac{45\sqrt{341}}{8866}iR_{32} + \frac{3\sqrt{6510}}{1612}iR_{50} - \frac{3\sqrt{31}}{403}iR_{52}$ $+ \frac{21\sqrt{93}}{806}iR_{54} + \frac{285\sqrt{4774}}{150722}iR_{70} + \frac{115\sqrt{2046}}{602888}iR_{72}$ $- \frac{10\sqrt{93}}{221}iR_{74} + \frac{5\sqrt{2418}}{54808}iR_{76} - \frac{63\sqrt{1360590}}{260338}iR_{90}$ $+ \frac{3619\sqrt{24738}}{1041352}iR_{92} - \frac{469\sqrt{22971}}{260338}iR_{94} + \frac{231\sqrt{107198}}{1041352}iR_{96}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	2	$-\frac{45\sqrt{1798}}{128557}iR_{30} - \frac{70\sqrt{13485}}{385671}iR_{32} - \frac{9\sqrt{138446}}{128557}iR_{50}$ $- \frac{61\sqrt{148335}}{385671}iR_{52} + \frac{136\sqrt{49445}}{128557}iR_{54} - \frac{114\sqrt{188790}}{2185469}iR_{70}$ $- \frac{16227\sqrt{8990}}{8741876}iR_{72} + \frac{6\sqrt{49445}}{4147}iR_{74} - \frac{285\sqrt{1285570}}{8741876}iR_{76}$ $+ \frac{378\sqrt{239134}}{3774901}iR_{90} + \frac{2079\sqrt{13152370}}{15099604}iR_{92} + \frac{42\sqrt{12212915}}{222053}iR_{94}$ $- \frac{21\sqrt{512942430}}{794716}iR_{96}$

Table B384: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 53 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	3	$-\frac{105\sqrt{29}}{4147}iR_{30} - \frac{115\sqrt{870}}{24882}iR_{32} - \frac{21\sqrt{2233}}{4147}iR_{50} - \frac{7\sqrt{9570}}{24882}iR_{52}$ $+ \frac{4\sqrt{3190}}{4147}iR_{54} - \frac{266\sqrt{3045}}{70499}iR_{70} + \frac{735\sqrt{145}}{70499}iR_{72}$ $+ \frac{93\sqrt{3190}}{70499}iR_{74} + \frac{15\sqrt{20735}}{70499}iR_{76} + \frac{882\sqrt{3857}}{121771}iR_{90}$ $+ \frac{147\sqrt{212135}}{121771}iR_{92} + \frac{21\sqrt{787930}}{121771}iR_{94} + \frac{21\sqrt{8273265}}{121771}iR_{96}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	4	$-\frac{20\sqrt{690}}{3289}R_{30} + \frac{105\sqrt{23}}{3289}R_{32} + \frac{\sqrt{53130}}{3289}R_{50} - \frac{3\sqrt{253}}{253}R_{52}$ $- \frac{8\sqrt{759}}{3289}R_{54} + \frac{450\sqrt{322}}{55913}R_{70} + \frac{295\sqrt{138}}{8602}R_{72} + \frac{25\sqrt{759}}{3289}R_{74}$ $- \frac{305\sqrt{19734}}{111826}R_{76} + \frac{231\sqrt{91770}}{1545232}R_{90} + \frac{21\sqrt{201894}}{386308}R_{92}$ $- \frac{7\sqrt{187473}}{22724}R_{94} - \frac{63\sqrt{874874}}{386308}R_{96} + \frac{7\sqrt{22309287}}{59432}R_{98}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	5	$\frac{5\sqrt{5474}}{782782}R_{30} + \frac{25\sqrt{41055}}{391391}R_{32} - \frac{259\sqrt{8602}}{111826}R_{50} + \frac{9\sqrt{451605}}{55913}R_{52}$ $- \frac{21\sqrt{150535}}{55913}R_{54} + \frac{48769\sqrt{11730}}{15208336}R_{70} - \frac{2265\sqrt{27370}}{15208336}R_{72}$ $- \frac{45\sqrt{150535}}{7604168}R_{74} + \frac{1737\sqrt{3913910}}{15208336}R_{76} - \frac{18081\sqrt{14858}}{26268944}R_{90}$ $- \frac{441\sqrt{817190}}{3283618}R_{92} + \frac{231\sqrt{37182145}}{6567236}R_{94} + \frac{441\sqrt{31870410}}{3283618}R_{96}$ $- \frac{441\sqrt{312455}}{772616}R_{98}$
$\frac{7}{2}$	3	4	$\frac{11}{2}$	6	6	$\frac{15\sqrt{255}}{9724}R_{30} + \frac{25\sqrt{34}}{884}R_{32} - \frac{3\sqrt{19635}}{2431}R_{50} - \frac{\sqrt{374}}{2431}R_{52}$ $- \frac{3\sqrt{1122}}{2431}R_{54} - \frac{915\sqrt{119}}{165308}R_{70} + \frac{220\sqrt{51}}{3757}R_{72} - \frac{1345\sqrt{1122}}{165308}R_{74}$ $- \frac{30\sqrt{7293}}{41327}R_{76} - \frac{21\sqrt{33915}}{15028}R_{90} - \frac{35\sqrt{74613}}{142766}R_{92}$ $+ \frac{161\sqrt{277134}}{142766}R_{94} + \frac{105\sqrt{323323}}{142766}R_{96} + \frac{21\sqrt{114114}}{16796}R_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	1	$-\frac{3\sqrt{7}}{26}R_{50} + \frac{\sqrt{30}}{13}R_{52} + \frac{\sqrt{10}}{10}R_{54} - \frac{9\sqrt{1155}}{2210}R_{70}$ $- \frac{9\sqrt{55}}{2210}R_{72} + \frac{9\sqrt{10}}{170}R_{74} - \frac{9\sqrt{65}}{170}R_{76} - \frac{3\sqrt{1463}}{5168}R_{90}$ $- \frac{\sqrt{665}}{1292}R_{92} + \frac{177\sqrt{2470}}{167960}R_{94} + \frac{\sqrt{25935}}{1292}R_{96} + \frac{7\sqrt{293930}}{335920}R_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	2	$-\frac{175\sqrt{66}}{4719}R_{30} + \frac{175\sqrt{55}}{1573}R_{32} + \frac{\sqrt{42}}{66}R_{50} + \frac{16\sqrt{5}}{143}R_{52}$ $- \frac{71\sqrt{15}}{715}R_{54} - \frac{621\sqrt{770}}{164560}R_{70} - \frac{41931\sqrt{330}}{2139280}R_{72}$ $+ \frac{873\sqrt{15}}{97240}R_{74} + \frac{2187\sqrt{390}}{194480}R_{76} - \frac{201\sqrt{8778}}{369512}R_{90}$ $- \frac{\sqrt{3990}}{4199}R_{92} + \frac{73\sqrt{3705}}{41990}R_{94} + \frac{3\sqrt{17290}}{4199}R_{96} + \frac{43\sqrt{440895}}{83980}R_{98}$

Table B385: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 54 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	3	$-\frac{35\sqrt{165}}{4719}R_{30} - \frac{105\sqrt{22}}{1573}R_{32} + \frac{17\sqrt{105}}{3432}R_{50} + \frac{175\sqrt{2}}{572}R_{52}$ $-\frac{59\sqrt{6}}{1144}R_{54} - \frac{1917\sqrt{77}}{53482}R_{70} + \frac{972\sqrt{33}}{26741}R_{72} - \frac{243\sqrt{6}}{4862}R_{74}$ $+ \frac{36\sqrt{39}}{2431}R_{76} + \frac{303\sqrt{21945}}{369512}R_{90} - \frac{\sqrt{399}}{1768}R_{92} - \frac{31\sqrt{1482}}{4199}R_{94}$ $+ \frac{3\sqrt{1729}}{1768}R_{96} - \frac{9\sqrt{176358}}{33592}R_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	4	$\frac{7\sqrt{165}}{286}iR_{30} - \frac{21\sqrt{22}}{286}iR_{32} + \frac{\sqrt{105}}{260}iR_{50} - \frac{27\sqrt{2}}{130}iR_{52}$ $+ \frac{25\sqrt{6}}{156}iR_{54} - \frac{243\sqrt{77}}{24310}iR_{70} - \frac{1257\sqrt{33}}{48620}iR_{72} + \frac{105\sqrt{6}}{442}iR_{74}$ $+ \frac{81\sqrt{39}}{4420}iR_{76} - \frac{81\sqrt{21945}}{83980}iR_{90} + \frac{583\sqrt{399}}{125970}iR_{92}$ $- \frac{5\sqrt{1482}}{1326}iR_{94} + \frac{81\sqrt{1729}}{41990}iR_{96} - \frac{\sqrt{176358}}{19380}iR_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	5	$\frac{441\sqrt{35790}}{170599}iR_{30} + \frac{4704\sqrt{1193}}{170599}iR_{32} + \frac{63\sqrt{2755830}}{1705990}iR_{50}$ $+ \frac{243\sqrt{13123}}{77545}iR_{52} + \frac{665\sqrt{39369}}{511797}iR_{54} - \frac{15309\sqrt{16702}}{14500915}iR_{70}$ $+ \frac{46443\sqrt{7158}}{58003660}iR_{72} + \frac{1140\sqrt{39369}}{2900183}iR_{74} - \frac{729\sqrt{1023594}}{5273060}iR_{76}$ $- \frac{5103\sqrt{4760070}}{50094070}iR_{90} - \frac{16747\sqrt{10472154}}{150282210}iR_{92} + \frac{5\sqrt{9724143}}{790959}iR_{94}$ $- \frac{729\sqrt{45379334}}{50094070}iR_{96} + \frac{\sqrt{1157173017}}{340005}iR_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	6	$\frac{70\sqrt{21515755}}{511797}iR_{30} - \frac{35\sqrt{25818906}}{55940963}iR_{32} + \frac{\sqrt{1656713135}}{511797}iR_{50}$ $+ \frac{12\sqrt{284007966}}{55940963}iR_{52} - \frac{25095\sqrt{94669322}}{615350593}iR_{54} - \frac{54\sqrt{90366171}}{2900183}iR_{70}$ $+ \frac{1566\sqrt{4303151}}{950996371}iR_{72} - \frac{129060\sqrt{94669322}}{10460960081}iR_{74} - \frac{54\sqrt{615350593}}{950996371}iR_{76}$ $- \frac{27\sqrt{2861595415}}{5009407}iR_{90} + \frac{528\sqrt{6295509913}}{18068931049}iR_{92} - \frac{3585\sqrt{23383322534}}{18068931049}iR_{94}$ $- \frac{36\sqrt{245524886607}}{18068931049}iR_{96} - \frac{279\sqrt{2782615381546}}{1389917773}iR_{98}$
$\frac{7}{2}$	3	4	$\frac{13}{2}$	6	7	$\frac{70\sqrt{7737015}}{515801}iR_{32} - \frac{24\sqrt{703365}}{46891}iR_{52} - \frac{28\sqrt{234455}}{46891}iR_{54}$ $- \frac{1566\sqrt{5158010}}{8768617}iR_{72} - \frac{144\sqrt{234455}}{797147}iR_{74} + \frac{54\sqrt{36070}}{61319}iR_{76}$ $- \frac{528\sqrt{62365030}}{15145793}iR_{92} - \frac{44\sqrt{342665}}{1165061}iR_{94} + \frac{36\sqrt{14391930}}{1165061}iR_{96}$ $+ \frac{40\sqrt{40777135}}{1165061}iR_{98}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	1	$R_{00} - \frac{4\sqrt{5}}{21}R_{20} + \frac{6}{77}R_{40} + \frac{15\sqrt{10}}{77}R_{42}$ $- \frac{80\sqrt{13}}{429}R_{60} - \frac{16\sqrt{1365}}{429}R_{62}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	2	$\frac{2\sqrt{15}}{21}R_{20} + \frac{6\sqrt{30}}{77}R_{42} + \frac{16\sqrt{455}}{429}R_{62}$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	3	$-\frac{\sqrt{10}}{7}iI_{21} - \frac{8\sqrt{15}}{77}iI_{41} - \frac{5\sqrt{182}}{143}iI_{61} + \frac{10\sqrt{455}}{429}iI_{63}$

Table B386: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 55 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{7}{2}$	4	4	$-\frac{4\sqrt{21}}{11}iI_{41} - \frac{40\sqrt{13}}{429}iI_{63}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	1	$-\frac{2\sqrt{3570}}{561}iI_{21} - \frac{36\sqrt{595}}{2431}iI_{41} + \frac{46\sqrt{1326}}{7293}iI_{61} - \frac{28\sqrt{3315}}{2431}iI_{63}$ $+ \frac{1162\sqrt{14}}{2431}iI_{81} + \frac{210\sqrt{330}}{2431}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{70}}{231}R_{20} + \frac{60\sqrt{14}}{1001}R_{40} + \frac{12\sqrt{35}}{1001}R_{42} - \frac{2\sqrt{182}}{33}R_{60}$ $-\frac{4\sqrt{390}}{55}R_{62} + \frac{98\sqrt{238}}{2431}R_{80} - \frac{84\sqrt{170}}{2431}R_{82} - \frac{126\sqrt{187}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{3\sqrt{30}}{77}R_{20} - \frac{120\sqrt{6}}{1001}R_{40} + \frac{72\sqrt{15}}{1001}R_{42} - \frac{14\sqrt{78}}{429}R_{60}$ $-\frac{68\sqrt{910}}{2145}R_{62} + \frac{98\sqrt{102}}{2431}R_{80} - \frac{28\sqrt{3570}}{2431}R_{82} + \frac{14\sqrt{3927}}{2431}R_{84}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	4	$\frac{19\sqrt{3570}}{11781}iI_{21} - \frac{20\sqrt{595}}{1309}iI_{41} - \frac{7\sqrt{1326}}{1989}iI_{61} + \frac{14\sqrt{3315}}{1683}iI_{63}$ $-\frac{588\sqrt{14}}{2431}iI_{81} + \frac{140\sqrt{330}}{7293}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	4	5	$-\frac{2\sqrt{30}}{99}iI_{21} - \frac{20\sqrt{5}}{143}iI_{41} - \frac{2\sqrt{546}}{99}iI_{61} - \frac{4\sqrt{1365}}{1287}iI_{63}$ $-\frac{588\sqrt{34}}{2431}iI_{81} - \frac{28\sqrt{39270}}{7293}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	1	$-\frac{\sqrt{21}}{6}iR_{10} - \frac{9}{22}iR_{30} - \frac{\sqrt{30}}{22}iR_{32} - \frac{7\sqrt{330}}{286}iR_{52}$ $+\frac{3\sqrt{110}}{143}iR_{54} - \frac{\sqrt{105}}{528}iR_{70} + \frac{97\sqrt{5}}{2288}iR_{72} - \frac{59\sqrt{110}}{2288}iR_{74}$ $+\frac{15\sqrt{715}}{2288}iR_{76}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	2	$-\frac{\sqrt{21}}{9}iR_{10} + \frac{2}{11}iR_{30} - \frac{\sqrt{30}}{11}iR_{32} - \frac{25\sqrt{77}}{572}iR_{50}$ $-\frac{5\sqrt{330}}{286}iR_{52} - \frac{3\sqrt{110}}{572}iR_{54} + \frac{5\sqrt{105}}{10296}iR_{70} - \frac{35\sqrt{5}}{1144}iR_{72}$ $-\frac{7\sqrt{110}}{312}iR_{74} - \frac{\sqrt{715}}{88}iR_{76}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	3	$\frac{1}{3}iR_{10} - \frac{\sqrt{21}}{11}iR_{30} - \frac{2\sqrt{70}}{77}iR_{32} + \frac{5\sqrt{33}}{572}iR_{50}$ $+\frac{5\sqrt{770}}{286}iR_{52} + \frac{\sqrt{2310}}{572}iR_{54} - \frac{287\sqrt{5}}{3432}iR_{70} - \frac{43\sqrt{105}}{3432}iR_{72}$ $+\frac{17\sqrt{2310}}{3432}iR_{74} - \frac{5\sqrt{15015}}{3432}iR_{76}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	4	$-\frac{\sqrt{21}}{18}iR_{10} + \frac{7}{22}iR_{30} - \frac{\sqrt{30}}{22}iR_{32} - \frac{5\sqrt{77}}{286}iR_{50}$ $+\frac{5\sqrt{330}}{286}iR_{52} + \frac{3\sqrt{110}}{286}iR_{54} - \frac{373\sqrt{105}}{20592}iR_{70} + \frac{665\sqrt{5}}{6864}iR_{72}$ $-\frac{49\sqrt{110}}{2288}iR_{74} + \frac{29\sqrt{715}}{2288}iR_{76}$
$\frac{7}{2}$	4	1	$\frac{9}{2}$	5	5	$\frac{\sqrt{6}}{18}R_{10} - \frac{6\sqrt{14}}{77}R_{30} - \frac{15\sqrt{22}}{572}R_{50} + \frac{9\sqrt{385}}{286}R_{54}$ $-\frac{371\sqrt{30}}{20592}R_{70} - \frac{\sqrt{70}}{48}R_{72} - \frac{19\sqrt{385}}{3432}R_{74} - \frac{\sqrt{10010}}{6864}R_{76}$

Table B387: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 56 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	1	$-\frac{35\sqrt{33}}{858}R_{32} + \frac{7\sqrt{3}}{78}R_{52} + \frac{3}{13}R_{54} - \frac{105\sqrt{22}}{9724}R_{72}$ $-\frac{75}{442}R_{74} + \frac{75\sqrt{26}}{884}R_{76} + \frac{7\sqrt{266}}{16796}R_{92} + \frac{21\sqrt{247}}{8398}R_{94}$ $-\frac{35\sqrt{10374}}{16796}R_{96} + \frac{7\sqrt{29393}}{4199}R_{98}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	2	$\frac{5\sqrt{3}}{858}R_{32} + \frac{17\sqrt{33}}{858}R_{52} + \frac{5\sqrt{11}}{143}R_{54} - \frac{645\sqrt{2}}{9724}R_{72}$ $+ \frac{525\sqrt{11}}{4862}R_{74} + \frac{15\sqrt{286}}{9724}R_{76} + \frac{7\sqrt{2926}}{16796}R_{92} - \frac{35\sqrt{2717}}{8398}R_{94}$ $+ \frac{21\sqrt{114114}}{16796}R_{96} + \frac{7\sqrt{323323}}{4199}R_{98}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	3	$\frac{25\sqrt{6}}{858}R_{30} + \frac{5\sqrt{5}}{78}R_{32} + \frac{\sqrt{462}}{858}R_{50} + \frac{19\sqrt{55}}{858}R_{52}$ $+ \frac{2\sqrt{165}}{143}R_{54} - \frac{87\sqrt{70}}{4862}R_{70} + \frac{15\sqrt{30}}{884}R_{72} + \frac{93\sqrt{165}}{4862}R_{74}$ $-\frac{63\sqrt{4290}}{9724}R_{76} + \frac{21\sqrt{798}}{8398}R_{90} - \frac{35\sqrt{43890}}{16796}R_{92} + \frac{21\sqrt{40755}}{8398}R_{94}$ $+ \frac{21\sqrt{190190}}{16796}R_{96}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	4	$-\frac{35\sqrt{2}}{286}R_{30} + \frac{5\sqrt{15}}{286}R_{32} + \frac{7\sqrt{154}}{286}R_{50} - \frac{\sqrt{165}}{286}R_{52}$ $+ \frac{2\sqrt{55}}{143}R_{54} - \frac{63\sqrt{210}}{4862}R_{70} - \frac{813\sqrt{10}}{9724}R_{72} + \frac{15\sqrt{55}}{4862}R_{74}$ $+ \frac{3\sqrt{1430}}{748}R_{76} + \frac{21\sqrt{266}}{8398}R_{90} + \frac{21\sqrt{14630}}{16796}R_{92} - \frac{35\sqrt{13585}}{8398}R_{94}$ $+ \frac{7\sqrt{570570}}{16796}R_{96}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	5	$-\frac{15\sqrt{3}}{286}R_{30} - \frac{10\sqrt{10}}{143}R_{32} - \frac{3\sqrt{231}}{286}R_{50} + \frac{3\sqrt{110}}{286}R_{52}$ $-\frac{5\sqrt{330}}{858}R_{54} - \frac{57\sqrt{35}}{2431}R_{70} - \frac{393\sqrt{15}}{2431}R_{72} - \frac{3\sqrt{330}}{4862}R_{74}$ $+ \frac{63\sqrt{399}}{4199}R_{90} - \frac{14\sqrt{21945}}{4199}R_{92} + \frac{7\sqrt{81510}}{8398}R_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	5	6	$-\frac{25\sqrt{105}}{6006}iR_{30} - \frac{50\sqrt{14}}{3003}iR_{32} - \frac{7\sqrt{165}}{858}iR_{50} - \frac{7\sqrt{154}}{858}iR_{52}$ $+ \frac{7\sqrt{462}}{858}iR_{54} - \frac{525}{2431}iR_{70} - \frac{15\sqrt{21}}{2431}iR_{72} - \frac{105\sqrt{462}}{4862}iR_{74}$ $-\frac{147\sqrt{285}}{4199}iR_{90} + \frac{98\sqrt{627}}{4199}iR_{92} + \frac{7\sqrt{114114}}{8398}iR_{94}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	1	$-\frac{10\sqrt{2387}}{341}R_{20} - \frac{60\sqrt{11935}}{31031}R_{40} - \frac{90\sqrt{4774}}{31031}R_{42} - \frac{6\sqrt{155155}}{4433}R_{60}$ $-\frac{148\sqrt{13299}}{13299}R_{62} + \frac{12\sqrt{202895}}{75361}R_{80} + \frac{144\sqrt{5797}}{75361}R_{82}$ $-\frac{50\sqrt{5270}}{6851}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	2	$\frac{8\sqrt{94395}}{9889}R_{20} - \frac{20\sqrt{18879}}{6293}R_{40} + \frac{10\sqrt{188790}}{899899}R_{42} - \frac{16\sqrt{245427}}{35061}R_{60}$ $-\frac{2936\sqrt{58435}}{1928355}R_{62} - \frac{420\sqrt{320943}}{2185469}R_{80} - \frac{1504\sqrt{229245}}{2185469}R_{82}$ $+ \frac{114\sqrt{1008678}}{198679}R_{84}$

Table B388: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 57 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	3	$-\frac{\sqrt{6090}}{957}R_{20} - \frac{50\sqrt{1218}}{29029}R_{40} - \frac{170\sqrt{3045}}{29029}R_{42} - \frac{70\sqrt{15834}}{12441}R_{60}$ $-\frac{188\sqrt{3770}}{20735}R_{62} - \frac{84\sqrt{20706}}{70499}R_{80} + \frac{24\sqrt{14790}}{70499}R_{82}$ $-\frac{148\sqrt{16269}}{70499}R_{84}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	4	$\frac{20\sqrt{966}}{759}iI_{21} - \frac{300\sqrt{161}}{3289}iI_{41} + \frac{40\sqrt{8970}}{9867}iI_{61} + \frac{16\sqrt{897}}{3289}iI_{63}$ $-\frac{630\sqrt{27370}}{55913}iI_{81} - \frac{38\sqrt{25806}}{4301}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	5	$\frac{2\sqrt{3910}}{759}iI_{21} - \frac{400\sqrt{5865}}{55913}iI_{41} + \frac{226\sqrt{71162}}{167739}iI_{61} - \frac{4\sqrt{177905}}{55913}iI_{63}$ $+\frac{3528\sqrt{138}}{55913}iI_{81} + \frac{480\sqrt{17710}}{55913}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{11}{2}$	6	6	$\frac{90\sqrt{238}}{2431}iI_{41} - \frac{8\sqrt{3315}}{2431}iI_{61} + \frac{48\sqrt{1326}}{2431}iI_{63} - \frac{28\sqrt{35}}{221}iI_{81}$ $-\frac{164\sqrt{33}}{2431}iI_{83}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	1	$\frac{28\sqrt{2310}}{2145}iI_{41} + \frac{36\sqrt{143}}{2431}iI_{61} - \frac{48\sqrt{1430}}{12155}iI_{63} + \frac{108\sqrt{3927}}{4199}iI_{81}$ $+\frac{3516\sqrt{85}}{20995}iI_{83} - \frac{112\sqrt{5}}{1615}iI_{10,1} - \frac{14\sqrt{390}}{4845}iI_{10,3}$ $+\frac{70\sqrt{78}}{969}iI_{10,5}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	2	$-\frac{12\sqrt{385}}{715}iI_{41} + \frac{318\sqrt{858}}{26741}iI_{61} - \frac{36\sqrt{2145}}{10285}iI_{63} - \frac{6\sqrt{2618}}{3553}iI_{81}$ $+\frac{18\sqrt{510}}{20995}iI_{83} + \frac{84\sqrt{30}}{1615}iI_{10,1} - \frac{14\sqrt{65}}{1615}iI_{10,3} - \frac{70\sqrt{13}}{323}iI_{10,5}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{4\sqrt{154}}{429}iI_{41} + \frac{90\sqrt{2145}}{26741}iI_{61} + \frac{6\sqrt{858}}{26741}iI_{63} - \frac{1296\sqrt{6545}}{46189}iI_{81}$ $-\frac{960\sqrt{51}}{4199}iI_{83} + \frac{140\sqrt{3}}{323}iI_{10,1} - \frac{63\sqrt{26}}{323}iI_{10,3} - \frac{7\sqrt{130}}{323}iI_{10,5}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	4	$\frac{16\sqrt{770}}{5005}R_{40} - \frac{584\sqrt{77}}{15015}R_{42} - \frac{6\sqrt{10010}}{2431}R_{60} + \frac{20\sqrt{858}}{2431}R_{62}$ $+\frac{96\sqrt{13090}}{46189}R_{80} - \frac{24\sqrt{374}}{2717}R_{82} - \frac{1296\sqrt{85}}{20995}R_{84} + \frac{28\sqrt{330}}{285}R_{10,0}$ $+\frac{15904}{4845}R_{10,2} + \frac{196\sqrt{13}}{323}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	5	$-\frac{436\sqrt{41755}}{459305}R_{40} - \frac{7334\sqrt{16702}}{17912895}R_{42} + \frac{888\sqrt{542815}}{2900183}R_{60}$ $-\frac{560\sqrt{46527}}{2900183}R_{62} - \frac{12\sqrt{709835}}{263653}R_{80} - \frac{11496\sqrt{20281}}{5009407}R_{82}$ $-\frac{8586\sqrt{2230910}}{25047035}R_{84} - \frac{392\sqrt{17895}}{304215}R_{10,0} - \frac{3136\sqrt{26246}}{5780085}R_{10,2}$ $-\frac{364\sqrt{341198}}{385339}R_{10,4}$

Table B389: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 58 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	6	$\frac{4\sqrt{903661710}}{1174760223}R_{40} - \frac{33724\sqrt{90366171}}{4307454151}R_{42} + \frac{36\sqrt{11747602230}}{950996371}R_{60}$ $+ \frac{403968\sqrt{111881926}}{10460960081}R_{62} - \frac{34344\sqrt{15362249070}}{18068931049}R_{80} - \frac{346776\sqrt{438921402}}{18068931049}R_{82}$ $+ \frac{104136\sqrt{12070338555}}{18068931049}R_{84} - \frac{84084\sqrt{43031510}}{1389917773}R_{10,0} - \frac{248640\sqrt{142003983}}{1389917773}R_{10,2}$ $- \frac{12964\sqrt{1846051779}}{1389917773}R_{10,4}$
$\frac{7}{2}$	4	1	$\frac{13}{2}$	6	7	$- \frac{40\sqrt{10831821}}{10831821}R_{40} + \frac{16\sqrt{108318210}}{10831821}R_{42} - \frac{360\sqrt{833217}}{674509}R_{60}$ $- \frac{5232\sqrt{198385}}{3372545}R_{62} - \frac{2832\sqrt{184140957}}{166603723}R_{80} + \frac{1008\sqrt{131529255}}{166603723}R_{82}$ $- \frac{1272\sqrt{4782882}}{15145793}R_{84} - \frac{16240\sqrt{515801}}{15145793}R_{10,0} + \frac{448\sqrt{1406730}}{15145793}R_{10,2}$ $+ \frac{616\sqrt{108210}}{3495183}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	2	$R_{00} - \frac{54}{77}R_{40} + \frac{9\sqrt{10}}{77}R_{42} + \frac{20\sqrt{13}}{143}R_{60}$ $+ \frac{8\sqrt{1365}}{429}R_{62}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	3	$\frac{8\sqrt{30}}{63}iI_{21} + \frac{12\sqrt{5}}{77}iI_{41} - \frac{20\sqrt{546}}{1287}iI_{61}$
$\frac{7}{2}$	4	2	$\frac{7}{2}$	4	4	$- \frac{5\sqrt{42}}{63}iI_{21} + \frac{24\sqrt{7}}{77}iI_{41} - \frac{5\sqrt{390}}{1287}iI_{61} - \frac{10\sqrt{39}}{143}iI_{63}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	1	$- \frac{36\sqrt{1785}}{2431}iI_{41} - \frac{16\sqrt{1105}}{2431}iI_{63} - \frac{70\sqrt{42}}{221}iI_{81} - \frac{574\sqrt{110}}{2431}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	2	$- \frac{5\sqrt{210}}{231}R_{20} - \frac{24\sqrt{105}}{1001}R_{42} - \frac{16\sqrt{130}}{165}R_{62} - \frac{28\sqrt{714}}{2431}R_{80}$ $+ \frac{84\sqrt{561}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	3	$- \frac{3\sqrt{10}}{77}R_{20} - \frac{144\sqrt{5}}{1001}R_{42} + \frac{16\sqrt{2730}}{2145}R_{62} + \frac{196\sqrt{34}}{2431}R_{80}$ $- \frac{84\sqrt{1309}}{2431}R_{84}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	4	$- \frac{\sqrt{1190}}{231}iI_{21} - \frac{124\sqrt{1785}}{17017}iI_{41} + \frac{\sqrt{442}}{33}iI_{61} - \frac{2\sqrt{1105}}{663}iI_{63}$ $- \frac{1176\sqrt{42}}{2431}iI_{81} - \frac{392\sqrt{110}}{2431}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	4	5	$- \frac{8\sqrt{10}}{231}iI_{21} - \frac{172\sqrt{15}}{1001}iI_{41} - \frac{4\sqrt{182}}{429}iI_{61} + \frac{8\sqrt{455}}{429}iI_{63}$ $+ \frac{588\sqrt{102}}{2431}iI_{81} + \frac{28\sqrt{13090}}{2431}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	1	$- \frac{5\sqrt{3}}{44}iR_{30} + \frac{3\sqrt{10}}{44}iR_{32} - \frac{5\sqrt{231}}{572}iR_{50} - \frac{3\sqrt{110}}{286}iR_{52}$ $+ \frac{9\sqrt{330}}{572}iR_{54} + \frac{6\sqrt{35}}{143}iR_{70} - \frac{137\sqrt{15}}{1144}iR_{72} + \frac{3\sqrt{330}}{286}iR_{74}$ $+ \frac{\sqrt{2145}}{1144}iR_{76}$

Table B390: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 59 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	2	$-\frac{\sqrt{7}}{6}iR_{10} + \frac{\sqrt{3}}{11}iR_{30} + \frac{\sqrt{10}}{11}iR_{32} + \frac{5\sqrt{231}}{286}iR_{50}$ $-\frac{\sqrt{110}}{22}iR_{52} + \frac{\sqrt{330}}{286}iR_{54} - \frac{10\sqrt{35}}{429}iR_{70} - \frac{5\sqrt{15}}{132}iR_{72}$ $+ \frac{\sqrt{330}}{429}iR_{74} - \frac{7\sqrt{2145}}{1716}iR_{76}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	3	$\frac{\sqrt{3}}{6}iR_{10} + \frac{2\sqrt{7}}{77}iR_{30} + \frac{4\sqrt{210}}{77}iR_{32} - \frac{5\sqrt{11}}{286}iR_{50}$ $-\frac{\sqrt{2310}}{286}iR_{52} - \frac{3\sqrt{770}}{286}iR_{54} - \frac{14\sqrt{15}}{429}iR_{70} - \frac{23\sqrt{35}}{572}iR_{72}$ $-\frac{\sqrt{770}}{143}iR_{74} - \frac{\sqrt{5005}}{572}iR_{76}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	4	$\frac{\sqrt{7}}{3}iR_{10} - \frac{3\sqrt{3}}{44}iR_{30} - \frac{3\sqrt{10}}{44}iR_{32} - \frac{15\sqrt{231}}{572}iR_{50}$ $-\frac{3\sqrt{110}}{286}iR_{52} - \frac{\sqrt{330}}{44}iR_{54} + \frac{2\sqrt{35}}{429}iR_{70} - \frac{73\sqrt{15}}{3432}iR_{72}$ $-\frac{\sqrt{330}}{66}iR_{74} + \frac{\sqrt{2145}}{3432}iR_{76}$
$\frac{7}{2}$	4	2	$\frac{9}{2}$	5	5	$-\frac{\sqrt{2}}{6}R_{10} + \frac{9\sqrt{42}}{308}R_{30} - \frac{\sqrt{35}}{14}R_{32} + \frac{15\sqrt{66}}{572}R_{50}$ $+ \frac{2\sqrt{385}}{143}R_{52} - \frac{\sqrt{1155}}{286}R_{54} - \frac{28\sqrt{10}}{429}R_{70} - \frac{7\sqrt{210}}{312}R_{72}$ $-\frac{\sqrt{1155}}{429}R_{74} + \frac{5\sqrt{30030}}{3432}R_{76}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{2\sqrt{3}}{13}R_{54} - \frac{25\sqrt{3}}{221}R_{74} + \frac{7\sqrt{741}}{4199}R_{94} - \frac{14\sqrt{88179}}{4199}R_{98}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	2	$-\frac{5}{143}R_{32} - \frac{17\sqrt{11}}{143}R_{52} + \frac{645\sqrt{6}}{4862}R_{72} + \frac{5\sqrt{858}}{4862}R_{76}$ $-\frac{7\sqrt{8778}}{8398}R_{92} + \frac{21\sqrt{38038}}{8398}R_{96}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	3	$-\frac{25\sqrt{2}}{143}R_{30} - \frac{\sqrt{154}}{143}R_{50} + \frac{4\sqrt{55}}{143}R_{54} + \frac{87\sqrt{210}}{2431}R_{70}$ $+ \frac{93\sqrt{55}}{2431}R_{74} - \frac{63\sqrt{266}}{4199}R_{90} + \frac{21\sqrt{13585}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	4	$\frac{5\sqrt{5}}{143}R_{32} - \frac{\sqrt{55}}{143}R_{52} - \frac{271\sqrt{30}}{4862}R_{72} - \frac{3\sqrt{4290}}{374}R_{76}$ $+ \frac{7\sqrt{43890}}{8398}R_{92} - \frac{21\sqrt{190190}}{8398}R_{96}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	5	$-\frac{15}{143}R_{30} - \frac{3\sqrt{77}}{143}R_{50} + \frac{5\sqrt{110}}{143}R_{54} - \frac{38\sqrt{105}}{2431}R_{70}$ $+ \frac{9\sqrt{110}}{2431}R_{74} + \frac{126\sqrt{133}}{4199}R_{90} - \frac{21\sqrt{27170}}{4199}R_{94}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	5	6	$-\frac{10\sqrt{42}}{231}iR_{32} + \frac{5\sqrt{462}}{429}iR_{52} + \frac{30\sqrt{7}}{143}iR_{72}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	1	$-\frac{40\sqrt{35805}}{31031}R_{40} + \frac{80\sqrt{14322}}{31031}R_{42} - \frac{4\sqrt{465465}}{4433}R_{60} - \frac{64\sqrt{4433}}{4433}R_{62}$ $+ \frac{24\sqrt{608685}}{75361}R_{80} - \frac{256\sqrt{17391}}{75361}R_{82} + \frac{12\sqrt{15810}}{6851}R_{84}$

Table B391: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 60 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	2	$-\frac{2\sqrt{31465}}{319}R_{20} + \frac{100\sqrt{6293}}{81809}R_{40} + \frac{1730\sqrt{62930}}{899899}R_{42} + \frac{10\sqrt{81809}}{11687}R_{60}$ $-\frac{2828\sqrt{175305}}{1928355}R_{62} - \frac{108\sqrt{106981}}{168113}R_{80} - \frac{120\sqrt{76415}}{198679}R_{82}$ $+ \frac{786\sqrt{336226}}{2185469}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{5\sqrt{2030}}{319}R_{20} + \frac{20\sqrt{406}}{2639}R_{40} - \frac{120\sqrt{1015}}{29029}R_{42} + \frac{2\sqrt{5278}}{377}R_{60}$ $+ \frac{548\sqrt{11310}}{62205}R_{62} - \frac{72\sqrt{6902}}{70499}R_{80} - \frac{24\sqrt{4930}}{6409}R_{82}$ $- \frac{24\sqrt{5423}}{5423}R_{84}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	4	$-\frac{80\sqrt{483}}{3289}iI_{41} + \frac{72\sqrt{299}}{3289}iI_{63} + \frac{8\sqrt{82110}}{5083}iI_{81} + \frac{240\sqrt{8602}}{55913}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	5	$\frac{4\sqrt{11730}}{561}iI_{21} + \frac{1060\sqrt{1955}}{55913}iI_{41} - \frac{8\sqrt{213486}}{7293}iI_{61} + \frac{40\sqrt{533715}}{55913}iI_{63}$ $+ \frac{9534\sqrt{46}}{55913}iI_{81} + \frac{210\sqrt{53130}}{55913}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{11}{2}$	6	6	$\frac{10\sqrt{119}}{187}iI_{21} - \frac{190\sqrt{714}}{2431}iI_{41} - \frac{28\sqrt{1105}}{2431}iI_{61} - \frac{12\sqrt{442}}{2431}iI_{63}$ $+ \frac{4\sqrt{105}}{2431}iI_{81} - \frac{228\sqrt{11}}{2431}iI_{83}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	1	$\frac{24\sqrt{429}}{2431}iI_{61} - \frac{12\sqrt{4290}}{2431}iI_{63} + \frac{96\sqrt{1309}}{4199}iI_{81} + \frac{144\sqrt{255}}{4199}iI_{83}$ $- \frac{56\sqrt{15}}{1615}iI_{10,1} + \frac{84\sqrt{130}}{1615}iI_{10,3} - \frac{56\sqrt{26}}{323}iI_{10,5}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	2	$-\frac{12\sqrt{1155}}{1573}iI_{41} + \frac{36\sqrt{286}}{26741}iI_{61} - \frac{24\sqrt{715}}{26741}iI_{63} - \frac{42\sqrt{7854}}{4199}iI_{81}$ $- \frac{450\sqrt{170}}{4199}iI_{83} - \frac{504\sqrt{10}}{1615}iI_{10,1} + \frac{84\sqrt{195}}{1615}iI_{10,3}$ $+ \frac{84\sqrt{39}}{323}iI_{10,5}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	3	$-\frac{40\sqrt{462}}{4719}iI_{41} - \frac{6\sqrt{715}}{26741}iI_{61} - \frac{738\sqrt{286}}{26741}iI_{63} - \frac{12\sqrt{19635}}{4199}iI_{81}$ $- \frac{252\sqrt{17}}{4199}iI_{83} + \frac{84}{323}iI_{10,1} - \frac{7\sqrt{78}}{323}iI_{10,3} - \frac{7\sqrt{390}}{323}iI_{10,5}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	4	$\frac{32\sqrt{2310}}{15015}R_{40} - \frac{128\sqrt{231}}{15015}R_{42} - \frac{4\sqrt{30030}}{2431}R_{60} - \frac{64\sqrt{286}}{2431}R_{62}$ $- \frac{288\sqrt{39270}}{230945}R_{80} + \frac{3072\sqrt{1122}}{230945}R_{82} - \frac{704\sqrt{255}}{20995}R_{84}$ $- \frac{392\sqrt{110}}{1615}R_{10,0} - \frac{14336\sqrt{3}}{4845}R_{10,2} - \frac{56\sqrt{39}}{95}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	5	$\frac{32\sqrt{125265}}{232635}R_{40} - \frac{404\sqrt{50106}}{2558985}R_{42} - \frac{28\sqrt{1628445}}{263653}R_{60}$ $+ \frac{472\sqrt{15509}}{2900183}R_{62} - \frac{432\sqrt{2129505}}{1926695}R_{80} - \frac{13296\sqrt{60843}}{25047035}R_{82}$ $+ \frac{2936\sqrt{6692730}}{25047035}R_{84} + \frac{62216\sqrt{5965}}{1926695}R_{10,0} + \frac{84224\sqrt{78738}}{5780085}R_{10,2}$ $+ \frac{3668\sqrt{1023594}}{1926695}R_{10,4}$

Table B392: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 61 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	6	$-\frac{64860\sqrt{301220570}}{4307454151}R_{40} + \frac{109948\sqrt{30122057}}{4307454151}R_{42} - \frac{134286\sqrt{3915867410}}{10460960081}R_{60}$ $-\frac{627372\sqrt{335645778}}{10460960081}R_{62} + \frac{51660\sqrt{5120749690}}{18068931049}R_{80} - \frac{179064\sqrt{146307134}}{18068931049}R_{82}$ $+ \frac{3996\sqrt{4023446185}}{1389917773}R_{84} - \frac{30744\sqrt{129094530}}{1389917773}R_{10,0} - \frac{123648\sqrt{47334661}}{1389917773}R_{10,2}$ $- \frac{31080\sqrt{615350593}}{1389917773}R_{10,4}$
$\frac{7}{2}$	4	2	$\frac{13}{2}$	6	7	$-\frac{60\sqrt{3610607}}{3610607}R_{40} - \frac{158\sqrt{36106070}}{3610607}R_{42} + \frac{96\sqrt{277739}}{674509}R_{60}$ $+ \frac{64\sqrt{595155}}{198385}R_{62} + \frac{216\sqrt{61380319}}{12815671}R_{80} + \frac{48\sqrt{43843085}}{674509}R_{82}$ $- \frac{36\sqrt{1594294}}{15145793}R_{84} - \frac{3920\sqrt{1547403}}{15145793}R_{10,0} - \frac{448\sqrt{468910}}{797147}R_{10,2}$ $+ \frac{56\sqrt{36070}}{1165061}R_{10,4}$
$\frac{7}{2}$	4	3	$\frac{7}{2}$	4	3	$R_{00} + \frac{4\sqrt{5}}{21}R_{20} + \frac{6}{77}R_{40} - \frac{17\sqrt{10}}{77}R_{42}$ $- \frac{80\sqrt{13}}{429}R_{60} - \frac{16\sqrt{1365}}{1287}R_{62}$
$\frac{7}{2}$	4	3	$\frac{7}{2}$	4	4	$\frac{10\sqrt{7}}{21}R_{20} + \frac{2\sqrt{14}}{77}R_{42} - \frac{80\sqrt{39}}{1287}R_{62}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	4	1	$-\frac{4\sqrt{1785}}{1309}R_{20} - \frac{60\sqrt{357}}{17017}R_{40} - \frac{30\sqrt{3570}}{17017}R_{42} - \frac{40\sqrt{4641}}{7293}R_{60}$ $+ \frac{16\sqrt{1105}}{2145}R_{62} - \frac{28\sqrt{21}}{2431}R_{80} - \frac{1064\sqrt{15}}{7293}R_{82} + \frac{322\sqrt{66}}{2431}R_{84}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	4	2	$-\frac{5\sqrt{35}}{231}iI_{21} + \frac{32\sqrt{210}}{1001}iI_{41} + \frac{19\sqrt{13}}{429}iI_{61} + \frac{\sqrt{130}}{39}iI_{63}$ $+ \frac{406\sqrt{357}}{2431}iI_{81} + \frac{14\sqrt{935}}{221}iI_{83}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	4	3	$-\frac{13\sqrt{15}}{693}iI_{21} + \frac{324\sqrt{10}}{1001}iI_{41} + \frac{5\sqrt{273}}{1287}iI_{61} - \frac{\sqrt{2730}}{429}iI_{63}$ $- \frac{1470\sqrt{17}}{2431}iI_{81} - \frac{42\sqrt{19635}}{2431}iI_{83}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	4	4	$\frac{214\sqrt{1785}}{35343}R_{20} + \frac{140\sqrt{357}}{7293}R_{40} - \frac{190\sqrt{3570}}{51051}R_{42} - \frac{284\sqrt{4641}}{65637}R_{60}$ $- \frac{8\sqrt{1105}}{495}R_{62} - \frac{1960\sqrt{21}}{21879}R_{80} - \frac{448\sqrt{15}}{7293}R_{82} + \frac{532\sqrt{66}}{7293}R_{84}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	4	5	$-\frac{4\sqrt{15}}{189}R_{20} - \frac{40\sqrt{3}}{3003}R_{40} + \frac{8\sqrt{30}}{231}R_{42} + \frac{448\sqrt{39}}{3861}R_{60}$ $+ \frac{224\sqrt{455}}{6435}R_{62} - \frac{784\sqrt{51}}{21879}R_{80} - \frac{112\sqrt{1785}}{7293}R_{82} - \frac{56\sqrt{7854}}{7293}R_{84}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	5	1	$\frac{3\sqrt{10}}{22}R_{32} - \frac{3\sqrt{110}}{143}R_{52} - \frac{2\sqrt{330}}{143}R_{54} + \frac{3\sqrt{15}}{286}R_{72}$ $+ \frac{5\sqrt{330}}{858}R_{74} + \frac{3\sqrt{2145}}{286}R_{76}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	5	2	$\frac{\sqrt{7}}{6}R_{10} - \frac{\sqrt{3}}{11}R_{30} - \frac{5\sqrt{231}}{286}R_{50} + \frac{3\sqrt{110}}{286}R_{52}$ $+ \frac{3\sqrt{330}}{286}R_{54} + \frac{10\sqrt{35}}{429}R_{70} + \frac{5\sqrt{15}}{117}R_{72} + \frac{\sqrt{330}}{143}R_{74}$ $+ \frac{7\sqrt{2145}}{1287}R_{76}$

Table B393: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 62 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	5	3	$\frac{\sqrt{3}}{2}R_{10} + \frac{6\sqrt{7}}{77}R_{30} + \frac{\sqrt{210}}{231}R_{32} - \frac{15\sqrt{11}}{286}R_{50}$ $- \frac{7\sqrt{2310}}{858}R_{52} + \frac{3\sqrt{770}}{286}R_{54} - \frac{14\sqrt{15}}{143}R_{70} + \frac{2\sqrt{35}}{429}R_{72}$ $+ \frac{\sqrt{770}}{143}R_{74}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	5	4	$-\frac{\sqrt{7}}{9}R_{10} + \frac{7\sqrt{3}}{33}R_{30} + \frac{3\sqrt{10}}{22}R_{32} - \frac{5\sqrt{231}}{429}R_{50}$ $+ \frac{6\sqrt{110}}{143}R_{52} - \frac{\sqrt{330}}{143}R_{54} + \frac{7\sqrt{35}}{1287}R_{70} - \frac{19\sqrt{15}}{286}R_{72}$ $- \frac{25\sqrt{330}}{2574}R_{74} - \frac{\sqrt{2145}}{858}R_{76}$
$\frac{7}{2}$	4	3	$\frac{9}{2}$	5	5	$-\frac{5\sqrt{2}}{18}iR_{10} - \frac{5\sqrt{42}}{154}iR_{30} + \frac{12\sqrt{35}}{77}iR_{32} - \frac{5\sqrt{66}}{286}iR_{50}$ $+ \frac{3\sqrt{385}}{143}iR_{52} + \frac{\sqrt{1155}}{143}iR_{54} - \frac{35\sqrt{10}}{1287}iR_{70} + \frac{\sqrt{210}}{429}iR_{72}$ $- \frac{7\sqrt{1155}}{1287}iR_{74}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	1	$\frac{5\sqrt{330}}{1144}iR_{30} - \frac{15\sqrt{11}}{572}iR_{32} + \frac{\sqrt{210}}{104}iR_{50} - \frac{1}{26}iR_{52}$ $- \frac{11\sqrt{3}}{156}iR_{54} + \frac{1095\sqrt{154}}{38896}iR_{70} - \frac{815\sqrt{66}}{19448}iR_{72} + \frac{5\sqrt{3}}{1768}iR_{74}$ $- \frac{5\sqrt{78}}{1768}iR_{76} - \frac{77\sqrt{43890}}{134368}iR_{90} + \frac{3437\sqrt{798}}{201552}iR_{92}$ $- \frac{763\sqrt{741}}{33592}iR_{94} + \frac{371\sqrt{3458}}{67184}iR_{96} - \frac{49\sqrt{88179}}{201552}iR_{98}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	2	$-\frac{125\sqrt{30}}{3432}iR_{30} + \frac{95}{1716}iR_{32} - \frac{5\sqrt{2310}}{3432}iR_{50} + \frac{19\sqrt{11}}{858}iR_{52}$ $- \frac{25\sqrt{33}}{572}iR_{54} + \frac{15\sqrt{14}}{9724}iR_{70} + \frac{6185\sqrt{6}}{38896}iR_{72} - \frac{125\sqrt{33}}{2431}iR_{74}$ $- \frac{35\sqrt{858}}{3536}iR_{76} + \frac{581\sqrt{3990}}{134368}iR_{90} + \frac{175\sqrt{8778}}{201552}iR_{92}$ $- \frac{497\sqrt{8151}}{100776}iR_{94} + \frac{49\sqrt{38038}}{67184}iR_{96} - \frac{7\sqrt{969969}}{67184}iR_{98}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	3	$-\frac{125\sqrt{2}}{3432}iR_{30} + \frac{35\sqrt{15}}{5148}iR_{32} - \frac{53\sqrt{154}}{3432}iR_{50} - \frac{35\sqrt{165}}{2574}iR_{52}$ $- \frac{71\sqrt{55}}{1716}iR_{54} - \frac{7\sqrt{210}}{38896}iR_{70} + \frac{519\sqrt{10}}{19448}iR_{72} + \frac{609\sqrt{55}}{19448}iR_{74}$ $+ \frac{69\sqrt{1430}}{19448}iR_{76} + \frac{2583\sqrt{266}}{134368}iR_{90} + \frac{245\sqrt{14630}}{67184}iR_{92}$ $+ \frac{7\sqrt{13585}}{33592}iR_{94} - \frac{21\sqrt{570570}}{67184}iR_{96} + \frac{7\sqrt{1616615}}{67184}iR_{98}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	4	$\frac{5\sqrt{6}}{1144}iR_{30} - \frac{35\sqrt{5}}{572}iR_{32} + \frac{9\sqrt{462}}{1144}iR_{50} - \frac{7\sqrt{55}}{286}iR_{52}$ $+ \frac{\sqrt{165}}{52}iR_{54} - \frac{3\sqrt{70}}{286}iR_{70} + \frac{2045\sqrt{30}}{38896}iR_{72} + \frac{123\sqrt{165}}{4862}iR_{74}$ $- \frac{5\sqrt{4290}}{2288}iR_{76} + \frac{49\sqrt{798}}{7904}iR_{90} + \frac{343\sqrt{43890}}{201552}iR_{92}$ $+ \frac{7\sqrt{40755}}{100776}iR_{94} - \frac{7\sqrt{190190}}{3952}iR_{96} + \frac{35\sqrt{4849845}}{201552}iR_{98}$

Table B394: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 63 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	5	$\begin{aligned} & \frac{5}{156}iR_{30} - \frac{125\sqrt{30}}{5148}iR_{32} + \frac{\sqrt{77}}{1716}iR_{50} + \frac{5\sqrt{330}}{2574}iR_{52} \\ & - \frac{29\sqrt{110}}{1716}iR_{54} - \frac{23\sqrt{105}}{1768}iR_{70} - \frac{45\sqrt{5}}{2431}iR_{72} + \frac{675\sqrt{110}}{19448}iR_{74} \\ & + \frac{24\sqrt{715}}{2431}iR_{76} + \frac{1659\sqrt{133}}{67184}iR_{90} + \frac{217\sqrt{7315}}{33592}iR_{92} \\ & + \frac{7\sqrt{27170}}{2584}iR_{94} + \frac{7\sqrt{285285}}{33592}iR_{96} - \frac{21\sqrt{3233230}}{67184}iR_{98} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	5	6	$\begin{aligned} & - \frac{5\sqrt{35}}{1092}R_{30} - \frac{775\sqrt{42}}{36036}R_{32} + \frac{35\sqrt{55}}{1716}R_{50} + \frac{19\sqrt{462}}{2574}R_{52} \\ & - \frac{29\sqrt{154}}{1716}R_{54} + \frac{35\sqrt{3}}{884}R_{70} + \frac{855\sqrt{7}}{19448}R_{72} + \frac{45\sqrt{154}}{9724}R_{74} \\ & - \frac{15\sqrt{1001}}{19448}R_{76} - \frac{2205\sqrt{95}}{67184}R_{90} - \frac{1421\sqrt{209}}{33592}R_{92} \\ & - \frac{7\sqrt{38038}}{2584}R_{94} - \frac{147\sqrt{8151}}{33592}R_{96} - \frac{49\sqrt{92378}}{67184}R_{98} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	1	$\begin{aligned} & - \frac{60\sqrt{7161}}{4433}iI_{41} - \frac{4\sqrt{44330}}{4433}iI_{61} + \frac{8\sqrt{4433}}{4433}iI_{63} + \frac{10\sqrt{1217370}}{20553}iI_{81} \\ & + \frac{198\sqrt{1054}}{6851}iI_{83} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	2	$\begin{aligned} & \frac{2\sqrt{188790}}{957}iI_{21} + \frac{640\sqrt{31465}}{128557}iI_{41} - \frac{14\sqrt{70122}}{385671}iI_{61} - \frac{180\sqrt{175305}}{128557}iI_{63} \\ & - \frac{152\sqrt{213962}}{75361}iI_{81} - \frac{16\sqrt{5043390}}{168113}iI_{83} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	3	$\begin{aligned} & \frac{28\sqrt{3045}}{2871}iI_{21} + \frac{70\sqrt{2030}}{4147}iI_{41} - \frac{272\sqrt{1131}}{37323}iI_{61} + \frac{8\sqrt{11310}}{12441}iI_{63} \\ & - \frac{12\sqrt{3451}}{2431}iI_{81} - \frac{60\sqrt{81345}}{70499}iI_{83} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	4	$\begin{aligned} & - \frac{10\sqrt{483}}{253}R_{20} - \frac{100\sqrt{2415}}{23023}R_{40} + \frac{410\sqrt{966}}{23023}R_{42} + \frac{14\sqrt{31395}}{9867}R_{60} \\ & + \frac{28\sqrt{299}}{429}R_{62} + \frac{100\sqrt{41055}}{55913}R_{80} - \frac{16\sqrt{1173}}{9867}R_{82} - \frac{194\sqrt{129030}}{167739}R_{84} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	5	$\begin{aligned} & \frac{248\sqrt{1955}}{12903}R_{20} - \frac{1140\sqrt{391}}{55913}R_{40} + \frac{70\sqrt{3910}}{55913}R_{42} - \frac{336\sqrt{5083}}{55913}R_{60} \\ & - \frac{8\sqrt{533715}}{6435}R_{62} + \frac{252\sqrt{23}}{55913}R_{80} + \frac{32\sqrt{805}}{3289}R_{82} - \frac{38\sqrt{3542}}{55913}R_{84} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{11}{2}$	6	6	$\begin{aligned} & - \frac{5\sqrt{714}}{561}R_{20} + \frac{50\sqrt{3570}}{17017}R_{40} - \frac{830\sqrt{357}}{17017}R_{42} + \frac{2\sqrt{46410}}{561}R_{60} \\ & + \frac{4\sqrt{442}}{143}R_{62} + \frac{36\sqrt{210}}{2431}R_{80} - \frac{8\sqrt{6}}{429}R_{82} + \frac{4\sqrt{165}}{663}R_{84} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	1	$\begin{aligned} & \frac{8\sqrt{154}}{1001}R_{40} - \frac{32\sqrt{385}}{5005}R_{42} + \frac{18\sqrt{2002}}{2431}R_{60} + \frac{4\sqrt{4290}}{935}R_{62} \\ & + \frac{24\sqrt{2618}}{3553}R_{80} - \frac{168\sqrt{1870}}{17765}R_{82} + \frac{72\sqrt{17}}{4199}R_{84} - \frac{196\sqrt{66}}{969}R_{10,0} \\ & - \frac{1568\sqrt{5}}{1615}R_{10,2} - \frac{1316\sqrt{65}}{4845}R_{10,4} \end{aligned}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{124\sqrt{231}}{33033}R_{40} - \frac{458\sqrt{2310}}{165165}R_{42} - \frac{72\sqrt{3003}}{26741}R_{60} - \frac{3984\sqrt{715}}{133705}R_{62} \\ & - \frac{108\sqrt{3927}}{46189}R_{80} + \frac{776\sqrt{2805}}{230945}R_{82} + \frac{186\sqrt{102}}{4199}R_{84} \\ & + \frac{3304\sqrt{11}}{3553}R_{10,0} + \frac{4928\sqrt{30}}{4845}R_{10,2} + \frac{812\sqrt{390}}{4845}R_{10,4} \end{aligned}$

Table B395: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 64 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	3	$-\frac{124\sqrt{2310}}{33033}R_{40} + \frac{284\sqrt{231}}{99099}R_{42} + \frac{72\sqrt{30030}}{26741}R_{60} + \frac{1608\sqrt{286}}{26741}R_{62}$ $-\frac{24\sqrt{39270}}{46189}R_{80} + \frac{24\sqrt{1122}}{2431}R_{82} + \frac{24\sqrt{255}}{4199}R_{84} + \frac{84\sqrt{110}}{3553}R_{10,0}$ $-\frac{28\sqrt{39}}{323}R_{10,4}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	4	$-\frac{4\sqrt{462}}{2145}iI_{41} + \frac{12\sqrt{715}}{12155}iI_{61} - \frac{168\sqrt{286}}{12155}iI_{63} - \frac{132\sqrt{19635}}{20995}iI_{81}$ $-\frac{420\sqrt{17}}{4199}iI_{83} - \frac{2912}{4845}iI_{10,1} + \frac{14\sqrt{78}}{4845}iI_{10,3} + \frac{14\sqrt{390}}{171}iI_{10,5}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	5	$-\frac{6508\sqrt{25053}}{2558985}iI_{41} - \frac{13038\sqrt{155090}}{14500915}iI_{61} + \frac{48564\sqrt{15509}}{14500915}iI_{63}$ $+\frac{16818\sqrt{4259010}}{25047035}iI_{81} + \frac{390\sqrt{446182}}{385339}iI_{83} + \frac{308\sqrt{26246}}{5780085}iI_{10,1}$ $-\frac{1134\sqrt{511797}}{1926695}iI_{10,3} - \frac{1694\sqrt{2558985}}{3468051}iI_{10,5}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	6	$-\frac{65828\sqrt{60244114}}{1846051779}iI_{41} + \frac{145142\sqrt{839114445}}{10460960081}iI_{61} - \frac{21738\sqrt{335645778}}{950996371}iI_{63}$ $+\frac{407952\sqrt{2560374845}}{18068931049}iI_{81} + \frac{130464\sqrt{2414067711}}{18068931049}iI_{83} - \frac{1932\sqrt{142003983}}{81759869}iI_{10,1}$ $-\frac{25221\sqrt{1230701186}}{1389917773}iI_{10,3} + \frac{651\sqrt{6153505930}}{1389917773}iI_{10,5}$
$\frac{7}{2}$	4	3	$\frac{13}{2}$	6	7	$\frac{164\sqrt{18053035}}{1547403}iI_{41} + \frac{24\sqrt{238062}}{61319}iI_{61} + \frac{192\sqrt{595155}}{674509}iI_{63}$ $-\frac{492\sqrt{122760638}}{15145793}iI_{81} - \frac{36\sqrt{23914410}}{890929}iI_{83} - \frac{2464\sqrt{1406730}}{3495183}iI_{10,1}$ $-\frac{728\sqrt{18035}}{1165061}iI_{10,3} - \frac{1400\sqrt{3607}}{3495183}iI_{10,5}$
$\frac{7}{2}$	4	4	$\frac{7}{2}$	4	4	$R_{00} + \frac{6}{11}R_{40} - \frac{\sqrt{10}}{11}R_{42} + \frac{100\sqrt{13}}{429}R_{60}$ $+\frac{40\sqrt{1365}}{1287}R_{62}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	4	1	$-\frac{24\sqrt{255}}{2431}R_{40} + \frac{48\sqrt{102}}{2431}R_{42} - \frac{112\sqrt{3315}}{7293}R_{60} - \frac{256\sqrt{1547}}{7293}R_{62}$ $-\frac{280\sqrt{15}}{2431}R_{80} + \frac{1280\sqrt{21}}{7293}R_{82} - \frac{36\sqrt{2310}}{2431}R_{84}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	4	2	$\frac{5}{33}iI_{21} - \frac{32\sqrt{6}}{143}iI_{41} + \frac{7\sqrt{455}}{429}iI_{61} - \frac{5\sqrt{182}}{429}iI_{63}$ $-\frac{14\sqrt{255}}{2431}iI_{81} - \frac{70\sqrt{1309}}{2431}iI_{83}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	4	3	$\frac{25\sqrt{21}}{693}iI_{21} + \frac{36\sqrt{14}}{1001}iI_{41} + \frac{35\sqrt{195}}{1287}iI_{61} - \frac{35\sqrt{78}}{429}iI_{63}$ $+\frac{210\sqrt{595}}{2431}iI_{81} + \frac{210\sqrt{561}}{2431}iI_{83}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	4	4	$\frac{10\sqrt{51}}{297}R_{20} - \frac{16\sqrt{255}}{7293}R_{40} - \frac{28\sqrt{102}}{663}R_{42} - \frac{224\sqrt{3315}}{65637}R_{60}$ $-\frac{32\sqrt{1547}}{1989}R_{62} + \frac{392\sqrt{15}}{21879}R_{80} - \frac{320\sqrt{21}}{7293}R_{82} - \frac{92\sqrt{2310}}{7293}R_{84}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	4	5	$-\frac{40\sqrt{21}}{2079}R_{20} - \frac{4\sqrt{105}}{429}R_{40} + \frac{10\sqrt{42}}{3003}R_{42} - \frac{56\sqrt{1365}}{3861}R_{60}$ $-\frac{112\sqrt{13}}{1287}R_{62} - \frac{280\sqrt{1785}}{21879}R_{80} - \frac{560\sqrt{51}}{7293}R_{82} + \frac{28\sqrt{5610}}{7293}R_{84}$

Table B396: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 65 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	5	1	$-\frac{4\sqrt{462}}{143}R_{54} + \frac{5\sqrt{462}}{429}R_{74}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	5	2	$\frac{3\sqrt{154}}{143}R_{52} + \frac{10\sqrt{21}}{117}R_{72} - \frac{10\sqrt{3003}}{1287}R_{76}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	5	3	$-\frac{10\sqrt{6}}{33}R_{32} + \frac{\sqrt{66}}{39}R_{52} - \frac{140}{429}R_{72}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	5	4	$\frac{2\sqrt{5}}{9}R_{10} - \frac{2\sqrt{105}}{33}R_{30} + \frac{10\sqrt{165}}{429}R_{50} - \frac{2\sqrt{462}}{143}R_{54}$ $-\frac{70}{1287}R_{70} - \frac{25\sqrt{462}}{1287}R_{74}$
$\frac{7}{2}$	4	4	$\frac{9}{2}$	5	5	$-\frac{\sqrt{70}}{9}iR_{10} - \frac{\sqrt{30}}{11}iR_{30} - \frac{\sqrt{2310}}{143}iR_{50} - \frac{10\sqrt{33}}{143}iR_{54}$ $-\frac{70\sqrt{14}}{1287}iR_{70} + \frac{70\sqrt{33}}{1287}iR_{74}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	1	$\frac{7\sqrt{6}}{104}iR_{50} - \frac{\sqrt{35}}{26}iR_{52} + \frac{\sqrt{105}}{156}iR_{54} + \frac{105\sqrt{110}}{7072}iR_{70}$ $+\frac{5\sqrt{2310}}{7072}iR_{72} - \frac{125\sqrt{105}}{3536}iR_{74} + \frac{25\sqrt{2730}}{7072}iR_{76} + \frac{161\sqrt{1254}}{10336}iR_{90}$ $-\frac{511\sqrt{570}}{15504}iR_{92} + \frac{77\sqrt{25935}}{33592}iR_{94} - \frac{301\sqrt{2470}}{67184}iR_{96}$ $+\frac{77\sqrt{62985}}{201552}iR_{98}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	2	$\frac{25\sqrt{42}}{1716}iR_{30} + \frac{25\sqrt{35}}{858}iR_{32} - \frac{49\sqrt{66}}{3432}iR_{50} + \frac{19\sqrt{385}}{858}iR_{52}$ $+\frac{\sqrt{1155}}{572}iR_{54} + \frac{3675\sqrt{10}}{77792}iR_{70} + \frac{475\sqrt{210}}{77792}iR_{72} - \frac{245\sqrt{1155}}{38896}iR_{74}$ $+\frac{5\sqrt{30030}}{4576}iR_{76} + \frac{1813\sqrt{114}}{134368}iR_{90} + \frac{343\sqrt{6270}}{201552}iR_{92}$ $-\frac{35\sqrt{285285}}{100776}iR_{94} - \frac{7\sqrt{27170}}{3952}iR_{96} + \frac{21\sqrt{692835}}{67184}iR_{98}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	3	$-\frac{5\sqrt{70}}{858}iR_{30} + \frac{5\sqrt{21}}{117}iR_{32} + \frac{49\sqrt{110}}{3432}iR_{50} + \frac{41\sqrt{231}}{2574}iR_{52}$ $+\frac{17\sqrt{77}}{1716}iR_{54} + \frac{245\sqrt{6}}{77792}iR_{70} + \frac{105\sqrt{14}}{7072}iR_{72} + \frac{735\sqrt{77}}{38896}iR_{74}$ $+\frac{525\sqrt{2002}}{77792}iR_{76} + \frac{2205\sqrt{190}}{134368}iR_{90} + \frac{1225\sqrt{418}}{67184}iR_{92}$ $+\frac{35\sqrt{19019}}{33592}iR_{94} - \frac{105\sqrt{16302}}{67184}iR_{96} - \frac{175\sqrt{46189}}{67184}iR_{98}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	4	$\frac{5\sqrt{210}}{572}iR_{30} - \frac{15\sqrt{7}}{286}iR_{32} - \frac{7\sqrt{330}}{1144}iR_{50} - \frac{3\sqrt{77}}{286}iR_{52}$ $+\frac{9\sqrt{231}}{572}iR_{54} + \frac{13335\sqrt{2}}{77792}iR_{70} - \frac{745\sqrt{42}}{77792}iR_{72} + \frac{135\sqrt{231}}{38896}iR_{74}$ $-\frac{295\sqrt{6006}}{77792}iR_{76} + \frac{1925\sqrt{570}}{134368}iR_{90} + \frac{875\sqrt{1254}}{201552}iR_{92}$ $-\frac{175\sqrt{57057}}{100776}iR_{94} + \frac{245\sqrt{5434}}{67184}iR_{96} - \frac{245\sqrt{138567}}{201552}iR_{98}$

Table B397: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 66 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	5	$\frac{5\sqrt{35}}{858}iR_{30} + \frac{25\sqrt{42}}{2574}iR_{32} + \frac{7\sqrt{55}}{1716}iR_{50} - \frac{\sqrt{462}}{234}iR_{52}$ $- \frac{\sqrt{154}}{1716}iR_{54} + \frac{2765\sqrt{3}}{38896}iR_{70} - \frac{405\sqrt{7}}{38896}iR_{72} - \frac{1305\sqrt{154}}{38896}iR_{74}$ $+ \frac{15\sqrt{1001}}{3536}iR_{76} + \frac{2037\sqrt{95}}{67184}iR_{90} + \frac{1085\sqrt{209}}{33592}iR_{92}$ $+ \frac{35\sqrt{38038}}{33592}iR_{94} + \frac{35\sqrt{8151}}{33592}iR_{96} + \frac{105\sqrt{92378}}{67184}iR_{98}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	5	6	$\frac{25}{429}R_{30} + \frac{35\sqrt{30}}{1287}R_{32} - \frac{35\sqrt{77}}{1716}R_{50} - \frac{35\sqrt{330}}{2574}R_{52}$ $+ \frac{7\sqrt{110}}{1716}R_{54} - \frac{35\sqrt{105}}{38896}R_{70} + \frac{945\sqrt{5}}{38896}R_{72} + \frac{945\sqrt{110}}{38896}R_{74}$ $+ \frac{735\sqrt{715}}{38896}R_{76} - \frac{1575\sqrt{133}}{67184}R_{90} - \frac{203\sqrt{7315}}{33592}R_{92}$ $- \frac{7\sqrt{27170}}{2584}R_{94} - \frac{21\sqrt{285285}}{33592}R_{96} - \frac{7\sqrt{3233230}}{67184}R_{98}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	1	$- \frac{8\sqrt{62062}}{4433}iI_{61} + \frac{8\sqrt{155155}}{4433}iI_{63} - \frac{112\sqrt{34782}}{20553}iI_{81} - \frac{24\sqrt{36890}}{6851}iI_{83}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	2	$\frac{140\sqrt{899}}{4147}iI_{41} + \frac{4\sqrt{2454270}}{35061}iI_{61} - \frac{32\sqrt{245427}}{128557}iI_{63} - \frac{518\sqrt{152830}}{198679}iI_{81}$ $- \frac{710\sqrt{7060746}}{2185469}iI_{83}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	3	$\frac{10\sqrt{87}}{99}iI_{21} + \frac{230\sqrt{58}}{4147}iI_{41} + \frac{76\sqrt{39585}}{37323}iI_{61} + \frac{4\sqrt{15834}}{12441}iI_{63}$ $+ \frac{2268\sqrt{2465}}{70499}iI_{81} + \frac{180\sqrt{113883}}{70499}iI_{83}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	4	$- \frac{200\sqrt{69}}{3289}R_{40} + \frac{80\sqrt{690}}{3289}R_{42} + \frac{196\sqrt{897}}{9867}R_{60} + \frac{448\sqrt{10465}}{49335}R_{62}$ $- \frac{280\sqrt{1173}}{55913}R_{80} + \frac{256\sqrt{41055}}{167739}R_{82} + \frac{4\sqrt{180642}}{9867}R_{84}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	5	$- \frac{10\sqrt{2737}}{561}R_{20} + \frac{1500\sqrt{13685}}{391391}R_{40} - \frac{1390\sqrt{5474}}{391391}R_{42} - \frac{70\sqrt{177905}}{55913}R_{60}$ $- \frac{140\sqrt{15249}}{503217}R_{62} - \frac{252\sqrt{805}}{55913}R_{80} + \frac{1400\sqrt{23}}{55913}R_{82}$ $+ \frac{658\sqrt{2530}}{55913}R_{84}$
$\frac{7}{2}$	4	4	$\frac{11}{2}$	6	6	$\frac{25\sqrt{510}}{561}R_{20} + \frac{100\sqrt{102}}{2431}R_{40} + \frac{40\sqrt{255}}{2431}R_{42} - \frac{98\sqrt{1326}}{7293}R_{60}$ $- \frac{124\sqrt{15470}}{12155}R_{62} + \frac{168\sqrt{6}}{2431}R_{80} + \frac{56\sqrt{210}}{7293}R_{82} - \frac{8\sqrt{231}}{561}R_{84}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	1	$- \frac{8\sqrt{6006}}{1105}R_{62} + \frac{1344\sqrt{1870}}{230945}R_{80} + \frac{48\sqrt{2618}}{46189}R_{82} - \frac{576\sqrt{595}}{20995}R_{84}$ $+ \frac{32\sqrt{2310}}{969}R_{10,0} + \frac{128\sqrt{7}}{323}R_{10,2} + \frac{160\sqrt{91}}{969}R_{10,4}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	2	$\frac{40\sqrt{165}}{4719}R_{40} - \frac{80\sqrt{66}}{4719}R_{42} - \frac{252\sqrt{2145}}{26741}R_{60} - \frac{3144\sqrt{1001}}{133705}R_{62}$ $+ \frac{504\sqrt{2805}}{230945}R_{80} - \frac{112\sqrt{3927}}{46189}R_{82} + \frac{132\sqrt{3570}}{20995}R_{84}$ $- \frac{248\sqrt{385}}{3553}R_{10,0} - \frac{448\sqrt{42}}{969}R_{10,2} - \frac{100\sqrt{546}}{969}R_{10,4}$

Table B398: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 67 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	3	$\frac{20\sqrt{66}}{4719}R_{40} + \frac{20\sqrt{165}}{1089}R_{42} - \frac{126\sqrt{858}}{26741}R_{60} + \frac{372\sqrt{10010}}{133705}R_{62}$ $+ \frac{420\sqrt{1122}}{46189}R_{80} + \frac{24\sqrt{39270}}{46189}R_{82} - \frac{132\sqrt{357}}{4199}R_{84}$ $+ \frac{360\sqrt{154}}{3553}R_{10,0} + \frac{64\sqrt{105}}{323}R_{10,2} + \frac{8\sqrt{1365}}{323}R_{10,4}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	4	$\frac{24\sqrt{1001}}{12155}iI_{61} - \frac{12\sqrt{10010}}{12155}iI_{63} - \frac{2016\sqrt{561}}{20995}iI_{81} - \frac{1296\sqrt{595}}{20995}iI_{83}$ $- \frac{104\sqrt{35}}{4845}iI_{10,1} + \frac{52\sqrt{2730}}{4845}iI_{10,3} - \frac{8\sqrt{546}}{171}iI_{10,5}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	5	$- \frac{2380\sqrt{17895}}{511797}iI_{41} + \frac{84\sqrt{217126}}{1318265}iI_{61} + \frac{4776\sqrt{542815}}{14500915}iI_{63}$ $- \frac{19866\sqrt{121686}}{25047035}iI_{81} + \frac{3414\sqrt{15616370}}{25047035}iI_{83} - \frac{4264\sqrt{918610}}{5780085}iI_{10,1}$ $+ \frac{164\sqrt{17912895}}{5780085}iI_{10,3} + \frac{1148\sqrt{3582579}}{3468051}iI_{10,5}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	6	$\frac{151648\sqrt{43031510}}{1846051779}iI_{41} - \frac{49838\sqrt{1174760223}}{10460960081}iI_{61} + \frac{4566\sqrt{11747602230}}{10460960081}iI_{63}$ $- \frac{159516\sqrt{73153567}}{950996371}iI_{81} - \frac{86796\sqrt{84492369885}}{18068931049}iI_{83} - \frac{4716\sqrt{4970139405}}{1389917773}iI_{10,1}$ $- \frac{2481\sqrt{43074541510}}{1389917773}iI_{10,3} - \frac{5085\sqrt{8614908302}}{1389917773}iI_{10,5}$
$\frac{7}{2}$	4	4	$\frac{13}{2}$	6	7	$- \frac{140\sqrt{515801}}{1547403}iI_{41} - \frac{60\sqrt{8332170}}{674509}iI_{61} - \frac{216\sqrt{833217}}{674509}iI_{63}$ $+ \frac{84\sqrt{87686170}}{15145793}iI_{81} + \frac{60\sqrt{33480174}}{797147}iI_{83} - \frac{1400\sqrt{1969422}}{3495183}iI_{10,1}$ $- \frac{2100\sqrt{25249}}{1165061}iI_{10,3} - \frac{140\sqrt{126245}}{3495183}iI_{10,5}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	1	$R_{00} - \frac{80\sqrt{5}}{187}R_{20} + \frac{108}{221}R_{40} - \frac{270\sqrt{10}}{2431}R_{42}$ $+ \frac{32\sqrt{13}}{221}R_{60} + \frac{448\sqrt{1365}}{12155}R_{62} - \frac{742\sqrt{17}}{41327}R_{80} - \frac{180\sqrt{595}}{41327}R_{82}$ $+ \frac{387\sqrt{2618}}{41327}R_{84}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	2	$- \frac{20\sqrt{255}}{561}iI_{21} + \frac{90\sqrt{170}}{2431}iI_{41} + \frac{4\sqrt{4641}}{7293}iI_{61} - \frac{4\sqrt{46410}}{2431}iI_{63}$ $+ \frac{3766}{2431}iI_{81} + \frac{98\sqrt{1155}}{2431}iI_{83}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	3	$\frac{4\sqrt{595}}{187}iI_{21} - \frac{54\sqrt{3570}}{2431}iI_{41} + \frac{4\sqrt{221}}{187}iI_{61} - \frac{28\sqrt{2210}}{2431}iI_{63}$ $+ \frac{294\sqrt{21}}{2431}iI_{81} + \frac{14\sqrt{55}}{221}iI_{83}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	4	$- \frac{76\sqrt{5}}{561}R_{20} + \frac{60}{2431}R_{40} - \frac{366\sqrt{10}}{2431}R_{42} + \frac{280\sqrt{13}}{7293}R_{60}$ $+ \frac{16\sqrt{1365}}{21879}R_{62} + \frac{3220\sqrt{17}}{41327}R_{80} - \frac{1208\sqrt{595}}{123981}R_{82}$ $- \frac{830\sqrt{2618}}{123981}R_{84}$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	4	5	$\frac{8\sqrt{595}}{561}R_{20} + \frac{240\sqrt{119}}{17017}R_{40} + \frac{12\sqrt{1190}}{1309}R_{42} + \frac{160\sqrt{1547}}{7293}R_{60}$ $+ \frac{1472\sqrt{3315}}{109395}R_{62} + \frac{112\sqrt{7}}{2431}R_{80} + \frac{280\sqrt{5}}{7293}R_{82} - \frac{224\sqrt{22}}{7293}R_{84}$

Table B399: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 68 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	1	$ \begin{aligned} & -\frac{\sqrt{51}}{44}R_{10} + \frac{3\sqrt{119}}{143}R_{30} - \frac{3\sqrt{3570}}{2431}R_{32} - \frac{3\sqrt{187}}{286}R_{50} \\ & + \frac{3\sqrt{39270}}{4862}R_{52} - \frac{9\sqrt{13090}}{4862}R_{54} + \frac{7\sqrt{255}}{2431}R_{70} - \frac{126\sqrt{595}}{41327}R_{72} \\ & + \frac{105\sqrt{13090}}{41327}R_{74} - \frac{42\sqrt{85085}}{41327}R_{76} - \frac{63\sqrt{323}}{184756}R_{90} \\ & + \frac{189\sqrt{17765}}{1570426}R_{92} - \frac{189\sqrt{3233230}}{3140852}R_{94} + \frac{441\sqrt{692835}}{1570426}R_{96} \\ & - \frac{189\sqrt{27170}}{184756}R_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	2	$ \begin{aligned} & \frac{5\sqrt{51}}{1122}R_{10} + \frac{15\sqrt{119}}{2431}R_{30} + \frac{\sqrt{3570}}{187}R_{32} + \frac{3\sqrt{187}}{4862}R_{50} \\ & - \frac{2\sqrt{39270}}{2431}R_{52} + \frac{3\sqrt{13090}}{4862}R_{54} - \frac{1204\sqrt{255}}{123981}R_{70} + \frac{623\sqrt{595}}{41327}R_{72} \\ & + \frac{56\sqrt{13090}}{41327}R_{74} - \frac{7\sqrt{85085}}{41327}R_{76} + \frac{3402\sqrt{323}}{785213}R_{90} \\ & - \frac{63\sqrt{17765}}{21964}R_{92} + \frac{189\sqrt{3233230}}{785213}R_{94} - \frac{567\sqrt{692835}}{3140852}R_{96} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	3	$ \begin{aligned} & -\frac{\sqrt{119}}{374}R_{10} - \frac{31\sqrt{51}}{2431}R_{30} - \frac{15\sqrt{170}}{2431}R_{32} - \frac{\sqrt{3927}}{442}R_{50} \\ & - \frac{6\sqrt{1870}}{2431}R_{52} + \frac{3\sqrt{5610}}{4862}R_{54} - \frac{196\sqrt{595}}{41327}R_{70} - \frac{287\sqrt{255}}{41327}R_{72} \\ & + \frac{56\sqrt{5610}}{41327}R_{74} + \frac{7\sqrt{36465}}{2431}R_{76} + \frac{2646\sqrt{6783}}{785213}R_{90} \\ & - \frac{2835\sqrt{373065}}{3140852}R_{92} + \frac{189\sqrt{1385670}}{785213}R_{94} - \frac{63\sqrt{1616615}}{184756}R_{96} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	4	$ \begin{aligned} & \frac{7\sqrt{51}}{2244}R_{10} + \frac{3\sqrt{119}}{2431}R_{30} + \frac{5\sqrt{3570}}{2431}R_{32} - \frac{21\sqrt{187}}{4862}R_{50} \\ & + \frac{\sqrt{39270}}{4862}R_{52} + \frac{9\sqrt{13090}}{4862}R_{54} + \frac{329\sqrt{255}}{123981}R_{70} - \frac{406\sqrt{595}}{41327}R_{72} \\ & + \frac{7\sqrt{13090}}{3757}R_{74} + \frac{14\sqrt{85085}}{41327}R_{76} - \frac{1701\sqrt{323}}{3140852}R_{90} \\ & + \frac{1323\sqrt{17765}}{1570426}R_{92} - \frac{567\sqrt{3233230}}{3140852}R_{94} + \frac{567\sqrt{692835}}{1570426}R_{96} \\ & - \frac{63\sqrt{27170}}{10868}R_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{9}{2}$	5	5	$ \begin{aligned} & \frac{\sqrt{714}}{2244}iR_{10} + \frac{18\sqrt{34}}{2431}iR_{30} + \frac{4\sqrt{255}}{2431}iR_{32} + \frac{9\sqrt{2618}}{4862}iR_{50} \\ & + \frac{\sqrt{2805}}{2431}iR_{52} + \frac{21\sqrt{935}}{2431}iR_{54} + \frac{392\sqrt{3570}}{123981}iR_{70} - \frac{224\sqrt{170}}{41327}iR_{72} \\ & - \frac{672\sqrt{935}}{41327}iR_{74} + \frac{11907\sqrt{4522}}{1570426}iR_{90} - \frac{945\sqrt{248710}}{785213}iR_{92} \\ & + \frac{63\sqrt{230945}}{120802}iR_{94} \end{aligned} $

Table B400: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 69 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	1	$ \begin{aligned} & -\frac{\sqrt{5610}}{88}iR_{10} - \frac{9\sqrt{13090}}{4862}iR_{30} - \frac{25\sqrt{3927}}{2431}iR_{32} - \frac{9\sqrt{170}}{884}iR_{50} \\ & + \frac{\sqrt{357}}{442}iR_{52} - \frac{15\sqrt{119}}{442}iR_{54} - \frac{35\sqrt{1122}}{330616}iR_{70} - \frac{1065\sqrt{2618}}{330616}iR_{72} \\ & + \frac{375\sqrt{119}}{15028}iR_{74} - \frac{135\sqrt{3094}}{30056}iR_{76} - \frac{945\sqrt{35530}}{50253632}iR_{90} \\ & + \frac{1113\sqrt{646}}{1142128}iR_{92} - \frac{777\sqrt{29393}}{1142128}iR_{94} + \frac{1239\sqrt{25194}}{1142128}iR_{96} \\ & - \frac{861\sqrt{247}}{134368}iR_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	2	$ \begin{aligned} & -\frac{9\sqrt{510}}{1496}iR_{10} + \frac{27\sqrt{1190}}{4862}iR_{30} - \frac{25\sqrt{357}}{2431}iR_{32} - \frac{27\sqrt{1870}}{9724}iR_{50} \\ & + \frac{25\sqrt{3927}}{4862}iR_{52} - \frac{9\sqrt{1309}}{4862}iR_{54} + \frac{315\sqrt{102}}{82654}iR_{70} - \frac{525\sqrt{238}}{41327}iR_{72} \\ & + \frac{105\sqrt{1309}}{41327}iR_{74} + \frac{45\sqrt{34034}}{41327}iR_{76} - \frac{157689\sqrt{3230}}{50253632}iR_{90} \\ & + \frac{48069\sqrt{7106}}{12563408}iR_{92} - \frac{3969\sqrt{323323}}{12563408}iR_{94} - \frac{2709\sqrt{277134}}{12563408}iR_{96} \\ & + \frac{5691\sqrt{2717}}{1478048}iR_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	3	$ \begin{aligned} & \frac{75\sqrt{34}}{1496}iR_{10} - \frac{75\sqrt{714}}{4862}iR_{30} - \frac{5\sqrt{595}}{2431}iR_{32} + \frac{75\sqrt{1122}}{9724}iR_{50} \\ & + \frac{5\sqrt{6545}}{4862}iR_{52} - \frac{3\sqrt{19635}}{4862}iR_{54} - \frac{5103\sqrt{170}}{330616}iR_{70} \\ & + \frac{721\sqrt{3570}}{330616}iR_{72} + \frac{49\sqrt{19635}}{165308}iR_{74} + \frac{95\sqrt{510510}}{330616}iR_{76} \\ & - \frac{122535\sqrt{1938}}{50253632}iR_{90} + \frac{1239\sqrt{106590}}{12563408}iR_{92} + \frac{63\sqrt{4849845}}{661232}iR_{94} \\ & - \frac{6741\sqrt{461890}}{12563408}iR_{96} - \frac{735\sqrt{40755}}{1478048}iR_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	4	$ \begin{aligned} & \frac{19\sqrt{102}}{1496}iR_{10} - \frac{177\sqrt{238}}{4862}iR_{30} - \frac{\sqrt{1785}}{143}iR_{32} + \frac{15\sqrt{374}}{9724}iR_{50} \\ & - \frac{19\sqrt{19635}}{4862}iR_{52} - \frac{27\sqrt{6545}}{4862}iR_{54} - \frac{245\sqrt{510}}{41327}iR_{70} \\ & - \frac{21\sqrt{1190}}{82654}iR_{72} + \frac{42\sqrt{6545}}{41327}iR_{74} - \frac{27\sqrt{170170}}{82654}iR_{76} \\ & - \frac{2205\sqrt{646}}{50253632}iR_{90} - \frac{3087\sqrt{35530}}{12563408}iR_{92} - \frac{945\sqrt{1616615}}{12563408}iR_{94} \\ & + \frac{63\sqrt{1385670}}{12563408}iR_{96} + \frac{21\sqrt{13585}}{10336}iR_{98} \end{aligned} $
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	5	$ \begin{aligned} & -\frac{45\sqrt{17}}{748}iR_{10} + \frac{35\sqrt{357}}{2431}iR_{30} + \frac{\sqrt{1190}}{143}iR_{32} - \frac{40\sqrt{561}}{2431}iR_{50} \\ & - \frac{\sqrt{13090}}{286}iR_{52} + \frac{3\sqrt{39270}}{2431}iR_{54} - \frac{945\sqrt{85}}{165308}iR_{70} - \frac{49\sqrt{1785}}{165308}iR_{72} \\ & + \frac{175\sqrt{39270}}{165308}iR_{74} + \frac{129\sqrt{255255}}{165308}iR_{76} - \frac{31815\sqrt{969}}{25126816}iR_{90} \\ & - \frac{2247\sqrt{53295}}{6281704}iR_{92} - \frac{315\sqrt{9699690}}{12563408}iR_{94} - \frac{315\sqrt{230945}}{6281704}iR_{96} \\ & + \frac{609\sqrt{81510}}{1478048}iR_{98} \end{aligned} $

Table B401: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 70 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	5	6	$\begin{aligned} & \frac{3\sqrt{595}}{748}R_{10} - \frac{21\sqrt{255}}{2431}R_{30} - \frac{35\sqrt{34}}{2431}R_{32} + \frac{3\sqrt{19635}}{2431}R_{50} \\ & + \frac{5\sqrt{374}}{4862}R_{52} + \frac{10\sqrt{1122}}{2431}R_{54} + \frac{945\sqrt{119}}{82654}R_{70} - \frac{35\sqrt{51}}{4862}R_{72} \\ & - \frac{1225\sqrt{1122}}{82654}R_{74} + \frac{35\sqrt{7293}}{82654}R_{76} + \frac{9513\sqrt{33915}}{25126816}R_{90} \\ & + \frac{105\sqrt{74613}}{369512}R_{92} - \frac{945\sqrt{277134}}{12563408}R_{94} - \frac{315\sqrt{323323}}{6281704}R_{96} \\ & + \frac{105\sqrt{114114}}{113696}R_{98} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	1	$\begin{aligned} & -\frac{5\sqrt{34782}}{4433}iI_{21} + \frac{456\sqrt{5797}}{75361}iI_{41} - \frac{94\sqrt{15825810}}{1281137}iI_{61} \\ & + \frac{420\sqrt{1582581}}{1281137}iI_{63} - \frac{47796\sqrt{3410}}{1431859}iI_{81} - \frac{6300\sqrt{1302}}{130169}iI_{83} \\ & + \frac{2874\sqrt{22134}}{2212873}iI_{10,1} - \frac{99\sqrt{47957}}{2212873}iI_{10,3} - \frac{2871\sqrt{239785}}{2212873}iI_{10,5} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	2	$\begin{aligned} & -\frac{9\sqrt{152830}}{75361}iI_{21} + \frac{48\sqrt{229245}}{198679}iI_{41} - \frac{5754\sqrt{2781506}}{37152973}iI_{61} \\ & + \frac{1596\sqrt{6953765}}{37152973}iI_{63} - \frac{131712\sqrt{5394}}{41523911}iI_{81} + \frac{15120\sqrt{692230}}{41523911}iI_{83} \\ & - \frac{5994\sqrt{11767910}}{64173317}iI_{10,1} - \frac{1239\sqrt{229474245}}{64173317}iI_{10,3} + \frac{13785\sqrt{45894849}}{64173317}iI_{10,5} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	3	$\begin{aligned} & -\frac{196\sqrt{14790}}{70499}iI_{41} - \frac{840\sqrt{44863}}{1198483}iI_{61} - \frac{168\sqrt{448630}}{1198483}iI_{63} \\ & - \frac{21000\sqrt{87}}{121771}iI_{81} - \frac{504\sqrt{11165}}{78793}iI_{83} - \frac{72\sqrt{189805}}{159239}iI_{10,1} \\ & + \frac{222\sqrt{14804790}}{2070107}iI_{10,3} - \frac{810\sqrt{2960958}}{2070107}iI_{10,5} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	4	$\begin{aligned} & -\frac{270\sqrt{391}}{55913}R_{20} + \frac{24\sqrt{1955}}{5083}R_{40} + \frac{324\sqrt{782}}{55913}R_{42} - \frac{168\sqrt{25415}}{86411}R_{60} \\ & - \frac{976\sqrt{106743}}{950521}R_{62} - \frac{3528\sqrt{115}}{1062347}R_{80} - \frac{240\sqrt{161}}{62491}R_{82} \\ & + \frac{3972\sqrt{17710}}{1062347}R_{84} - \frac{15348\sqrt{41055}}{1641809}R_{10,0} - \frac{22320\sqrt{60214}}{1641809}R_{10,2} \\ & - \frac{4302\sqrt{782782}}{1641809}R_{10,4} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	5	$\begin{aligned} & \frac{2\sqrt{2415}}{3289}R_{20} - \frac{80\sqrt{483}}{391391}R_{40} + \frac{984\sqrt{4830}}{391391}R_{42} - \frac{840\sqrt{6279}}{950521}R_{60} \\ & - \frac{44912\sqrt{1495}}{4752605}R_{62} - \frac{2016\sqrt{8211}}{1062347}R_{80} + \frac{9408\sqrt{5865}}{1641809}R_{82} \\ & - \frac{1008\sqrt{25806}}{950521}R_{84} + \frac{817740\sqrt{23}}{1641809}R_{10,0} + \frac{65184\sqrt{7590}}{1641809}R_{10,2} \\ & + \frac{882\sqrt{98670}}{86411}R_{10,4} \end{aligned}$
$\frac{9}{2}$	4	1	$\frac{11}{2}$	6	6	$\begin{aligned} & \frac{24\sqrt{10}}{2431}R_{40} - \frac{96}{2431}R_{42} + \frac{1764\sqrt{130}}{41327}R_{60} + \frac{1608\sqrt{546}}{41327}R_{62} \\ & - \frac{1008\sqrt{170}}{46189}R_{80} + \frac{5520\sqrt{238}}{785213}R_{82} + \frac{7248\sqrt{6545}}{785213}R_{84} \\ & - \frac{4356\sqrt{210}}{71383}R_{10,0} + \frac{1920\sqrt{77}}{71383}R_{10,2} - \frac{1212\sqrt{1001}}{71383}R_{10,4} \end{aligned}$

Table B402: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 71 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	1	$-\frac{3\sqrt{5610}}{143}R_{20} + \frac{8\sqrt{1122}}{2431}R_{40} - \frac{168\sqrt{2805}}{12155}R_{42} + \frac{126\sqrt{14586}}{41327}R_{60}$ $+ \frac{588\sqrt{170170}}{206635}R_{62} - \frac{504\sqrt{66}}{46189}R_{80} - \frac{1152\sqrt{2310}}{230945}R_{82}$ $+ \frac{600\sqrt{21}}{4199}R_{84} - \frac{66\sqrt{2618}}{4199}R_{10,0} - \frac{11664\sqrt{1785}}{356915}R_{10,2}$ $- \frac{2374\sqrt{23205}}{356915}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	2	$\frac{372\sqrt{935}}{26741}R_{20} - \frac{1416\sqrt{187}}{26741}R_{40} + \frac{108\sqrt{1870}}{133705}R_{42} + \frac{7728\sqrt{2431}}{454597}R_{60}$ $+ \frac{1728\sqrt{255255}}{2272985}R_{62} - \frac{41832\sqrt{11}}{508079}R_{80} + \frac{14544\sqrt{385}}{2540395}R_{82}$ $+ \frac{180\sqrt{14}}{2717}R_{84} + \frac{24\sqrt{3927}}{4199}R_{10,0} + \frac{5424\sqrt{1190}}{356915}R_{10,2}$ $+ \frac{1284\sqrt{15470}}{356915}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	3	$-\frac{45\sqrt{374}}{26741}R_{20} + \frac{8\sqrt{1870}}{26741}R_{40} - \frac{392\sqrt{187}}{26741}R_{42} + \frac{588\sqrt{24310}}{454597}R_{60}$ $+ \frac{736\sqrt{102102}}{454597}R_{62} + \frac{3024\sqrt{110}}{508079}R_{80} - \frac{144\sqrt{154}}{39083}R_{82}$ $- \frac{2160\sqrt{35}}{46189}R_{84} + \frac{318\sqrt{39270}}{71383}R_{10,0} + \frac{14496\sqrt{119}}{71383}R_{10,2}$ $+ \frac{2118\sqrt{1547}}{71383}R_{10,4}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	4	$\frac{4\sqrt{561}}{143}iI_{21} - \frac{184\sqrt{374}}{12155}iI_{41} + \frac{64\sqrt{255255}}{206635}iI_{61} + \frac{96\sqrt{102102}}{206635}iI_{63}$ $+ \frac{23016\sqrt{55}}{230945}iI_{81} + \frac{2424\sqrt{21}}{20995}iI_{83} - \frac{3384\sqrt{357}}{356915}iI_{10,1}$ $+ \frac{458\sqrt{3094}}{356915}iI_{10,3} + \frac{1426\sqrt{15470}}{356915}iI_{10,5}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	5	$\frac{\sqrt{121686}}{2431}iI_{21} - \frac{15968\sqrt{20281}}{14500915}iI_{41} + \frac{18514\sqrt{55367130}}{246515555}iI_{61}$ $+ \frac{22692\sqrt{5536713}}{246515555}iI_{63} + \frac{1950816\sqrt{11930}}{275517385}iI_{81} + \frac{227424\sqrt{551166}}{275517385}iI_{83}$ $- \frac{21894\sqrt{9369822}}{425799595}iI_{10,1} + \frac{25781\sqrt{20301281}}{425799595}iI_{10,3} + \frac{9457\sqrt{101506405}}{425799595}iI_{10,5}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	6	$\frac{56\sqrt{438921402}}{2900183}iI_{41} - \frac{144\sqrt{33284872985}}{16166938307}iI_{61} + \frac{609936\sqrt{13313949194}}{177836321377}iI_{63}$ $- \frac{1248912\sqrt{64547265}}{18068931049}iI_{81} - \frac{11005776\sqrt{331342627}}{198758241539}iI_{83} + \frac{85968\sqrt{5632824659}}{23628602141}iI_{10,1}$ $- \frac{1644\sqrt{439360323402}}{18068931049}iI_{10,3} - \frac{101100\sqrt{2196801617010}}{307171827833}iI_{10,5}$
$\frac{9}{2}$	4	1	$\frac{13}{2}$	6	7	$\frac{720\sqrt{9443126}}{11466653}iI_{61} - \frac{720\sqrt{23607815}}{11466653}iI_{63} + \frac{16800\sqrt{3094806}}{15145793}iI_{81}$ $+ \frac{8928\sqrt{3282370}}{15145793}iI_{83} + \frac{600\sqrt{55800290}}{19806037}iI_{10,1} - \frac{1816\sqrt{6438495}}{19806037}iI_{10,3}$ $+ \frac{1040\sqrt{1287699}}{19806037}iI_{10,5}$

Table B403: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 72 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	2	$R_{00} - \frac{4\sqrt{5}}{33}R_{20} - \frac{51}{143}R_{40} + \frac{51\sqrt{10}}{286}R_{42}$ $- \frac{40\sqrt{13}}{429}R_{60} - \frac{16\sqrt{1365}}{429}R_{62} + \frac{35\sqrt{17}}{2431}R_{80} - \frac{30\sqrt{595}}{2431}R_{82}$ $+ \frac{45\sqrt{2618}}{4862}R_{84}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	3	$\frac{75\sqrt{21}}{1001}R_{40} + \frac{45\sqrt{210}}{2002}R_{42} - \frac{16\sqrt{273}}{429}R_{60} - \frac{32\sqrt{65}}{429}R_{62}$ $+ \frac{21\sqrt{357}}{2431}R_{80} - \frac{14\sqrt{255}}{2431}R_{82} - \frac{35\sqrt{1122}}{4862}R_{84}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	4	$\frac{2\sqrt{255}}{1683}iI_{21} - \frac{122\sqrt{170}}{2431}iI_{41} - \frac{184\sqrt{4641}}{21879}iI_{61} + \frac{8\sqrt{46410}}{21879}iI_{63}$ $+ \frac{1358}{2431}iI_{81} + \frac{14\sqrt{1155}}{7293}iI_{83}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	4	5	$- \frac{4\sqrt{105}}{99}iI_{21} - \frac{2\sqrt{70}}{11}iI_{41} - \frac{16\sqrt{39}}{1287}iI_{61} + \frac{32\sqrt{390}}{1287}iI_{63}$ $+ \frac{56\sqrt{119}}{2431}iI_{81} + \frac{56\sqrt{2805}}{7293}iI_{83}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	1	$- \frac{5\sqrt{6}}{264}iR_{10} - \frac{15\sqrt{14}}{572}iR_{30} - \frac{5\sqrt{105}}{286}iR_{32} - \frac{3\sqrt{22}}{1144}iR_{50}$ $- \frac{\sqrt{1155}}{143}iR_{52} - \frac{3\sqrt{385}}{572}iR_{54} - \frac{35\sqrt{30}}{3432}iR_{70} + \frac{427\sqrt{70}}{19448}iR_{72}$ $- \frac{203\sqrt{385}}{9724}iR_{74} + \frac{21\sqrt{10010}}{19448}iR_{76} - \frac{11151\sqrt{38}}{173888}iR_{90}$ $+ \frac{2205\sqrt{2090}}{184756}iR_{92} - \frac{63\sqrt{95095}}{739024}iR_{94} - \frac{189\sqrt{81510}}{184756}iR_{96}$ $+ \frac{441\sqrt{230945}}{1478048}iR_{98}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	2	$\frac{5\sqrt{6}}{198}iR_{10} + \frac{5\sqrt{14}}{143}iR_{30} - \frac{59\sqrt{22}}{1144}iR_{50} - \frac{3\sqrt{385}}{572}iR_{54}$ $- \frac{791\sqrt{30}}{43758}iR_{70} - \frac{175\sqrt{385}}{7293}iR_{74} - \frac{44793\sqrt{38}}{1478048}iR_{90}$ $+ \frac{567\sqrt{95095}}{369512}iR_{94} - \frac{945\sqrt{230945}}{739024}iR_{98}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	3	$- \frac{\sqrt{14}}{33}iR_{10} + \frac{\sqrt{6}}{143}iR_{30} + \frac{8\sqrt{5}}{143}iR_{32} + \frac{5\sqrt{462}}{1144}iR_{50}$ $- \frac{4\sqrt{55}}{143}iR_{52} + \frac{\sqrt{165}}{52}iR_{54} - \frac{140\sqrt{70}}{7293}iR_{70} - \frac{665\sqrt{30}}{14586}iR_{72}$ $- \frac{56\sqrt{165}}{7293}iR_{74} - \frac{7\sqrt{4290}}{14586}iR_{76} - \frac{6615\sqrt{798}}{1478048}iR_{90}$ $- \frac{63\sqrt{43890}}{184756}iR_{92} + \frac{567\sqrt{40755}}{369512}iR_{94} + \frac{189\sqrt{190190}}{184756}iR_{96}$ $- \frac{63\sqrt{4849845}}{739024}iR_{98}$

Table B404: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 73 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	4	$\frac{7\sqrt{6}}{792}iR_{10} - \frac{\sqrt{14}}{44}iR_{30} + \frac{\sqrt{105}}{286}iR_{32} - \frac{35\sqrt{22}}{1144}iR_{50}$ $- \frac{\sqrt{1155}}{143}iR_{52} - \frac{3\sqrt{385}}{572}iR_{54} + \frac{7385\sqrt{30}}{175032}iR_{70} - \frac{2905\sqrt{70}}{58344}iR_{72}$ $- \frac{21\sqrt{385}}{9724}iR_{74} - \frac{7\sqrt{10010}}{1768}iR_{76} - \frac{8505\sqrt{38}}{227392}iR_{90}$ $+ \frac{189\sqrt{2090}}{92378}iR_{92} + \frac{1323\sqrt{95095}}{739024}iR_{94} - \frac{189\sqrt{81510}}{92378}iR_{96}$ $- \frac{189\sqrt{230945}}{1478048}iR_{98}$
$\frac{9}{2}$	4	2	$\frac{9}{2}$	5	5	$\frac{5\sqrt{21}}{396}R_{10} - \frac{15}{286}R_{30} - \frac{5\sqrt{30}}{286}R_{32} + \frac{3\sqrt{77}}{286}R_{50}$ $+ \frac{2\sqrt{330}}{143}R_{52} - \frac{3\sqrt{110}}{286}R_{54} - \frac{2345\sqrt{105}}{87516}R_{70} - \frac{4109\sqrt{5}}{29172}R_{72}$ $+ \frac{329\sqrt{110}}{29172}R_{74} + \frac{7\sqrt{715}}{2652}R_{76} - \frac{13041\sqrt{133}}{1478048}R_{90}$ $- \frac{189\sqrt{7315}}{184756}R_{92} + \frac{945\sqrt{27170}}{739024}R_{94} + \frac{189\sqrt{285285}}{184756}R_{96}$ $+ \frac{567\sqrt{3233230}}{1478048}R_{98}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	1	$\frac{25\sqrt{462}}{858}R_{32} - \frac{5\sqrt{42}}{78}R_{52} + \frac{75\sqrt{77}}{4862}R_{72} - \frac{15\sqrt{91}}{442}R_{76}$ $- \frac{35\sqrt{19}}{8398}R_{92} + \frac{49\sqrt{741}}{8398}R_{96} - \frac{14\sqrt{8398}}{4199}R_{98}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	2	$\frac{3\sqrt{15}}{44}R_{10} - \frac{9\sqrt{35}}{143}R_{30} + \frac{25\sqrt{42}}{429}R_{32} + \frac{9\sqrt{55}}{286}R_{50}$ $+ \frac{4\sqrt{462}}{429}R_{52} + \frac{7\sqrt{154}}{286}R_{54} - \frac{105\sqrt{3}}{2431}R_{70} - \frac{15\sqrt{7}}{143}R_{72}$ $+ \frac{75\sqrt{154}}{4862}R_{74} + \frac{189\sqrt{95}}{184756}R_{90} + \frac{14\sqrt{209}}{2717}R_{92} - \frac{161\sqrt{38038}}{184756}R_{94}$ $+ \frac{35\sqrt{92378}}{184756}R_{98}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	3	$\frac{6}{11}R_{10} - \frac{2\sqrt{21}}{429}R_{30} - \frac{\sqrt{70}}{78}R_{32} - \frac{20\sqrt{33}}{429}R_{50}$ $+ \frac{7\sqrt{770}}{858}R_{52} - \frac{210\sqrt{5}}{2431}R_{70} - \frac{15\sqrt{105}}{442}R_{72} - \frac{15\sqrt{15015}}{4862}R_{76}$ $+ \frac{1050\sqrt{57}}{46189}R_{90} - \frac{140\sqrt{3135}}{46189}R_{92} - \frac{105\sqrt{13585}}{46189}R_{96}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	4	$\frac{15\sqrt{3}}{44}R_{10} - \frac{20\sqrt{7}}{143}R_{30} - \frac{25\sqrt{11}}{286}R_{50} + \frac{\sqrt{770}}{286}R_{54}$ $+ \frac{210\sqrt{15}}{2431}R_{70} + \frac{3\sqrt{770}}{442}R_{74} - \frac{3\sqrt{5005}}{2431}R_{76} - \frac{3675\sqrt{19}}{184756}R_{90}$ $+ \frac{7\sqrt{190190}}{14212}R_{94} - \frac{14\sqrt{40755}}{46189}R_{96} + \frac{63\sqrt{461890}}{184756}R_{98}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	5	$-\frac{5\sqrt{35}}{143}R_{32} + \frac{3\sqrt{385}}{143}R_{52} + \frac{4\sqrt{1155}}{429}R_{54} + \frac{75\sqrt{210}}{2431}R_{72}$ $+ \frac{18\sqrt{1155}}{2431}R_{74} - \frac{3\sqrt{30030}}{2431}R_{76} - \frac{259\sqrt{6270}}{184756}R_{92} + \frac{14\sqrt{285285}}{46189}R_{94}$ $+ \frac{189\sqrt{27170}}{184756}R_{96}$

Table B405: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 74 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	5	6	$-\frac{3\sqrt{70}}{44}iR_{10} - \frac{49\sqrt{30}}{858}iR_{30} - \frac{175}{429}iR_{32} - \frac{2\sqrt{2310}}{429}iR_{50}$ $- \frac{16\sqrt{11}}{429}iR_{52} + \frac{46\sqrt{33}}{429}iR_{54} - \frac{105\sqrt{14}}{2431}iR_{70} + \frac{105\sqrt{6}}{2431}iR_{72}$ $- \frac{105\sqrt{33}}{2431}iR_{74} - \frac{147\sqrt{3990}}{92378}iR_{90} + \frac{112\sqrt{8778}}{46189}iR_{92}$ $- \frac{203\sqrt{8151}}{92378}iR_{94}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	1	$- \frac{25\sqrt{682}}{4433}R_{20} - \frac{60\sqrt{341}}{4433}R_{42} - \frac{32\sqrt{186186}}{226083}R_{62} + \frac{336\sqrt{57970}}{1431859}R_{80}$ $+ \frac{60\sqrt{81158}}{75361}R_{82} - \frac{664\sqrt{18445}}{130169}R_{84} + \frac{414\sqrt{71610}}{130169}R_{10,0}$ $+ \frac{1296\sqrt{217}}{6851}R_{10,2} + \frac{3294\sqrt{2821}}{130169}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	2	$- \frac{135\sqrt{26970}}{128557}R_{20} + \frac{10\sqrt{5394}}{4147}R_{40} - \frac{138\sqrt{13485}}{128557}R_{42} - \frac{28\sqrt{70122}}{211497}R_{60}$ $- \frac{3832\sqrt{818090}}{32782035}R_{62} - \frac{2058\sqrt{91698}}{2185469}R_{80} + \frac{5288\sqrt{3209430}}{41523911}R_{82}$ $- \frac{1038\sqrt{3530373}}{3774901}R_{84} - \frac{4050\sqrt{12586}}{198679}R_{10,0} - \frac{15264\sqrt{1038345}}{3774901}R_{10,2}$ $- \frac{2502\sqrt{13498485}}{3774901}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	3	$\frac{70\sqrt{435}}{12441}R_{20} - \frac{50\sqrt{87}}{4147}R_{40} + \frac{\sqrt{870}}{319}R_{42} + \frac{140\sqrt{1131}}{211497}R_{60}$ $+ \frac{216\sqrt{13195}}{352495}R_{62} - \frac{3948\sqrt{1479}}{1339481}R_{80} - \frac{3360\sqrt{51765}}{1339481}R_{82}$ $+ \frac{686\sqrt{227766}}{1339481}R_{84} + \frac{540\sqrt{203}}{121771}R_{10,0} + \frac{288\sqrt{66990}}{121771}R_{10,2}$ $+ \frac{126\sqrt{870870}}{121771}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	4	$- \frac{125\sqrt{69}}{9867}iI_{21} - \frac{90\sqrt{46}}{3289}iI_{41} + \frac{466\sqrt{31395}}{167739}iI_{61} - \frac{10\sqrt{12558}}{4301}iI_{63}$ $- \frac{33222\sqrt{1955}}{1062347}iI_{81} - \frac{2170\sqrt{90321}}{1062347}iI_{83} + \frac{1098\sqrt{5313}}{96577}iI_{10,1}$ $- \frac{711\sqrt{46046}}{193154}iI_{10,3} - \frac{387\sqrt{230230}}{193154}iI_{10,5}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	5	$- \frac{5\sqrt{13685}}{15249}iI_{21} + \frac{42\sqrt{82110}}{55913}iI_{41} - \frac{938\sqrt{5083}}{2851563}iI_{61} - \frac{14\sqrt{50830}}{950521}iI_{63}$ $- \frac{6594\sqrt{483}}{96577}iI_{81} - \frac{45066\sqrt{1265}}{1062347}iI_{83} - \frac{2646\sqrt{21505}}{1641809}iI_{10,1}$ $- \frac{189\sqrt{1677390}}{3283618}iI_{10,3} + \frac{315\sqrt{335478}}{193154}iI_{10,5}$
$\frac{9}{2}$	4	2	$\frac{11}{2}$	6	6	$- \frac{35\sqrt{102}}{2431}iI_{21} - \frac{168\sqrt{17}}{2431}iI_{41} + \frac{12\sqrt{46410}}{41327}iI_{61} - \frac{360\sqrt{4641}}{41327}iI_{63}$ $+ \frac{9688\sqrt{10}}{46189}iI_{81} + \frac{280\sqrt{462}}{46189}iI_{83} - \frac{360\sqrt{7854}}{71383}iI_{10,1}$ $+ \frac{360\sqrt{17017}}{71383}iI_{10,3}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	1	$- \frac{56\sqrt{165}}{429}iI_{41} - \frac{12\sqrt{5005}}{2431}iI_{63} - \frac{84\sqrt{1122}}{4199}iI_{81} - \frac{444\sqrt{1190}}{20995}iI_{83}$ $+ \frac{4\sqrt{70}}{323}iI_{10,1} + \frac{8\sqrt{1365}}{3315}iI_{10,3} - \frac{412\sqrt{273}}{12597}iI_{10,5}$

Table B406: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 75 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	2	$\frac{75\sqrt{165}}{1573}iI_{21} - \frac{48\sqrt{110}}{1573}iI_{41} - \frac{150\sqrt{3003}}{26741}iI_{61} - \frac{6\sqrt{30030}}{26741}iI_{63}$ $- \frac{22092\sqrt{187}}{508079}iI_{81} - \frac{3924\sqrt{1785}}{230945}iI_{83} - \frac{42\sqrt{105}}{4199}iI_{10,1}$ $- \frac{73\sqrt{910}}{41990}iI_{10,3} + \frac{283\sqrt{182}}{8398}iI_{10,5}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	3	$\frac{120\sqrt{66}}{1573}iI_{21} - \frac{1816\sqrt{11}}{4719}iI_{41} + \frac{3\sqrt{30030}}{1573}iI_{61} - \frac{6\sqrt{3003}}{26741}iI_{63}$ $- \frac{17640\sqrt{1870}}{508079}iI_{81} - \frac{120\sqrt{714}}{2431}iI_{83} - \frac{10\sqrt{42}}{4199}iI_{10,1}$ $- \frac{15\sqrt{91}}{4199}iI_{10,3} + \frac{25\sqrt{455}}{4199}iI_{10,5}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	4	$- \frac{45\sqrt{11}}{143}R_{20} + \frac{20\sqrt{22}}{429}R_{42} - \frac{40\sqrt{3003}}{2431}R_{62} - \frac{1344\sqrt{935}}{230945}R_{80}$ $+ \frac{2616\sqrt{1309}}{230945}R_{82} - \frac{24\sqrt{1190}}{20995}R_{84} - \frac{2498\sqrt{1155}}{62985}R_{10,0}$ $- \frac{440\sqrt{14}}{741}R_{10,2} - \frac{2467\sqrt{182}}{20995}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	5	$- \frac{45\sqrt{2386}}{170599}R_{20} - \frac{300\sqrt{11930}}{170599}R_{40} - \frac{2660\sqrt{1193}}{511797}R_{42} - \frac{4725\sqrt{155090}}{2900183}R_{60}$ $- \frac{2290\sqrt{651378}}{2900183}R_{62} + \frac{149856\sqrt{202810}}{275517385}R_{80} + \frac{148416\sqrt{283934}}{275517385}R_{82}$ $+ \frac{3552\sqrt{7808185}}{275517385}R_{84} - \frac{39248\sqrt{250530}}{75141105}R_{10,0} - \frac{4240\sqrt{91861}}{15028221}R_{10,2}$ $+ \frac{3656\sqrt{1194193}}{25047035}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	6	$\frac{130545\sqrt{12909453}}{615350593}R_{20} + \frac{56\sqrt{64547265}}{167822889}R_{40} - \frac{1464\sqrt{25818906}}{47334661}R_{42}$ $+ \frac{294\sqrt{839114445}}{950996371}R_{60} + \frac{352740\sqrt{391586741}}{10460960081}R_{62} - \frac{1505700\sqrt{1097303505}}{198758241539}R_{80}$ $+ \frac{240\sqrt{1536224907}}{18068931049}R_{82} + \frac{325290\sqrt{168984739770}}{198758241539}R_{84} + \frac{394350\sqrt{150610285}}{18068931049}R_{10,0}$ $- \frac{1920\sqrt{1988055762}}{18068931049}R_{10,2} + \frac{30035\sqrt{25844724906}}{18068931049}R_{10,4}$
$\frac{9}{2}$	4	2	$\frac{13}{2}$	6	7	$- \frac{63\sqrt{15474030}}{515801}R_{20} - \frac{280\sqrt{3094806}}{1547403}R_{40} - \frac{112\sqrt{7737015}}{1547403}R_{42}$ $- \frac{1470\sqrt{238062}}{674509}R_{60} - \frac{588\sqrt{2777390}}{674509}R_{62} - \frac{4200\sqrt{52611702}}{166603723}R_{80}$ $- \frac{240\sqrt{1841409570}}{166603723}R_{82} - \frac{600\sqrt{16740087}}{15145793}R_{84} + \frac{1100\sqrt{7221214}}{15145793}R_{10,0}$ $+ \frac{3840\sqrt{4923555}}{15145793}R_{10,2} + \frac{140\sqrt{378735}}{3495183}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	4	3	$R_{00} - \frac{4\sqrt{5}}{11}R_{20} + \frac{9}{143}R_{40} - \frac{9\sqrt{10}}{286}R_{42}$ $- \frac{8\sqrt{13}}{143}R_{60} - \frac{16\sqrt{1365}}{715}R_{62} - \frac{49\sqrt{17}}{2431}R_{80} + \frac{42\sqrt{595}}{2431}R_{82}$ $- \frac{63\sqrt{2618}}{4862}R_{84}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	4	4	$- \frac{14\sqrt{595}}{561}iI_{21} - \frac{2\sqrt{3570}}{221}iI_{41} + \frac{56\sqrt{221}}{7293}iI_{61} - \frac{24\sqrt{2210}}{2431}iI_{63}$ $- \frac{2338\sqrt{21}}{7293}iI_{81} - \frac{378\sqrt{55}}{2431}iI_{83}$

Table B407: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 76 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	4	5	$\frac{4\sqrt{5}}{33}iI_{21} + \frac{2\sqrt{30}}{143}iI_{41} - \frac{16\sqrt{91}}{429}iI_{61} - \frac{784\sqrt{51}}{7293}iI_{81}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	1	$\frac{\sqrt{14}}{88}iR_{10} + \frac{\sqrt{6}}{52}iR_{30} + \frac{27\sqrt{5}}{286}iR_{32} + \frac{\sqrt{462}}{1144}iR_{50}$ $+ \frac{15\sqrt{165}}{572}iR_{54} + \frac{7\sqrt{70}}{1768}iR_{70} - \frac{7\sqrt{30}}{1496}iR_{72} - \frac{7\sqrt{165}}{884}iR_{74}$ $+ \frac{7\sqrt{4290}}{1496}iR_{76} - \frac{45801\sqrt{798}}{2956096}iR_{90} + \frac{1323\sqrt{43890}}{369512}iR_{92}$ $- \frac{1575\sqrt{40755}}{739024}iR_{94} + \frac{63\sqrt{190190}}{369512}iR_{96} + \frac{63\sqrt{4849845}}{1478048}iR_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	2	$-\frac{\sqrt{14}}{33}iR_{10} + \frac{\sqrt{6}}{143}iR_{30} - \frac{8\sqrt{5}}{143}iR_{32} + \frac{5\sqrt{462}}{1144}iR_{50}$ $+ \frac{4\sqrt{55}}{143}iR_{52} + \frac{\sqrt{165}}{52}iR_{54} - \frac{140\sqrt{70}}{7293}iR_{70} + \frac{665\sqrt{30}}{14586}iR_{72}$ $- \frac{56\sqrt{165}}{7293}iR_{74} + \frac{7\sqrt{4290}}{14586}iR_{76} - \frac{6615\sqrt{798}}{1478048}iR_{90}$ $+ \frac{63\sqrt{43890}}{184756}iR_{92} + \frac{567\sqrt{40755}}{369512}iR_{94} - \frac{189\sqrt{190190}}{184756}iR_{96}$ $- \frac{63\sqrt{4849845}}{739024}iR_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	3	$-\frac{\sqrt{6}}{66}iR_{10} + \frac{19\sqrt{14}}{1001}iR_{30} - \frac{79\sqrt{22}}{1144}iR_{50} + \frac{9\sqrt{385}}{572}iR_{54}$ $+ \frac{49\sqrt{30}}{14586}iR_{70} - \frac{7\sqrt{385}}{2431}iR_{74} + \frac{11907\sqrt{38}}{1478048}iR_{90}$ $- \frac{189\sqrt{95095}}{369512}iR_{94} + \frac{1323\sqrt{230945}}{739024}iR_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	4	$-\frac{\sqrt{14}}{88}iR_{10} - \frac{31\sqrt{6}}{572}iR_{30} - \frac{15\sqrt{5}}{286}iR_{32} + \frac{\sqrt{462}}{1144}iR_{50}$ $- \frac{6\sqrt{55}}{143}iR_{52} - \frac{\sqrt{165}}{572}iR_{54} - \frac{469\sqrt{70}}{19448}iR_{70} + \frac{3745\sqrt{30}}{58344}iR_{72}$ $- \frac{35\sqrt{165}}{2652}iR_{74} - \frac{161\sqrt{4290}}{58344}iR_{76} + \frac{15309\sqrt{798}}{2956096}iR_{90}$ $- \frac{189\sqrt{43890}}{369512}iR_{92} - \frac{63\sqrt{40755}}{38896}iR_{94} + \frac{567\sqrt{190190}}{369512}iR_{96}$ $- \frac{315\sqrt{4849845}}{1478048}iR_{98}$
$\frac{9}{2}$	4	3	$\frac{9}{2}$	5	5	$\frac{13}{132}R_{10} - \frac{69\sqrt{21}}{2002}R_{30} - \frac{\sqrt{70}}{154}R_{32} - \frac{3\sqrt{33}}{286}R_{50}$ $+ \frac{\sqrt{770}}{143}R_{52} + \frac{\sqrt{2310}}{286}R_{54} - \frac{931\sqrt{5}}{29172}R_{70} + \frac{7\sqrt{105}}{1716}R_{72}$ $+ \frac{133\sqrt{2310}}{29172}R_{74} - \frac{7\sqrt{15015}}{1716}R_{76} - \frac{3969\sqrt{57}}{1478048}R_{90}$ $+ \frac{63\sqrt{570570}}{739024}R_{94} - \frac{441\sqrt{1385670}}{1478048}R_{98}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	1	$-\frac{35\sqrt{22}}{286}R_{32} + \frac{7\sqrt{2}}{26}R_{52} - \frac{2\sqrt{6}}{13}R_{54} - \frac{105\sqrt{33}}{4862}R_{72}$ $+ \frac{25\sqrt{6}}{221}R_{74} - \frac{15\sqrt{39}}{442}R_{76} + \frac{7\sqrt{399}}{8398}R_{92} - \frac{7\sqrt{1482}}{4199}R_{94}$ $+ \frac{21\sqrt{1729}}{8398}R_{96}$

Table B408: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 77 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	2	$\frac{3\sqrt{35}}{44}R_{10} - \frac{21\sqrt{15}}{143}R_{30} + \frac{3\sqrt{1155}}{286}R_{50} + \frac{7\sqrt{66}}{286}R_{54}$ $- \frac{105\sqrt{7}}{2431}R_{70} + \frac{75\sqrt{66}}{4862}R_{74} + \frac{25\sqrt{429}}{2431}R_{76} + \frac{63\sqrt{1995}}{184756}R_{90}$ $- \frac{161\sqrt{16302}}{184756}R_{94} + \frac{84\sqrt{19019}}{46189}R_{96} - \frac{7\sqrt{1939938}}{184756}R_{98}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	3	$- \frac{35\sqrt{30}}{858}R_{32} + \frac{19\sqrt{330}}{858}R_{52} + \frac{2\sqrt{110}}{143}R_{54} - \frac{831\sqrt{5}}{4862}R_{72}$ $+ \frac{27\sqrt{110}}{2431}R_{74} + \frac{63\sqrt{715}}{4862}R_{76} - \frac{42\sqrt{7315}}{46189}R_{92} + \frac{21\sqrt{27170}}{46189}R_{94}$ $+ \frac{21\sqrt{285285}}{46189}R_{96}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	4	$- \frac{9\sqrt{7}}{44}R_{10} + \frac{28\sqrt{3}}{143}R_{30} + \frac{7\sqrt{10}}{143}R_{32} + \frac{5\sqrt{231}}{286}R_{50}$ $+ \frac{4\sqrt{110}}{143}R_{52} + \frac{\sqrt{330}}{286}R_{54} - \frac{126\sqrt{35}}{2431}R_{70} + \frac{109\sqrt{15}}{2431}R_{72}$ $+ \frac{3\sqrt{330}}{442}R_{74} + \frac{735\sqrt{399}}{184756}R_{90} - \frac{56\sqrt{21945}}{46189}R_{92} + \frac{7\sqrt{81510}}{14212}R_{94}$ $+ \frac{21\sqrt{9699690}}{184756}R_{98}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	5	$\frac{\sqrt{42}}{11}R_{10} + \frac{21\sqrt{2}}{143}R_{30} + \frac{21\sqrt{15}}{143}R_{32} - \frac{\sqrt{165}}{143}R_{52}$ $- \frac{2\sqrt{210}}{187}R_{70} - \frac{9\sqrt{10}}{143}R_{72} - \frac{21\sqrt{1430}}{2431}R_{76} - \frac{630\sqrt{266}}{46189}R_{90}$ $+ \frac{21\sqrt{14630}}{10868}R_{92} + \frac{63\sqrt{570570}}{184756}R_{96}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	5	6	$- \frac{3\sqrt{30}}{44}iR_{10} - \frac{7\sqrt{70}}{286}iR_{30} - \frac{35\sqrt{21}}{429}iR_{32} - \frac{2\sqrt{110}}{143}iR_{50}$ $- \frac{8\sqrt{231}}{429}iR_{52} - \frac{2\sqrt{77}}{143}iR_{54} - \frac{105\sqrt{6}}{2431}iR_{70} - \frac{135\sqrt{14}}{2431}iR_{72}$ $- \frac{105\sqrt{77}}{2431}iR_{74} - \frac{441\sqrt{190}}{92378}iR_{90} - \frac{294\sqrt{418}}{46189}iR_{92}$ $+ \frac{21\sqrt{19019}}{7106}iR_{94}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	1	$\frac{5\sqrt{14322}}{4433}R_{20} - \frac{8\sqrt{71610}}{31031}R_{40} + \frac{116\sqrt{7161}}{31031}R_{42} - \frac{40\sqrt{930930}}{75361}R_{60}$ $- \frac{912\sqrt{8866}}{75361}R_{62} + \frac{168\sqrt{1217370}}{1431859}R_{80} + \frac{700\sqrt{34782}}{1431859}R_{82}$ $- \frac{784\sqrt{7905}}{130169}R_{84} - \frac{126\sqrt{3410}}{10013}R_{10,0} + \frac{3696\sqrt{93}}{130169}R_{10,2}$ $- \frac{2562\sqrt{1209}}{130169}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	2	$- \frac{43\sqrt{62930}}{128557}R_{20} + \frac{1150\sqrt{12586}}{899899}R_{40} - \frac{514\sqrt{31465}}{899899}R_{42}$ $- \frac{3116\sqrt{163618}}{2185469}R_{60} - \frac{3048\sqrt{350610}}{10927345}R_{62} + \frac{882\sqrt{213962}}{3774901}R_{80}$ $- \frac{17304\sqrt{152830}}{41523911}R_{82} + \frac{5502\sqrt{168113}}{41523911}R_{84} + \frac{135450\sqrt{5394}}{3774901}R_{10,0}$ $+ \frac{86688\sqrt{49445}}{3774901}R_{10,2} + \frac{16254\sqrt{642785}}{3774901}R_{10,4}$

Table B409: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 78 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	3	$\frac{6\sqrt{1015}}{4147}R_{20} - \frac{410\sqrt{203}}{29029}R_{40} - \frac{3\sqrt{2030}}{2233}R_{42} - \frac{620\sqrt{2639}}{70499}R_{60}$ $- \frac{9272\sqrt{5655}}{1057485}R_{62} - \frac{7812\sqrt{3451}}{1339481}R_{80} + \frac{6720\sqrt{2465}}{1339481}R_{82}$ $+ \frac{294\sqrt{10846}}{78793}R_{84} - \frac{18900\sqrt{87}}{121771}R_{10,0} - \frac{6048\sqrt{3190}}{121771}R_{10,2}$ $- \frac{1134\sqrt{41470}}{121771}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	4	$\frac{25\sqrt{161}}{3289}iI_{21} - \frac{34\sqrt{966}}{3289}iI_{41} - \frac{278\sqrt{1495}}{55913}iI_{61} - \frac{30\sqrt{598}}{55913}iI_{63}$ $- \frac{4382\sqrt{41055}}{1062347}iI_{81} - \frac{1470\sqrt{4301}}{96577}iI_{83} + \frac{630\sqrt{253}}{96577}iI_{10,1}$ $- \frac{651\sqrt{19734}}{193154}iI_{10,3} + \frac{441\sqrt{98670}}{193154}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	5	$\frac{13\sqrt{5865}}{12903}iI_{21} + \frac{2\sqrt{3910}}{55913}iI_{41} - \frac{190\sqrt{106743}}{219351}iI_{61} + \frac{14\sqrt{1067430}}{950521}iI_{63}$ $- \frac{60270\sqrt{23}}{1062347}iI_{81} - \frac{3402\sqrt{26565}}{1062347}iI_{83} + \frac{126\sqrt{451605}}{126293}iI_{10,1}$ $- \frac{441\sqrt{3913910}}{3283618}iI_{10,3} - \frac{315\sqrt{782782}}{172822}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{11}{2}$	6	6	$- \frac{25\sqrt{238}}{2431}iI_{21} + \frac{32\sqrt{357}}{2431}iI_{41} - \frac{124\sqrt{2210}}{41327}iI_{61} - \frac{600\sqrt{221}}{41327}iI_{63}$ $+ \frac{336\sqrt{210}}{2431}iI_{81} + \frac{16800\sqrt{22}}{46189}iI_{83} + \frac{1008\sqrt{374}}{71383}iI_{10,1}$ $- \frac{420\sqrt{7293}}{71383}iI_{10,3} + \frac{84\sqrt{36465}}{71383}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	1	$\frac{56\sqrt{385}}{715}iI_{41} - \frac{24\sqrt{858}}{2431}iI_{61} + \frac{12\sqrt{2145}}{715}iI_{63} - \frac{132\sqrt{2618}}{4199}iI_{81}$ $- \frac{1308\sqrt{510}}{20995}iI_{83} + \frac{28\sqrt{30}}{1615}iI_{10,1} - \frac{112\sqrt{65}}{20995}iI_{10,3}$ $- \frac{252\sqrt{13}}{4199}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	2	$- \frac{45\sqrt{385}}{1573}iI_{21} + \frac{48\sqrt{2310}}{7865}iI_{41} + \frac{558\sqrt{143}}{26741}iI_{61} + \frac{966\sqrt{1430}}{133705}iI_{63}$ $- \frac{444\sqrt{3927}}{39083}iI_{81} - \frac{4644\sqrt{85}}{230945}iI_{83} + \frac{882\sqrt{5}}{20995}iI_{10,1}$ $- \frac{49\sqrt{390}}{3230}iI_{10,3} + \frac{343\sqrt{78}}{8398}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	3	$\frac{60\sqrt{154}}{1573}iI_{21} - \frac{200\sqrt{231}}{4719}iI_{41} + \frac{399\sqrt{1430}}{26741}iI_{61} - \frac{414\sqrt{143}}{26741}iI_{63}$ $- \frac{1752\sqrt{39270}}{508079}iI_{81} - \frac{504\sqrt{34}}{46189}iI_{83} + \frac{966\sqrt{2}}{4199}iI_{10,1}$ $- \frac{7\sqrt{39}}{221}iI_{10,3} - \frac{189\sqrt{195}}{4199}iI_{10,5}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	4	$\frac{9\sqrt{231}}{143}R_{20} - \frac{16\sqrt{1155}}{2145}R_{40} + \frac{4\sqrt{462}}{715}R_{42} + \frac{4\sqrt{15015}}{12155}R_{60}$ $+ \frac{112\sqrt{143}}{12155}R_{62} - \frac{48\sqrt{19635}}{230945}R_{80} - \frac{1656\sqrt{561}}{230945}R_{82}$ $+ \frac{64\sqrt{510}}{4199}R_{84} - \frac{154\sqrt{55}}{1615}R_{10,0} - \frac{392\sqrt{6}}{1235}R_{10,2} - \frac{1883\sqrt{78}}{20995}R_{10,4}$

Table B410: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 79 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	5	$-\frac{441\sqrt{50106}}{170599}R_{20} + \frac{2084\sqrt{250530}}{2558985}R_{40} + \frac{908\sqrt{25053}}{852995}R_{42}$ $-\frac{521\sqrt{3256890}}{14500915}R_{60} - \frac{514\sqrt{31018}}{852995}R_{62} - \frac{52248\sqrt{4259010}}{275517385}R_{80}$ $+ \frac{120144\sqrt{121686}}{275517385}R_{82} + \frac{6728\sqrt{3346365}}{55103477}R_{84} + \frac{125048\sqrt{11930}}{25047035}R_{10,0}$ $+ \frac{131152\sqrt{39369}}{25047035}R_{10,2} + \frac{32144\sqrt{511797}}{25047035}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	6	$\frac{108705\sqrt{30122057}}{615350593}R_{20} + \frac{8\sqrt{150610285}}{55940963}R_{40} + \frac{2240\sqrt{60244114}}{47334661}R_{42}$ $-\frac{6\sqrt{1957933705}}{950996371}R_{60} + \frac{57756\sqrt{167822889}}{10460960081}R_{62} - \frac{390348\sqrt{2560374845}}{198758241539}R_{80}$ $-\frac{688752\sqrt{73153567}}{18068931049}R_{82} + \frac{593442\sqrt{8046892370}}{198758241539}R_{84} - \frac{2775234\sqrt{64547265}}{18068931049}R_{10,0}$ $-\frac{3226944\sqrt{94669322}}{18068931049}R_{10,2} - \frac{632079\sqrt{1230701186}}{18068931049}R_{10,4}$
$\frac{9}{2}$	4	3	$\frac{13}{2}$	6	7	$-\frac{45\sqrt{36106070}}{515801}R_{20} - \frac{40\sqrt{7221214}}{515801}R_{40} - \frac{48\sqrt{18053035}}{515801}R_{42}$ $+ \frac{30\sqrt{555478}}{674509}R_{60} - \frac{4\sqrt{1190310}}{674509}R_{62} + \frac{360\sqrt{122760638}}{166603723}R_{80}$ $-\frac{3792\sqrt{87686170}}{166603723}R_{82} - \frac{8280\sqrt{797147}}{15145793}R_{84} - \frac{980\sqrt{3094806}}{15145793}R_{10,0}$ $-\frac{9856\sqrt{234455}}{15145793}R_{10,2} + \frac{1708\sqrt{18035}}{1165061}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	4	4	$R_{00} + \frac{448\sqrt{5}}{1683}R_{20} - \frac{2986}{7293}R_{40} + \frac{997\sqrt{10}}{7293}R_{42}$ $+ \frac{2272\sqrt{13}}{21879}R_{60} + \frac{2368\sqrt{1365}}{65637}R_{62} - \frac{392\sqrt{17}}{123981}R_{80}$ $-\frac{1024\sqrt{595}}{123981}R_{82} - \frac{940\sqrt{2618}}{123981}R_{84}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	4	5	$\frac{28\sqrt{595}}{1683}R_{20} + \frac{1520\sqrt{119}}{51051}R_{40} - \frac{40\sqrt{1190}}{4641}R_{42} + \frac{16\sqrt{1547}}{21879}R_{60}$ $-\frac{224\sqrt{3315}}{29835}R_{62} - \frac{560\sqrt{7}}{7293}R_{80} - \frac{784\sqrt{5}}{7293}R_{82} + \frac{56\sqrt{22}}{7293}R_{84}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	5	1	$-\frac{19\sqrt{3570}}{7293}R_{32} + \frac{19\sqrt{39270}}{14586}R_{52} - \frac{\sqrt{13090}}{2431}R_{54} - \frac{266\sqrt{595}}{41327}R_{72}$ $+ \frac{70\sqrt{13090}}{123981}R_{74} + \frac{70\sqrt{85085}}{41327}R_{76} + \frac{21\sqrt{17765}}{82654}R_{92}$ $-\frac{21\sqrt{3233230}}{1570426}R_{94} - \frac{735\sqrt{692835}}{1570426}R_{96} - \frac{189\sqrt{27170}}{46189}R_{98}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	5	2	$\frac{95\sqrt{51}}{10098}R_{10} + \frac{95\sqrt{119}}{7293}R_{30} + \frac{\sqrt{3570}}{2431}R_{32} + \frac{19\sqrt{187}}{14586}R_{50}$ $+ \frac{\sqrt{39270}}{4862}R_{52} - \frac{5\sqrt{13090}}{4862}R_{54} - \frac{22876\sqrt{255}}{1115829}R_{70} + \frac{532\sqrt{595}}{371943}R_{72}$ $-\frac{280\sqrt{13090}}{123981}R_{74} - \frac{28\sqrt{85085}}{41327}R_{76} + \frac{378\sqrt{323}}{41327}R_{90}$ $-\frac{441\sqrt{17765}}{785213}R_{92} - \frac{315\sqrt{3233230}}{785213}R_{94} - \frac{567\sqrt{692835}}{785213}R_{96}$

Table B411: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 80 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	5	3	$\frac{5\sqrt{119}}{1122}R_{10} + \frac{155\sqrt{51}}{7293}R_{30} - \frac{95\sqrt{170}}{7293}R_{32} + \frac{5\sqrt{3927}}{1326}R_{50}$ $- \frac{25\sqrt{1870}}{14586}R_{52} + \frac{19\sqrt{5610}}{14586}R_{54} + \frac{980\sqrt{595}}{123981}R_{70}$ $+ \frac{6328\sqrt{255}}{371943}R_{72} + \frac{1064\sqrt{5610}}{371943}R_{74} - \frac{4410\sqrt{6783}}{785213}R_{90}$ $- \frac{336\sqrt{373065}}{785213}R_{92} + \frac{21\sqrt{1385670}}{41327}R_{94}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	5	4	$\frac{7\sqrt{51}}{561}R_{10} + \frac{12\sqrt{119}}{2431}R_{30} - \frac{25\sqrt{3570}}{7293}R_{32} - \frac{42\sqrt{187}}{2431}R_{50}$ $- \frac{5\sqrt{39270}}{14586}R_{52} + \frac{\sqrt{13090}}{2431}R_{54} + \frac{1316\sqrt{255}}{123981}R_{70} + \frac{2030\sqrt{595}}{123981}R_{72}$ $+ \frac{14\sqrt{13090}}{33813}R_{74} + \frac{266\sqrt{85085}}{371943}R_{76} - \frac{1701\sqrt{323}}{785213}R_{90}$ $- \frac{2205\sqrt{17765}}{1570426}R_{92} - \frac{63\sqrt{3233230}}{1570426}R_{94} + \frac{63\sqrt{692835}}{82654}R_{96}$
$\frac{9}{2}$	4	4	$\frac{9}{2}$	5	5	$\frac{\sqrt{714}}{10098}iR_{10} + \frac{4\sqrt{34}}{2431}iR_{30} + \frac{82\sqrt{255}}{7293}iR_{32} + \frac{\sqrt{2618}}{2431}iR_{50}$ $+ \frac{46\sqrt{2805}}{7293}iR_{52} - \frac{18\sqrt{935}}{2431}iR_{54} + \frac{784\sqrt{3570}}{1115829}iR_{70}$ $+ \frac{12404\sqrt{170}}{371943}iR_{72} - \frac{28\sqrt{935}}{3757}iR_{74} + \frac{1323\sqrt{4522}}{785213}iR_{90}$ $+ \frac{504\sqrt{248710}}{785213}iR_{92} + \frac{567\sqrt{230945}}{785213}iR_{94}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	1	$\frac{95\sqrt{13090}}{58344}iR_{30} - \frac{95\sqrt{3927}}{29172}iR_{32} + \frac{7\sqrt{170}}{663}iR_{50} + \frac{2\sqrt{357}}{221}iR_{52}$ $- \frac{22\sqrt{119}}{663}iR_{54} - \frac{4725\sqrt{1122}}{1322464}iR_{70} + \frac{8375\sqrt{2618}}{1322464}iR_{72}$ $- \frac{375\sqrt{119}}{60112}iR_{74} - \frac{375\sqrt{3094}}{120224}iR_{76} - \frac{1449\sqrt{35530}}{1142128}iR_{90}$ $+ \frac{17507\sqrt{646}}{1713192}iR_{92} + \frac{175\sqrt{29393}}{285532}iR_{94} - \frac{497\sqrt{25194}}{571064}iR_{96}$ $+ \frac{35\sqrt{247}}{100776}iR_{98}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	2	$- \frac{9\sqrt{510}}{374}iR_{10} - \frac{163\sqrt{1190}}{19448}iR_{30} + \frac{15\sqrt{357}}{748}iR_{32} + \frac{\sqrt{1870}}{884}iR_{50}$ $+ \frac{31\sqrt{3927}}{7293}iR_{52} + \frac{113\sqrt{1309}}{14586}iR_{54} + \frac{46935\sqrt{102}}{1322464}iR_{70}$ $+ \frac{35\sqrt{238}}{1322464}iR_{72} + \frac{3405\sqrt{1309}}{661232}iR_{74} - \frac{1635\sqrt{34034}}{1322464}iR_{76}$ $- \frac{609\sqrt{3230}}{12563408}iR_{90} + \frac{329\sqrt{7106}}{241604}iR_{92} + \frac{259\sqrt{323323}}{856596}iR_{94}$ $- \frac{259\sqrt{277134}}{724812}iR_{96} - \frac{1015\sqrt{2717}}{1108536}iR_{98}$

Table B412: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 81 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	3	$-\frac{2\sqrt{34}}{17}iR_{10} - \frac{19\sqrt{714}}{15912}iR_{30} + \frac{3\sqrt{595}}{748}iR_{32} + \frac{80\sqrt{1122}}{21879}iR_{50}$ $-\frac{38\sqrt{6545}}{7293}iR_{52} - \frac{20\sqrt{19635}}{21879}iR_{54} + \frac{161\sqrt{170}}{120224}iR_{70}$ $+ \frac{3053\sqrt{3570}}{1322464}iR_{72} + \frac{1379\sqrt{19635}}{661232}iR_{74} + \frac{211\sqrt{510510}}{1322464}iR_{76}$ $+ \frac{3465\sqrt{1938}}{1142128}iR_{90} + \frac{1057\sqrt{106590}}{1449624}iR_{92} + \frac{245\sqrt{4849845}}{3140852}iR_{94}$ $+ \frac{105\sqrt{461890}}{571064}iR_{96} + \frac{889\sqrt{40755}}{1108536}iR_{98}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	4	$\frac{19\sqrt{102}}{374}iR_{10} - \frac{761\sqrt{238}}{58344}iR_{30} - \frac{25\sqrt{1785}}{5148}iR_{32} - \frac{415\sqrt{374}}{29172}iR_{50}$ $+ \frac{49\sqrt{19635}}{21879}iR_{52} - \frac{35\sqrt{6545}}{14586}iR_{54} + \frac{3031\sqrt{510}}{1322464}iR_{70}$ $+ \frac{16659\sqrt{1190}}{1322464}iR_{72} - \frac{1715\sqrt{6545}}{661232}iR_{74} + \frac{941\sqrt{170170}}{1322464}iR_{76}$ $- \frac{2205\sqrt{646}}{12563408}iR_{90} - \frac{49\sqrt{35530}}{495924}iR_{92} + \frac{497\sqrt{1616615}}{9422556}iR_{94}$ $+ \frac{777\sqrt{1385670}}{3140852}iR_{96} - \frac{511\sqrt{13585}}{1108536}iR_{98}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	5	$\frac{6\sqrt{17}}{187}iR_{10} - \frac{173\sqrt{357}}{29172}iR_{30} + \frac{31\sqrt{1190}}{1716}iR_{32} - \frac{5\sqrt{561}}{663}iR_{50}$ $- \frac{5\sqrt{39270}}{2431}iR_{54} - \frac{4053\sqrt{85}}{661232}iR_{70} + \frac{9\sqrt{1785}}{50864}iR_{72}$ $+ \frac{675\sqrt{39270}}{661232}iR_{74} + \frac{75\sqrt{255255}}{661232}iR_{76} + \frac{26495\sqrt{969}}{6281704}iR_{90}$ $+ \frac{7343\sqrt{53295}}{9422556}iR_{92} + \frac{7\sqrt{9699690}}{9422556}iR_{94} - \frac{511\sqrt{230945}}{3140852}iR_{96}$ $+ \frac{49\sqrt{81510}}{85272}iR_{98}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	5	6	$\frac{3\sqrt{595}}{187}R_{10} - \frac{49\sqrt{255}}{87516}R_{30} + \frac{245\sqrt{34}}{7956}R_{32} - \frac{5\sqrt{19635}}{43758}R_{50}$ $- \frac{131\sqrt{374}}{21879}R_{52} - \frac{419\sqrt{1122}}{43758}R_{54} + \frac{7035\sqrt{119}}{661232}R_{70}$ $+ \frac{105\sqrt{51}}{3536}R_{72} + \frac{3045\sqrt{1122}}{661232}R_{74} + \frac{525\sqrt{7293}}{661232}R_{76}$ $- \frac{6195\sqrt{33915}}{6281704}R_{90} - \frac{161\sqrt{74613}}{138567}R_{92} - \frac{301\sqrt{277134}}{856596}R_{94}$ $+ \frac{21\sqrt{323323}}{785213}R_{96} + \frac{763\sqrt{114114}}{1108536}R_{98}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	1	$\frac{532\sqrt{5797}}{75361}iI_{41} - \frac{40\sqrt{15825810}}{3843411}iI_{61} + \frac{320\sqrt{1582581}}{1281137}iI_{63}$ $+ \frac{5390\sqrt{3410}}{390507}iI_{81} + \frac{11270\sqrt{1302}}{390507}iI_{83} - \frac{528\sqrt{22134}}{170221}iI_{10,1}$ $+ \frac{6540\sqrt{47957}}{2212873}iI_{10,3} - \frac{60\sqrt{239785}}{2212873}iI_{10,5}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	2	$\frac{38\sqrt{152830}}{634491}iI_{21} - \frac{20\sqrt{229245}}{504339}iI_{41} + \frac{3268\sqrt{2781506}}{25721289}iI_{61}$ $- \frac{568\sqrt{6953765}}{111458919}iI_{63} - \frac{813946\sqrt{5394}}{124571733}iI_{81} - \frac{31150\sqrt{692230}}{41523911}iI_{83}$ $- \frac{14796\sqrt{11767910}}{64173317}iI_{10,1} + \frac{1266\sqrt{229474245}}{64173317}iI_{10,3} + \frac{8730\sqrt{45894849}}{64173317}iI_{10,5}$

Table B413: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 82 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	3	$\frac{98\sqrt{2465}}{37323}iI_{21} + \frac{112\sqrt{14790}}{16269}iI_{41} - \frac{592\sqrt{44863}}{10786347}iI_{61}$ $- \frac{672\sqrt{448630}}{1198483}iI_{63} - \frac{226352\sqrt{87}}{4018443}iI_{81} - \frac{112\sqrt{11165}}{78793}iI_{83}$ $- \frac{72\sqrt{189805}}{2070107}iI_{10,1} - \frac{18\sqrt{14804790}}{159239}iI_{10,3} - \frac{690\sqrt{2960958}}{2070107}iI_{10,5}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	4	$\frac{1520\sqrt{391}}{167739}R_{20} - \frac{32\sqrt{1955}}{55913}R_{40} + \frac{140\sqrt{782}}{55913}R_{42} - \frac{280\sqrt{25415}}{2851563}R_{60}$ $+ \frac{7600\sqrt{106743}}{2851563}R_{62} - \frac{8400\sqrt{115}}{1062347}R_{80} + \frac{1880\sqrt{161}}{187473}R_{82}$ $- \frac{11360\sqrt{17710}}{3187041}R_{84} + \frac{1848\sqrt{41055}}{1641809}R_{10,0} - \frac{1152\sqrt{60214}}{1641809}R_{10,2}$ $- \frac{1500\sqrt{782782}}{1641809}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	5	$- \frac{4\sqrt{2415}}{2691}R_{20} + \frac{740\sqrt{483}}{1174173}R_{40} + \frac{3274\sqrt{4830}}{1174173}R_{42} + \frac{57344\sqrt{6279}}{8554689}R_{60}$ $+ \frac{580384\sqrt{1495}}{42773445}R_{62} - \frac{4340\sqrt{8211}}{1062347}R_{80} - \frac{22064\sqrt{5865}}{18059899}R_{82}$ $+ \frac{31738\sqrt{25806}}{54179697}R_{84} + \frac{829080\sqrt{23}}{1641809}R_{10,0} + \frac{77952\sqrt{7590}}{1641809}R_{10,2}$ $+ \frac{11340\sqrt{98670}}{1641809}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{11}{2}$	6	6	$- \frac{70\sqrt{2}}{429}R_{20} - \frac{74\sqrt{10}}{2431}R_{40} + \frac{58}{2431}R_{42} - \frac{1512\sqrt{130}}{41327}R_{60}$ $- \frac{12016\sqrt{546}}{371943}R_{62} - \frac{28\sqrt{170}}{2717}R_{80} - \frac{77920\sqrt{238}}{2355639}R_{82}$ $+ \frac{1996\sqrt{6545}}{785213}R_{84} + \frac{1344\sqrt{210}}{71383}R_{10,0} + \frac{1152\sqrt{77}}{71383}R_{10,2}$ $- \frac{768\sqrt{1001}}{71383}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	1	$\frac{152\sqrt{1122}}{21879}R_{40} - \frac{608\sqrt{2805}}{109395}R_{42} + \frac{266\sqrt{14586}}{41327}R_{60} + \frac{652\sqrt{170170}}{206635}R_{62}$ $- \frac{56\sqrt{66}}{2431}R_{80} + \frac{248\sqrt{2310}}{46189}R_{82} + \frac{88\sqrt{21}}{4199}R_{84} + \frac{4\sqrt{2618}}{663}R_{10,0}$ $+ \frac{18400\sqrt{1785}}{642447}R_{10,2} + \frac{1452\sqrt{23205}}{356915}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	2	$\frac{570\sqrt{935}}{26741}R_{20} - \frac{128\sqrt{187}}{80223}R_{40} - \frac{928\sqrt{1870}}{133705}R_{42} + \frac{126\sqrt{2431}}{34969}R_{60}$ $+ \frac{3852\sqrt{255255}}{2272985}R_{62} + \frac{6888\sqrt{11}}{508079}R_{80} + \frac{12560\sqrt{385}}{508079}R_{82}$ $- \frac{404\sqrt{14}}{2717}R_{84} - \frac{184\sqrt{3927}}{12597}R_{10,0} - \frac{10048\sqrt{1190}}{214149}R_{10,2}$ $- \frac{7916\sqrt{15470}}{1070745}R_{10,4}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	3	$- \frac{1200\sqrt{374}}{26741}R_{20} - \frac{2432\sqrt{1870}}{240669}R_{40} + \frac{11864\sqrt{187}}{240669}R_{42} + \frac{210\sqrt{24310}}{454597}R_{60}$ $+ \frac{20\sqrt{102102}}{454597}R_{62} + \frac{10668\sqrt{110}}{508079}R_{80} - \frac{144\sqrt{154}}{508079}R_{82}$ $+ \frac{3396\sqrt{35}}{46189}R_{84} + \frac{620\sqrt{39270}}{214149}R_{10,0} + \frac{1664\sqrt{119}}{16473}R_{10,2}$ $+ \frac{1332\sqrt{1547}}{71383}R_{10,4}$

Table B414: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 83 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	4	$\frac{4256\sqrt{374}}{109395}iI_{41} - \frac{16\sqrt{255255}}{206635}iI_{61} - \frac{412\sqrt{102102}}{619905}iI_{63}$ $+ \frac{1792\sqrt{55}}{20995}iI_{81} + \frac{12224\sqrt{21}}{62985}iI_{83} + \frac{1448\sqrt{357}}{82365}iI_{10,1}$ $- \frac{16424\sqrt{3094}}{3212235}iI_{10,3} - \frac{11972\sqrt{15470}}{3212235}iI_{10,5}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	5	$- \frac{5700\sqrt{121686}}{2900183}iI_{21} + \frac{20224\sqrt{20281}}{10039095}iI_{41} + \frac{88\sqrt{55367130}}{1723885}iI_{61}$ $- \frac{149024\sqrt{5536713}}{739546665}iI_{63} - \frac{3228988\sqrt{11930}}{275517385}iI_{81} - \frac{1291276\sqrt{551166}}{826552155}iI_{83}$ $- \frac{76816\sqrt{9369822}}{1277398785}iI_{10,1} + \frac{19432\sqrt{20301281}}{3832196355}iI_{10,3} + \frac{111496\sqrt{101506405}}{3832196355}iI_{10,5}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	6	$\frac{21180\sqrt{73153567}}{615350593}iI_{21} + \frac{485504\sqrt{438921402}}{7242203133}iI_{41} + \frac{370554\sqrt{33284872985}}{177836321377}iI_{61}$ $- \frac{36534\sqrt{13313949194}}{16166938307}iI_{63} + \frac{32517632\sqrt{64547265}}{198758241539}iI_{81} + \frac{6882240\sqrt{331342627}}{198758241539}iI_{83}$ $- \frac{968644\sqrt{5632824659}}{307171827833}iI_{10,1} + \frac{11\sqrt{439360323402}}{219460701}iI_{10,3} - \frac{169451\sqrt{2196801617010}}{921515483499}iI_{10,5}$
$\frac{9}{2}$	4	4	$\frac{13}{2}$	6	7	$\frac{42\sqrt{87686170}}{515801}iI_{21} - \frac{224\sqrt{131529255}}{4642209}iI_{41} - \frac{1200\sqrt{9443126}}{11466653}iI_{61}$ $+ \frac{928\sqrt{23607815}}{11466653}iI_{63} + \frac{1400\sqrt{3094806}}{166603723}iI_{81} + \frac{1304\sqrt{3282370}}{15145793}iI_{83}$ $- \frac{1208\sqrt{55800290}}{40654497}iI_{10,1} - \frac{24644\sqrt{6438495}}{178254333}iI_{10,3} - \frac{260\sqrt{1287699}}{19806037}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	4	5	$R_{00} + \frac{64\sqrt{5}}{99}R_{20} + \frac{92}{429}R_{40} - \frac{74\sqrt{10}}{429}R_{42}$ $- \frac{128\sqrt{13}}{1287}R_{60} - \frac{256\sqrt{1365}}{19305}R_{62} + \frac{196\sqrt{17}}{7293}R_{80} + \frac{56\sqrt{595}}{7293}R_{82}$ $+ \frac{14\sqrt{2618}}{7293}R_{84}$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	5	1	$\frac{14\sqrt{30}}{429}R_{32} - \frac{7\sqrt{330}}{429}R_{52} - \frac{4\sqrt{110}}{143}R_{54} + \frac{196\sqrt{5}}{2431}R_{72}$ $+ \frac{280\sqrt{110}}{7293}R_{74} + \frac{28\sqrt{715}}{2431}R_{76} - \frac{21\sqrt{7315}}{46189}R_{92} - \frac{42\sqrt{27170}}{46189}R_{94}$ $- \frac{21\sqrt{285285}}{46189}R_{96}$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	5	2	$- \frac{5\sqrt{21}}{297}R_{10} - \frac{70}{429}R_{30} + \frac{4\sqrt{30}}{143}R_{32} - \frac{\sqrt{77}}{429}R_{50}$ $+ \frac{2\sqrt{330}}{143}R_{52} - \frac{\sqrt{110}}{143}R_{54} + \frac{2408\sqrt{105}}{65637}R_{70} + \frac{2128\sqrt{5}}{21879}R_{72}$ $- \frac{112\sqrt{110}}{7293}R_{74} - \frac{756\sqrt{133}}{46189}R_{90} - \frac{252\sqrt{7315}}{46189}R_{92} - \frac{126\sqrt{27170}}{46189}R_{94}$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	5	3	$\frac{1}{33}R_{10} + \frac{62\sqrt{21}}{3003}R_{30} - \frac{20\sqrt{70}}{3003}R_{32} + \frac{\sqrt{33}}{39}R_{50}$ $- \frac{2\sqrt{770}}{429}R_{52} - \frac{\sqrt{2310}}{429}R_{54} + \frac{392\sqrt{5}}{7293}R_{70} - \frac{560\sqrt{105}}{21879}R_{72}$ $- \frac{112\sqrt{2310}}{21879}R_{74} - \frac{1764\sqrt{57}}{46189}R_{90} - \frac{588\sqrt{3135}}{46189}R_{92}$ $- \frac{42\sqrt{570570}}{46189}R_{94}$

Table B415: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 84 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	5	4	$-\frac{10\sqrt{30}}{429}R_{32} - \frac{\sqrt{330}}{429}R_{52} + \frac{4\sqrt{110}}{143}R_{54} + \frac{812\sqrt{5}}{7293}R_{72}$ $+ \frac{56\sqrt{110}}{1989}R_{74} - \frac{196\sqrt{715}}{21879}R_{76} - \frac{63\sqrt{7315}}{46189}R_{92} - \frac{126\sqrt{27170}}{46189}R_{94}$ $- \frac{63\sqrt{285285}}{46189}R_{96}$
$\frac{9}{2}$	4	5	$\frac{9}{2}$	5	5	$\frac{2\sqrt{6}}{297}iR_{10} + \frac{16\sqrt{14}}{1001}iR_{30} - \frac{32\sqrt{105}}{3003}iR_{32} + \frac{4\sqrt{22}}{143}iR_{50}$ $- \frac{2\sqrt{1155}}{429}iR_{52} + \frac{3136\sqrt{30}}{65637}iR_{70} - \frac{112\sqrt{70}}{21879}iR_{72} + \frac{5292\sqrt{38}}{46189}iR_{90}$ $+ \frac{882\sqrt{2090}}{46189}iR_{92}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	1	$-\frac{35\sqrt{110}}{1716}iR_{30} + \frac{35\sqrt{33}}{858}iR_{32} - \frac{\sqrt{70}}{24}iR_{50} + \frac{\sqrt{3}}{26}iR_{52}$ $+ \frac{53}{156}iR_{54} - \frac{45\sqrt{462}}{2992}iR_{70} + \frac{145\sqrt{22}}{38896}iR_{72} + \frac{555}{1768}iR_{74}$ $+ \frac{15\sqrt{26}}{3536}iR_{76} - \frac{63\sqrt{14630}}{67184}iR_{90} - \frac{539\sqrt{266}}{201552}iR_{92}$ $+ \frac{49\sqrt{247}}{4199}iR_{94} - \frac{7\sqrt{10374}}{67184}iR_{96} - \frac{7\sqrt{29393}}{100776}iR_{98}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	2	$-\frac{35\sqrt{10}}{572}iR_{30} + \frac{35\sqrt{3}}{286}iR_{32} - \frac{\sqrt{770}}{104}iR_{50} + \frac{47\sqrt{33}}{858}iR_{52}$ $- \frac{23\sqrt{11}}{1716}iR_{54} - \frac{45\sqrt{42}}{2288}iR_{70} + \frac{11545\sqrt{2}}{38896}iR_{72} - \frac{1065\sqrt{11}}{19448}iR_{74}$ $- \frac{345\sqrt{286}}{38896}iR_{76} + \frac{21\sqrt{1330}}{3952}iR_{90} + \frac{7\sqrt{2926}}{3536}iR_{92} - \frac{742\sqrt{2717}}{138567}iR_{94}$ $- \frac{469\sqrt{114114}}{2217072}iR_{96} + \frac{7\sqrt{323323}}{100776}iR_{98}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	3	$-\frac{\sqrt{14}}{11}iR_{10} - \frac{427\sqrt{6}}{5148}iR_{30} + \frac{7\sqrt{5}}{26}iR_{32} - \frac{5\sqrt{462}}{792}iR_{50}$ $+ \frac{35\sqrt{55}}{858}iR_{52} - \frac{203\sqrt{165}}{5148}iR_{54} - \frac{13\sqrt{70}}{2992}iR_{70} - \frac{79\sqrt{30}}{3536}iR_{72}$ $- \frac{167\sqrt{165}}{19448}iR_{74} + \frac{197\sqrt{4290}}{38896}iR_{76} + \frac{2205\sqrt{798}}{739024}iR_{90}$ $+ \frac{1799\sqrt{43890}}{2217072}iR_{92} + \frac{35\sqrt{40755}}{46189}iR_{94} + \frac{105\sqrt{190190}}{739024}iR_{96}$ $- \frac{7\sqrt{4849845}}{100776}iR_{98}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	4	$-\frac{\sqrt{42}}{11}iR_{10} - \frac{217\sqrt{2}}{1716}iR_{30} + \frac{35\sqrt{15}}{198}iR_{32} - \frac{5\sqrt{154}}{3432}iR_{50}$ $+ \frac{7\sqrt{165}}{234}iR_{52} - \frac{5\sqrt{55}}{156}iR_{54} - \frac{61\sqrt{210}}{38896}iR_{70} - \frac{2151\sqrt{10}}{38896}iR_{72}$ $- \frac{937\sqrt{55}}{19448}iR_{74} - \frac{89\sqrt{1430}}{38896}iR_{76} - \frac{7245\sqrt{266}}{739024}iR_{90}$ $- \frac{343\sqrt{14630}}{170544}iR_{92} - \frac{70\sqrt{13585}}{138567}iR_{94} + \frac{105\sqrt{570570}}{739024}iR_{96}$ $+ \frac{7\sqrt{1616615}}{100776}iR_{98}$

Table B416: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 85 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	5	$-\frac{3\sqrt{7}}{11}iR_{10} - \frac{7\sqrt{3}}{66}iR_{30} + \frac{49\sqrt{10}}{858}iR_{32} + \frac{5\sqrt{231}}{1716}iR_{50}$ $+ \frac{\sqrt{110}}{286}iR_{52} - \frac{3\sqrt{330}}{572}iR_{54} + \frac{183\sqrt{35}}{19448}iR_{70} + \frac{603\sqrt{15}}{19448}iR_{72}$ $+ \frac{9\sqrt{330}}{1144}iR_{74} + \frac{69\sqrt{2145}}{19448}iR_{76} - \frac{175\sqrt{399}}{28424}iR_{90} - \frac{1841\sqrt{21945}}{1108536}iR_{92}$ $- \frac{7\sqrt{81510}}{8151}iR_{94} - \frac{287\sqrt{95095}}{369512}iR_{96} - \frac{7\sqrt{9699690}}{100776}iR_{98}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	5	6	$\frac{3\sqrt{5}}{11}R_{10} + \frac{49\sqrt{105}}{2574}R_{30} - \frac{175\sqrt{14}}{2574}R_{32} + \frac{5\sqrt{165}}{5148}R_{50}$ $- \frac{7\sqrt{154}}{2574}R_{52} - \frac{43\sqrt{462}}{5148}R_{54} - \frac{735}{19448}R_{70} - \frac{105\sqrt{21}}{19448}R_{72}$ $+ \frac{105\sqrt{462}}{19448}R_{74} + \frac{105\sqrt{3003}}{19448}R_{76} + \frac{735\sqrt{285}}{369512}R_{90}$ $+ \frac{1813\sqrt{627}}{1108536}R_{92} - \frac{14\sqrt{114114}}{138567}R_{94} - \frac{1029\sqrt{2717}}{369512}R_{96}$ $- \frac{49\sqrt{277134}}{100776}R_{98}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	1	$-\frac{56\sqrt{2387}}{4433}iI_{41} - \frac{160\sqrt{132990}}{226083}iI_{61} + \frac{80\sqrt{13299}}{75361}iI_{63} - \frac{700\sqrt{405790}}{390507}iI_{81}$ $- \frac{1540\sqrt{3162}}{390507}iI_{83} - \frac{168\sqrt{186}}{10013}iI_{10,1} + \frac{672\sqrt{403}}{130169}iI_{10,3}$ $+ \frac{840\sqrt{2015}}{130169}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	2	$-\frac{4\sqrt{62930}}{37323}iI_{21} - \frac{560\sqrt{94395}}{385671}iI_{41} - \frac{22016\sqrt{23374}}{19669221}iI_{61}$ $+ \frac{10832\sqrt{58435}}{6556407}iI_{63} + \frac{285992\sqrt{641886}}{124571733}iI_{81} + \frac{37688\sqrt{1681130}}{41523911}iI_{83}$ $- \frac{1512\sqrt{98890}}{3774901}iI_{10,1} - \frac{1848\sqrt{1928355}}{3774901}iI_{10,3} - \frac{5040\sqrt{385671}}{3774901}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	3	$-\frac{38\sqrt{1015}}{37323}iI_{21} + \frac{4\sqrt{6090}}{12441}iI_{41} + \frac{16\sqrt{377}}{2871}iI_{61} - \frac{144\sqrt{3770}}{70499}iI_{63}$ $- \frac{25592\sqrt{10353}}{4018443}iI_{81} - \frac{4088\sqrt{27115}}{1339481}iI_{83} - \frac{3528\sqrt{1595}}{121771}iI_{10,1}$ $- \frac{126\sqrt{124410}}{121771}iI_{10,3} + \frac{210\sqrt{24882}}{121771}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	4	$-\frac{160\sqrt{161}}{9867}R_{20} - \frac{128\sqrt{805}}{23023}R_{40} + \frac{200\sqrt{322}}{23023}R_{42} - \frac{160\sqrt{10465}}{167739}R_{60}$ $- \frac{608\sqrt{897}}{167739}R_{62} + \frac{672\sqrt{13685}}{1062347}R_{80} + \frac{2240\sqrt{391}}{138567}R_{82}$ $+ \frac{4816\sqrt{43010}}{3187041}R_{84} + \frac{7392\sqrt{345}}{96577}R_{10,0} + \frac{10080\sqrt{506}}{96577}R_{10,2}$ $+ \frac{1344\sqrt{6578}}{96577}R_{10,4}$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	5	$-\frac{1192\sqrt{5865}}{503217}R_{20} - \frac{760\sqrt{1173}}{167739}R_{40} + \frac{28\sqrt{11730}}{12903}R_{42} + \frac{32312\sqrt{15249}}{8554689}R_{60}$ $+ \frac{91888\sqrt{177905}}{42773445}R_{62} + \frac{2744\sqrt{69}}{55913}R_{80} - \frac{112\sqrt{2415}}{46189}R_{82}$ $- \frac{16604\sqrt{10626}}{3187041}R_{84} - \frac{2520\sqrt{2737}}{86411}R_{10,0} - \frac{4704\sqrt{903210}}{1641809}R_{10,2}$ $- \frac{756\sqrt{11741730}}{1641809}R_{10,4}$

Table B417: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 86 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	4	5	$\frac{11}{2}$	6	6	$-\frac{50\sqrt{238}}{7293}R_{20} - \frac{80\sqrt{1190}}{17017}R_{40} + \frac{376\sqrt{119}}{17017}R_{42} - \frac{48\sqrt{15470}}{41327}R_{60}$ $+ \frac{3488\sqrt{1326}}{371943}R_{62} - \frac{112\sqrt{70}}{3553}R_{80} + \frac{17360\sqrt{2}}{138567}R_{82}$ $+ \frac{112\sqrt{55}}{46189}R_{84} - \frac{168\sqrt{510}}{5491}R_{10,0} - \frac{4032\sqrt{187}}{71383}R_{10,2}$ $+ \frac{168\sqrt{2431}}{71383}R_{10,4}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	1	$-\frac{16\sqrt{462}}{1287}R_{40} + \frac{64\sqrt{1155}}{6435}R_{42} - \frac{28\sqrt{6006}}{2431}R_{60} - \frac{16\sqrt{1430}}{715}R_{62}$ $- \frac{16\sqrt{7854}}{4199}R_{80} + \frac{32\sqrt{5610}}{20995}R_{82} + \frac{16\sqrt{51}}{323}R_{84} + \frac{56\sqrt{22}}{12597}R_{10,0}$ $+ \frac{8288\sqrt{15}}{188955}R_{10,2} + \frac{392\sqrt{195}}{20995}R_{10,4}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	2	$-\frac{60\sqrt{385}}{1573}R_{20} - \frac{16\sqrt{77}}{429}R_{40} + \frac{224\sqrt{770}}{7865}R_{42} + \frac{36\sqrt{1001}}{2431}R_{60}$ $+ \frac{3528\sqrt{2145}}{133705}R_{62} + \frac{48\sqrt{1309}}{26741}R_{80} - \frac{1568\sqrt{935}}{195415}R_{82}$ $- \frac{2488\sqrt{34}}{46189}R_{84} - \frac{56\sqrt{33}}{663}R_{10,0} - \frac{14336\sqrt{10}}{62985}R_{10,2}$ $- \frac{1316\sqrt{130}}{62985}R_{10,4}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	3	$-\frac{30\sqrt{154}}{1573}R_{20} - \frac{16\sqrt{770}}{1287}R_{40} + \frac{896\sqrt{77}}{14157}R_{42} + \frac{6\sqrt{10010}}{2431}R_{60}$ $+ \frac{1268\sqrt{858}}{26741}R_{62} - \frac{384\sqrt{13090}}{508079}R_{80} + \frac{8064\sqrt{374}}{508079}R_{82}$ $- \frac{1536\sqrt{85}}{46189}R_{84} + \frac{140\sqrt{330}}{12597}R_{10,0} + \frac{1568}{12597}R_{10,2} - \frac{252\sqrt{13}}{4199}R_{10,4}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	4	$-\frac{448\sqrt{154}}{6435}iI_{41} - \frac{64\sqrt{2145}}{12155}iI_{61} + \frac{872\sqrt{858}}{36465}iI_{63} + \frac{448\sqrt{6545}}{20995}iI_{81}$ $+ \frac{8864\sqrt{51}}{62985}iI_{83} + \frac{112\sqrt{3}}{969}iI_{10,1} - \frac{112\sqrt{26}}{11115}iI_{10,3}$ $- \frac{2744\sqrt{130}}{188955}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	5	$\frac{600\sqrt{50106}}{170599}iI_{21} + \frac{51904\sqrt{8351}}{7676955}iI_{41} - \frac{3664\sqrt{465270}}{14500915}iI_{61}$ $+ \frac{2944\sqrt{46527}}{43502745}iI_{63} - \frac{53272\sqrt{1419670}}{275517385}iI_{81} + \frac{4792\sqrt{1338546}}{48620715}iI_{83}$ $+ \frac{14056\sqrt{78738}}{15028221}iI_{10,1} + \frac{146272\sqrt{170599}}{225423315}iI_{10,3} + \frac{5992\sqrt{852995}}{225423315}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	6	$\frac{75120\sqrt{30122057}}{615350593}iI_{21} + \frac{400112\sqrt{180732342}}{5538155337}iI_{41} + \frac{13308\sqrt{279704815}}{804689237}iI_{61}$ $- \frac{547692\sqrt{111881926}}{10460960081}iI_{63} - \frac{888376\sqrt{7681124535}}{198758241539}iI_{81} - \frac{4878600\sqrt{804689237}}{198758241539}iI_{83}$ $+ \frac{37912\sqrt{47334661}}{1062878297}iI_{10,1} - \frac{211694\sqrt{3692103558}}{54206793147}iI_{10,3} + \frac{25186\sqrt{18460517790}}{54206793147}iI_{10,5}$
$\frac{9}{2}$	4	5	$\frac{13}{2}$	6	7	$\frac{57\sqrt{36106070}}{515801}iI_{21} + \frac{64\sqrt{54159105}}{422019}iI_{41} + \frac{60\sqrt{79354}}{674509}iI_{61}$ $- \frac{104\sqrt{198385}}{674509}iI_{63} - \frac{2800\sqrt{368281914}}{166603723}iI_{81} + \frac{176\sqrt{7971470}}{15145793}iI_{83}$ $- \frac{14588\sqrt{468910}}{45437379}iI_{10,1} + \frac{406\sqrt{54105}}{551871}iI_{10,3} + \frac{210\sqrt{10821}}{1165061}iI_{10,5}$

Table B418: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 87 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	1	$\frac{\sqrt{30}}{44}I_{21} - \frac{54\sqrt{5}}{143}I_{41} + \frac{7\sqrt{546}}{572}I_{61} - \frac{5\sqrt{1365}}{286}I_{63}$ $+ \frac{42\sqrt{34}}{187}I_{81} + \frac{14\sqrt{39270}}{2431}I_{83} + R_{00} - \frac{4\sqrt{5}}{11}R_{20}$ $+ \frac{54}{143}R_{40} - \frac{4\sqrt{13}}{143}R_{60} + \frac{7\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	2	$- \frac{5\sqrt{30}}{66}I_{21} + \frac{45\sqrt{5}}{286}I_{41} + \frac{\sqrt{546}}{858}I_{61} - \frac{\sqrt{1365}}{143}I_{63}$ $+ \frac{343\sqrt{34}}{9724}I_{81} - \frac{7\sqrt{39270}}{9724}I_{83} + \frac{2\sqrt{5}}{11}R_{20} + \frac{27\sqrt{10}}{143}R_{42}$ $- \frac{4\sqrt{1365}}{429}R_{62} + \frac{7\sqrt{595}}{2431}R_{82}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	3	$\frac{\sqrt{70}}{22}I_{21} + \frac{9\sqrt{105}}{286}I_{41} + \frac{\sqrt{26}}{22}I_{61} + \frac{\sqrt{65}}{143}I_{63}$ $+ \frac{147\sqrt{714}}{9724}I_{81} + \frac{49\sqrt{1870}}{9724}I_{83} - \frac{4\sqrt{65}}{65}R_{62} + \frac{28\sqrt{357}}{2431}R_{80}$ $+ \frac{7\sqrt{255}}{2431}R_{82} - \frac{42\sqrt{1122}}{2431}R_{84}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	4	$- \frac{7\sqrt{30}}{132}I_{21} + \frac{63\sqrt{5}}{143}I_{41} - \frac{\sqrt{546}}{1716}I_{61} + \frac{\sqrt{1365}}{286}I_{63}$ $+ \frac{763\sqrt{34}}{4862}I_{81} + \frac{21\sqrt{39270}}{4862}I_{83} + \frac{105\sqrt{17}}{2431}R_{80} - \frac{32\sqrt{595}}{2431}R_{82}$ $+ \frac{10\sqrt{2618}}{2431}R_{84}$
$\frac{9}{2}$	5	1	$\frac{9}{2}$	5	5	$- \frac{\sqrt{105}}{66}iI_{21} - \frac{9\sqrt{70}}{286}iI_{41} - \frac{25\sqrt{39}}{858}iI_{61} + \frac{\sqrt{390}}{286}iI_{63}$ $- \frac{35\sqrt{119}}{4862}iI_{81} + \frac{21\sqrt{2805}}{4862}iI_{83} - \frac{45\sqrt{14}}{1001}iR_{40} + \frac{36\sqrt{35}}{1001}iR_{42}$ $- \frac{10\sqrt{182}}{143}iR_{60} - \frac{32\sqrt{390}}{429}iR_{62} - \frac{35\sqrt{187}}{2431}iR_{84}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	1	$- \frac{5\sqrt{33}}{143}iI_{21} + \frac{6\sqrt{22}}{143}iI_{41} - \frac{2\sqrt{15015}}{2431}iI_{61} + \frac{42\sqrt{935}}{46189}iI_{81}$ $- \frac{3\sqrt{21}}{4199}iI_{10,1} + \frac{15\sqrt{22}}{2288}iR_{20} - \frac{3\sqrt{110}}{572}iR_{40} + \frac{21\sqrt{11}}{572}iR_{42}$ $- \frac{105\sqrt{1430}}{9724}iR_{60} - \frac{59\sqrt{6006}}{4862}iR_{62} + \frac{567\sqrt{1870}}{184756}iR_{80}$ $+ \frac{345\sqrt{2618}}{92378}iR_{82} - \frac{543\sqrt{595}}{16796}iR_{84} + \frac{813\sqrt{2310}}{33592}iR_{10,0}$ $+ \frac{3225\sqrt{7}}{4199}iR_{10,2} + \frac{393\sqrt{91}}{2584}iR_{10,4}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	2	$- \frac{3\sqrt{231}}{323}iI_{10,1} + \frac{9\sqrt{2002}}{646}iI_{10,3} - \frac{81\sqrt{10010}}{8398}iI_{10,5} + \frac{105\sqrt{2}}{2288}iR_{20}$ $- \frac{15\sqrt{10}}{572}iR_{40} + \frac{81}{572}iR_{42} - \frac{63\sqrt{130}}{9724}iR_{60} - \frac{61\sqrt{546}}{4862}iR_{62}$ $- \frac{1449\sqrt{170}}{184756}iR_{80} - \frac{15\sqrt{238}}{5434}iR_{82} + \frac{993\sqrt{6545}}{184756}iR_{84}$ $- \frac{3813\sqrt{210}}{33592}iR_{10,0} - \frac{1395\sqrt{77}}{4199}iR_{10,2} - \frac{2151\sqrt{1001}}{33592}iR_{10,4}$

Table B419: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 88 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	3	$\begin{aligned} & \frac{630\sqrt{51}}{4199}iI_{81} + \frac{756\sqrt{6545}}{46189}iI_{83} - \frac{9\sqrt{385}}{323}iI_{10,1} + \frac{15\sqrt{30030}}{8398}iI_{10,3} \\ & + \frac{105\sqrt{6006}}{8398}iI_{10,5} - \frac{35\sqrt{30}}{2288}iR_{20} + \frac{35\sqrt{6}}{572}iR_{40} + \frac{7\sqrt{15}}{572}iR_{42} \\ & - \frac{315\sqrt{78}}{9724}iR_{60} - \frac{163\sqrt{910}}{24310}iR_{62} - \frac{3087\sqrt{102}}{184756}iR_{80} \\ & + \frac{9\sqrt{3570}}{4862}iR_{82} + \frac{3\sqrt{3927}}{836}iR_{84} + \frac{405\sqrt{14}}{2584}iR_{10,0} + \frac{3\sqrt{1155}}{221}iR_{10,2} \\ & + \frac{261\sqrt{15015}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	4	$\begin{aligned} & -\frac{3\sqrt{15}}{143}iI_{21} + \frac{12\sqrt{10}}{143}iI_{41} - \frac{42\sqrt{273}}{2431}iI_{61} + \frac{1512\sqrt{17}}{46189}iI_{81} \\ & - \frac{3\sqrt{1155}}{4199}iI_{10,1} - \frac{63\sqrt{10}}{2288}iR_{20} + \frac{45\sqrt{2}}{572}iR_{40} - \frac{15\sqrt{5}}{572}iR_{42} \\ & - \frac{735\sqrt{26}}{9724}iR_{60} - \frac{157\sqrt{2730}}{24310}iR_{62} + \frac{441\sqrt{34}}{16796}iR_{80} \\ & - \frac{3\sqrt{1190}}{418}iR_{82} - \frac{699\sqrt{1309}}{184756}iR_{84} - \frac{6585\sqrt{42}}{33592}iR_{10,0} \\ & - \frac{435\sqrt{385}}{4199}iR_{10,2} - \frac{807\sqrt{5005}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	5	$\begin{aligned} & -\frac{14\sqrt{15}}{143}iI_{41} - \frac{42\sqrt{455}}{2431}iI_{63} + \frac{126\sqrt{13090}}{46189}iI_{83} - \frac{3\sqrt{15015}}{4199}iI_{10,3} \\ & + \frac{17\sqrt{15}}{1144}iR_{20} - \frac{25\sqrt{3}}{286}iR_{40} - \frac{9\sqrt{30}}{572}iR_{42} - \frac{105\sqrt{39}}{4862}iR_{60} \\ & - \frac{89\sqrt{455}}{12155}iR_{62} - \frac{63\sqrt{51}}{5434}iR_{80} - \frac{9\sqrt{1785}}{2717}iR_{82} + \frac{3\sqrt{7854}}{14212}iR_{84} \\ & + \frac{2385\sqrt{7}}{16796}iR_{10,0} - \frac{3\sqrt{2310}}{323}iR_{10,2} + \frac{69\sqrt{30030}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	5	6	$\begin{aligned} & \frac{42\sqrt{130}}{2431}I_{61} - \frac{210\sqrt{13}}{2431}I_{63} + \frac{168\sqrt{3570}}{4199}I_{81} + \frac{3780\sqrt{374}}{46189}I_{83} \\ & + \frac{21\sqrt{2145}}{4199}I_{10,5} - \frac{5\sqrt{21}}{1144}R_{20} + \frac{\sqrt{105}}{154}R_{40} + \frac{25\sqrt{42}}{4004}R_{42} \\ & + \frac{21\sqrt{1365}}{4862}R_{60} + \frac{7\sqrt{13}}{187}R_{62} + \frac{441\sqrt{1785}}{92378}R_{80} - \frac{315\sqrt{51}}{46189}R_{82} \\ & - \frac{21\sqrt{5610}}{16796}R_{84} + \frac{3969\sqrt{5}}{16796}R_{10,0} - \frac{315\sqrt{66}}{4199}R_{10,2} \\ & + \frac{105\sqrt{858}}{33592}R_{10,4} \end{aligned}$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	1	$\begin{aligned} & -\frac{4\sqrt{5115}}{341}iR_{10} - \frac{12\sqrt{11935}}{4433}iR_{30} - \frac{25\sqrt{14322}}{4433}iR_{32} - \frac{3\sqrt{155}}{403}iR_{50} \\ & - \frac{\sqrt{1302}}{403}iR_{52} - \frac{9\sqrt{434}}{403}iR_{54} - \frac{175\sqrt{1023}}{301444}iR_{70} - \frac{405\sqrt{2387}}{301444}iR_{72} \\ & + \frac{15\sqrt{434}}{1612}iR_{74} - \frac{15\sqrt{2821}}{2108}iR_{76} - \frac{441\sqrt{32395}}{45819488}iR_{90} \\ & + \frac{21\sqrt{589}}{1041352}iR_{92} - \frac{21\sqrt{107198}}{122512}iR_{94} + \frac{1155\sqrt{22971}}{1041352}iR_{96} \\ & - \frac{105\sqrt{260338}}{320416}iR_{98} \end{aligned}$

Table B420: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 89 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	2	$ \begin{aligned} & -\frac{3\sqrt{899}}{1364}iR_{10} - \frac{138\sqrt{18879}}{128557}iR_{30} - \frac{126\sqrt{62930}}{128557}iR_{32} - \frac{255\sqrt{29667}}{257114}iR_{50} \\ & - \frac{51\sqrt{692230}}{257114}iR_{52} - \frac{\sqrt{2076690}}{8866}iR_{54} - \frac{59703\sqrt{4495}}{17483752}iR_{70} \\ & + \frac{1981\sqrt{94395}}{17483752}iR_{72} + \frac{553\sqrt{2076690}}{17483752}iR_{74} - \frac{525\sqrt{13498485}}{17483752}iR_{76} \\ & + \frac{2205\sqrt{51243}}{34967504}iR_{90} - \frac{27741\sqrt{2818365}}{166095644}iR_{92} + \frac{189\sqrt{512942430}}{11454872}iR_{94} \\ & - \frac{7245\sqrt{12212915}}{166095644}iR_{96} - \frac{105\sqrt{1245717330}}{664382576}iR_{98} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	3	$ \begin{aligned} & -\frac{35\sqrt{1218}}{16588}iR_{30} + \frac{21\sqrt{1015}}{8294}iR_{32} - \frac{175\sqrt{1914}}{33176}iR_{50} - \frac{3\sqrt{11165}}{8294}iR_{52} \\ & + \frac{\sqrt{33495}}{572}iR_{54} - \frac{2163\sqrt{290}}{140998}iR_{70} - \frac{553\sqrt{6090}}{281996}iR_{72} \\ & + \frac{7\sqrt{33495}}{4147}iR_{74} + \frac{49\sqrt{870870}}{281996}iR_{76} - \frac{7875\sqrt{3306}}{1948336}iR_{90} \\ & + \frac{5943\sqrt{181830}}{21431696}iR_{92} + \frac{3339\sqrt{787930}}{21431696}iR_{96} - \frac{21\sqrt{20092215}}{10715848}iR_{98} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	4	$ \begin{aligned} & \frac{\sqrt{345}}{44}R_{10} - \frac{3\sqrt{805}}{143}R_{30} - \frac{25\sqrt{966}}{3289}R_{32} + \frac{3\sqrt{1265}}{286}R_{50} \\ & + \frac{25\sqrt{10626}}{6578}R_{52} - \frac{9\sqrt{3542}}{6578}R_{54} - \frac{35\sqrt{69}}{2431}R_{70} - \frac{1050\sqrt{161}}{55913}R_{72} \\ & + \frac{105\sqrt{3542}}{55913}R_{74} + \frac{90\sqrt{23023}}{55913}R_{76} + \frac{63\sqrt{2185}}{184756}R_{90} \\ & + \frac{1575\sqrt{4807}}{2124694}R_{92} - \frac{189\sqrt{874874}}{4249388}R_{94} - \frac{945\sqrt{187473}}{2124694}R_{96} \\ & + \frac{735\sqrt{2124694}}{4249388}R_{98} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	5	$ \begin{aligned} & -\frac{14\sqrt{3910}}{3289}R_{32} + \frac{7\sqrt{43010}}{3289}R_{52} - \frac{6\sqrt{129030}}{55913}R_{54} - \frac{196\sqrt{5865}}{55913}R_{72} \\ & + \frac{140\sqrt{129030}}{950521}R_{74} + \frac{28\sqrt{838695}}{950521}R_{76} + \frac{21\sqrt{8580495}}{1062347}R_{92} \\ & - \frac{63\sqrt{31870410}}{18059899}R_{94} - \frac{63\sqrt{37182145}}{18059899}R_{96} - \frac{126\sqrt{13123110}}{1062347}R_{98} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{11}{2}$	6	6	$ \begin{aligned} & \frac{18\sqrt{1309}}{2431}R_{54} - \frac{420\sqrt{1309}}{41327}R_{74} + \frac{60\sqrt{34034}}{41327}R_{76} + \frac{189\sqrt{323323}}{785213}R_{94} \\ & - \frac{315\sqrt{277134}}{785213}R_{96} - \frac{210\sqrt{2717}}{46189}R_{98} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{\sqrt{462}}{1144}R_{30} - \frac{7\sqrt{385}}{572}R_{32} - \frac{7\sqrt{6}}{442}R_{50} + \frac{10\sqrt{35}}{221}R_{52} \\ & - \frac{7\sqrt{105}}{1105}R_{54} + \frac{567\sqrt{110}}{184756}R_{70} - \frac{1719\sqrt{2310}}{369512}R_{72} \\ & + \frac{189\sqrt{105}}{8398}R_{74} - \frac{81\sqrt{2730}}{33592}R_{76} - \frac{3\sqrt{1254}}{8398}R_{90} + \frac{79\sqrt{570}}{16796}R_{92} \\ & - \frac{33\sqrt{25935}}{20995}R_{94} + \frac{99\sqrt{2470}}{16796}R_{96} - \frac{11\sqrt{62985}}{20995}R_{98} \\ & + \frac{3\sqrt{1518}}{59432}R_{11,0} - \frac{9\sqrt{1495}}{14858}R_{11,2} + \frac{33\sqrt{6279}}{29716}R_{11,4} \\ & - \frac{99\sqrt{10166}}{59432}R_{11,6} + \frac{33\sqrt{482885}}{148580}R_{11,8} - \frac{3\sqrt{1352078}}{59432}R_{11,10} \end{aligned} $

Table B421: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 90 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	2	$ \begin{aligned} & -\frac{\sqrt{77}}{52}R_{30} + \frac{\sqrt{2310}}{6292}R_{32} + \frac{77}{221}R_{50} - \frac{7\sqrt{210}}{2431}R_{52} \\ & -\frac{63\sqrt{70}}{12155}R_{54} - \frac{189\sqrt{165}}{8398}R_{70} + \frac{1701\sqrt{385}}{508079}R_{72} + \frac{1701\sqrt{70}}{92378}R_{74} \\ & -\frac{81\sqrt{455}}{46189}R_{76} + \frac{33\sqrt{209}}{4199}R_{90} - \frac{18\sqrt{95}}{4199}R_{92} - \frac{27\sqrt{17290}}{20995}R_{94} \\ & + \frac{6\sqrt{3705}}{4199}R_{96} + \frac{21\sqrt{41990}}{20995}R_{98} - \frac{33\sqrt{253}}{29716}R_{11,0} + \frac{3\sqrt{8970}}{29716}R_{11,2} \\ & + \frac{27\sqrt{4186}}{29716}R_{11,4} - \frac{3\sqrt{15249}}{7429}R_{11,6} - \frac{21\sqrt{2897310}}{148580}R_{11,8} \\ & + \frac{3\sqrt{2028117}}{14858}R_{11,10} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	3	$ \begin{aligned} & -\frac{5\sqrt{231}}{3146}R_{32} + \frac{70\sqrt{21}}{2431}R_{52} - \frac{28\sqrt{7}}{2431}R_{54} - \frac{8505\sqrt{154}}{508079}R_{72} \\ & + \frac{1890\sqrt{7}}{46189}R_{74} + \frac{405\sqrt{182}}{46189}R_{76} + \frac{90\sqrt{38}}{4199}R_{92} - \frac{12\sqrt{1729}}{4199}R_{94} \\ & - \frac{30\sqrt{1482}}{4199}R_{96} + \frac{24\sqrt{4199}}{4199}R_{98} - \frac{15\sqrt{897}}{14858}R_{11,2} + \frac{3\sqrt{10465}}{7429}R_{11,4} \\ & + \frac{3\sqrt{152490}}{7429}R_{11,6} - \frac{6\sqrt{289731}}{7429}R_{11,8} - \frac{3\sqrt{20281170}}{14858}R_{11,10} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	4	$ \begin{aligned} & -\frac{2\sqrt{770}}{715}iR_{30} - \frac{37\sqrt{231}}{4290}iR_{32} - \frac{28\sqrt{10}}{1105}iR_{50} - \frac{82\sqrt{21}}{3315}iR_{52} \\ & - \frac{12\sqrt{7}}{1105}iR_{54} - \frac{945\sqrt{66}}{184756}iR_{70} - \frac{1953\sqrt{154}}{184756}iR_{72} \\ & + \frac{207\sqrt{7}}{8398}iR_{74} + \frac{9\sqrt{182}}{1292}iR_{76} - \frac{21\sqrt{2090}}{83980}iR_{90} - \frac{2\sqrt{38}}{20995}iR_{92} \\ & - \frac{109\sqrt{1729}}{20995}iR_{94} + \frac{30\sqrt{1482}}{4199}iR_{96} + \frac{\sqrt{4199}}{3230}iR_{98} - \frac{63\sqrt{2530}}{2377280}iR_{11,0} \\ & - \frac{249\sqrt{897}}{1188640}iR_{11,2} + \frac{321\sqrt{10465}}{594320}iR_{11,4} - \frac{1359\sqrt{152490}}{2377280}iR_{11,6} \\ & + \frac{571\sqrt{289731}}{1188640}iR_{11,8} - \frac{33\sqrt{20281170}}{2377280}iR_{11,10} \end{aligned} $
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	5	$ \begin{aligned} & -\frac{691\sqrt{41755}}{3411980}iR_{30} - \frac{2699\sqrt{50106}}{10235940}iR_{32} - \frac{721\sqrt{65615}}{1318265}iR_{50} \\ & - \frac{11857\sqrt{551166}}{43502745}iR_{52} - \frac{2337\sqrt{183722}}{14500915}iR_{54} - \frac{620865\sqrt{3579}}{220413908}iR_{70} \\ & - \frac{801081\sqrt{8351}}{220413908}iR_{72} - \frac{23211\sqrt{183722}}{220413908}iR_{74} + \frac{3609\sqrt{1194193}}{220413908}iR_{76} \\ & + \frac{7341\sqrt{113335}}{200376280}iR_{90} - \frac{1687\sqrt{249337}}{2636530}iR_{92} - \frac{2651\sqrt{45379334}}{100188140}iR_{94} \\ & + \frac{705\sqrt{9724143}}{10018814}iR_{96} - \frac{343\sqrt{110206954}}{200376280}iR_{98} - \frac{87813\sqrt{137195}}{1418047520}iR_{11,0} \\ & + \frac{45591\sqrt{23542662}}{1418047520}iR_{11,2} - \frac{18339\sqrt{274664390}}{709023760}iR_{11,4} + \frac{9081\sqrt{1000563135}}{1418047520}iR_{11,6} \\ & + \frac{1211\sqrt{7604279826}}{1418047520}iR_{11,8} - \frac{9\sqrt{133074896955}}{83414560}iR_{11,10} \end{aligned} $

Table B422: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 91 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	6	$-\frac{\sqrt{903661710}}{4094376}iR_{30} + \frac{\sqrt{30122057}}{682396}iR_{32} - \frac{88025\sqrt{1420039830}}{62765760486}iR_{50}$ $-\frac{25414\sqrt{331342627}}{10460960081}iR_{52} + \frac{37901\sqrt{994027881}}{10460960081}iR_{54} - \frac{154788165\sqrt{8606302}}{3180131864624}iR_{70}$ $-\frac{16184205\sqrt{180732342}}{3180131864624}iR_{72} + \frac{124875\sqrt{994027881}}{1590065932312}iR_{74} + \frac{5248125\sqrt{25844724906}}{3180131864624}iR_{76}$ $-\frac{587433\sqrt{2452796070}}{144551448392}iR_{90} - \frac{22560\sqrt{5396151354}}{18068931049}iR_{92} + \frac{1371\sqrt{245524886607}}{2779835546}iR_{94}$ $-\frac{19092\sqrt{23383322534}}{18068931049}iR_{96} + \frac{25419\sqrt{596274724617}}{72275724196}iR_{98} + \frac{813813\sqrt{2969174190}}{127872435116}iR_{11,0}$ $-\frac{3581127\sqrt{14153063639}}{511489740464}iR_{11,2} + \frac{61539\sqrt{1486071682095}}{127872435116}iR_{11,4}$ $-\frac{41205\sqrt{2406020818630}}{1022979480928}iR_{11,6} - \frac{2187\sqrt{4571439555397}}{31968108779}iR_{11,8}$ $+ \frac{7533\sqrt{320000768877790}}{1022979480928}iR_{11,10}$
$\frac{9}{2}$	5	1	$\frac{13}{2}$	6	7	$-\frac{105\sqrt{140673}}{1594294}iR_{50} + \frac{15\sqrt{3282370}}{797147}iR_{52} - \frac{5\sqrt{9847110}}{1594294}iR_{54}$ $-\frac{5481\sqrt{2579005}}{60583172}iR_{70} + \frac{207\sqrt{54159105}}{60583172}iR_{72} + \frac{4653\sqrt{9847110}}{60583172}iR_{74}$ $-\frac{981\sqrt{378735}}{4660244}iR_{76} - \frac{135\sqrt{29400657}}{2330122}iR_{90} + \frac{5\sqrt{13363935}}{2330122}iR_{92}$ $+ \frac{106\sqrt{14391930}}{1165061}iR_{94} + \frac{621\sqrt{342665}}{2330122}iR_{96} - \frac{5\sqrt{34951830}}{137066}iR_{98}$ $-\frac{18825\sqrt{35590269}}{214371224}iR_{11,0} + \frac{52077\sqrt{829610}}{107185612}iR_{11,2} + \frac{3735\sqrt{3484362}}{107185612}iR_{11,4}$ $+ \frac{6795\sqrt{1410337}}{107185612}iR_{11,6} + \frac{9\sqrt{267964030}}{9320488}iR_{11,8} - \frac{675\sqrt{187574821}}{107185612}iR_{11,10}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	2	$\frac{5\sqrt{30}}{66}I_{21} + \frac{30\sqrt{5}}{143}I_{41} - \frac{5\sqrt{546}}{429}I_{61} - \frac{2\sqrt{1365}}{429}I_{63}$ $-\frac{105\sqrt{34}}{2431}I_{81} - \frac{7\sqrt{39270}}{2431}I_{83} + R_{00} + \frac{2\sqrt{5}}{33}R_{20}$ $-\frac{51}{143}R_{40} - \frac{40\sqrt{13}}{429}R_{60} + \frac{140\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	3	$-\frac{\sqrt{70}}{66}I_{21} + \frac{6\sqrt{105}}{143}I_{41} + \frac{25\sqrt{26}}{429}I_{61} - \frac{2\sqrt{65}}{143}I_{63}$ $-\frac{70\sqrt{714}}{2431}I_{81} - \frac{42\sqrt{1870}}{2431}I_{83} + \frac{75\sqrt{21}}{1001}R_{40} - \frac{30\sqrt{210}}{1001}R_{42}$ $-\frac{16\sqrt{273}}{429}R_{60} - \frac{256\sqrt{65}}{2145}R_{62} + \frac{14\sqrt{1122}}{2431}R_{84}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	4	$\frac{7\sqrt{30}}{66}I_{21} + \frac{63\sqrt{5}}{286}I_{41} - \frac{5\sqrt{546}}{858}I_{61} - \frac{\sqrt{1365}}{429}I_{63}$ $+ \frac{105\sqrt{34}}{9724}I_{81} + \frac{7\sqrt{39270}}{9724}I_{83} - \frac{4\sqrt{1365}}{195}R_{62} - \frac{84\sqrt{17}}{2431}R_{80}$ $-\frac{3\sqrt{595}}{2431}R_{82} + \frac{18\sqrt{2618}}{2431}R_{84}$
$\frac{9}{2}$	5	2	$\frac{9}{2}$	5	5	$-\frac{15\sqrt{70}}{286}iI_{41} - \frac{3\sqrt{39}}{143}iI_{61} + \frac{\sqrt{390}}{143}iI_{63} - \frac{21\sqrt{119}}{442}iI_{81}$ $-\frac{63\sqrt{2805}}{4862}iI_{83} - \frac{\sqrt{70}}{11}iR_{20} + \frac{3\sqrt{35}}{143}iR_{42} - \frac{4\sqrt{390}}{429}iR_{62}$ $-\frac{63\sqrt{170}}{2431}iR_{82}$

Table B423: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 92 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	1	$ \begin{aligned} & -\frac{21\sqrt{22}}{143}iI_{41} - \frac{10\sqrt{6006}}{2431}iI_{63} + \frac{35\sqrt{357}}{4199}iI_{83} - \frac{9\sqrt{182}}{4199}iI_{10,3} \\ & - \frac{25\sqrt{22}}{1144}iR_{20} - \frac{15\sqrt{11}}{286}iR_{42} - \frac{4\sqrt{6006}}{7293}iR_{62} + \frac{252\sqrt{1870}}{46189}iR_{80} \\ & - \frac{355\sqrt{2618}}{92378}iR_{82} - \frac{43\sqrt{595}}{4199}iR_{84} - \frac{297\sqrt{2310}}{16796}iR_{10,0} \\ & - \frac{90\sqrt{7}}{247}iR_{10,2} - \frac{2097\sqrt{91}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	2	$ \begin{aligned} & -\frac{175\sqrt{85}}{4199}iI_{81} - \frac{350\sqrt{3927}}{46189}iI_{83} - \frac{18\sqrt{231}}{323}iI_{10,1} + \frac{45\sqrt{2002}}{4199}iI_{10,3} \\ & + \frac{63\sqrt{10010}}{4199}iI_{10,5} - \frac{35\sqrt{2}}{1144}iR_{20} - \frac{15\sqrt{10}}{286}iR_{40} + \frac{9}{143}iR_{42} \\ & + \frac{7\sqrt{130}}{2431}iR_{60} - \frac{70\sqrt{546}}{7293}iR_{62} + \frac{861\sqrt{170}}{92378}iR_{80} - \frac{725\sqrt{238}}{92378}iR_{82} \\ & + \frac{445\sqrt{6545}}{92378}iR_{84} + \frac{1737\sqrt{210}}{16796}iR_{10,0} + \frac{1422\sqrt{77}}{4199}iR_{10,2} \\ & + \frac{1107\sqrt{1001}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	3	$ \begin{aligned} & -\frac{4\sqrt{91}}{221}iI_{61} + \frac{2\sqrt{910}}{221}iI_{63} + \frac{1078\sqrt{51}}{4199}iI_{81} + \frac{63\sqrt{6545}}{4199}iI_{83} \\ & - \frac{45\sqrt{6006}}{4199}iI_{10,5} - \frac{35\sqrt{30}}{1144}iR_{20} - \frac{5\sqrt{6}}{143}iR_{40} + \frac{\sqrt{15}}{286}iR_{42} \\ & + \frac{14\sqrt{78}}{7293}iR_{60} - \frac{8\sqrt{910}}{7293}iR_{62} + \frac{84\sqrt{102}}{3553}iR_{80} - \frac{\sqrt{3570}}{5434}iR_{82} \\ & - \frac{45\sqrt{3927}}{46189}iR_{84} - \frac{7965\sqrt{14}}{16796}iR_{10,0} - \frac{378\sqrt{1155}}{4199}iR_{10,2} \\ & - \frac{225\sqrt{15015}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	4	$ \begin{aligned} & -\frac{2\sqrt{15}}{429}iI_{21} - \frac{9\sqrt{10}}{143}iI_{41} - \frac{76\sqrt{273}}{7293}iI_{61} + \frac{4417\sqrt{17}}{46189}iI_{81} \\ & - \frac{18\sqrt{1155}}{4199}iI_{10,1} - \frac{35\sqrt{10}}{1144}iR_{20} + \frac{15\sqrt{2}}{286}iR_{40} - \frac{6\sqrt{5}}{143}iR_{42} \\ & - \frac{7\sqrt{26}}{2431}iR_{60} - \frac{434\sqrt{2730}}{36465}iR_{62} - \frac{5607\sqrt{34}}{92378}iR_{80} + \frac{219\sqrt{1190}}{92378}iR_{82} \\ & + \frac{809\sqrt{1309}}{92378}iR_{84} + \frac{5805\sqrt{42}}{16796}iR_{10,0} + \frac{846\sqrt{385}}{4199}iR_{10,2} \\ & + \frac{531\sqrt{5005}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	5	$ \begin{aligned} & -\frac{19\sqrt{10}}{429}iI_{21} - \frac{\sqrt{15}}{143}iI_{41} + \frac{112\sqrt{182}}{7293}iI_{61} + \frac{1757\sqrt{102}}{46189}iI_{81} \\ & - \frac{54\sqrt{770}}{4199}iI_{10,1} + \frac{5\sqrt{15}}{156}iR_{20} + \frac{5\sqrt{3}}{143}iR_{40} - \frac{14\sqrt{39}}{7293}iR_{60} \\ & + \frac{4\sqrt{455}}{3315}iR_{62} - \frac{756\sqrt{51}}{46189}iR_{80} - \frac{489\sqrt{1785}}{46189}iR_{82} + \frac{113\sqrt{7854}}{46189}iR_{84} \\ & - \frac{1485\sqrt{7}}{8398}iR_{10,0} - \frac{90\sqrt{2310}}{4199}iR_{10,2} - \frac{81\sqrt{30030}}{16796}iR_{10,4} \end{aligned} $

Table B424: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 93 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	5	6	$\begin{aligned} & \frac{19\sqrt{21}}{143}I_{41} - \frac{140\sqrt{13}}{2431}I_{63} - \frac{105\sqrt{374}}{46189}I_{83} + \frac{126\sqrt{429}}{4199}I_{10,3} \\ & - \frac{5\sqrt{21}}{572}R_{20} - \frac{\sqrt{42}}{286}R_{42} - \frac{168\sqrt{13}}{2431}R_{62} + \frac{147\sqrt{1785}}{46189}R_{80} \\ & - \frac{805\sqrt{51}}{46189}R_{82} + \frac{469\sqrt{5610}}{92378}R_{84} + \frac{1323\sqrt{5}}{8398}R_{10,0} + \frac{126\sqrt{66}}{4199}R_{10,2} \\ & - \frac{189\sqrt{858}}{16796}R_{10,4} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	1	$\begin{aligned} & -\frac{10\sqrt{11935}}{4433}iR_{30} + \frac{80\sqrt{14322}}{13299}iR_{32} - \frac{7\sqrt{155}}{403}iR_{50} - \frac{16\sqrt{1302}}{1209}iR_{52} \\ & + \frac{9\sqrt{434}}{403}iR_{54} - \frac{1575\sqrt{1023}}{602888}iR_{70} - \frac{225\sqrt{2387}}{602888}iR_{72} \\ & + \frac{75\sqrt{434}}{54808}iR_{74} - \frac{15\sqrt{2821}}{54808}iR_{76} - \frac{147\sqrt{32395}}{2082704}iR_{90} \\ & - \frac{721\sqrt{589}}{520676}iR_{92} - \frac{21\sqrt{107198}}{1041352}iR_{94} + \frac{441\sqrt{22971}}{520676}iR_{96} \\ & + \frac{1043\sqrt{260338}}{2082704}iR_{98} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	2	$\begin{aligned} & -\frac{9\sqrt{899}}{638}iR_{10} - \frac{2\sqrt{18879}}{11687}iR_{30} + \frac{153\sqrt{62930}}{128557}iR_{32} - \frac{285\sqrt{29667}}{257114}iR_{50} \\ & + \frac{50\sqrt{692230}}{128557}iR_{52} + \frac{25\sqrt{2076690}}{771342}iR_{54} + \frac{2835\sqrt{4495}}{794716}iR_{70} \\ & - \frac{10605\sqrt{94395}}{8741876}iR_{72} - \frac{51\sqrt{2076690}}{514228}iR_{74} - \frac{27\sqrt{13498485}}{514228}iR_{76} \\ & - \frac{256515\sqrt{51243}}{332191288}iR_{90} - \frac{13615\sqrt{2818365}}{166095644}iR_{92} + \frac{49\sqrt{512942430}}{9770332}iR_{94} \\ & - \frac{315\sqrt{12212915}}{9770332}iR_{96} + \frac{581\sqrt{1245717330}}{332191288}iR_{98} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	3	$\begin{aligned} & -\frac{21\sqrt{58}}{638}iR_{10} - \frac{511\sqrt{1218}}{49764}iR_{30} - \frac{7\sqrt{1015}}{1914}iR_{32} + \frac{35\sqrt{1914}}{49764}iR_{50} \\ & + \frac{31\sqrt{11165}}{12441}iR_{52} + \frac{\sqrt{33495}}{638}iR_{54} - \frac{420\sqrt{290}}{70499}iR_{70} + \frac{1185\sqrt{6090}}{281996}iR_{72} \\ & - \frac{6\sqrt{33495}}{5423}iR_{74} - \frac{57\sqrt{870870}}{281996}iR_{76} - \frac{13545\sqrt{3306}}{10715848}iR_{90} \\ & - \frac{497\sqrt{181830}}{824296}iR_{92} - \frac{140\sqrt{8273265}}{1339481}iR_{94} + \frac{903\sqrt{787930}}{10715848}iR_{96} \\ & + \frac{35\sqrt{20092215}}{5357924}iR_{98} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	4	$\begin{aligned} & \frac{15\sqrt{345}}{506}R_{10} - \frac{5\sqrt{805}}{6578}R_{30} + \frac{125\sqrt{966}}{6578}R_{32} - \frac{25\sqrt{1265}}{3289}R_{50} \\ & + \frac{9\sqrt{10626}}{3289}R_{52} - \frac{15\sqrt{3542}}{3289}R_{54} - \frac{2625\sqrt{69}}{111826}R_{70} - \frac{6495\sqrt{161}}{223652}R_{72} \\ & - \frac{405\sqrt{3542}}{111826}R_{74} - \frac{105\sqrt{23023}}{223652}R_{76} + \frac{7875\sqrt{2185}}{2124694}R_{90} \\ & + \frac{35\sqrt{4807}}{193154}R_{92} - \frac{315\sqrt{874874}}{2124694}R_{94} - \frac{245\sqrt{187473}}{2124694}R_{96} \\ & + \frac{7\sqrt{2124694}}{193154}R_{98} \end{aligned}$

Table B425: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 94 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	5	$\begin{aligned} & \frac{3\sqrt{2737}}{253}R_{10} - \frac{7\sqrt{1173}}{9867}R_{30} + \frac{175\sqrt{3910}}{167739}R_{32} - \frac{10\sqrt{90321}}{9867}R_{50} \\ & + \frac{16\sqrt{43010}}{167739}R_{52} - \frac{14\sqrt{129030}}{167739}R_{54} - \frac{105\sqrt{13685}}{55913}R_{70} \\ & - \frac{210\sqrt{5865}}{950521}R_{72} - \frac{63\sqrt{129030}}{950521}R_{74} + \frac{126\sqrt{838695}}{950521}R_{76} \\ & + \frac{525\sqrt{156009}}{1062347}R_{90} - \frac{224\sqrt{8580495}}{18059899}R_{92} - \frac{49\sqrt{31870410}}{18059899}R_{94} \\ & + \frac{252\sqrt{37182145}}{18059899}R_{96} - \frac{7\sqrt{13123110}}{96577}R_{98} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{11}{2}$	6	6	$\begin{aligned} & -\frac{175\sqrt{357}}{7293}R_{32} - \frac{16\sqrt{3927}}{7293}R_{52} - \frac{20\sqrt{1309}}{2431}R_{54} + \frac{315\sqrt{238}}{41327}R_{72} \\ & - \frac{270\sqrt{1309}}{41327}R_{74} + \frac{15\sqrt{34034}}{41327}R_{76} + \frac{2352\sqrt{7106}}{785213}R_{92} \\ & - \frac{210\sqrt{323323}}{785213}R_{94} + \frac{70\sqrt{277134}}{785213}R_{96} + \frac{28\sqrt{2717}}{4199}R_{98} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	1	$\begin{aligned} & -\frac{5\sqrt{462}}{1716}R_{30} + \frac{\sqrt{385}}{286}R_{32} - \frac{35\sqrt{6}}{1326}R_{50} - \frac{2\sqrt{35}}{221}R_{52} \\ & + \frac{47\sqrt{105}}{1105}R_{54} + \frac{63\sqrt{110}}{21736}R_{70} - \frac{1107\sqrt{2310}}{369512}R_{72} - \frac{393\sqrt{105}}{16796}R_{74} \\ & + \frac{3\sqrt{2730}}{1976}R_{76} + \frac{5\sqrt{1254}}{988}R_{90} - \frac{761\sqrt{570}}{83980}R_{92} + \frac{8\sqrt{25935}}{20995}R_{94} \\ & + \frac{11\sqrt{2470}}{4940}R_{96} - \frac{\sqrt{62985}}{41990}R_{98} - \frac{165\sqrt{1518}}{59432}R_{11,0} + \frac{27\sqrt{1495}}{3230}R_{11,2} \\ & - \frac{39\sqrt{6279}}{7429}R_{11,4} + \frac{33\sqrt{10166}}{14858}R_{11,6} - \frac{9\sqrt{482885}}{148580}R_{11,8} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{5\sqrt{77}}{1573}R_{30} + \frac{\sqrt{2310}}{429}R_{32} + \frac{70}{2431}R_{50} - \frac{122\sqrt{210}}{7293}R_{52} \\ & + \frac{58\sqrt{70}}{12155}R_{54} - \frac{63\sqrt{165}}{59774}R_{70} - \frac{4203\sqrt{385}}{184756}R_{72} + \frac{189\sqrt{70}}{92378}R_{74} \\ & - \frac{63\sqrt{455}}{10868}R_{76} - \frac{15\sqrt{209}}{2717}R_{90} + \frac{1351\sqrt{95}}{41990}R_{92} - \frac{3\sqrt{17290}}{20995}R_{94} \\ & - \frac{7\sqrt{3705}}{2470}R_{96} + \frac{3\sqrt{41990}}{20995}R_{98} + \frac{45\sqrt{253}}{14858}R_{11,0} + \frac{63\sqrt{8970}}{74290}R_{11,2} \\ & - \frac{27\sqrt{4186}}{14858}R_{11,4} - \frac{21\sqrt{15249}}{7429}R_{11,6} + \frac{9\sqrt{2897310}}{74290}R_{11,8} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	3	$\begin{aligned} & -\frac{5\sqrt{770}}{1573}R_{30} + \frac{\sqrt{231}}{429}R_{32} - \frac{70\sqrt{10}}{2431}R_{50} - \frac{56\sqrt{21}}{7293}R_{52} \\ & - \frac{116\sqrt{7}}{2431}R_{54} + \frac{315\sqrt{66}}{59774}R_{70} - \frac{315\sqrt{154}}{46189}R_{72} - \frac{945\sqrt{7}}{46189}R_{74} \\ & - \frac{45\sqrt{182}}{2717}R_{76} + \frac{15\sqrt{2090}}{2717}R_{90} - \frac{54\sqrt{38}}{4199}R_{92} + \frac{6\sqrt{1729}}{4199}R_{94} \\ & - \frac{2\sqrt{1482}}{247}R_{96} - \frac{6\sqrt{4199}}{4199}R_{98} - \frac{45\sqrt{2530}}{14858}R_{11,0} + \frac{36\sqrt{897}}{7429}R_{11,2} \\ & + \frac{27\sqrt{10465}}{7429}R_{11,4} - \frac{12\sqrt{152490}}{7429}R_{11,6} - \frac{9\sqrt{289731}}{7429}R_{11,8} \end{aligned}$

Table B426: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 95 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	4	$\begin{aligned} & \frac{8\sqrt{770}}{2145}iR_{30} - \frac{7\sqrt{231}}{715}iR_{32} - \frac{14\sqrt{10}}{3315}iR_{50} - \frac{36\sqrt{21}}{1105}iR_{52} \\ & + \frac{12\sqrt{7}}{1105}iR_{54} - \frac{2205\sqrt{66}}{184756}iR_{70} + \frac{465\sqrt{154}}{184756}iR_{72} \\ & + \frac{105\sqrt{7}}{8398}iR_{74} + \frac{447\sqrt{182}}{16796}iR_{76} - \frac{217\sqrt{2090}}{167960}iR_{90} \\ & - \frac{1151\sqrt{38}}{41990}iR_{92} - \frac{31\sqrt{1729}}{41990}iR_{94} + \frac{287\sqrt{1482}}{41990}iR_{96} \\ & + \frac{9\sqrt{4199}}{4940}iR_{98} - \frac{273\sqrt{2530}}{1188640}iR_{11,0} - \frac{159\sqrt{897}}{594320}iR_{11,2} \\ & - \frac{33\sqrt{10465}}{297160}iR_{11,4} - \frac{441\sqrt{152490}}{1188640}iR_{11,6} - \frac{363\sqrt{289731}}{594320}iR_{11,8} \\ & + \frac{21\sqrt{20281170}}{237728}iR_{11,10} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	5	$\begin{aligned} & - \frac{2293\sqrt{41755}}{5117970}iR_{30} - \frac{1039\sqrt{50106}}{1705990}iR_{32} + \frac{16772\sqrt{65615}}{43502745}iR_{50} \\ & + \frac{1414\sqrt{551166}}{14500915}iR_{52} + \frac{6912\sqrt{183722}}{14500915}iR_{54} + \frac{881055\sqrt{3579}}{440827816}iR_{70} \\ & - \frac{11685\sqrt{8351}}{23201464}iR_{72} + \frac{1695\sqrt{183722}}{40075256}iR_{74} - \frac{11937\sqrt{1194193}}{440827816}iR_{76} \\ & - \frac{48821\sqrt{113335}}{50094070}iR_{90} - \frac{14791\sqrt{249337}}{25047035}iR_{92} - \frac{823\sqrt{45379334}}{25047035}iR_{94} \\ & - \frac{2233\sqrt{9724143}}{25047035}iR_{96} - \frac{1401\sqrt{110206954}}{50094070}iR_{98} + \frac{10527\sqrt{137195}}{709023760}iR_{11,0} \\ & - \frac{651\sqrt{23542662}}{37317040}iR_{11,2} - \frac{8103\sqrt{274664390}}{354511880}iR_{11,4} - \frac{12831\sqrt{1000563135}}{709023760}iR_{11,6} \\ & - \frac{33\sqrt{7604279826}}{709023760}iR_{11,8} + \frac{3\sqrt{133074896955}}{8341456}iR_{11,10} \end{aligned}$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	6	$\begin{aligned} & - \frac{14351\sqrt{903661710}}{7384207116}iR_{30} - \frac{5567\sqrt{30122057}}{284007966}iR_{32} - \frac{99071\sqrt{1420039830}}{62765760486}iR_{50} \\ & + \frac{187630\sqrt{331342627}}{31382880243}iR_{52} - \frac{1219\sqrt{994027881}}{2414067711}iR_{54} + \frac{7772625\sqrt{8606302}}{795032966156}iR_{70} \\ & + \frac{5933835\sqrt{180732342}}{795032966156}iR_{72} + \frac{158445\sqrt{994027881}}{30578191006}iR_{74} + \frac{279765\sqrt{25844724906}}{795032966156}iR_{76} \\ & + \frac{122913\sqrt{2452796070}}{36137862098}iR_{90} - \frac{31475\sqrt{5396151354}}{5559671092}iR_{92} - \frac{3513\sqrt{245524886607}}{18068931049}iR_{94} \\ & - \frac{162555\sqrt{23383322534}}{72275724196}iR_{96} - \frac{25\sqrt{596274724617}}{18068931049}iR_{98} - \frac{458073\sqrt{2969174190}}{255744870232}iR_{11,0} \\ & - \frac{853767\sqrt{14153063639}}{255744870232}iR_{11,2} - \frac{7965\sqrt{1486071682095}}{31968108779}iR_{11,4} \\ & + \frac{6597\sqrt{2406020818630}}{22238684368}iR_{11,6} - \frac{135\sqrt{4571439555397}}{127872435116}iR_{11,8} \\ & - \frac{12555\sqrt{320000768877790}}{511489740464}iR_{11,10} \end{aligned}$

Table B427: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 96 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	2	$\frac{13}{2}$	6	7	$ \begin{aligned} & -\frac{35\sqrt{10831821}}{3094806}iR_{30} + \frac{7\sqrt{36106070}}{1031602}iR_{32} - \frac{875\sqrt{140673}}{2391441}iR_{50} \\ & - \frac{2\sqrt{3282370}}{797147}iR_{52} + \frac{43\sqrt{9847110}}{797147}iR_{54} - \frac{4221\sqrt{2579005}}{333207446}iR_{70} \\ & + \frac{5232\sqrt{54159105}}{166603723}iR_{72} - \frac{345\sqrt{9847110}}{30291586}iR_{74} - \frac{420\sqrt{378735}}{1165061}iR_{76} \\ & - \frac{125\sqrt{29400657}}{15145793}iR_{90} + \frac{792\sqrt{13363935}}{15145793}iR_{92} - \frac{94\sqrt{14391930}}{1165061}iR_{94} \\ & + \frac{120\sqrt{342665}}{1165061}iR_{96} + \frac{25\sqrt{34951830}}{1165061}iR_{98} - \frac{8205\sqrt{35590269}}{107185612}iR_{11,0} \\ & - \frac{25191\sqrt{829610}}{53592806}iR_{11,2} + \frac{7455\sqrt{3484362}}{53592806}iR_{11,4} + \frac{9675\sqrt{1410337}}{53592806}iR_{11,6} \\ & + \frac{1755\sqrt{267964030}}{107185612}iR_{11,8} + \frac{1125\sqrt{187574821}}{53592806}iR_{11,10} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{9}{2}$	5	3	$ \begin{aligned} & \frac{\sqrt{30}}{66}I_{21} + \frac{54\sqrt{5}}{143}I_{41} - \frac{\sqrt{546}}{429}I_{61} + \frac{2\sqrt{1365}}{143}I_{63} \\ & + \frac{441\sqrt{34}}{2431}I_{81} + \frac{7\sqrt{39270}}{2431}I_{83} + R_{00} + \frac{2\sqrt{5}}{11}R_{20} \\ & + \frac{9}{143}R_{40} - \frac{8\sqrt{13}}{143}R_{60} - \frac{196\sqrt{17}}{2431}R_{80} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{9}{2}$	5	4	$ \begin{aligned} & \frac{\sqrt{70}}{22}I_{21} + \frac{3\sqrt{105}}{286}I_{41} + \frac{15\sqrt{26}}{286}I_{61} - \frac{5\sqrt{65}}{143}I_{63} \\ & - \frac{315\sqrt{714}}{9724}I_{81} - \frac{105\sqrt{1870}}{9724}I_{83} + \frac{2\sqrt{105}}{33}R_{20} + \frac{3\sqrt{210}}{143}R_{42} \\ & + \frac{20\sqrt{65}}{429}R_{62} - \frac{35\sqrt{255}}{2431}R_{82} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{9}{2}$	5	5	$ \begin{aligned} & \frac{2\sqrt{5}}{33}iI_{21} + \frac{51\sqrt{30}}{286}iI_{41} - \frac{\sqrt{91}}{429}iI_{61} + \frac{\sqrt{910}}{143}iI_{63} \\ & - \frac{441\sqrt{51}}{4862}iI_{81} - \frac{21\sqrt{6545}}{4862}iI_{83} - \frac{5\sqrt{30}}{33}iR_{20} + \frac{15\sqrt{15}}{143}iR_{42} \\ & + \frac{4\sqrt{910}}{429}iR_{62} + \frac{7\sqrt{3570}}{2431}iR_{82} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	1	$ \begin{aligned} & \frac{35\sqrt{19635}}{4199}iI_{81} + \frac{1470\sqrt{17}}{4199}iI_{83} - \frac{126}{323}iI_{10,1} + \frac{105\sqrt{78}}{4199}iI_{10,3} \\ & + \frac{147\sqrt{390}}{4199}iI_{10,5} + \frac{5\sqrt{462}}{1144}iR_{20} + \frac{\sqrt{2310}}{1001}iR_{40} + \frac{\sqrt{231}}{154}iR_{42} \\ & + \frac{5\sqrt{30030}}{2431}iR_{60} + \frac{46\sqrt{286}}{2431}iR_{62} + \frac{21\sqrt{39270}}{46189}iR_{80} \\ & + \frac{175\sqrt{1122}}{92378}iR_{82} - \frac{28\sqrt{255}}{4199}iR_{84} - \frac{63\sqrt{110}}{1292}iR_{10,0} \\ & + \frac{462\sqrt{3}}{4199}iR_{10,2} - \frac{1449\sqrt{39}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	2	$ \begin{aligned} & \frac{\sqrt{42}}{11}iI_{41} - \frac{90\sqrt{26}}{2431}iI_{63} + \frac{105\sqrt{187}}{3553}iI_{83} - \frac{21\sqrt{858}}{4199}iI_{10,3} \\ & + \frac{15\sqrt{42}}{1144}iR_{20} - \frac{27\sqrt{210}}{2002}iR_{40} + \frac{12\sqrt{21}}{1001}iR_{42} + \frac{4\sqrt{2730}}{2431}iR_{60} \\ & + \frac{112\sqrt{26}}{2431}iR_{62} - \frac{189\sqrt{3570}}{92378}iR_{80} + \frac{2345\sqrt{102}}{92378}iR_{82} \\ & - \frac{287\sqrt{2805}}{92378}iR_{84} - \frac{1701\sqrt{10}}{16796}iR_{10,0} - \frac{42\sqrt{33}}{247}iR_{10,2} \\ & - \frac{861\sqrt{429}}{16796}iR_{10,4} \end{aligned} $

Table B428: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 97 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	3	$ \begin{aligned} & -\frac{2\sqrt{105}}{429}iI_{21} + \frac{\sqrt{70}}{143}iI_{41} + \frac{284\sqrt{39}}{7293}iI_{61} + \frac{1491\sqrt{119}}{46189}iI_{81} \\ & -\frac{126\sqrt{165}}{4199}iI_{10,1} - \frac{\sqrt{70}}{104}iR_{20} - \frac{20\sqrt{14}}{1001}iR_{40} + \frac{\sqrt{35}}{182}iR_{42} \\ & + \frac{43\sqrt{182}}{2431}iR_{60} + \frac{10\sqrt{390}}{221}iR_{62} - \frac{63\sqrt{238}}{46189}iR_{80} - \frac{609\sqrt{170}}{92378}iR_{82} \\ & - \frac{420\sqrt{187}}{46189}iR_{84} + \frac{10395\sqrt{6}}{16796}iR_{10,0} + \frac{1386\sqrt{55}}{4199}iR_{10,2} \\ & + \frac{693\sqrt{715}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	4	$ \begin{aligned} & -\frac{12\sqrt{13}}{2431}iI_{61} + \frac{6\sqrt{130}}{2431}iI_{63} + \frac{14\sqrt{357}}{323}iI_{81} + \frac{63\sqrt{935}}{3553}iI_{83} \\ & - \frac{105\sqrt{858}}{4199}iI_{10,5} + \frac{15\sqrt{210}}{1144}iR_{20} + \frac{15\sqrt{42}}{2002}iR_{40} - \frac{\sqrt{105}}{77}iR_{42} \\ & - \frac{2\sqrt{546}}{143}iR_{60} - \frac{196\sqrt{130}}{12155}iR_{62} + \frac{21\sqrt{714}}{8398}iR_{80} + \frac{1561\sqrt{510}}{92378}iR_{82} \\ & - \frac{259\sqrt{561}}{92378}iR_{84} + \frac{11655\sqrt{2}}{16796}iR_{10,0} + \frac{630\sqrt{165}}{4199}iR_{10,2} \\ & + \frac{483\sqrt{2145}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	5	$ \begin{aligned} & \frac{\sqrt{35}}{13}iI_{41} - \frac{4\sqrt{195}}{221}iI_{63} - \frac{21\sqrt{5610}}{4199}iI_{83} - \frac{126\sqrt{715}}{4199}iI_{10,3} \\ & + \frac{5\sqrt{35}}{572}iR_{20} + \frac{5\sqrt{7}}{143}iR_{40} - \frac{3\sqrt{70}}{143}iR_{42} + \frac{32\sqrt{91}}{2431}iR_{60} \\ & + \frac{64\sqrt{195}}{36465}iR_{62} - \frac{378\sqrt{119}}{46189}iR_{80} + \frac{567\sqrt{85}}{46189}iR_{82} \\ & + \frac{1134\sqrt{374}}{46189}iR_{84} - \frac{4725\sqrt{3}}{8398}iR_{10,0} - \frac{630\sqrt{110}}{4199}iR_{10,2} \\ & - \frac{315\sqrt{1430}}{16796}iR_{10,4} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	5	6	$ \begin{aligned} & -\frac{25\sqrt{6}}{429}I_{21} - \frac{23}{143}I_{41} - \frac{16\sqrt{2730}}{7293}I_{61} + \frac{147\sqrt{170}}{46189}I_{81} \\ & + \frac{126\sqrt{462}}{4199}I_{10,1} + \frac{45}{572}R_{20} + \frac{6\sqrt{5}}{143}R_{40} - \frac{19\sqrt{2}}{286}R_{42} \\ & + \frac{210\sqrt{65}}{2431}R_{60} + \frac{12\sqrt{273}}{187}R_{62} + \frac{441\sqrt{85}}{46189}R_{80} + \frac{525\sqrt{119}}{46189}R_{82} \\ & + \frac{21\sqrt{13090}}{92378}R_{84} + \frac{189\sqrt{105}}{8398}R_{10,0} + \frac{126\sqrt{154}}{4199}R_{10,2} \\ & + \frac{63\sqrt{2002}}{16796}R_{10,4} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	1	$ \begin{aligned} & -\frac{70\sqrt{682}}{4433}iR_{32} + \frac{14\sqrt{62}}{403}iR_{52} + \frac{8\sqrt{186}}{403}iR_{54} - \frac{15\sqrt{2387}}{4216}iR_{70} \\ & + \frac{3325\sqrt{1023}}{602888}iR_{72} - \frac{1255\sqrt{186}}{54808}iR_{74} - \frac{205\sqrt{1209}}{54808}iR_{76} \\ & - \frac{21\sqrt{680295}}{160208}iR_{90} + \frac{147\sqrt{12369}}{520676}iR_{92} + \frac{1351\sqrt{45942}}{1041352}iR_{94} \\ & - \frac{21\sqrt{53599}}{40052}iR_{96} + \frac{49\sqrt{5467098}}{2082704}iR_{98} \end{aligned} $

Table B429: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 98 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	2	$ \begin{aligned} & -\frac{3\sqrt{18879}}{638}iR_{10} + \frac{56\sqrt{899}}{4147}iR_{30} - \frac{49\sqrt{26970}}{385671}iR_{32} - \frac{5\sqrt{69223}}{8294}iR_{50} \\ & + \frac{140\sqrt{296670}}{385671}iR_{52} - \frac{181\sqrt{98890}}{257114}iR_{54} - \frac{141\sqrt{94395}}{514228}iR_{70} \\ & - \frac{30123\sqrt{4495}}{8741876}iR_{72} - \frac{6213\sqrt{98890}}{8741876}iR_{74} + \frac{15\sqrt{642785}}{39556}iR_{76} \\ & + \frac{945\sqrt{119567}}{19540664}iR_{90} + \frac{6027\sqrt{6576185}}{166095644}iR_{92} + \frac{693\sqrt{24425830}}{15099604}iR_{94} \\ & + \frac{189\sqrt{256471215}}{9770332}iR_{96} + \frac{1113\sqrt{2906673770}}{332191288}iR_{98} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	3	$ \begin{aligned} & -\frac{7\sqrt{1218}}{638}iR_{10} - \frac{1169\sqrt{58}}{16588}iR_{30} + \frac{217\sqrt{435}}{8294}iR_{32} + \frac{25\sqrt{4466}}{16588}iR_{50} \\ & + \frac{9\sqrt{4785}}{4147}iR_{52} + \frac{3\sqrt{1595}}{8294}iR_{54} - \frac{14\sqrt{6090}}{70499}iR_{70} - \frac{1083\sqrt{290}}{281996}iR_{72} \\ & - \frac{282\sqrt{1595}}{70499}iR_{74} - \frac{381\sqrt{41470}}{281996}iR_{76} + \frac{14175\sqrt{7714}}{10715848}iR_{90} \\ & + \frac{3507\sqrt{424270}}{10715848}iR_{92} + \frac{336\sqrt{393965}}{1339481}iR_{94} + \frac{189\sqrt{16546530}}{10715848}iR_{96} \\ & - \frac{21\sqrt{46881835}}{5357924}iR_{98} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{9\sqrt{805}}{506}R_{10} - \frac{63\sqrt{345}}{6578}R_{30} + \frac{245\sqrt{46}}{6578}R_{32} + \frac{49\sqrt{506}}{3289}R_{52} \\ & + \frac{18\sqrt{1518}}{3289}R_{54} + \frac{45\sqrt{161}}{4301}R_{70} + \frac{5705\sqrt{69}}{223652}R_{72} + \frac{100\sqrt{1518}}{55913}R_{74} \\ & + \frac{25\sqrt{9867}}{9724}R_{76} + \frac{945\sqrt{45885}}{1062347}R_{90} - \frac{343\sqrt{100947}}{1062347}R_{92} \\ & + \frac{301\sqrt{374946}}{2124694}R_{94} + \frac{21\sqrt{437437}}{46189}R_{96} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	5	$ \begin{aligned} & -\frac{7\sqrt{1173}}{4301}R_{10} - \frac{21\sqrt{2737}}{55913}R_{30} - \frac{7\sqrt{82110}}{12903}R_{32} - \frac{64\sqrt{903210}}{167739}R_{52} \\ & - \frac{16\sqrt{301070}}{55913}R_{54} + \frac{14\sqrt{5865}}{73117}R_{70} - \frac{1692\sqrt{13685}}{950521}R_{72} \\ & + \frac{642\sqrt{301070}}{950521}R_{74} + \frac{4410\sqrt{7429}}{18059899}R_{90} + \frac{588\sqrt{408595}}{1389223}R_{92} \\ & + \frac{63\sqrt{74364290}}{18059899}R_{94} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{11}{2}$	6	6	$ \begin{aligned} & -\frac{3\sqrt{1190}}{187}R_{10} - \frac{21\sqrt{510}}{2431}R_{30} - \frac{315\sqrt{17}}{2431}R_{32} - \frac{96\sqrt{187}}{2431}R_{52} \\ & + \frac{4\sqrt{561}}{221}R_{54} + \frac{30\sqrt{238}}{3179}R_{70} - \frac{1490\sqrt{102}}{41327}R_{72} - \frac{50\sqrt{561}}{3757}R_{74} \\ & + \frac{630\sqrt{67830}}{785213}R_{90} - \frac{14\sqrt{149226}}{785213}R_{92} + \frac{14\sqrt{138567}}{71383}R_{94} \end{aligned} $
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{7\sqrt{22}}{572}R_{30} - \frac{7\sqrt{165}}{1430}R_{32} + \frac{\sqrt{14}}{34}R_{50} - \frac{6\sqrt{15}}{1105}R_{52} \\ & - \frac{53\sqrt{5}}{1105}R_{54} + \frac{81\sqrt{2310}}{28424}R_{70} - \frac{261\sqrt{110}}{369512}R_{72} - \frac{999\sqrt{5}}{16796}R_{74} \\ & - \frac{27\sqrt{130}}{33592}R_{76} + \frac{27\sqrt{2926}}{16796}R_{90} + \frac{77\sqrt{1330}}{83980}R_{92} - \frac{84\sqrt{1235}}{20995}R_{94} \\ & + \frac{3\sqrt{51870}}{83980}R_{96} + \frac{\sqrt{146965}}{646}R_{98} - \frac{297\sqrt{3542}}{59432}R_{11,0} + \frac{231\sqrt{31395}}{74290}R_{11,2} \\ & - \frac{147\sqrt{299}}{7429}R_{11,4} + \frac{3\sqrt{213486}}{14858}R_{11,6} - \frac{3\sqrt{10140585}}{29716}R_{11,8} \end{aligned} $

Table B430: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 99 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{14\sqrt{33}}{4719}R_{30} - \frac{84\sqrt{110}}{7865}R_{32} + \frac{4\sqrt{21}}{561}R_{50} - \frac{174\sqrt{10}}{12155}R_{52} \\ & + \frac{216\sqrt{30}}{12155}R_{54} + \frac{81\sqrt{385}}{39083}R_{70} + \frac{14247\sqrt{165}}{2032316}R_{72} \\ & + \frac{1062\sqrt{30}}{46189}R_{74} + \frac{99\sqrt{195}}{16796}R_{76} + \frac{18\sqrt{4389}}{46189}R_{90} + \frac{251\sqrt{1995}}{41990}R_{92} \\ & - \frac{7\sqrt{7410}}{20995}R_{94} - \frac{33\sqrt{8645}}{41990}R_{96} - \frac{9\sqrt{5313}}{7429}R_{11,0} + \frac{99\sqrt{20930}}{74290}R_{11,2} \\ & + \frac{63\sqrt{1794}}{14858}R_{11,4} - \frac{33\sqrt{35581}}{7429}R_{11,6} \end{aligned}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	3	$\begin{aligned} & -\frac{14\sqrt{330}}{4719}R_{30} - \frac{63\sqrt{11}}{1573}R_{32} - \frac{4\sqrt{210}}{561}R_{50} - \frac{8}{143}R_{52} \\ & - \frac{432\sqrt{3}}{2431}R_{54} - \frac{405\sqrt{154}}{39083}R_{70} + \frac{450\sqrt{66}}{26741}R_{72} - \frac{10620\sqrt{3}}{46189}R_{74} \\ & - \frac{18\sqrt{43890}}{46189}R_{90} + \frac{56\sqrt{798}}{4199}R_{92} + \frac{14\sqrt{741}}{4199}R_{94} + \frac{9\sqrt{53130}}{7429}R_{11,0} \\ & - \frac{63\sqrt{4485}}{7429}R_{11,4} \end{aligned}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	4	$\begin{aligned} & \frac{7\sqrt{11}}{715}iR_{32} + \frac{28}{221}iR_{52} - \frac{176\sqrt{3}}{3315}iR_{54} + \frac{9\sqrt{154}}{646}iR_{70} \\ & - \frac{4725\sqrt{66}}{92378}iR_{72} - \frac{27\sqrt{3}}{4199}iR_{74} + \frac{45\sqrt{78}}{8398}iR_{76} - \frac{\sqrt{43890}}{2584}iR_{90} \\ & + \frac{73\sqrt{798}}{25194}iR_{92} + \frac{1589\sqrt{741}}{125970}iR_{94} - \frac{\sqrt{3458}}{3230}iR_{96} + \frac{7\sqrt{88179}}{50388}iR_{98} \\ & - \frac{39\sqrt{53130}}{69920}iR_{11,0} - \frac{1011\sqrt{2093}}{594320}iR_{11,2} + \frac{847\sqrt{4485}}{297160}iR_{11,4} \\ & + \frac{123\sqrt{355810}}{1188640}iR_{11,6} - \frac{231\sqrt{676039}}{594320}iR_{11,8} + \frac{819\sqrt{965770}}{1188640}iR_{11,10} \end{aligned}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	5	$\begin{aligned} & \frac{245\sqrt{17895}}{341198}iR_{30} - \frac{1561\sqrt{2386}}{1705990}iR_{32} + \frac{230\sqrt{1377915}}{2900183}iR_{50} \\ & - \frac{2402\sqrt{26246}}{2900183}iR_{52} + \frac{7474\sqrt{78738}}{43502745}iR_{54} - \frac{792279\sqrt{8351}}{440827816}iR_{70} \\ & - \frac{960525\sqrt{3579}}{440827816}iR_{72} + \frac{294759\sqrt{78738}}{440827816}iR_{74} - \frac{2655\sqrt{511797}}{33909832}iR_{76} \\ & + \frac{713\sqrt{2380035}}{5009407}iR_{90} + \frac{2123\sqrt{5236077}}{15028221}iR_{92} + \frac{812\sqrt{19448286}}{75141105}iR_{94} \\ & - \frac{983\sqrt{22689667}}{25047035}iR_{96} - \frac{37\sqrt{2314346034}}{15028221}iR_{98} - \frac{125763\sqrt{2881095}}{709023760}iR_{11,0} \\ & - \frac{41001\sqrt{54932878}}{709023760}iR_{11,2} + \frac{77\sqrt{117713310}}{354511880}iR_{11,4} + \frac{6393\sqrt{2334647315}}{709023760}iR_{11,6} \\ & + \frac{141\sqrt{17743319594}}{37317040}iR_{11,8} - \frac{63\sqrt{6336899855}}{41707280}iR_{11,10} \end{aligned}$

Table B431: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 100 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	6	$\frac{50267\sqrt{43031510}}{7384207116}iR_{30} - \frac{52115\sqrt{12909453}}{3692103558}iR_{32} + \frac{94739\sqrt{3313426270}}{62765760486}iR_{50}$ $- \frac{373742\sqrt{142003983}}{31382880243}iR_{52} - \frac{133953\sqrt{47334661}}{10460960081}iR_{54} + \frac{3162915\sqrt{180732342}}{397516483078}iR_{70}$ $+ \frac{8280495\sqrt{8606302}}{397516483078}iR_{72} - \frac{3273885\sqrt{47334661}}{198758241539}iR_{74} + \frac{4149225\sqrt{1230701186}}{397516483078}iR_{76}$ $+ \frac{16479\sqrt{5723190830}}{18068931049}iR_{90} + \frac{33483\sqrt{12591019826}}{72275724196}iR_{92} - \frac{25179\sqrt{11691661267}}{18068931049}iR_{94}$ $- \frac{32523\sqrt{491049773214}}{72275724196}iR_{96} - \frac{3612\sqrt{1391307690773}}{18068931049}iR_{98} - \frac{707751\sqrt{6928073110}}{255744870232}iR_{11,0}$ $- \frac{198693\sqrt{297214336419}}{255744870232}iR_{11,2} - \frac{37422\sqrt{70765318195}}{31968108779}iR_{11,4}$ $- \frac{8919\sqrt{50526437191230}}{511489740464}iR_{11,6} + \frac{1701\sqrt{96000230663337}}{127872435116}iR_{11,8}$ $+ \frac{17577\sqrt{137143186661910}}{511489740464}iR_{11,10}$
$\frac{9}{2}$	5	3	$\frac{13}{2}$	6	7	$\frac{35\sqrt{515801}}{1031602}iR_{30} + \frac{49\sqrt{15474030}}{1031602}iR_{32} - \frac{145\sqrt{328237}}{797147}iR_{50}$ $- \frac{42\sqrt{1406730}}{797147}iR_{52} - \frac{283\sqrt{468910}}{797147}iR_{54} + \frac{405\sqrt{54159105}}{333207446}iR_{70}$ $+ \frac{45\sqrt{2579005}}{515801}iR_{72} + \frac{13869\sqrt{468910}}{30291586}iR_{74} + \frac{549\sqrt{18035}}{1165061}iR_{76}$ $- \frac{225\sqrt{68601533}}{15145793}iR_{90} - \frac{30\sqrt{31182515}}{890929}iR_{92} - \frac{70\sqrt{685330}}{1165061}iR_{94}$ $+ \frac{30\sqrt{7195965}}{1165061}iR_{96} + \frac{5\sqrt{81554270}}{1165061}iR_{98} - \frac{2925\sqrt{83043961}}{107185612}iR_{11,0}$ $- \frac{327\sqrt{17421810}}{2820674}iR_{11,2} - \frac{58695\sqrt{165922}}{53592806}iR_{11,4} - \frac{3855\sqrt{29617077}}{53592806}iR_{11,6}$ $- \frac{471\sqrt{5627244630}}{107185612}iR_{11,8} - \frac{1575\sqrt{80389209}}{53592806}iR_{11,10}$
$\frac{9}{2}$	5	4	$\frac{9}{2}$	5	4	$- \frac{13\sqrt{30}}{132}I_{21} + \frac{24\sqrt{5}}{143}I_{41} + \frac{29\sqrt{546}}{1716}I_{61} - \frac{7\sqrt{1365}}{858}I_{63}$ $- \frac{441\sqrt{34}}{2431}I_{81} - \frac{7\sqrt{39270}}{2431}I_{83} + R_{00} - \frac{4\sqrt{5}}{33}R_{20}$ $- \frac{6}{13}R_{40} + \frac{4\sqrt{13}}{39}R_{60} - \frac{49\sqrt{17}}{2431}R_{80}$
$\frac{9}{2}$	5	4	$\frac{9}{2}$	5	5	$\frac{\sqrt{105}}{66}iI_{21} - \frac{3\sqrt{70}}{26}iI_{41} + \frac{37\sqrt{39}}{858}iI_{61} + \frac{3\sqrt{390}}{286}iI_{63}$ $+ \frac{189\sqrt{119}}{4862}iI_{81} + \frac{21\sqrt{2805}}{4862}iI_{83} - \frac{75\sqrt{14}}{1001}iR_{40} + \frac{60\sqrt{35}}{1001}iR_{42}$ $- \frac{2\sqrt{182}}{143}iR_{60} - \frac{32\sqrt{390}}{2145}iR_{62} + \frac{63\sqrt{187}}{2431}iR_{84}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	1	$- \frac{9\sqrt{21}}{323}iI_{10,1} + \frac{27\sqrt{182}}{646}iI_{10,3} - \frac{243\sqrt{910}}{8398}iI_{10,5} - \frac{35\sqrt{22}}{2288}iR_{20}$ $+ \frac{3\sqrt{110}}{572}iR_{40} - \frac{3\sqrt{11}}{52}iR_{42} + \frac{105\sqrt{1430}}{9724}iR_{60} + \frac{11\sqrt{6006}}{1326}iR_{62}$ $- \frac{21\sqrt{1870}}{16796}iR_{80} + \frac{365\sqrt{2618}}{92378}iR_{82} - \frac{121\sqrt{595}}{16796}iR_{84}$ $+ \frac{927\sqrt{2310}}{33592}iR_{10,0} + \frac{3483\sqrt{7}}{4199}iR_{10,2} + \frac{6039\sqrt{91}}{33592}iR_{10,4}$

Table B432: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 101 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	2	$\begin{aligned} & \frac{25\sqrt{3}}{429}iI_{21} + \frac{18\sqrt{2}}{143}iI_{41} - \frac{62\sqrt{1365}}{7293}iI_{61} + \frac{854\sqrt{85}}{46189}iI_{81} \\ & - \frac{9\sqrt{231}}{4199}iI_{10,1} + \frac{155\sqrt{2}}{2288}iR_{20} + \frac{3\sqrt{10}}{572}iR_{40} + \frac{3}{44}iR_{42} \\ & - \frac{49\sqrt{130}}{9724}iR_{60} + \frac{101\sqrt{546}}{4862}iR_{62} + \frac{231\sqrt{170}}{16796}iR_{80} - \frac{2135\sqrt{238}}{92378}iR_{82} \\ & + \frac{147\sqrt{6545}}{184756}iR_{84} + \frac{5193\sqrt{210}}{33592}iR_{10,0} + \frac{2007\sqrt{77}}{4199}iR_{10,2} \\ & + \frac{2835\sqrt{1001}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	3	$\begin{aligned} & \frac{23\sqrt{5}}{429}iI_{21} - \frac{4\sqrt{30}}{143}iI_{41} - \frac{14\sqrt{91}}{561}iI_{61} + \frac{2408\sqrt{51}}{46189}iI_{81} \\ & - \frac{27\sqrt{385}}{4199}iI_{10,1} + \frac{53\sqrt{30}}{6864}iR_{20} + \frac{5\sqrt{6}}{572}iR_{40} + \frac{29\sqrt{15}}{572}iR_{42} \\ & + \frac{49\sqrt{78}}{1716}iR_{60} + \frac{109\sqrt{910}}{14586}iR_{62} - \frac{21\sqrt{102}}{836}iR_{80} + \frac{7\sqrt{3570}}{5434}iR_{82} \\ & - \frac{735\sqrt{3927}}{184756}iR_{84} - \frac{9045\sqrt{14}}{33592}iR_{10,0} - \frac{261\sqrt{1155}}{4199}iR_{10,2} \\ & - \frac{441\sqrt{15015}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	4	$\begin{aligned} & - \frac{770\sqrt{17}}{4199}iI_{81} - \frac{28\sqrt{19635}}{4199}iI_{83} - \frac{9\sqrt{1155}}{323}iI_{10,1} + \frac{45\sqrt{10010}}{8398}iI_{10,3} \\ & + \frac{315\sqrt{2002}}{8398}iI_{10,5} + \frac{35\sqrt{10}}{2288}iR_{20} + \frac{15\sqrt{2}}{572}iR_{40} - \frac{3\sqrt{5}}{52}iR_{42} \\ & + \frac{63\sqrt{26}}{9724}iR_{60} + \frac{29\sqrt{2730}}{6630}iR_{62} + \frac{1953\sqrt{34}}{184756}iR_{80} + \frac{609\sqrt{1190}}{92378}iR_{82} \\ & - \frac{7\sqrt{1309}}{748}iR_{84} - \frac{675\sqrt{42}}{1976}iR_{10,0} - \frac{873\sqrt{385}}{4199}iR_{10,2} \\ & - \frac{63\sqrt{5005}}{1768}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	5	$\begin{aligned} & \frac{46\sqrt{182}}{2431}iI_{61} - \frac{46\sqrt{455}}{2431}iI_{63} - \frac{392\sqrt{102}}{4199}iI_{81} - \frac{252\sqrt{13090}}{46189}iI_{83} \\ & - \frac{45\sqrt{3003}}{4199}iI_{10,5} + \frac{35\sqrt{15}}{1144}iR_{20} + \frac{5\sqrt{3}}{286}iR_{40} + \frac{17\sqrt{30}}{572}iR_{42} \\ & + \frac{371\sqrt{39}}{14586}iR_{60} - \frac{53\sqrt{455}}{36465}iR_{62} + \frac{189\sqrt{51}}{8398}iR_{80} - \frac{277\sqrt{1785}}{46189}iR_{82} \\ & - \frac{79\sqrt{7854}}{184756}iR_{84} - \frac{405\sqrt{7}}{16796}iR_{10,0} + \frac{27\sqrt{2310}}{4199}iR_{10,2} \\ & + \frac{135\sqrt{30030}}{33592}iR_{10,4} \end{aligned}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	5	6	$\begin{aligned} & - \frac{18\sqrt{21}}{143}I_{41} - \frac{70\sqrt{13}}{2431}I_{63} - \frac{1050\sqrt{374}}{46189}I_{83} + \frac{63\sqrt{429}}{4199}I_{10,3} \\ & + \frac{115\sqrt{21}}{3432}R_{20} - \frac{5\sqrt{105}}{2002}R_{40} + \frac{83\sqrt{42}}{4004}R_{42} - \frac{7\sqrt{1365}}{858}R_{60} \\ & - \frac{203\sqrt{13}}{2431}R_{62} + \frac{147\sqrt{1785}}{92378}R_{80} + \frac{175\sqrt{51}}{4199}R_{82} + \frac{203\sqrt{5610}}{184756}R_{84} \\ & + \frac{1323\sqrt{5}}{16796}R_{10,0} + \frac{63\sqrt{66}}{4199}R_{10,2} - \frac{189\sqrt{858}}{33592}R_{10,4} \end{aligned}$

Table B433: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 102 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	1	$\frac{35\sqrt{14322}}{13299}iR_{32} - \frac{7\sqrt{1302}}{1209}iR_{52} + \frac{6\sqrt{434}}{403}iR_{54} + \frac{105\sqrt{2387}}{75361}iR_{72}$ $- \frac{75\sqrt{434}}{6851}iR_{74} - \frac{15\sqrt{2821}}{6851}iR_{76} - \frac{21\sqrt{32395}}{18848}iR_{90}$ $+ \frac{13531\sqrt{589}}{1041352}iR_{92} - \frac{735\sqrt{107198}}{2082704}iR_{94} + \frac{749\sqrt{22971}}{1041352}iR_{96}$ $- \frac{2303\sqrt{260338}}{4165408}iR_{98}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	2	$\frac{21\sqrt{899}}{1276}iR_{10} - \frac{28\sqrt{18879}}{12441}iR_{30} - \frac{518\sqrt{62930}}{385671}iR_{32} - \frac{35\sqrt{29667}}{24882}iR_{50}$ $- \frac{295\sqrt{692230}}{771342}iR_{52} - \frac{35\sqrt{2076690}}{771342}iR_{54} - \frac{651\sqrt{4495}}{563992}iR_{70}$ $+ \frac{15975\sqrt{94395}}{17483752}iR_{72} - \frac{21\sqrt{2076690}}{1028456}iR_{74} - \frac{183\sqrt{13498485}}{17483752}iR_{76}$ $+ \frac{292845\sqrt{51243}}{664382576}iR_{90} + \frac{10255\sqrt{2818365}}{166095644}iR_{92} - \frac{21\sqrt{512942430}}{19540664}iR_{94}$ $+ \frac{1575\sqrt{12212915}}{166095644}iR_{96} - \frac{1379\sqrt{1245717330}}{664382576}iR_{98}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	3	$- \frac{24\sqrt{58}}{319}iR_{10} - \frac{71\sqrt{1218}}{16588}iR_{30} + \frac{67\sqrt{1015}}{24882}iR_{32} - \frac{125\sqrt{1914}}{33176}iR_{50}$ $+ \frac{85\sqrt{11165}}{24882}iR_{52} + \frac{3\sqrt{33495}}{1276}iR_{54} + \frac{483\sqrt{290}}{140998}iR_{70}$ $+ \frac{771\sqrt{6090}}{281996}iR_{72} + \frac{9\sqrt{33495}}{5423}iR_{74} - \frac{27\sqrt{870870}}{281996}iR_{76}$ $+ \frac{61005\sqrt{3306}}{21431696}iR_{90} + \frac{10437\sqrt{181830}}{21431696}iR_{92} - \frac{28\sqrt{8273265}}{1339481}iR_{94}$ $- \frac{5439\sqrt{787930}}{21431696}iR_{96} + \frac{49\sqrt{20092215}}{10715848}iR_{98}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	4	$\frac{21\sqrt{345}}{1012}R_{10} - \frac{28\sqrt{805}}{3289}R_{30} + \frac{70\sqrt{966}}{9867}R_{32} - \frac{35\sqrt{1265}}{6578}R_{50}$ $- \frac{19\sqrt{10626}}{19734}R_{52} - \frac{\sqrt{3542}}{506}R_{54} + \frac{1470\sqrt{69}}{55913}R_{70} - \frac{2055\sqrt{161}}{111826}R_{72}$ $- \frac{225\sqrt{23023}}{111826}R_{76} - \frac{5145\sqrt{2185}}{4249388}R_{90} + \frac{2086\sqrt{4807}}{1062347}R_{92}$ $+ \frac{21\sqrt{874874}}{249964}R_{94} - \frac{525\sqrt{187473}}{1062347}R_{96} + \frac{7\sqrt{2124694}}{184756}R_{98}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	5	$- \frac{54\sqrt{2737}}{4301}R_{10} + \frac{672\sqrt{1173}}{55913}R_{30} + \frac{1246\sqrt{3910}}{167739}R_{32} + \frac{60\sqrt{90321}}{55913}R_{50}$ $- \frac{245\sqrt{43010}}{167739}R_{52} - \frac{2\sqrt{129030}}{12903}R_{54} - \frac{3024\sqrt{13685}}{950521}R_{70}$ $+ \frac{861\sqrt{5865}}{950521}R_{72} - \frac{21\sqrt{838695}}{55913}R_{76} + \frac{4410\sqrt{156009}}{18059899}R_{90}$ $+ \frac{14\sqrt{8580495}}{18059899}R_{92} + \frac{7\sqrt{31870410}}{1062347}R_{94} - \frac{42\sqrt{37182145}}{1062347}R_{96}$
$\frac{9}{2}$	5	4	$\frac{11}{2}$	6	6	$- \frac{3\sqrt{510}}{187}R_{10} + \frac{16\sqrt{1190}}{2431}R_{30} - \frac{30\sqrt{357}}{2431}R_{32} + \frac{10\sqrt{1870}}{2431}R_{50}$ $+ \frac{8\sqrt{3927}}{2431}R_{52} + \frac{2\sqrt{1309}}{187}R_{54} - \frac{840\sqrt{102}}{41327}R_{70} - \frac{960\sqrt{238}}{41327}R_{72}$ $+ \frac{735\sqrt{3230}}{785213}R_{90} + \frac{1519\sqrt{7106}}{785213}R_{92} - \frac{21\sqrt{323323}}{46189}R_{94}$

Table B434: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 103 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	1	$ \begin{aligned} & -\frac{7\sqrt{462}}{3432}R_{30} + \frac{7\sqrt{385}}{2860}R_{32} + \frac{7\sqrt{6}}{1326}R_{50} - \frac{22\sqrt{35}}{1105}R_{52} \\ & + \frac{\sqrt{105}}{85}R_{54} + \frac{1449\sqrt{110}}{184756}R_{70} - \frac{501\sqrt{2310}}{369512}R_{72} - \frac{9\sqrt{105}}{646}R_{74} \\ & + \frac{93\sqrt{2730}}{33592}R_{76} - \frac{\sqrt{1254}}{442}R_{90} + \frac{883\sqrt{570}}{83980}R_{92} - \frac{33\sqrt{25935}}{20995}R_{94} \\ & + \frac{11\sqrt{2470}}{16796}R_{96} + \frac{\sqrt{62985}}{4199}R_{98} + \frac{33\sqrt{1518}}{59432}R_{11,0} - \frac{45\sqrt{1495}}{14858}R_{11,2} \\ & + \frac{99\sqrt{6279}}{29716}R_{11,4} - \frac{165\sqrt{10166}}{59432}R_{11,6} + \frac{27\sqrt{482885}}{148580}R_{11,8} \\ & - \frac{45\sqrt{1352078}}{59432}R_{11,10} \end{aligned} $
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	2	$ \begin{aligned} & \frac{49\sqrt{77}}{6292}R_{30} - \frac{7\sqrt{2310}}{94380}R_{32} - \frac{49}{2431}R_{50} - \frac{263\sqrt{210}}{36465}R_{52} \\ & + \frac{9\sqrt{70}}{935}R_{54} - \frac{10143\sqrt{165}}{1016158}R_{70} + \frac{3303\sqrt{385}}{1016158}R_{72} \\ & - \frac{81\sqrt{70}}{7106}R_{74} - \frac{279\sqrt{455}}{92378}R_{76} + \frac{21\sqrt{209}}{2431}R_{90} + \frac{81\sqrt{95}}{20995}R_{92} \\ & - \frac{27\sqrt{17290}}{20995}R_{94} - \frac{\sqrt{3705}}{4199}R_{96} - \frac{11\sqrt{41990}}{4199}R_{98} - \frac{63\sqrt{253}}{29716}R_{11,0} \\ & - \frac{9\sqrt{8970}}{29716}R_{11,2} + \frac{81\sqrt{4186}}{29716}R_{11,4} + \frac{15\sqrt{15249}}{14858}R_{11,6} \\ & - \frac{99\sqrt{2897310}}{148580}R_{11,8} \end{aligned} $
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	3	$ \begin{aligned} & \frac{7\sqrt{770}}{1573}R_{30} + \frac{7\sqrt{231}}{9438}R_{32} - \frac{28\sqrt{10}}{2431}R_{50} + \frac{526\sqrt{21}}{7293}R_{52} \\ & + \frac{4\sqrt{7}}{187}R_{54} - \frac{14490\sqrt{66}}{508079}R_{70} - \frac{16515\sqrt{154}}{1016158}R_{72} - \frac{90\sqrt{7}}{3553}R_{74} \\ & + \frac{1395\sqrt{182}}{92378}R_{76} + \frac{12\sqrt{2090}}{2431}R_{90} - \frac{81\sqrt{38}}{4199}R_{92} - \frac{12\sqrt{1729}}{4199}R_{94} \\ & + \frac{5\sqrt{1482}}{4199}R_{96} - \frac{9\sqrt{2530}}{7429}R_{11,0} + \frac{45\sqrt{897}}{14858}R_{11,2} + \frac{9\sqrt{10465}}{7429}R_{11,4} \\ & - \frac{15\sqrt{152490}}{14858}R_{11,6} \end{aligned} $
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	4	$ \begin{aligned} & -\frac{7\sqrt{231}}{4290}iR_{32} - \frac{14\sqrt{21}}{663}iR_{52} - \frac{44\sqrt{7}}{1105}iR_{54} + \frac{861\sqrt{154}}{92378}iR_{72} \\ & - \frac{225\sqrt{7}}{4199}iR_{74} + \frac{33\sqrt{182}}{8398}iR_{76} + \frac{\sqrt{2090}}{190}iR_{90} - \frac{79\sqrt{38}}{1105}iR_{92} \\ & + \frac{40\sqrt{1729}}{4199}iR_{94} + \frac{59\sqrt{1482}}{62985}iR_{96} + \frac{23\sqrt{4199}}{20995}iR_{98} \\ & - \frac{39\sqrt{2530}}{7360}iR_{11,0} + \frac{5181\sqrt{897}}{1188640}iR_{11,2} + \frac{2571\sqrt{10465}}{594320}iR_{11,4} \\ & - \frac{785\sqrt{152490}}{475456}iR_{11,6} + \frac{309\sqrt{289731}}{237728}iR_{11,8} - \frac{123\sqrt{20281170}}{2377280}iR_{11,10} \end{aligned} $

Table B435: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 104 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	5	$-\frac{245\sqrt{41755}}{682396}iR_{30} - \frac{3689\sqrt{50106}}{10235940}iR_{32} + \frac{245\sqrt{65615}}{2900183}iR_{50}$ $- \frac{899\sqrt{551166}}{8700549}iR_{52} - \frac{569\sqrt{183722}}{14500915}iR_{54} + \frac{12600\sqrt{3579}}{2900183}iR_{70}$ $- \frac{46203\sqrt{8351}}{110206954}iR_{72} + \frac{5400\sqrt{183722}}{55103477}iR_{74} + \frac{20091\sqrt{1194193}}{110206954}iR_{76}$ $+ \frac{20443\sqrt{113335}}{200376280}iR_{90} + \frac{2161\sqrt{249337}}{50094070}iR_{92} + \frac{215\sqrt{45379334}}{20037628}iR_{94}$ $+ \frac{18301\sqrt{9724143}}{150282210}iR_{96} + \frac{101\sqrt{110206954}}{10546120}iR_{98} - \frac{61413\sqrt{137195}}{74634080}iR_{11,0}$ $- \frac{64779\sqrt{23542662}}{1418047520}iR_{11,2} + \frac{19911\sqrt{274664390}}{709023760}iR_{11,4} + \frac{4415\sqrt{1000563135}}{283609504}iR_{11,6}$ $- \frac{1011\sqrt{7604279826}}{283609504}iR_{11,8} + \frac{21\sqrt{133074896955}}{83414560}iR_{11,10}$
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	6	$\frac{61187\sqrt{903661710}}{14768414232}iR_{30} - \frac{4179\sqrt{30122057}}{2461402372}iR_{32} + \frac{289555\sqrt{1420039830}}{62765760486}iR_{50}$ $+ \frac{53786\sqrt{331342627}}{10460960081}iR_{52} - \frac{6481\sqrt{994027881}}{2414067711}iR_{54} + \frac{95101965\sqrt{8606302}}{3180131864624}iR_{70}$ $- \frac{263475\sqrt{180732342}}{187066580272}iR_{72} - \frac{1277775\sqrt{994027881}}{122312764024}iR_{74} - \frac{1571085\sqrt{25844724906}}{3180131864624}iR_{76}$ $- \frac{380559\sqrt{2452796070}}{144551448392}iR_{90} - \frac{291\sqrt{5396151354}}{111881926}iR_{92} - \frac{3467\sqrt{245524886607}}{36137862098}iR_{94}$ $- \frac{1821\sqrt{23383322534}}{36137862098}iR_{96} - \frac{25459\sqrt{596274724617}}{72275724196}iR_{98} - \frac{162657\sqrt{2969174190}}{63936217558}iR_{11,0}$ $- \frac{819909\sqrt{14153063639}}{511489740464}iR_{11,2} + \frac{1773\sqrt{1486071682095}}{127872435116}iR_{11,4}$ $+ \frac{130833\sqrt{2406020818630}}{1022979480928}iR_{11,6} + \frac{189\sqrt{4571439555397}}{2779835546}iR_{11,8}$ $- \frac{17577\sqrt{320000768877790}}{1022979480928}iR_{11,10}$
$\frac{9}{2}$	5	4	$\frac{13}{2}$	6	7	$\frac{5\sqrt{10831821}}{515801}iR_{30} + \frac{\sqrt{36106070}}{39677}iR_{32} + \frac{245\sqrt{140673}}{1594294}iR_{50}$ $+ \frac{29\sqrt{3282370}}{797147}iR_{52} - \frac{31\sqrt{9847110}}{1594294}iR_{54} - \frac{36225\sqrt{2579005}}{666414892}iR_{70}$ $- \frac{15285\sqrt{54159105}}{666414892}iR_{72} - \frac{2913\sqrt{9847110}}{60583172}iR_{74} - \frac{891\sqrt{378735}}{4660244}iR_{76}$ $- \frac{1225\sqrt{29400657}}{30291586}iR_{90} - \frac{245\sqrt{13363935}}{2330122}iR_{92} - \frac{70\sqrt{14391930}}{1165061}iR_{94}$ $+ \frac{35\sqrt{342665}}{2330122}iR_{96} + \frac{105\sqrt{34951830}}{2330122}iR_{98} - \frac{3675\sqrt{35590269}}{214371224}iR_{11,0}$ $- \frac{21609\sqrt{829610}}{107185612}iR_{11,2} - \frac{7035\sqrt{3484362}}{107185612}iR_{11,4} - \frac{105\sqrt{1410337}}{4660244}iR_{11,6}$ $+ \frac{63\sqrt{267964030}}{11282696}iR_{11,8} + \frac{1575\sqrt{187574821}}{107185612}iR_{11,10}$
$\frac{9}{2}$	5	5	$\frac{9}{2}$	5	5	$-\frac{\sqrt{30}}{66}I_{21} - \frac{54\sqrt{5}}{143}I_{41} - \frac{\sqrt{546}}{66}I_{61} + \frac{7\sqrt{1365}}{429}I_{63}$ $- \frac{441\sqrt{34}}{2431}I_{81} - \frac{7\sqrt{39270}}{2431}I_{83} + R_{00} + \frac{8\sqrt{5}}{33}R_{20}$ $+ \frac{54}{143}R_{40} + \frac{32\sqrt{13}}{429}R_{60} + \frac{98\sqrt{17}}{2431}R_{80}$

Table B436: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 105 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	1	$\frac{10\sqrt{4290}}{2431}I_{61} - \frac{50\sqrt{429}}{2431}I_{63} + \frac{70\sqrt{13090}}{4199}I_{81} + \frac{525\sqrt{102}}{4199}I_{83}$ $+ \frac{63\sqrt{65}}{4199}I_{10,5} - \frac{5\sqrt{77}}{1144}R_{20} - \frac{3\sqrt{385}}{2002}R_{40} - \frac{9\sqrt{154}}{4004}R_{42}$ $- \frac{15\sqrt{5005}}{4862}R_{60} - \frac{53\sqrt{429}}{7293}R_{62} - \frac{21\sqrt{6545}}{8398}R_{80} + \frac{420\sqrt{187}}{46189}R_{82}$ $+ \frac{7\sqrt{170}}{884}R_{84} - \frac{693\sqrt{165}}{16796}R_{10,0} + \frac{1827\sqrt{2}}{4199}R_{10,2} - \frac{63\sqrt{26}}{1768}R_{10,4}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	2	$- \frac{2\sqrt{390}}{187}I_{61} + \frac{10\sqrt{39}}{187}I_{63} + \frac{14\sqrt{1190}}{247}I_{81} + \frac{105\sqrt{1122}}{2717}I_{83}$ $+ \frac{63\sqrt{715}}{4199}I_{10,5} + \frac{85\sqrt{7}}{1144}R_{20} - \frac{45\sqrt{35}}{2002}R_{40} - \frac{51\sqrt{14}}{4004}R_{42}$ $+ \frac{3\sqrt{455}}{374}R_{60} + \frac{37\sqrt{39}}{7293}R_{62} - \frac{105\sqrt{595}}{92378}R_{80} - \frac{210\sqrt{17}}{3553}R_{82}$ $- \frac{7\sqrt{1870}}{16796}R_{84} - \frac{315\sqrt{15}}{16796}R_{10,0} + \frac{63\sqrt{22}}{4199}R_{10,2} + \frac{567\sqrt{286}}{33592}R_{10,4}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	3	$\frac{2\sqrt{105}}{143}I_{41} - \frac{2\sqrt{65}}{2431}I_{63} + \frac{147\sqrt{1870}}{46189}I_{83} + \frac{63\sqrt{2145}}{4199}I_{10,3}$ $+ \frac{35\sqrt{105}}{3432}R_{20} + \frac{5\sqrt{21}}{182}R_{40} - \frac{79\sqrt{210}}{4004}R_{42} - \frac{\sqrt{273}}{102}R_{60}$ $- \frac{263\sqrt{65}}{12155}R_{62} - \frac{945\sqrt{357}}{92378}R_{80} - \frac{588\sqrt{255}}{46189}R_{82} + \frac{483\sqrt{1122}}{184756}R_{84}$ $- \frac{8505}{16796}R_{10,0} - \frac{189\sqrt{330}}{4199}R_{10,2} - \frac{189\sqrt{4290}}{33592}R_{10,4}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	4	$\frac{6\sqrt{35}}{143}I_{41} - \frac{46\sqrt{195}}{2431}I_{63} - \frac{217\sqrt{5610}}{46189}I_{83} + \frac{63\sqrt{715}}{4199}I_{10,3}$ $- \frac{19\sqrt{35}}{1144}R_{20} - \frac{45\sqrt{7}}{2002}R_{40} + \frac{57\sqrt{70}}{4004}R_{42} + \frac{127\sqrt{91}}{4862}R_{60}$ $+ \frac{447\sqrt{195}}{12155}R_{62} - \frac{525\sqrt{119}}{92378}R_{80} + \frac{42\sqrt{85}}{4199}R_{82} - \frac{21\sqrt{374}}{836}R_{84}$ $- \frac{1575\sqrt{3}}{16796}R_{10,0} + \frac{63\sqrt{110}}{4199}R_{10,2} + \frac{567\sqrt{1430}}{33592}R_{10,4}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	5	$- \frac{7\sqrt{35}}{429}I_{21} - \frac{\sqrt{210}}{143}I_{41} - \frac{8\sqrt{13}}{561}I_{61} + \frac{14\sqrt{357}}{2717}I_{81}$ $+ \frac{378\sqrt{55}}{4199}I_{10,1} - \frac{17\sqrt{210}}{3432}R_{20} - \frac{5\sqrt{42}}{286}R_{40} + \frac{5\sqrt{105}}{286}R_{42}$ $- \frac{41\sqrt{546}}{14586}R_{60} + \frac{877\sqrt{130}}{36465}R_{62} - \frac{945\sqrt{714}}{92378}R_{80} - \frac{56\sqrt{510}}{46189}R_{82}$ $+ \frac{2611\sqrt{561}}{92378}R_{84} - \frac{8505\sqrt{2}}{16796}R_{10,0} - \frac{378\sqrt{165}}{4199}R_{10,2}$ $- \frac{189\sqrt{2145}}{16796}R_{10,4}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	5	6	$\frac{5}{39}iI_{21} + \frac{\sqrt{6}}{13}iI_{41} + \frac{8\sqrt{455}}{663}iI_{61} + \frac{98\sqrt{255}}{4199}iI_{81}$ $+ \frac{378\sqrt{77}}{4199}iI_{10,1} + \frac{5\sqrt{6}}{3432}iR_{20} + \frac{\sqrt{30}}{286}iR_{40} - \frac{9\sqrt{3}}{286}iR_{42}$ $- \frac{203\sqrt{390}}{14586}iR_{60} - \frac{335\sqrt{182}}{7293}iR_{62} + \frac{441\sqrt{510}}{92378}iR_{80}$ $- \frac{70\sqrt{714}}{46189}iR_{82} - \frac{245\sqrt{19635}}{92378}iR_{84} + \frac{567\sqrt{70}}{16796}iR_{10,0}$ $+ \frac{126\sqrt{231}}{4199}iR_{10,2} + \frac{63\sqrt{3003}}{16796}iR_{10,4}$

Table B437: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 106 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	1	$\begin{aligned} & \frac{70\sqrt{1023}}{13299}R_{32} + \frac{3\sqrt{2170}}{806}R_{50} - \frac{44\sqrt{93}}{1209}R_{52} - \frac{7\sqrt{31}}{403}R_{54} \\ & + \frac{75\sqrt{14322}}{54808}R_{70} + \frac{1665\sqrt{682}}{602888}R_{72} - \frac{75\sqrt{31}}{1612}R_{74} + \frac{735\sqrt{806}}{54808}R_{76} \\ & + \frac{21\sqrt{453530}}{320416}R_{90} + \frac{21\sqrt{8246}}{54808}R_{92} - \frac{63\sqrt{7657}}{61256}R_{94} \\ & - \frac{343\sqrt{321594}}{1041352}R_{96} - \frac{21\sqrt{911183}}{160208}R_{98} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	2	$\begin{aligned} & \frac{3\sqrt{12586}}{1276}R_{10} + \frac{7\sqrt{5394}}{1131}R_{30} - \frac{280\sqrt{4495}}{29667}R_{32} - \frac{235\sqrt{415338}}{385671}R_{50} \\ & + \frac{335\sqrt{49445}}{385671}R_{52} + \frac{28\sqrt{148335}}{29667}R_{54} + \frac{471\sqrt{62930}}{1589432}R_{70} \\ & + \frac{8991\sqrt{26970}}{17483752}R_{72} - \frac{129\sqrt{148335}}{672452}R_{74} - \frac{1983\sqrt{3856710}}{17483752}R_{76} \\ & + \frac{66255\sqrt{717402}}{664382576}R_{90} + \frac{42\sqrt{39457110}}{3194147}R_{92} - \frac{2653\sqrt{36638745}}{166095644}R_{94} \\ & - \frac{483\sqrt{170980810}}{41523911}R_{96} + \frac{77\sqrt{4360010655}}{30199208}R_{98} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	3	$\begin{aligned} & \frac{18\sqrt{203}}{319}R_{10} - \frac{14\sqrt{87}}{957}R_{30} - \frac{322\sqrt{290}}{12441}R_{32} + \frac{175\sqrt{6699}}{49764}R_{50} \\ & - \frac{\sqrt{3190}}{2262}R_{52} + \frac{181\sqrt{9570}}{49764}R_{54} - \frac{189\sqrt{1015}}{70499}R_{70} - \frac{564\sqrt{435}}{70499}R_{72} \\ & - \frac{123\sqrt{9570}}{70499}R_{74} - \frac{60\sqrt{62205}}{70499}R_{76} - \frac{105\sqrt{11571}}{824296}R_{90} \\ & + \frac{651\sqrt{636405}}{10715848}R_{92} + \frac{14\sqrt{2363790}}{103037}R_{94} + \frac{1743\sqrt{2757755}}{10715848}R_{96} \\ & + \frac{7\sqrt{281291010}}{10715848}R_{98} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	4	$\begin{aligned} & -\frac{3\sqrt{4830}}{1012}iR_{10} - \frac{49\sqrt{230}}{6578}iR_{30} + \frac{175\sqrt{69}}{9867}iR_{32} - \frac{2\sqrt{17710}}{3289}iR_{50} \\ & + \frac{85\sqrt{759}}{9867}iR_{52} - \frac{98\sqrt{253}}{3289}iR_{54} - \frac{105\sqrt{966}}{55913}iR_{70} + \frac{10125\sqrt{46}}{223652}iR_{72} \\ & - \frac{1440\sqrt{253}}{55913}iR_{74} - \frac{15\sqrt{6578}}{20332}iR_{76} - \frac{441\sqrt{30590}}{2124694}iR_{90} \\ & + \frac{4935\sqrt{67298}}{4249388}iR_{92} + \frac{259\sqrt{62491}}{2124694}iR_{94} + \frac{7\sqrt{2624622}}{386308}iR_{96} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	5	$\begin{aligned} & -\frac{15\sqrt{782}}{4301}iR_{10} - \frac{70\sqrt{16422}}{167739}iR_{30} - \frac{28\sqrt{13685}}{55913}iR_{32} - \frac{40\sqrt{25806}}{167739}iR_{50} \\ & + \frac{14\sqrt{150535}}{55913}iR_{52} + \frac{12\sqrt{451605}}{55913}iR_{54} - \frac{420\sqrt{3910}}{950521}iR_{70} \\ & + \frac{1467\sqrt{82110}}{1901042}iR_{72} + \frac{36\sqrt{451605}}{86411}iR_{74} + \frac{15\sqrt{11741730}}{172822}iR_{76} \\ & - \frac{1470\sqrt{44574}}{18059899}iR_{90} + \frac{6027\sqrt{2451570}}{36119798}iR_{92} + \frac{42\sqrt{111546435}}{1389223}iR_{94} \\ & - \frac{147\sqrt{10623470}}{3283618}iR_{96} \end{aligned}$

Table B438: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 107 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	5	$\frac{11}{2}$	6	6	$\begin{aligned} & \frac{3\sqrt{1785}}{187}iR_{10} + \frac{98\sqrt{85}}{2431}iR_{30} + \frac{175\sqrt{102}}{7293}iR_{32} + \frac{8\sqrt{6545}}{2431}iR_{50} \\ & + \frac{40\sqrt{1122}}{7293}iR_{52} + \frac{10\sqrt{374}}{2431}iR_{54} + \frac{420\sqrt{357}}{41327}iR_{70} + \frac{1350\sqrt{17}}{41327}iR_{72} \\ & + \frac{30\sqrt{374}}{3757}iR_{74} - \frac{30\sqrt{2431}}{3757}iR_{76} + \frac{882\sqrt{11305}}{785213}iR_{90} \\ & + \frac{420\sqrt{24871}}{785213}iR_{92} + \frac{35\sqrt{92378}}{60401}iR_{94} + \frac{14\sqrt{969969}}{71383}iR_{96} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	1	$\begin{aligned} & \frac{7\sqrt{33}}{1716}iR_{30} - \frac{7\sqrt{110}}{2860}iR_{32} + \frac{8\sqrt{21}}{663}iR_{50} - \frac{8\sqrt{10}}{1105}iR_{52} \\ & - \frac{8\sqrt{30}}{1105}iR_{54} + \frac{243\sqrt{385}}{46189}iR_{70} - \frac{753\sqrt{165}}{184756}iR_{72} - \frac{48\sqrt{30}}{4199}iR_{74} \\ & - \frac{471\sqrt{195}}{16796}iR_{76} + \frac{12\sqrt{4389}}{4199}iR_{90} - \frac{77\sqrt{1995}}{20995}iR_{92} \\ & - \frac{14\sqrt{7410}}{20995}iR_{94} + \frac{87\sqrt{8645}}{20995}iR_{96} + \frac{99\sqrt{5313}}{14858}iR_{11,0} \\ & - \frac{693\sqrt{20930}}{148580}iR_{11,2} + \frac{147\sqrt{1794}}{29716}iR_{11,4} - \frac{9\sqrt{35581}}{14858}iR_{11,6} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{21\sqrt{22}}{6292}iR_{30} - \frac{203\sqrt{165}}{47190}iR_{32} + \frac{24\sqrt{14}}{2431}iR_{50} - \frac{614\sqrt{15}}{36465}iR_{52} \\ & + \frac{436\sqrt{5}}{12155}iR_{54} + \frac{729\sqrt{2310}}{508079}iR_{70} - \frac{14247\sqrt{110}}{2032316}iR_{72} \\ & + \frac{6516\sqrt{5}}{46189}iR_{74} - \frac{99\sqrt{130}}{16796}iR_{76} + \frac{108\sqrt{2926}}{46189}iR_{90} \\ & - \frac{81\sqrt{1330}}{41990}iR_{92} + \frac{308\sqrt{1235}}{20995}iR_{94} - \frac{23\sqrt{51870}}{41990}iR_{96} \\ & + \frac{81\sqrt{3542}}{14858}iR_{11,0} - \frac{9\sqrt{31395}}{74290}iR_{11,2} - \frac{567\sqrt{299}}{14858}iR_{11,4} \\ & + \frac{3\sqrt{213486}}{14858}iR_{11,6} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	3	$\begin{aligned} & \frac{7\sqrt{55}}{4719}iR_{30} + \frac{203\sqrt{66}}{9438}iR_{32} + \frac{32\sqrt{35}}{7293}iR_{50} + \frac{614\sqrt{6}}{7293}iR_{52} \\ & + \frac{180\sqrt{2}}{2431}iR_{54} + \frac{1620\sqrt{231}}{508079}iR_{70} + \frac{71235\sqrt{11}}{1016158}iR_{72} \\ & + \frac{180\sqrt{2}}{2717}iR_{74} + \frac{495\sqrt{13}}{8398}iR_{76} + \frac{48\sqrt{7315}}{46189}iR_{90} + \frac{81\sqrt{133}}{4199}iR_{92} \\ & + \frac{23\sqrt{5187}}{4199}iR_{96} + \frac{18\sqrt{8855}}{7429}iR_{11,0} + \frac{9\sqrt{12558}}{14858}iR_{11,2} \\ & - \frac{63\sqrt{2990}}{7429}iR_{11,4} - \frac{3\sqrt{533715}}{7429}iR_{11,6} \end{aligned}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	4	$\begin{aligned} & -\frac{7\sqrt{66}}{4290}R_{32} - \frac{24\sqrt{35}}{1105}R_{50} + \frac{2\sqrt{6}}{39}R_{52} + \frac{4\sqrt{2}}{1105}R_{54} \\ & + \frac{15\sqrt{231}}{16796}R_{70} + \frac{3609\sqrt{11}}{184756}R_{72} + \frac{525\sqrt{2}}{16796}R_{74} - \frac{321\sqrt{13}}{16796}R_{76} \\ & + \frac{9\sqrt{7315}}{6460}R_{90} + \frac{29\sqrt{133}}{4199}R_{92} - \frac{511\sqrt{494}}{41990}R_{94} - \frac{121\sqrt{5187}}{20995}R_{96} \\ & + \frac{7\sqrt{58786}}{6460}R_{98} + \frac{117\sqrt{8855}}{237728}R_{11,0} + \frac{39\sqrt{12558}}{69920}R_{11,2} \\ & + \frac{63\sqrt{2990}}{594320}R_{11,4} + \frac{33\sqrt{533715}}{1188640}R_{11,6} + \frac{147\sqrt{4056234}}{1188640}R_{11,8} \\ & + \frac{777\sqrt{1448655}}{1188640}R_{11,10} \end{aligned}$

Table B439: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 108 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	5	$-\frac{805\sqrt{11930}}{682396}R_{30} + \frac{77\sqrt{3579}}{35790}R_{32} + \frac{326\sqrt{918610}}{14500915}R_{50}$ $+ \frac{538\sqrt{39369}}{790959}R_{52} - \frac{1984\sqrt{13123}}{1115455}R_{54} - \frac{11145\sqrt{50106}}{440827816}R_{70}$ $- \frac{112887\sqrt{2386}}{40075256}R_{72} + \frac{375\sqrt{13123}}{16954916}R_{74} + \frac{251133\sqrt{341198}}{440827816}R_{76}$ $+ \frac{9159\sqrt{1586690}}{200376280}R_{90} + \frac{11\sqrt{3490718}}{770678}R_{92} - \frac{133\sqrt{3241381}}{2636530}R_{94}$ $- \frac{347\sqrt{136138002}}{50094070}R_{96} - \frac{2213\sqrt{385724339}}{100188140}R_{98} + \frac{30987\sqrt{1920730}}{283609504}R_{11,0}$ $+ \frac{24483\sqrt{82399317}}{709023760}R_{11,2} + \frac{27783\sqrt{19618885}}{354511880}R_{11,4} + \frac{4653\sqrt{14007883890}}{1418047520}R_{11,6}$ $+ \frac{1527\sqrt{26614979391}}{709023760}R_{11,8} + \frac{21\sqrt{38021399130}}{83414560}R_{11,10}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	6	$\frac{1883\sqrt{64547265}}{568015932}R_{30} - \frac{25375\sqrt{8606302}}{671291556}R_{32} + \frac{1864\sqrt{4970139405}}{31382880243}R_{50}$ $+ \frac{89396\sqrt{94669322}}{31382880243}R_{52} + \frac{129088\sqrt{284007966}}{31382880243}R_{54} - \frac{27017415\sqrt{30122057}}{1590065932312}R_{70}$ $+ \frac{7672905\sqrt{12909453}}{144551448392}R_{72} - \frac{8237025\sqrt{284007966}}{1590065932312}R_{74} - \frac{1706355\sqrt{1846051779}}{1590065932312}R_{76}$ $- \frac{11919\sqrt{8584786245}}{5559671092}R_{90} - \frac{28311\sqrt{18886529739}}{36137862098}R_{92} + \frac{1981\sqrt{70149967602}}{2779835546}R_{94}$ $- \frac{28779\sqrt{81841628869}}{36137862098}R_{96} + \frac{3617\sqrt{8347846144638}}{72275724196}R_{98} + \frac{293535\sqrt{10392109665}}{127872435116}R_{11,0}$ $+ \frac{560493\sqrt{198142890946}}{511489740464}R_{11,2} + \frac{92547\sqrt{424591909170}}{127872435116}R_{11,4}$ $+ \frac{2871\sqrt{8421072865205}}{30087631792}R_{11,6} - \frac{1269\sqrt{64000153775558}}{127872435116}R_{11,8}$ $- \frac{17577\sqrt{22857197776985}}{511489740464}R_{11,10}$
$\frac{9}{2}$	5	5	$\frac{13}{2}$	6	7	$\frac{175\sqrt{3094806}}{3094806}R_{30} + \frac{21\sqrt{2579005}}{515801}R_{32} - \frac{55\sqrt{1969422}}{4782882}R_{50}$ $- \frac{30\sqrt{234455}}{61319}R_{52} - \frac{63\sqrt{703365}}{797147}R_{54} + \frac{13653\sqrt{36106070}}{666414892}R_{70}$ $+ \frac{801\sqrt{15474030}}{51262684}R_{72} + \frac{10923\sqrt{703365}}{30291586}R_{74} + \frac{339\sqrt{108210}}{4660244}R_{76}$ $- \frac{35\sqrt{411609198}}{30291586}R_{90} - \frac{545\sqrt{187095090}}{30291586}R_{92} - \frac{504\sqrt{1027995}}{1165061}R_{94}$ $- \frac{77\sqrt{4797310}}{2330122}R_{96} - \frac{5\sqrt{122331405}}{1165061}R_{98} + \frac{3675\sqrt{498263766}}{214371224}R_{11,0}$ $+ \frac{20673\sqrt{2903635}}{53592806}R_{11,2} + \frac{44205\sqrt{248883}}{53592806}R_{11,4} + \frac{4935\sqrt{19744718}}{107185612}R_{11,6}$ $+ \frac{531\sqrt{937874105}}{107185612}R_{11,8} + \frac{1575\sqrt{53592806}}{107185612}R_{11,10}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	1	$-\frac{5\sqrt{30}}{416}I_{21} + \frac{3\sqrt{5}}{13}I_{41} - \frac{35\sqrt{546}}{3536}I_{61} + \frac{25\sqrt{1365}}{1768}I_{63}$ $- \frac{105\sqrt{34}}{323}I_{81} - \frac{35\sqrt{39270}}{4199}I_{83} + \frac{213\sqrt{2310}}{67184}I_{10,1} - \frac{27\sqrt{5005}}{134368}I_{10,3}$ $- \frac{2043\sqrt{1001}}{134368}I_{10,5} + R_{00} - \frac{5\sqrt{5}}{13}R_{20} + \frac{6}{13}R_{40}$ $- \frac{10\sqrt{13}}{221}R_{60} + \frac{35\sqrt{17}}{4199}R_{80} - \frac{3\sqrt{21}}{4199}R_{10,0}$

Table B440: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 109 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	2	$ \begin{aligned} & -\frac{45\sqrt{330}}{4576}I_{21} + \frac{3\sqrt{55}}{26}I_{41} - \frac{75\sqrt{6006}}{38896}I_{61} + \frac{5\sqrt{15015}}{1496}I_{63} \\ & + \frac{525\sqrt{374}}{184756}I_{81} + \frac{35\sqrt{3570}}{16796}I_{83} - \frac{579\sqrt{210}}{67184}I_{10,1} \\ & - \frac{99\sqrt{455}}{134368}I_{10,3} + \frac{6237\sqrt{91}}{134368}I_{10,5} + \frac{6\sqrt{231}}{221}R_{10,0} \\ & + \frac{3\sqrt{70}}{221}R_{10,2} + \frac{3\sqrt{910}}{221}R_{10,4} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	3	$ \begin{aligned} & \frac{375\sqrt{22}}{4576}I_{21} - \frac{5\sqrt{33}}{143}I_{41} + \frac{45\sqrt{10010}}{38896}I_{61} + \frac{125\sqrt{1001}}{19448}I_{63} \\ & - \frac{105\sqrt{5610}}{46189}I_{81} + \frac{35\sqrt{238}}{4199}I_{83} - \frac{2871\sqrt{14}}{67184}I_{10,1} \\ & + \frac{81\sqrt{273}}{7072}I_{10,3} + \frac{231\sqrt{1365}}{134368}I_{10,5} + \frac{105\sqrt{2805}}{46189}R_{80} \\ & - \frac{160\sqrt{3927}}{46189}R_{82} + \frac{10\sqrt{3570}}{4199}R_{84} - \frac{189\sqrt{385}}{4199}R_{10,0} \\ & - \frac{1152\sqrt{42}}{4199}R_{10,2} - \frac{18\sqrt{546}}{323}R_{10,4} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	4	$ \begin{aligned} & \frac{175\sqrt{66}}{4576}I_{21} - \frac{63\sqrt{11}}{286}I_{41} + \frac{5\sqrt{30030}}{38896}I_{61} + \frac{5\sqrt{3003}}{19448}I_{63} \\ & - \frac{4515\sqrt{1870}}{184756}I_{81} - \frac{385\sqrt{714}}{16796}I_{83} + \frac{657\sqrt{42}}{67184}I_{10,1} \\ & - \frac{2655\sqrt{91}}{134368}I_{10,3} + \frac{909\sqrt{455}}{134368}I_{10,5} + \frac{15\sqrt{11}}{143}R_{20} \\ & + \frac{18\sqrt{22}}{143}R_{42} - \frac{20\sqrt{3003}}{2431}R_{62} + \frac{210\sqrt{1309}}{46189}R_{82} - \frac{27\sqrt{14}}{4199}R_{10,2} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	5	$ \begin{aligned} & -\frac{225\sqrt{11}}{2288}I_{21} - \frac{4\sqrt{66}}{143}I_{41} - \frac{75\sqrt{5005}}{19448}I_{61} - \frac{35\sqrt{2002}}{19448}I_{63} \\ & - \frac{490\sqrt{2805}}{46189}I_{81} - \frac{70\sqrt{119}}{4199}I_{83} - \frac{711\sqrt{7}}{33592}I_{10,1} - \frac{69\sqrt{546}}{134368}I_{10,3} \\ & + \frac{207\sqrt{2730}}{134368}I_{10,5} + \frac{\sqrt{330}}{143}R_{40} - \frac{4\sqrt{33}}{143}R_{42} + \frac{35\sqrt{4290}}{2431}R_{60} \\ & + \frac{80\sqrt{2002}}{2431}R_{62} + \frac{35\sqrt{1785}}{4199}R_{84} - \frac{21\sqrt{273}}{4199}R_{10,4} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	5	6	$ \begin{aligned} & -\frac{15\sqrt{385}}{2288}iI_{21} - \frac{\sqrt{2310}}{286}iI_{41} - \frac{15\sqrt{143}}{1144}iI_{61} + \frac{5\sqrt{1430}}{19448}iI_{63} \\ & - \frac{35\sqrt{3927}}{7106}iI_{81} + \frac{35\sqrt{85}}{8398}iI_{83} - \frac{2079\sqrt{5}}{33592}iI_{10,1} + \frac{1155\sqrt{390}}{134368}iI_{10,3} \\ & - \frac{525\sqrt{78}}{134368}iI_{10,5} - \frac{2\sqrt{1430}}{221}iR_{62} + \frac{140\sqrt{7854}}{46189}iR_{80} \\ & + \frac{35\sqrt{5610}}{46189}iR_{82} - \frac{420\sqrt{51}}{4199}iR_{84} + \frac{630\sqrt{22}}{4199}iR_{10,0} \\ & + \frac{1302\sqrt{15}}{4199}iR_{10,2} + \frac{210\sqrt{195}}{4199}iR_{10,4} \end{aligned} $

Table B441: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 110 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	1	$ \begin{aligned} & -\frac{\sqrt{186}}{104}R_{10} + \frac{\sqrt{434}}{104}R_{30} + \frac{\sqrt{3255}}{1612}R_{32} - \frac{5\sqrt{682}}{884}R_{50} \\ & -\frac{5\sqrt{35805}}{13702}R_{52} + \frac{15\sqrt{11935}}{13702}R_{54} + \frac{35\sqrt{930}}{16796}R_{70} + \frac{315\sqrt{2170}}{260338}R_{72} \\ & -\frac{525\sqrt{11935}}{260338}R_{74} + \frac{105\sqrt{310310}}{260338}R_{76} - \frac{15\sqrt{1178}}{33592}R_{90} \\ & -\frac{45\sqrt{64790}}{520676}R_{92} + \frac{45\sqrt{2947945}}{520676}R_{94} - \frac{105\sqrt{2526810}}{520676}R_{96} \\ & + \frac{45\sqrt{7159295}}{520676}R_{98} + \frac{33\sqrt{1426}}{772616}R_{11,0} + \frac{33\sqrt{1529385}}{11975548}R_{11,2} \\ & -\frac{495\sqrt{713713}}{11975548}R_{11,4} + \frac{231\sqrt{10399818}}{5987774}R_{11,6} - \frac{99\sqrt{493991355}}{11975548}R_{11,8} \\ & + \frac{33\sqrt{1383175794}}{11975548}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	2	$ \begin{aligned} & \frac{3\sqrt{69223}}{8866}R_{32} - \frac{15\sqrt{6293}}{6851}R_{52} - \frac{30\sqrt{18879}}{198679}R_{54} + \frac{315\sqrt{415338}}{1431859}R_{72} \\ & + \frac{1050\sqrt{18879}}{3774901}R_{74} + \frac{875\sqrt{490854}}{3774901}R_{76} - \frac{45\sqrt{102486}}{260338}R_{92} \\ & - \frac{45\sqrt{4663113}}{3774901}R_{94} - \frac{2625\sqrt{444106}}{7549802}R_{96} - \frac{30\sqrt{11324703}}{222053}R_{98} \\ & + \frac{99\sqrt{268801}}{5987774}R_{11,2} + \frac{99\sqrt{28224105}}{86822723}R_{11,4} + \frac{1155\sqrt{45696170}}{86822723}R_{11,6} \\ & + \frac{198\sqrt{86822723}}{5107219}R_{11,8} - \frac{99\sqrt{6077590610}}{9139234}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	3	$ \begin{aligned} & -\frac{35\sqrt{1218}}{6409}R_{54} + \frac{1225\sqrt{1218}}{121771}R_{74} + \frac{350\sqrt{7917}}{121771}R_{76} - \frac{105\sqrt{300846}}{243542}R_{94} \\ & - \frac{525\sqrt{7163}}{121771}R_{96} - \frac{15\sqrt{730626}}{121771}R_{98} + \frac{231\sqrt{1820910}}{5601466}R_{11,4} \\ & + \frac{462\sqrt{737035}}{2800733}R_{11,6} + \frac{99\sqrt{5601466}}{2800733}R_{11,8} + \frac{198\sqrt{98025655}}{2800733}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	4	$ \begin{aligned} & \frac{\sqrt{1518}}{1144}iR_{10} + \frac{47\sqrt{3542}}{26312}iR_{30} + \frac{9\sqrt{26565}}{13156}iR_{32} + \frac{395\sqrt{46}}{20332}iR_{50} \\ & + \frac{45\sqrt{2415}}{10166}iR_{52} - \frac{15\sqrt{805}}{10166}iR_{54} + \frac{875\sqrt{7590}}{4249388}iR_{70} \\ & + \frac{105\sqrt{17710}}{55913}iR_{72} + \frac{525\sqrt{805}}{193154}iR_{74} - \frac{105\sqrt{20930}}{96577}iR_{76} \\ & + \frac{9465\sqrt{9614}}{33995104}iR_{90} - \frac{1395\sqrt{4370}}{772616}iR_{92} + \frac{675\sqrt{198835}}{772616}iR_{94} \\ & - \frac{15\sqrt{170430}}{33592}iR_{96} - \frac{135\sqrt{482885}}{1545232}iR_{98} - \frac{825\sqrt{22}}{6180928}iR_{11,0} \\ & + \frac{495\sqrt{195}}{162656}iR_{11,2} - \frac{29997\sqrt{91}}{1545232}iR_{11,4} + \frac{58575\sqrt{1326}}{6180928}iR_{11,6} \\ & - \frac{2871\sqrt{62985}}{3090464}iR_{11,8} + \frac{33\sqrt{176358}}{363584}iR_{11,10} \end{aligned} $

Table B442: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 111 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	5	$\begin{aligned} & \frac{7\sqrt{129030}}{78936}iR_{30} - \frac{7\sqrt{4301}}{13156}iR_{32} + \frac{275\sqrt{82110}}{1036932}iR_{50} + \frac{335\sqrt{391}}{86411}iR_{52} \\ & - \frac{905\sqrt{1173}}{172822}iR_{54} + \frac{4305\sqrt{60214}}{18059899}iR_{70} + \frac{52395\sqrt{25806}}{72239596}iR_{72} \\ & + \frac{140\sqrt{1173}}{1641809}iR_{74} - \frac{8435\sqrt{30498}}{6567236}iR_{76} - \frac{4665\sqrt{17160990}}{105075776}iR_{90} \\ & + \frac{17205\sqrt{312018}}{26268944}iR_{92} - \frac{5145\sqrt{289731}}{26268944}iR_{94} + \frac{15\sqrt{1352078}}{1142128}iR_{96} \\ & - \frac{1095\sqrt{119301}}{3090464}iR_{98} + \frac{5907\sqrt{39270}}{8082752}iR_{11,0} - \frac{644193\sqrt{1547}}{52537888}iR_{11,2} \\ & + \frac{329637\sqrt{3315}}{26268944}iR_{11,4} - \frac{110847\sqrt{910}}{6180928}iR_{11,6} + \frac{15543\sqrt{1729}}{3090464}iR_{11,8} \\ & - \frac{7623\sqrt{2470}}{6180928}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	1	$\frac{11}{2}$	6	6	$\begin{aligned} & \frac{315\sqrt{17}}{30056}iR_{50} - \frac{15\sqrt{3570}}{15028}iR_{52} + \frac{15\sqrt{1190}}{30056}iR_{54} + \frac{105\sqrt{2805}}{142766}iR_{70} \\ & + \frac{105\sqrt{6545}}{71383}iR_{72} - \frac{1155\sqrt{1190}}{142766}iR_{74} + \frac{105\sqrt{7735}}{71383}iR_{76} \\ & - \frac{105\sqrt{3553}}{43928}iR_{90} + \frac{585\sqrt{1615}}{87856}iR_{92} + \frac{45\sqrt{293930}}{571064}iR_{94} \\ & - \frac{1605\sqrt{62985}}{1142128}iR_{96} + \frac{135\sqrt{2470}}{33592}iR_{98} - \frac{18249\sqrt{4301}}{2020688}iR_{11,0} \\ & + \frac{54615\sqrt{152490}}{26268944}iR_{11,2} - \frac{7821\sqrt{71162}}{13134472}iR_{11,4} - \frac{1947\sqrt{897}}{1545232}iR_{11,6} \\ & - \frac{363\sqrt{170430}}{1545232}iR_{11,8} + \frac{363\sqrt{119301}}{1545232}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	1	$\begin{aligned} & -\frac{24\sqrt{5}}{65}iR_{10} - \frac{2\sqrt{105}}{65}iR_{30} - \frac{7\sqrt{14}}{52}iR_{32} - \frac{2\sqrt{165}}{221}iR_{50} \\ & - \frac{5\sqrt{154}}{221}iR_{52} - \frac{525}{16796}iR_{70} - \frac{135\sqrt{21}}{16796}iR_{72} - \frac{15\sqrt{462}}{1292}iR_{74} \\ & + \frac{75\sqrt{3003}}{16796}iR_{76} - \frac{21\sqrt{285}}{67184}iR_{90} - \frac{11\sqrt{627}}{16796}iR_{92} \\ & + \frac{7\sqrt{114114}}{33592}iR_{94} - \frac{87\sqrt{2717}}{16796}iR_{96} + \frac{31\sqrt{277134}}{67184}iR_{98} \\ & - \frac{693\sqrt{345}}{30904640}iR_{11,0} - \frac{15\sqrt{6578}}{6180928}iR_{11,2} - \frac{3\sqrt{690690}}{181792}iR_{11,4} \\ & + \frac{3987\sqrt{279565}}{30904640}iR_{11,6} - \frac{579\sqrt{2124694}}{6180928}iR_{11,8} + \frac{477\sqrt{37182145}}{30904640}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	2	$\begin{aligned} & -\frac{11\sqrt{30}}{520}iR_{10} - \frac{87\sqrt{70}}{2860}iR_{30} - \frac{31\sqrt{21}}{286}iR_{32} - \frac{177\sqrt{110}}{9724}iR_{50} \\ & - \frac{155\sqrt{231}}{4862}iR_{52} - \frac{15\sqrt{77}}{286}iR_{54} - \frac{7175\sqrt{6}}{369512}iR_{70} - \frac{16905\sqrt{14}}{369512}iR_{72} \\ & - \frac{735\sqrt{77}}{16796}iR_{74} - \frac{1575\sqrt{2002}}{369512}iR_{76} - \frac{801\sqrt{190}}{268736}iR_{90} \\ & + \frac{2619\sqrt{418}}{739024}iR_{92} - \frac{603\sqrt{19019}}{739024}iR_{94} - \frac{1179\sqrt{16302}}{739024}iR_{96} \\ & + \frac{81\sqrt{46189}}{1478048}iR_{98} + \frac{297\sqrt{230}}{7726160}iR_{11,0} - \frac{375\sqrt{9867}}{772616}iR_{11,2} \\ & + \frac{9\sqrt{115115}}{22724}iR_{11,4} - \frac{801\sqrt{1677390}}{7726160}iR_{11,6} - \frac{3\sqrt{3187041}}{772616}iR_{11,8} \\ & + \frac{9\sqrt{223092870}}{7726160}iR_{11,10} \end{aligned}$

Table B443: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 112 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	3	$ \begin{aligned} & -\frac{15\sqrt{7}}{1144}iR_{30} + \frac{3\sqrt{210}}{1144}iR_{32} - \frac{105\sqrt{11}}{4862}iR_{50} - \frac{5\sqrt{2310}}{2431}iR_{52} \\ & + \frac{35\sqrt{770}}{4862}iR_{54} - \frac{945\sqrt{15}}{739024}iR_{70} - \frac{21315\sqrt{35}}{739024}iR_{72} \\ & - \frac{105\sqrt{770}}{67184}iR_{74} + \frac{2835\sqrt{5005}}{739024}iR_{76} - \frac{225\sqrt{19}}{67184}iR_{90} \\ & + \frac{489\sqrt{1045}}{184756}iR_{92} - \frac{243\sqrt{190190}}{369512}iR_{94} + \frac{111\sqrt{40755}}{184756}iR_{96} \\ & + \frac{141\sqrt{461890}}{739024}iR_{98} - \frac{4653\sqrt{23}}{118864}iR_{11,0} + \frac{2853\sqrt{98670}}{3090464}iR_{11,2} \\ & - \frac{105\sqrt{46046}}{386308}iR_{11,4} - \frac{1317\sqrt{167739}}{3090464}iR_{11,6} + \frac{3\sqrt{31870410}}{118864}iR_{11,8} \\ & - \frac{3\sqrt{22309287}}{3090464}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	4	$ \begin{aligned} & \frac{15\sqrt{3}}{52}R_{10} - \frac{15\sqrt{7}}{52}R_{30} + \frac{7\sqrt{210}}{780}R_{32} + \frac{75\sqrt{11}}{442}R_{50} \\ & - \frac{7\sqrt{2310}}{1326}R_{52} + \frac{9\sqrt{770}}{2210}R_{54} - \frac{525\sqrt{15}}{8398}R_{70} + \frac{147\sqrt{35}}{4199}R_{72} \\ & - \frac{63\sqrt{770}}{8398}R_{74} - \frac{3\sqrt{5005}}{4199}R_{76} + \frac{225\sqrt{19}}{16796}R_{90} - \frac{21\sqrt{1045}}{8398}R_{92} \\ & + \frac{27\sqrt{190190}}{83980}R_{94} + \frac{3\sqrt{40755}}{8398}R_{96} - \frac{5\sqrt{461890}}{16796}R_{98} \\ & - \frac{495\sqrt{23}}{386308}R_{11,0} + \frac{77\sqrt{98670}}{1931540}R_{11,2} - \frac{297\sqrt{46046}}{1931540}R_{11,4} \\ & - \frac{33\sqrt{167739}}{482885}R_{11,6} + \frac{11\sqrt{31870410}}{386308}R_{11,8} - \frac{27\sqrt{22309287}}{965770}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	5	$ \begin{aligned} & -\frac{\sqrt{1377915}}{4290}R_{32} + \frac{\sqrt{125265}}{663}R_{52} + \frac{1134\sqrt{41755}}{1318265}R_{54} - \frac{21\sqrt{918610}}{46189}R_{72} \\ & - \frac{7938\sqrt{41755}}{5009407}R_{74} - \frac{453\sqrt{1085630}}{5009407}R_{76} + \frac{3\sqrt{226670}}{8398}R_{92} \\ & + \frac{1701\sqrt{10313485}}{25047035}R_{94} + \frac{453\sqrt{8840130}}{10018814}R_{96} - \frac{10\sqrt{25047035}}{263653}R_{98} \\ & - \frac{11\sqrt{5350605}}{965770}R_{11,2} - \frac{18711\sqrt{2496949}}{576081805}R_{11,4} - \frac{4983\sqrt{36384114}}{576081805}R_{11,6} \\ & + \frac{22\sqrt{1728245415}}{6064019}R_{11,8} + \frac{2673\sqrt{4839087162}}{1152163610}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	6	$ \begin{aligned} & \frac{2\sqrt{903661710}}{263653}R_{54} - \frac{70\sqrt{903661710}}{5009407}R_{74} + \frac{660\sqrt{5873801115}}{18068931049}R_{76} \\ & + \frac{3\sqrt{223204442370}}{5009407}R_{94} - \frac{990\sqrt{5314391485}}{18068931049}R_{96} + \frac{7170\sqrt{542067931470}}{18068931049}R_{98} \\ & - \frac{33\sqrt{54038970258}}{115216361}R_{11,4} + \frac{4356\sqrt{21872916533}}{415585414127}R_{11,6} - \frac{47322\sqrt{4155854141270}}{415585414127}R_{11,8} \\ & + \frac{396\sqrt{2909097898889}}{415585414127}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	1	$\frac{13}{2}$	6	7	$ \begin{aligned} & -\frac{300\sqrt{1666434}}{1165061}R_{76} + \frac{450\sqrt{1507726}}{1165061}R_{96} + \frac{40\sqrt{38447013}}{1165061}R_{98} \\ & - \frac{396\sqrt{155137070}}{26796403}R_{11,6} - \frac{264\sqrt{294760433}}{26796403}R_{11,8} - \frac{36\sqrt{20633230310}}{26796403}R_{11,10} \end{aligned} $

Table B444: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 113 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	2	$\frac{335\sqrt{30}}{4576}I_{21} - \frac{54\sqrt{5}}{143}I_{41} - \frac{415\sqrt{546}}{38896}I_{61} + \frac{45\sqrt{1365}}{19448}I_{63}$ $- \frac{3045\sqrt{34}}{92378}I_{81} - \frac{315\sqrt{39270}}{92378}I_{83} - \frac{333\sqrt{2310}}{67184}I_{10,1}$ $+ \frac{387\sqrt{5005}}{134368}I_{10,3} + \frac{1827\sqrt{1001}}{134368}I_{10,5} + R_{00} - \frac{25\sqrt{5}}{143}R_{20}$ $- \frac{54}{143}R_{40} + \frac{310\sqrt{13}}{2431}R_{60} - \frac{2135\sqrt{17}}{46189}R_{80} + \frac{27\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	3	$- \frac{1665\sqrt{2}}{4576}I_{21} - \frac{69\sqrt{3}}{286}I_{41} - \frac{75\sqrt{910}}{38896}I_{61} + \frac{245\sqrt{91}}{19448}I_{63}$ $- \frac{245\sqrt{510}}{184756}I_{81} - \frac{805\sqrt{2618}}{184756}I_{83} - \frac{189\sqrt{154}}{67184}I_{10,1}$ $+ \frac{21\sqrt{3003}}{10336}I_{10,3} + \frac{189\sqrt{15015}}{134368}I_{10,5} + \frac{45\sqrt{3}}{143}R_{20}$ $+ \frac{2\sqrt{6}}{11}R_{42} + \frac{60\sqrt{91}}{2431}R_{62} - \frac{70\sqrt{357}}{3553}R_{82} + \frac{21\sqrt{462}}{4199}R_{10,2}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	4	$\frac{1035\sqrt{6}}{4576}I_{21} - \frac{12}{143}I_{41} - \frac{15\sqrt{2730}}{2288}I_{61} + \frac{305\sqrt{273}}{19448}I_{63}$ $+ \frac{5145\sqrt{170}}{92378}I_{81} + \frac{35\sqrt{7854}}{5434}I_{83} + \frac{303\sqrt{462}}{67184}I_{10,1}$ $- \frac{369\sqrt{1001}}{134368}I_{10,3} - \frac{189\sqrt{5005}}{134368}I_{10,5} + \frac{945\sqrt{85}}{46189}R_{80}$ $- \frac{1440\sqrt{119}}{46189}R_{82} + \frac{90\sqrt{13090}}{46189}R_{84} + \frac{231\sqrt{105}}{4199}R_{10,0}$ $+ \frac{384\sqrt{154}}{4199}R_{10,2} + \frac{6\sqrt{2002}}{323}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	5	$- \frac{705}{2288}I_{21} + \frac{9\sqrt{6}}{286}I_{41} - \frac{315\sqrt{455}}{19448}I_{61} + \frac{285\sqrt{182}}{19448}I_{63}$ $+ \frac{3885\sqrt{255}}{92378}I_{81} + \frac{105\sqrt{1309}}{7106}I_{83} + \frac{603\sqrt{77}}{33592}I_{10,1}$ $- \frac{111\sqrt{6006}}{134368}I_{10,3} - \frac{147\sqrt{30030}}{134368}I_{10,5} - \frac{10\sqrt{182}}{221}R_{62}$ $+ \frac{140\sqrt{510}}{46189}R_{80} + \frac{25\sqrt{714}}{46189}R_{82} - \frac{60\sqrt{19635}}{46189}R_{84} - \frac{594\sqrt{70}}{4199}R_{10,0}$ $- \frac{558\sqrt{231}}{4199}R_{10,2} - \frac{90\sqrt{3003}}{4199}R_{10,4}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	5	6	$\frac{45\sqrt{35}}{2288}iI_{21} - \frac{9\sqrt{210}}{143}iI_{41} + \frac{1605\sqrt{13}}{19448}iI_{61} + \frac{265\sqrt{130}}{19448}iI_{63}$ $+ \frac{490\sqrt{357}}{46189}iI_{81} + \frac{350\sqrt{935}}{46189}iI_{83} + \frac{567\sqrt{55}}{33592}iI_{10,1}$ $+ \frac{21\sqrt{4290}}{134368}iI_{10,3} - \frac{315\sqrt{858}}{134368}iI_{10,5} + \frac{5\sqrt{42}}{143}iR_{40}$ $- \frac{4\sqrt{105}}{143}iR_{42} + \frac{5\sqrt{546}}{187}iR_{60} + \frac{16\sqrt{130}}{187}iR_{62} - \frac{35\sqrt{561}}{2717}iR_{84}$ $+ \frac{21\sqrt{2145}}{4199}iR_{10,4}$

Table B445: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 114 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	1	$\begin{aligned} & \frac{9\sqrt{2046}}{35464}R_{10} + \frac{\sqrt{4774}}{35464}R_{30} + \frac{7\sqrt{35805}}{17732}R_{32} - \frac{95\sqrt{62}}{27404}R_{50} \\ & - \frac{5\sqrt{3255}}{13702}R_{52} + \frac{75\sqrt{1085}}{13702}R_{54} + \frac{1575\sqrt{10230}}{5727436}R_{70} \\ & - \frac{2415\sqrt{23870}}{2863718}R_{72} + \frac{105\sqrt{1085}}{260338}R_{74} + \frac{315\sqrt{28210}}{260338}R_{76} \\ & - \frac{1185\sqrt{12958}}{11454872}R_{90} + \frac{45\sqrt{5890}}{27404}R_{92} - \frac{315\sqrt{267995}}{520676}R_{94} \\ & + \frac{15\sqrt{229710}}{40052}R_{96} + \frac{45\sqrt{650845}}{520676}R_{98} + \frac{363\sqrt{15686}}{23951096}R_{11,0} \\ & - \frac{1089\sqrt{139035}}{11975548}R_{11,2} + \frac{7623\sqrt{64883}}{11975548}R_{11,4} - \frac{1815\sqrt{945438}}{5987774}R_{11,6} \\ & + \frac{363\sqrt{44908305}}{11975548}R_{11,8} + \frac{33\sqrt{125743254}}{386308}R_{11,10} \end{aligned}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	2	$\begin{aligned} & - \frac{513\sqrt{8990}}{514228}R_{10} - \frac{19\sqrt{188790}}{514228}R_{30} - \frac{238\sqrt{6293}}{128557}R_{32} + \frac{1805\sqrt{296670}}{4370938}R_{50} \\ & + \frac{20\sqrt{69223}}{128557}R_{52} + \frac{625\sqrt{207669}}{2185469}R_{54} - \frac{23625\sqrt{1798}}{4370938}R_{70} \\ & + \frac{3220\sqrt{37758}}{2442583}R_{72} + \frac{875\sqrt{207669}}{41523911}R_{74} - \frac{630\sqrt{5399394}}{41523911}R_{76} \\ & + \frac{1185\sqrt{512430}}{8741876}R_{90} - \frac{30\sqrt{1127346}}{128557}R_{92} - \frac{2625\sqrt{51294243}}{83047822}R_{94} \\ & - \frac{45\sqrt{4885166}}{3194147}R_{96} + \frac{45\sqrt{124571733}}{2863718}R_{98} - \frac{363\sqrt{620310}}{18278468}R_{11,0} \\ & + \frac{198\sqrt{2956811}}{5107219}R_{11,2} + \frac{1155\sqrt{310465155}}{173645446}R_{11,4} + \frac{198\sqrt{502657870}}{86822723}R_{11,6} \\ & + \frac{99\sqrt{955049953}}{5987774}R_{11,8} \end{aligned}$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	3	$\begin{aligned} & \frac{27\sqrt{145}}{4147}R_{10} + \frac{\sqrt{3045}}{4147}R_{30} - \frac{7\sqrt{406}}{4147}R_{32} - \frac{190\sqrt{4785}}{70499}R_{50} \\ & + \frac{10\sqrt{4466}}{70499}R_{52} + \frac{125\sqrt{13398}}{70499}R_{54} + \frac{47250\sqrt{29}}{1339481}R_{70} \\ & + \frac{3220\sqrt{609}}{1339481}R_{72} + \frac{175\sqrt{13398}}{1339481}R_{74} - \frac{1470\sqrt{87087}}{1339481}R_{76} \\ & - \frac{1185\sqrt{8265}}{1339481}R_{90} - \frac{30\sqrt{18183}}{70499}R_{92} - \frac{525\sqrt{3309306}}{2678962}R_{94} \\ & - \frac{105\sqrt{78793}}{103037}R_{96} + \frac{363\sqrt{10005}}{2800733}R_{11,0} + \frac{99\sqrt{190762}}{2800733}R_{11,2} \\ & + \frac{231\sqrt{20030010}}{5601466}R_{11,4} + \frac{462\sqrt{8107385}}{2800733}R_{11,6} \end{aligned}$

Table B446: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 115 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{81\sqrt{138}}{26312}iR_{10} - \frac{9\sqrt{322}}{26312}iR_{30} - \frac{35\sqrt{2415}}{13156}iR_{32} + \frac{855\sqrt{506}}{223652}iR_{50} \\ & + \frac{25\sqrt{26565}}{111826}iR_{52} - \frac{75\sqrt{8855}}{111826}iR_{54} - \frac{14175\sqrt{690}}{4249388}iR_{70} \\ & + \frac{525\sqrt{1610}}{92378}iR_{72} - \frac{105\sqrt{8855}}{2124694}iR_{74} + \frac{945\sqrt{230230}}{2124694}iR_{76} \\ & - \frac{160995\sqrt{874}}{16997552}iR_{90} + \frac{2835\sqrt{48070}}{2124694}iR_{92} - \frac{225\sqrt{2187185}}{2124694}iR_{94} \\ & + \frac{210\sqrt{1874730}}{1062347}iR_{96} + \frac{45\sqrt{5311735}}{653752}iR_{98} + \frac{1498101\sqrt{2}}{6180928}iR_{11,0} \\ & - \frac{6699\sqrt{2145}}{3090464}iR_{11,2} - \frac{2673\sqrt{1001}}{118864}iR_{11,4} + \frac{22407\sqrt{14586}}{6180928}iR_{11,6} \\ & + \frac{33\sqrt{692835}}{181792}iR_{11,8} - \frac{231\sqrt{1939938}}{6180928}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	5	$ \begin{aligned} & \frac{105\sqrt{27370}}{223652}iR_{10} + \frac{1505\sqrt{11730}}{1341912}iR_{30} + \frac{2359\sqrt{391}}{223652}iR_{32} \\ & + \frac{25\sqrt{903210}}{1036932}iR_{50} + \frac{20\sqrt{4301}}{950521}iR_{52} + \frac{75\sqrt{12903}}{1901042}iR_{54} \\ & - \frac{96495\sqrt{5474}}{36119798}iR_{70} + \frac{3745\sqrt{2346}}{3140852}iR_{72} - \frac{175\sqrt{12903}}{86411}iR_{74} \\ & - \frac{9135\sqrt{335478}}{72239596}iR_{76} - \frac{47535\sqrt{1560090}}{1155833536}iR_{90} - \frac{18075\sqrt{3432198}}{288958384}iR_{92} \\ & - \frac{16485\sqrt{3187041}}{288958384}iR_{94} - \frac{1095\sqrt{14872858}}{288958384}iR_{96} - \frac{2355\sqrt{1312311}}{33995104}iR_{98} \\ & + \frac{218163\sqrt{3570}}{105075776}iR_{11,0} + \frac{16533\sqrt{17017}}{52537888}iR_{11,2} - \frac{2079\sqrt{36465}}{1382576}iR_{11,4} \\ & - \frac{825\sqrt{10010}}{475456}iR_{11,6} + \frac{8217\sqrt{19019}}{3090464}iR_{11,8} - \frac{6237\sqrt{27170}}{6180928}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	2	$\frac{11}{2}$	6	6	$ \begin{aligned} & -\frac{\sqrt{51}}{2431}iR_{10} + \frac{\sqrt{119}}{2431}iR_{30} - \frac{5\sqrt{3570}}{2431}iR_{32} - \frac{265\sqrt{187}}{30056}iR_{50} \\ & - \frac{25\sqrt{39270}}{165308}iR_{52} - \frac{855\sqrt{13090}}{330616}iR_{54} - \frac{35525\sqrt{255}}{3140852}iR_{70} \\ & - \frac{30975\sqrt{595}}{3140852}iR_{72} - \frac{735\sqrt{13090}}{3140852}iR_{74} - \frac{945\sqrt{85085}}{3140852}iR_{76} \\ & - \frac{2205\sqrt{323}}{3140852}iR_{90} - \frac{9765\sqrt{17765}}{12563408}iR_{92} - \frac{45\sqrt{3233230}}{330616}iR_{94} \\ & - \frac{2955\sqrt{692835}}{12563408}iR_{96} + \frac{90\sqrt{27170}}{46189}iR_{98} + \frac{53361\sqrt{391}}{26268944}iR_{11,0} \\ & + \frac{693\sqrt{1677390}}{26268944}iR_{11,2} - \frac{1089\sqrt{782782}}{13134472}iR_{11,4} - \frac{2409\sqrt{9867}}{1545232}iR_{11,6} \\ & - \frac{99\sqrt{1874730}}{1545232}iR_{11,8} + \frac{297\sqrt{1312311}}{1545232}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{9\sqrt{154}}{572}iR_{32} - \frac{9\sqrt{14}}{221}iR_{52} + \frac{10\sqrt{42}}{221}iR_{54} + \frac{405\sqrt{231}}{92378}iR_{72} \\ & - \frac{375\sqrt{42}}{8398}iR_{74} + \frac{45\sqrt{273}}{8398}iR_{76} - \frac{9\sqrt{57}}{4199}iR_{92} + \frac{5\sqrt{10374}}{4199}iR_{94} \\ & - \frac{21\sqrt{247}}{4199}iR_{96} - \frac{6\sqrt{25194}}{4199}iR_{98} - \frac{21\sqrt{3795}}{7360}iR_{11,0} \\ & + \frac{75045\sqrt{598}}{6180928}iR_{11,2} - \frac{11859\sqrt{62790}}{15452320}iR_{11,4} + \frac{1323\sqrt{25415}}{2377280}iR_{11,6} \\ & + \frac{1497\sqrt{193154}}{6180928}iR_{11,8} - \frac{3327\sqrt{3380195}}{30904640}iR_{11,10} \end{aligned} $

Table B447: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 116 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{9\sqrt{330}}{1144}iR_{10} - \frac{27\sqrt{770}}{6292}iR_{30} - \frac{3\sqrt{231}}{286}iR_{32} - \frac{135\sqrt{10}}{9724}iR_{50} \\ & - \frac{243\sqrt{21}}{4862}iR_{52} - \frac{45\sqrt{7}}{4862}iR_{54} + \frac{6300\sqrt{66}}{508079}iR_{70} - \frac{15\sqrt{154}}{46189}iR_{72} \\ & - \frac{150\sqrt{7}}{4199}iR_{74} + \frac{315\sqrt{182}}{46189}iR_{76} - \frac{13185\sqrt{2090}}{2956096}iR_{90} \\ & + \frac{4629\sqrt{38}}{67184}iR_{92} - \frac{225\sqrt{1729}}{67184}iR_{94} + \frac{267\sqrt{1482}}{67184}iR_{96} \\ & - \frac{141\sqrt{4199}}{134368}iR_{98} + \frac{207\sqrt{2530}}{335920}iR_{11,0} - \frac{165\sqrt{897}}{96577}iR_{11,2} \\ & - \frac{1089\sqrt{10465}}{1931540}iR_{11,4} + \frac{1107\sqrt{152490}}{1931540}iR_{11,6} - \frac{81\sqrt{289731}}{772616}iR_{11,8} \\ & - \frac{21\sqrt{20281170}}{1931540}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	3	$\begin{aligned} & -\frac{3\sqrt{33}}{22}iR_{10} - \frac{219\sqrt{77}}{12584}iR_{30} - \frac{\sqrt{2310}}{104}iR_{32} + \frac{45}{187}iR_{50} \\ & + \frac{3\sqrt{210}}{187}iR_{52} - \frac{5\sqrt{70}}{2431}iR_{54} + \frac{6615\sqrt{165}}{625328}iR_{70} + \frac{1455\sqrt{385}}{56848}iR_{72} \\ & + \frac{1395\sqrt{70}}{67184}iR_{74} + \frac{11535\sqrt{455}}{739024}iR_{76} - \frac{945\sqrt{209}}{739024}iR_{90} \\ & + \frac{36\sqrt{95}}{4199}iR_{92} + \frac{63\sqrt{17290}}{33592}iR_{94} + \frac{12\sqrt{3705}}{4199}iR_{96} + \frac{87\sqrt{41990}}{67184}iR_{98} \\ & + \frac{189\sqrt{253}}{118864}iR_{11,0} - \frac{99\sqrt{8970}}{3090464}iR_{11,2} - \frac{33\sqrt{4186}}{29716}iR_{11,4} \\ & + \frac{339\sqrt{15249}}{3090464}iR_{11,6} + \frac{15\sqrt{2897310}}{118864}iR_{11,8} - \frac{27\sqrt{2028117}}{3090464}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	4	$\begin{aligned} & \frac{9\sqrt{33}}{260}R_{10} - \frac{27\sqrt{77}}{1430}R_{30} + \frac{3\sqrt{2310}}{715}R_{32} - \frac{27}{442}R_{50} \\ & - \frac{29\sqrt{210}}{2210}R_{52} + \frac{19\sqrt{70}}{2210}R_{54} + \frac{504\sqrt{165}}{46189}R_{70} - \frac{1167\sqrt{385}}{184756}R_{72} \\ & - \frac{21\sqrt{70}}{4199}R_{74} - \frac{9\sqrt{455}}{988}R_{76} - \frac{81\sqrt{209}}{16796}R_{90} + \frac{419\sqrt{95}}{20995}R_{92} \\ & - \frac{33\sqrt{17290}}{83980}R_{94} - \frac{77\sqrt{41990}}{83980}R_{98} + \frac{729\sqrt{253}}{965770}R_{11,0} \\ & - \frac{1189\sqrt{8970}}{1931540}R_{11,2} + \frac{264\sqrt{4186}}{482885}R_{11,4} + \frac{2079\sqrt{15249}}{1931540}R_{11,6} \\ & - \frac{77\sqrt{2897310}}{965770}R_{11,8} - \frac{15\sqrt{2028117}}{386308}R_{11,10} \end{aligned}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	5	$\begin{aligned} & -\frac{891\sqrt{7158}}{310180}R_{10} + \frac{243\sqrt{16702}}{155090}R_{30} + \frac{1887\sqrt{125265}}{1705990}R_{32} \\ & + \frac{243\sqrt{26246}}{527306}R_{50} - \frac{4154\sqrt{1377915}}{14500915}R_{52} + \frac{2869\sqrt{459305}}{14500915}R_{54} \\ & - \frac{4536\sqrt{35790}}{5009407}R_{70} - \frac{18021\sqrt{83510}}{110206954}R_{72} - \frac{6342\sqrt{459305}}{55103477}R_{74} \\ & - \frac{567\sqrt{11941930}}{6482762}R_{76} + \frac{8019\sqrt{45334}}{20037628}R_{90} + \frac{2629\sqrt{2493370}}{25047035}R_{92} \\ & - \frac{453\sqrt{113448335}}{50094070}R_{94} + \frac{\sqrt{275517385}}{41990}R_{98} - \frac{72171\sqrt{54878}}{1152163610}R_{11,0} \\ & - \frac{7949\sqrt{58856655}}{1152163610}R_{11,2} + \frac{7248\sqrt{27466439}}{576081805}R_{11,4} + \frac{11907\sqrt{400225254}}{1152163610}R_{11,6} \\ & + \frac{\sqrt{19010699565}}{482885}R_{11,8} \end{aligned}$

Table B448: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 117 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	6	$-\frac{66\sqrt{4303151}}{55940963}R_{10} + \frac{12\sqrt{90366171}}{55940963}R_{30} - \frac{64275\sqrt{301220570}}{1230701186}R_{32}$ $+ \frac{60\sqrt{142003983}}{950996371}R_{50} + \frac{137154\sqrt{3313426270}}{10460960081}R_{52} - \frac{38\sqrt{9940278810}}{950996371}R_{54}$ $- \frac{6720\sqrt{21515755}}{18068931049}R_{70} - \frac{289665\sqrt{451830855}}{198758241539}R_{72} + \frac{420\sqrt{9940278810}}{18068931049}R_{74}$ $- \frac{5\sqrt{64611812265}}{3241381}R_{76} + \frac{990\sqrt{245279607}}{18068931049}R_{90} - \frac{35766\sqrt{13490378385}}{18068931049}R_{92}$ $+ \frac{33\sqrt{2455248866070}}{18068931049}R_{94} - \frac{3564\sqrt{296917419}}{415585414127}R_{11,0} + \frac{174105\sqrt{141530636390}}{831170828254}R_{11,2}$ $- \frac{1056\sqrt{594428672838}}{415585414127}R_{11,4} + \frac{63\sqrt{240602081863}}{115216361}R_{11,6}$
$\frac{11}{2}$	5	2	$\frac{13}{2}$	6	7	$\frac{6\sqrt{5158010}}{46891}R_{10} - \frac{12\sqrt{108318210}}{515801}R_{30} + \frac{32\sqrt{3610607}}{515801}R_{32}$ $- \frac{60\sqrt{1406730}}{797147}R_{50} - \frac{80\sqrt{328237}}{797147}R_{52} + \frac{380\sqrt{984711}}{797147}R_{54}$ $+ \frac{33600\sqrt{1031602}}{166603723}R_{70} + \frac{8700\sqrt{21663642}}{166603723}R_{72} - \frac{4200\sqrt{984711}}{15145793}R_{74}$ $- \frac{90\sqrt{294006570}}{15145793}R_{90} - \frac{80\sqrt{5345574}}{797147}R_{92} - \frac{330\sqrt{1439193}}{1165061}R_{94}$ $+ \frac{324\sqrt{355902690}}{348353239}R_{11,0} + \frac{5976\sqrt{82961}}{26796403}R_{11,2} + \frac{2112\sqrt{8710905}}{26796403}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	3	$\frac{\sqrt{30}}{352}I_{21} - \frac{47\sqrt{5}}{143}I_{41} - \frac{25\sqrt{546}}{2992}I_{61} - \frac{5\sqrt{1365}}{1496}I_{63}$ $+ \frac{2625\sqrt{34}}{46189}I_{81} + \frac{175\sqrt{39270}}{46189}I_{83} + \frac{45\sqrt{2310}}{5168}I_{10,1}$ $- \frac{135\sqrt{5005}}{134368}I_{10,3} - \frac{1575\sqrt{1001}}{134368}I_{10,5} + R_{00} + \frac{17\sqrt{5}}{143}R_{20}$ $- \frac{2}{11}R_{40} - \frac{250\sqrt{13}}{2431}R_{60} - \frac{175\sqrt{17}}{3553}R_{80} + \frac{225\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	4	$- \frac{465\sqrt{10}}{4576}I_{21} - \frac{17\sqrt{15}}{286}I_{41} + \frac{345\sqrt{182}}{38896}I_{61} + \frac{245\sqrt{455}}{19448}I_{63}$ $+ \frac{10535\sqrt{102}}{184756}I_{81} + \frac{875\sqrt{13090}}{184756}I_{83} + \frac{99\sqrt{770}}{67184}I_{10,1}$ $+ \frac{33\sqrt{15015}}{134368}I_{10,3} - \frac{735\sqrt{3003}}{134368}I_{10,5} - \frac{8\sqrt{455}}{221}R_{62}$ $- \frac{1120\sqrt{51}}{46189}R_{80} - \frac{40\sqrt{1785}}{46189}R_{82} + \frac{240\sqrt{7854}}{46189}R_{84}$ $+ \frac{990\sqrt{7}}{4199}R_{10,0} + \frac{93\sqrt{2310}}{4199}R_{10,2} + \frac{15\sqrt{30030}}{4199}R_{10,4}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	5	$- \frac{75\sqrt{15}}{2288}I_{21} - \frac{46\sqrt{10}}{143}I_{41} - \frac{45\sqrt{273}}{19448}I_{61} - \frac{5\sqrt{2730}}{1496}I_{63}$ $- \frac{210\sqrt{17}}{2431}I_{81} - \frac{70\sqrt{19635}}{46189}I_{83} - \frac{135\sqrt{1155}}{33592}I_{10,1}$ $+ \frac{225\sqrt{10010}}{134368}I_{10,3} + \frac{945\sqrt{2002}}{134368}I_{10,5} + \frac{35\sqrt{2}}{143}R_{40}$ $- \frac{28\sqrt{5}}{143}R_{42} - \frac{315\sqrt{26}}{2431}R_{60} - \frac{48\sqrt{2730}}{2431}R_{62} + \frac{315\sqrt{1309}}{46189}R_{84}$ $+ \frac{9\sqrt{5005}}{4199}R_{10,4}$

Table B449: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is shorthand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 118 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	5	6	$\begin{aligned} & \frac{5\sqrt{21}}{208}iI_{21} + \frac{3\sqrt{14}}{22}iI_{41} - \frac{245\sqrt{195}}{19448}iI_{61} + \frac{995\sqrt{78}}{19448}iI_{63} \\ & - \frac{105\sqrt{595}}{8398}iI_{81} - \frac{1015\sqrt{561}}{92378}iI_{83} + \frac{693\sqrt{33}}{33592}iI_{10,1} \\ & + \frac{63\sqrt{286}}{7072}iI_{10,3} + \frac{441\sqrt{1430}}{134368}iI_{10,5} + \frac{30\sqrt{14}}{143}iR_{20} \\ & - \frac{12\sqrt{7}}{143}iR_{42} + \frac{10\sqrt{78}}{2431}iR_{62} + \frac{105\sqrt{34}}{2717}iR_{82} + \frac{378\sqrt{11}}{4199}iR_{10,2} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	1	$\begin{aligned} & -\frac{15\sqrt{3410}}{35464}R_{10} - \frac{25\sqrt{71610}}{106392}R_{30} - \frac{35\sqrt{2387}}{17732}R_{32} - \frac{145\sqrt{930}}{82212}R_{50} \\ & - \frac{125\sqrt{217}}{13702}R_{52} - \frac{25\sqrt{651}}{13702}R_{54} + \frac{8715\sqrt{682}}{5727436}R_{70} \\ & - \frac{1645\sqrt{14322}}{1431859}R_{72} - \frac{945\sqrt{651}}{260338}R_{74} + \frac{35\sqrt{16926}}{130169}R_{76} \\ & + \frac{4545\sqrt{194370}}{11454872}R_{90} - \frac{615\sqrt{3534}}{260338}R_{92} - \frac{225\sqrt{160797}}{520676}R_{94} \\ & + \frac{75\sqrt{15314}}{130169}R_{96} - \frac{15\sqrt{390507}}{16796}R_{98} - \frac{5445\sqrt{235290}}{23951096}R_{11,0} \\ & + \frac{46827\sqrt{9269}}{11975548}R_{11,2} - \frac{5445\sqrt{973245}}{11975548}R_{11,4} + \frac{1815\sqrt{1575730}}{11975548}R_{11,6} \\ & + \frac{99\sqrt{2993887}}{386308}R_{11,8} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	2	$\begin{aligned} & \frac{85\sqrt{5394}}{128557}R_{10} + \frac{425\sqrt{12586}}{385671}R_{30} + \frac{259\sqrt{94395}}{771342}R_{32} + \frac{10\sqrt{19778}}{13299}R_{50} \\ & - \frac{5\sqrt{1038345}}{35061}R_{52} + \frac{30\sqrt{346115}}{2185469}R_{54} - \frac{1162\sqrt{26970}}{2442583}R_{70} \\ & - \frac{66360\sqrt{62930}}{41523911}R_{72} + \frac{1134\sqrt{346115}}{41523911}R_{74} + \frac{42\sqrt{8998990}}{1431859}R_{76} \\ & - \frac{4545\sqrt{34162}}{2442583}R_{90} + \frac{5760\sqrt{1878910}}{41523911}R_{92} + \frac{135\sqrt{85490405}}{41523911}R_{94} \\ & + \frac{30\sqrt{73277490}}{1431859}R_{96} + \frac{5445\sqrt{41354}}{5107219}R_{11,0} + \frac{297\sqrt{44352165}}{10214438}R_{11,2} \\ & + \frac{1485\sqrt{20697677}}{86822723}R_{11,4} + \frac{165\sqrt{301594722}}{5987774}R_{11,6} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	3	$\begin{aligned} & \frac{5\sqrt{87}}{4147}R_{10} + \frac{25\sqrt{203}}{12441}R_{30} - \frac{35\sqrt{6090}}{12441}R_{32} + \frac{10\sqrt{319}}{7293}R_{50} \\ & - \frac{100\sqrt{66990}}{211497}R_{52} + \frac{35\sqrt{22330}}{70499}R_{54} - \frac{1162\sqrt{435}}{1339481}R_{70} \\ & + \frac{1470\sqrt{1015}}{1339481}R_{72} + \frac{1323\sqrt{22330}}{1339481}R_{74} - \frac{4545\sqrt{551}}{1339481}R_{90} \\ & - \frac{2655\sqrt{30305}}{1339481}R_{92} + \frac{315\sqrt{5515510}}{2678962}R_{94} + \frac{5445\sqrt{667}}{2800733}R_{11,0} \\ & + \frac{792\sqrt{2861430}}{2800733}R_{11,2} + \frac{3465\sqrt{1335334}}{5601466}R_{11,4} \end{aligned}$

Table B450: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 119 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	4	$\begin{aligned} & \frac{135\sqrt{230}}{26312}iR_{10} + \frac{5\sqrt{4830}}{26312}iR_{30} - \frac{35\sqrt{161}}{13156}iR_{32} - \frac{475\sqrt{7590}}{223652}iR_{50} \\ & + \frac{25\sqrt{1771}}{111826}iR_{52} - \frac{125\sqrt{5313}}{111826}iR_{54} - \frac{105\sqrt{46}}{223652}iR_{70} \\ & + \frac{24045\sqrt{966}}{2124694}iR_{72} - \frac{3815\sqrt{5313}}{2124694}iR_{74} + \frac{1295\sqrt{138138}}{2124694}iR_{76} \\ & - \frac{17265\sqrt{13110}}{33995104}iR_{90} - \frac{3045\sqrt{28842}}{8498776}iR_{92} + \frac{705\sqrt{1312311}}{8498776}iR_{94} \\ & + \frac{5235\sqrt{124982}}{8498776}iR_{96} - \frac{105\sqrt{3187041}}{1307504}iR_{98} + \frac{13431\sqrt{30}}{325312}iR_{11,0} \\ & + \frac{32571\sqrt{143}}{3090464}iR_{11,2} - \frac{5973\sqrt{15015}}{1545232}iR_{11,4} - \frac{957\sqrt{24310}}{268736}iR_{11,6} \\ & + \frac{2079\sqrt{46189}}{3090464}iR_{11,8} + \frac{891\sqrt{3233230}}{6180928}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	5	$\begin{aligned} & -\frac{25\sqrt{16422}}{55913}iR_{10} + \frac{875\sqrt{782}}{1341912}iR_{30} - \frac{623\sqrt{5865}}{670956}iR_{32} \\ & + \frac{545\sqrt{60214}}{11406252}iR_{50} + \frac{3845\sqrt{64515}}{2851563}iR_{52} - \frac{615\sqrt{21505}}{1901042}iR_{54} \\ & + \frac{13909\sqrt{82110}}{36119798}iR_{70} + \frac{43113\sqrt{3910}}{72239596}iR_{72} - \frac{33873\sqrt{21505}}{18059899}iR_{74} \\ & - \frac{11697\sqrt{559130}}{72239596}iR_{76} - \frac{621135\sqrt{104006}}{1155833536}iR_{90} - \frac{30735\sqrt{5720330}}{288958384}iR_{92} \\ & - \frac{8505\sqrt{5311735}}{288958384}iR_{94} - \frac{45\sqrt{223092870}}{22227568}iR_{96} - \frac{9495\sqrt{2187185}}{33995104}iR_{98} \\ & + \frac{735075\sqrt{238}}{105075776}iR_{11,0} + \frac{9999\sqrt{255255}}{52537888}iR_{11,2} - \frac{100485\sqrt{2431}}{26268944}iR_{11,4} \\ & - \frac{1485\sqrt{6006}}{268736}iR_{11,6} - \frac{99\sqrt{285285}}{162656}iR_{11,8} + \frac{17325\sqrt{16302}}{6180928}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{11}{2}$	6	6	$\begin{aligned} & \frac{3\sqrt{85}}{2431}iR_{10} - \frac{8\sqrt{1785}}{2431}iR_{30} + \frac{12\sqrt{238}}{2431}iR_{32} - \frac{95\sqrt{2805}}{330616}iR_{50} \\ & + \frac{45\sqrt{2618}}{165308}iR_{52} + \frac{465\sqrt{7854}}{330616}iR_{54} - \frac{27195\sqrt{17}}{1570426}iR_{70} \\ & - \frac{3430\sqrt{357}}{785213}iR_{72} + \frac{1505\sqrt{7854}}{1570426}iR_{74} + \frac{1050\sqrt{51051}}{785213}iR_{76} \\ & - \frac{15225\sqrt{4845}}{6281704}iR_{90} - \frac{38325\sqrt{10659}}{12563408}iR_{92} - \frac{1125\sqrt{1939938}}{6281704}iR_{94} \\ & - \frac{8625\sqrt{46189}}{12563408}iR_{96} - \frac{75\sqrt{16302}}{369512}iR_{98} + \frac{12705\sqrt{5865}}{26268944}iR_{11,0} \\ & + \frac{3465\sqrt{111826}}{26268944}iR_{11,2} - \frac{165\sqrt{11741730}}{13134472}iR_{11,4} - \frac{165\sqrt{16445}}{118864}iR_{11,6} \\ & - \frac{1485\sqrt{124982}}{1545232}iR_{11,8} - \frac{495\sqrt{2187185}}{1545232}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	1	$\begin{aligned} & -\frac{5\sqrt{2310}}{572}iR_{32} + \frac{5\sqrt{210}}{221}iR_{52} + \frac{2\sqrt{70}}{221}iR_{54} - \frac{675\sqrt{385}}{92378}iR_{72} \\ & - \frac{75\sqrt{70}}{8398}iR_{74} + \frac{45\sqrt{455}}{8398}iR_{76} - \frac{3\sqrt{209}}{304}iR_{90} + \frac{2289\sqrt{95}}{83980}iR_{92} \\ & - \frac{113\sqrt{17290}}{167960}iR_{94} - \frac{89\sqrt{3705}}{83980}iR_{96} - \frac{19\sqrt{41990}}{17680}iR_{98} \\ & - \frac{9\sqrt{253}}{1472}iR_{11,0} + \frac{2667\sqrt{8970}}{6180928}iR_{11,2} + \frac{8481\sqrt{4186}}{3090464}iR_{11,4} \\ & - \frac{699\sqrt{15249}}{475456}iR_{11,6} + \frac{3867\sqrt{2897310}}{30904640}iR_{11,8} + \frac{591\sqrt{2028117}}{6180928}iR_{11,10} \end{aligned}$

Table B451: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 120 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	2	$ \begin{aligned} & -\frac{75\sqrt{22}}{1144}iR_{10} + \frac{75\sqrt{462}}{6292}iR_{30} - \frac{15\sqrt{385}}{3146}iR_{32} + \frac{375\sqrt{6}}{9724}iR_{50} \\ & - \frac{15\sqrt{35}}{4862}iR_{52} - \frac{31\sqrt{105}}{4862}iR_{54} - \frac{159075\sqrt{110}}{4064632}iR_{70} \\ & + \frac{23425\sqrt{2310}}{4064632}iR_{72} - \frac{3875\sqrt{105}}{184756}iR_{74} + \frac{815\sqrt{2730}}{369512}iR_{76} \\ & + \frac{14889\sqrt{1254}}{2956096}iR_{90} + \frac{843\sqrt{570}}{335920}iR_{92} - \frac{471\sqrt{25935}}{335920}iR_{94} \\ & + \frac{1791\sqrt{2470}}{335920}iR_{96} - \frac{107\sqrt{62985}}{671840}iR_{98} - \frac{3087\sqrt{1518}}{1545232}iR_{11,0} \\ & - \frac{747\sqrt{1495}}{772616}iR_{11,2} + \frac{807\sqrt{6279}}{386308}iR_{11,4} + \frac{2403\sqrt{10166}}{1545232}iR_{11,6} \\ & - \frac{423\sqrt{482885}}{3863080}iR_{11,8} + \frac{261\sqrt{1352078}}{1545232}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	3	$ \begin{aligned} & -\frac{6\sqrt{55}}{143}iR_{10} + \frac{19\sqrt{1155}}{12584}iR_{30} + \frac{51\sqrt{154}}{968}iR_{32} - \frac{419\sqrt{15}}{4862}iR_{50} \\ & - \frac{45\sqrt{14}}{2431}iR_{52} - \frac{43\sqrt{42}}{4862}iR_{54} + \frac{230475\sqrt{11}}{8129264}iR_{70} \\ & + \frac{36675\sqrt{231}}{8129264}iR_{72} - \frac{17925\sqrt{42}}{739024}iR_{74} - \frac{6675\sqrt{273}}{739024}iR_{76} \\ & + \frac{1845\sqrt{3135}}{739024}iR_{90} + \frac{45\sqrt{57}}{1292}iR_{92} + \frac{5\sqrt{10374}}{2584}iR_{94} \\ & + \frac{45\sqrt{247}}{16796}iR_{96} - \frac{5\sqrt{25194}}{3536}iR_{98} + \frac{135\sqrt{3795}}{1545232}iR_{11,0} \\ & + \frac{45\sqrt{598}}{237728}iR_{11,2} - \frac{15\sqrt{62790}}{386308}iR_{11,4} - \frac{405\sqrt{25415}}{3090464}iR_{11,6} \\ & - \frac{45\sqrt{193154}}{1545232}iR_{11,8} + \frac{45\sqrt{3380195}}{3090464}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	4	$ \begin{aligned} & -\frac{3\sqrt{55}}{52}R_{10} - \frac{\sqrt{1155}}{572}R_{30} + \frac{\sqrt{154}}{572}R_{32} + \frac{15\sqrt{15}}{442}R_{50} \\ & + \frac{11\sqrt{14}}{442}R_{52} + \frac{43\sqrt{42}}{1326}R_{54} + \frac{2625\sqrt{11}}{46189}R_{70} + \frac{45\sqrt{231}}{92378}R_{72} \\ & + \frac{5\sqrt{42}}{247}R_{74} + \frac{35\sqrt{273}}{8398}R_{76} + \frac{25\sqrt{3135}}{16796}R_{90} - \frac{226\sqrt{57}}{20995}R_{92} \\ & + \frac{\sqrt{10374}}{780}R_{94} + \frac{77\sqrt{247}}{20995}R_{96} - \frac{35\sqrt{25194}}{16796}R_{98} - \frac{825\sqrt{3795}}{386308}R_{11,0} \\ & + \frac{7083\sqrt{598}}{1931540}R_{11,2} + \frac{581\sqrt{62790}}{1931540}R_{11,4} + \frac{231\sqrt{25415}}{965770}R_{11,6} \\ & - \frac{315\sqrt{193154}}{386308}R_{11,8} \end{aligned} $
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	5	$ \begin{aligned} & -\frac{57\sqrt{11930}}{15509}R_{10} - \frac{19\sqrt{250530}}{170599}R_{30} - \frac{109\sqrt{8351}}{31018}R_{32} + \frac{570\sqrt{393690}}{2900183}R_{50} \\ & - \frac{2389\sqrt{91861}}{2900183}R_{52} + \frac{2818\sqrt{275583}}{8700549}R_{54} + \frac{10500\sqrt{2386}}{2900183}R_{70} \\ & - \frac{405\sqrt{50106}}{10018814}R_{72} + \frac{37670\sqrt{275583}}{55103477}R_{74} - \frac{5\sqrt{7165158}}{92378}R_{76} \\ & + \frac{25\sqrt{680010}}{263653}R_{90} + \frac{4159\sqrt{1496022}}{25047035}R_{92} + \frac{1259\sqrt{68069001}}{75141105}R_{94} \\ & - \frac{\sqrt{6482762}}{20995}R_{96} - \frac{825\sqrt{823170}}{6064019}R_{11,0} + \frac{21753\sqrt{3923777}}{1152163610}R_{11,2} \\ & + \frac{3623\sqrt{411996585}}{576081805}R_{11,4} - \frac{3\sqrt{667042090}}{965770}R_{11,6} \end{aligned} $

Table B452: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 121 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	6	$\frac{4302\sqrt{64547265}}{55940963}R_{10} + \frac{4302\sqrt{150610285}}{615350593}R_{30} + \frac{16\sqrt{180732342}}{55940963}R_{32}$ $- \frac{129060\sqrt{236673305}}{10460960081}R_{50} + \frac{16\sqrt{1988055762}}{950996371}R_{52} + \frac{311082\sqrt{662685254}}{10460960081}R_{54}$ $- \frac{15057000\sqrt{12909453}}{198758241539}R_{70} - \frac{300\sqrt{30122057}}{18068931049}R_{72} - \frac{557550\sqrt{662685254}}{198758241539}R_{74}$ $- \frac{107550\sqrt{408799345}}{18068931049}R_{90} - \frac{270\sqrt{899358559}}{18068931049}R_{92} + \frac{18075\sqrt{163683257738}}{18068931049}R_{94}$ $+ \frac{3549150\sqrt{494862365}}{415585414127}R_{11,0} - \frac{4500\sqrt{84918381834}}{415585414127}R_{11,2} + \frac{54045\sqrt{990714454730}}{415585414127}R_{11,4}$
$\frac{11}{2}$	5	3	$\frac{13}{2}$	6	7	$\frac{12\sqrt{3094806}}{46891}R_{10} + \frac{12\sqrt{7221214}}{515801}R_{30} - \frac{32\sqrt{54159105}}{515801}R_{32}$ $- \frac{360\sqrt{93782}}{797147}R_{50} - \frac{32\sqrt{4923555}}{797147}R_{52} - \frac{160\sqrt{1641185}}{797147}R_{54}$ $- \frac{8400\sqrt{15474030}}{166603723}R_{70} + \frac{300\sqrt{36106070}}{166603723}R_{72} + \frac{3000\sqrt{1641185}}{15145793}R_{74}$ $- \frac{300\sqrt{19600438}}{15145793}R_{90} + \frac{270\sqrt{8909290}}{15145793}R_{92} - \frac{80\sqrt{2398655}}{1165061}R_{94}$ $+ \frac{9900\sqrt{23726846}}{348353239}R_{11,0} + \frac{9000\sqrt{1244415}}{26796403}R_{11,2} + \frac{600\sqrt{580727}}{26796403}R_{11,4}$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	5	4	$- \frac{469\sqrt{30}}{4576}I_{21} - \frac{42\sqrt{5}}{143}I_{41} + \frac{485\sqrt{546}}{38896}I_{61} + \frac{5\sqrt{1365}}{1496}I_{63}$ $- \frac{2205\sqrt{34}}{92378}I_{81} - \frac{35\sqrt{39270}}{92378}I_{83} - \frac{33\sqrt{2310}}{67184}I_{10,1}$ $- \frac{369\sqrt{5005}}{134368}I_{10,3} + \frac{495\sqrt{1001}}{134368}I_{10,5} + R_{00} - \frac{\sqrt{5}}{143}R_{20}$ $- \frac{6}{13}R_{40} - \frac{10\sqrt{13}}{221}R_{60} + \frac{245\sqrt{17}}{2717}R_{80} - \frac{105\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	5	5	$\frac{63\sqrt{5}}{2288}I_{21} - \frac{35\sqrt{30}}{286}I_{41} - \frac{375\sqrt{91}}{19448}I_{61} + \frac{125\sqrt{910}}{19448}I_{63}$ $+ \frac{8225\sqrt{51}}{92378}I_{81} + \frac{245\sqrt{6545}}{92378}I_{83} - \frac{261\sqrt{385}}{33592}I_{10,1}$ $+ \frac{33\sqrt{30030}}{134368}I_{10,3} - \frac{495\sqrt{6006}}{134368}I_{10,5} + \frac{18\sqrt{30}}{143}R_{20}$ $+ \frac{4\sqrt{15}}{143}R_{42} + \frac{30\sqrt{910}}{2431}R_{62} + \frac{175\sqrt{3570}}{46189}R_{82} - \frac{30\sqrt{1155}}{4199}R_{10,2}$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	5	6	$- \frac{15\sqrt{7}}{2288}iI_{21} - \frac{\sqrt{42}}{13}iI_{41} - \frac{315\sqrt{65}}{19448}iI_{61} + \frac{925\sqrt{26}}{19448}iI_{63}$ $+ \frac{840\sqrt{1785}}{46189}iI_{81} + \frac{1400\sqrt{187}}{46189}iI_{83} - \frac{189\sqrt{11}}{33592}iI_{10,1}$ $- \frac{1239\sqrt{858}}{134368}iI_{10,3} + \frac{21\sqrt{4290}}{7904}iI_{10,5} + \frac{3\sqrt{210}}{143}iR_{40}$ $- \frac{12\sqrt{21}}{143}iR_{42} - \frac{5\sqrt{2730}}{2431}iR_{60} - \frac{80\sqrt{26}}{2431}iR_{62} - \frac{175\sqrt{2805}}{46189}iR_{84}$ $- \frac{63\sqrt{429}}{4199}iR_{10,4}$

Table B453: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 122 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	1	$ \begin{aligned} & -\frac{7\sqrt{10230}}{35464}R_{10} - \frac{7\sqrt{23870}}{35464}R_{30} + \frac{\sqrt{7161}}{1612}R_{32} + \frac{35\sqrt{310}}{27404}R_{50} \\ & - \frac{205\sqrt{651}}{13702}R_{52} - \frac{135\sqrt{217}}{13702}R_{54} + \frac{8785\sqrt{2046}}{5727436}R_{70} \\ & + \frac{525\sqrt{4774}}{130169}R_{72} - \frac{3465\sqrt{217}}{260338}R_{74} - \frac{105\sqrt{5642}}{130169}R_{76} \\ & - \frac{3405\sqrt{64790}}{11454872}R_{90} + \frac{1215\sqrt{1178}}{260338}R_{92} - \frac{315\sqrt{53599}}{520676}R_{94} \\ & - \frac{75\sqrt{45942}}{130169}R_{96} + \frac{45\sqrt{130169}}{520676}R_{98} + \frac{1815\sqrt{78430}}{23951096}R_{11,0} \\ & - \frac{33\sqrt{27807}}{40052}R_{11,2} + \frac{7623\sqrt{324415}}{11975548}R_{11,4} - \frac{1815\sqrt{4727190}}{11975548}R_{11,6} \\ & + \frac{363\sqrt{8981661}}{11975548}R_{11,8} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	2	$ \begin{aligned} & -\frac{21\sqrt{1798}}{17732}R_{10} - \frac{7\sqrt{37758}}{17732}R_{30} + \frac{12\sqrt{31465}}{128557}R_{32} + \frac{35\sqrt{59334}}{150722}R_{50} \\ & + \frac{60\sqrt{346115}}{2185469}R_{52} - \frac{225\sqrt{1038345}}{2185469}R_{54} + \frac{5271\sqrt{8990}}{2863718}R_{70} \\ & - \frac{42\sqrt{188790}}{2442583}R_{72} - \frac{525\sqrt{1038345}}{3774901}R_{74} + \frac{56\sqrt{26996970}}{2442583}R_{76} \\ & - \frac{3405\sqrt{102486}}{5727436}R_{90} - \frac{45\sqrt{5636730}}{2442583}R_{92} - \frac{525\sqrt{256471215}}{83047822}R_{94} \\ & + \frac{120\sqrt{24425830}}{2442583}R_{96} - \frac{45\sqrt{622858665}}{4370938}R_{98} + \frac{1815\sqrt{124062}}{11975548}R_{11,0} \\ & + \frac{594\sqrt{14784055}}{86822723}R_{11,2} + \frac{5775\sqrt{62093031}}{173645446}R_{11,4} + \frac{330\sqrt{100531574}}{5107219}R_{11,6} \\ & - \frac{99\sqrt{4775249765}}{9139234}R_{11,8} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	3	$ \begin{aligned} & \frac{14\sqrt{2030}}{4147}R_{32} + \frac{70\sqrt{22330}}{70499}R_{52} - \frac{45\sqrt{66990}}{70499}R_{54} - \frac{98\sqrt{3045}}{78793}R_{72} \\ & - \frac{105\sqrt{66990}}{121771}R_{74} + \frac{56\sqrt{435435}}{1339481}R_{76} - \frac{105\sqrt{90915}}{78793}R_{92} \\ & - \frac{105\sqrt{16546530}}{2678962}R_{94} + \frac{120\sqrt{393965}}{1339481}R_{96} + \frac{45\sqrt{40184430}}{1339481}R_{98} \\ & + \frac{693\sqrt{953810}}{2800733}R_{11,2} + \frac{1155\sqrt{4006002}}{5601466}R_{11,4} + \frac{330\sqrt{1621477}}{2800733}R_{11,6} \\ & + \frac{99\sqrt{308080630}}{2800733}R_{11,8} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{\sqrt{690}}{26312}iR_{10} - \frac{41\sqrt{1610}}{26312}iR_{30} - \frac{31\sqrt{483}}{13156}iR_{32} - \frac{25\sqrt{2530}}{13156}iR_{50} \\ & + \frac{125\sqrt{5313}}{111826}iR_{52} - \frac{135\sqrt{1771}}{111826}iR_{54} + \frac{96775\sqrt{138}}{4249388}iR_{70} \\ & + \frac{4935\sqrt{322}}{1062347}iR_{72} + \frac{10185\sqrt{1771}}{2124694}iR_{74} + \frac{735\sqrt{46046}}{1062347}iR_{76} \\ & - \frac{525\sqrt{4370}}{16997552}iR_{90} + \frac{2835\sqrt{9614}}{1062347}iR_{92} + \frac{45\sqrt{437437}}{81719}iR_{94} \\ & + \frac{15\sqrt{374946}}{111826}iR_{96} + \frac{225\sqrt{1062347}}{772616}iR_{98} + \frac{2541\sqrt{10}}{363584}iR_{11,0} \\ & - \frac{2079\sqrt{429}}{3090464}iR_{11,2} - \frac{99\sqrt{5005}}{67184}iR_{11,4} + \frac{1551\sqrt{72930}}{6180928}iR_{11,6} \\ & + \frac{5181\sqrt{138567}}{3090464}iR_{11,8} - \frac{495\sqrt{9699690}}{6180928}iR_{11,10} \end{aligned} $

Table B454: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 123 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	5	$\frac{9\sqrt{5474}}{13156}iR_{10} + \frac{7\sqrt{2346}}{121992}iR_{30} + \frac{175\sqrt{1955}}{223652}iR_{32} - \frac{1855\sqrt{180642}}{11406252}iR_{50}$ $- \frac{670\sqrt{21505}}{950521}iR_{52} - \frac{755\sqrt{64515}}{1901042}iR_{54} - \frac{1407\sqrt{27370}}{1641809}iR_{70}$ $+ \frac{239645\sqrt{11730}}{72239596}iR_{72} - \frac{5124\sqrt{64515}}{18059899}iR_{74} + \frac{3115\sqrt{1677390}}{72239596}iR_{76}$ $+ \frac{696165\sqrt{312018}}{1155833536}iR_{90} - \frac{4815\sqrt{17160990}}{288958384}iR_{92} - \frac{3045\sqrt{15935205}}{288958384}iR_{94}$ $+ \frac{12885\sqrt{74364290}}{288958384}iR_{96} + \frac{1245\sqrt{6561555}}{33995104}iR_{98} - \frac{390225\sqrt{714}}{105075776}iR_{11,0}$ $- \frac{26235\sqrt{85085}}{52537888}iR_{11,2} + \frac{3465\sqrt{7293}}{1142128}iR_{11,4} + \frac{86295\sqrt{2002}}{6180928}iR_{11,6}$ $- \frac{6039\sqrt{95095}}{3090464}iR_{11,8} + \frac{24255\sqrt{5434}}{6180928}iR_{11,10}$
$\frac{11}{2}$	5	4	$\frac{11}{2}$	6	6	$\frac{7\sqrt{595}}{2431}iR_{30} - \frac{7\sqrt{714}}{2431}iR_{32} - \frac{875\sqrt{935}}{330616}iR_{50} + \frac{235\sqrt{7854}}{165308}iR_{52}$ $- \frac{315\sqrt{2618}}{330616}iR_{54} - \frac{56805\sqrt{51}}{3140852}iR_{70} + \frac{23625\sqrt{119}}{3140852}iR_{72}$ $- \frac{7455\sqrt{2618}}{3140852}iR_{74} + \frac{4935\sqrt{17017}}{3140852}iR_{76} + \frac{15\sqrt{1615}}{285532}iR_{90}$ $+ \frac{7245\sqrt{3553}}{1142128}iR_{92} - \frac{2115\sqrt{646646}}{6281704}iR_{94} + \frac{2625\sqrt{138567}}{12563408}iR_{96}$ $- \frac{315\sqrt{5434}}{92378}iR_{98} - \frac{14883\sqrt{1955}}{2020688}iR_{11,0} - \frac{231\sqrt{335478}}{26268944}iR_{11,2}$ $+ \frac{4455\sqrt{3913910}}{13134472}iR_{11,4} + \frac{231\sqrt{49335}}{1545232}iR_{11,6} - \frac{231\sqrt{374946}}{1545232}iR_{11,8}$ $- \frac{231\sqrt{6561555}}{1545232}iR_{11,10}$
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	1	$- \frac{2\sqrt{231}}{143}iR_{30} - \frac{\sqrt{770}}{260}iR_{32} - \frac{28\sqrt{3}}{221}iR_{50} + \frac{11\sqrt{70}}{1105}iR_{52}$ $+ \frac{22\sqrt{210}}{1105}iR_{54} - \frac{2835\sqrt{55}}{184756}iR_{70} - \frac{135\sqrt{1155}}{16796}iR_{72}$ $+ \frac{15\sqrt{210}}{988}iR_{74} + \frac{225\sqrt{1365}}{16796}iR_{76} - \frac{21\sqrt{627}}{16796}iR_{90} - \frac{28\sqrt{285}}{20995}iR_{92}$ $- \frac{\sqrt{51870}}{2470}iR_{94} - \frac{84\sqrt{1235}}{20995}iR_{96} + \frac{29\sqrt{125970}}{83980}iR_{98}$ $- \frac{63\sqrt{759}}{475456}iR_{11,0} - \frac{5271\sqrt{2990}}{30904640}iR_{11,2} + \frac{237\sqrt{12558}}{3090464}iR_{11,4}$ $+ \frac{315\sqrt{5083}}{475456}iR_{11,6} - \frac{387\sqrt{965770}}{30904640}iR_{11,8} - \frac{1743\sqrt{676039}}{6180928}iR_{11,10}$

Table B455: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 124 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	2	$ \begin{aligned} & -\frac{115\sqrt{66}}{1144}iR_{10} + \frac{153\sqrt{154}}{6292}iR_{30} + \frac{147\sqrt{1155}}{15730}iR_{32} + \frac{927\sqrt{2}}{9724}iR_{50} \\ & + \frac{717\sqrt{105}}{24310}iR_{52} + \frac{177\sqrt{35}}{24310}iR_{54} - \frac{14665\sqrt{330}}{1016158}iR_{70} \\ & - \frac{6195\sqrt{770}}{1016158}iR_{72} - \frac{1965\sqrt{35}}{46189}iR_{74} - \frac{225\sqrt{910}}{92378}iR_{76} \\ & + \frac{2331\sqrt{418}}{2956096}iR_{90} - \frac{6027\sqrt{190}}{335920}iR_{92} - \frac{693\sqrt{8645}}{335920}iR_{94} \\ & - \frac{597\sqrt{7410}}{335920}iR_{96} - \frac{609\sqrt{20995}}{671840}iR_{98} - \frac{2079\sqrt{506}}{1545232}iR_{11,0} \\ & + \frac{147\sqrt{4485}}{965770}iR_{11,2} + \frac{567\sqrt{2093}}{386308}iR_{11,4} - \frac{45\sqrt{30498}}{193154}iR_{11,6} \\ & - \frac{189\sqrt{1448655}}{3863080}iR_{11,8} - \frac{6\sqrt{4056234}}{96577}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	3	$ \begin{aligned} & -\frac{3\sqrt{165}}{286}iR_{10} - \frac{51\sqrt{385}}{12584}iR_{30} - \frac{181\sqrt{462}}{12584}iR_{32} + \frac{213\sqrt{5}}{2431}iR_{50} \\ & - \frac{\sqrt{42}}{2431}iR_{52} + \frac{27\sqrt{14}}{2431}iR_{54} - \frac{191625\sqrt{33}}{8129264}iR_{70} + \frac{248925\sqrt{77}}{8129264}iR_{72} \\ & - \frac{16875\sqrt{14}}{739024}iR_{74} + \frac{13875\sqrt{91}}{739024}iR_{76} - \frac{4977\sqrt{1045}}{739024}iR_{90} \\ & + \frac{147\sqrt{19}}{4199}iR_{92} - \frac{165\sqrt{3458}}{33592}iR_{94} + \frac{21\sqrt{741}}{4199}iR_{96} - \frac{141\sqrt{8398}}{67184}iR_{98} \\ & + \frac{3465\sqrt{1265}}{1545232}iR_{11,0} - \frac{735\sqrt{1794}}{3090464}iR_{11,2} - \frac{369\sqrt{20930}}{386308}iR_{11,4} \\ & + \frac{21\sqrt{76245}}{134368}iR_{11,6} - \frac{27\sqrt{579462}}{81328}iR_{11,8} + \frac{21\sqrt{10140585}}{3090464}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	4	$ \begin{aligned} & -\frac{7\sqrt{165}}{260}R_{10} + \frac{7\sqrt{385}}{1430}R_{30} + \frac{14\sqrt{462}}{715}R_{32} + \frac{203\sqrt{5}}{2210}R_{50} \\ & + \frac{59\sqrt{42}}{2210}R_{52} + \frac{49\sqrt{14}}{2210}R_{54} + \frac{245\sqrt{33}}{46189}R_{70} - \frac{6975\sqrt{77}}{184756}R_{72} \\ & + \frac{30\sqrt{14}}{4199}R_{74} + \frac{375\sqrt{91}}{16796}R_{76} - \frac{441\sqrt{1045}}{83980}R_{90} + \frac{3291\sqrt{19}}{41990}R_{92} \\ & - \frac{33\sqrt{3458}}{83980}R_{94} + \frac{55\sqrt{741}}{8398}R_{96} + \frac{27\sqrt{8398}}{83980}R_{98} + \frac{1617\sqrt{1265}}{965770}R_{11,0} \\ & - \frac{507\sqrt{1794}}{148580}R_{11,2} - \frac{33\sqrt{20930}}{96577}R_{11,4} + \frac{165\sqrt{76245}}{386308}R_{11,6} \\ & + \frac{27\sqrt{579462}}{965770}R_{11,8} - \frac{\sqrt{10140585}}{148580}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	5	$ \begin{aligned} & \frac{\sqrt{35790}}{260}R_{10} - \frac{\sqrt{83510}}{1430}R_{30} - \frac{3969\sqrt{25053}}{1705990}R_{32} - \frac{29\sqrt{131230}}{24310}R_{50} \\ & + \frac{1134\sqrt{275583}}{14500915}R_{52} + \frac{7399\sqrt{91861}}{14500915}R_{54} - \frac{35\sqrt{7158}}{46189}R_{70} \\ & + \frac{99225\sqrt{16702}}{55103477}R_{72} + \frac{9060\sqrt{91861}}{55103477}R_{74} + \frac{375\sqrt{2388386}}{2900183}R_{76} \\ & + \frac{63\sqrt{226670}}{83980}R_{90} + \frac{5103\sqrt{498674}}{25047035}R_{92} - \frac{453\sqrt{22689667}}{50094070}R_{94} \\ & + \frac{10\sqrt{19448286}}{263653}R_{96} - \frac{243\sqrt{55103477}}{50094070}R_{98} - \frac{231\sqrt{274390}}{965770}R_{11,0} \\ & - \frac{52731\sqrt{11771331}}{1152163610}R_{11,2} - \frac{906\sqrt{137332195}}{115216361}R_{11,4} + \frac{15\sqrt{2001126270}}{6064019}R_{11,6} \\ & - \frac{243\sqrt{3802139913}}{576081805}R_{11,8} + \frac{\sqrt{266149793910}}{5213410}R_{11,10} \end{aligned} $

Table B456: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 125 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	6	$-\frac{21\sqrt{60244114}}{341198}R_{32} + \frac{6\sqrt{662685254}}{2900183}R_{52} - \frac{98\sqrt{1988055762}}{950996371}R_{54}$ $+ \frac{1750\sqrt{90366171}}{55103477}R_{72} - \frac{600\sqrt{1988055762}}{18068931049}R_{74} - \frac{537750\sqrt{12922362453}}{198758241539}R_{76}$ $+ \frac{18\sqrt{2698075677}}{5009407}R_{92} + \frac{33\sqrt{491049773214}}{18068931049}R_{94} - \frac{43020\sqrt{11691661267}}{18068931049}R_{96}$ $- \frac{6\sqrt{1192549449234}}{18068931049}R_{98} - \frac{279\sqrt{28306127278}}{230432722}R_{11,2} + \frac{660\sqrt{2972143364190}}{415585414127}R_{11,4}$ $- \frac{64530\sqrt{1203010409315}}{415585414127}R_{11,6} - \frac{36\sqrt{9142879110794}}{415585414127}R_{11,8} - \frac{837\sqrt{160000384438895}}{31968108779}R_{11,10}$
$\frac{11}{2}$	5	4	$\frac{13}{2}$	6	7	$\frac{196\sqrt{4923555}}{797147}R_{54} + \frac{1200\sqrt{4923555}}{15145793}R_{74} - \frac{300\sqrt{757470}}{1165061}R_{76}$ $- \frac{66\sqrt{7195965}}{1165061}R_{94} - \frac{264\sqrt{685330}}{1165061}R_{96} + \frac{12\sqrt{17475915}}{1165061}R_{98}$ $- \frac{6600\sqrt{1742181}}{26796403}R_{11,4} - \frac{1980\sqrt{2820674}}{26796403}R_{11,6} + \frac{72\sqrt{133982015}}{26796403}R_{11,8}$ $+ \frac{300\sqrt{375149642}}{26796403}R_{11,10}$
$\frac{11}{2}$	5	5	$\frac{11}{2}$	5	5	$\frac{53\sqrt{30}}{2288}I_{21} + \frac{54\sqrt{5}}{143}I_{41} - \frac{5\sqrt{546}}{19448}I_{61} + \frac{15\sqrt{1365}}{9724}I_{63}$ $+ \frac{210\sqrt{34}}{2431}I_{81} + \frac{210\sqrt{39270}}{46189}I_{83} - \frac{279\sqrt{2310}}{33592}I_{10,1}$ $+ \frac{9\sqrt{5005}}{67184}I_{10,3} + \frac{45\sqrt{1001}}{5168}I_{10,5} + R_{00} + \frac{29\sqrt{5}}{143}R_{20}$ $+ \frac{24}{143}R_{40} - \frac{40\sqrt{13}}{2431}R_{60} - \frac{2590\sqrt{17}}{46189}R_{80} - \frac{270\sqrt{21}}{4199}R_{10,0}$
$\frac{11}{2}$	5	5	$\frac{11}{2}$	5	6	$\frac{15\sqrt{42}}{2288}iI_{21} + \frac{17\sqrt{7}}{143}iI_{41} + \frac{75\sqrt{390}}{19448}iI_{61} - \frac{245\sqrt{39}}{9724}iI_{63}$ $- \frac{3885\sqrt{1190}}{92378}iI_{81} - \frac{245\sqrt{1122}}{7106}iI_{83} + \frac{189\sqrt{66}}{33592}iI_{10,1}$ $- \frac{63\sqrt{143}}{5168}iI_{10,3} - \frac{567\sqrt{715}}{67184}iI_{10,5} + \frac{45\sqrt{7}}{143}iR_{20} - \frac{16\sqrt{14}}{143}iR_{42}$ $- \frac{120\sqrt{39}}{2431}iR_{62} - \frac{2520\sqrt{17}}{46189}iR_{82} - \frac{126\sqrt{22}}{4199}iR_{10,2}$
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	1	$\frac{9\sqrt{1705}}{17732}R_{10} + \frac{19\sqrt{35805}}{53196}R_{30} + \frac{17\sqrt{4774}}{17732}R_{32} + \frac{110\sqrt{465}}{20553}R_{50}$ $+ \frac{5\sqrt{434}}{1054}R_{52} - \frac{45\sqrt{1302}}{6851}R_{54} + \frac{630\sqrt{341}}{84227}R_{70} + \frac{245\sqrt{7161}}{220286}R_{72}$ $+ \frac{1120\sqrt{1302}}{130169}R_{74} - \frac{105\sqrt{8463}}{260338}R_{76} + \frac{45\sqrt{97185}}{168454}R_{90}$ $+ \frac{1245\sqrt{1767}}{520676}R_{92} - \frac{345\sqrt{321594}}{520676}R_{94} - \frac{15\sqrt{7657}}{40052}R_{96}$ $- \frac{5445\sqrt{117645}}{5987774}R_{11,0} + \frac{51183\sqrt{18538}}{11975548}R_{11,2} - \frac{2211\sqrt{1946490}}{11975548}R_{11,4}$ $+ \frac{363\sqrt{787865}}{5987774}R_{11,6}$

Table B457: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 126 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	2	$ \begin{aligned} & -\frac{9\sqrt{2697}}{128557}R_{10} - \frac{19\sqrt{6293}}{128557}R_{30} + \frac{19\sqrt{188790}}{70122}R_{32} - \frac{40\sqrt{9889}}{198679}R_{50} \\ & + \frac{635\sqrt{2076690}}{6556407}R_{52} + \frac{10\sqrt{692230}}{128557}R_{54} - \frac{504\sqrt{13485}}{2442583}R_{70} \\ & + \frac{777\sqrt{31465}}{3774901}R_{72} + \frac{378\sqrt{692230}}{2442583}R_{74} + \frac{315\sqrt{4499495}}{2185469}R_{76} \\ & - \frac{270\sqrt{17081}}{2442583}R_{90} - \frac{9585\sqrt{939455}}{83047822}R_{92} + \frac{45\sqrt{170980810}}{2442583}R_{94} \\ & + \frac{15\sqrt{36638745}}{336226}R_{96} + \frac{32670\sqrt{20677}}{86822723}R_{11,0} + \frac{9801\sqrt{88704330}}{173645446}R_{11,2} \\ & + \frac{495\sqrt{41395354}}{5107219}R_{11,4} - \frac{165\sqrt{150797361}}{4569617}R_{11,6} \end{aligned} $
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	3	$ \begin{aligned} & -\frac{21\sqrt{174}}{8294}R_{10} - \frac{133\sqrt{406}}{24882}R_{30} + \frac{7\sqrt{3045}}{12441}R_{32} - \frac{140\sqrt{638}}{19227}R_{50} \\ & + \frac{80\sqrt{33495}}{211497}R_{52} + \frac{10\sqrt{11165}}{70499}R_{54} - \frac{588\sqrt{870}}{78793}R_{70} \\ & + \frac{3780\sqrt{2030}}{1339481}R_{72} + \frac{378\sqrt{11165}}{1339481}R_{74} - \frac{630\sqrt{290290}}{1339481}R_{76} \\ & - \frac{315\sqrt{1102}}{78793}R_{90} + \frac{1260\sqrt{60610}}{1339481}R_{92} + \frac{45\sqrt{2757755}}{1339481}R_{94} \\ & - \frac{15\sqrt{2363790}}{103037}R_{96} + \frac{38115\sqrt{1334}}{2800733}R_{11,0} + \frac{1386\sqrt{1430715}}{2800733}R_{11,2} \\ & + \frac{495\sqrt{667667}}{2800733}R_{11,4} + \frac{330\sqrt{9728862}}{2800733}R_{11,6} \end{aligned} $
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{81\sqrt{115}}{13156}iR_{10} - \frac{73\sqrt{2415}}{39468}iR_{30} + \frac{141\sqrt{322}}{13156}iR_{32} + \frac{365\sqrt{3795}}{335478}iR_{50} \\ & - \frac{15\sqrt{3542}}{8602}iR_{52} + \frac{5\sqrt{10626}}{6578}iR_{54} - \frac{18900\sqrt{23}}{1062347}iR_{70} \\ & - \frac{35\sqrt{483}}{9614}iR_{72} - \frac{350\sqrt{10626}}{1062347}iR_{74} - \frac{945\sqrt{69069}}{2124694}iR_{76} \\ & + \frac{40785\sqrt{6555}}{16997552}iR_{90} + \frac{795\sqrt{14421}}{249964}iR_{92} + \frac{1395\sqrt{2624622}}{8498776}iR_{94} \\ & - \frac{1245\sqrt{62491}}{4249388}iR_{96} - \frac{2235\sqrt{6374082}}{16997552}iR_{98} + \frac{24321\sqrt{15}}{3090464}iR_{11,0} \\ & + \frac{4455\sqrt{286}}{3090464}iR_{11,2} - \frac{33\sqrt{30030}}{90896}iR_{11,4} - \frac{3399\sqrt{12155}}{3090464}iR_{11,6} \\ & + \frac{99\sqrt{92378}}{3090464}iR_{11,8} + \frac{99\sqrt{1616615}}{237728}iR_{11,10} \end{aligned} $
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	5	$ \begin{aligned} & -\frac{3\sqrt{8211}}{4301}iR_{10} + \frac{679\sqrt{391}}{670956}iR_{30} + \frac{7\sqrt{11730}}{13156}iR_{32} - \frac{1795\sqrt{30107}}{2851563}iR_{50} \\ & + \frac{560\sqrt{129030}}{950521}iR_{52} - \frac{175\sqrt{43010}}{950521}iR_{54} + \frac{441\sqrt{41055}}{2124694}iR_{70} \\ & - \frac{81480\sqrt{1955}}{18059899}iR_{72} - \frac{30975\sqrt{43010}}{36119798}iR_{74} - \frac{84\sqrt{279565}}{1641809}iR_{76} \\ & + \frac{29385\sqrt{52003}}{33995104}iR_{90} + \frac{12735\sqrt{2860165}}{144479192}iR_{92} - \frac{8505\sqrt{10623470}}{288958384}iR_{94} \\ & + \frac{3945\sqrt{111546435}}{144479192}iR_{96} + \frac{945\sqrt{4374370}}{33995104}iR_{98} - \frac{27225\sqrt{119}}{4041376}iR_{11,0} \\ & - \frac{6633\sqrt{510510}}{52537888}iR_{11,2} + \frac{38115\sqrt{4862}}{26268944}iR_{11,4} + \frac{22605\sqrt{3003}}{3090464}iR_{11,6} \\ & + \frac{2079\sqrt{570570}}{3090464}iR_{11,8} - \frac{10395\sqrt{8151}}{3090464}iR_{11,10} \end{aligned} $

Table B458: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 127 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	5	$\frac{11}{2}$	6	6	$\begin{aligned} & \frac{21\sqrt{170}}{4862}iR_{10} - \frac{14\sqrt{3570}}{7293}iR_{30} + \frac{175\sqrt{5610}}{991848}iR_{50} + \frac{465\sqrt{1309}}{82654}iR_{52} \\ & - \frac{235\sqrt{3927}}{165308}iR_{54} - \frac{945\sqrt{34}}{46189}iR_{70} + \frac{105\sqrt{714}}{142766}iR_{72} \\ & - \frac{1470\sqrt{3927}}{785213}iR_{74} + \frac{805\sqrt{102102}}{1570426}iR_{76} - \frac{315\sqrt{9690}}{369512}iR_{90} \\ & + \frac{675\sqrt{21318}}{966416}iR_{92} + \frac{915\sqrt{969969}}{3140852}iR_{94} - \frac{15525\sqrt{92378}}{12563408}iR_{96} \\ & - \frac{15\sqrt{8151}}{9724}iR_{98} - \frac{38115\sqrt{11730}}{26268944}iR_{11,0} - \frac{297\sqrt{55913}}{571064}iR_{11,2} \\ & + \frac{33\sqrt{5870865}}{285532}iR_{11,4} + \frac{4455\sqrt{32890}}{1545232}iR_{11,6} + \frac{99\sqrt{62491}}{59432}iR_{11,8} \\ & + \frac{297\sqrt{4374370}}{1545232}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	1	$\begin{aligned} & \frac{3\sqrt{1155}}{286}iR_{32} - \frac{21\sqrt{2}}{221}iR_{50} - \frac{2\sqrt{105}}{221}iR_{52} - \frac{54\sqrt{35}}{1105}iR_{54} \\ & - \frac{315\sqrt{330}}{33592}iR_{70} + \frac{1125\sqrt{770}}{369512}iR_{72} + \frac{105\sqrt{35}}{988}iR_{74} \\ & - \frac{45\sqrt{910}}{33592}iR_{76} - \frac{21\sqrt{418}}{5168}iR_{90} - \frac{127\sqrt{190}}{16796}iR_{92} + \frac{\sqrt{8645}}{4940}iR_{94} \\ & + \frac{7\sqrt{7410}}{16796}iR_{96} - \frac{271\sqrt{20995}}{167960}iR_{98} - \frac{315\sqrt{506}}{475456}iR_{11,0} \\ & - \frac{717\sqrt{4485}}{3090464}iR_{11,2} + \frac{801\sqrt{2093}}{1545232}iR_{11,4} + \frac{189\sqrt{30498}}{475456}iR_{11,6} \\ & + \frac{891\sqrt{1448655}}{15452320}iR_{11,8} - \frac{201\sqrt{4056234}}{6180928}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{45\sqrt{11}}{572}iR_{10} - \frac{105\sqrt{231}}{3146}iR_{30} + \frac{57\sqrt{770}}{3146}iR_{32} - \frac{81\sqrt{3}}{2431}iR_{50} \\ & + \frac{111\sqrt{70}}{4862}iR_{52} - \frac{14\sqrt{210}}{935}iR_{54} + \frac{63315\sqrt{55}}{2032316}iR_{70} \\ & + \frac{6575\sqrt{1155}}{2032316}iR_{72} - \frac{65\sqrt{210}}{14212}iR_{74} - \frac{735\sqrt{1365}}{184756}iR_{76} \\ & - \frac{9831\sqrt{627}}{1478048}iR_{90} - \frac{519\sqrt{285}}{33592}iR_{92} - \frac{111\sqrt{51870}}{335920}iR_{94} \\ & + \frac{9\sqrt{1235}}{2584}iR_{96} + \frac{293\sqrt{125970}}{671840}iR_{98} - \frac{675\sqrt{759}}{772616}iR_{11,0} \\ & - \frac{225\sqrt{2990}}{772616}iR_{11,2} + \frac{147\sqrt{12558}}{386308}iR_{11,4} + \frac{657\sqrt{5083}}{772616}iR_{11,6} \\ & + \frac{261\sqrt{965770}}{3863080}iR_{11,8} + \frac{279\sqrt{676039}}{772616}iR_{11,10} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	3	$\begin{aligned} & -\frac{3\sqrt{110}}{143}iR_{10} + \frac{79\sqrt{2310}}{12584}iR_{30} + \frac{59\sqrt{77}}{6292}iR_{32} - \frac{311\sqrt{30}}{4862}iR_{50} \\ & + \frac{50\sqrt{7}}{2431}iR_{52} - \frac{87\sqrt{21}}{2431}iR_{54} - \frac{13125\sqrt{22}}{8129264}iR_{70} + \frac{163575\sqrt{462}}{8129264}iR_{72} \\ & - \frac{1125\sqrt{21}}{21736}iR_{74} + \frac{5625\sqrt{546}}{739024}iR_{76} - \frac{843\sqrt{6270}}{739024}iR_{90} \\ & - \frac{149\sqrt{114}}{16796}iR_{92} + \frac{\sqrt{5187}}{988}iR_{94} + \frac{87\sqrt{494}}{16796}iR_{96} - \frac{31\sqrt{12597}}{33592}iR_{98} \\ & + \frac{1647\sqrt{7590}}{1545232}iR_{11,0} + \frac{4401\sqrt{299}}{1545232}iR_{11,2} - \frac{213\sqrt{31395}}{193154}iR_{11,4} \\ & - \frac{225\sqrt{50830}}{237728}iR_{11,6} + \frac{9\sqrt{96577}}{40664}iR_{11,8} - \frac{27\sqrt{6760390}}{3090464}iR_{11,10} \end{aligned}$

Table B459: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 128 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	4	$\begin{aligned} & \frac{9\sqrt{110}}{260}R_{10} + \frac{9\sqrt{2310}}{2860}R_{30} - \frac{21\sqrt{77}}{1430}R_{32} + \frac{9\sqrt{30}}{1105}R_{50} \\ & - \frac{7\sqrt{7}}{85}R_{52} - \frac{100\sqrt{21}}{663}R_{54} - \frac{1575\sqrt{22}}{184756}R_{70} - \frac{145\sqrt{462}}{14212}R_{72} \\ & - \frac{375\sqrt{21}}{8398}R_{74} + \frac{45\sqrt{546}}{16796}R_{76} - \frac{27\sqrt{6270}}{20995}R_{90} - \frac{2387\sqrt{114}}{251940}R_{92} \\ & + \frac{115\sqrt{5187}}{25194}R_{94} + \frac{27\sqrt{494}}{6460}R_{96} + \frac{\sqrt{12597}}{4845}R_{98} - \frac{2673\sqrt{7590}}{1931540}R_{11,0} \\ & + \frac{231\sqrt{299}}{41990}R_{11,2} - \frac{205\sqrt{31395}}{193154}R_{11,4} + \frac{81\sqrt{50830}}{193154}R_{11,6} \\ & - \frac{3\sqrt{96577}}{74290}R_{11,8} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	5	$\begin{aligned} & \frac{567\sqrt{5965}}{77545}R_{10} + \frac{567\sqrt{125265}}{852995}R_{30} - \frac{921\sqrt{16702}}{1705990}R_{32} \\ & + \frac{2268\sqrt{196845}}{14500915}R_{50} + \frac{6509\sqrt{183722}}{14500915}R_{52} - \frac{1330\sqrt{551166}}{8700549}R_{54} \\ & - \frac{99225\sqrt{1193}}{55103477}R_{70} + \frac{176615\sqrt{25053}}{110206954}R_{72} - \frac{375\sqrt{551166}}{2900183}R_{74} \\ & - \frac{405\sqrt{3582579}}{10018814}R_{76} - \frac{6804\sqrt{340005}}{25047035}R_{90} + \frac{9983\sqrt{748011}}{150282210}R_{92} \\ & - \frac{5\sqrt{136138002}}{790959}R_{94} - \frac{243\sqrt{3241381}}{3853390}R_{96} - \frac{2\sqrt{330620862}}{340005}R_{98} \\ & - \frac{168399\sqrt{411585}}{576081805}R_{11,0} - \frac{122817\sqrt{7847554}}{1152163610}R_{11,2} - \frac{10\sqrt{823993170}}{6064019}R_{11,4} \\ & - \frac{729\sqrt{333521045}}{115216361}R_{11,6} + \frac{3\sqrt{2534759942}}{2606705}R_{11,8} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	6	$\begin{aligned} & \frac{\sqrt{129094530}}{15509}R_{10} + \frac{3\sqrt{301220570}}{170599}R_{30} + \frac{28\sqrt{90366171}}{55940963}R_{32} \\ & + \frac{12\sqrt{473346610}}{2900183}R_{50} + \frac{112\sqrt{994027881}}{950996371}R_{52} + \frac{100380\sqrt{331342627}}{10460960081}R_{54} \\ & - \frac{875\sqrt{25818906}}{55103477}R_{70} + \frac{6750\sqrt{60244114}}{18068931049}R_{72} + \frac{1613250\sqrt{331342627}}{198758241539}R_{74} \\ & - \frac{150\sqrt{8614908302}}{18068931049}R_{76} - \frac{36\sqrt{817598690}}{5009407}R_{90} + \frac{924\sqrt{1798717118}}{18068931049}R_{92} \\ & + \frac{7170\sqrt{81841628869}}{18068931049}R_{94} - \frac{6\sqrt{70149967602}}{1389917773}R_{96} + \frac{1116\sqrt{198758241539}}{1389917773}R_{98} \\ & - \frac{891\sqrt{989724730}}{115216361}R_{11,0} + \frac{2772\sqrt{42459190917}}{415585414127}R_{11,2} + \frac{43020\sqrt{495357227365}}{415585414127}R_{11,4} \\ & - \frac{180\sqrt{7218062455890}}{415585414127}R_{11,6} - \frac{1674\sqrt{13714318666191}}{31968108779}R_{11,8} \end{aligned}$
$\frac{11}{2}$	5	5	$\frac{13}{2}$	6	7	$\begin{aligned} & - \frac{28\sqrt{108318210}}{515801}R_{32} - \frac{112\sqrt{9847110}}{797147}R_{52} + \frac{56\sqrt{3282370}}{797147}R_{54} \\ & - \frac{13500\sqrt{18053035}}{166603723}R_{72} + \frac{900\sqrt{3282370}}{15145793}R_{74} + \frac{300\sqrt{126245}}{1165061}R_{76} \\ & - \frac{1848\sqrt{4454645}}{15145793}R_{92} + \frac{44\sqrt{4797310}}{1165061}R_{94} + \frac{156\sqrt{1027995}}{1165061}R_{96} \\ & - \frac{80\sqrt{11650610}}{1165061}R_{98} - \frac{2772\sqrt{2488830}}{26796403}R_{11,2} + \frac{1320\sqrt{1161454}}{26796403}R_{11,4} \\ & + \frac{1800\sqrt{4231011}}{26796403}R_{11,6} + \frac{120\sqrt{803892090}}{26796403}R_{11,8} \end{aligned}$

Table B460: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 129 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	6	$\frac{11}{2}$	5	6	$\begin{aligned} & \frac{35\sqrt{30}}{2288}I_{21} + \frac{56\sqrt{5}}{143}I_{41} + \frac{25\sqrt{546}}{1496}I_{61} - \frac{175\sqrt{1365}}{9724}I_{63} \\ & + \frac{11025\sqrt{34}}{46189}I_{81} + \frac{175\sqrt{39270}}{46189}I_{83} + \frac{63\sqrt{2310}}{33592}I_{10,1} \\ & + \frac{63\sqrt{5005}}{67184}I_{10,3} + \frac{63\sqrt{1001}}{67184}I_{10,5} + R_{00} + \frac{35\sqrt{5}}{143}R_{20} \\ & + \frac{56}{143}R_{40} + \frac{200\sqrt{13}}{2431}R_{60} + \frac{2450\sqrt{17}}{46189}R_{80} + \frac{126\sqrt{21}}{4199}R_{10,0} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	1	$\begin{aligned} & -\frac{3\sqrt{2387}}{17732}iR_{10} - \frac{49\sqrt{1023}}{53196}iR_{30} - \frac{7\sqrt{3410}}{17732}iR_{32} - \frac{50\sqrt{651}}{20553}iR_{50} \\ & - \frac{25\sqrt{310}}{13702}iR_{52} + \frac{5\sqrt{930}}{6851}iR_{54} - \frac{1470\sqrt{11935}}{1431859}iR_{70} \\ & - \frac{315\sqrt{5115}}{2863718}iR_{72} + \frac{280\sqrt{930}}{130169}iR_{74} - \frac{35\sqrt{6045}}{8398}iR_{76} \\ & - \frac{1575\sqrt{136059}}{2863718}iR_{90} + \frac{225\sqrt{61845}}{520676}iR_{92} + \frac{105\sqrt{229710}}{520676}iR_{94} \\ & + \frac{15\sqrt{267995}}{16796}iR_{96} - \frac{7623\sqrt{164703}}{5987774}iR_{11,0} + \frac{9801\sqrt{648830}}{11975548}iR_{11,2} \\ & - \frac{7623\sqrt{55614}}{11975548}iR_{11,4} - \frac{33\sqrt{1103011}}{193154}iR_{11,6} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	2	$\begin{aligned} & -\frac{5\sqrt{94395}}{257114}iR_{10} - \frac{245\sqrt{4495}}{771342}iR_{30} + \frac{35\sqrt{5394}}{29667}iR_{32} - \frac{500\sqrt{346115}}{6556407}iR_{50} \\ & + \frac{380\sqrt{59334}}{596037}iR_{52} + \frac{5520\sqrt{19778}}{2185469}iR_{54} - \frac{24500\sqrt{18879}}{41523911}iR_{70} \\ & + \frac{8820\sqrt{899}}{1431859}iR_{72} + \frac{55230\sqrt{19778}}{41523911}iR_{74} - \frac{7875\sqrt{597835}}{41523911}iR_{90} \\ & + \frac{270\sqrt{1315237}}{3194147}iR_{92} - \frac{945\sqrt{4885166}}{7549802}iR_{94} - \frac{38115\sqrt{723695}}{86822723}iR_{11,0} \\ & - \frac{3960\sqrt{124186062}}{86822723}iR_{11,2} - \frac{3465\sqrt{29568110}}{173645446}iR_{11,4} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	3	$\begin{aligned} & -\frac{\sqrt{6090}}{8294}iR_{10} - \frac{49\sqrt{290}}{24882}iR_{30} - \frac{7\sqrt{87}}{4147}iR_{32} - \frac{100\sqrt{22330}}{211497}iR_{50} \\ & - \frac{100\sqrt{957}}{70499}iR_{52} - \frac{750\sqrt{319}}{70499}iR_{54} - \frac{4900\sqrt{1218}}{1339481}iR_{70} \\ & - \frac{630\sqrt{58}}{46189}iR_{72} - \frac{1050\sqrt{319}}{1339481}iR_{74} - \frac{1575\sqrt{38570}}{1339481}iR_{90} \\ & - \frac{1125\sqrt{84854}}{1339481}iR_{92} + \frac{1575\sqrt{78793}}{1339481}iR_{94} - \frac{7623\sqrt{46690}}{2800733}iR_{11,0} \\ & - \frac{1584\sqrt{2003001}}{2800733}iR_{11,2} - \frac{693\sqrt{476905}}{2800733}iR_{11,4} \end{aligned}$

Table B461: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 130 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	4	$ \begin{aligned} & -\frac{27\sqrt{161}}{13156}R_{10} - \frac{7\sqrt{69}}{13156}R_{30} + \frac{49\sqrt{230}}{13156}R_{32} - \frac{5\sqrt{5313}}{6578}R_{50} \\ & + \frac{25\sqrt{2530}}{8602}R_{52} - \frac{185\sqrt{7590}}{111826}R_{54} - \frac{5250\sqrt{805}}{1062347}R_{70} \\ & - \frac{1015\sqrt{345}}{163438}R_{72} + \frac{2100\sqrt{7590}}{1062347}R_{74} + \frac{35\sqrt{49335}}{124982}R_{76} \\ & + \frac{1905\sqrt{9177}}{1062347}R_{90} + \frac{675\sqrt{504735}}{2124694}R_{92} - \frac{105\sqrt{1874730}}{4249388}R_{94} \\ & - \frac{15\sqrt{2187185}}{124982}R_{96} + \frac{15\sqrt{223092870}}{2124694}R_{98} + \frac{3993\sqrt{21}}{181792}R_{11,0} \\ & + \frac{3267\sqrt{10010}}{3090464}R_{11,2} - \frac{7623\sqrt{858}}{1545232}R_{11,4} - \frac{10527\sqrt{17017}}{3090464}R_{11,6} \\ & - \frac{1089\sqrt{3233230}}{3090464}R_{11,8} - \frac{7623\sqrt{46189}}{3090464}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	5	$ \begin{aligned} & \frac{5\sqrt{5865}}{111826}R_{10} - \frac{7\sqrt{13685}}{4692}R_{30} + \frac{315\sqrt{16422}}{223652}R_{32} + \frac{5\sqrt{21505}}{9867}R_{50} \\ & - \frac{15\sqrt{180642}}{950521}R_{52} - \frac{215\sqrt{60214}}{950521}R_{54} + \frac{12005\sqrt{1173}}{3283618}R_{70} \\ & + \frac{26460\sqrt{2737}}{18059899}R_{72} - \frac{31815\sqrt{60214}}{36119798}R_{74} - \frac{1680\sqrt{391391}}{18059899}R_{76} \\ & - \frac{9135\sqrt{37145}}{44455136}R_{90} - \frac{52605\sqrt{81719}}{144479192}R_{92} - \frac{9135\sqrt{14872858}}{288958384}R_{94} \\ & + \frac{105\sqrt{3187041}}{11113784}R_{96} + \frac{43785\sqrt{124982}}{33995104}R_{98} + \frac{7623\sqrt{85}}{3090464}R_{11,0} \\ & + \frac{10395\sqrt{14586}}{52537888}R_{11,2} - \frac{2079\sqrt{170170}}{26268944}R_{11,4} - \frac{6699\sqrt{2145}}{3090464}R_{11,6} \\ & - \frac{3465\sqrt{16302}}{3090464}R_{11,8} - \frac{693\sqrt{285285}}{3090464}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	6	$\frac{11}{2}$	6	6	$ \begin{aligned} & -\frac{3\sqrt{238}}{442}R_{10} + \frac{28\sqrt{102}}{7293}R_{30} + \frac{56\sqrt{85}}{2431}R_{32} - \frac{5\sqrt{7854}}{3432}R_{50} \\ & - \frac{265\sqrt{935}}{82654}R_{52} - \frac{445\sqrt{2805}}{165308}R_{54} + \frac{735\sqrt{1190}}{3140852}R_{70} \\ & + \frac{24325\sqrt{510}}{3140852}R_{72} + \frac{10745\sqrt{2805}}{1570426}R_{74} - \frac{105\sqrt{72930}}{241604}R_{76} \\ & - \frac{120\sqrt{13566}}{71383}R_{90} - \frac{4065\sqrt{746130}}{12563408}R_{92} - \frac{105\sqrt{692835}}{3140852}R_{94} \\ & + \frac{915\sqrt{3233230}}{12563408}R_{96} - \frac{15\sqrt{285285}}{92378}R_{98} - \frac{363\sqrt{16422}}{1545232}R_{11,0} \\ & - \frac{297\sqrt{1956955}}{13134472}R_{11,2} + \frac{693\sqrt{167739}}{6567236}R_{11,4} + \frac{957\sqrt{46046}}{1545232}R_{11,6} \\ & + \frac{99\sqrt{2187185}}{772616}R_{11,8} + \frac{693\sqrt{124982}}{1545232}R_{11,10} \end{aligned} $
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	1	$ \begin{aligned} & \frac{7\sqrt{33}}{286}R_{32} - \frac{14\sqrt{3}}{221}R_{52} - \frac{28}{221}R_{54} - \frac{15\sqrt{462}}{2584}R_{70} \\ & + \frac{18795\sqrt{22}}{369512}R_{72} + \frac{735}{16796}R_{74} + \frac{1005\sqrt{26}}{33592}R_{76} - \frac{3\sqrt{14630}}{2584}R_{90} \\ & + \frac{7\sqrt{266}}{8398}R_{92} + \frac{7\sqrt{247}}{442}R_{94} - \frac{31\sqrt{10374}}{8398}R_{96} - \frac{9\sqrt{29393}}{16796}R_{98} \\ & - \frac{9\sqrt{17710}}{27968}R_{11,0} - \frac{63\sqrt{6279}}{237728}R_{11,2} + \frac{273\sqrt{1495}}{118864}R_{11,4} \\ & + \frac{39\sqrt{1067430}}{475456}R_{11,6} - \frac{3\sqrt{2028117}}{237728}R_{11,8} + \frac{63\sqrt{2897310}}{475456}R_{11,10} \end{aligned} $

Table B462: Box matrix elements $B_{J'L'n'; JLn}^{(P\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 131 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	2	$\begin{aligned} & \frac{3\sqrt{385}}{572}R_{10} - \frac{21\sqrt{165}}{3146}R_{30} + \frac{63\sqrt{22}}{3146}R_{32} - \frac{60\sqrt{105}}{2431}R_{50} \\ & + \frac{1323\sqrt{2}}{4862}R_{52} - \frac{189\sqrt{6}}{2431}R_{54} + \frac{13185\sqrt{77}}{1016158}R_{70} + \frac{7705\sqrt{33}}{1016158}R_{72} \\ & - \frac{8285\sqrt{6}}{92378}R_{74} + \frac{2095\sqrt{39}}{92378}R_{76} - \frac{321\sqrt{21945}}{1478048}R_{90} \\ & - \frac{97\sqrt{399}}{33592}R_{92} - \frac{63\sqrt{1482}}{67184}R_{94} + \frac{3\sqrt{1729}}{33592}R_{96} + \frac{\sqrt{176358}}{7072}R_{98} \\ & - \frac{279\sqrt{26565}}{772616}R_{11,0} - \frac{297\sqrt{4186}}{386308}R_{11,2} + \frac{441\sqrt{8970}}{386308}R_{11,4} \\ & + \frac{9\sqrt{177905}}{16796}R_{11,6} + \frac{81\sqrt{1352078}}{772616}R_{11,8} - \frac{189\sqrt{482885}}{386308}R_{11,10} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	3	$\begin{aligned} & \frac{9\sqrt{154}}{286}R_{10} - \frac{889\sqrt{66}}{12584}R_{30} + \frac{287\sqrt{55}}{6292}R_{32} + \frac{25\sqrt{42}}{2431}R_{50} \\ & + \frac{602\sqrt{5}}{2431}R_{52} - \frac{14\sqrt{15}}{143}R_{54} - \frac{3285\sqrt{770}}{427856}R_{70} - \frac{112845\sqrt{330}}{8129264}R_{72} \\ & + \frac{7815\sqrt{15}}{369512}R_{74} + \frac{3645\sqrt{390}}{739024}R_{76} + \frac{1215\sqrt{8778}}{739024}R_{90} \\ & + \frac{27\sqrt{3990}}{8398}R_{92} - \frac{7\sqrt{3705}}{16796}R_{94} - \frac{9\sqrt{17290}}{8398}R_{96} + \frac{7\sqrt{440895}}{33592}R_{98} \\ & + \frac{27\sqrt{10626}}{81328}R_{11,0} + \frac{495\sqrt{10465}}{1545232}R_{11,2} - \frac{21\sqrt{897}}{11362}R_{11,4} \\ & - \frac{1647\sqrt{71162}}{3090464}R_{11,6} - \frac{63\sqrt{3380195}}{772616}R_{11,8} - \frac{63\sqrt{193154}}{3090464}R_{11,10} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	4	$\begin{aligned} & -\frac{3\sqrt{154}}{260}iR_{10} - \frac{7\sqrt{66}}{715}iR_{30} + \frac{7\sqrt{55}}{715}iR_{32} - \frac{2\sqrt{42}}{221}iR_{50} \\ & + \frac{63\sqrt{5}}{1105}iR_{52} + \frac{14\sqrt{15}}{663}iR_{54} - \frac{75\sqrt{770}}{46189}iR_{70} + \frac{1825\sqrt{330}}{184756}iR_{72} \\ & + \frac{36\sqrt{15}}{4199}iR_{74} - \frac{393\sqrt{390}}{16796}iR_{76} - \frac{3\sqrt{8778}}{8398}iR_{90} + \frac{847\sqrt{3990}}{251940}iR_{92} \\ & - \frac{35\sqrt{3705}}{25194}iR_{94} - \frac{163\sqrt{17290}}{83980}iR_{96} - \frac{99\sqrt{10626}}{482885}iR_{11,0} \\ & + \frac{924\sqrt{10465}}{482885}iR_{11,2} - \frac{3479\sqrt{897}}{482885}iR_{11,4} + \frac{516\sqrt{71162}}{482885}iR_{11,6} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	5	$\begin{aligned} & -\frac{453\sqrt{8351}}{155090}iR_{10} - \frac{2114\sqrt{3579}}{852995}iR_{30} + \frac{203\sqrt{11930}}{131230}iR_{32} \\ & - \frac{604\sqrt{275583}}{2900183}iR_{50} + \frac{7938\sqrt{131230}}{14500915}iR_{52} - \frac{1036\sqrt{393690}}{8700549}iR_{54} \\ & - \frac{22650\sqrt{41755}}{55103477}iR_{70} + \frac{189325\sqrt{17895}}{110206954}iR_{72} + \frac{3186\sqrt{393690}}{55103477}iR_{74} \\ & - \frac{3\sqrt{2558985}}{45334}iR_{76} - \frac{453\sqrt{476007}}{5009407}iR_{90} + \frac{277\sqrt{26180385}}{5780085}iR_{92} \\ & + \frac{35\sqrt{97241430}}{1581918}iR_{94} + \frac{\sqrt{113448335}}{113335}iR_{96} - \frac{29898\sqrt{576219}}{576081805}iR_{11,0} \\ & + \frac{14793\sqrt{274664390}}{1152163610}iR_{11,2} + \frac{45311\sqrt{23542662}}{576081805}iR_{11,4} - \frac{3\sqrt{466929463}}{2606705}iR_{11,6} \end{aligned}$

Table B463: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 132 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	6	$\begin{aligned} & \frac{33\sqrt{180732342}}{55940963}iR_{10} + \frac{84\sqrt{8606302}}{55940963}iR_{30} + \frac{35287\sqrt{64547265}}{615350593}iR_{32} \\ & + \frac{120\sqrt{662685254}}{950996371}iR_{50} + \frac{28\sqrt{710019915}}{2900183}iR_{52} - \frac{84\sqrt{236673305}}{950996371}iR_{54} \\ & + \frac{1500\sqrt{903661710}}{18068931049}iR_{70} + \frac{304875\sqrt{43031510}}{23383322534}iR_{72} - \frac{1740\sqrt{236673305}}{18068931049}iR_{74} \\ & + \frac{12555\sqrt{6153505930}}{2779835546}iR_{76} + \frac{990\sqrt{1144638166}}{18068931049}iR_{90} - \frac{207\sqrt{62955099130}}{1062878297}iR_{92} \\ & - \frac{42\sqrt{58458306335}}{18068931049}iR_{94} - \frac{279\sqrt{2455248866070}}{1389917773}iR_{96} + \frac{13068\sqrt{1385614622}}{415585414127}iR_{11,0} \\ & - \frac{40671\sqrt{1486071682095}}{415585414127}iR_{11,2} + \frac{3528\sqrt{14153063639}}{415585414127}iR_{11,4} \\ & + \frac{837\sqrt{10105287438246}}{31968108779}iR_{11,6} \end{aligned}$
$\frac{11}{2}$	5	6	$\frac{13}{2}$	6	7	$\begin{aligned} & -\frac{6\sqrt{54159105}}{46891}iR_{10} - \frac{168\sqrt{2579005}}{515801}iR_{30} + \frac{28\sqrt{3094806}}{515801}iR_{32} \\ & - \frac{240\sqrt{1641185}}{797147}iR_{50} + \frac{420\sqrt{93782}}{797147}iR_{54} - \frac{15000\sqrt{10831821}}{166603723}iR_{70} \\ & - \frac{1500\sqrt{515801}}{12815671}iR_{72} + \frac{8700\sqrt{93782}}{15145793}iR_{74} - \frac{4500\sqrt{3607}}{1165061}iR_{76} \\ & - \frac{180\sqrt{343007665}}{15145793}iR_{90} - \frac{880\sqrt{6236503}}{15145793}iR_{92} + \frac{210\sqrt{137066}}{1165061}iR_{94} \\ & + \frac{200\sqrt{1439193}}{1165061}iR_{96} - \frac{2376\sqrt{415219805}}{348353239}iR_{11,0} - \frac{132\sqrt{3484362}}{1576259}iR_{11,2} \\ & - \frac{3528\sqrt{829610}}{26796403}iR_{11,4} - \frac{120\sqrt{148085385}}{26796403}iR_{11,6} \end{aligned}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	1	$\begin{aligned} & R_{00} - \frac{140\sqrt{5}}{403}R_{20} + \frac{12}{31}R_{40} + \frac{30\sqrt{10}}{403}R_{42} \\ & - \frac{80\sqrt{13}}{403}R_{60} - \frac{224\sqrt{1365}}{6851}R_{62} + \frac{5390\sqrt{17}}{130169}R_{80} + \frac{900\sqrt{595}}{130169}R_{82} \\ & - \frac{1935\sqrt{2618}}{130169}R_{84} + \frac{25416\sqrt{21}}{130169}R_{10,0} + \frac{7392\sqrt{770}}{130169}R_{10,2} \\ & + \frac{1452\sqrt{10010}}{130169}R_{10,4} \end{aligned}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	2	$\begin{aligned} & \frac{30\sqrt{957}}{4433}R_{20} + \frac{24\sqrt{4785}}{128557}R_{40} + \frac{996\sqrt{1914}}{128557}R_{42} + \frac{840\sqrt{62205}}{2185469}R_{60} \\ & - \frac{3760\sqrt{29029}}{2185469}R_{62} + \frac{3080\sqrt{81345}}{3774901}R_{80} - \frac{320\sqrt{113883}}{2185469}R_{82} \\ & - \frac{2420\sqrt{103530}}{3774901}R_{84} - \frac{900\sqrt{11165}}{130169}R_{10,0} - \frac{5472\sqrt{1218}}{198679}R_{10,2} \\ & - \frac{32406\sqrt{15834}}{3774901}R_{10,4} \end{aligned}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	3	$\begin{aligned} & \frac{28\sqrt{296670}}{128557}R_{40} - \frac{112\sqrt{29667}}{128557}R_{42} + \frac{980\sqrt{3856710}}{2185469}R_{60} \\ & + \frac{1800\sqrt{1799798}}{2185469}R_{62} + \frac{140\sqrt{5043390}}{1339481}R_{80} + \frac{60\sqrt{7060746}}{41523911}R_{82} \\ & - \frac{20\sqrt{1604715}}{121771}R_{84} + \frac{108\sqrt{692230}}{130169}R_{10,0} + \frac{19104\sqrt{18879}}{3774901}R_{10,2} \\ & + \frac{4020\sqrt{245427}}{3774901}R_{10,4} \end{aligned}$

Table B464: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 133 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	4	$-\frac{5\sqrt{235290}}{4433}iI_{21} - \frac{144\sqrt{39215}}{101959}iI_{41} - \frac{10\sqrt{4282278}}{101959}iI_{61}$ $- \frac{20\sqrt{10705695}}{133331}iI_{63} + \frac{2520\sqrt{266662}}{32932757}iI_{81} - \frac{280\sqrt{2545410}}{2993887}iI_{83}$ $+ \frac{1062\sqrt{149730}}{2993887}iI_{10,1} + \frac{99\sqrt{324415}}{2993887}iI_{10,3} - \frac{6237\sqrt{64883}}{2993887}iI_{10,5}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	5	$-\frac{56\sqrt{2799951}}{101959}iI_{41} + \frac{240\sqrt{17333030}}{29466151}iI_{61} - \frac{10720\sqrt{1733303}}{29466151}iI_{63}$ $+ \frac{420\sqrt{1647030}}{2993887}iI_{81} + \frac{23380\sqrt{1426}}{2993887}iI_{83} + \frac{2016\sqrt{24242}}{3915083}iI_{10,1}$ $- \frac{23352\sqrt{472719}}{50896079}iI_{10,3} + \frac{12936\sqrt{2363595}}{50896079}iI_{10,5}$
$\frac{11}{2}$	6	1	$\frac{11}{2}$	6	6	$-\frac{240\sqrt{1582581}}{1281137}iI_{61} + \frac{120\sqrt{15825810}}{1281137}iI_{63} - \frac{840\sqrt{341}}{6851}iI_{81}$ $- \frac{4200\sqrt{3255}}{130169}iI_{83} + \frac{168\sqrt{55335}}{170221}iI_{10,1} - \frac{828\sqrt{479570}}{2212873}iI_{10,3}$ $- \frac{1656\sqrt{95914}}{2212873}iI_{10,5}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	1	$-\frac{2\sqrt{31}}{65}iI_{21} + \frac{30\sqrt{186}}{6851}iI_{41} - \frac{4\sqrt{14105}}{130169}iI_{61} - \frac{420\sqrt{5642}}{130169}iI_{63}$ $+ \frac{2372\sqrt{7905}}{130169}iI_{81} + \frac{900\sqrt{40579}}{130169}iI_{83} - \frac{18108\sqrt{2387}}{2993887}iI_{10,1}$ $+ \frac{99\sqrt{186186}}{2993887}iI_{10,3} + \frac{2871\sqrt{930930}}{2993887}iI_{10,5} - \frac{14388\sqrt{4030}}{303025}iI_{12,1}$ $- \frac{14058\sqrt{930930}}{5757475}iI_{12,3} - \frac{572\sqrt{7912905}}{1151495}iI_{12,5}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	2	$-\frac{11\sqrt{186}}{2015}iI_{21} + \frac{4260\sqrt{31}}{75361}iI_{41} - \frac{1442\sqrt{84630}}{1431859}iI_{61} - \frac{420\sqrt{8463}}{1431859}iI_{63}$ $+ \frac{2088\sqrt{5270}}{130169}iI_{81} + \frac{1800\sqrt{243474}}{1431859}iI_{83} - \frac{4974\sqrt{14322}}{2993887}iI_{10,1}$ $+ \frac{3897\sqrt{31031}}{2993887}iI_{10,3} + \frac{693\sqrt{155155}}{2993887}iI_{10,5} + \frac{7128\sqrt{6045}}{185725}iI_{12,1}$ $+ \frac{1908\sqrt{155155}}{338675}iI_{12,3} + \frac{732\sqrt{5275270}}{1151495}iI_{12,5}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	3	$-\frac{630\sqrt{310}}{75361}iI_{41} + \frac{560\sqrt{8463}}{1431859}iI_{61} - \frac{1120\sqrt{84630}}{1431859}iI_{63}$ $+ \frac{120\sqrt{527}}{10013}iI_{81} + \frac{360\sqrt{608685}}{1431859}iI_{83} + \frac{288\sqrt{35805}}{230299}iI_{10,1}$ $- \frac{36\sqrt{310310}}{2993887}iI_{10,3} - \frac{9900\sqrt{62062}}{2993887}iI_{10,5} + \frac{7788\sqrt{2418}}{230299}iI_{12,1}$ $+ \frac{666\sqrt{62062}}{67735}iI_{12,3} + \frac{732\sqrt{527527}}{1151495}iI_{12,5}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	4	$-\frac{82\sqrt{310}}{10075}R_{20} + \frac{18\sqrt{62}}{527}R_{40} - \frac{246\sqrt{155}}{34255}R_{42} - \frac{168\sqrt{806}}{130169}R_{60}$ $+ \frac{2864\sqrt{84630}}{1952535}R_{62} + \frac{444\sqrt{1054}}{130169}R_{80} - \frac{232\sqrt{36890}}{911183}R_{82}$ $+ \frac{4\sqrt{40579}}{29393}R_{84} + \frac{132\sqrt{1302}}{4199}R_{10,0} + \frac{56928\sqrt{11935}}{2993887}R_{10,2}$ $+ \frac{53772\sqrt{155155}}{14969435}R_{10,4} - \frac{139524\sqrt{62}}{5757475}R_{12,0} - \frac{3278\sqrt{93093}}{5757475}R_{12,2}$ $+ \frac{264\sqrt{62062}}{230299}R_{12,4} + \frac{13002\sqrt{150722}}{5757475}R_{12,6}$

Table B465: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 134 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	5	$\frac{2\sqrt{2034065}}{110825}R_{20} + \frac{2268\sqrt{406813}}{89905673}R_{40} + \frac{31254\sqrt{4068130}}{449528365}R_{42}$ $+ \frac{222264\sqrt{5288569}}{1708207787}R_{60} + \frac{134128\sqrt{555299745}}{25623116805}R_{62} + \frac{20688\sqrt{6915821}}{1708207787}R_{80}$ $+ \frac{259936\sqrt{242053735}}{11957454509}R_{82} + \frac{872\sqrt{8801954}}{63943607}R_{84} + \frac{41052\sqrt{8543073}}{115216361}R_{10,0}$ $+ \frac{4726128\sqrt{2588810}}{3571707191}R_{10,2} + \frac{3723522\sqrt{33654530}}{17858535955}R_{10,4} + \frac{3432\sqrt{406813}}{6868667675}R_{12,0}$ $- \frac{300278\sqrt{20192718}}{6868667675}R_{12,2} + \frac{63888\sqrt{3365453}}{274746707}R_{12,4} - \frac{251196\sqrt{8173243}}{6868667675}R_{12,6}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	6	$\frac{20\sqrt{8804246946}}{89905673}R_{40} - \frac{16\sqrt{22010617365}}{89905673}R_{42} + \frac{1960\sqrt{114455210298}}{1708207787}R_{60}$ $+ \frac{3237680\sqrt{1335310786810}}{6161505487709}R_{62} + \frac{828720\sqrt{149672198082}}{6161505487709}R_{80}$ $- \frac{1843440\sqrt{5238526932870}}{43130538413963}R_{82} + \frac{7302000\sqrt{47622972117}}{3920958037633}R_{84}$ $- \frac{100833480\sqrt{20543242874}}{12883147837937}R_{10,0} - \frac{245039520\sqrt{14006756505}}{12883147837937}R_{10,2}$ $- \frac{2450712\sqrt{182087834565}}{560136862519}R_{10,4} - \frac{14507064\sqrt{8804246946}}{4955056860745}R_{12,0}$ $+ \frac{41212512\sqrt{12139188971}}{4955056860745}R_{12,2} - \frac{13911216\sqrt{72835133826}}{4955056860745}R_{12,4}$ $- \frac{3519648\sqrt{176885325006}}{4955056860745}R_{12,6}$
$\frac{11}{2}$	6	1	$\frac{13}{2}$	6	7	$- \frac{5280\sqrt{782719}}{36116891}R_{62} + \frac{6720\sqrt{370673355}}{469519583}R_{80} - \frac{160\sqrt{518942697}}{172980899}R_{82}$ $- \frac{8000\sqrt{57083696670}}{3286637081}R_{84} + \frac{1694880\sqrt{50876735}}{10798950409}R_{10,0} + \frac{30240\sqrt{671572902}}{568365811}R_{10,2}$ $+ \frac{83520\sqrt{51659454}}{830688493}R_{10,4} + \frac{446688\sqrt{21804315}}{4153442465}R_{12,0} - \frac{227616\sqrt{86099090}}{4153442465}R_{12,2}$ $- \frac{14784\sqrt{129148635}}{4153442465}R_{12,4} + \frac{1728\sqrt{313646685}}{830688493}R_{12,6}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	2	$R_{00} + \frac{92\sqrt{5}}{11687}R_{20} - \frac{27444}{128557}R_{40} - \frac{1614\sqrt{10}}{11687}R_{42}$ $- \frac{176240\sqrt{13}}{2185469}R_{60} - \frac{416\sqrt{1365}}{15283}R_{62} - \frac{2331350\sqrt{17}}{41523911}R_{80}$ $+ \frac{862380\sqrt{595}}{41523911}R_{82} + \frac{13215\sqrt{2618}}{3194147}R_{84} + \frac{160200\sqrt{21}}{3774901}R_{10,0}$ $+ \frac{16272\sqrt{770}}{3774901}R_{10,2} - \frac{7884\sqrt{10010}}{3774901}R_{10,4}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	3	$\frac{252\sqrt{310}}{4147}R_{20} + \frac{5740\sqrt{62}}{128557}R_{40} - \frac{2856\sqrt{155}}{128557}R_{42} - \frac{37800\sqrt{806}}{2185469}R_{60}$ $- \frac{2432\sqrt{84630}}{2185469}R_{62} + \frac{3360\sqrt{1054}}{1339481}R_{80} - \frac{16140\sqrt{36890}}{41523911}R_{82}$ $+ \frac{120\sqrt{40579}}{103037}R_{84} + \frac{63360\sqrt{1302}}{3774901}R_{10,0} + \frac{36576\sqrt{11935}}{3774901}R_{10,2}$ $+ \frac{432\sqrt{155155}}{290377}R_{10,4}$

Table B466: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 135 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	4	$\frac{240\sqrt{41354}}{101959}iI_{21} + \frac{120\sqrt{62031}}{268801}iI_{41} - \frac{1080\sqrt{18816070}}{50265787}iI_{61}$ $- \frac{11760\sqrt{1881607}}{50265787}iI_{63} - \frac{256340\sqrt{10545270}}{955049953}iI_{81} - \frac{139860\sqrt{54132386}}{955049953}iI_{83}$ $- \frac{18000\sqrt{3184258}}{86822723}iI_{10,1} + \frac{96\sqrt{62093031}}{4569617}iI_{10,3} + \frac{2016\sqrt{310465155}}{86822723}iI_{10,5}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	5	$- \frac{9\sqrt{73816890}}{95381}iI_{21} + \frac{2384\sqrt{12302815}}{50265787}iI_{41} + \frac{39030\sqrt{27417702}}{854518379}iI_{61}$ $+ \frac{300\sqrt{68544255}}{29466151}iI_{63} + \frac{387240\sqrt{289478}}{955049953}iI_{81} - \frac{89880\sqrt{6823410}}{955049953}iI_{83}$ $- \frac{29106\sqrt{115997970}}{1475986291}iI_{10,1} - \frac{8505\sqrt{251328935}}{1475986291}iI_{10,3} + \frac{62055\sqrt{50265787}}{1475986291}iI_{10,5}$
$\frac{11}{2}$	6	2	$\frac{11}{2}$	6	6	$- \frac{392\sqrt{91698}}{70499}iI_{41} + \frac{5040\sqrt{6953765}}{37152973}iI_{61} - \frac{2680\sqrt{2781506}}{37152973}iI_{63}$ $- \frac{31500\sqrt{13485}}{3774901}iI_{81} - \frac{6860\sqrt{69223}}{3774901}iI_{83} - \frac{792\sqrt{1176791}}{4936409}iI_{10,1}$ $+ \frac{504\sqrt{91789698}}{64173317}iI_{10,3} - \frac{36\sqrt{458948490}}{4936409}iI_{10,5}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	1	$- \frac{378\sqrt{98890}}{376805}iI_{41} - \frac{480\sqrt{2699697}}{41523911}iI_{61} - \frac{1152\sqrt{26996970}}{41523911}iI_{63}$ $+ \frac{140\sqrt{168113}}{290377}iI_{81} + \frac{1388\sqrt{1604715}}{3774901}iI_{83} - \frac{32544\sqrt{94395}}{33393355}iI_{10,1}$ $+ \frac{9864\sqrt{818090}}{22848085}iI_{10,3} - \frac{15480\sqrt{163618}}{86822723}iI_{10,5} + \frac{220836\sqrt{771342}}{33393355}iI_{12,1}$ $+ \frac{332046\sqrt{163618}}{33393355}iI_{12,3} + \frac{84612\sqrt{1390753}}{33393355}iI_{12,5}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	2	$- \frac{3\sqrt{98890}}{48763}iI_{21} - \frac{47172\sqrt{148335}}{120200795}iI_{41} - \frac{21570\sqrt{1799798}}{456763021}iI_{61}$ $+ \frac{1308\sqrt{4499495}}{35135617}iI_{63} + \frac{390860\sqrt{1008678}}{456763021}iI_{81} + \frac{22092\sqrt{1069810}}{41523911}iI_{83}$ $- \frac{78138\sqrt{62930}}{434113615}iI_{10,1} + \frac{2757\sqrt{1227135}}{33393355}iI_{10,3} - \frac{115395\sqrt{245427}}{86822723}iI_{10,5}$ $- \frac{32472\sqrt{128557}}{1077205}iI_{12,1} - \frac{597564\sqrt{245427}}{33393355}iI_{12,3} - \frac{52404\sqrt{8344518}}{33393355}iI_{12,5}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	3	$- \frac{50\sqrt{9889}}{45617}iI_{21} + \frac{2774\sqrt{59334}}{1849243}iI_{41} + \frac{81860\sqrt{4499495}}{456763021}iI_{61}$ $- \frac{66540\sqrt{1799798}}{456763021}iI_{63} - \frac{108960\sqrt{2521695}}{456763021}iI_{81} + \frac{18000\sqrt{106981}}{41523911}iI_{83}$ $+ \frac{58860\sqrt{6293}}{86822723}iI_{10,1} - \frac{36963\sqrt{490854}}{86822723}iI_{10,3} - \frac{12447\sqrt{2454270}}{86822723}iI_{10,5}$ $+ \frac{43956\sqrt{1285570}}{33393355}iI_{12,1} + \frac{33462\sqrt{2454270}}{33393355}iI_{12,3} + \frac{396\sqrt{20861295}}{1757545}iI_{12,5}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	4	$- \frac{8\sqrt{59334}}{22165}R_{20} - \frac{192\sqrt{296670}}{10927345}R_{40} - \frac{2364\sqrt{29667}}{10927345}R_{42}$ $- \frac{560\sqrt{3856710}}{41523911}R_{60} + \frac{288\sqrt{1799798}}{41523911}R_{62} - \frac{144\sqrt{5043390}}{2185469}R_{80}$ $+ \frac{123560\sqrt{7060746}}{872002131}R_{82} - \frac{64\sqrt{1604715}}{2557191}R_{84} + \frac{864\sqrt{692230}}{737035}R_{10,0}$ $+ \frac{2456448\sqrt{18879}}{434113615}R_{10,2} + \frac{138816\sqrt{245427}}{86822723}R_{10,4} + \frac{6864\sqrt{296670}}{9821575}R_{12,0}$ $+ \frac{6996\sqrt{409045}}{7259425}R_{12,2} - \frac{70752\sqrt{2454270}}{166966775}R_{12,4} - \frac{8844\sqrt{5960370}}{9821575}R_{12,6}$

Table B467: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 136 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	5	$-\frac{55514\sqrt{3217521}}{766842505}R_{20} - \frac{37044\sqrt{16087605}}{1185120235}R_{40} + \frac{406386\sqrt{6435042}}{13036322585}R_{42}$ $+ \frac{87080\sqrt{209138865}}{4503456893}R_{60} + \frac{264752\sqrt{97598137}}{3810617371}R_{62} + \frac{53112\sqrt{273489285}}{2607264517}R_{80}$ $- \frac{794480\sqrt{382884999}}{1040298542283}R_{82} - \frac{12188\sqrt{42117349890}}{7274814981}R_{84} - \frac{8316\sqrt{37537745}}{51722515}R_{10,0}$ $- \frac{42436032\sqrt{495498234}}{517897542695}R_{10,2} - \frac{1221894\sqrt{6441477042}}{103579508539}R_{10,4}$ $- \frac{14755224\sqrt{16087605}}{199191362575}R_{12,0} - \frac{129822\sqrt{10735795070}}{199191362575}R_{12,2} + \frac{1471536\sqrt{16103692605}}{199191362575}R_{12,4}$ $+ \frac{1125564\sqrt{39108967755}}{199191362575}R_{12,6}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	6	$\frac{6\sqrt{7737065498}}{4947371}R_{20} - \frac{41278\sqrt{38685327490}}{854945737529}R_{40} + \frac{1319606\sqrt{3868532749}}{324289762511}R_{42}$ $- \frac{3634680\sqrt{502909257370}}{16243969013051}R_{60} - \frac{57885840\sqrt{2112218880954}}{178683659143561}R_{62}$ $- \frac{10137960\sqrt{657650567330}}{178683659143561}R_{80} - \frac{8567640\sqrt{920710794262}}{113707783091357}R_{82}$ $- \frac{1795320\sqrt{25319546842205}}{96214278000379}R_{84} - \frac{452271204\sqrt{812391877290}}{373611287300173}R_{10,0}$ $- \frac{33084000\sqrt{297877021673}}{12883147837937}R_{10,2} - \frac{11432124\sqrt{3872401281749}}{28739329792321}R_{10,4}$ $+ \frac{76277916\sqrt{38685327490}}{143696648961605}R_{12,0} + \frac{1383030\sqrt{58086019226235}}{28739329792321}R_{12,2}$ $+ \frac{6971976\sqrt{38724012817490}}{143696648961605}R_{12,4} - \frac{670626\sqrt{94044031128190}}{28739329792321}R_{12,6}$
$\frac{11}{2}$	6	2	$\frac{13}{2}$	6	7	$\frac{1680\sqrt{463705099}}{254289893}R_{40} - \frac{672\sqrt{4637050990}}{254289893}R_{42} + \frac{32200\sqrt{35669623}}{371654459}R_{60}$ $+ \frac{288944\sqrt{3745310415}}{34563864687}R_{62} + \frac{8640\sqrt{7882986683}}{149776746977}R_{80} - \frac{466880\sqrt{275904533905}}{1048437228839}R_{82}$ $- \frac{107360\sqrt{10032892142}}{95312475349}R_{84} + \frac{823320\sqrt{9737807079}}{313169561861}R_{10,0} + \frac{1647648\sqrt{2950850630}}{313169561861}R_{10,2}$ $+ \frac{586332\sqrt{226988510}}{24089966297}R_{10,4} + \frac{415008\sqrt{463705099}}{24089966297}R_{12,0} + \frac{804672\sqrt{136193106}}{24089966297}R_{12,2}$ $- \frac{344256\sqrt{22698851}}{24089966297}R_{12,4} + \frac{50688\sqrt{55125781}}{24089966297}R_{12,6}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	3	$R_{00} + \frac{1930\sqrt{5}}{4147}R_{20} + \frac{1136}{4147}R_{40} - \frac{664\sqrt{10}}{4147}R_{42}$ $+ \frac{8080\sqrt{13}}{70499}R_{60} - \frac{32\sqrt{1365}}{5423}R_{62} - \frac{980\sqrt{17}}{103037}R_{80} - \frac{840\sqrt{595}}{121771}R_{82}$ $- \frac{6510\sqrt{2618}}{1339481}R_{84} - \frac{22680\sqrt{21}}{121771}R_{10,0} - \frac{6048\sqrt{770}}{121771}R_{10,2}$ $- \frac{756\sqrt{10010}}{121771}R_{10,4}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	4	$\frac{2352\sqrt{4002}}{95381}iI_{41} + \frac{960\sqrt{303485}}{1621477}iI_{61} - \frac{2120\sqrt{121394}}{1621477}iI_{63}$ $- \frac{5040\sqrt{170085}}{2800733}iI_{81} - \frac{5600\sqrt{873103}}{30808063}iI_{83} - \frac{72\sqrt{51359}}{215441}iI_{10,1}$ $- \frac{192\sqrt{4006002}}{2800733}iI_{10,3} - \frac{84\sqrt{20030010}}{2800733}iI_{10,5}$

Table B468: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 137 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	5	$\frac{32\sqrt{1190595}}{70499}iI_{21} - \frac{24\sqrt{793730}}{124729}iI_{41} + \frac{80\sqrt{442221}}{2505919}iI_{61}$ $+ \frac{40\sqrt{4422210}}{950521}iI_{63} + \frac{590940\sqrt{4669}}{30808063}iI_{81} + \frac{62300\sqrt{110055}}{30808063}iI_{83}$ $+ \frac{1512\sqrt{1870935}}{47612461}iI_{10,1} - \frac{3528\sqrt{16214770}}{47612461}iI_{10,3} - \frac{11340\sqrt{3242954}}{47612461}iI_{10,5}$
$\frac{11}{2}$	6	3	$\frac{11}{2}$	6	6	$- \frac{15\sqrt{986}}{2431}iI_{21} - \frac{128\sqrt{1479}}{70499}iI_{41} - \frac{1080\sqrt{448630}}{1198483}iI_{61}$ $+ \frac{240\sqrt{44863}}{108953}iI_{63} + \frac{7840\sqrt{870}}{1339481}iI_{81} + \frac{10080\sqrt{4466}}{1339481}iI_{83}$ $- \frac{2268\sqrt{75922}}{2070107}iI_{10,1} - \frac{42\sqrt{1480479}}{2070107}iI_{10,3} + \frac{126\sqrt{7402395}}{2070107}iI_{10,5}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	1	$- \frac{560\sqrt{174174}}{1339481}iI_{61} + \frac{560\sqrt{435435}}{1339481}iI_{63} - \frac{1260\sqrt{10846}}{121771}iI_{81}$ $- \frac{140\sqrt{103530}}{121771}iI_{83} - \frac{5256\sqrt{6090}}{1077205}iI_{10,1} + \frac{33624\sqrt{13195}}{14003665}iI_{10,3}$ $+ \frac{18864\sqrt{2639}}{2800733}iI_{10,5} - \frac{29568\sqrt{12441}}{1077205}iI_{12,1} - \frac{34848\sqrt{2639}}{1077205}iI_{12,3}$ $- \frac{1056\sqrt{89726}}{215441}iI_{12,5}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	2	$- \frac{196\sqrt{9570}}{70499}iI_{41} - \frac{8280\sqrt{29029}}{14734291}iI_{61} + \frac{8760\sqrt{290290}}{14734291}iI_{63}$ $+ \frac{460\sqrt{16269}}{70499}iI_{81} + \frac{6540\sqrt{17255}}{1339481}iI_{83} + \frac{792\sqrt{1015}}{1077205}iI_{10,1}$ $- \frac{22638\sqrt{79170}}{14003665}iI_{10,3} - \frac{198\sqrt{15834}}{2800733}iI_{10,5} + \frac{46728\sqrt{8294}}{1077205}iI_{12,1}$ $+ \frac{32076\sqrt{15834}}{1077205}iI_{12,3} + \frac{1320\sqrt{134589}}{215441}iI_{12,5}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	3	$\frac{14\sqrt{638}}{4147}iI_{21} + \frac{280\sqrt{957}}{70499}iI_{41} - \frac{1840\sqrt{290290}}{14734291}iI_{61} - \frac{18960\sqrt{29029}}{14734291}iI_{63}$ $- \frac{2540\sqrt{162690}}{1339481}iI_{81} - \frac{15540\sqrt{6902}}{1339481}iI_{83} - \frac{66528\sqrt{406}}{2800733}iI_{10,1}$ $+ \frac{1188\sqrt{7917}}{2800733}iI_{10,3} + \frac{396\sqrt{39585}}{215441}iI_{10,5} - \frac{4752\sqrt{20735}}{215441}iI_{12,1}$ $- \frac{2376\sqrt{39585}}{215441}iI_{12,3} - \frac{792\sqrt{1345890}}{1077205}iI_{12,5}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	4	$- \frac{448\sqrt{4785}}{352495}R_{40} + \frac{896\sqrt{1914}}{352495}R_{42} - \frac{3920\sqrt{62205}}{4018443}R_{60}$ $- \frac{2624\sqrt{29029}}{4018443}R_{62} - \frac{32\sqrt{81345}}{121771}R_{80} + \frac{296\sqrt{113883}}{2557191}R_{82}$ $+ \frac{904\sqrt{103530}}{852397}R_{84} + \frac{97488\sqrt{11165}}{14003665}R_{10,0} + \frac{732384\sqrt{1218}}{14003665}R_{10,2}$ $+ \frac{43464\sqrt{15834}}{14003665}R_{10,4} + \frac{6864\sqrt{4785}}{5386025}R_{12,0} - \frac{6864\sqrt{26390}}{5386025}R_{12,2}$ $- \frac{352\sqrt{39585}}{1077205}R_{12,4} + \frac{1056\sqrt{96135}}{316825}R_{12,6}$

Table B469: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 138 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	5	$-\frac{1680\sqrt{207582}}{4947371}R_{20} - \frac{59248\sqrt{1037910}}{420526535}R_{40} + \frac{417592\sqrt{103791}}{420526535}R_{42}$ $+ \frac{266980\sqrt{13492830}}{4794002499}R_{60} + \frac{1125976\sqrt{6296654}}{4794002499}R_{62} - \frac{37552\sqrt{17644470}}{1598000833}R_{80}$ $+ \frac{39808\sqrt{24702258}}{4794002499}R_{82} - \frac{48\sqrt{679312095}}{6469639}R_{84} + \frac{2000988\sqrt{2421790}}{16706372345}R_{10,0}$ $+ \frac{1375488\sqrt{7991907}}{16706372345}R_{10,2} + \frac{84\sqrt{103894791}}{67637135}R_{10,4} + \frac{3095664\sqrt{1037910}}{6425527825}R_{12,0}$ $+ \frac{10824\sqrt{173157985}}{279370775}R_{12,2} - \frac{14432\sqrt{1038947910}}{1285105565}R_{12,4} - \frac{75768\sqrt{2523159210}}{6425527825}R_{12,6}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	6	$-\frac{110124\sqrt{124791379}}{17845167197}R_{20} - \frac{14980\sqrt{623956895}}{27578894759}R_{40} - \frac{115122\sqrt{249582758}}{10460960081}R_{42}$ $- \frac{1400280\sqrt{8111439635}}{523999000421}R_{60} - \frac{103600\sqrt{34068046467}}{443383769587}R_{62} - \frac{1147860\sqrt{10607267215}}{443383769587}R_{80}$ $+ \frac{3161280\sqrt{14850174101}}{3667993002947}R_{82} + \frac{11464230\sqrt{1633519151110}}{40347923032417}R_{84}$ $+ \frac{51371496\sqrt{13103094795}}{12051977009683}R_{10,0} + \frac{3370464\sqrt{19217872366}}{415585414127}R_{10,2}$ $+ \frac{23185980\sqrt{249832340758}}{12051977009683}R_{10,4} + \frac{30814344\sqrt{623956895}}{4635375772955}R_{12,0}$ $+ \frac{958122\sqrt{3747485111370}}{4635375772955}R_{12,2} + \frac{2770416\sqrt{624580851895}}{4635375772955}R_{12,4}$ $+ \frac{1208196\sqrt{1516839211745}}{4635375772955}R_{12,6}$
$\frac{11}{2}$	6	3	$\frac{13}{2}$	6	7	$\frac{6\sqrt{149582290}}{515801}R_{20} + \frac{2760\sqrt{29916458}}{254289893}R_{40} - \frac{264\sqrt{74791145}}{23117263}R_{42}$ $- \frac{68320\sqrt{2301266}}{371654459}R_{60} - \frac{4288\sqrt{241632930}}{101360307}R_{62} + \frac{34440\sqrt{508579786}}{4831507967}R_{80}$ $+ \frac{1840\sqrt{17800292510}}{4831507967}R_{82} + \frac{1720\sqrt{161820841}}{439227997}R_{84} + \frac{22680\sqrt{628245618}}{10102243931}R_{10,0}$ $- \frac{189504\sqrt{47594365}}{10102243931}R_{10,2} - \frac{144648\sqrt{3661105}}{777095687}R_{10,4} + \frac{55440\sqrt{29916458}}{777095687}R_{12,0}$ $+ \frac{323400\sqrt{2196663}}{777095687}R_{12,2} + \frac{7392\sqrt{1464442}}{33786769}R_{12,4} + \frac{5544\sqrt{3556502}}{777095687}R_{12,6}$
$\frac{11}{2}$	6	4	$\frac{11}{2}$	6	4	$R_{00} + \frac{100\sqrt{5}}{3289}R_{20} - \frac{132}{299}R_{40} + \frac{474\sqrt{10}}{3289}R_{42}$ $+ \frac{400\sqrt{13}}{5083}R_{60} + \frac{32\sqrt{1365}}{3289}R_{62} - \frac{28630\sqrt{17}}{1062347}R_{80} - \frac{1860\sqrt{595}}{81719}R_{82}$ $+ \frac{7635\sqrt{2618}}{1062347}R_{84} + \frac{1944\sqrt{21}}{7429}R_{10,0} + \frac{7968\sqrt{770}}{96577}R_{10,2}$ $+ \frac{1236\sqrt{10010}}{96577}R_{10,4}$
$\frac{11}{2}$	6	4	$\frac{11}{2}$	6	5	$\frac{90\sqrt{357}}{3289}R_{20} - \frac{40\sqrt{1785}}{55913}R_{40} + \frac{964\sqrt{714}}{55913}R_{42} - \frac{40\sqrt{23205}}{73117}R_{60}$ $+ \frac{9040\sqrt{221}}{950521}R_{62} - \frac{23240\sqrt{105}}{1062347}R_{80} + \frac{2240\sqrt{3}}{96577}R_{82}$ $- \frac{700\sqrt{330}}{62491}R_{84} - \frac{2772\sqrt{85}}{96577}R_{10,0} - \frac{47712\sqrt{1122}}{1641809}R_{10,2}$ $- \frac{8274\sqrt{14586}}{1641809}R_{10,4}$

Table B470: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 139 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	4	$\frac{11}{2}$	6	6	$\frac{420\sqrt{782}}{55913}R_{40} - \frac{336\sqrt{1955}}{55913}R_{42} + \frac{420\sqrt{10166}}{73117}R_{60} + \frac{1272\sqrt{1067430}}{950521}R_{62}$ $- \frac{2100\sqrt{46}}{81719}R_{80} + \frac{420\sqrt{1610}}{81719}R_{82} - \frac{420\sqrt{1771}}{62491}R_{84}$ $+ \frac{132\sqrt{16422}}{96577}R_{10,0} + \frac{3168\sqrt{150535}}{1641809}R_{10,2} + \frac{252\sqrt{1956955}}{1641809}R_{10,4}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	1	$- \frac{2\sqrt{1518}}{715}R_{20} - \frac{30\sqrt{7590}}{55913}R_{40} - \frac{294\sqrt{759}}{55913}R_{42} - \frac{1400\sqrt{98670}}{1062347}R_{60}$ $- \frac{2544\sqrt{46046}}{1062347}R_{62} + \frac{348\sqrt{129030}}{1062347}R_{80} - \frac{3320\sqrt{180642}}{7436429}R_{82}$ $- \frac{964\sqrt{41055}}{676039}R_{84} - \frac{13860\sqrt{17710}}{2221271}R_{10,0} - \frac{124512\sqrt{483}}{2221271}R_{10,2}$ $- \frac{31596\sqrt{6279}}{2221271}R_{10,4} + \frac{9636\sqrt{7590}}{4271675}R_{12,0} + \frac{198\sqrt{10465}}{170867}R_{12,2}$ $- \frac{2904\sqrt{62790}}{4271675}R_{12,4} - \frac{2046\sqrt{152490}}{854335}R_{12,6}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	2	$- \frac{2298\sqrt{253}}{180895}R_{20} + \frac{60\sqrt{1265}}{36179}R_{40} - \frac{18\sqrt{506}}{36179}R_{42} + \frac{7560\sqrt{16445}}{11685817}R_{60}$ $- \frac{19024\sqrt{69069}}{11685817}R_{62} - \frac{27216\sqrt{21505}}{11685817}R_{80} - \frac{17760\sqrt{30107}}{81800719}R_{82}$ $+ \frac{984\sqrt{27370}}{7436429}R_{84} - \frac{4380\sqrt{26565}}{2221271}R_{10,0} - \frac{87408\sqrt{322}}{2221271}R_{10,2}$ $- \frac{27054\sqrt{4186}}{2221271}R_{10,4} - \frac{2376\sqrt{1265}}{251275}R_{12,0} - \frac{66\sqrt{62790}}{50255}R_{12,2}$ $+ \frac{1584\sqrt{10465}}{251275}R_{12,4} + \frac{396\sqrt{25415}}{50255}R_{12,6}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	3	$\frac{24\sqrt{2530}}{36179}R_{20} - \frac{480\sqrt{506}}{615043}R_{40} + \frac{2724\sqrt{1265}}{615043}R_{42} - \frac{1960\sqrt{6578}}{898909}R_{60}$ $- \frac{16\sqrt{690690}}{80223}R_{62} + \frac{1440\sqrt{8602}}{11685817}R_{80} - \frac{66720\sqrt{301070}}{81800719}R_{82}$ $+ \frac{61440\sqrt{2737}}{7436429}R_{84} + \frac{29160\sqrt{10626}}{2221271}R_{10,0} + \frac{124128\sqrt{805}}{2221271}R_{10,2}$ $+ \frac{24408\sqrt{10465}}{2221271}R_{10,4} - \frac{20592\sqrt{506}}{854335}R_{12,0} - \frac{396\sqrt{6279}}{854335}R_{12,2}$ $+ \frac{13728\sqrt{4186}}{854335}R_{12,4} + \frac{1188\sqrt{10166}}{854335}R_{12,6}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	4	$- \frac{14\sqrt{3795}}{10725}iI_{21} - \frac{2478\sqrt{2530}}{279565}iI_{41} + \frac{140\sqrt{69069}}{138567}iI_{61}$ $- \frac{4\sqrt{690690}}{81719}iI_{63} - \frac{11140\sqrt{4301}}{1062347}iI_{81} - \frac{20\sqrt{41055}}{5083}iI_{83}$ $- \frac{43788\sqrt{2415}}{11106355}iI_{10,1} + \frac{1251\sqrt{20930}}{482885}iI_{10,3} + \frac{6993\sqrt{4186}}{2221271}iI_{10,5}$ $- \frac{226116\sqrt{19734}}{4271675}iI_{12,1} - \frac{17226\sqrt{4186}}{185725}iI_{12,3} - \frac{74932\sqrt{35581}}{4271675}iI_{12,5}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	5	$- \frac{29\sqrt{823170}}{246675}iI_{21} - \frac{114756\sqrt{137195}}{333521045}iI_{41} + \frac{49870\sqrt{14981694}}{3802139913}iI_{61}$ $- \frac{9404\sqrt{37454235}}{1267379971}iI_{63} - \frac{1414840\sqrt{932926}}{1267379971}iI_{81} - \frac{34280\sqrt{1077529530}}{1267379971}iI_{83}$ $+ \frac{266142\sqrt{63384090}}{13249881515}iI_{10,1} + \frac{322911\sqrt{137332195}}{13249881515}iI_{10,3} + \frac{289251\sqrt{27466439}}{2649976303}iI_{10,5}$ $+ \frac{8761368\sqrt{1070121}}{5096108275}iI_{12,1} + \frac{1429164\sqrt{27466439}}{5096108275}iI_{12,3} + \frac{181588\sqrt{933858926}}{5096108275}iI_{12,5}$

Table B471: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 140 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	6	$-\frac{518\sqrt{2969174190}}{66704209}iI_{41} + \frac{8880\sqrt{9006495043}}{415585414127}iI_{61} - \frac{3078720\sqrt{90064950430}}{4571439555397}iI_{63}$ $+ \frac{4195560\sqrt{5047596123}}{415585414127}iI_{81} + \frac{3715560\sqrt{647774835785}}{4571439555397}iI_{83}$ $+ \frac{775296\sqrt{38104402105}}{735266501917}iI_{10,1} + \frac{1642668\sqrt{2972143364190}}{9558464524921}iI_{10,3}$ $- \frac{4557420\sqrt{594428672838}}{9558464524921}iI_{10,5} + \frac{7801596\sqrt{2573284298}}{216254853505}iI_{12,1}$ $+ \frac{9545382\sqrt{594428672838}}{3676332509585}iI_{12,3} + \frac{403524\sqrt{5052643719123}}{3676332509585}iI_{12,5}$
$\frac{11}{2}$	6	4	$\frac{13}{2}$	6	7	$-\frac{8880\sqrt{63879970}}{294760433}iI_{61} + \frac{44400\sqrt{6387997}}{294760433}iI_{63} - \frac{80\sqrt{6050345730}}{26796403}iI_{81}$ $+ \frac{240\sqrt{256681334}}{26796403}iI_{83} + \frac{19080\sqrt{15098902}}{616317269}iI_{10,1} + \frac{21240\sqrt{1742181}}{616317269}iI_{10,3}$ $+ \frac{25200\sqrt{8710905}}{616317269}iI_{10,5} + \frac{1711776\sqrt{4562855}}{3081586345}iI_{12,1} - \frac{119328\sqrt{8710905}}{3081586345}iI_{12,3}$ $- \frac{8448\sqrt{296170770}}{3081586345}iI_{12,5}$
$\frac{11}{2}$	6	5	$\frac{11}{2}$	6	5	$R_{00} - \frac{7588\sqrt{5}}{55913}R_{20} - \frac{10276}{55913}R_{40} - \frac{6034\sqrt{10}}{55913}R_{42}$ $- \frac{63760\sqrt{13}}{950521}R_{60} + \frac{23136\sqrt{1365}}{950521}R_{62} + \frac{76930\sqrt{17}}{1062347}R_{80}$ $- \frac{138180\sqrt{595}}{18059899}R_{82} - \frac{104265\sqrt{2618}}{18059899}R_{84} - \frac{340200\sqrt{21}}{1641809}R_{10,0}$ $- \frac{107856\sqrt{770}}{1641809}R_{10,2} - \frac{19908\sqrt{10010}}{1641809}R_{10,4}$
$\frac{11}{2}$	6	5	$\frac{11}{2}$	6	6	$\frac{60\sqrt{966}}{2431}R_{20} - \frac{380\sqrt{4830}}{55913}R_{40} + \frac{88\sqrt{483}}{5083}R_{42} + \frac{120\sqrt{62790}}{950521}R_{60}$ $+ \frac{640\sqrt{598}}{86411}R_{62} + \frac{560\sqrt{82110}}{1062347}R_{80} + \frac{104020\sqrt{2346}}{18059899}R_{82}$ $- \frac{28840\sqrt{64515}}{18059899}R_{84} + \frac{33264\sqrt{230}}{1641809}R_{10,0} + \frac{40992\sqrt{759}}{1641809}R_{10,2}$ $+ \frac{9408\sqrt{9867}}{1641809}R_{10,4}$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	1	$-\frac{12\sqrt{60214}}{55913}R_{40} + \frac{48\sqrt{150535}}{279565}R_{42} - \frac{560\sqrt{782782}}{1062347}R_{60}$ $- \frac{31520\sqrt{1677390}}{54179697}R_{62} + \frac{600\sqrt{3542}}{1062347}R_{80} - \frac{8\sqrt{2530}}{62491}R_{82}$ $- \frac{6040\sqrt{23}}{96577}R_{84} + \frac{123984\sqrt{25806}}{37761607}R_{10,0} + \frac{737856\sqrt{1955}}{188808035}R_{10,2}$ $+ \frac{688464\sqrt{25415}}{188808035}R_{10,4} - \frac{21384\sqrt{60214}}{14523695}R_{12,0} + \frac{7392\sqrt{15249}}{2904739}R_{12,2}$ $- \frac{48048\sqrt{10166}}{14523695}R_{12,4} + \frac{3168\sqrt{4186}}{170867}R_{12,6}$

Table B472: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 141 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	2	$-\frac{6\sqrt{451605}}{36179}R_{20} + \frac{196\sqrt{90321}}{10455731}R_{40} + \frac{1818\sqrt{903210}}{52278655}R_{42}$ $-\frac{12120\sqrt{1174173}}{198658889}R_{60} - \frac{91920\sqrt{279565}}{198658889}R_{62} + \frac{21000\sqrt{5313}}{11685817}R_{80}$ $-\frac{77456\sqrt{3795}}{11685817}R_{82} + \frac{620\sqrt{138}}{55913}R_{84} + \frac{438732\sqrt{4301}}{37761607}R_{10,0}$ $+ \frac{3537408\sqrt{11730}}{188808035}R_{10,2} + \frac{29358\sqrt{152490}}{9937265}R_{10,4} + \frac{26136\sqrt{90321}}{14523695}R_{12,0}$ $+ \frac{15246\sqrt{10166}}{2904739}R_{12,2} - \frac{121968\sqrt{15249}}{14523695}R_{12,4} - \frac{4356\sqrt{6279}}{170867}R_{12,6}$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	3	$-\frac{194\sqrt{180642}}{615043}R_{20} - \frac{142\sqrt{903210}}{804287}R_{40} - \frac{2998\sqrt{90321}}{10455731}R_{42}$ $+ \frac{7720\sqrt{11741730}}{198658889}R_{60} - \frac{400\sqrt{111826}}{508079}R_{62} + \frac{5400\sqrt{53130}}{11685817}R_{80}$ $-\frac{12680\sqrt{1518}}{11685817}R_{82} + \frac{16040\sqrt{345}}{1062347}R_{84} + \frac{148932\sqrt{43010}}{37761607}R_{10,0}$ $+ \frac{1743840\sqrt{1173}}{37761607}R_{10,2} + \frac{325836\sqrt{15249}}{37761607}R_{10,4} - \frac{4356\sqrt{903210}}{14523695}R_{12,0}$ $-\frac{15246\sqrt{25415}}{14523695}R_{12,2} + \frac{20328\sqrt{152490}}{14523695}R_{12,4} + \frac{2178\sqrt{62790}}{854335}R_{12,6}$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	4	$-\frac{266\sqrt{180642}}{279565}iI_{41} + \frac{32\sqrt{279565}}{785213}iI_{61} + \frac{64\sqrt{111826}}{18059899}iI_{63}$ $-\frac{188\sqrt{26565}}{289731}iI_{81} - \frac{420\sqrt{23}}{5681}iI_{83} + \frac{2016\sqrt{391}}{14523695}iI_{10,1}$ $+ \frac{3528\sqrt{30498}}{8209045}iI_{10,3} + \frac{18984\sqrt{152490}}{37761607}iI_{10,5} + \frac{357852\sqrt{3913910}}{72618475}iI_{12,1}$ $+ \frac{3234\sqrt{152490}}{166175}iI_{12,3} + \frac{305228\sqrt{4485}}{4271675}iI_{12,5}$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	5	$\frac{15\sqrt{6530482}}{3923777}iI_{21} - \frac{498044\sqrt{9795723}}{5669857765}iI_{41} - \frac{455714\sqrt{60640190}}{21545459507}iI_{61}$ $-\frac{137572\sqrt{6064019}}{21545459507}iI_{63} + \frac{595532\sqrt{5762190}}{3802139913}iI_{81} + \frac{639660\sqrt{603658}}{1267379971}iI_{83}$ $+ \frac{56555478\sqrt{10262186}}{225247985755}iI_{10,1} - \frac{7031367\sqrt{200112627}}{225247985755}iI_{10,3}$ $-\frac{413007\sqrt{1000563135}}{45049597151}iI_{10,5} - \frac{2459688\sqrt{212240665}}{5096108275}iI_{12,1} - \frac{14674044\sqrt{1000563135}}{86633840675}iI_{12,3}$ $-\frac{1160852\sqrt{117713310}}{5096108275}iI_{12,5}$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	6	$-\frac{2\sqrt{35333172861}}{2900183}iI_{21} + \frac{634622\sqrt{23555448574}}{314633491667}iI_{41} - \frac{5780300\sqrt{328093747995}}{77714472441749}iI_{61}$ $+ \frac{80890020\sqrt{131237499198}}{77714472441749}iI_{63} + \frac{66972480\sqrt{3464036555}}{4571439555397}iI_{81}$ $+ \frac{17809680\sqrt{3266091609}}{4571439555397}iI_{83} + \frac{65597868\sqrt{55523557353}}{162493896923657}iI_{10,1}$ $+ \frac{26190927\sqrt{481204163726}}{162493896923657}iI_{10,3} - \frac{65427957\sqrt{2406020818630}}{162493896923657}iI_{10,5}$ $+ \frac{57451284\sqrt{4593312471930}}{62497652662945}iI_{12,1} + \frac{67987458\sqrt{2406020818630}}{62497652662945}iI_{12,3}$ $+ \frac{2514204\sqrt{70765318195}}{735266501917}iI_{12,5}$

Table B473: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 142 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	5	$\frac{13}{2}$	6	7	$-\frac{1176\sqrt{7058736685}}{149066489}iI_{41} + \frac{63160\sqrt{93082242}}{5010927361}iI_{61} + \frac{22400\sqrt{232705605}}{5010927361}iI_{63}$ $+ \frac{27520\sqrt{166087922}}{348353239}iI_{81} + \frac{33600\sqrt{32354790}}{348353239}iI_{83} - \frac{81648\sqrt{550031430}}{10477393573}iI_{10,1}$ $- \frac{1025388\sqrt{7051685}}{10477393573}iI_{10,3} + \frac{2097900\sqrt{1410337}}{10477393573}iI_{10,5} + \frac{377520\sqrt{325787847}}{10477393573}iI_{12,1}$ $+ \frac{2079000\sqrt{1410337}}{10477393573}iI_{12,3} - \frac{112728\sqrt{165922}}{616317269}iI_{12,5}$
$\frac{11}{2}$	6	6	$\frac{11}{2}$	6	6	$R_{00} - \frac{50\sqrt{5}}{2431}R_{20} + \frac{432}{2431}R_{40} + \frac{456\sqrt{10}}{2431}R_{42}$ $+ \frac{6320\sqrt{13}}{41327}R_{60} + \frac{1312\sqrt{1365}}{41327}R_{62} - \frac{980\sqrt{17}}{46189}R_{80}$ $+ \frac{7560\sqrt{595}}{785213}R_{82} + \frac{11130\sqrt{2618}}{785213}R_{84} - \frac{7560\sqrt{21}}{71383}R_{10,0}$ $- \frac{2016\sqrt{770}}{71383}R_{10,2} - \frac{252\sqrt{10010}}{71383}R_{10,4}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	1	$\frac{96\sqrt{17017}}{71383}R_{62} - \frac{432\sqrt{165}}{46189}R_{80} - \frac{200\sqrt{231}}{19019}R_{82} + \frac{1168\sqrt{210}}{29393}R_{84}$ $- \frac{30816\sqrt{6545}}{1641809}R_{10,0} - \frac{199776\sqrt{714}}{1641809}R_{10,2} - \frac{33024\sqrt{9282}}{1641809}R_{10,4}$ $+ \frac{37488\sqrt{2805}}{3157325}R_{12,0} - \frac{19536\sqrt{15470}}{3157325}R_{12,2} + \frac{3168\sqrt{23205}}{3157325}R_{12,4}$ $- \frac{3168\sqrt{195}}{185725}R_{12,6}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	2	$-\frac{840\sqrt{1870}}{454597}R_{40} + \frac{3360\sqrt{187}}{454597}R_{42} + \frac{420\sqrt{24310}}{664411}R_{60} - \frac{1912\sqrt{102102}}{8637343}R_{62}$ $- \frac{648\sqrt{110}}{508079}R_{80} - \frac{48000\sqrt{154}}{3556553}R_{82} + \frac{24984\sqrt{35}}{323323}R_{84}$ $+ \frac{6372\sqrt{39270}}{1641809}R_{10,0} + \frac{149952\sqrt{119}}{1641809}R_{10,2} + \frac{51348\sqrt{1547}}{1641809}R_{10,4}$ $+ \frac{28512\sqrt{1870}}{3157325}R_{12,0} - \frac{1056\sqrt{23205}}{3157325}R_{12,2} - \frac{19008\sqrt{15470}}{3157325}R_{12,4}$ $+ \frac{3168\sqrt{130}}{185725}R_{12,6}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	3	$-\frac{84\sqrt{935}}{12155}R_{20} + \frac{3780\sqrt{187}}{454597}R_{40} + \frac{798\sqrt{1870}}{454597}R_{42} - \frac{66920\sqrt{2431}}{8637343}R_{60}$ $- \frac{2576\sqrt{255255}}{1524237}R_{62} + \frac{24300\sqrt{11}}{508079}R_{80} + \frac{30000\sqrt{385}}{3556553}R_{82}$ $+ \frac{14670\sqrt{14}}{323323}R_{84} - \frac{32040\sqrt{3927}}{1641809}R_{10,0} - \frac{104544\sqrt{1190}}{1641809}R_{10,2}$ $- \frac{17028\sqrt{15470}}{1641809}R_{10,4} + \frac{792\sqrt{187}}{126293}R_{12,0} + \frac{66\sqrt{9282}}{126293}R_{12,2}$ $- \frac{528\sqrt{1547}}{126293}R_{12,4} - \frac{396\sqrt{13}}{7429}R_{12,6}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	4	$-\frac{368\sqrt{102102}}{785213}iI_{61} + \frac{368\sqrt{255255}}{785213}iI_{63} + \frac{12\sqrt{22}}{4199}iI_{81}$ $- \frac{4\sqrt{210}}{247}iI_{83} - \frac{2568\sqrt{3570}}{631465}iI_{10,1} + \frac{7128\sqrt{7735}}{8209045}iI_{10,3}$ $+ \frac{37296\sqrt{1547}}{1641809}iI_{10,5} - \frac{55264\sqrt{7293}}{3157325}iI_{12,1} - \frac{4224\sqrt{1547}}{3157325}iI_{12,3}$ $- \frac{10912\sqrt{182}}{185725}iI_{12,5}$

Table B474: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 143 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	5	$-\frac{8820\sqrt{202810}}{49303111}iI_{41} - \frac{31336\sqrt{5536713}}{936759109}iI_{61} + \frac{30968\sqrt{55367130}}{936759109}iI_{63}$ $+ \frac{996\sqrt{1193}}{263653}iI_{81} + \frac{16364\sqrt{1377915}}{55103477}iI_{83} + \frac{7224\sqrt{23424555}}{753337745}iI_{10,1}$ $+ \frac{290898\sqrt{203012810}}{9793390685}iI_{10,3} - \frac{6678\sqrt{40602562}}{150667549}iI_{10,5} - \frac{163592\sqrt{1581918}}{221569925}iI_{12,1}$ $- \frac{64284\sqrt{40602562}}{3766688725}iI_{12,3} + \frac{75416\sqrt{1194193}}{221569925}iI_{12,5}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	6	$\frac{126\sqrt{731535670}}{43843085}iI_{21} - \frac{702128\sqrt{1097303505}}{177836321377}iI_{41} + \frac{2518320\sqrt{13313949194}}{3378890106163}iI_{61}$ $+ \frac{685680\sqrt{33284872985}}{3378890106163}iI_{63} + \frac{45643440\sqrt{25818906}}{198758241539}iI_{81} + \frac{4144320\sqrt{3313426270}}{198758241539}iI_{83}$ $- \frac{16442064\sqrt{56328246590}}{7064952040159}iI_{10,1} + \frac{1468284\sqrt{1098400808505}}{7064952040159}iI_{10,3}$ $+ \frac{9885540\sqrt{219680161701}}{7064952040159}iI_{10,5} - \frac{24219360\sqrt{950996371}}{543457849243}iI_{12,1}$ $- \frac{1100880\sqrt{219680161701}}{543457849243}iI_{12,3} - \frac{73392\sqrt{25844724906}}{31968108779}iI_{12,5}$
$\frac{11}{2}$	6	6	$\frac{13}{2}$	6	7	$- \frac{2\sqrt{8768617}}{39677}iI_{21} - \frac{8760\sqrt{52611702}}{149066489}iI_{41} - \frac{11920\sqrt{23607815}}{217866407}iI_{61}$ $+ \frac{3120\sqrt{9443126}}{217866407}iI_{63} - \frac{5320\sqrt{7737015}}{8768617}iI_{81} - \frac{29400\sqrt{328237}}{15145793}iI_{83}$ $- \frac{37800\sqrt{5580029}}{455538851}iI_{10,1} - \frac{91350\sqrt{2575398}}{455538851}iI_{10,3} - \frac{38430\sqrt{12876990}}{455538851}iI_{10,5}$ $+ \frac{55440\sqrt{6745090}}{455538851}iI_{12,1} + \frac{27720\sqrt{12876990}}{455538851}iI_{12,3} + \frac{3696\sqrt{378735}}{26796403}iI_{12,5}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	1	$R_{00} - \frac{136\sqrt{5}}{325}R_{20} + \frac{126}{221}R_{40} - \frac{9\sqrt{10}}{221}R_{42}$ $+ \frac{160\sqrt{13}}{4199}R_{60} + \frac{448\sqrt{1365}}{20995}R_{62} - \frac{58\sqrt{17}}{4199}R_{80} - \frac{180\sqrt{595}}{29393}R_{82}$ $+ \frac{387\sqrt{2618}}{29393}R_{84} - \frac{9072\sqrt{21}}{28405}R_{10,0} - \frac{44352\sqrt{770}}{482885}R_{10,2}$ $- \frac{8712\sqrt{10010}}{482885}R_{10,4} + \frac{18348}{185725}R_{12,0} + \frac{201\sqrt{6006}}{185725}R_{12,2}$ $- \frac{792\sqrt{1001}}{185725}R_{12,4} - \frac{1686\sqrt{2431}}{185725}R_{12,6}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	2	$\frac{22\sqrt{30}}{325}R_{20} - \frac{18\sqrt{6}}{2431}R_{40} + \frac{450\sqrt{15}}{2431}R_{42} - \frac{840\sqrt{78}}{46189}R_{60}$ $- \frac{5968\sqrt{910}}{230945}R_{62} - \frac{444\sqrt{102}}{46189}R_{80} + \frac{1440\sqrt{3570}}{323323}R_{82}$ $+ \frac{1172\sqrt{3927}}{323323}R_{84} - \frac{76356\sqrt{14}}{482885}R_{10,0} - \frac{204192\sqrt{1155}}{5311735}R_{10,2}$ $- \frac{2124\sqrt{15015}}{408595}R_{10,4} - \frac{1716\sqrt{6}}{185725}R_{12,0} + \frac{258\sqrt{1001}}{185725}R_{12,2}$ $- \frac{216\sqrt{6006}}{185725}R_{12,4} + \frac{222\sqrt{14586}}{185725}R_{12,6}$

Table B475: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 144 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	3	$\frac{36\sqrt{15}}{2431}R_{40} - \frac{72\sqrt{6}}{2431}R_{42} + \frac{1680\sqrt{195}}{46189}R_{60} + \frac{4192\sqrt{91}}{46189}R_{62}$ $- \frac{344\sqrt{255}}{46189}R_{80} + \frac{1000\sqrt{357}}{323323}R_{82} + \frac{52\sqrt{39270}}{24871}R_{84}$ $+ \frac{31536\sqrt{35}}{482885}R_{10,0} + \frac{26784\sqrt{462}}{1062347}R_{10,2} + \frac{7416\sqrt{6006}}{1062347}R_{10,4}$ $+ \frac{3432\sqrt{15}}{185725}R_{12,0} - \frac{144\sqrt{10010}}{37145}R_{12,2} + \frac{432\sqrt{15015}}{185725}R_{12,4}$ $+ \frac{96\sqrt{36465}}{37145}R_{12,6}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	4	$- \frac{6\sqrt{2}}{13}iI_{21} + \frac{744\sqrt{3}}{1105}iI_{41} - \frac{372\sqrt{910}}{20995}iI_{61} + \frac{184\sqrt{91}}{4199}iI_{63}$ $- \frac{664\sqrt{510}}{20995}iI_{81} - \frac{56\sqrt{2618}}{4199}iI_{83} - \frac{2988\sqrt{154}}{482885}iI_{10,1}$ $- \frac{18\sqrt{3003}}{28405}iI_{10,3} + \frac{4302\sqrt{15015}}{2414425}iI_{10,5} - \frac{249744\sqrt{65}}{928625}iI_{12,1}$ $- \frac{2552\sqrt{15015}}{185725}iI_{12,3} - \frac{264\sqrt{510510}}{185725}iI_{12,5}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	5	$- \frac{42\sqrt{78738}}{12155}iI_{41} - \frac{18144\sqrt{5970965}}{275517385}iI_{61} - \frac{10016\sqrt{2388386}}{55103477}iI_{63}$ $- \frac{1396\sqrt{3346365}}{1926695}iI_{81} - \frac{5212\sqrt{141967}}{5009407}iI_{83} - \frac{51552\sqrt{8351}}{44313985}iI_{10,1}$ $- \frac{120456\sqrt{651378}}{576081805}iI_{10,3} + \frac{402552\sqrt{3256890}}{2880409025}iI_{10,5} - \frac{963204\sqrt{1705990}}{1107849625}iI_{12,1}$ $- \frac{136202\sqrt{3256890}}{221569925}iI_{12,3} - \frac{18348\sqrt{27683565}}{221569925}iI_{12,5}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	6	$- \frac{32\sqrt{129223624530}}{55103477}iI_{61} + \frac{160\sqrt{12922362453}}{55103477}iI_{63} - \frac{405304\sqrt{8046892370}}{18068931049}iI_{81}$ $- \frac{22920\sqrt{3072449814}}{950996371}iI_{83} - \frac{93744\sqrt{180732342}}{31968108779}iI_{10,1} + \frac{3979152\sqrt{391586741}}{415585414127}iI_{10,3}$ $- \frac{25178688\sqrt{1957933705}}{2077927070635}iI_{10,5} + \frac{17479968\sqrt{9230258895}}{799202719475}iI_{12,1}$ $+ \frac{32405472\sqrt{1957933705}}{799202719475}iI_{12,3} + \frac{3229248\sqrt{66569745970}}{799202719475}iI_{12,5}$
$\frac{13}{2}$	6	1	$\frac{13}{2}$	6	7	$\frac{13200\sqrt{797147}}{15145793}iI_{81} + \frac{480\sqrt{920704785}}{15145793}iI_{83} - \frac{9216\sqrt{54159105}}{133982015}iI_{10,1}$ $+ \frac{1728\sqrt{2777390}}{7051685}iI_{10,3} + \frac{22464\sqrt{555478}}{26796403}iI_{10,5} - \frac{120912\sqrt{21642}}{26796403}iI_{12,1}$ $- \frac{6864\sqrt{555478}}{26796403}iI_{12,3} - \frac{14784\sqrt{4721563}}{133982015}iI_{12,5}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	2	$R_{00} - \frac{304\sqrt{5}}{3575}R_{20} - \frac{15552}{26741}R_{40} + \frac{1296\sqrt{10}}{26741}R_{42}$ $- \frac{16480\sqrt{13}}{508079}R_{60} - \frac{28608\sqrt{1365}}{2540395}R_{62} + \frac{4918\sqrt{17}}{46189}R_{80}$ $- \frac{60\sqrt{595}}{17017}R_{82} + \frac{111\sqrt{2618}}{24871}R_{84} - \frac{1728\sqrt{21}}{28405}R_{10,0}$ $+ \frac{1728\sqrt{770}}{279565}R_{10,2} + \frac{6912\sqrt{10010}}{5311735}R_{10,4} + \frac{16632}{185725}R_{12,0}$ $- \frac{6\sqrt{6006}}{185725}R_{12,2} - \frac{1008\sqrt{1001}}{185725}R_{12,4} + \frac{36\sqrt{2431}}{185725}R_{12,6}$

Table B476: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 145 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	3	$\begin{aligned} & \frac{30\sqrt{2}}{143}R_{20} - \frac{486\sqrt{10}}{26741}R_{40} + \frac{5454}{26741}R_{42} - \frac{1120\sqrt{130}}{508079}R_{60} \\ & + \frac{28448\sqrt{546}}{1524237}R_{62} + \frac{384\sqrt{170}}{46189}R_{80} - \frac{600\sqrt{238}}{46189}R_{82} \\ & + \frac{144\sqrt{6545}}{46189}R_{84} + \frac{35748\sqrt{210}}{482885}R_{10,0} + \frac{162432\sqrt{77}}{1062347}R_{10,2} \\ & + \frac{44388\sqrt{1001}}{1062347}R_{10,4} + \frac{5148\sqrt{10}}{185725}R_{12,0} + \frac{42\sqrt{15015}}{37145}R_{12,2} \\ & - \frac{312\sqrt{10010}}{185725}R_{12,4} - \frac{126\sqrt{24310}}{37145}R_{12,6} \end{aligned}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	4	$\begin{aligned} & \frac{88\sqrt{3}}{195}iI_{21} - \frac{4194\sqrt{2}}{12155}iI_{41} - \frac{32\sqrt{1365}}{2145}iI_{61} + \frac{32\sqrt{546}}{4199}iI_{63} \\ & + \frac{188\sqrt{85}}{20995}iI_{81} - \frac{276\sqrt{3927}}{46189}iI_{83} - \frac{60048\sqrt{231}}{5311735}iI_{10,1} \\ & - \frac{108\sqrt{2002}}{230945}iI_{10,3} + \frac{77868\sqrt{10010}}{26558675}iI_{10,5} + \frac{36388\sqrt{390}}{928625}iI_{12,1} \\ & + \frac{54\sqrt{10010}}{8075}iI_{12,3} + \frac{12\sqrt{85085}}{10925}iI_{12,5} \end{aligned}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	5	$\begin{aligned} & -\frac{4\sqrt{78738}}{2145}iI_{21} - \frac{130608\sqrt{13123}}{14500915}iI_{41} + \frac{251564\sqrt{35825790}}{9092073705}iI_{61} \\ & + \frac{4808\sqrt{3582579}}{46626019}iI_{63} + \frac{24488\sqrt{2230910}}{275517385}iI_{81} - \frac{1416\sqrt{851802}}{5009407}iI_{83} \\ & - \frac{1057968\sqrt{50106}}{576081805}iI_{10,1} - \frac{13176\sqrt{108563}}{44313985}iI_{10,3} + \frac{58104\sqrt{542815}}{151600475}iI_{10,5} \\ & + \frac{52448\sqrt{2558985}}{65167625}iI_{12,1} + \frac{278784\sqrt{542815}}{221569925}iI_{12,3} + \frac{30624\sqrt{18455710}}{221569925}iI_{12,5} \end{aligned}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	6	$\begin{aligned} & -\frac{1890\sqrt{284007966}}{31902013}iI_{41} - \frac{309312\sqrt{21537270755}}{2186340656929}iI_{61} + \frac{3658880\sqrt{8614908302}}{2186340656929}iI_{63} \\ & + \frac{1568\sqrt{12070338555}}{1062878297}iI_{81} + \frac{135760\sqrt{512074969}}{18068931049}iI_{83} + \frac{1241568\sqrt{30122057}}{31968108779}iI_{10,1} \\ & - \frac{2645784\sqrt{2349520446}}{415585414127}iI_{10,3} - \frac{8538264\sqrt{11747602230}}{2077927070635}iI_{10,5} \\ & - \frac{24529428\sqrt{6153505930}}{799202719475}iI_{12,1} - \frac{10607454\sqrt{11747602230}}{799202719475}iI_{12,3} \\ & - \frac{2700852\sqrt{99854618955}}{799202719475}iI_{12,5} \end{aligned}$
$\frac{13}{2}$	6	2	$\frac{13}{2}$	6	7	$\begin{aligned} & -\frac{16800\sqrt{50498}}{12815671}iI_{61} + \frac{16800\sqrt{126245}}{12815671}iI_{63} + \frac{11000\sqrt{4782882}}{15145793}iI_{81} \\ & + \frac{8520\sqrt{613803190}}{166603723}iI_{83} + \frac{25056\sqrt{36106070}}{1473802165}iI_{10,1} - \frac{31968\sqrt{4166085}}{1473802165}iI_{10,3} \\ & - \frac{63936\sqrt{833217}}{294760433}iI_{10,5} - \frac{238656\sqrt{3607}}{26796403}iI_{12,1} - \frac{15168\sqrt{833217}}{26796403}iI_{12,3} \\ & + \frac{3328\sqrt{28329378}}{133982015}iI_{12,5} \end{aligned}$

Table B477: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S_a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 146 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	3	$R_{00} + \frac{8\sqrt{5}}{715}R_{20} - \frac{11178}{26741}R_{40} + \frac{5535\sqrt{10}}{26741}R_{42}$ $- \frac{6400\sqrt{13}}{508079}R_{60} - \frac{384\sqrt{1365}}{29887}R_{62} - \frac{2410\sqrt{17}}{46189}R_{80}$ $- \frac{8100\sqrt{595}}{323323}R_{82} + \frac{2715\sqrt{2618}}{323323}R_{84} + \frac{10800\sqrt{21}}{96577}R_{10,0}$ $+ \frac{27648\sqrt{770}}{1062347}R_{10,2} + \frac{1944\sqrt{10010}}{1062347}R_{10,4} - \frac{1188}{7429}R_{12,0}$ $- \frac{9\sqrt{6006}}{7429}R_{12,2} + \frac{72\sqrt{1001}}{7429}R_{12,4} + \frac{54\sqrt{2431}}{7429}R_{12,6}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	4	$\frac{4032\sqrt{5}}{12155}iI_{41} - \frac{192\sqrt{546}}{46189}iI_{61} + \frac{32\sqrt{1365}}{4199}iI_{63} + \frac{16\sqrt{34}}{323}iI_{81}$ $+ \frac{144\sqrt{39270}}{46189}iI_{83} + \frac{144\sqrt{2310}}{81719}iI_{10,1} - \frac{5184\sqrt{5005}}{1062347}iI_{10,3}$ $+ \frac{39888\sqrt{1001}}{5311735}iI_{10,5} + \frac{102432\sqrt{39}}{185725}iI_{12,1} + \frac{16752\sqrt{1001}}{185725}iI_{12,3}$ $+ \frac{1488\sqrt{34034}}{185725}iI_{12,5}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	5	$\frac{120\sqrt{196845}}{170599}iI_{21} + \frac{774\sqrt{131230}}{1115455}iI_{41} - \frac{36384\sqrt{3582579}}{606138247}iI_{61}$ $+ \frac{2208\sqrt{35825790}}{31902013}iI_{63} + \frac{90416\sqrt{223091}}{55103477}iI_{81} + \frac{3008\sqrt{2129505}}{5009407}iI_{83}$ $- \frac{51696\sqrt{125265}}{115216361}iI_{10,1} + \frac{756\sqrt{1085630}}{115216361}iI_{10,3} - \frac{22068\sqrt{217126}}{30320095}iI_{10,5}$ $- \frac{205788\sqrt{1023594}}{221569925}iI_{12,1} - \frac{488598\sqrt{217126}}{221569925}iI_{12,3} - \frac{113124\sqrt{1845571}}{221569925}iI_{12,5}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	6	$- \frac{2\sqrt{473346610}}{77545}iI_{21} - \frac{4034664\sqrt{710019915}}{115070560891}iI_{41} - \frac{8566180\sqrt{8614908302}}{2186340656929}iI_{61}$ $- \frac{2827560\sqrt{21537270755}}{2186340656929}iI_{63} + \frac{325840\sqrt{4828135422}}{18068931049}iI_{81} + \frac{253200\sqrt{5120749690}}{18068931049}iI_{83}$ $+ \frac{3472308\sqrt{301220570}}{415585414127}iI_{10,1} + \frac{576990\sqrt{5873801115}}{415585414127}iI_{10,3}$ $- \frac{277290\sqrt{1174760223}}{31968108779}iI_{10,5} + \frac{2418768\sqrt{615350593}}{31968108779}iI_{12,1} + \frac{1356696\sqrt{1174760223}}{31968108779}iI_{12,3}$ $+ \frac{110088\sqrt{39941847582}}{31968108779}iI_{12,5}$
$\frac{13}{2}$	6	3	$\frac{13}{2}$	6	7	$- \frac{1764\sqrt{281346}}{797147}iI_{41} - \frac{3360\sqrt{126245}}{12815671}iI_{61} + \frac{39200\sqrt{50498}}{12815671}iI_{63}$ $- \frac{2420\sqrt{11957205}}{15145793}iI_{81} - \frac{7100\sqrt{61380319}}{166603723}iI_{83} + \frac{25920\sqrt{3610607}}{294760433}iI_{10,1}$ $+ \frac{2160\sqrt{1666434}}{17338849}iI_{10,3} + \frac{33840\sqrt{8332170}}{294760433}iI_{10,5} - \frac{19800\sqrt{36070}}{26796403}iI_{12,1}$ $- \frac{1860\sqrt{8332170}}{26796403}iI_{12,3} - \frac{504\sqrt{70823445}}{26796403}iI_{12,5}$

Table B478: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B Sa)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 147 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	4	$R_{00} - \frac{504\sqrt{5}}{1625}R_{20} - \frac{18}{85}R_{40} - \frac{33\sqrt{10}}{325}R_{42}$ $+ \frac{4832\sqrt{13}}{20995}R_{60} + \frac{704\sqrt{1365}}{62985}R_{62} - \frac{1698\sqrt{17}}{20995}R_{80}$ $+ \frac{1916\sqrt{595}}{146965}R_{82} - \frac{125\sqrt{2618}}{29393}R_{84} + \frac{116976\sqrt{21}}{2414425}R_{10,0}$ $- \frac{192\sqrt{770}}{2414425}R_{10,2} + \frac{1704\sqrt{10010}}{482885}R_{10,4} + \frac{100892}{928625}R_{12,0}$ $+ \frac{1789\sqrt{6006}}{928625}R_{12,2} - \frac{8184\sqrt{1001}}{928625}R_{12,4} - \frac{9038\sqrt{2431}}{928625}R_{12,6}$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	5	$\frac{2\sqrt{131230}}{1625}R_{20} + \frac{10206\sqrt{26246}}{14500915}R_{40} + \frac{95178\sqrt{65615}}{72504575}R_{42}$ $+ \frac{243432\sqrt{341198}}{275517385}R_{60} + \frac{102224\sqrt{35825790}}{826552155}R_{62} - \frac{292\sqrt{446182}}{14500915}R_{80}$ $- \frac{117184\sqrt{15616370}}{1928621695}R_{82} - \frac{28780\sqrt{141967}}{35065849}R_{84} - \frac{57036\sqrt{551166}}{151600475}R_{10,0}$ $+ \frac{122016\sqrt{41755}}{2880409025}R_{10,2} + \frac{8988\sqrt{542815}}{576081805}R_{10,4} + \frac{1087372\sqrt{26246}}{1107849625}R_{12,0}$ $- \frac{85822\sqrt{325689}}{1107849625}R_{12,2} - \frac{602184\sqrt{217126}}{1107849625}R_{12,4} - \frac{24002\sqrt{527306}}{58307875}R_{12,6}$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	6	$\frac{36\sqrt{142003983}}{2900183}R_{40} - \frac{72\sqrt{1420039830}}{14500915}R_{42} + \frac{2576\sqrt{1846051779}}{165310431}R_{60}$ $+ \frac{21319328\sqrt{21537270755}}{2981373623085}R_{62} + \frac{423512\sqrt{2414067711}}{198758241539}R_{80} - \frac{919432\sqrt{84492369885}}{1391307690773}R_{82}$ $+ \frac{183524\sqrt{3072449814}}{379447552029}R_{84} - \frac{24573456\sqrt{331342627}}{2077927070635}R_{10,0} - \frac{1301472\sqrt{903661710}}{90344655245}R_{10,2}$ $- \frac{689544\sqrt{11747602230}}{2077927070635}R_{10,4} - \frac{21240648\sqrt{142003983}}{799202719475}R_{12,0}$ $+ \frac{360624\sqrt{783173482}}{159840543895}R_{12,2} + \frac{583792\sqrt{1174760223}}{159840543895}R_{12,4} + \frac{529056\sqrt{2852989113}}{47011924675}R_{12,6}$
$\frac{13}{2}$	6	4	$\frac{13}{2}$	6	7	$- \frac{2464\sqrt{50498}}{1165061}R_{62} + \frac{848\sqrt{23914410}}{15145793}R_{80} - \frac{1800\sqrt{33480174}}{106020551}R_{82}$ $- \frac{1504\sqrt{920704785}}{106020551}R_{84} - \frac{877536\sqrt{3282370}}{1741766195}R_{10,0} - \frac{992832\sqrt{10831821}}{1741766195}R_{10,2}$ $- \frac{144384\sqrt{833217}}{133982015}R_{10,4} - \frac{26224\sqrt{1406730}}{669910075}R_{12,0} - \frac{106656\sqrt{1388695}}{669910075}R_{12,2}$ $+ \frac{70752\sqrt{8332170}}{669910075}R_{12,4} - \frac{10208\sqrt{20235270}}{669910075}R_{12,6}$
$\frac{13}{2}$	6	5	$\frac{13}{2}$	6	5	$R_{00} + \frac{728272\sqrt{5}}{1938625}R_{20} - \frac{2726208}{14500915}R_{40} + \frac{427728\sqrt{10}}{72504575}R_{42}$ $- \frac{14995936\sqrt{13}}{275517385}R_{60} + \frac{1360576\sqrt{1365}}{63580935}R_{62} + \frac{284314\sqrt{17}}{25047035}R_{80}$ $+ \frac{1881812\sqrt{595}}{175329245}R_{82} - \frac{26795\sqrt{2618}}{2697373}R_{84} - \frac{253762368\sqrt{21}}{2880409025}R_{10,0}$ $- \frac{116814144\sqrt{770}}{2880409025}R_{10,2} - \frac{4581312\sqrt{10010}}{576081805}R_{10,4} - \frac{125178856}{1107849625}R_{12,0}$ $- \frac{3650702\sqrt{6006}}{1107849625}R_{12,2} - \frac{3997488\sqrt{1001}}{1107849625}R_{12,4} + \frac{4528084\sqrt{2431}}{1107849625}R_{12,6}$

Table B479: Box matrix elements $B_{J'L'n'; JLn}^{(\mathbf{P}\Lambda_B S a)}(E)$ for $\mathbf{P} = (2\pi/L)(0, n, n)$, irrep $\Lambda_B = G$, and total spin $S = \frac{1}{2}$. These quantities depend on a only through \mathbf{s}_a and u_a . R_{lm} is short hand for $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Re } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$ and I_{lm} abbreviates $(\gamma\pi^{3/2}u_a^{l+1})^{-1}\text{Im } \mathcal{Z}_{lm}(\mathbf{s}_a, \gamma, u_a^2)$. The Hermiticity of B can be used to obtain other elements that are not shown. (Table 148 of 148.)

J'	L'	n'	J	L	n	$u_a^{-(L'+L+1)} B$
$\frac{13}{2}$	6	5	$\frac{13}{2}$	6	6	$\frac{30\sqrt{108210}}{15509}R_{20} + \frac{435582\sqrt{21642}}{950996371}R_{40} - \frac{24035058\sqrt{54105}}{52304800405}R_{42}$ $+ \frac{32785312\sqrt{281346}}{54206793147}R_{60} + \frac{223240928\sqrt{3282370}}{2981373623085}R_{62} - \frac{2842208\sqrt{367914}}{18068931049}R_{80}$ $+ \frac{5854088\sqrt{12876990}}{126482517343}R_{82} + \frac{3075536\sqrt{14164689}}{29188273233}R_{84} + \frac{118777428\sqrt{50498}}{90344655245}R_{10,0}$ $+ \frac{910271808\sqrt{4166085}}{2077927070635}R_{10,2} + \frac{8219484\sqrt{54159105}}{159840543895}R_{10,4} - \frac{820596348\sqrt{21642}}{799202719475}R_{12,0}$ $- \frac{5970822\sqrt{3610607}}{159840543895}R_{12,2} + \frac{2162072\sqrt{21663642}}{159840543895}R_{12,4} - \frac{28530018\sqrt{52611702}}{799202719475}R_{12,6}$
$\frac{13}{2}$	6	5	$\frac{13}{2}$	6	7	$\frac{37800\sqrt{9230258895}}{10460960081}R_{40} - \frac{75600\sqrt{3692103558}}{10460960081}R_{42} - \frac{176400\sqrt{710019915}}{15289095503}R_{60}$ $- \frac{962528\sqrt{331342627}}{15289095503}R_{62} + \frac{57496\sqrt{156914401215}}{198758241539}R_{80} - \frac{97800\sqrt{219680161701}}{198758241539}R_{82}$ $+ \frac{212\sqrt{199709237910}}{950996371}R_{84} + \frac{6860448\sqrt{21537270755}}{2077927070635}R_{10,0} + \frac{1055616\sqrt{2349520446}}{90344655245}R_{10,2}$ $+ \frac{218064\sqrt{180732342}}{8412660205}R_{10,4} + \frac{331232\sqrt{9230258895}}{799202719475}R_{12,0} - \frac{5413056\sqrt{301220570}}{799202719475}R_{12,2}$ $- \frac{9996096\sqrt{451830855}}{799202719475}R_{12,4} + \frac{137984\sqrt{1097303505}}{799202719475}R_{12,6}$
$\frac{13}{2}$	6	6	$\frac{13}{2}$	6	6	$R_{00} - \frac{2213288\sqrt{5}}{279704815}R_{20} + \frac{256650606}{615350593}R_{40} - \frac{699168429\sqrt{10}}{10460960081}R_{42}$ $- \frac{63301605440\sqrt{13}}{198758241539}R_{60} - \frac{648864512\sqrt{1365}}{15289095503}R_{62} - \frac{3106030\sqrt{17}}{73153567}R_{80}$ $+ \frac{535915980\sqrt{595}}{126482517343}R_{82} - \frac{406514145\sqrt{2618}}{126482517343}R_{84} + \frac{3035108880\sqrt{21}}{21872916533}R_{10,0}$ $+ \frac{1347850368\sqrt{770}}{24446200831}R_{10,2} + \frac{5690021256\sqrt{10010}}{415585414127}R_{10,4} - \frac{4407588108}{31968108779}R_{12,0}$ $- \frac{33753159\sqrt{6006}}{31968108779}R_{12,2} + \frac{264807576\sqrt{1001}}{31968108779}R_{12,4} + \frac{199040490\sqrt{2431}}{31968108779}R_{12,6}$
$\frac{13}{2}$	6	6	$\frac{13}{2}$	6	7	$\frac{84\sqrt{341198}}{46891}R_{20} - \frac{339444\sqrt{1705990}}{10460960081}R_{40} - \frac{715932\sqrt{170599}}{615350593}R_{42}$ $- \frac{8704360\sqrt{131230}}{15289095503}R_{60} - \frac{20730640\sqrt{551166}}{45867286509}R_{62} - \frac{6764580\sqrt{29001830}}{198758241539}R_{80}$ $- \frac{38895200\sqrt{40602562}}{1391307690773}R_{82} + \frac{856740\sqrt{9227855}}{6656974597}R_{84} - \frac{66678120\sqrt{35825790}}{415585414127}R_{10,0}$ $- \frac{2163654720\sqrt{108563}}{415585414127}R_{10,2} - \frac{18335160\sqrt{8351}}{1682532041}R_{10,4} + \frac{2174040\sqrt{1705990}}{31968108779}R_{12,0}$ $+ \frac{9370020\sqrt{125265}}{31968108779}R_{12,2} - \frac{3930960\sqrt{83510}}{31968108779}R_{12,4} - \frac{5743980\sqrt{202810}}{31968108779}R_{12,6}$
$\frac{13}{2}$	6	7	$\frac{13}{2}$	6	7	$R_{00} + \frac{1568\sqrt{5}}{3607}R_{20} + \frac{25272}{61319}R_{40} - \frac{3204\sqrt{10}}{61319}R_{42}$ $+ \frac{174400\sqrt{13}}{1165061}R_{60} + \frac{14720\sqrt{1365}}{1165061}R_{62} + \frac{4900\sqrt{17}}{68533}R_{80}$ $+ \frac{7800\sqrt{595}}{1165061}R_{82} - \frac{10050\sqrt{2618}}{1165061}R_{84} + \frac{4536000\sqrt{21}}{26796403}R_{10,0}$ $+ \frac{1209600\sqrt{770}}{26796403}R_{10,2} + \frac{151200\sqrt{10010}}{26796403}R_{10,4} + \frac{3049200}{26796403}R_{12,0}$ $+ \frac{69300\sqrt{6006}}{26796403}R_{12,2} + \frac{110880\sqrt{1001}}{26796403}R_{12,4} + \frac{27720\sqrt{2431}}{26796403}R_{12,6}$

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