

PG No. 15 D_{4h} $4/mmm$ [tetragonal] (lgs basis)

bra: $\langle s, \uparrow |, \langle s, \downarrow |$
ket: $= |s, \uparrow \rangle, |s, \downarrow \rangle$

Table 1: (s,s) block.

No.	multipole	matrix
1	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_{1g})$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$
2	symmetry	z
	$\mathbb{M}_1^{(1,-1;a)}(A_{2g})$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$
3	symmetry	x
	$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$
4	symmetry	$-y$
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{2} \\ -\frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$

bra: $\langle s, \uparrow |, \langle s, \downarrow |$
ket: $= |p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

Table 2: (s,p) block.

No.	multipole	matrix
5	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
6	symmetry	x
	$\mathbb{Q}_{1,1}^{(a)}(E_u)$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 2

No.	multipole	matrix
7	symmetry	y $\mathbb{Q}_{1,2}^{(a)}(E_u)$ $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
8	symmetry	z $\mathbb{Q}_1^{(1,0;a)}(A_{2u})$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
9	symmetry	x $\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
10	symmetry	y $\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)$ $\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
11	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{G}_2^{(1,-1;a)}(A_{1u})$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$
12	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{G}_2^{(1,-1;a)}(B_{1u})$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
13	symmetry	$\sqrt{3}xy$ $\mathbb{G}_2^{(1,-1;a)}(B_{2u})$ $\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
14	symmetry	$\sqrt{3}yz$ $\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
15	symmetry	$-\sqrt{3}xz$ $\mathbb{G}_{2,2}^{(1,-1;a)}(E_u)$ $\begin{bmatrix} -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
16	symmetry	1

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
17	symmetry	z $\mathbb{T}_1^{(a)}(A_{2u})$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
18	symmetry	x $\mathbb{T}_{1,1}^{(a)}(E_u)$ $\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
19	symmetry	y $\mathbb{T}_{1,2}^{(a)}(E_u)$ $\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
20	symmetry	z $\mathbb{T}_1^{(1,0;a)}(A_{2u})$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
21	symmetry	x $\mathbb{T}_{1,1}^{(1,0;a)}(E_u)$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
22	symmetry	y $\mathbb{T}_{1,2}^{(1,0;a)}(E_u)$ $\begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
23	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{M}_2^{(1,-1;a)}(A_{1u})$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
24	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{M}_2^{(1,-1;a)}(B_{1u})$ $\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
25	symmetry	$\sqrt{3}xy$

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{M}_2^{(1,-1;a)}(B_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
26	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
27	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)$	$\begin{bmatrix} -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
28	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$

bra: $= \langle s, \uparrow |, \langle s, \downarrow |$ ket: $= |d_v, \uparrow \rangle, |d_v, \downarrow \rangle, |d_{xy}, \uparrow \rangle, |d_{xy}, \downarrow \rangle, |d_{xz}, \uparrow \rangle, |d_{xz}, \downarrow \rangle, |d_{yz}, \uparrow \rangle, |d_{yz}, \downarrow \rangle, |d_u, \uparrow \rangle, |d_u, \downarrow \rangle$

Table 3: (s,d) block.

No.	multipole	matrix
29	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
30	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(a)}(B_{1g})$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
31	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(a)}(B_{2g})$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
32	symmetry	$\sqrt{3}yz$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
33	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$
34	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
35	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,0;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
36	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(1,0;a)}(B_{2g})$	$\begin{bmatrix} \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
37	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
38	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{2}}{4} \\ \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
39	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{10} \end{bmatrix}$
40	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,-1;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
41	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(B_{2g})$	$\begin{bmatrix} \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
42	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \end{bmatrix}$
43	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
44	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{i}{4} & 0 \end{bmatrix}$
45	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{1}{4} \\ \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{1}{4} & 0 \end{bmatrix}$
46	symmetry	z
	$\mathbb{G}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{10} \end{bmatrix}$
47	symmetry	x
	$\mathbb{G}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
48	symmetry	$-y$
	$\mathbb{G}_{1,2}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{10}}{20} \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & -\frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
49	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
50	symmetry ...	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{T}_2^{(a)}(B_{1g})$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
51	symmetry	$\sqrt{3}xy$ $\mathbb{T}_2^{(a)}(B_{2g})$ $\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
52	symmetry	$\sqrt{3}yz$ $\mathbb{T}_{2,1}^{(a)}(E_g)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
53	symmetry	$\sqrt{3}xz$ $\mathbb{T}_{2,2}^{(a)}(E_g)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
54	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{T}_2^{(1,0;a)}(A_{1g})$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
55	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{T}_2^{(1,0;a)}(B_{1g})$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
56	symmetry	$\sqrt{3}xy$ $\mathbb{T}_2^{(1,0;a)}(B_{2g})$ $\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
57	symmetry	$\sqrt{3}yz$ $\mathbb{T}_{2,1}^{(1,0;a)}(E_g)$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
58	symmetry	$\sqrt{3}xz$ $\mathbb{T}_{2,2}^{(1,0;a)}(E_g)$ $\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
59	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{15}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{10} \end{bmatrix}$
60	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(1,-1;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
61	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(B_{2g})$	$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
62	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
63	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{20} & 0 \end{bmatrix}$
64	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{1}{4} & 0 \end{bmatrix}$
65	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{i}{4} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{i}{4} & 0 \end{bmatrix}$
66	symmetry	z
	$\mathbb{M}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$
67	symmetry	x
	$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
68	symmetry	$-y$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$

bra: = $\langle s, \uparrow |, \langle s, \downarrow |$ ket: = $|f_2, \uparrow \rangle, |f_2, \downarrow \rangle, |f_1, \uparrow \rangle, |f_1, \downarrow \rangle, |f_{bz}, \uparrow \rangle, |f_{bz}, \downarrow \rangle, |f_3, \uparrow \rangle, |f_3, \downarrow \rangle, |f_{3x}, \uparrow \rangle, |f_{3x}, \downarrow \rangle, |f_{3y}, \uparrow \rangle, |f_{3y}, \downarrow \rangle, |f_{az}, \uparrow \rangle, |f_{az}, \downarrow \rangle$

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
70	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
71	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
72	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
73	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \end{bmatrix}$
74	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
75	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 \end{bmatrix}$
76	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$
77	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(1,0;a)}(B_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \end{bmatrix}$
78	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(B_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \end{bmatrix}$
79	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & \frac{\sqrt{3}}{8} & 0 & 0 \end{bmatrix}$
80	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
81	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & -\frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
82	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
83	symmetry	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
84	symmetry	$-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{24} & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{42} & 0 \\ -\frac{\sqrt{42}i}{24} & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
85	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
86	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
87	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(B_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
88	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & \frac{\sqrt{5}}{8} & 0 & 0 \end{bmatrix}$
89	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
90	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & -\frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{112} & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
91	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{14} & \frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \end{bmatrix}$
93	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{70}i}{28} & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
94	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,1;a)}(B_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
95	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
96	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
97	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
98	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(a)}(B_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
99	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(a)}(B_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
100	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
	$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
101	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
	$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \end{bmatrix}$
102	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
103	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 \end{bmatrix}$
104	symmetry	$\frac{-z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \end{bmatrix}$
105	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(1,0;a)}(B_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \end{bmatrix}$
106	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(B_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \end{bmatrix}$
107	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{16} & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \end{bmatrix}$
108	symmetry	$\frac{-y(3x^2-2y^2+3z^2)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & \frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
109	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & -\frac{\sqrt{5}i}{8} & 0 & 0 \end{bmatrix}$
110	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
111	symmetry	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
112	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{24} & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{42} & 0 \\ -\frac{\sqrt{42}}{24} & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{42} \end{bmatrix}$
113	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
114	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
115	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(B_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
116	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & -\frac{\sqrt{5}i}{8} & 0 & 0 \end{bmatrix}$
117	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
118	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & \frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{210}}{112} & -\frac{\sqrt{35}i}{56} & 0 & 0 \end{bmatrix}$
119	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & \frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & -\frac{\sqrt{14}}{16} & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & -\frac{\sqrt{14}i}{14} & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{14} \end{bmatrix}$
121	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{28} & 0 & -\frac{\sqrt{70}i}{28} & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
122	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,1;a)}(B_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ -\frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
123	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & -\frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
124	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$

bra: = $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$ ket: = $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

Table 5: (p,p) block.

No.	multipole	matrix
125	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_{1g})$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
126	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$
127	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
128	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
129	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
130	symmetry	$\sqrt{3}xz$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
131	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
132	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
133	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
134	symmetry	$\sqrt{3}yz$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
135	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$
136	symmetry	1
	$\mathbb{Q}_0^{(1,1;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
137	symmetry	z
	$\mathbb{G}_1^{(1,0;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
138	symmetry	x

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
139	symmetry	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$
140	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
141	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
142	symmetry	$\begin{bmatrix} \sqrt{3}(x-y)(x+y) \\ \sqrt{3}xy \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
143	symmetry	$\sqrt{3}yz$
		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
144	symmetry	$\sqrt{3}xz$
		$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
145	symmetry	z
		$\begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
146	symmetry	x

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
147	symmetry	$\begin{bmatrix} & & & -y & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
148	symmetry	$\begin{bmatrix} & & & z & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$ $\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
149	symmetry	$\begin{bmatrix} & & & x & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$ $\begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
150	symmetry	$\begin{bmatrix} & & & -y & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
151	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$
152	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
153	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
154	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
155	symmetry	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & \frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
156	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
157	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
		$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
158	symmetry	z

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$
159	symmetry	x $\begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$
160	symmetry	$-y$ $\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & -\frac{\sqrt{30}}{20} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$

bra: = $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$ ket: = $|d_v, \uparrow \rangle, |d_v, \downarrow \rangle, |d_{xy}, \uparrow \rangle, |d_{xy}, \downarrow \rangle, |d_{xz}, \uparrow \rangle, |d_{xz}, \downarrow \rangle, |d_{yz}, \uparrow \rangle, |d_{yz}, \downarrow \rangle, |d_u, \uparrow \rangle, |d_u, \downarrow \rangle$

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	z

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{bmatrix}$
162	symmetry	x $\begin{bmatrix} \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \end{bmatrix}$
163	symmetry	y $\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \end{bmatrix}$
164	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} \end{bmatrix}$
165	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
166	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
167	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
168	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \end{bmatrix}$
169	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
170	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
171	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \end{bmatrix}$
172	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{bmatrix}$
173	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{bmatrix}$
174	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \end{bmatrix}$
175	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{20} & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$
176	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \end{bmatrix}$
177	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{6} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
178	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
179	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
180	symmetry	$\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \end{bmatrix}$
181	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ -\frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 \end{bmatrix}$
182	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & -\frac{i}{12} & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$
183	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & -\frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{6} & 0 & \frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ \frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{6} & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$
184	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & \frac{\sqrt{5}i}{40} & 0 \\ 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{3\sqrt{5}}{40} \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
185	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 \\ 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{40} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
186	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ \frac{5i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{12} & \frac{\sqrt{3}i}{24} & 0 \\ 0 & -\frac{5i}{24} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ -\frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{12} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
187	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\begin{bmatrix} \frac{5i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{6} & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & -\frac{5i}{24} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{3}i}{24} \\ 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{6} & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ 0 & \frac{i}{24} & 0 & \frac{1}{6} & -\frac{i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
188	symmetry	z $\begin{bmatrix} 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \end{bmatrix}$
189	symmetry	x

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \end{bmatrix}$
190	symmetry	$\begin{bmatrix} \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
191	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
192	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
193	symmetry	$\begin{bmatrix} \sqrt{3}(x-y)(x+y) \\ \sqrt{3}xy \end{bmatrix}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
194	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
195	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \end{bmatrix}$
196	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{15} \end{bmatrix}$
197	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(1,-1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
198	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
199	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
200	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
201	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & -\frac{\sqrt{15}}{30} & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}i}{10} \end{bmatrix}$
202	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} \end{bmatrix}$
203	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
204	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{28} & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
205	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{bmatrix}$
206	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
207	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
		$\begin{bmatrix} -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
208	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{28} & -\frac{\sqrt{21}i}{56} & 0 \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{56} \\ -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{21}}{56} & 0 \end{bmatrix}$
209	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{56} & 0 \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} \\ \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 \end{bmatrix}$
210	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \end{bmatrix}$
211	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_2^{(1,0;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{i}{12} & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ \frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{3}}{12} & 0 \\ \frac{i}{3} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & -\frac{i}{3} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 \end{bmatrix}$
212	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,0;a)}(B_{2u})$	$\begin{bmatrix} 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{i}{12} & 0 & \frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & \frac{i}{3} & 0 & 0 & -\frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{3} & \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 \end{bmatrix}$
213	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,0;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{12} & 0 & 0 & -\frac{1}{12} & 0 & \frac{i}{3} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{12} & \frac{1}{12} & 0 & \frac{i}{3} & 0 & 0 & 0 \\ \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{12} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & 0 \\ -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & 0 \end{bmatrix}$
214	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,0;a)}(E_u)$	$\begin{bmatrix} \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{i}{12} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & 0 & \frac{i}{12} & 0 & 0 & -\frac{1}{3} & 0 & \frac{i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{12} & \frac{1}{3} & 0 & \frac{i}{12} & 0 & 0 & 0 \\ 0 & \frac{i}{6} & 0 & \frac{1}{6} & -\frac{i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
215	symmetry	1
	$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{60} \\ \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{30}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & \frac{\sqrt{30}i}{30} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} \end{bmatrix}$
216	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} \\ -\frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 \\ 0 & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}}{35} \\ -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & -\frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & \frac{2\sqrt{105}}{105} & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & -\frac{2\sqrt{105}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{70} \end{bmatrix}$
217	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{4\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{30} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{105}}{210} \\ -\frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{105}}{210} & 0 \\ \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$
218	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,1;a)}(B_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{105}}{210} & 0 \\ 0 & \frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{\sqrt{35}i}{30} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
219	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & \frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{4\sqrt{35}}{105} & \frac{2\sqrt{105}i}{105} & 0 \\ 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{2\sqrt{105}i}{105} \\ 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{105} & \frac{\sqrt{105}}{70} & 0 \end{bmatrix}$
220	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u)$	$\begin{bmatrix} \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{42} & -\frac{2\sqrt{105}i}{105} & 0 \\ 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & -\frac{4\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{2\sqrt{105}i}{105} \\ 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
221	symmetry	z

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \end{bmatrix}$
222	symmetry	x $\begin{bmatrix} \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \end{bmatrix}$
223	symmetry	y $\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
224	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} \end{bmatrix}$
225	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
226	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
227	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
228	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \end{bmatrix}$
229	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \end{bmatrix}$
230	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \end{bmatrix}$
231	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & \frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \end{bmatrix}$
232	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{bmatrix}$
233	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{6} & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{bmatrix}$
234	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{10}}{20} \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \end{bmatrix}$
235	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
		$\begin{bmatrix} \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{30}i}{20} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$
236	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 \end{bmatrix}$
237	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
238	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
239	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & \frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
240	symmetry	$\begin{bmatrix} \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
241	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ \frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \end{bmatrix}$
242	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & -\frac{1}{12} & 0 & \frac{i}{6} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & -\frac{1}{6} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$
243	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & \frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{6} & 0 & -\frac{i}{12} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{6} & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$
244	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & \frac{\sqrt{5}}{40} & 0 \\ 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & -\frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
245	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 \\ 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{40} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} \\ \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
246	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \\ \frac{5}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{12} & \frac{\sqrt{3}}{24} \\ 0 & -\frac{5}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{24} \\ 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{12} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
247	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\begin{bmatrix} \frac{5}{24} & 0 & 0 & 0 & 0 & -\frac{1}{12} & 0 & -\frac{i}{6} & -\frac{\sqrt{3}}{24} & 0 \\ 0 & -\frac{5}{24} & 0 & 0 & -\frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{24} \\ 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{6} & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \\ 0 & \frac{1}{24} & 0 & -\frac{i}{6} & -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ \frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
248	symmetry	z $\begin{bmatrix} 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \end{bmatrix}$
249	symmetry	x

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \end{bmatrix}$
250	symmetry	y $\begin{bmatrix} -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
251	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
252	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
253	symmetry	$\sqrt{3}xy$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(a)}(B_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
254	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(a)}(E_u)$	$\begin{bmatrix} \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
255	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(a)}(E_u)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \end{bmatrix}$
256	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{60} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{15} \end{bmatrix}$
257	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
258	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
259	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
260	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
261	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{30} & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{10} \end{bmatrix}$
262	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} \end{bmatrix}$
263	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
264	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{28} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{bmatrix}$
265	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(B_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
266	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & -\frac{\sqrt{3}}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
267	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{8} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
268	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & -\frac{\sqrt{21}}{56} & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{21}i}{56} & 0 \end{bmatrix}$
269	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{21}}{56} & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{56} \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}}{56} & 0 \end{bmatrix}$
270	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \end{bmatrix}$
271	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,0;a)}(B_{1u})$	$\begin{bmatrix} 0 & -\frac{1}{12} & 0 & -\frac{i}{12} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ -\frac{1}{3} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 \\ 0 & \frac{1}{3} & 0 & 0 & \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 \end{bmatrix}$
272	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,0;a)}(B_{2u})$	$\begin{bmatrix} 0 & \frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{6} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{12} & 0 & \frac{i}{12} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{1}{3} & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{3} & \frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 & 0 \end{bmatrix}$
273	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,0;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & \frac{1}{12} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{3} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{12} & \frac{i}{12} & 0 & -\frac{1}{3} & 0 & 0 & 0 \\ -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{12} & \frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & -\frac{1}{12} & 0 & 0 & 0 \\ -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & 0 \end{bmatrix}$
274	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,0;a)}(E_u)$	$\begin{bmatrix} -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{1}{12} & 0 & 0 & \frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & 0 & -\frac{1}{12} & 0 & 0 & -\frac{i}{3} & 0 & -\frac{1}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{12} & \frac{i}{3} & 0 & -\frac{1}{12} & 0 & 0 & 0 \\ 0 & -\frac{1}{6} & 0 & \frac{i}{6} & \frac{1}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
275	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{30}i}{60} \\ -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} \end{bmatrix}$
276	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{210} & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} \\ -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & \frac{\sqrt{35}}{35} \\ 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{35}i}{35} \\ \frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & \frac{\sqrt{35}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & -\frac{2\sqrt{105}i}{105} & \frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{70} \end{bmatrix}$
277	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(B_{1u})$	$\begin{bmatrix} 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & -\frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{105}i}{210} & 0 \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
278	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & \frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{105}i}{210} \\ -\frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & \frac{\sqrt{35}}{30} & 0 & -\frac{4\sqrt{35}i}{105} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$
279	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{4\sqrt{35}i}{105} & \frac{2\sqrt{105}}{105} & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{2\sqrt{105}}{105} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & -\frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
280	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & -\frac{2\sqrt{105}}{105} & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{2\sqrt{105}}{105} \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 \end{bmatrix}$

bra: = $\langle p_x, \uparrow |, \langle p_x, \downarrow |, \langle p_y, \uparrow |, \langle p_y, \downarrow |, \langle p_z, \uparrow |, \langle p_z, \downarrow |$

ket: = $|f_2, \uparrow \rangle, |f_2, \downarrow \rangle, |f_1, \uparrow \rangle, |f_1, \downarrow \rangle, |f_{bz}, \uparrow \rangle, |f_{bz}, \downarrow \rangle, |f_3, \uparrow \rangle, |f_3, \downarrow \rangle, |f_{3x}, \uparrow \rangle, |f_{3x}, \downarrow \rangle, |f_{3y}, \uparrow \rangle, |f_{3y}, \downarrow \rangle, |f_{az}, \uparrow \rangle, |f_{az}, \downarrow \rangle$

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \end{bmatrix}$
282	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
283	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
284	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 \end{bmatrix}$
285	symmetry	$\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 \end{bmatrix}$
286	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ $\begin{bmatrix} \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
287	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$ $\begin{bmatrix} -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$
288	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
289	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
290	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
291	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 \end{bmatrix}$
293	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 \end{bmatrix}$
294	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 \end{bmatrix}$
295	symmetry	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{1}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{i}{8} \\ 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 \\ -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
296	symmetry	$-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \\ 0 & -\frac{\sqrt{14}}{16} & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 \\ \frac{\sqrt{14}}{16} & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
298	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{56} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 \\ 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
299	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
300	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}}{32} & -\frac{3i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & -\frac{\sqrt{15}i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}i}{16} \\ 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{3i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} \\ 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 \end{bmatrix}$
302	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & \frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{224} & -\frac{\sqrt{105}i}{112} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{112} \\ 0 & \frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & \frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{32} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
303	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{56} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{112} & 0 \\ -\frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{112} \\ 0 & 0 & -\frac{\sqrt{42}i}{32} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{32} & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
305	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{42}}{84} & 0 \\ \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 \end{bmatrix}$
306	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 \end{bmatrix}$
307	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{\sqrt{7}}{84} & -\frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
308	symmetry	$\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{12} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{12} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & \frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & -\frac{\sqrt{42}}{28} & 0 \end{bmatrix}$
309	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 \\ -\frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
310	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{60} & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{60} & \frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 \\ \frac{\sqrt{210}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & -\frac{\sqrt{210}i}{60} & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & -\frac{\sqrt{210}}{240} & 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{240} & 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
312	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,0;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & \frac{3\sqrt{7}}{56} & 0 \\ \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & \frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 \\ -\frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & \frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
313	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & -\frac{3\sqrt{7}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 \\ -\frac{\sqrt{70}i}{80} & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 \end{bmatrix}$
314	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{160} & -\frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & -\frac{i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{i}{16} \\ 0 & \frac{3\sqrt{10}}{160} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 \\ -\frac{3\sqrt{10}}{160} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & -\frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & \frac{i}{4} & 0 \end{bmatrix}$
315	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 \\ \frac{\sqrt{10}}{40} & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & -\frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{i}{16} & 0 \\ \frac{\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{i}{16} \\ 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{160} & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & \frac{1}{4} & 0 & 0 \end{bmatrix}$
316	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{19\sqrt{70}}{1120} & \frac{11\sqrt{105}i}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{5\sqrt{42}}{224} & -\frac{\sqrt{7}i}{112} & 0 \\ -\frac{3\sqrt{70}i}{280} & 0 & \frac{19\sqrt{70}}{1120} & 0 & 0 & -\frac{11\sqrt{105}i}{560} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{112} \\ 0 & -\frac{9\sqrt{70}}{1120} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{70}}{1120} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & -\frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{3\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
317	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{9\sqrt{70}i}{1120} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & -\frac{9\sqrt{70}i}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{19\sqrt{70}i}{1120} & 0 & -\frac{3\sqrt{70}}{280} & \frac{11\sqrt{105}i}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{112} & 0 \\ -\frac{19\sqrt{70}i}{1120} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{11\sqrt{105}i}{560} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{112} \\ 0 & 0 & \frac{3\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}i}{160} & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{224} & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
319	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{84} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{84} & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
320	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(B_{2g})$	$\begin{bmatrix} \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 \\ -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \end{bmatrix}$
321	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{11\sqrt{14}}{168} & \frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{11\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 \end{bmatrix}$
322	symmetry	$\sqrt{3}xz$ $\begin{bmatrix} 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{11\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 \end{bmatrix}$
323	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(B_{1g})$	$\begin{bmatrix} -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
325	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
326	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
327	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
328	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 \end{bmatrix}$
329	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_{3,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
330	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & -\frac{\sqrt{210}}{105} & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{70} \end{bmatrix}$
331	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,-1;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
332	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(B_{2g})$	$\begin{bmatrix} \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{14}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
333	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & \frac{\sqrt{35}i}{70} & 0 \\ \frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & \frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 \\ -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
334	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 \\ -\frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & \frac{3\sqrt{210}}{280} & -\frac{\sqrt{35}i}{70} & 0 \\ -\frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & -\frac{3\sqrt{35}}{140} & 0 & 0 \end{bmatrix}$
335	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 \\ \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
336	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & \frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & -\frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
337	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{21} \end{bmatrix}$
339	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
340	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \end{bmatrix}$
341	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
		$\begin{bmatrix} -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \end{bmatrix}$
342	symmetry	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{5\sqrt{14}i}{84} & 0 & -\frac{5\sqrt{14}}{112} & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{336} & \frac{\sqrt{35}i}{56} & 0 \\ \frac{5\sqrt{14}i}{84} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & -\frac{13\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 \\ \frac{13\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & \frac{\sqrt{14}i}{48} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
343	symmetry	$-\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$
		$\begin{bmatrix} 0 & -\frac{5\sqrt{14}}{112} & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 \\ \frac{5\sqrt{14}}{112} & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{84} & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{56} & 0 \\ -\frac{5\sqrt{14}i}{112} & 0 & -\frac{5\sqrt{14}}{84} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & -\frac{\sqrt{14}i}{48} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{48} & \frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{112} & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
344	symmetry	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{80} & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{8} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{8} \\ 0 & -\frac{3\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ \frac{3\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{8} & 0 \end{bmatrix}$
345	symmetry	$-\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ $\begin{bmatrix} 0 & -\frac{\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ \frac{\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{i}{8} & 0 \\ -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & \frac{1}{8} & 0 \end{bmatrix}$
346	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{30} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
347	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 & 0 \end{bmatrix}$
348	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
349	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{15}}{24} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & \frac{1}{6} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
350	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
351	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & \frac{i}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{i}{16} & 0 \\ 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & \frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
352	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{11\sqrt{6}i}{96} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & \frac{11\sqrt{6}i}{96} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{i}{16} & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{i}{16} \\ 0 & 0 & \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 \end{bmatrix}$
353	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & \frac{7i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{5\sqrt{10}}{96} & \frac{\sqrt{15}i}{48} & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & -\frac{7i}{48} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{5\sqrt{10}}{96} & 0 & 0 & -\frac{\sqrt{15}i}{48} \\ 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & 0 & -\frac{7\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 \\ -\frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{24} & \frac{7\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 \\ -\frac{3\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{6}i}{32} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
354	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{24} & \frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{96} & 0 & -\frac{\sqrt{6}}{24} & \frac{7i}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{48} & 0 \\ -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{7i}{48} & 0 & 0 & -\frac{5\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{48} \\ 0 & 0 & -\frac{3\sqrt{6}i}{32} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}i}{32} & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 \end{bmatrix}$
355	symmetry	z $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{210}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 \end{bmatrix}$
356	symmetry	x

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & -\frac{\sqrt{210}i}{140} & 0 \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
357	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & \frac{3\sqrt{35}}{140} & \frac{\sqrt{210}i}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & -\frac{\sqrt{210}}{140} & 0 & 0 \end{bmatrix}$
358	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & \frac{2\sqrt{7}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & -\frac{2\sqrt{7}i}{21} & 0 \end{bmatrix}$
359	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{168} & 0 & 0 \\ \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & -\frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
360	symmetry	$\begin{bmatrix} \sqrt{15}z(x-y)(x+y) \\ 2 \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,1;a)}(B_{2g})$	$\begin{bmatrix} -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
361	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{70}i}{42} & 0 & \frac{5\sqrt{70}}{224} & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{5\sqrt{42}}{672} & -\frac{5\sqrt{7}i}{112} & 0 \\ \frac{\sqrt{70}i}{42} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{5\sqrt{42}}{672} & 0 & 0 & \frac{5\sqrt{7}i}{112} \\ 0 & \frac{13\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 \\ -\frac{13\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & \frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{\sqrt{70}i}{96} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
362	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{13\sqrt{70}i}{672} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{672} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{13\sqrt{70}i}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & \frac{\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{672} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{42} & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & \frac{5\sqrt{7}i}{112} & 0 \\ \frac{5\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & \frac{5\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & 0 & \frac{\sqrt{70}i}{96} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{96} & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{224} & \frac{\sqrt{7}}{28} & 0 & 0 \end{bmatrix}$
363	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{11\sqrt{42}}{672} & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & -\frac{5\sqrt{105}i}{336} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{11\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & \frac{5\sqrt{105}i}{336} \\ 0 & -\frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 \\ \frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & -\frac{5\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & \frac{\sqrt{42}i}{96} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
364	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 \\ -\frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & \frac{5\sqrt{105}i}{336} & 0 \\ -\frac{11\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{5\sqrt{105}i}{336} \\ 0 & 0 & -\frac{\sqrt{42}i}{96} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{96} & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{70}i}{224} & \frac{\sqrt{105}}{84} & 0 & 0 \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \end{bmatrix}$
366	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
367	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
368	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 \end{bmatrix}$
369	symmetry	$\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 \end{bmatrix}$
370	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ $\begin{bmatrix} \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \end{bmatrix}$
371	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$ $\begin{bmatrix} -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \end{bmatrix}$
372	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
373	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
374	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 \\ \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
375	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 \end{bmatrix}$
377	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 \end{bmatrix}$
378	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 \end{bmatrix}$
379	symmetry	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & \frac{i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{1}{8} \\ 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 \\ -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 \end{bmatrix}$
380	symmetry	$-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & -\frac{\sqrt{14}i}{16} & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ \frac{\sqrt{14}i}{16} & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
382	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{56} & 0 \\ \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & -\frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
383	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{56} & 0 \\ 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 \\ -\frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
384	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & \frac{3}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{32} & \frac{\sqrt{15}}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{3}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}}{16} \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 \\ -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{3}{16} & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{16} \\ 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 \end{bmatrix}$
386	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{3\sqrt{42}i}{224} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{224} & \frac{\sqrt{105}}{112} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{112} \\ 0 & \frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & \frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{32} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
387	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{70}i}{56} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{112} & 0 \\ \frac{3\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{112} \\ 0 & 0 & \frac{\sqrt{42}}{32} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{32} & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
389	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & \frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 \end{bmatrix}$
390	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 \end{bmatrix}$
391	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{84} & -\frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \end{bmatrix}$
392	symmetry	$\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{12} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{12} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & \frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
393	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 \\ \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
394	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{60} & 0 & 0 & \frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{60} & -\frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 \\ \frac{\sqrt{210}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} \\ 0 & -\frac{\sqrt{210}}{60} & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 \\ 0 & \frac{\sqrt{210}i}{240} & 0 & -\frac{\sqrt{210}}{240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}i}{240} & 0 & -\frac{\sqrt{210}}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
396	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(B_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{280} & \frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & -\frac{3\sqrt{7}i}{56} & 0 \\ \frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 \\ \frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 \end{bmatrix}$
397	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{280} & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{70}}{80} & 0 & \frac{\sqrt{70}i}{80} & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 \\ -\frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
398	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{160} & -\frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & -\frac{1}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & \frac{1}{16} \\ 0 & -\frac{3\sqrt{10}i}{160} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 \\ \frac{3\sqrt{10}i}{160} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & \frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & \frac{1}{4} & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 \\ -\frac{\sqrt{10}i}{40} & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{1}{16} & 0 \\ \frac{\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{1}{16} \\ 0 & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{160} & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & -\frac{i}{4} & 0 \end{bmatrix}$
400	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{70}}{280} & 0 & \frac{19\sqrt{70}i}{1120} & \frac{11\sqrt{105}}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{5\sqrt{42}i}{224} & -\frac{\sqrt{7}}{112} & 0 \\ -\frac{3\sqrt{70}}{280} & 0 & -\frac{19\sqrt{70}i}{1120} & 0 & 0 & -\frac{11\sqrt{105}}{560} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{112} \\ 0 & \frac{9\sqrt{70}i}{1120} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 \\ -\frac{9\sqrt{70}i}{1120} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & \frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & -\frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & -\frac{3\sqrt{70}}{160} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
401	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 \\ 0 & -\frac{19\sqrt{70}}{1120} & 0 & \frac{3\sqrt{70}i}{280} & \frac{11\sqrt{105}}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{112} & 0 \\ -\frac{19\sqrt{70}}{1120} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{11\sqrt{105}}{560} & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{112} \\ 0 & 0 & \frac{3\sqrt{70}}{160} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{160} & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & -\frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
403	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \end{bmatrix}$
404	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
405	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{11\sqrt{14}i}{168} & -\frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{11\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
406	symmetry	$\sqrt{3}xz$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{11\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{11\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 \end{bmatrix}$
407	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
409	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \end{bmatrix}$
411	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
412	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 \end{bmatrix}$
413	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
414	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & \frac{\sqrt{35}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & \frac{\sqrt{210}i}{105} & \frac{3\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{70} \end{bmatrix}$
415	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
416	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
417	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{420} & \frac{\sqrt{35}}{70} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 \end{bmatrix}$
418	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 \\ \frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{3\sqrt{210}i}{280} & -\frac{\sqrt{35}}{70} & 0 \\ -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & \frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
419	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
420	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & -\frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{42} & 0 \\ \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{21} & \frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
421	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{21} & 0 \end{bmatrix}$
423	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
424	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 \end{bmatrix}$
425	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
		$\begin{bmatrix} -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \end{bmatrix}$
426	symmetry	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{5\sqrt{14}}{84} & 0 & \frac{5\sqrt{14}i}{112} & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{336} & \frac{\sqrt{35}}{56} & 0 \\ \frac{5\sqrt{14}}{84} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & \frac{13\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ -\frac{13\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & \frac{\sqrt{14}}{48} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
427	symmetry	$-\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{5\sqrt{14}i}{112} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 \\ -\frac{5\sqrt{14}i}{112} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & -\frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}}{112} & 0 & -\frac{5\sqrt{14}i}{84} & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{56} & 0 \\ -\frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{84} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & 0 & -\frac{\sqrt{14}}{48} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{48} & -\frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & \frac{\sqrt{210}}{112} & -\frac{\sqrt{35}i}{56} & 0 & 0 \end{bmatrix}$
428	symmetry	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{80} & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & \frac{1}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{1}{8} \\ 0 & \frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & \frac{1}{8} & 0 \end{bmatrix}$
429	symmetry	$-\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{1}{8} & 0 \\ -\frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{i}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & -\frac{i}{8} & 0 \end{bmatrix}$
430	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{30} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
431	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{40} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & -\frac{\sqrt{3}}{12} & 0 \\ \frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
432	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
433	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{24} & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
434	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & \frac{\sqrt{15}i}{24} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
435	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & -\frac{1}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & \frac{1}{16} & 0 \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
436	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{6}}{96} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{11\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & \frac{1}{16} & 0 \\ \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{1}{16} \\ 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 \end{bmatrix}$
437	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{96} & -\frac{7}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{5\sqrt{10}i}{96} & -\frac{\sqrt{15}}{48} & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{7}{48} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{5\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}}{48} \\ 0 & \frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 & 0 & -\frac{7\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 \\ -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{24} & \frac{7\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 \\ \frac{3\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{24} & \frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}}{32} & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
438	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{7\sqrt{10}}{96} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{24} & \frac{\sqrt{10}i}{24} & 0 & -\frac{7\sqrt{10}}{96} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{7}{48} & 0 & 0 & 0 & 0 & \frac{5\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{48} & 0 \\ \frac{\sqrt{6}}{96} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{7}{48} & 0 & 0 & 0 & \frac{5\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{15}}{48} \\ 0 & 0 & \frac{3\sqrt{6}}{32} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{32} & -\frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{96} & 0 & 0 & 0 \end{bmatrix}$
439	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{70} \end{bmatrix}$
440	symmetry	x

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & -\frac{\sqrt{210}}{140} & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \end{bmatrix}$
441	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & -\frac{3\sqrt{35}i}{140} & \frac{\sqrt{210}}{140} & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
442	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & \frac{5\sqrt{7}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & \frac{2\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{2\sqrt{7}}{21} \end{bmatrix}$
443	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{168} & 0 \\ \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ -\frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
444	symmetry	$\begin{bmatrix} \sqrt{15}xyz \\ \frac{\sqrt{15}z(x-y)(x+y)}{2} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(B_{2g})$	$\begin{bmatrix} -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{168} & 0 \\ 0 & \frac{\sqrt{42}}{48} & 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
445	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{70}}{42} & 0 & -\frac{5\sqrt{70}i}{224} & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{5\sqrt{42}i}{672} & -\frac{5\sqrt{7}}{112} & 0 \\ \frac{\sqrt{70}}{42} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & -\frac{13\sqrt{70}i}{672} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 \\ \frac{13\sqrt{70}i}{672} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & -\frac{\sqrt{70}}{96} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
446	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{13\sqrt{70}}{672} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{672} & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & \frac{13\sqrt{70}}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & -\frac{\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{672} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{42} & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{42} & \frac{5\sqrt{7}}{112} & 0 \\ \frac{5\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & \frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{5\sqrt{7}}{112} \\ 0 & 0 & \frac{\sqrt{70}}{96} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{96} & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & -\frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
447	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{11\sqrt{42}i}{672} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{3\sqrt{70}i}{224} & -\frac{5\sqrt{105}}{336} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{11\sqrt{42}i}{672} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 & \frac{5\sqrt{105}}{336} \\ 0 & \frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 \\ -\frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & -\frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} \\ 0 & \frac{\sqrt{42}}{96} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
448	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 \\ \frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & \frac{5\sqrt{105}}{336} & 0 \\ -\frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{5\sqrt{105}}{336} \\ 0 & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{96} & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{70}}{224} & -\frac{\sqrt{105}i}{84} & 0 & 0 \end{bmatrix}$

bra: = $\langle d_v, \uparrow |, \langle d_v, \downarrow |, \langle d_{xy}, \uparrow |, \langle d_{xy}, \downarrow |, \langle d_{xz}, \uparrow |, \langle d_{xz}, \downarrow |, \langle d_{yz}, \uparrow |, \langle d_{yz}, \downarrow |, \langle d_u, \uparrow |, \langle d_u, \downarrow |$ ket: = $|d_v, \uparrow \rangle, |d_v, \downarrow \rangle, |d_{xy}, \uparrow \rangle, |d_{xy}, \downarrow \rangle, |d_{xz}, \uparrow \rangle, |d_{xz}, \downarrow \rangle, |d_{yz}, \uparrow \rangle, |d_{yz}, \downarrow \rangle, |d_u, \uparrow \rangle, |d_u, \downarrow \rangle$

Table 8: (d,d) block.

No.	multipole	matrix
449	symmetry	$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{bmatrix}$
450	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(A_{1g})$		$\begin{bmatrix} -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} \end{bmatrix}$
451	symmetry	$\begin{bmatrix} & & & & & & & \frac{\sqrt{3}(x-y)(x+y)}{2} & & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
452	symmetry	$\begin{bmatrix} & & & & & & & \sqrt{3}xy & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{bmatrix}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
453	symmetry	$\sqrt{3}yz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \end{bmatrix}$
454	symmetry	$\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(a)}(E_g)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$		$\begin{bmatrix} \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} \end{bmatrix}$
		$\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	$-\frac{\sqrt{21}}{14} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{2\sqrt{21}}{21} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{2\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0$	
457	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{Q}_4^{(a)}(A_{2g})$	$0 \quad 0 \quad \frac{1}{2} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{1}{2} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{1}{2} \quad 0 \quad 0$	
	$0 \quad \frac{1}{2} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
458	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(B_{1g})$	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
459		
460		

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 \end{bmatrix}$
461	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
462	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
$\mathbb{Q}_{4,2}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
464	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$	0 0 $-\frac{\sqrt{30}i}{15}$ 0 0 $-\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0	
	0 0 0 $\frac{\sqrt{30}i}{15}$ $\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0	
	$\frac{\sqrt{30}i}{15}$ 0 0 0 0 $\frac{\sqrt{30}i}{60}$ 0 $-\frac{\sqrt{30}}{60}$ 0 0	
	0 $-\frac{\sqrt{30}i}{15}$ 0 0 $\frac{\sqrt{30}i}{60}$ 0 $\frac{\sqrt{30}}{60}$ 0 0 0	
	0 $\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{10}}{20}$	
	$-\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$ $\frac{\sqrt{10}}{20}$ 0	
	0 $\frac{\sqrt{30}i}{60}$ 0 $\frac{\sqrt{30}}{60}$ $\frac{\sqrt{30}i}{30}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$	
	$\frac{\sqrt{30}i}{60}$ 0 $-\frac{\sqrt{30}}{60}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0	
465 symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$	
	0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0	
	0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{20}$	
	$-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0	
	0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$	
	$-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0	
	0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 $\frac{\sqrt{30}i}{20}$ 0 0	
466 symmetry	$\sqrt{3}xy$	

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(B_{2g})$	0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0	
	0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0	
	0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$	
	$-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0	
	0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{20}$	
	$\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 $\frac{\sqrt{30}}{20}$	
	0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 $\frac{\sqrt{30}}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 $-\frac{\sqrt{30}}{20}$ 0 0 0	
467	symmetry	$\sqrt{3}yz$
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)$	0 0 0 $-\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{10}}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0	
	0 $\frac{\sqrt{10}}{10}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0	
	$-\frac{\sqrt{10}}{10}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	$-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{30}i}{20}$ 0	
	0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 0 $-\frac{\sqrt{30}i}{20}$	
	0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{10}i}{20}$ $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0	
468	symmetry	$\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)$	0 0 0 $-\frac{\sqrt{10}i}{10}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0	
	0 0 $-\frac{\sqrt{10}i}{10}$ 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	0 $\frac{\sqrt{10}i}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0	
	$\frac{\sqrt{10}i}{10}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0	
	0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0	
	$-\frac{\sqrt{10}i}{20}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 $-\frac{\sqrt{30}i}{20}$ 0	
	0 $\frac{\sqrt{10}i}{20}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 $\frac{\sqrt{30}i}{20}$	
	0 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0	
469	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$	0 0 $\frac{\sqrt{15}i}{30}$ 0 0 $-\frac{\sqrt{15}}{60}$ 0 $-\frac{\sqrt{15}i}{60}$ 0 0	
	0 0 0 $-\frac{\sqrt{15}i}{30}$ $\frac{\sqrt{15}}{60}$ 0 $-\frac{\sqrt{15}i}{60}$ 0 0 0	
	$-\frac{\sqrt{15}i}{30}$ 0 0 0 0 $-\frac{\sqrt{15}i}{15}$ 0 $\frac{\sqrt{15}}{15}$ 0 0	
	0 $\frac{\sqrt{15}i}{30}$ 0 0 $-\frac{\sqrt{15}i}{15}$ 0 $-\frac{\sqrt{15}}{15}$ 0 0 0	
	0 $\frac{\sqrt{15}}{60}$ 0 $\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{5}}{20}$	
	$-\frac{\sqrt{15}}{60}$ 0 $\frac{\sqrt{15}i}{15}$ 0 0 0 0 $\frac{\sqrt{15}i}{15}$ $\frac{\sqrt{5}}{20}$ 0	
	0 $\frac{\sqrt{15}i}{60}$ 0 $-\frac{\sqrt{15}}{15}$ $\frac{\sqrt{15}i}{15}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$	
	$\frac{\sqrt{15}i}{60}$ 0 $\frac{\sqrt{15}}{15}$ 0 0 $-\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{5}i}{20}$ 0	
	0 0 0 0 0 $\frac{\sqrt{5}}{20}$ 0 $-\frac{\sqrt{5}i}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{5}}{20}$ 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0	
470	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{5\sqrt{21}}{84} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{5\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{5\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ -\frac{5\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \end{bmatrix}$
		471 symmetry
		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		472 symmetry
		$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(B_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \\ 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \end{bmatrix}$
		$473 \quad \text{symmetry} \quad -\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$474 \quad \text{symmetry} \quad \frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{\sqrt{3}}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & -\frac{\sqrt{3}}{8} & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
475	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 \end{bmatrix}$
476	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{7}}{56}$ $\frac{5\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{21}i}{14}$	
	0 0 $\frac{\sqrt{7}}{56}$ 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{21}i}{14}$ 0	
	0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{3\sqrt{21}}{56}$	
	$-\frac{\sqrt{7}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $\frac{3\sqrt{21}}{56}$ 0	
	$-\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ $-\frac{\sqrt{21}i}{56}$ 0	
	0 $\frac{5\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 $\frac{\sqrt{21}i}{56}$	
	0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{21}i}{14}$ 0 $\frac{3\sqrt{21}}{56}$ $\frac{\sqrt{21}i}{56}$ 0 0 0 0 0	
	$-\frac{\sqrt{21}i}{14}$ 0 $-\frac{3\sqrt{21}}{56}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 0	
477	symmetry	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $\frac{5\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{21}}{14}$	
	0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{5\sqrt{7}i}{56}$ $-\frac{\sqrt{21}}{14}$ 0	
	0 $\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{3\sqrt{21}i}{56}$	
	$\frac{\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{3\sqrt{21}i}{56}$ 0	
	0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	$-\frac{5\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{21}i}{56}$ 0	
	0 $\frac{5\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{\sqrt{21}i}{56}$	
	0 $-\frac{\sqrt{21}}{14}$ 0 $-\frac{3\sqrt{21}i}{56}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0	
	$\frac{\sqrt{21}}{14}$ 0 $-\frac{3\sqrt{21}i}{56}$ 0 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 0	
478	symmetry	1

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_0^{(1,1;a)}(A_{1g})$	0 0 $-\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0	
	0 0 0 $\frac{\sqrt{15}i}{15}$ $-\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0	
	$\frac{\sqrt{15}i}{15}$ 0 0 0 0 $-\frac{\sqrt{15}i}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0	
	0 $-\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{15}i}{30}$ 0 $-\frac{\sqrt{15}}{30}$ 0 0 0	
	0 $-\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 $-\frac{\sqrt{15}i}{30}$ 0 0 $\frac{\sqrt{5}}{10}$	
	$\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 $\frac{\sqrt{15}i}{30}$ $-\frac{\sqrt{5}}{10}$ 0	
	0 $-\frac{\sqrt{15}i}{30}$ 0 $-\frac{\sqrt{15}}{30}$ $\frac{\sqrt{15}i}{30}$ 0 0 0 0 $-\frac{\sqrt{5}i}{10}$	
	$-\frac{\sqrt{15}i}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 $-\frac{\sqrt{15}i}{30}$ 0 0 $-\frac{\sqrt{5}i}{10}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{5}}{10}$ 0 $\frac{\sqrt{5}i}{10}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{5}}{10}$ 0 $\frac{\sqrt{5}i}{10}$ 0 0	
479	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{Q}_2^{(1,1;a)}(A_{1g})$	0 0 $\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0	
	$-\frac{\sqrt{105}i}{70}$ 0 0 0 0 $\frac{\sqrt{105}i}{70}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0	
	0 $\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{70}$ 0 0 0	
	0 $\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 $\frac{\sqrt{35}}{35}$	
	$-\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 $\frac{\sqrt{105}i}{35}$ $-\frac{\sqrt{35}}{35}$ 0	
	0 $\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{70}$ $\frac{\sqrt{105}i}{35}$ 0 0 0 0 $-\frac{\sqrt{35}i}{35}$	
	$\frac{\sqrt{105}i}{70}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0	
480	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(1,1;a)}(B_{1g})$	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $-\frac{3\sqrt{35}}{70}$ $-\frac{3\sqrt{35}i}{42}$ 0	
	0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $\frac{3\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{105}i}{42}$	
	0 $-\frac{\sqrt{35}}{35}$ 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}}{210}$	
	$\frac{\sqrt{35}}{35}$ 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{210}$ 0	
	0 $\frac{\sqrt{35}i}{35}$ 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{210}$	
	$\frac{\sqrt{35}i}{35}$ 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{210}$ 0	
	0 0 $\frac{\sqrt{105}i}{42}$ 0 0 $-\frac{\sqrt{105}}{210}$ 0 $-\frac{\sqrt{105}i}{210}$ 0 0	
$\mathbb{Q}_2^{(1,1;a)}(B_{2g})$	0 0 0 $-\frac{\sqrt{105}i}{42}$ $\frac{\sqrt{105}}{210}$ 0 $-\frac{\sqrt{105}i}{210}$ 0 0 0	
	481 symmetry $\sqrt{3}xy$	0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 $\frac{3\sqrt{35}}{70}$ $\frac{\sqrt{105}i}{42}$ 0
	0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 $-\frac{3\sqrt{35}}{70}$ 0 0 $-\frac{\sqrt{105}i}{42}$	
	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0	
	0 $-\frac{3\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{210}$	
	$-\frac{3\sqrt{35}i}{70}$ 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{210}$ 0	
	0 $-\frac{3\sqrt{35}}{70}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 $\frac{\sqrt{105}}{210}$	
	$\frac{3\sqrt{35}}{70}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{210}$ 0	
	$-\frac{\sqrt{105}i}{42}$ 0 0 0 0 $\frac{\sqrt{105}i}{210}$ 0 $-\frac{\sqrt{105}}{210}$ 0 0	
482 symmetry	$\sqrt{3}yz$	0 $\frac{\sqrt{105}i}{42}$ 0 0 $\frac{\sqrt{105}i}{210}$ 0 $\frac{\sqrt{105}}{210}$ 0 0 0

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g)$	0	0 0 0 $-\frac{\sqrt{35}}{70}$ $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{\sqrt{105}i}{42}$
	0	0 0 $\frac{\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{105}i}{42}$ 0
	0	$\frac{\sqrt{35}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{105}}{42}$
	$-\frac{\sqrt{35}}{70}$	0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{35}$ $-\frac{\sqrt{105}}{42}$ 0
	$\frac{\sqrt{35}i}{35}$	0 0 0 0 0 0 0 $\frac{\sqrt{35}}{35}$ $\frac{2\sqrt{105}i}{105}$ 0
	0	$-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 $-\frac{2\sqrt{105}i}{105}$
	0	0 0 $\frac{\sqrt{35}i}{35}$ 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{35}}{35}$ 0 0 0 0 0
	0	$-\frac{\sqrt{105}i}{42}$ 0 $-\frac{\sqrt{105}}{42}$ $-\frac{2\sqrt{105}i}{105}$ 0 0 0 0 0
	$-\frac{\sqrt{105}i}{42}$	0 $\frac{\sqrt{105}}{42}$ 0 0 $\frac{2\sqrt{105}i}{105}$ 0 0 0 0 0
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g)$	483	symmetry $\sqrt{3}xz$
	0	0 0 0 $-\frac{\sqrt{35}i}{70}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{105}}{42}$
	0	0 0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 0 $\frac{\sqrt{35}i}{35}$ $-\frac{\sqrt{105}}{42}$ 0
	0	$\frac{\sqrt{35}i}{70}$ 0 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 $-\frac{\sqrt{105}i}{42}$
	$\frac{\sqrt{35}i}{70}$	0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 $-\frac{\sqrt{105}i}{42}$ 0
	0	0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{\sqrt{35}i}{35}$ 0 0
	0	0 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 0
	$\frac{\sqrt{35}i}{35}$	0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 $-\frac{2\sqrt{105}i}{105}$ 0
	0	$-\frac{\sqrt{35}i}{35}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{2\sqrt{105}i}{105}$
	0	$-\frac{\sqrt{105}}{42}$ 0 $\frac{\sqrt{105}i}{42}$ 0 0 $\frac{2\sqrt{105}i}{105}$ 0 0 0
	$\frac{\sqrt{105}}{42}$	0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 $-\frac{2\sqrt{105}i}{105}$ 0 0 0
484	symmetry	z

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_1^{(1,0;a)}(A_{2g})$	0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0	
	0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0	
	0 $-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$	
	$-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0	
	0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{30}}{20}$	
	$-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{20}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 $-\frac{\sqrt{30}}{20}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 $\frac{\sqrt{30}}{20}$ 0 0 0	
485	symmetry	x
$\mathbb{G}_{1,1}^{(1,0;a)}(E_g)$	0 0 0 $-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{10}}{10}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0	
	0 $\frac{\sqrt{10}}{10}$ 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0	
	$-\frac{\sqrt{10}}{10}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0	
	$\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{30}i}{20}$ 0	
	0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 0 $\frac{\sqrt{30}i}{20}$	
	0 0 $\frac{\sqrt{10}i}{20}$ 0 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{10}i}{20}$ $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0	
486	symmetry	$-y$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_{1,2}^{(1,0;a)}(E_g)$		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\mathbb{G}_3^{(1,0;a)}(A_{2g})$
487	symmetry	$\sqrt{15}xyz$
488	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(B_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{G}_3^{(1,0;a)}(B_{2g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \end{bmatrix}$
490	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
490	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{15}}{40}$ $-\frac{3\sqrt{15}i}{40}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{15}}{40}$ 0 0 $\frac{3\sqrt{15}i}{40}$ 0 0 0 0
	0	$\frac{\sqrt{15}}{40}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 $-\frac{\sqrt{5}}{8}$
	$-\frac{\sqrt{15}}{40}$	0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{20}$ $\frac{\sqrt{5}}{8}$ 0
	$\frac{3\sqrt{15}i}{40}$	0 0 0 0 0 0 0 $\frac{\sqrt{15}}{20}$ $\frac{\sqrt{5}i}{40}$ 0
	0	$-\frac{3\sqrt{15}i}{40}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{20}$ 0 0 $-\frac{\sqrt{5}i}{40}$
	0	0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{15}i}{20}$ $\frac{\sqrt{15}}{20}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{5}}{8}$ $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{5}}{8}$ 0 0 $\frac{\sqrt{5}i}{40}$ 0 0 0 0
491 symmetry	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$	
	0	0 0 0 $-\frac{\sqrt{15}i}{40}$ 0 0 $-\frac{3\sqrt{15}i}{40}$ 0 0 0
	0	0 0 $-\frac{\sqrt{15}i}{40}$ 0 0 0 0 $\frac{3\sqrt{15}i}{40}$ 0 0
	0	$\frac{\sqrt{15}i}{40}$ 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{8}$
	$\frac{\sqrt{15}i}{40}$	0 0 0 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 $\frac{\sqrt{5}i}{8}$ 0
	0	0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0
	$\frac{3\sqrt{15}i}{40}$	0 0 0 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0
	0	$-\frac{3\sqrt{15}i}{40}$ 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{40}$
	0	0 0 0 $-\frac{\sqrt{5}i}{8}$ 0 0 $\frac{\sqrt{5}i}{40}$ 0 0 0 0
492 symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$	
	continued ...	

Table 8

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}}{24} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & \frac{\sqrt{3}}{24} & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & \frac{\sqrt{3}i}{24} \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{24} & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
493	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{\sqrt{3}}{6} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 \end{bmatrix}$
494	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_2^{(1,0;a)}(A_{1g})$	0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 $-\frac{\sqrt{42}}{28}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $-\frac{\sqrt{42}}{28}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0	
	0 $\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$	
	$-\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 $-\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{42}}{28}$ 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0	
495	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{T}_2^{(1,0;a)}(B_{1g})$	0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{42}}{21}$ 0	
	0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{42}}{21}$	
	0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 $-\frac{\sqrt{42}i}{84}$	
	$\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{14}$ $\frac{\sqrt{42}i}{84}$ 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ $-\frac{\sqrt{14}}{14}$ 0 0 0 0 $\frac{\sqrt{42}}{84}$	
	$-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{14}}{14}$ 0 0 $\frac{\sqrt{42}}{84}$ 0	
	0 0 $\frac{\sqrt{42}}{21}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0	
	0 0 0 $-\frac{\sqrt{42}}{21}$ $\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0	
496	symmetry	$\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_2^{(1,0;a)}(B_{2g})$	0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ $-\frac{\sqrt{42}}{21}$ 0	
	0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{42}}{21}$	
	0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{14}}{14}$ 0 0 0 0 $-\frac{\sqrt{42}}{84}$	
	$-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 $-\frac{\sqrt{42}i}{84}$	
	$-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{14}$ $\frac{\sqrt{42}i}{84}$ 0	
	$-\frac{\sqrt{42}}{21}$ 0 0 0 0 $-\frac{\sqrt{42}}{84}$ 0 $-\frac{\sqrt{42}i}{84}$ 0 0	
	0 $\frac{\sqrt{42}}{21}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{84}$ 0 0 0	
497	symmetry	$\sqrt{3}yz$
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g)$	0 $\frac{\sqrt{14}}{14}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{42}}{42}$	
	$\frac{\sqrt{14}}{14}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 $\frac{\sqrt{42}}{42}$ 0	
	0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{42}i}{42}$	
	0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ $\frac{\sqrt{42}i}{42}$ 0	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 $\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{42}}{84}$ 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{42}}{84}$	
	0 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0	
	0 $\frac{\sqrt{42}}{42}$ 0 $-\frac{\sqrt{42}i}{42}$ $\frac{\sqrt{42}}{84}$ 0 0 0 0 $-\frac{\sqrt{14}}{14}$	
	$\frac{\sqrt{42}}{42}$ 0 $\frac{\sqrt{42}i}{42}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0	
498	symmetry	$\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g)$	0	$\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{42}i}{42}$
	$-\frac{\sqrt{14}i}{14}$	0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ $\frac{\sqrt{42}i}{42}$ 0
	0	0 0 0 $\frac{\sqrt{14}i}{14}$ $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{42}}{42}$
	0	0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{42}}{42}$ 0
	0	0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0
	0	0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0
	$\frac{\sqrt{14}}{28}$	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{14}$ $-\frac{\sqrt{42}}{84}$ 0
	0	$-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 $\frac{\sqrt{42}}{84}$
	0	$-\frac{\sqrt{42}i}{42}$ 0 $-\frac{\sqrt{42}}{42}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 $-\frac{\sqrt{14}i}{14}$
	$\frac{\sqrt{42}i}{42}$	0 $-\frac{\sqrt{42}}{42}$ 0 0 0 0 $\frac{\sqrt{42}}{84}$ $\frac{\sqrt{14}i}{14}$ 0
499	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 1)$	0	0 0 $-\frac{\sqrt{3}}{6}$ 0 0 $-\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{3}}{12}$ 0 0
	0	0 0 0 $\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{3}}{12}$ 0 0 0
	$-\frac{\sqrt{3}}{6}$	0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 $\frac{i}{4}$
	$\frac{\sqrt{3}i}{12}$	0 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0
	0	$\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 $\frac{1}{4}$
	$\frac{\sqrt{3}}{12}$	0 0 0 0 0 0 0 0 $\frac{1}{4}$ 0
	0	0 0 0 0 0 $\frac{i}{4}$ 0 $\frac{1}{4}$ 0 0
	0	0 0 0 0 $-\frac{i}{4}$ 0 $\frac{1}{4}$ 0 0 0
500	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$	0	$\frac{\sqrt{105}}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{105}}{420} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{30} \quad -\frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{105}}{30}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad 0$
	0	$-\frac{\sqrt{105}}{30} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{105}i}{420} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{28}$
	$-\frac{\sqrt{105}i}{420}$	$0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0$
	0	$-\frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{28}$
	$-\frac{\sqrt{105}}{420}$	$0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{35}}{28} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{28} \quad 0 \quad \frac{\sqrt{35}}{28} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0 \quad \frac{\sqrt{35}}{28} \quad 0 \quad 0 \quad 0$
501	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	$\frac{\sqrt{5}}{5}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20} \quad 0 \quad -\frac{\sqrt{5}i}{20} \quad 0 \quad 0$
	0	$-\frac{\sqrt{5}}{5} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20} \quad 0 \quad \frac{\sqrt{5}i}{20} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{5}}{5} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20} \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{5} \quad \frac{\sqrt{5}i}{20} \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{5}}{20} \quad 0 \quad -\frac{\sqrt{5}i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{5}}{20}$	$0 \quad \frac{\sqrt{5}i}{20} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{5}i}{20} \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{5}i}{20}$	$0 \quad \frac{\sqrt{5}}{20} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
502	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_4^{(1,0;a)}(B_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{3\sqrt{105}i}{140} \\ \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{3\sqrt{105}i}{140} & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} \\ -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{3\sqrt{105}i}{140} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{3\sqrt{105}i}{140} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{T}_4^{(1,0;a)}(B_{2g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} \\ -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}i}{140} \\ -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{3\sqrt{105}i}{140} & 0 \\ \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & -\frac{3\sqrt{105}i}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & \frac{3\sqrt{105}i}{140} & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{5}}{20}$ 0 $-\frac{\sqrt{5}i}{40}$ $-\frac{\sqrt{5}}{40}$ 0 0 0 0 0 $\frac{\sqrt{15}}{20}$
	$\frac{\sqrt{5}}{20}$	0 $\frac{\sqrt{5}i}{40}$ 0 0 0 $\frac{\sqrt{5}}{40}$ 0 0 0 $\frac{\sqrt{15}}{20}$ 0
	0	$-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 $\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{15}i}{40}$
	$\frac{\sqrt{5}i}{40}$	0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{20}$ $\frac{\sqrt{15}i}{40}$ 0
	$-\frac{\sqrt{5}}{40}$	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ $-\frac{\sqrt{15}}{40}$ 0
	0	$\frac{\sqrt{5}}{40}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 $\frac{\sqrt{15}}{40}$
	0	0 $\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 $-\frac{\sqrt{5}}{5}$ 0 0 0
	0	0 0 $-\frac{\sqrt{5}}{20}$ $\frac{\sqrt{5}i}{20}$ 0 $-\frac{\sqrt{5}}{5}$ 0 0 0 0
	0	$\frac{\sqrt{15}}{20}$ 0 $-\frac{\sqrt{15}i}{40}$ $-\frac{\sqrt{15}}{40}$ 0 0 0 0 $\frac{3\sqrt{5}}{20}$
	$\frac{\sqrt{15}}{20}$	0 $\frac{\sqrt{15}i}{40}$ 0 0 $\frac{\sqrt{15}}{40}$ 0 0 $\frac{3\sqrt{5}}{20}$ 0
505	symmetry	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{5}i}{20}$ 0 $\frac{\sqrt{5}}{40}$ 0 0 0 $-\frac{\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{15}i}{20}$
	$-\frac{\sqrt{5}i}{20}$	0 $\frac{\sqrt{5}}{40}$ 0 0 0 0 0 $\frac{\sqrt{5}}{40}$ $\frac{\sqrt{15}i}{20}$ 0
	0	$\frac{\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 0 0 $-\frac{\sqrt{15}}{40}$
	$\frac{\sqrt{5}}{40}$	0 0 0 0 0 $\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{15}}{40}$ 0
	0	0 $-\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{5}i}{5}$ 0 $-\frac{\sqrt{5}}{20}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{5}}{20}$ $\frac{\sqrt{5}i}{5}$ 0 $-\frac{\sqrt{5}}{20}$ 0 0 0
	$-\frac{\sqrt{5}}{40}$	0 0 0 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 $\frac{\sqrt{15}}{40}$ 0
	0	$\frac{\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 0 0 $-\frac{\sqrt{15}}{40}$
	0	$-\frac{\sqrt{15}i}{20}$ 0 $-\frac{\sqrt{15}}{40}$ 0 0 0 $\frac{\sqrt{15}}{40}$ 0 0 $\frac{3\sqrt{5}i}{20}$
	$\frac{\sqrt{15}i}{20}$	0 $-\frac{\sqrt{15}}{40}$ 0 0 0 0 $-\frac{\sqrt{15}}{40}$ $-\frac{3\sqrt{5}i}{20}$ 0
506	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	0	$-\frac{3\sqrt{35}}{140}$ 0 $\frac{\sqrt{35}i}{40}$ $\frac{11\sqrt{35}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{140}$
	$-\frac{3\sqrt{35}}{140}$	0 $-\frac{\sqrt{35}i}{40}$ 0 0 0 $-\frac{11\sqrt{35}}{280}$ 0 0 0 $-\frac{\sqrt{105}}{140}$ 0
	0	$\frac{\sqrt{35}i}{40}$ 0 $\frac{\sqrt{35}}{35}$ 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 $-\frac{\sqrt{105}i}{56}$
	$-\frac{\sqrt{35}i}{40}$	0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ $\frac{\sqrt{105}i}{56}$ 0
	$\frac{11\sqrt{35}}{280}$	0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{28}$ $-\frac{\sqrt{105}}{280}$ 0
	0	$-\frac{11\sqrt{35}}{280}$ 0 0 $-\frac{\sqrt{35}}{35}$ 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 $\frac{\sqrt{105}}{280}$
	0	0 $-\frac{\sqrt{35}}{28}$ 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0
	0	0 0 $\frac{\sqrt{35}}{28}$ $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{105}}{140}$ 0 $-\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{105}}{280}$ 0 0 0 0 0 $\frac{3\sqrt{35}}{140}$
	$-\frac{\sqrt{105}}{140}$	0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $\frac{\sqrt{105}}{280}$ 0 0 0 $\frac{3\sqrt{35}}{140}$ 0
507	symmetry	$-\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 2)$	0	$-\frac{3\sqrt{35}i}{140}$ 0 $-\frac{\sqrt{35}}{40}$ 0 0 0 $\frac{11\sqrt{35}}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$
	$\frac{3\sqrt{35}i}{140}$	0 $-\frac{\sqrt{35}}{40}$ 0 0 0 0 0 $-\frac{11\sqrt{35}}{280}$ $-\frac{\sqrt{105}i}{140}$ 0
	0	$-\frac{\sqrt{35}}{40}$ 0 $\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$
	$-\frac{\sqrt{35}}{40}$	0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0
	0	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0
	0	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0
	$\frac{11\sqrt{35}}{280}$	0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 $-\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{105}}{280}$ 0
	0	$-\frac{11\sqrt{35}}{280}$ 0 0 $-\frac{\sqrt{35}}{28}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 $-\frac{\sqrt{105}}{280}$
	0	$\frac{\sqrt{105}i}{140}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 $\frac{\sqrt{105}}{280}$ 0 0 0 $\frac{3\sqrt{35}i}{140}$
	$-\frac{\sqrt{105}i}{140}$	0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 0 $-\frac{\sqrt{105}}{280}$ $-\frac{3\sqrt{35}i}{140}$ 0
508	symmetry	z

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_1^{(a)}(A_{2g})$		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
509	symmetry	$\begin{bmatrix} & & & & & & & x & & \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 \end{bmatrix}$
510	symmetry	$-y$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,2}^{(a)}(E_g)$	0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0	
	$\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{10}$ 0	
	0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{10}$	
	0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}i}{10}$ 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{15}i}{10}$ 0 0 0 0	
511	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{M}_3^{(a)}(A_{2g})$	0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{5}i}{5}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{5}$ 0 0	
	0 0 0 0 $\frac{\sqrt{5}i}{5}$ 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{5}i}{5}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
512	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
513	$\mathbb{M}_3^{(a)}(B_{1g})$	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
514	$\mathbb{M}_3^{(a)}(B_{2g})$	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \end{bmatrix}$
515	symmetry	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
516	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \end{bmatrix}$
$\mathbb{M}_{3,2}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
		z

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_1^{(1,-1;a)}(A_{2g})$		$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$
519	symmetry	$\begin{bmatrix} & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{bmatrix}$
		x
520	symmetry	$\begin{bmatrix} & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{bmatrix}$
		$-y$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \end{bmatrix}$
521	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & \frac{\sqrt{105}}{35} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{35} & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{35} \end{bmatrix}$
522	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
$M_3^{(1,-1;a)}(B_{1g})$	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0	
	0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{21}}{21}$ 0	
	0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{21}}{21}$	
	0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{21}i}{42}$	
	$\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$ $\frac{\sqrt{21}i}{42}$ 0	
	0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$	
	$-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{21}}{42}$ 0	
	0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{42}$ 0 0	
	0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{42}$ 0 0 0	
523	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$M_3^{(1,-1;a)}(B_{2g})$	0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{21}}{21}$ 0	
	0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{21}}{21}$	
	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0	
	0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$	
	$\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{21}}{42}$ 0	
	0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{21}i}{42}$	
	$\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{21}i}{42}$ 0	
	$-\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0	
	0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0	
524	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $-\frac{3\sqrt{35}}{70}$
	$\frac{\sqrt{105}}{70}$	0 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0
	0	0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{35}i}{35}$
	0	0 0 $\frac{\sqrt{105}}{70}$ 0 0 0 0 $\frac{\sqrt{105}}{70}$ $\frac{\sqrt{35}i}{35}$ 0
	$-\frac{\sqrt{105}}{70}$	0 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 $\frac{\sqrt{105}i}{70}$ $-\frac{\sqrt{35}}{70}$ 0
	0	$\frac{\sqrt{105}}{70}$ 0 0 $\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 $\frac{\sqrt{35}}{70}$
	0	0 0 $-\frac{\sqrt{105}}{70}$ 0 0 $\frac{\sqrt{105}i}{70}$ 0 $-\frac{\sqrt{105}}{35}$ 0 0
	0	0 0 0 $\frac{\sqrt{105}}{70}$ $-\frac{\sqrt{105}i}{70}$ 0 $-\frac{\sqrt{105}}{35}$ 0 0 0
	0	$-\frac{3\sqrt{35}}{70}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{35}}{70}$ 0 0 0 $-\frac{\sqrt{105}}{70}$
	$-\frac{3\sqrt{35}}{70}$	0 $\frac{\sqrt{35}i}{35}$ 0 0 0 $\frac{\sqrt{35}}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$	
	0	$\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 $\frac{3\sqrt{35}i}{70}$
	$-\frac{\sqrt{105}i}{70}$	0 0 0 0 0 0 0 $\frac{\sqrt{105}}{70}$ $-\frac{3\sqrt{35}i}{70}$ 0
	0	0 0 0 $\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{105}}{70}$ 0 0 0 0 $-\frac{\sqrt{35}}{35}$
	0	0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{35}}{35}$
	0	0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}i}{35}$ 0 $\frac{\sqrt{105}}{70}$ 0 0
	0	0 0 0 $-\frac{\sqrt{105}}{70}$ $\frac{\sqrt{105}i}{35}$ 0 $\frac{\sqrt{105}}{70}$ 0 0 0
	$-\frac{\sqrt{105}}{70}$	0 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 $\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{35}}{70}$ 0
	0	$\frac{\sqrt{105}}{70}$ 0 0 $\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 $-\frac{\sqrt{35}}{70}$
	0	$\frac{3\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 $\frac{\sqrt{35}}{70}$ 0 0 0 $-\frac{\sqrt{105}i}{70}$
	$-\frac{3\sqrt{35}i}{70}$	0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 $-\frac{\sqrt{35}}{70}$ $\frac{\sqrt{105}i}{70}$ 0
526	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$	
	continued ...	

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{7}}{14}$ 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$
	$\frac{\sqrt{7}}{14}$	0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{21}}{42}$ 0
	0	0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{21}i}{21}$
	0	0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{21}i}{21}$ 0
	$-\frac{\sqrt{7}}{14}$	0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{21}}{42}$ 0
	0	$\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{\sqrt{21}}{42}$
	0	0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{7}}{14}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0
	0	$\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{21}i}{21}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$
	$\frac{\sqrt{21}}{42}$	0 $-\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0
527	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{21}i}{42}$
	$-\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ $\frac{\sqrt{21}i}{42}$ 0
	0	0 0 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$
	0	0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{21}}{21}$ 0
	0	0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0
	0	0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0
	$-\frac{\sqrt{7}}{14}$	0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{21}}{42}$ 0
	0	$\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{21}}{42}$
	0	$-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{7}i}{14}$
	$\frac{\sqrt{21}i}{42}$	0 $\frac{\sqrt{21}}{21}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ $\frac{\sqrt{7}i}{14}$ 0
528	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
529	$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & -\frac{2\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & \frac{2\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 \\ 0 & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & \frac{\sqrt{21}i}{21} \\ -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}}{21} & -\frac{\sqrt{21}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{7} \end{bmatrix}$
530	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 1)$	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
531	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
532	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{5}i}{10} & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
533	symmetry	$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{19\sqrt{7}}{168} & 0 & \frac{\sqrt{7}i}{12} & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ \frac{19\sqrt{7}}{168} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 \\ 0 & \frac{\sqrt{7}i}{12} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ -\frac{\sqrt{7}i}{12} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{21}i}{84} & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{21}}{28} & 0 \\ 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ -\frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \end{bmatrix}$
534	symmetry	$-\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{19\sqrt{7}i}{168} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ -\frac{19\sqrt{7}i}{168} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & -\frac{5\sqrt{21}i}{168} & 0 \\ 0 & -\frac{\sqrt{7}}{12} & 0 & -\frac{2\sqrt{7}i}{21} & -\frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ -\frac{\sqrt{7}}{12} & 0 & \frac{2\sqrt{7}i}{21} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{42} & -\frac{\sqrt{7}i}{42} & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & -\frac{2\sqrt{7}i}{21} & -\frac{\sqrt{21}}{28} & 0 \\ 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & \frac{2\sqrt{7}i}{21} & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & \frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ -\frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & -\frac{3\sqrt{7}i}{56} & 0 \end{bmatrix}$
535	symmetry	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{5}}{40} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ \frac{\sqrt{5}}{40} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \\ \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} \\ \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
536	symmetry	$-\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{40} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ -\frac{\sqrt{5}i}{40} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{15}i}{40} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
537	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
538	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 & 0 \end{bmatrix}$
539	symmetry	<i>z</i>
		$\begin{bmatrix} -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{35} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{35} & \frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{70}}{140} & 0 & -\frac{3\sqrt{70}i}{140} & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ \frac{3\sqrt{70}}{140} & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 \\ 0 & \frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ -\frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & \frac{\sqrt{70}}{35} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{70}}{35} \end{bmatrix}$
540	symmetry	<i>x</i>

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0	$\frac{\sqrt{70}}{70}$ 0 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 0 0 $-\frac{\sqrt{210}}{70}$
	$\frac{\sqrt{70}}{70}$	0 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{210}}{70}$ 0
	0	0 0 0 $\frac{\sqrt{70}}{70}$ 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{210}i}{70}$
	0	0 0 $\frac{\sqrt{70}}{70}$ 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ $-\frac{\sqrt{210}i}{70}$ 0
	$\frac{3\sqrt{70}}{140}$	0 0 0 0 0 $\frac{\sqrt{70}}{70}$ 0 $-\frac{3\sqrt{70}i}{140}$ $\frac{\sqrt{210}}{140}$ 0
	0	$-\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{70}}{70}$ 0 $\frac{3\sqrt{70}i}{140}$ 0 0 $-\frac{\sqrt{210}}{140}$
	0	0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{3\sqrt{70}i}{140}$ 0 $-\frac{\sqrt{70}}{35}$ 0 0
	0	0 0 0 $-\frac{3\sqrt{70}}{140}$ $\frac{3\sqrt{70}i}{140}$ 0 $-\frac{\sqrt{70}}{35}$ 0 0 0
	0	$-\frac{\sqrt{210}}{70}$ 0 $\frac{\sqrt{210}i}{70}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{70}}{70}$
	$-\frac{\sqrt{210}}{70}$	0 0 $-\frac{\sqrt{210}i}{70}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $-\frac{\sqrt{70}}{70}$ 0
$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	541	symmetry $-y$
	0	$\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{210}i}{70}$
	$-\frac{\sqrt{70}i}{70}$	0 0 0 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ $-\frac{\sqrt{210}i}{70}$ 0
	0	0 0 0 $\frac{\sqrt{70}i}{70}$ $-\frac{3\sqrt{70}}{140}$ 0 0 0 0 $\frac{\sqrt{210}}{70}$
	0	0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{210}}{70}$ 0
	0	0 0 $-\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{70}i}{35}$ 0 $-\frac{3\sqrt{70}}{140}$ 0 0
	0	0 0 0 $\frac{3\sqrt{70}}{140}$ $\frac{\sqrt{70}i}{35}$ 0 $-\frac{3\sqrt{70}}{140}$ 0 0 0
	$\frac{3\sqrt{70}}{140}$	0 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ 0 $\frac{\sqrt{70}i}{70}$ $-\frac{\sqrt{210}}{140}$ 0
	0	$-\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{3\sqrt{70}}{140}$ 0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 $\frac{\sqrt{210}}{140}$
	0	$\frac{\sqrt{210}i}{70}$ 0 $\frac{\sqrt{210}}{70}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $-\frac{\sqrt{70}i}{70}$
542	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{2g})$	$\sqrt{\frac{35}{105}}$	0 0 0 0 0 $-\frac{\sqrt{35}}{84}$ 0 $-\frac{\sqrt{35}i}{84}$ 0 0
	0	$-\frac{\sqrt{35}}{105}$ 0 0 $-\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0 0
	0	0 $\frac{\sqrt{35}}{105}$ 0 0 $\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0
	0	0 0 0 $-\frac{\sqrt{35}}{105}$ $-\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0 0
	0	$-\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ $-\frac{4\sqrt{35}}{105}$ 0 0 0 0 $\frac{\sqrt{105}}{42}$
	$-\frac{\sqrt{35}}{84}$	0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 $\frac{4\sqrt{35}}{105}$ 0 0 $\frac{\sqrt{105}}{42}$ 0
	0	$-\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0 0 $-\frac{4\sqrt{35}}{105}$ 0 0 $-\frac{\sqrt{105}i}{42}$
	$\frac{\sqrt{35}i}{84}$	0 $-\frac{\sqrt{35}}{84}$ 0 0 0 0 0 $\frac{4\sqrt{35}}{105}$ $\frac{\sqrt{105}i}{42}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{105}}{42}$ 0 $-\frac{\sqrt{105}i}{42}$ $\frac{2\sqrt{35}}{35}$ 0
	0	0 0 0 0 $\frac{\sqrt{105}}{42}$ 0 $\frac{\sqrt{105}i}{42}$ 0 0 $-\frac{2\sqrt{35}}{35}$
543	symmetry	$\sqrt{15}xyz$
$\mathbb{M}_3^{(1,1;a)}(B_{1g})$	0	0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0 0
	0	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{21}}{21}$ 0 $-\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{7}}{14}$ 0
	0	0 0 0 0 $\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{7}}{14}$
	0	$\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{21}$ 0 0 0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{7}i}{28}$
	$-\frac{\sqrt{21}i}{28}$	0 $\frac{\sqrt{21}}{21}$ 0 0 0 0 $-\frac{\sqrt{21}}{21}$ $-\frac{\sqrt{7}i}{28}$ 0
	0	$\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{21}}{21}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$
	$\frac{\sqrt{21}}{28}$	0 $\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 0 $-\frac{\sqrt{7}}{28}$ 0
	0	0 0 $\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ 0 0
	0	0 0 0 $-\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ 0 0 0
544	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(B_{2g})$	0 0 0 0 0 $\frac{\sqrt{21}}{21}$ 0 $-\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{7}}{14}$ 0	
	0 0 0 0 $\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{7}}{14}$	
	0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0	
	0 $\frac{\sqrt{21}}{21}$ 0 $-\frac{\sqrt{21}i}{28}$ $\frac{\sqrt{21}}{21}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$	
	$\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0	
	0 $-\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{7}i}{28}$	
	$\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{7}i}{28}$ 0	
	$\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $-\frac{\sqrt{7}i}{28}$ 0 0	
	0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
545	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0 $\frac{19\sqrt{35}}{420}$ 0 $-\frac{\sqrt{35}i}{24}$ $\frac{5\sqrt{35}}{168}$ 0 0 0 0 $-\frac{\sqrt{105}}{84}$	
	$\frac{19\sqrt{35}}{420}$ 0 $\frac{\sqrt{35}i}{24}$ 0 0 $-\frac{5\sqrt{35}}{168}$ 0 0 $-\frac{\sqrt{105}}{84}$ 0	
	0 $-\frac{\sqrt{35}i}{24}$ 0 $-\frac{4\sqrt{35}}{105}$ 0 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{105}i}{168}$	
	$\frac{\sqrt{35}i}{24}$ 0 $-\frac{4\sqrt{35}}{105}$ 0 0 0 0 $\frac{\sqrt{35}}{84}$ $-\frac{\sqrt{105}i}{168}$ 0	
	$\frac{5\sqrt{35}}{168}$ 0 0 0 0 $-\frac{4\sqrt{35}}{105}$ 0 $\frac{\sqrt{35}i}{84}$ $-\frac{\sqrt{105}}{56}$ 0	
	0 $-\frac{5\sqrt{35}}{168}$ 0 0 $-\frac{4\sqrt{35}}{105}$ 0 $-\frac{\sqrt{35}i}{84}$ 0 0 $\frac{\sqrt{105}}{56}$	
	0 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{105}$ 0 0	
	0 0 0 $\frac{\sqrt{35}}{84}$ $-\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{105}$ 0 0 0	
	0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{168}$ $-\frac{\sqrt{105}}{56}$ 0 0 0 0 $\frac{3\sqrt{35}}{140}$	
	$-\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{105}}{56}$ 0 0 $\frac{3\sqrt{35}}{140}$ 0	
546	symmetry	$\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{19\sqrt{35}i}{420}$ 0 $\frac{\sqrt{35}}{24}$ 0 0 0 $\frac{5\sqrt{35}}{168}$ 0 0 $\frac{\sqrt{105}i}{84}$
	$-\frac{19\sqrt{35}i}{420}$	0 $\frac{\sqrt{35}}{24}$ 0 0 0 0 $-\frac{5\sqrt{35}}{168}$ $-\frac{\sqrt{105}i}{84}$ 0
	0	$\frac{\sqrt{35}}{24}$ 0 $-\frac{4\sqrt{35}i}{105}$ $\frac{\sqrt{35}}{84}$ 0 0 0 0 $\frac{\sqrt{105}}{168}$
	$\frac{\sqrt{35}}{24}$	0 $\frac{4\sqrt{35}i}{105}$ 0 0 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{105}}{168}$ 0
	0	0 $\frac{\sqrt{35}}{84}$ 0 0 0 $\frac{\sqrt{35}i}{105}$ 0 $\frac{\sqrt{35}}{84}$ 0 0
	0	0 0 $-\frac{\sqrt{35}}{84}$ $-\frac{\sqrt{35}i}{105}$ 0 $\frac{\sqrt{35}}{84}$ 0 0 0
	$\frac{5\sqrt{35}}{168}$	0 0 0 0 0 $\frac{\sqrt{35}}{84}$ 0 $-\frac{4\sqrt{35}i}{105}$ $\frac{\sqrt{105}}{56}$ 0
	0	$-\frac{5\sqrt{35}}{168}$ 0 0 0 $\frac{\sqrt{35}}{84}$ 0 $\frac{4\sqrt{35}i}{105}$ 0 0 $-\frac{\sqrt{105}}{56}$
	0	$\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 $\frac{\sqrt{105}}{56}$ 0 0 $\frac{3\sqrt{35}i}{140}$
	$-\frac{\sqrt{105}i}{84}$	0 $\frac{\sqrt{105}}{168}$ 0 0 0 0 $-\frac{\sqrt{105}}{56}$ $-\frac{3\sqrt{35}i}{140}$ 0
547	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	0	$-\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{24}$ $-\frac{\sqrt{21}}{168}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{21}}{28}$	0 $-\frac{\sqrt{21}i}{24}$ 0 0 $\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{\sqrt{7}}{28}$ 0
	0	$\frac{\sqrt{21}i}{24}$ 0 $\frac{\sqrt{21}}{21}$ 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 $\frac{3\sqrt{7}i}{56}$
	$-\frac{\sqrt{21}i}{24}$	0 $\frac{\sqrt{21}}{21}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ $-\frac{3\sqrt{7}i}{56}$ 0
	$-\frac{\sqrt{21}}{168}$	0 0 0 0 0 $-\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{21}i}{28}$ $-\frac{5\sqrt{7}}{56}$ 0
	0	$\frac{\sqrt{21}}{168}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 $-\frac{\sqrt{21}i}{28}$ 0 0 $\frac{5\sqrt{7}}{56}$
	0	0 $\frac{\sqrt{21}}{28}$ 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{21}}{28}$ $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0
	0	$-\frac{\sqrt{7}}{28}$ 0 $\frac{3\sqrt{7}i}{56}$ $-\frac{5\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$
	$-\frac{\sqrt{7}}{28}$	0 $-\frac{3\sqrt{7}i}{56}$ 0 0 $\frac{5\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{21}}{28}$ 0
548	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	0	$-\frac{\sqrt{21}i}{28}$
	$\frac{\sqrt{21}i}{28}$	0
	0	$-\frac{\sqrt{21}}{24}$
	$-\frac{\sqrt{21}}{24}$	0
	0	$-\frac{\sqrt{21}i}{21}$
	$-\frac{\sqrt{21}}{21}$	0
	0	$-\frac{\sqrt{21}}{28}$
	0	$-\frac{\sqrt{21}}{28}$
	$-\frac{\sqrt{21}}{168}$	0
	0	$\frac{\sqrt{21}}{28}$
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	$\frac{\sqrt{21}}{168}$	0
	0	$-\frac{\sqrt{21}i}{21}$
	$-\frac{\sqrt{21}i}{21}$	0
	0	$-\frac{3\sqrt{7}}{56}$
	$-\frac{\sqrt{7}i}{28}$	0
	0	$\frac{3\sqrt{7}}{56}$
	$-\frac{\sqrt{7}i}{28}$	0
	0	$\frac{3\sqrt{7}}{56}$
	$-\frac{\sqrt{7}i}{28}$	0
	0	$\frac{3\sqrt{7}}{56}$

bra: $= \langle d_v, \uparrow |, \langle d_v, \downarrow |, \langle d_{xy}, \uparrow |, \langle d_{xy}, \downarrow |, \langle d_{xz}, \uparrow |, \langle d_{xz}, \downarrow |, \langle d_{yz}, \uparrow |, \langle d_{yz}, \downarrow |, \langle d_u, \uparrow |, \langle d_u, \downarrow |$ ket: $= |f_2, \uparrow\rangle, |f_2, \downarrow\rangle, |f_1, \uparrow\rangle, |f_1, \downarrow\rangle, |f_{bz}, \uparrow\rangle, |f_{bz}, \downarrow\rangle, |f_3, \uparrow\rangle, |f_3, \downarrow\rangle, |f_{3x}, \uparrow\rangle, |f_{3x}, \downarrow\rangle, |f_{3y}, \uparrow\rangle, |f_{3y}, \downarrow\rangle, |f_{az}, \uparrow\rangle, |f_{az}, \downarrow\rangle$

Table 9: (d,f) block.

No.	multipole	matrix
549	symmetry	z
$\mathbb{Q}_1^{(a)}(A_{2u})$	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0$

continued ...

Table 9

No.	multipole	matrix
550	symmetry $\mathbb{Q}_{1,1}^{(a)}(E_u)$	x $\begin{bmatrix} \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
551	symmetry $\mathbb{Q}_{1,2}^{(a)}(E_u)$	y $\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 \end{bmatrix}$
552	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \end{bmatrix}$
553	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
554	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
555	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
556	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(a)}(E_u, 1)$	0 0 $\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0 0 $\frac{11\sqrt{30}}{240}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0 0 $\frac{11\sqrt{30}}{240}$ 0 0 0	
	$-\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{240}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{240}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{3}}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{40}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{3}}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{40}$	
	0 0 $\frac{5\sqrt{6}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{80}$ 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{80}$ 0 0 0	
557	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{24}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{5}}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{24}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{10}}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{10}}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0 0 0 0	
558	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 0	
	0 0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 0	
	$-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{24}$ 0	
	0 0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{24}$	
	0 0 $-\frac{\sqrt{10}}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{10}}{16}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0	
559	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{Q}_5^{(a)}(A_{1u})$	0 0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
560	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(a)}(A_{2u}, 1)$	0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$	
561	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{Q}_5^{(a)}(A_{2u}, 2)$	0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{20}$ 0 0 0 0 0 0	
	$\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
562	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(a)}(B_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	563 symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
	$\mathbb{Q}_5^{(a)}(B_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
564	symmetry	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 1)$	$\frac{11\sqrt{7}}{112} \quad 0 \quad -\frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{11\sqrt{7}}{112} \quad 0 \quad -\frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{7}}{56} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}}{56} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad \frac{\sqrt{70}}{56}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0$	
	$-\frac{\sqrt{21}}{48} \quad 0 \quad \frac{3\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}}{48} \quad 0 \quad \frac{3\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
565	symmetry	$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 1)$	$0 \quad 0 \quad \frac{11\sqrt{7}}{112} \quad 0 \quad \frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{11\sqrt{7}}{112} \quad 0 \quad \frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{5\sqrt{7}}{56} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{5\sqrt{7}}{56} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{168} \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{168} \quad 0 \quad \frac{\sqrt{70}}{56}$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{48} \quad 0 \quad \frac{3\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{48} \quad 0 \quad \frac{3\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad 0$	
566	symmetry	$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 2)$	$\frac{3\sqrt{5}}{80}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
	567	symmetry
		$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
	$\mathbb{Q}_{5,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & -\frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 \end{bmatrix}$
		568
		symmetry
		$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 3)$	$-\frac{7\sqrt{15}}{120}$	0 0 0 0 0 0 0 0 $-\frac{1}{8}$ 0 0 0 0 0
	0	$-\frac{7\sqrt{15}}{120}$ 0 0 0 0 0 0 0 $-\frac{1}{8}$ 0 0 0 0 0
	0	0 $\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0
	0	0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{5}}{40}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0 0 0 0 0
	0	$-\frac{\sqrt{5}}{40}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0 0 0 0 0
569	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 3)$	0 0 $-\frac{7\sqrt{15}}{120}$ 0 0 0 0 0 0 $\frac{1}{8}$ 0 0 0	
	0 0 0 $-\frac{7\sqrt{15}}{120}$ 0 0 0 0 0 0 $\frac{1}{8}$ 0 0	
	$-\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$	
	0 0 $\frac{\sqrt{5}}{40}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0 0 0	
	0 0 0 $\frac{\sqrt{5}}{40}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0 0	
	570	symmetry $-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u})$		$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{70}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 \end{bmatrix}$
		571 symmetry
		$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{42}i}{84} \\ 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} \\ 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
		572 symmetry
		$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(B_{2u})$	0	$-\frac{\sqrt{105}}{84}$
	$\frac{\sqrt{105}}{84}$	$0 - \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 -\frac{\sqrt{7}}{28} 0 \frac{\sqrt{7}i}{28} 0 0 0$
	0	$\frac{\sqrt{105}i}{84} 0 -\frac{\sqrt{105}i}{84} 0 0 0 0 0 \frac{\sqrt{7}}{28} 0 \frac{\sqrt{7}i}{28} 0 0 0 0$
	$\frac{\sqrt{105}i}{84}$	$0 \frac{\sqrt{105}}{84} 0 -\frac{\sqrt{105}}{84} 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 -\frac{\sqrt{7}i}{28} \frac{\sqrt{42}i}{84} 0$
	0	$0 0 \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 0 0 -\frac{\sqrt{42}i}{42}$
	0	$0 0 0 -\frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 0 \frac{\sqrt{7}i}{28} \frac{\sqrt{42}}{42} 0$
	$-\frac{\sqrt{105}i}{84}$	$0 0 0 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 0 0 0 -\frac{\sqrt{42}i}{42}$
	0	$0 \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 0 \frac{\sqrt{7}i}{28} 0 0 0 -\frac{\sqrt{42}i}{42} 0$
	0	$0 0 0 0 0 0 \frac{\sqrt{210}i}{84} 0 0 \frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 0 0$
	0	$0 0 0 0 0 0 -\frac{\sqrt{210}i}{84} -\frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 0 0 0$
573	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	0	$0 \frac{\sqrt{7}i}{28} 0 0 0 0 0 \frac{\sqrt{42}i}{56} 0 0 0 -\frac{\sqrt{105}i}{140} 0 0 \frac{\sqrt{70}}{140}$
	0	$0 0 0 -\frac{\sqrt{7}i}{28} 0 0 0 \frac{\sqrt{42}i}{56} 0 0 0 0 \frac{\sqrt{105}i}{140} -\frac{\sqrt{70}}{140} 0$
	$-\frac{\sqrt{7}i}{28}$	$0 0 0 0 0 -\frac{\sqrt{42}i}{56} 0 0 0 \frac{\sqrt{105}i}{140} 0 0 0 0 0 \frac{3\sqrt{70}i}{280}$
	0	$\frac{\sqrt{7}i}{28} 0 0 -\frac{\sqrt{42}i}{56} 0 0 0 0 0 -\frac{\sqrt{105}i}{140} 0 0 0 \frac{3\sqrt{70}i}{280} 0$
	0	$\frac{\sqrt{7}}{28} 0 \frac{3\sqrt{7}i}{56} 0 0 0 0 0 0 -\frac{\sqrt{105}}{140} 0 -\frac{\sqrt{105}i}{280} 0 0 0 0$
	$-\frac{\sqrt{7}}{28}$	$0 \frac{3\sqrt{7}i}{56} 0 0 0 0 0 0 0 \frac{\sqrt{105}}{140} 0 -\frac{\sqrt{105}i}{280} 0 0 0 0$
	0	$-\frac{3\sqrt{7}i}{56} 0 \frac{\sqrt{7}}{28} 0 0 0 0 0 0 -\frac{\sqrt{105}i}{56} 0 \frac{\sqrt{105}}{140} \frac{\sqrt{70}i}{70} 0$
	$-\frac{3\sqrt{7}i}{56}$	$0 -\frac{\sqrt{7}}{28} 0 0 0 0 0 0 0 -\frac{\sqrt{105}i}{56} 0 -\frac{\sqrt{105}}{140} 0 0 0 -\frac{\sqrt{70}i}{70}$
	0	$0 0 0 0 0 \frac{\sqrt{14}}{28} 0 \frac{3\sqrt{14}i}{56} 0 0 0 -\frac{\sqrt{35}i}{70} 0 0 0 0$
	0	$0 0 0 0 -\frac{\sqrt{14}}{28} 0 \frac{3\sqrt{14}i}{56} 0 0 0 0 \frac{\sqrt{35}i}{70} 0 0 0 0$
574	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 1)$	$-\frac{\sqrt{7}i}{28}$	0 0 0 0 0 0 0 $\frac{\sqrt{42}}{56}$ $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 $\frac{\sqrt{70}i}{140}$
	0	$\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{70}i}{140}$ 0
	0	0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $-\frac{3\sqrt{70}}{280}$
	0	0 0 0 $\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{140}$ $\frac{3\sqrt{70}}{280}$ 0
	0	$\frac{\sqrt{7}i}{28}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{105}}{56}$ $-\frac{\sqrt{70}i}{70}$ 0
	$\frac{\sqrt{7}i}{28}$	0 $\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 $\frac{\sqrt{70}i}{70}$
	0	$\frac{3\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{140}$ 0 0 0
	$-\frac{3\sqrt{7}}{56}$	0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{140}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{3\sqrt{14}}{56}$ $\frac{\sqrt{35}i}{70}$ 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $\frac{3\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 0
575	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 2)$	0	0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}}{84}$
	0	0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{42}}{84}$ 0
	$-\frac{\sqrt{105}i}{84}$	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{168}$
	0	$\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0
	0	$-\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0
	$\frac{\sqrt{105}}{84}$	0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0
	0	$\frac{\sqrt{105}i}{168}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{42}i}{42}$ 0
	$\frac{\sqrt{105}i}{168}$	0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 $-\frac{\sqrt{42}i}{42}$
	0	0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0
576	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{105}i}{84}$	0 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{\sqrt{42}i}{84}$
	0	$\frac{\sqrt{105}i}{84}$ 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0
	0	0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{42}}{168}$
	0	0 0 0 $\frac{\sqrt{105}i}{84}$ $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $-\frac{\sqrt{42}}{168}$ 0
	0	$-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{42}i}{42}$ 0
	$-\frac{\sqrt{105}i}{84}$	0 $-\frac{\sqrt{105}}{168}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{42}i}{42}$
	0	$-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{28}$ 0 0
	$\frac{\sqrt{105}}{168}$	0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{168}$ $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0
577	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{1u})$	0	0 0 0 0 $\frac{i}{10}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0
	0	0 0 0 0 0 $-\frac{i}{10}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0
	0	0 0 0 0 0 0 $-\frac{i}{10}$ 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0
	0	0 0 0 0 0 0 0 $\frac{i}{10}$ $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0
	$-\frac{\sqrt{6}i}{20}$	0 0 0 0 0 $-\frac{i}{20}$ 0 $\frac{1}{20}$ 0 0 0 0 0 0
	0	$\frac{\sqrt{6}i}{20}$ 0 0 $-\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{6}i}{20}$ 0 0 $\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{6}i}{20}$ $-\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0 0
	0	$-\frac{3\sqrt{2}i}{20}$ 0 $\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{2}i}{20}$	0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0
578	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 1)$	0	$\frac{\sqrt{210}}{420} \quad 0 \quad -\frac{\sqrt{210}i}{420} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{42} \quad 0 \quad \frac{\sqrt{14}i}{42} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{420}$	$0 \quad -\frac{\sqrt{210}i}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{42} \quad -\frac{\sqrt{14}}{42} \quad 0 \quad \frac{\sqrt{14}i}{42} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{210}i}{420} \quad 0 \quad \frac{\sqrt{210}}{420} \quad -\frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{42} \quad 0 \quad \frac{\sqrt{14}}{42} \quad 0 \quad \frac{\sqrt{14}i}{42} \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{420}$	$0 \quad -\frac{\sqrt{210}}{420} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{42} \quad 0 \quad -\frac{\sqrt{14}}{42} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad \frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad \frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}i}{84} \quad \frac{\sqrt{21}}{42} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad -\frac{\sqrt{35}}{60} \quad \frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0$
579	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 2)$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad \frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad \frac{1}{20} \quad 0 \quad \frac{i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{20} \quad -\frac{1}{20} \quad 0 \quad \frac{i}{20} \quad 0 \quad 0$
	$\frac{\sqrt{6}i}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{20} \quad 0 \quad -\frac{1}{20} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad \frac{i}{20} \quad 0 \quad \frac{1}{20} \quad 0 \quad 0$
	0	$0 \quad \frac{3\sqrt{2}}{20} \quad 0 \quad \frac{3\sqrt{2}i}{20} \quad 0 \quad 0$
	$-\frac{3\sqrt{2}}{20}$	$0 \quad \frac{3\sqrt{2}i}{20} \quad 0 \quad 0$
580	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,-1;a)}(B_{1u})$	0	$\frac{\sqrt{2}i}{40} \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad -\frac{\sqrt{5}i}{10} \quad 0$
	$\frac{\sqrt{2}i}{40}$	$0 \quad \frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{10}$
	0	$\frac{\sqrt{2}}{40} \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{40}$	$0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0$
	$-\frac{3\sqrt{2}i}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad \frac{\sqrt{3}}{20} \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20}$
	0	$\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20} \quad 0$
	0	$0 \quad -\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20}$
	0	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40} \quad \frac{\sqrt{3}}{15} \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad -\frac{\sqrt{5}}{20} \quad 0$
	$0 \quad -\frac{\sqrt{6}i}{40}$	$0 \quad -\frac{\sqrt{6}}{40} \quad \frac{i}{5} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0$
581 symmetry	$-\frac{\sqrt{6}i}{40}$	$0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad -\frac{i}{5} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$	
	0	$\frac{\sqrt{2}}{40} \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{40}$	$0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{2}i}{40} \quad 0 \quad \frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad -\frac{\sqrt{5}i}{10} \quad 0$
	$-\frac{\sqrt{2}i}{40}$	$0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{10}$
	0	$0 \quad 0 \quad -\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20}$
	0	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40} \quad \frac{\sqrt{3}}{20} \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad \frac{\sqrt{5}}{20} \quad 0$
	$\frac{3\sqrt{2}i}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{20} \quad 0 \quad -\frac{\sqrt{3}}{15} \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20}$
582 symmetry	0	$0 \quad -\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{20} \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20} \quad 0$
	$0 \quad \frac{\sqrt{6}}{40}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{5} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{40}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{5} \quad -\frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0$
	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$	

continued ...

Table 9

No.	multipole	matrix	
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{560} & \frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{336} & -\frac{\sqrt{21}}{84} & 0 \\ -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{60} & \frac{13\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & \frac{17\sqrt{210}}{1680} & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{336} & 0 & 0 \\ -\frac{17\sqrt{210}}{1680} & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} & -\frac{\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{11\sqrt{210}}{1680} & \frac{\sqrt{35}i}{120} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{336} & -\frac{\sqrt{21}i}{56} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & \frac{11\sqrt{210}}{1680} & 0 & 0 & -\frac{\sqrt{35}i}{120} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{80} & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$		
		$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$	
	583 symmetry	$\begin{bmatrix} -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & -\frac{\sqrt{35}}{84} & \frac{\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & \frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & 0 & \frac{13\sqrt{14}i}{336} & \frac{5\sqrt{21}}{168} & 0 & 0 \\ 0 & -\frac{11\sqrt{210}i}{1680} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{56} & 0 \\ -\frac{11\sqrt{210}i}{1680} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{120} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & \frac{5\sqrt{210}}{336} & 0 & \frac{17\sqrt{210}i}{1680} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & \frac{5\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 \\ -\frac{5\sqrt{210}}{336} & 0 & \frac{17\sqrt{210}i}{1680} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{60} & -\frac{5\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$	
		$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$	
584	symmetry		

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 2)$	0 0 $\frac{\sqrt{6}i}{80}$ 0 0 $-\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 $-\frac{\sqrt{15}}{20}$	
	0 0 0 $-\frac{\sqrt{6}i}{80}$ $\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 $\frac{\sqrt{10}i}{16}$ $\frac{\sqrt{15}}{20}$ 0	
	$-\frac{\sqrt{6}i}{80}$ 0 0 0 0 $-\frac{3i}{40}$ 0 $\frac{1}{20}$ $-\frac{\sqrt{10}i}{80}$ 0 0 0 0 $-\frac{\sqrt{15}i}{40}$	
	0 $\frac{\sqrt{6}i}{80}$ 0 0 0 $-\frac{3i}{40}$ 0 $-\frac{1}{20}$ 0 0 $\frac{\sqrt{10}i}{80}$ 0 0 $-\frac{\sqrt{15}i}{40}$ 0	
	0 $-\frac{\sqrt{6}}{80}$ 0 $-\frac{\sqrt{6}i}{80}$ 0 0 $-\frac{i}{20}$ 0 0 $-\frac{\sqrt{10}}{80}$ 0 $-\frac{3\sqrt{10}i}{80}$ 0 0	
	$\frac{\sqrt{6}}{80}$ 0 $-\frac{\sqrt{6}i}{80}$ 0 0 0 $\frac{i}{20}$ $\frac{\sqrt{10}}{80}$ 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0	
	0 $\frac{\sqrt{6}i}{40}$ 0 $-\frac{\sqrt{6}}{16}$ $\frac{i}{8}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{80}$ $-\frac{\sqrt{15}i}{40}$ 0	
	$\frac{\sqrt{6}i}{40}$ 0 $\frac{\sqrt{6}}{16}$ 0 0 $-\frac{i}{8}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{80}$ 0 0 $\frac{\sqrt{15}i}{40}$	
	0 0 $\frac{9\sqrt{2}i}{80}$ 0 0 $\frac{\sqrt{3}}{10}$ 0 $\frac{\sqrt{3}i}{20}$ 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0	
	0 0 0 $-\frac{9\sqrt{2}i}{80}$ $-\frac{\sqrt{3}}{10}$ 0 $\frac{\sqrt{3}i}{20}$ 0 0 0 $-\frac{\sqrt{30}i}{80}$ 0 0 0	
585	symmetry	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{6}i}{80}$ 0 0 0 0 $\frac{i}{20}$ 0 $\frac{1}{20}$ $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 $-\frac{\sqrt{15}i}{20}$	
	0 $\frac{\sqrt{6}i}{80}$ 0 0 0 $\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0 $-\frac{\sqrt{15}i}{20}$ 0	
	0 0 $-\frac{\sqrt{6}i}{80}$ 0 0 $-\frac{3}{40}$ 0 $-\frac{i}{20}$ 0 0 0 $\frac{\sqrt{10}i}{80}$ 0 0 0 $\frac{\sqrt{15}}{40}$	
	0 0 0 $\frac{\sqrt{6}i}{80}$ $\frac{3}{40}$ 0 $-\frac{i}{20}$ 0 0 0 0 $-\frac{\sqrt{10}i}{80}$ 0 $-\frac{\sqrt{10}}{80}$ $-\frac{\sqrt{15}}{40}$ 0	
	0 $-\frac{\sqrt{6}i}{16}$ 0 $\frac{\sqrt{6}}{40}$ $\frac{i}{8}$ 0 0 0 0 $-\frac{\sqrt{10}i}{80}$ 0 $-\frac{\sqrt{10}}{40}$ $\frac{\sqrt{15}i}{40}$ 0	
	$-\frac{\sqrt{6}i}{16}$ 0 $-\frac{\sqrt{6}}{40}$ 0 0 $-\frac{i}{8}$ 0 0 $-\frac{\sqrt{10}i}{80}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 $-\frac{\sqrt{15}i}{40}$	
	0 $-\frac{\sqrt{6}}{80}$ 0 $-\frac{\sqrt{6}i}{80}$ 0 0 $\frac{i}{20}$ 0 0 $\frac{3\sqrt{10}}{80}$ 0 $\frac{\sqrt{10}i}{80}$ 0 0 0	
	$\frac{\sqrt{6}}{80}$ 0 $-\frac{\sqrt{6}i}{80}$ 0 0 0 0 $-\frac{i}{20}$ $-\frac{3\sqrt{10}}{80}$ 0 $\frac{\sqrt{10}i}{80}$ 0 0 0	
	$\frac{9\sqrt{2}i}{80}$ 0 0 0 0 $\frac{\sqrt{3}i}{10}$ 0 $-\frac{\sqrt{3}}{20}$ $-\frac{\sqrt{30}i}{80}$ 0 0 0 0 0	
	0 $-\frac{9\sqrt{2}i}{80}$ 0 0 0 $\frac{\sqrt{3}i}{10}$ 0 $\frac{\sqrt{3}}{20}$ 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0	
586	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 3)$	0 0 $\frac{\sqrt{2}i}{40}$ 0 0 $\frac{\sqrt{3}}{15}$ 0 $\frac{\sqrt{3}i}{10}$ 0 0 - $\frac{\sqrt{30}i}{120}$ 0 0 0	
	0 0 0 - $\frac{\sqrt{2}i}{40}$ - $\frac{\sqrt{3}}{15}$ 0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 0	
	- $\frac{\sqrt{2}i}{40}$ 0 0 0 0 $\frac{\sqrt{3}i}{60}$ 0 - $\frac{\sqrt{3}}{15}$ $\frac{\sqrt{30}i}{40}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$	
	0 $\frac{\sqrt{2}i}{40}$ 0 0 $\frac{\sqrt{3}i}{60}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 - $\frac{\sqrt{30}i}{40}$ 0 0 0 $\frac{\sqrt{5}i}{20}$ 0	
	0 - $\frac{\sqrt{2}}{10}$ 0 - $\frac{\sqrt{2}i}{20}$ 0 0 - $\frac{\sqrt{3}i}{15}$ 0 0 0 0 - $\frac{\sqrt{30}i}{60}$ 0 0 0	
	$\frac{\sqrt{2}}{10}$ 0 - $\frac{\sqrt{2}i}{20}$ 0 0 0 0 $\frac{\sqrt{3}i}{15}$ 0 0 - $\frac{\sqrt{30}i}{60}$ 0 0 0	
	0 - $\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{10}$ $\frac{\sqrt{3}i}{20}$ 0 0 0 0 $\frac{\sqrt{30}i}{40}$ 0 0 0 - $\frac{\sqrt{5}i}{20}$ 0	
	- $\frac{\sqrt{2}i}{8}$ 0 - $\frac{\sqrt{2}}{10}$ 0 0 - $\frac{\sqrt{3}i}{20}$ 0 0 $\frac{\sqrt{30}i}{40}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$	
	0 0 - $\frac{\sqrt{6}i}{40}$ 0 0 0 - $\frac{i}{10}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 0 0	
	0 0 0 $\frac{\sqrt{6}i}{40}$ 0 0 - $\frac{i}{10}$ 0 0 0 0 - $\frac{\sqrt{10}i}{40}$ 0 0	
587	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 3)$	- $\frac{\sqrt{2}i}{40}$ 0 0 0 0 - $\frac{\sqrt{3}i}{15}$ 0 $\frac{\sqrt{3}}{10}$ - $\frac{\sqrt{30}i}{120}$ 0 0 0 0 0	
	0 $\frac{\sqrt{2}i}{40}$ 0 0 - $\frac{\sqrt{3}i}{15}$ 0 - $\frac{\sqrt{3}}{10}$ 0 0 $\frac{\sqrt{30}i}{120}$ 0 0 0 0 0	
	0 0 - $\frac{\sqrt{2}i}{40}$ 0 0 $\frac{\sqrt{3}}{60}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 - $\frac{\sqrt{30}i}{40}$ 0 0 - $\frac{\sqrt{5}i}{20}$	
	0 0 0 $\frac{\sqrt{2}i}{40}$ - $\frac{\sqrt{3}}{60}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 0 0 $\frac{\sqrt{30}i}{40}$ $\frac{\sqrt{5}}{20}$ 0	
	0 $\frac{\sqrt{2}i}{10}$ 0 - $\frac{\sqrt{2}}{8}$ $\frac{\sqrt{3}i}{20}$ 0 0 0 0 0 0 - $\frac{\sqrt{30}}{40}$ $\frac{\sqrt{5}i}{20}$ 0	
	$\frac{\sqrt{2}i}{10}$ 0 $\frac{\sqrt{2}}{8}$ 0 0 - $\frac{\sqrt{3}i}{20}$ 0 0 0 0 $\frac{\sqrt{30}}{40}$ 0 0 - $\frac{\sqrt{5}i}{20}$	
	0 - $\frac{\sqrt{2}}{20}$ 0 - $\frac{\sqrt{2}i}{10}$ 0 0 $\frac{\sqrt{3}i}{15}$ 0 0 $\frac{\sqrt{30}}{60}$ 0 0 0 0	
	$\frac{\sqrt{2}}{20}$ 0 - $\frac{\sqrt{2}i}{10}$ 0 0 0 0 - $\frac{\sqrt{3}i}{15}$ - $\frac{\sqrt{30}}{60}$ 0 0 0 0	
	- $\frac{\sqrt{6}i}{40}$ 0 0 0 0 0 0 $\frac{1}{10}$ - $\frac{\sqrt{10}i}{40}$ 0 0 0 0	
	0 $\frac{\sqrt{6}i}{40}$ 0 0 0 0 - $\frac{1}{10}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0	
588	symmetry	z

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_1^{(1,0;a)}(A_{2u})$	0	$-\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	$\frac{\sqrt{21}}{28}$	$0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{21}i}{28}$	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0$
589	symmetry	x
$\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)$	0	$0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{35} \quad \frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{140}$
	0	$0 \quad 0 \quad \frac{\sqrt{105}i}{70} \quad -\frac{3\sqrt{70}}{140} \quad 0$
590	symmetry	y

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{21}i}{28}$	0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 0
	0	$-\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{35}i}{140}$ 0 0 0 0 0
	0	0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{35}i}{140}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{\sqrt{210}i}{140}$
	0	0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{140}$
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{3\sqrt{70}i}{140}$ 0
591	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(1,0;a)}(A_{2u})$	0	$\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0
	$-\frac{\sqrt{6}}{24}$	0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0
	0	$\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0
	$\frac{\sqrt{6}i}{24}$	0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0
	0	0 0 0 0 0 $-\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{60}$
	0	0 0 0 0 $\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{60}$ 0
	0	0 0 0 0 0 $-\frac{i}{8}$ 0 $-\frac{1}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{60}$
	0	0 0 0 0 $-\frac{i}{8}$ 0 $\frac{1}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{60}$ 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{40}$ 0 $\frac{\sqrt{30}i}{40}$ 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{30}}{40}$ 0 $-\frac{\sqrt{30}i}{40}$ 0 0 0
592	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,0;a)}(B_{1u})$	0	$\frac{\sqrt{10}i}{48} \quad 0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad -\frac{i}{6} \quad 0$
	$\frac{\sqrt{10}i}{48}$	$0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad \frac{i}{6}$
	0	$\frac{\sqrt{10}}{48} \quad 0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{10}}{48}$	$0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{10}i}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24}$
	0	$-\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad \frac{1}{24}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{24} \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad -\frac{1}{24} \quad 0$
	0	$\frac{\sqrt{30}i}{48} \quad 0 \quad \frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{30}i}{48}$	$0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0$
593	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_3^{(1,0;a)}(B_{2u})$	0	$0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0$
	$\frac{\sqrt{10}}{48}$	$0 \quad 0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{10}i}{48} \quad 0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad \frac{i}{6} \quad 0$
	$\frac{\sqrt{10}i}{48}$	$0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad -\frac{i}{6}$
	0	$0 \quad 0 \quad -\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad \frac{1}{24}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad -\frac{1}{24} \quad 0$
	$\frac{\sqrt{10}i}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{24}$
	0	$-\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad \frac{i}{24} \quad 0$
	0	$0 \quad \frac{\sqrt{30}}{48} \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad \frac{\sqrt{2}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{30}}{48}$	$0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0$
594	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{6}i}{96}$ 0 0 $\frac{1}{8}$ 0 0 0 0 0 $\frac{3\sqrt{10}i}{160}$ 0 0 $-\frac{\sqrt{15}}{24}$	
	0 0 0 $\frac{\sqrt{6}i}{96}$ $-\frac{1}{8}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{160}$ $\frac{\sqrt{15}}{24}$ 0	
	$\frac{\sqrt{6}i}{96}$ 0 0 0 0 0 0 $\frac{1}{8}$ $\frac{7\sqrt{10}i}{160}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{1}{8}$ 0 0 $-\frac{7\sqrt{10}i}{160}$ 0 0 0 0	
	0 $\frac{5\sqrt{6}}{96}$ 0 0 0 0 $-\frac{i}{8}$ 0 0 $\frac{3\sqrt{10}}{160}$ 0 0 0 0	
	$-\frac{5\sqrt{6}}{96}$ 0 0 0 0 0 0 $\frac{i}{8}$ $-\frac{3\sqrt{10}}{160}$ 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}}{96}$ $-\frac{3i}{16}$ 0 0 0 0 0 0 $-\frac{7\sqrt{10}}{160}$ $\frac{\sqrt{15}i}{240}$ 0	
	0 0 $-\frac{5\sqrt{6}}{96}$ 0 0 $\frac{3i}{16}$ 0 0 0 0 0 $\frac{7\sqrt{10}}{160}$ 0 0 $-\frac{\sqrt{15}i}{240}$	
	0 0 $\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{160}$ 0 0 $-\frac{\sqrt{5}}{20}$	
	0 0 0 $-\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{160}$ $\frac{\sqrt{5}}{20}$ 0	
595	symmetry	$-\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{i}{8}$ 0 0 $\frac{3\sqrt{10}i}{160}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$	
	0 $-\frac{\sqrt{6}i}{96}$ 0 0 $-\frac{i}{8}$ 0 0 0 0 $-\frac{3\sqrt{10}i}{160}$ 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 0 $\frac{\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{i}{8}$ 0 0 0 $-\frac{7\sqrt{10}i}{160}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{96}$ 0 0 $-\frac{i}{8}$ 0 0 0 0 0 $\frac{7\sqrt{10}i}{160}$ 0 0	
	0 $\frac{5\sqrt{6}i}{96}$ 0 0 $-\frac{3i}{16}$ 0 0 0 0 0 $\frac{7\sqrt{10}i}{160}$ 0 0 0 $-\frac{\sqrt{15}i}{240}$	
	$\frac{5\sqrt{6}i}{96}$ 0 0 0 0 $\frac{3i}{16}$ 0 0 $\frac{7\sqrt{10}i}{160}$ 0 0 0 0 $\frac{\sqrt{15}i}{240}$	
	0 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 $\frac{i}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{10}i}{160}$ 0 0 0	
	0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{i}{8}$ 0 0 0 $-\frac{3\sqrt{10}i}{160}$ 0 0 0	
	$\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{160}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$	
	0 $-\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{160}$ 0 0 0 $\frac{\sqrt{5}i}{20}$ 0	
596	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	0 0 $-\frac{\sqrt{10}i}{96}$ 0 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 $-\frac{5\sqrt{6}i}{96}$ 0 0 $-\frac{1}{24}$	
	0 0 0 $\frac{\sqrt{10}i}{96}$ $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $\frac{5\sqrt{6}i}{96}$ $\frac{1}{24}$ 0	
	$\frac{\sqrt{10}i}{96}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ $-\frac{\sqrt{6}i}{96}$ 0 0 0 0 $\frac{i}{6}$	
	0 $-\frac{\sqrt{10}i}{96}$ 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 $\frac{\sqrt{6}i}{96}$ 0 0 $\frac{i}{6}$ 0	
	0 $\frac{\sqrt{10}}{96}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{\sqrt{6}}{96}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0	
	$-\frac{\sqrt{10}}{96}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ $\frac{\sqrt{6}}{96}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0	
	0 $\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{96}$ $\frac{\sqrt{15}i}{48}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{32}$ $\frac{i}{48}$ 0	
	$\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{96}$ 0 0 $-\frac{\sqrt{15}i}{48}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{32}$ 0 0 $-\frac{i}{48}$	
	0 0 $-\frac{\sqrt{30}i}{32}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{32}$ 0 0 $-\frac{\sqrt{3}}{12}$	
	0 0 0 $\frac{\sqrt{30}i}{32}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{32}$ $\frac{\sqrt{3}}{12}$ 0	
597	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{10}i}{96}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{5\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{i}{24}$	
	0 $-\frac{\sqrt{10}i}{96}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0 $-\frac{i}{24}$ 0	
	0 0 $\frac{\sqrt{10}i}{96}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 $\frac{\sqrt{6}i}{96}$ 0 0 $-\frac{1}{6}$	
	0 0 0 $-\frac{\sqrt{10}i}{96}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{96}$ $\frac{1}{6}$ 0	
	0 $\frac{\sqrt{10}i}{96}$ 0 $\frac{\sqrt{10}}{24}$ $\frac{\sqrt{15}i}{48}$ 0 0 0 0 $\frac{\sqrt{6}i}{32}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{i}{48}$ 0	
	$\frac{\sqrt{10}i}{96}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 $-\frac{\sqrt{15}i}{48}$ 0 0 $\frac{\sqrt{6}i}{32}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{i}{48}$	
	0 $-\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{96}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{96}$ 0 0	
	$\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{96}$ 0 0 0 0 $\frac{\sqrt{15}i}{24}$ $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{96}$ 0 0 0	
	$-\frac{\sqrt{30}i}{32}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{32}$ 0 0 0 0 $\frac{\sqrt{3}i}{12}$	
	0 $\frac{\sqrt{30}i}{32}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{3}i}{12}$ 0	
598	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
599	symmetry	$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ \frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{840} & 0 & -\frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \end{bmatrix}$
600	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
601	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{30} \\ 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 \\ -\frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & \frac{\sqrt{3}}{10} & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & -\frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{5}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} & -\frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & \frac{\sqrt{5}}{15} & 0 \\ 0 & \frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{6}}{30} & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ \frac{\sqrt{6}i}{30} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \end{bmatrix}$
602	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(B_{2u})$	0	$\frac{\sqrt{2}}{120} \quad 0 \quad \frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{120}$	$0 \quad \frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{2}i}{120} \quad 0 \quad \frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad \frac{\sqrt{30}}{120} \quad -\frac{\sqrt{5}i}{30} \quad 0$
	$-\frac{\sqrt{2}i}{120}$	$0 \quad -\frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{30}$
	0	$0 \quad 0 \quad \frac{\sqrt{2}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{10} \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{5}}{15}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{60} \quad \frac{\sqrt{3}}{10} \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad -\frac{\sqrt{5}}{15} \quad 0$
	$-\frac{\sqrt{2}i}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad \frac{\sqrt{3}}{30} \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{15}$
	0	$\frac{\sqrt{2}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad -\frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{15} \quad 0$
	0	$0 \quad -\frac{\sqrt{6}}{30} \quad 0 \quad \frac{\sqrt{6}i}{30} \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0$
	$\frac{\sqrt{6}}{30}$	$0 \quad \frac{\sqrt{6}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad -\frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$
603	symmetry	$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 1)$	0	$0 \quad 0 \quad -\frac{53\sqrt{210}i}{3360} \quad 0 \quad 0 \quad \frac{13\sqrt{35}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{48}$
	0	$0 \quad 0 \quad 0 \quad \frac{53\sqrt{210}i}{3360} \quad -\frac{13\sqrt{35}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{224} \quad \frac{\sqrt{21}}{48} \quad 0$
	$-\frac{13\sqrt{210}i}{840}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70} \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{13\sqrt{210}i}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{120}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70} \quad \frac{3\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{240} \quad \frac{3\sqrt{35}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{112} \quad -\frac{\sqrt{21}i}{168} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{210}}{240} \quad 0 \quad 0 \quad -\frac{3\sqrt{35}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{168}$
	0	$0 \quad 0 \quad \frac{\sqrt{70}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{224} \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{112}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{160} \quad \frac{\sqrt{105}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{224} \quad -\frac{5\sqrt{7}}{112} \quad 0$
604	symmetry	$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 1)$	$\frac{53\sqrt{210}i}{3360} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{35}i}{560} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{48}$	
	$0 \quad -\frac{53\sqrt{210}i}{3360} \quad 0 \quad 0 \quad -\frac{13\sqrt{35}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{224} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{48} \quad 0$	
	$0 \quad 0 \quad -\frac{13\sqrt{210}i}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{13\sqrt{210}i}{840} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{210}i}{240} \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{168} \quad 0$	
	$-\frac{\sqrt{210}i}{240} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{168}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{70}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}i}{112}$	
	$0 \quad -\frac{\sqrt{70}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{224} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}i}{112} \quad 0$	
605	symmetry	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 2)$	$0 \quad 0 \quad -\frac{13\sqrt{6}i}{480} \quad 0 \quad 0 \quad -\frac{3}{80} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{240}$	
	$0 \quad 0 \quad 0 \quad \frac{13\sqrt{6}i}{480} \quad \frac{3}{80} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad -\frac{\sqrt{15}}{240} \quad 0$	
	$-\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad 0 \quad \frac{1}{10} \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{30}$	
	$0 \quad \frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad \frac{i}{10} \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{30} \quad 0$	
	$0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad \frac{\sqrt{6}i}{60} \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{6}}{40} \quad 0 \quad \frac{\sqrt{6}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad \frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}i}{20} \quad 0 \quad \frac{\sqrt{6}}{48} \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad -\frac{3\sqrt{10}}{80} \quad -\frac{\sqrt{15}i}{120} \quad 0$	
	$\frac{\sqrt{6}i}{20} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{3\sqrt{10}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{120}$	
	$0 \quad 0 \quad -\frac{9\sqrt{2}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{80} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{16}$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{2}i}{160} \quad -\frac{\sqrt{3}}{80} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{160} \quad -\frac{\sqrt{5}}{16} \quad 0$	
606	symmetry	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 2)$	$\frac{13\sqrt{6}i}{480}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3i}{80} \quad 0 \quad \frac{1}{10} \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{240}$
	$0 \quad -\frac{13\sqrt{6}i}{480}$	$0 \quad 0 \quad \frac{3i}{80} \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{240} \quad 0$
	$0 \quad 0 \quad -\frac{\sqrt{6}i}{40}$	$0 \quad 0 \quad \frac{1}{10} \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{30}$
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{40}$	$-\frac{1}{10} \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad \frac{\sqrt{15}}{30} \quad 0$
	$0 \quad \frac{\sqrt{6}i}{48}$	$0 \quad \frac{\sqrt{6}}{20} \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad \frac{\sqrt{15}i}{120} \quad 0$
	$\frac{\sqrt{6}i}{48}$	$0 \quad -\frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad \frac{3\sqrt{10}i}{80} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{120}$
	$0 \quad \frac{\sqrt{6}}{60}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{60}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad \frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0$
	$-\frac{9\sqrt{2}i}{160}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{80} \quad 0 \quad -\frac{\sqrt{3}}{10} \quad \frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{16}$
	$0 \quad \frac{9\sqrt{2}i}{160}$	$0 \quad 0 \quad \frac{\sqrt{3}i}{80} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{16} \quad 0$
607	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 3)$	$0 \quad 0 \quad \frac{37\sqrt{2}i}{240}$	$0 \quad 0 \quad \frac{\sqrt{3}}{120} \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{240} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{24}$
	$0 \quad 0 \quad 0 \quad -\frac{37\sqrt{2}i}{240}$	$-\frac{\sqrt{3}}{120} \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{240} \quad \frac{\sqrt{5}}{24} \quad 0$
	$\frac{19\sqrt{2}i}{120}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad \frac{\sqrt{3}}{30} \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{60}$
	$0 \quad -\frac{19\sqrt{2}i}{120}$	$0 \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{60}$
	$0 \quad \frac{\sqrt{2}}{120}$	$0 \quad -\frac{7\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{24} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{120}$	$0 \quad -\frac{7\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{30} \quad \frac{\sqrt{30}i}{24} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{2}i}{24}$	$0 \quad \frac{\sqrt{2}}{30} \quad \frac{\sqrt{3}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{60}$
	$-\frac{\sqrt{2}i}{24}$	$0 \quad -\frac{\sqrt{2}}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{60}$
	$0 \quad 0 \quad \frac{\sqrt{6}i}{80}$	$0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad \frac{i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24}$
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{80}$	$\frac{1}{8} \quad 0 \quad \frac{i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{80} \quad -\frac{\sqrt{15}}{24} \quad 0$
608	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 3)$	$\frac{-37\sqrt{2}i}{240}$	0 0 0 0 0 $-\frac{\sqrt{3}i}{120}$ 0 $-\frac{\sqrt{3}}{20}$ $\frac{\sqrt{30}i}{240}$ 0 0 0 0 $-\frac{\sqrt{5}i}{24}$
	0	$\frac{37\sqrt{2}i}{240}$ 0 0 $-\frac{\sqrt{3}i}{120}$ 0 $\frac{\sqrt{3}}{20}$ 0 0 $-\frac{\sqrt{30}i}{240}$ 0 0 $-\frac{\sqrt{5}i}{24}$ 0
	0	0 0 $\frac{19\sqrt{2}i}{120}$ 0 0 $-\frac{\sqrt{3}}{20}$ 0 $-\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{30}i}{120}$ 0 0 $-\frac{\sqrt{5}}{60}$
	0	0 0 0 $-\frac{19\sqrt{2}i}{120}$ $\frac{\sqrt{3}}{20}$ 0 $-\frac{\sqrt{3}i}{30}$ 0 0 0 0 $\frac{\sqrt{30}i}{120}$ $\frac{\sqrt{5}}{60}$ 0
	0	$\frac{\sqrt{2}i}{30}$ 0 $-\frac{\sqrt{2}}{24}$ $\frac{\sqrt{3}i}{60}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{120}$ $\frac{\sqrt{5}i}{60}$ 0
	$\frac{\sqrt{2}i}{30}$	0 $\frac{\sqrt{2}}{24}$ 0 0 $-\frac{\sqrt{3}i}{60}$ 0 0 0 0 $\frac{\sqrt{30}}{120}$ 0 0 $-\frac{\sqrt{5}i}{60}$
	0	$-\frac{7\sqrt{2}}{120}$ 0 $\frac{\sqrt{2}i}{120}$ 0 0 $-\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0
	$\frac{7\sqrt{2}}{120}$	0 $\frac{\sqrt{2}i}{120}$ 0 0 0 0 $\frac{\sqrt{3}i}{30}$ $\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0
	$\frac{\sqrt{6}i}{80}$	0 0 0 0 $-\frac{i}{8}$ 0 $-\frac{1}{20}$ $\frac{\sqrt{10}i}{80}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$
	0	$-\frac{\sqrt{6}i}{80}$ 0 0 $-\frac{i}{8}$ 0 $\frac{1}{20}$ 0 0 $-\frac{\sqrt{10}i}{80}$ 0 0 0 $-\frac{\sqrt{15}i}{24}$
609	symmetry	z
$\mathbb{Q}_1^{(1,1;a)}(A_{2u})$	0	$\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{3\sqrt{70}}{280}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0
	$-\frac{\sqrt{42}}{56}$	0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $-\frac{3\sqrt{70}}{280}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0
	0	$\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0
	$\frac{\sqrt{42}i}{56}$	0 $-\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 $\frac{\sqrt{105}}{70}$
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ $-\frac{\sqrt{105}}{70}$ 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 0 0 $-\frac{\sqrt{105}i}{70}$
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 $-\frac{\sqrt{105}i}{70}$
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 $\frac{\sqrt{210}i}{140}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 $\frac{\sqrt{210}i}{140}$ 0 0 0
610	symmetry	x

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{140}$ 0	
	$\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $\frac{\sqrt{105}i}{140}$	
	0 $-\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $\frac{\sqrt{105}i}{140}$ 0	
	0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{280}$ 0 0 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{280}$ 0 0 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{3\sqrt{70}}{280}$ $-\frac{\sqrt{105}i}{70}$ 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 $\frac{\sqrt{105}i}{70}$	
	0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{21}i}{140}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0	
611	symmetry	y
$\mathbb{Q}_{1,2}^{(1,1;a)}(E_u)$	$\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$	
	0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0	
	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $-\frac{\sqrt{42}i}{56}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{140}$ 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{56}$ $\frac{\sqrt{105}i}{70}$ 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 $-\frac{\sqrt{105}i}{70}$	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0	
	$-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0	
612	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{2u})$	0	$-\frac{\sqrt{42}}{168} \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad -\frac{\sqrt{70}i}{84} \quad 0 \quad 0$
	$\frac{\sqrt{42}}{168}$	$0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{21} \quad \frac{\sqrt{70}}{84} \quad 0 \quad -\frac{\sqrt{70}i}{84} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{42}i}{168} \quad 0 \quad -\frac{\sqrt{42}}{168} \quad -\frac{\sqrt{7}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{84} \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad 0$
	$-\frac{\sqrt{42}i}{168}$	$0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{21} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{84} \quad 0 \quad \frac{\sqrt{70}}{84} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{42} \quad -\frac{\sqrt{105}}{84} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad \frac{\sqrt{7}}{24} \quad \frac{\sqrt{70}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0$
613	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_3^{(1,1;a)}(B_{1u})$	0	$\frac{\sqrt{70}i}{560} \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}i}{112} \quad 0 \quad \frac{3\sqrt{42}}{112} \quad \frac{\sqrt{7}i}{14} \quad 0$
	$\frac{\sqrt{70}i}{560}$	$0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{112} \quad 0 \quad -\frac{3\sqrt{42}}{112} \quad 0 \quad -\frac{\sqrt{7}i}{14}$
	0	$\frac{\sqrt{70}}{560} \quad 0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0$
	$-\frac{\sqrt{70}}{560}$	$0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{70}i}{280}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56}$
	0	$0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56} \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56}$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad \frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad -\frac{\sqrt{7}}{56} \quad 0$
	0	$0 \quad -\frac{\sqrt{210}i}{80} \quad 0 \quad -\frac{\sqrt{210}}{80} \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{112} \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad 0$
	$-\frac{\sqrt{210}i}{80}$	$0 \quad \frac{\sqrt{210}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0$
614	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(B_{2u})$	0	$-\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0$
	$\frac{\sqrt{70}}{560}$	$0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{70}i}{560} \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}i}{112} \quad 0 \quad -\frac{3\sqrt{42}}{112} \quad -\frac{\sqrt{7}i}{14} \quad 0$
	$\frac{\sqrt{70}i}{560}$	$0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}i}{112} \quad 0 \quad \frac{3\sqrt{42}}{112} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14}$
	0	$0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56}$
	0	$0 \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad -\frac{\sqrt{7}}{56} \quad 0$
	$\frac{3\sqrt{70}i}{280}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{120} \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$-\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$-\frac{\sqrt{210}}{80} \quad 0 \quad \frac{\sqrt{210}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad 0$
	$\frac{\sqrt{210}}{80}$	$0 \quad \frac{\sqrt{210}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad \frac{\sqrt{14}}{112} \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0$
615	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 1)$	0	$0 \quad 0 \quad -\frac{\sqrt{42}i}{224} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad -\frac{\sqrt{7}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{168}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{224} \quad -\frac{\sqrt{7}}{24} \quad 0 \quad -\frac{\sqrt{7}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{672} \quad \frac{\sqrt{105}}{168} \quad 0$
	$\frac{\sqrt{42}i}{224}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}i}{84} \quad 0 \quad -\frac{\sqrt{7}}{24} \quad -\frac{13\sqrt{70}i}{672} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84}$
	0	$-\frac{\sqrt{42}i}{224} \quad 0 \quad 0 \quad -\frac{5\sqrt{7}i}{84} \quad 0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad \frac{13\sqrt{70}i}{672} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0$
	0	$-\frac{17\sqrt{42}}{672} \quad 0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{672} \quad 0 \quad -\frac{\sqrt{70}i}{168} \quad 0 \quad 0$
	$\frac{17\sqrt{42}}{672}$	$0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad \frac{\sqrt{70}}{672} \quad 0 \quad -\frac{\sqrt{70}i}{168} \quad 0 \quad 0$
	0	$\frac{\sqrt{42}i}{84} \quad 0 \quad \frac{11\sqrt{42}}{672} \quad -\frac{\sqrt{7}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{84} \quad 0 \quad \frac{\sqrt{70}}{672} \quad \frac{\sqrt{105}i}{112} \quad 0$
	$\frac{\sqrt{42}i}{84}$	$0 \quad -\frac{11\sqrt{42}}{672} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{48} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{84} \quad 0 \quad -\frac{\sqrt{70}}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{112}$
	0	$0 \quad 0 \quad \frac{\sqrt{14}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{84} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{224} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{32} \quad -\frac{\sqrt{21}}{84} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{224} \quad 0 \quad 0 \quad 0$
616	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 1)$	$\frac{\sqrt{42}i}{224}$	0 0 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 $-\frac{\sqrt{7}}{42}$ $-\frac{\sqrt{70}i}{672}$ 0 0 0 0 $-\frac{\sqrt{105}i}{168}$
	0	$-\frac{\sqrt{42}i}{224}$ 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{70}i}{672}$ 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0
	0	0 0 $\frac{\sqrt{42}i}{224}$ 0 0 $-\frac{5\sqrt{7}}{84}$ 0 $\frac{\sqrt{7}i}{24}$ 0 0 $\frac{13\sqrt{70}i}{672}$ 0 0 0 $-\frac{\sqrt{105}}{84}$
	0	0 0 0 $-\frac{\sqrt{42}i}{224}$ $\frac{5\sqrt{7}}{84}$ 0 $\frac{\sqrt{7}i}{24}$ 0 0 0 0 $-\frac{13\sqrt{70}i}{672}$ $\frac{\sqrt{105}}{84}$ 0
	0	$\frac{11\sqrt{42}i}{672}$ 0 $\frac{\sqrt{42}}{84}$ $-\frac{\sqrt{7}i}{48}$ 0 0 0 0 $-\frac{\sqrt{70}i}{672}$ 0 $-\frac{\sqrt{70}}{84}$ $-\frac{\sqrt{105}i}{112}$ 0
	$\frac{11\sqrt{42}i}{672}$	0 $-\frac{\sqrt{42}}{84}$ 0 0 $\frac{\sqrt{7}i}{48}$ 0 0 $-\frac{\sqrt{70}i}{672}$ 0 $\frac{\sqrt{70}}{84}$ 0 0 $-\frac{\sqrt{105}i}{112}$
	0	$\frac{5\sqrt{42}}{168}$ 0 $-\frac{17\sqrt{42}i}{672}$ 0 0 $-\frac{\sqrt{7}i}{24}$ 0 0 $\frac{\sqrt{70}}{168}$ 0 $\frac{\sqrt{70}i}{672}$ 0 0
	$-\frac{5\sqrt{42}}{168}$	0 $-\frac{17\sqrt{42}i}{672}$ 0 0 0 0 $\frac{\sqrt{7}i}{24}$ $-\frac{\sqrt{70}}{168}$ 0 $\frac{\sqrt{70}i}{672}$ 0 0 0
	$\frac{\sqrt{14}i}{32}$	0 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 $\frac{\sqrt{21}}{42}$ $\frac{\sqrt{210}i}{224}$ 0 0 0 0 0
	0	$-\frac{\sqrt{14}i}{32}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{210}i}{224}$ 0 0 0 0
617	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 2)$	0	0 0 $-\frac{\sqrt{70}i}{224}$ 0 0 $-\frac{\sqrt{105}}{120}$ 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 $\frac{17\sqrt{42}i}{672}$ 0 0 $-\frac{3\sqrt{7}}{56}$
	0	0 0 0 $\frac{\sqrt{70}i}{224}$ $\frac{\sqrt{105}}{120}$ 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{17\sqrt{42}i}{672}$ $\frac{3\sqrt{7}}{56}$ 0
	$\frac{\sqrt{70}i}{224}$	0 0 0 0 0 $\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{105}}{120}$ $-\frac{\sqrt{42}i}{224}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$
	0	$-\frac{\sqrt{70}i}{224}$ 0 0 $\frac{\sqrt{105}i}{420}$ 0 $-\frac{\sqrt{105}}{120}$ 0 0 $\frac{\sqrt{42}i}{224}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0
	0	$\frac{\sqrt{70}}{224}$ 0 $-\frac{\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{105}i}{120}$ 0 0 $-\frac{\sqrt{42}}{224}$ 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0
	$-\frac{\sqrt{70}}{224}$	0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 $-\frac{\sqrt{105}i}{120}$ $\frac{\sqrt{42}}{224}$ 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0
	0	$-\frac{\sqrt{70}i}{56}$ 0 $-\frac{23\sqrt{70}}{1120}$ $-\frac{\sqrt{105}i}{80}$ 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{224}$ $\frac{5\sqrt{7}i}{112}$ 0
	$-\frac{\sqrt{70}i}{56}$	0 $\frac{23\sqrt{70}}{1120}$ 0 0 $\frac{\sqrt{105}i}{80}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{224}$ 0 0 0 $-\frac{5\sqrt{7}i}{112}$
	0	0 0 $-\frac{\sqrt{210}i}{160}$ 0 0 $\frac{3\sqrt{35}}{140}$ 0 $-\frac{\sqrt{35}i}{70}$ 0 0 $-\frac{5\sqrt{14}i}{224}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{210}i}{160}$ $-\frac{3\sqrt{35}}{140}$ 0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 0 $\frac{5\sqrt{14}i}{224}$ 0 0
618	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 2)$	$\frac{\sqrt{70}i}{224}$	0 0 0 0 0 $\frac{\sqrt{105}i}{120}$ 0 $\frac{\sqrt{105}}{70}$ $\frac{17\sqrt{42}i}{672}$ 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$
	0	$-\frac{\sqrt{70}i}{224}$ 0 0 0 $\frac{\sqrt{105}i}{120}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 $-\frac{17\sqrt{42}i}{672}$ 0 0 $-\frac{3\sqrt{7}i}{56}$ 0
	0	0 0 $\frac{\sqrt{70}i}{224}$ 0 0 $\frac{\sqrt{105}}{420}$ 0 $-\frac{\sqrt{105}i}{120}$ 0 0 $\frac{\sqrt{42}i}{224}$ 0 0 $-\frac{\sqrt{7}}{28}$
	0	0 0 0 $-\frac{\sqrt{70}i}{224}$ $-\frac{\sqrt{105}}{420}$ 0 $-\frac{\sqrt{105}i}{120}$ 0 0 0 0 $-\frac{\sqrt{42}i}{224}$ $\frac{\sqrt{7}}{28}$ 0
	0	$-\frac{23\sqrt{70}i}{1120}$ 0 $-\frac{\sqrt{70}}{56}$ $-\frac{\sqrt{105}i}{80}$ 0 0 0 0 $-\frac{\sqrt{42}i}{224}$ 0 $-\frac{\sqrt{42}}{56}$ $-\frac{5\sqrt{7}i}{112}$ 0
	$-\frac{23\sqrt{70}i}{1120}$	0 $\frac{\sqrt{70}}{56}$ 0 0 $\frac{\sqrt{105}i}{80}$ 0 0 $-\frac{\sqrt{42}i}{224}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 $\frac{5\sqrt{7}i}{112}$
	0	$-\frac{\sqrt{70}}{140}$ 0 $\frac{\sqrt{70}i}{224}$ 0 0 $-\frac{\sqrt{105}i}{120}$ 0 0 $\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{224}$ 0 0
	$\frac{\sqrt{70}}{140}$	0 $\frac{\sqrt{70}i}{224}$ 0 0 0 0 $\frac{\sqrt{105}i}{120}$ $-\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{224}$ 0 0 0
	$-\frac{\sqrt{210}i}{160}$	0 0 0 0 0 $\frac{3\sqrt{35}i}{140}$ 0 $\frac{\sqrt{35}}{70}$ $\frac{5\sqrt{14}i}{224}$ 0 0 0 0
	0	$\frac{\sqrt{210}i}{160}$ 0 0 $\frac{3\sqrt{35}i}{140}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 $-\frac{5\sqrt{14}i}{224}$ 0 0 0 0
619	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{G}_2^{(a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{3}(x-y)(x+y)}{2}$
620	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(a)}(B_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	$\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0	
621	symmetry	$\sqrt{3}xy$
$\mathbb{G}_2^{(a)}(B_{2u})$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0	
622	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(a)}(E_u)$	$-\frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}}{14} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}}{14}$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
623	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,2}^{(a)}(E_u)$	$0 \quad 0 \quad -\frac{\sqrt{35}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{35}}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}}{14} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}}{14}$	
	$0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0$	
624	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
625	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
626	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
627	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
628	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(a)}(B_{2u})$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{14}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{14}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{105}}{35}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{105}}{35}$ 0 0 0 0 0 0 0 0 0 0	
629	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{G}_{4,1}^{(a)}(E_u, 1)$	$-\frac{\sqrt{30}}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{30}}{80}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}}{80}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0	
	0 0 0 0 $\frac{3\sqrt{5}}{40}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{5}}{40}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{8}$	
	0 0 0 0 0 0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{10}}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0 0 0 0	
630	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(a)}(E_u, 1)$	$0 \ 0 \ -\frac{\sqrt{30}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}}{16} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{30}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}}{16} \ 0 \ 0 \ 0$	
	$\frac{\sqrt{30}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{16} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{30}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{16} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}}{10} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}}{10} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{5}}{40} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{3}}{8} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{5}}{40} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{3}}{8}$	
	$0 \ 0 \ \frac{3\sqrt{10}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}}{16} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{3\sqrt{10}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}}{16} \ 0 \ 0 \ 0$	
631	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{G}_{4,1}^{(a)}(E_u, 2)$	$-\frac{\sqrt{210}}{560} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{9\sqrt{14}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{210}}{560} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{9\sqrt{14}}{112} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{210}}{560} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{5\sqrt{14}}{112} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{210}}{560} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{5\sqrt{14}}{112} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}}{40} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{21}}{56} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}}{40} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{21}}{56}$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$\frac{3\sqrt{70}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{3\sqrt{70}}{80} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0$	
632	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}}{112} & 0 & 0 \\ \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & 0 & -\frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 \end{bmatrix}$
633	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{105} & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{210}i}{70} \end{bmatrix}$
634	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(1,-1;a)}(B_{1u})$	0	$\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0$
	$\frac{\sqrt{21}i}{28}$	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	$-\frac{\sqrt{21}}{28}$	$0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0$
635	symmetry	$\sqrt{3}xy$
$\mathbb{G}_2^{(1,-1;a)}(B_{2u})$	0	$\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	$-\frac{\sqrt{21}}{28}$	$0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	0	$-\frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0$
	$-\frac{\sqrt{21}i}{28}$	$0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0$
636	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u)$		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & -\frac{3\sqrt{70}}{140} & 0 & 0 \end{bmatrix}$
		637 symmetry
		$-\sqrt{3}xz$
		$\begin{bmatrix} -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 \end{bmatrix}$
		638 symmetry
		$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad -\frac{i}{6} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{10}i}{240} \quad 0 \quad \frac{11\sqrt{10}}{240} \quad 0 \quad 0$
	$\frac{\sqrt{6}i}{48}$	$0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad \frac{i}{6} \quad 0 \quad 0 \quad -\frac{11\sqrt{10}i}{240} \quad 0 \quad -\frac{11\sqrt{10}}{240} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad -\frac{i}{6} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{240} \quad 0 \quad -\frac{\sqrt{10}i}{240} \quad 0 \quad 0$
	$\frac{\sqrt{6}}{48}$	$0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{6} \quad \frac{\sqrt{10}}{240} \quad 0 \quad -\frac{\sqrt{10}i}{240} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{24} \quad 0 \quad -\frac{1}{6} \quad \frac{\sqrt{10}i}{60} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{120}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{24} \quad 0 \quad \frac{1}{6} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{120}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{24} \quad 0 \quad -\frac{i}{6} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{120}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{24} \quad 0 \quad -\frac{i}{6} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{60} \quad \frac{\sqrt{15}}{120} \quad 0$
	0	$0 \quad -\frac{5\sqrt{2}i}{48} \quad 0 \quad \frac{5\sqrt{2}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{80} \quad 0 \quad -\frac{\sqrt{30}}{80} \quad \frac{\sqrt{5}i}{15} \quad 0$
	$-\frac{5\sqrt{2}i}{48}$	$0 \quad -\frac{5\sqrt{2}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{80} \quad 0 \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{15}$
639	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	0	$\frac{\sqrt{210}i}{336} \quad 0 \quad \frac{\sqrt{210}}{336} \quad -\frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{336} \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{336}$	$0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{336} \quad 0 \quad \frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{210}}{336} \quad 0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad -\frac{13\sqrt{14}}{336} \quad 0 \quad -\frac{13\sqrt{14}i}{336} \quad 0 \quad 0$
	$\frac{\sqrt{210}}{336}$	$0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad \frac{13\sqrt{14}}{336} \quad 0 \quad -\frac{13\sqrt{14}i}{336} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{35}i}{168} \quad 0 \quad \frac{\sqrt{35}}{84} \quad \frac{\sqrt{14}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{168}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{35}i}{168} \quad 0 \quad -\frac{\sqrt{35}}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{168}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{35}}{168} \quad 0 \quad \frac{\sqrt{35}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{168}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{35}}{168} \quad 0 \quad \frac{\sqrt{35}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{84} \quad \frac{\sqrt{21}}{168} \quad 0$
	$0 \quad \frac{\sqrt{70}i}{48}$	$0 \quad -\frac{\sqrt{70}}{48} \quad 0 \quad -\frac{\sqrt{42}i}{112} \quad 0 \quad -\frac{\sqrt{42}}{112} \quad \frac{\sqrt{7}i}{21} \quad 0$
	$\frac{\sqrt{70}i}{48}$	$0 \quad \frac{\sqrt{70}}{48} \quad 0 \quad -\frac{\sqrt{42}i}{112} \quad 0 \quad \frac{\sqrt{42}}{112} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{21}$
640	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0	
641	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{G}_4^{(1,-1;a)}(B_{1u})$	0 $\frac{\sqrt{70}i}{112}$ 0 $-\frac{\sqrt{70}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{48}$ 0 $-\frac{\sqrt{42}}{48}$ $\frac{\sqrt{7}i}{14}$ 0	
	$\frac{\sqrt{70}i}{112}$ 0 $\frac{\sqrt{70}}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{48}$ 0 $\frac{\sqrt{42}}{48}$ 0 0 $-\frac{\sqrt{7}i}{14}$	
	0 $\frac{\sqrt{70}}{112}$ 0 $\frac{\sqrt{70}i}{112}$ 0 0 0 0 0 0 $\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0	
	$-\frac{\sqrt{70}}{112}$ 0 $\frac{\sqrt{70}i}{112}$ 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0	
	$-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{56}$	
	0 $\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0	
	0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}}{56}$	
	0 0 0 $\frac{\sqrt{70}i}{56}$ $\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ $-\frac{\sqrt{7}}{56}$ 0	
	0 $-\frac{\sqrt{210}i}{336}$ 0 $-\frac{\sqrt{210}}{336}$ 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{112}$ 0 $\frac{3\sqrt{14}}{112}$ 0 0	
	$-\frac{\sqrt{210}i}{336}$ 0 $\frac{\sqrt{210}}{336}$ 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{112}$ 0 $-\frac{3\sqrt{14}}{112}$ 0 0 0	
642	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(B_{2u})$	0	$-\frac{\sqrt{70}}{112} \quad 0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{70}}{112}$	$0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{70}i}{112} \quad 0 \quad -\frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{48} \quad 0 \quad \frac{\sqrt{42}}{48} \quad -\frac{\sqrt{7}i}{14} \quad 0 \quad 0$
	$\frac{\sqrt{70}i}{112}$	$0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{48} \quad 0 \quad -\frac{\sqrt{42}}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14}$
	0	$0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56}$
	0	$0 \quad 0 \quad -\frac{\sqrt{70}i}{56} \quad -\frac{\sqrt{105}}{84} \quad 0 \quad \frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad -\frac{\sqrt{7}}{56} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{70}i}{56}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad \frac{\sqrt{105}}{168} \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad -\frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56} \quad 0 \quad 0$
	0	$-\frac{\sqrt{210}}{336} \quad 0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{112} \quad 0 \quad \frac{3\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{210}}{336}$	$0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{112} \quad 0 \quad \frac{3\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
643	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	0	$0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad \frac{1}{8}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{6}i}{96} \quad -\frac{1}{8} \quad 0$
	$-\frac{\sqrt{10}i}{32}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad -\frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad -\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{10}}{32}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad \frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{96} \quad -\frac{i}{16} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{i}{16} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{30}i}{96} \quad 0 \quad -\frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{12} \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{96} \quad 0 \quad \frac{3\sqrt{2}i}{32} \quad \frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad 0 \quad 0$
644	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$-\frac{\sqrt{10}i}{32}$	0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{7\sqrt{6}i}{96}$ 0 0 0 0 $\frac{i}{8}$
	0 $\frac{\sqrt{10}i}{32}$	0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $-\frac{7\sqrt{6}i}{96}$ 0 0 0 $\frac{i}{8}$ 0
	0 0 $-\frac{\sqrt{10}i}{32}$	0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0 0
	0 0 0 $\frac{\sqrt{10}i}{32}$	0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 $-\frac{5\sqrt{6}i}{96}$ 0 0 0
	0 $-\frac{\sqrt{10}i}{32}$	0 0 $\frac{\sqrt{15}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{96}$ 0 0 0 $\frac{i}{16}$ 0
	$-\frac{\sqrt{10}i}{32}$	0 0 0 0 0 $-\frac{\sqrt{15}i}{48}$ 0 0 $-\frac{\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{i}{16}$
	0 0 0 $-\frac{\sqrt{10}i}{32}$	0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0
	0 0 $-\frac{\sqrt{10}i}{32}$	0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0
	$\frac{\sqrt{30}i}{96}$	0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{32}$ 0 0 0 0 $\frac{\sqrt{3}i}{12}$
	0 $-\frac{\sqrt{30}i}{96}$	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{3}i}{12}$ 0
645	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	0 0 $\frac{\sqrt{70}i}{224}$	0 0 $\frac{\sqrt{105}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{672}$ 0 0 $-\frac{3\sqrt{7}}{56}$
	0 0 0 $-\frac{\sqrt{70}i}{224}$	$-\frac{\sqrt{105}}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{672}$ $\frac{3\sqrt{7}}{56}$ 0
	$-\frac{\sqrt{70}i}{224}$ 0 0	0 0 0 0 0 0 $\frac{\sqrt{105}}{168}$ $-\frac{13\sqrt{42}i}{672}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$
	0 $\frac{\sqrt{70}i}{224}$ 0	0 0 0 0 0 $-\frac{\sqrt{105}}{168}$ 0 0 $\frac{13\sqrt{42}i}{672}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0
	0 $\frac{3\sqrt{70}}{224}$ 0	$\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{42}}{96}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0
	$-\frac{3\sqrt{70}}{224}$ 0 $\frac{\sqrt{70}i}{56}$	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ $-\frac{\sqrt{42}}{96}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0
	0 $-\frac{\sqrt{70}i}{56}$ 0	$\frac{3\sqrt{70}}{224}$ $\frac{5\sqrt{105}i}{336}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{11\sqrt{42}}{672}$ $-\frac{\sqrt{7}i}{112}$ 0
	$-\frac{\sqrt{70}i}{56}$ 0 $-\frac{3\sqrt{70}}{224}$	0 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{11\sqrt{42}}{672}$ 0 0 $\frac{\sqrt{7}i}{112}$
	0 0 $-\frac{\sqrt{210}i}{96}$	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{224}$ 0 0 $-\frac{\sqrt{21}}{84}$
	0 0 0 $\frac{\sqrt{210}i}{96}$	0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{224}$ $\frac{\sqrt{21}}{84}$ 0
646	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ..

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{70}i}{224}$	0 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 $-\frac{\sqrt{42}i}{672}$ 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$
	0	$\frac{\sqrt{70}i}{224}$ 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 $\frac{\sqrt{42}i}{672}$ 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0
	0	0 0 $-\frac{\sqrt{70}i}{224}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 $\frac{13\sqrt{42}i}{672}$ 0 0 0 $\frac{\sqrt{7}}{14}$
	0	0 0 0 $\frac{\sqrt{70}i}{224}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 $-\frac{13\sqrt{42}i}{672}$ $-\frac{\sqrt{7}}{14}$ 0
	0	$\frac{3\sqrt{70}i}{224}$ 0 $-\frac{\sqrt{70}}{56}$ $\frac{5\sqrt{105}i}{336}$ 0 0 0 0 0 $\frac{11\sqrt{42}i}{672}$ 0 $-\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{112}$ 0
	$\frac{3\sqrt{70}i}{224}$	0 $\frac{\sqrt{70}}{56}$ 0 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 0 $\frac{11\sqrt{42}i}{672}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{112}$
	0	$\frac{\sqrt{70}}{56}$ 0 $\frac{3\sqrt{70}i}{224}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{96}$ 0 0 0
	$-\frac{\sqrt{70}}{56}$	0 $\frac{3\sqrt{70}i}{224}$ 0 0 0 0 $\frac{\sqrt{105}i}{168}$ $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{96}$ 0 0 0 0
	$-\frac{\sqrt{210}i}{96}$	0 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{224}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{84}$
	0	$\frac{\sqrt{210}i}{96}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{224}$ 0 0 0 $\frac{\sqrt{21}i}{84}$ 0
647	symmetry	$\frac{\sqrt{2}(2x^6 - 15x^4y^2 - 15x^4z^2 - 15x^2y^4 + 180x^2y^2z^2 - 15x^2z^4 + 2y^6 - 15y^4z^2 - 15y^2z^4 + 2z^6)}{8}$
$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{231}i}{616}$ 0 $\frac{\sqrt{231}}{616}$ $-\frac{3\sqrt{154}i}{308}$ 0 0 0 0 $-\frac{3\sqrt{385}i}{616}$ 0 $\frac{3\sqrt{385}}{616}$ 0 0
	$\frac{\sqrt{231}i}{616}$	0 $-\frac{\sqrt{231}}{616}$ 0 0 $\frac{3\sqrt{154}i}{308}$ 0 0 0 $-\frac{3\sqrt{385}i}{616}$ 0 $-\frac{3\sqrt{385}}{616}$ 0 0 0
	0	$\frac{\sqrt{231}}{462}$ 0 $-\frac{\sqrt{231}i}{462}$ 0 0 0 $\frac{\sqrt{154}i}{77}$ 0 0 0 $\frac{\sqrt{385}}{154}$ 0 $\frac{\sqrt{385}i}{154}$ 0 0
	$-\frac{\sqrt{231}}{462}$	0 $-\frac{\sqrt{231}i}{462}$ 0 0 0 0 0 $-\frac{\sqrt{154}i}{77}$ $-\frac{\sqrt{385}}{154}$ 0 $\frac{\sqrt{385}i}{154}$ 0 0 0
	$-\frac{\sqrt{231}i}{132}$	0 0 0 0 $-\frac{3\sqrt{154}i}{308}$ 0 $\frac{\sqrt{154}}{77}$ $-\frac{\sqrt{385}i}{308}$ 0 0 0 0 $-\frac{\sqrt{2310}i}{924}$
	0	$\frac{\sqrt{231}i}{132}$ 0 0 $-\frac{3\sqrt{154}i}{308}$ 0 $-\frac{\sqrt{154}}{77}$ 0 0 $\frac{\sqrt{385}i}{308}$ 0 0 $-\frac{\sqrt{2310}i}{924}$ 0
	0	0 $\frac{\sqrt{231}i}{132}$ 0 0 $\frac{3\sqrt{154}}{308}$ 0 $\frac{\sqrt{154}i}{77}$ 0 0 $-\frac{\sqrt{385}i}{308}$ 0 0 $-\frac{\sqrt{2310}}{924}$
	0	0 0 $-\frac{\sqrt{231}i}{132}$ $-\frac{3\sqrt{154}}{308}$ 0 $\frac{\sqrt{154}i}{77}$ 0 0 0 0 $\frac{\sqrt{385}i}{308}$ $\frac{\sqrt{2310}}{924}$ 0
	0	$-\frac{\sqrt{77}i}{88}$ 0 $\frac{\sqrt{77}}{88}$ 0 0 0 0 0 $-\frac{\sqrt{1155}i}{616}$ 0 $-\frac{\sqrt{1155}}{616}$ $\frac{\sqrt{770}i}{308}$ 0
	$-\frac{\sqrt{77}i}{88}$	0 $-\frac{\sqrt{77}}{88}$ 0 0 0 0 0 $-\frac{\sqrt{1155}i}{616}$ 0 $\frac{\sqrt{1155}}{616}$ 0 0 $-\frac{\sqrt{770}i}{308}$
648	symmetry	$-\frac{\sqrt{14}(x^6 - 15x^4z^2 + 15x^2z^4 + y^6 - 15y^4z^2 + 15y^2z^4 - 2z^6)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 2)$	0	$-\frac{\sqrt{33}i}{264}$ 0 $-\frac{\sqrt{33}}{264}$ $\frac{\sqrt{22}i}{44}$ 0 0 0 0 $\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{88}$ 0 0
	$-\frac{\sqrt{33}i}{264}$	0 $\frac{\sqrt{33}}{264}$ 0 0 $-\frac{\sqrt{22}i}{44}$ 0 0 $\frac{\sqrt{55}i}{88}$ 0 $\frac{\sqrt{55}}{88}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{33}i}{132}$	0 0 0 0 $\frac{\sqrt{22}i}{44}$ 0 0 $-\frac{\sqrt{55}i}{44}$ 0 0 0 0 $-\frac{\sqrt{330}i}{132}$
	0	$-\frac{\sqrt{33}i}{132}$ 0 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 $\frac{\sqrt{55}i}{44}$ 0 0 $-\frac{\sqrt{330}i}{132}$ 0
	0	0 $-\frac{\sqrt{33}i}{132}$ 0 0 $-\frac{\sqrt{22}}{44}$ 0 0 0 0 $-\frac{\sqrt{55}i}{44}$ 0 0 $-\frac{\sqrt{330}}{132}$
	0	0 0 0 $\frac{\sqrt{33}i}{132}$ $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 0 $\frac{\sqrt{55}i}{44}$ $\frac{\sqrt{330}}{132}$ 0
	0	$\frac{\sqrt{11}i}{88}$ 0 $-\frac{\sqrt{11}}{88}$ 0 0 0 0 $-\frac{\sqrt{165}i}{88}$ 0 $-\frac{\sqrt{165}}{88}$ $\frac{\sqrt{110}i}{44}$ 0
	$\frac{\sqrt{11}i}{88}$	0 $\frac{\sqrt{11}}{88}$ 0 0 0 0 0 $-\frac{\sqrt{165}i}{88}$ 0 $\frac{\sqrt{165}}{88}$ 0 0 $-\frac{\sqrt{110}i}{44}$
649	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
$\mathbb{G}_6^{(1,-1;a)}(A_{2u})$	0	$\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 $\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0
	$-\frac{\sqrt{66}}{264}$	0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{22}$ $-\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0
	0	$-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ $\frac{\sqrt{11}i}{22}$ 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0
	$-\frac{\sqrt{66}i}{264}$	0 $\frac{\sqrt{66}}{264}$ 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0
	0	0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{11}}{22}$ 0 $\frac{\sqrt{11}i}{22}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{66}i}{66}$ $-\frac{\sqrt{11}}{22}$ 0 $\frac{\sqrt{11}i}{22}$ 0 0 0 0 0 0 0
	$\frac{\sqrt{66}i}{66}$	0 0 0 0 0 $\frac{\sqrt{11}i}{22}$ 0 $-\frac{\sqrt{11}}{22}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{11}i}{22}$ 0 $\frac{\sqrt{11}}{22}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{22}}{44}$ 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{22}}{44}$	0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0
650	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_6^{(1,-1;a)}(B_{1u}, 1)$	$0 \quad \frac{7\sqrt{5}i}{120} \quad 0 \quad -\frac{7\sqrt{5}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{24} \quad 0 \quad \frac{\sqrt{3}}{24} \quad -\frac{\sqrt{2}i}{12} \quad 0$	
	$\frac{7\sqrt{5}i}{120} \quad 0 \quad \frac{7\sqrt{5}}{120} \quad 0 \quad -\frac{\sqrt{3}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{12}$	
	$0 \quad -\frac{\sqrt{5}}{15} \quad 0 \quad -\frac{\sqrt{5}i}{15} \quad 0 \quad 0$	
	$\frac{\sqrt{5}}{15} \quad 0 \quad -\frac{\sqrt{5}i}{15} \quad 0 \quad 0$	
	$\frac{\sqrt{5}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{12} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{12}$	
	$0 \quad -\frac{\sqrt{5}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{12} \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{12} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{5}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{12} \quad 0 \quad 0 \quad \frac{\sqrt{2}}{12}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{60} \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{12} \quad -\frac{\sqrt{2}}{12} \quad 0$	
	$0 \quad \frac{\sqrt{15}i}{120} \quad 0 \quad \frac{\sqrt{15}}{120} \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad \frac{1}{8} \quad 0 \quad 0$	
	$\frac{\sqrt{15}i}{120} \quad 0 \quad -\frac{\sqrt{15}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0$	
651	symmetry	$\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$
$\mathbb{G}_6^{(1,-1;a)}(B_{1u}, 2)$	$0 \quad \frac{17\sqrt{11}i}{264} \quad 0 \quad -\frac{17\sqrt{11}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{264} \quad 0 \quad -\frac{\sqrt{165}}{264} \quad \frac{\sqrt{110}i}{132} \quad 0$	
	$\frac{17\sqrt{11}i}{264} \quad 0 \quad \frac{17\sqrt{11}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{264} \quad 0 \quad \frac{\sqrt{165}}{264} \quad 0 \quad -\frac{\sqrt{110}i}{132}$	
	$0 \quad -\frac{2\sqrt{11}}{33} \quad 0 \quad -\frac{2\sqrt{11}i}{33} \quad 0 \quad 0$	
	$\frac{2\sqrt{11}}{33} \quad 0 \quad -\frac{2\sqrt{11}i}{33} \quad 0 \quad 0$	
	$-\frac{\sqrt{11}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{132} \quad 0 \quad 0 \quad \frac{\sqrt{165}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}i}{132}$	
	$0 \quad \frac{\sqrt{11}i}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{132} \quad 0 \quad 0 \quad \frac{\sqrt{110}i}{132} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{11}i}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{132}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{132} \quad \frac{\sqrt{66}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}i}{132} \quad \frac{\sqrt{110}}{132} \quad 0$	
	$0 \quad -\frac{\sqrt{33}i}{264} \quad 0 \quad -\frac{\sqrt{33}}{264} \quad \frac{\sqrt{22}i}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}i}{88} \quad 0 \quad -\frac{\sqrt{55}}{88} \quad 0 \quad 0$	
	$-\frac{\sqrt{33}i}{264} \quad 0 \quad \frac{\sqrt{33}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{22}i}{44} \quad 0 \quad 0 \quad \frac{\sqrt{55}i}{88} \quad 0 \quad \frac{\sqrt{55}}{88} \quad 0 \quad 0 \quad 0$	
652	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(B_{2u}, 1)$	$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
653	symmetry	$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ $\begin{bmatrix} 0 & \frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & \frac{\sqrt{22}i}{33} & 0 \\ -\frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & -\frac{\sqrt{22}i}{33} \\ 0 & 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & \frac{\sqrt{22}}{33} \\ 0 & 0 & 0 & \frac{\sqrt{55}i}{165} & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & -\frac{\sqrt{22}}{33} & 0 & 0 \\ \frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{165} & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} \\ 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 \\ 0 & \frac{\sqrt{165}}{330} & 0 & -\frac{\sqrt{165}i}{330} & 0 & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 \\ -\frac{\sqrt{165}}{330} & 0 & -\frac{\sqrt{165}i}{330} & 0 & 0 & 0 & -\frac{\sqrt{110}i}{55} & -\frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 \end{bmatrix}$
654	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 1)$	$0 \ 0 \ -\frac{5\sqrt{66}i}{528} \ 0 \ 0 \ -\frac{3\sqrt{11}}{88} \ 0 \ -\frac{\sqrt{11}i}{44} \ 0 \ 0 \ -\frac{\sqrt{110}i}{176} \ 0 \ 0 \ -\frac{\sqrt{165}}{264}$	
	$0 \ 0 \ 0 \ \frac{5\sqrt{66}i}{528} \ \frac{3\sqrt{11}}{88} \ 0 \ -\frac{\sqrt{11}i}{44} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{110}i}{176} \ \frac{\sqrt{165}}{264} \ 0$	
	$-\frac{\sqrt{66}i}{88} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{11}i}{44} \ 0 \ \frac{\sqrt{11}}{22} \ -\frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{165}i}{132}$	
	$0 \ \frac{\sqrt{66}i}{88} \ 0 \ 0 \ -\frac{\sqrt{11}i}{44} \ 0 \ -\frac{\sqrt{11}}{22} \ 0 \ 0 \ \frac{\sqrt{110}i}{88} \ 0 \ 0 \ -\frac{\sqrt{165}i}{132} \ 0$	
	$0 \ -\frac{\sqrt{66}}{88} \ 0 \ -\frac{\sqrt{66}i}{264} \ 0 \ 0 \ -\frac{\sqrt{11}i}{22} \ 0 \ 0 \ -\frac{\sqrt{110}}{88} \ 0 \ -\frac{\sqrt{110}i}{88} \ 0 \ 0$	
	$\frac{\sqrt{66}}{88} \ 0 \ -\frac{\sqrt{66}i}{264} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{11}i}{22} \ \frac{\sqrt{110}}{88} \ 0 \ -\frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{66}i}{88} \ 0 \ \frac{\sqrt{66}}{66} \ -\frac{\sqrt{11}i}{44} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0 \ \frac{\sqrt{165}i}{132}$	
	$-\frac{\sqrt{66}i}{88} \ 0 \ -\frac{\sqrt{66}}{66} \ 0 \ 0 \ \frac{\sqrt{11}i}{44} \ 0 \ 0 \ -\frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0 \ -\frac{\sqrt{165}i}{132}$	
	$0 \ 0 \ -\frac{3\sqrt{22}i}{176} \ 0 \ 0 \ -\frac{\sqrt{33}}{88} \ 0 \ -\frac{\sqrt{33}i}{44} \ 0 \ 0 \ \frac{\sqrt{330}i}{176} \ 0 \ 0 \ \frac{\sqrt{55}}{88}$	
	$0 \ 0 \ 0 \ \frac{3\sqrt{22}i}{176} \ \frac{\sqrt{33}}{88} \ 0 \ -\frac{\sqrt{33}i}{44} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{330}i}{176} \ -\frac{\sqrt{55}}{88} \ 0$	
655	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$
$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 1)$	$\frac{5\sqrt{66}i}{528} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{11}i}{88} \ 0 \ -\frac{\sqrt{11}}{44} \ -\frac{\sqrt{110}i}{176} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{165}i}{264}$	
	$0 \ -\frac{5\sqrt{66}i}{528} \ 0 \ 0 \ \frac{3\sqrt{11}i}{88} \ 0 \ \frac{\sqrt{11}}{44} \ 0 \ 0 \ 0 \ \frac{\sqrt{110}i}{176} \ 0 \ 0 \ 0 \ -\frac{\sqrt{165}i}{264} \ 0$	
	$0 \ 0 \ -\frac{\sqrt{66}i}{88} \ 0 \ 0 \ -\frac{\sqrt{11}i}{44} \ 0 \ -\frac{\sqrt{11}i}{22} \ 0 \ 0 \ 0 \ \frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0 \ \frac{\sqrt{165}}{132}$	
	$0 \ 0 \ 0 \ \frac{\sqrt{66}i}{88} \ \frac{\sqrt{11}}{44} \ 0 \ -\frac{\sqrt{11}i}{22} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{110}i}{88} \ -\frac{\sqrt{165}}{132} \ 0$	
	$0 \ \frac{\sqrt{66}i}{66} \ 0 \ -\frac{\sqrt{66}}{88} \ -\frac{\sqrt{11}i}{44} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{110}}{88} \ -\frac{\sqrt{165}i}{132} \ 0$	
	$\frac{\sqrt{66}i}{66} \ 0 \ \frac{\sqrt{66}}{88} \ 0 \ 0 \ \frac{\sqrt{11}i}{44} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{110}}{88} \ 0 \ 0 \ \frac{\sqrt{165}i}{132}$	
	$0 \ -\frac{\sqrt{66}}{264} \ 0 \ -\frac{\sqrt{66}i}{88} \ 0 \ 0 \ \frac{\sqrt{11}i}{22} \ 0 \ 0 \ \frac{\sqrt{110}}{88} \ 0 \ \frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0$	
	$\frac{\sqrt{66}}{264} \ 0 \ -\frac{\sqrt{66}i}{88} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{11}i}{22} \ -\frac{\sqrt{110}}{88} \ 0 \ \frac{\sqrt{110}i}{88} \ 0 \ 0 \ 0$	
	$-\frac{3\sqrt{22}i}{176} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}i}{88} \ 0 \ \frac{\sqrt{33}}{44} \ -\frac{\sqrt{330}i}{176} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{55}i}{88} \ 0$	
	$0 \ \frac{3\sqrt{22}i}{176} \ 0 \ 0 \ -\frac{\sqrt{33}i}{88} \ 0 \ -\frac{\sqrt{33}}{44} \ 0 \ 0 \ \frac{\sqrt{330}i}{176} \ 0 \ 0 \ 0 \ -\frac{\sqrt{55}i}{88} \ 0$	
656	symmetry	$\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{i}{32} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & \frac{\sqrt{10}}{32} \\ 0 & 0 & 0 & -\frac{i}{32} & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{32} & -\frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{16} & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & \frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & \frac{1}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & -\frac{\sqrt{10}i}{16} \\ 0 & 0 & \frac{\sqrt{3}i}{32} & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{32} & 0 & \frac{\sqrt{30}}{32} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{32} & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{32} & -\frac{\sqrt{30}}{32} & 0 \end{bmatrix}$
657	symmetry	$-\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} -\frac{i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} \\ 0 & \frac{i}{32} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{16} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 \\ -\frac{i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & -\frac{3\sqrt{5}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} \\ 0 & -\frac{\sqrt{3}i}{32} & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{32} & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 \end{bmatrix}$
658	symmetry	$\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 3)$	$0 \quad 0 \quad \frac{17\sqrt{55}i}{1056} \quad 0 \quad 0 \quad \frac{37\sqrt{330}}{5280} \quad 0 \quad \frac{\sqrt{330}i}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{96}$	
	$0 \quad 0 \quad 0 \quad -\frac{17\sqrt{55}i}{1056} \quad -\frac{37\sqrt{330}}{5280} \quad 0 \quad \frac{\sqrt{330}i}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{96} \quad \frac{\sqrt{22}}{96} \quad 0$	
	$\frac{\sqrt{55}i}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{110} \quad 0 \quad -\frac{\sqrt{330}}{165} \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{22}i}{66}$	
	$0 \quad -\frac{\sqrt{55}i}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{110} \quad 0 \quad \frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad -\frac{\sqrt{22}i}{66} \quad 0$	
	$0 \quad \frac{\sqrt{55}}{66} \quad 0 \quad \frac{7\sqrt{55}i}{330} \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad 0$	
	$-\frac{\sqrt{55}}{66} \quad 0 \quad \frac{7\sqrt{55}i}{330} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{165} \quad \frac{\sqrt{33}}{66} \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{55}i}{66} \quad 0 \quad -\frac{29\sqrt{55}}{2640} \quad -\frac{\sqrt{330}i}{240} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad \frac{\sqrt{33}}{176} \quad \frac{5\sqrt{22}i}{528} \quad 0$	
	$\frac{\sqrt{55}i}{66} \quad 0 \quad \frac{29\sqrt{55}}{2640} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{240} \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad -\frac{\sqrt{33}}{176} \quad 0 \quad 0 \quad -\frac{5\sqrt{22}i}{528}$	
	$0 \quad 0 \quad -\frac{9\sqrt{165}i}{1760} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{160} \quad 0 \quad -\frac{\sqrt{110}i}{110} \quad 0 \quad 0 \quad \frac{5\sqrt{11}i}{352} \quad 0 \quad 0 \quad \frac{5\sqrt{66}}{1056}$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{165}i}{1760} \quad \frac{\sqrt{110}}{160} \quad 0 \quad -\frac{\sqrt{110}i}{110} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{11}i}{352} \quad -\frac{5\sqrt{66}}{1056} \quad 0$	
659	symmetry	$-\frac{\sqrt{210}xz(x^4 - 16x^2y^2 + 2x^2z^2 + 16y^4 - 16y^2z^2 + z^4)}{16}$
$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 3)$	$-\frac{17\sqrt{55}i}{1056} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{37\sqrt{330}i}{5280} \quad 0 \quad \frac{\sqrt{330}}{110} \quad -\frac{\sqrt{33}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{22}i}{96}$	
	$0 \quad \frac{17\sqrt{55}i}{1056} \quad 0 \quad 0 \quad -\frac{37\sqrt{330}i}{5280} \quad 0 \quad -\frac{\sqrt{330}}{110} \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{22}i}{96} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{55}i}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{110} \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad \frac{\sqrt{22}}{66}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}i}{66} \quad -\frac{\sqrt{330}}{110} \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad -\frac{\sqrt{22}}{66} \quad 0$	
	$0 \quad -\frac{29\sqrt{55}i}{2640} \quad 0 \quad \frac{\sqrt{55}}{66} \quad -\frac{\sqrt{330}i}{240} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{176} \quad 0 \quad \frac{\sqrt{33}}{66} \quad -\frac{5\sqrt{22}i}{528} \quad 0$	
	$-\frac{29\sqrt{55}i}{2640} \quad 0 \quad -\frac{\sqrt{55}}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{240} \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{176} \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad \frac{5\sqrt{22}i}{528}$	
	$0 \quad \frac{7\sqrt{55}}{330} \quad 0 \quad \frac{\sqrt{55}i}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad \frac{\sqrt{33}i}{66} \quad 0 \quad 0$	
	$-\frac{7\sqrt{55}}{330} \quad 0 \quad \frac{\sqrt{55}i}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{165} \quad -\frac{\sqrt{33}}{66} \quad 0 \quad \frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad 0$	
	$-\frac{9\sqrt{165}i}{1760} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{160} \quad 0 \quad \frac{\sqrt{110}}{110} \quad -\frac{5\sqrt{11}i}{352} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{66}i}{1056}$	
	$0 \quad \frac{9\sqrt{165}i}{1760} \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{160} \quad 0 \quad -\frac{\sqrt{110}}{110} \quad 0 \quad 0 \quad \frac{5\sqrt{11}i}{352} \quad 0 \quad 0 \quad -\frac{5\sqrt{66}i}{1056} \quad 0$	
660	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
661	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \end{bmatrix}$
662	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(1,0;a)}(B_{2u})$	0	$\frac{\sqrt{210}}{168} \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{168}$	$0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad \frac{\sqrt{14}}{56} \quad \frac{\sqrt{21}i}{42} \quad 0$
	$-\frac{\sqrt{210}i}{168}$	$0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad \frac{\sqrt{210}i}{84} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{84} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad -\frac{\sqrt{21}}{42} \quad 0$
	$-\frac{\sqrt{210}i}{84}$	$0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42}$
	0	$\frac{\sqrt{210}i}{84} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{42} \quad \frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$
663	symmetry	$\sqrt{3}yz$
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u)$	0	$0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{84}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad -\frac{\sqrt{21}}{84} \quad 0$
	$\frac{\sqrt{210}i}{168}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84}$
	0	$0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0$
	0	$0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad \frac{3\sqrt{14}i}{56} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{168}$	$0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad \frac{3\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad \frac{\sqrt{14}}{56} \quad -\frac{\sqrt{21}i}{42} \quad 0$
	$\frac{\sqrt{210}i}{168}$	$0 \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad \frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0$
664	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{210}i}{168}$	0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ $\frac{\sqrt{14}i}{56}$ 0 0 0 0 $\frac{\sqrt{21}i}{84}$
	0	$-\frac{\sqrt{210}i}{168}$ 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0
	0	0 0 $\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{21}}{84}$
	0	0 0 0 $-\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{21}}{84}$ 0
	0	$\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ $\frac{\sqrt{21}i}{42}$ 0
	$\frac{\sqrt{210}i}{168}$	0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{21}i}{42}$
	0	$-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	$\frac{\sqrt{210}}{168}$	0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0
665	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 1)$	0	$-\frac{\sqrt{10}i}{80}$ 0 $-\frac{\sqrt{10}}{80}$ $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 $-\frac{\sqrt{6}i}{48}$ 0 $\frac{\sqrt{6}}{48}$ 0 0
	$-\frac{\sqrt{10}i}{80}$	0 $\frac{\sqrt{10}}{80}$ 0 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 $-\frac{\sqrt{6}i}{48}$ 0 $-\frac{\sqrt{6}}{48}$ 0 0 0
	0	$\frac{\sqrt{10}}{80}$ 0 $-\frac{\sqrt{10}i}{80}$ 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 $-\frac{\sqrt{6}i}{16}$ 0 0
	$-\frac{\sqrt{10}}{80}$	0 $-\frac{\sqrt{10}i}{80}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{30}$ $\frac{\sqrt{6}}{16}$ 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0
	$\frac{\sqrt{10}i}{20}$	0 0 0 0 0 $\frac{\sqrt{15}i}{40}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0 0 $\frac{i}{8}$
	0	$-\frac{\sqrt{10}i}{20}$ 0 0 0 $\frac{\sqrt{15}i}{40}$ 0 $-\frac{\sqrt{15}}{30}$ 0 0 0 0 0 0 $\frac{i}{8}$
	0	0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 $-\frac{\sqrt{15}}{40}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 $\frac{1}{8}$
	0	0 0 0 $\frac{\sqrt{10}i}{20}$ $\frac{\sqrt{15}}{40}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 $-\frac{1}{8}$
	0	$-\frac{\sqrt{30}i}{80}$ 0 $\frac{\sqrt{30}}{80}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 $-\frac{\sqrt{2}}{16}$ 0 0 0
	$-\frac{\sqrt{30}i}{80}$	0 $-\frac{\sqrt{30}}{80}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 $\frac{\sqrt{2}}{16}$ 0 0 0
666	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 2)$	$0 - \frac{\sqrt{14}i}{112} 0 - \frac{\sqrt{14}}{112} \frac{\sqrt{21}i}{30} 0 0 0 0 - \frac{17\sqrt{210}i}{1680} 0 \frac{17\sqrt{210}}{1680} 0 0$	
	$- \frac{\sqrt{14}i}{112} 0 \frac{\sqrt{14}}{112} 0 0 - \frac{\sqrt{21}i}{30} 0 0 - \frac{17\sqrt{210}i}{1680} 0 - \frac{17\sqrt{210}}{1680} 0 0 0$	
	$0 \frac{\sqrt{14}}{112} 0 - \frac{\sqrt{14}i}{112} 0 0 - \frac{\sqrt{21}i}{30} 0 0 - \frac{\sqrt{210}}{560} 0 - \frac{\sqrt{210}i}{560} 0 0 0$	
	$- \frac{\sqrt{14}}{112} 0 - \frac{\sqrt{14}i}{112} 0 0 0 0 \frac{\sqrt{21}i}{30} \frac{\sqrt{210}}{560} 0 - \frac{\sqrt{210}i}{560} 0 0 0 0$	
	$- \frac{\sqrt{14}i}{20} 0 0 0 0 \frac{\sqrt{21}i}{40} 0 \frac{\sqrt{21}}{60} 0 0 0 0 0 0 \frac{\sqrt{35}i}{56}$	
	$0 \frac{\sqrt{14}i}{20} 0 0 \frac{\sqrt{21}i}{40} 0 - \frac{\sqrt{21}}{60} 0 0 0 0 0 0 \frac{\sqrt{35}i}{56} 0$	
	$0 0 \frac{\sqrt{14}i}{20} 0 0 - \frac{\sqrt{21}}{40} 0 \frac{\sqrt{21}i}{60} 0 0 0 0 0 0 \frac{\sqrt{35}}{56}$	
	$0 0 0 - \frac{\sqrt{14}i}{20} \frac{\sqrt{21}}{40} 0 \frac{\sqrt{21}i}{60} 0 0 0 0 0 0 - \frac{\sqrt{35}}{56} 0$	
	$0 \frac{\sqrt{42}i}{80} 0 - \frac{\sqrt{42}}{80} 0 0 0 0 0 - \frac{\sqrt{70}i}{112} 0 - \frac{\sqrt{70}}{112} 0 0 0$	
	$\frac{\sqrt{42}i}{80} 0 \frac{\sqrt{42}}{80} 0 0 0 0 0 - \frac{\sqrt{70}i}{112} 0 \frac{\sqrt{70}}{112} 0 0 0 0$	
667	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{G}_4^{(1,0;a)}(A_{2u})$	$0 0 0 0 0 0 - \frac{i}{5} 0 0 \frac{\sqrt{10}}{40} 0 \frac{\sqrt{10}i}{40} 0 0$	
	$0 0 0 0 0 0 0 \frac{i}{5} - \frac{\sqrt{10}}{40} 0 \frac{\sqrt{10}i}{40} 0 0 0 0$	
	$0 0 0 0 - \frac{i}{5} 0 0 0 0 0 \frac{\sqrt{10}i}{40} 0 - \frac{\sqrt{10}}{40} 0 0$	
	$0 0 0 0 0 0 \frac{i}{5} 0 0 0 \frac{\sqrt{10}i}{40} 0 \frac{\sqrt{10}}{40} 0 0 0$	
	$0 0 \frac{\sqrt{6}i}{10} 0 0 - \frac{1}{40} 0 - \frac{i}{40} 0 0 0 0 0 0 0 0$	
	$0 0 0 - \frac{\sqrt{6}i}{10} \frac{1}{40} 0 - \frac{i}{40} 0 0 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{6}i}{10} 0 0 0 0 - \frac{i}{40} 0 \frac{1}{40} 0 0 0 0 0 0 0 0 0$	
	$0 - \frac{\sqrt{6}i}{10} 0 0 - \frac{i}{40} 0 - \frac{1}{40} 0 0 0 0 0 0 0 0 0 0$	
	$0 - \frac{3\sqrt{2}}{40} 0 - \frac{3\sqrt{2}i}{40} 0 0 0 0 0 0 0 0 0 0 0 0 0$	
	$\frac{3\sqrt{2}}{40} 0 - \frac{3\sqrt{2}i}{40} 0 0 0 0 0 0 0 0 0 0 0 0 0$	
668	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,0;a)}(B_{1u})$	$0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad -\frac{\sqrt{70}}{560} \quad \frac{\sqrt{105}i}{70} \quad 0$	
	$\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{70}$	
	$0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad 0$	
	$-\frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{40} \quad 0 \quad \frac{\sqrt{7}}{20} \quad \frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{105}i}{280}$	
	$0 \quad -\frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{40} \quad 0 \quad -\frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{105}i}{280} \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280}$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}i}{280} \quad \frac{\sqrt{7}}{40} \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{280} \quad -\frac{3\sqrt{105}}{280} \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{14}i}{80} \quad 0 \quad \frac{3\sqrt{14}}{80} \quad -\frac{\sqrt{21}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad 0$	
	$\frac{3\sqrt{14}i}{80} \quad 0 \quad -\frac{3\sqrt{14}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{35} \quad 0 \quad 0 \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad \frac{3\sqrt{210}}{560} \quad 0 \quad 0 \quad 0$	
669	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{G}_4^{(1,0;a)}(B_{2u})$	$0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad 0$	
	$\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad \frac{\sqrt{70}}{560} \quad -\frac{\sqrt{105}i}{70} \quad 0$	
	$\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{70}$	
	$0 \quad 0 \quad -\frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{20} \quad 0 \quad \frac{\sqrt{7}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280}$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}i}{280} \quad -\frac{\sqrt{7}}{20} \quad 0 \quad \frac{\sqrt{7}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{280} \quad -\frac{3\sqrt{105}}{280} \quad 0$	
	$\frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad \frac{\sqrt{7}}{40} \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}i}{280}$	
	$0 \quad -\frac{3\sqrt{42}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}i}{280}$	
	$0 \quad \frac{3\sqrt{14}}{80} \quad 0 \quad -\frac{3\sqrt{14}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{35} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad 0$	
	$-\frac{3\sqrt{14}}{80} \quad 0 \quad -\frac{3\sqrt{14}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{35} \quad \frac{3\sqrt{210}}{560} \quad 0 \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0$	
670	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad -\frac{\sqrt{6}i}{160} \quad 0 \quad 0 \quad \frac{1}{40} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{40}$
	$\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{160} \quad -\frac{1}{40} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad -\frac{\sqrt{15}}{40} \quad 0$
	$\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3i}{20} \quad 0 \quad -\frac{1}{40} \quad \frac{\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{20}$
	$0 \quad -\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad -\frac{3i}{20} \quad 0 \quad \frac{1}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{20} \quad 0$
	$0 \quad \frac{\sqrt{6}}{160}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad \frac{i}{40} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{160} \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{160}$	$0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{40} \quad -\frac{\sqrt{10}}{160} \quad 0 \quad -\frac{3\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0$
	$0 \quad \frac{\sqrt{6}i}{20}$	$0 \quad \frac{\sqrt{6}}{32} \quad -\frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{160} \quad \frac{\sqrt{15}i}{80} \quad 0$
	$\frac{\sqrt{6}i}{20}$	$0 \quad -\frac{\sqrt{6}}{32} \quad 0 \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{80}$
	$0 \quad 0 \quad -\frac{9\sqrt{2}i}{160}$	$0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{2}i}{160}$	$\frac{\sqrt{3}}{20} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0$
671	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{40} \quad 0 \quad \frac{1}{10} \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{40}$
	$0 \quad -\frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad -\frac{i}{40} \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{40} \quad 0$
	$0 \quad 0 \quad \frac{\sqrt{6}i}{160}$	$0 \quad 0 \quad -\frac{3}{20} \quad 0 \quad \frac{i}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{20}$
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{160}$	$\frac{3}{20} \quad 0 \quad \frac{i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{160} \quad -\frac{\sqrt{10}}{20} \quad -\frac{\sqrt{15}}{20} \quad 0$
	$0 \quad \frac{\sqrt{6}i}{32}$	$0 \quad \frac{\sqrt{6}}{20} \quad -\frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{160} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad -\frac{\sqrt{15}i}{80} \quad 0$
	$\frac{\sqrt{6}i}{32}$	$0 \quad -\frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{160} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{80}$
	$0 \quad -\frac{\sqrt{6}}{40}$	$0 \quad \frac{\sqrt{6}i}{160} \quad 0 \quad 0 \quad -\frac{i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{160} \quad 0 \quad 0$
	$\frac{\sqrt{6}}{40}$	$0 \quad \frac{\sqrt{6}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{40} \quad -\frac{3\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0$
	$-\frac{9\sqrt{2}i}{160}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad -\frac{\sqrt{3}}{10} \quad \frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad \frac{9\sqrt{2}i}{160}$	$0 \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
672	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 $-\frac{\sqrt{42}i}{1120}$ 0 0 $-\frac{\sqrt{7}}{40}$ 0 $\frac{3\sqrt{7}i}{70}$ 0 0 $-\frac{19\sqrt{70}i}{1120}$ 0 0 $\frac{\sqrt{105}}{56}$	
	0 0 0 $\frac{\sqrt{42}i}{1120}$ $\frac{\sqrt{7}}{40}$ 0 $\frac{3\sqrt{7}i}{70}$ 0 0 0 0 $\frac{19\sqrt{70}i}{1120}$ $-\frac{\sqrt{105}}{56}$ 0	
	$\frac{\sqrt{42}i}{1120}$ 0 0 0 0 $\frac{\sqrt{7}i}{140}$ 0 $\frac{\sqrt{7}}{40}$ $-\frac{23\sqrt{70}i}{1120}$ 0 0 0 0 $\frac{\sqrt{105}i}{140}$	
	0 $-\frac{\sqrt{42}i}{1120}$ 0 0 0 $\frac{\sqrt{7}i}{140}$ 0 $-\frac{\sqrt{7}}{40}$ 0 0 $\frac{23\sqrt{70}i}{1120}$ 0 0 $\frac{\sqrt{105}i}{140}$ 0	
	0 $\frac{29\sqrt{42}}{1120}$ 0 $-\frac{\sqrt{42}i}{140}$ 0 0 $\frac{\sqrt{7}i}{40}$ 0 0 $\frac{\sqrt{70}}{224}$ 0 $-\frac{\sqrt{70}i}{140}$ 0 0	
	$-\frac{29\sqrt{42}}{1120}$ 0 $-\frac{\sqrt{42}i}{140}$ 0 0 0 0 $-\frac{\sqrt{7}i}{40}$ $-\frac{\sqrt{70}}{224}$ 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{1120}$ $\frac{\sqrt{7}i}{80}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $-\frac{\sqrt{70}}{224}$ $\frac{\sqrt{105}i}{560}$ 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{1120}$ 0 0 $-\frac{\sqrt{7}i}{80}$ 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{224}$ 0 0 $-\frac{\sqrt{105}i}{560}$	
	0 0 $\frac{9\sqrt{14}i}{160}$ 0 0 $-\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{70}$ 0 0 $-\frac{\sqrt{210}i}{1120}$ 0 0 0	
	0 0 0 $-\frac{9\sqrt{14}i}{160}$ $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{70}$ 0 0 0 $\frac{\sqrt{210}i}{1120}$ 0 0 0	
673 symmetry	$\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$	
	$\frac{\sqrt{42}i}{1120}$ 0 0 0 0 $\frac{\sqrt{7}i}{40}$ 0 $\frac{3\sqrt{7}}{70}$ $-\frac{19\sqrt{70}i}{1120}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$	
	0 $-\frac{\sqrt{42}i}{1120}$ 0 0 $\frac{\sqrt{7}i}{40}$ 0 $-\frac{3\sqrt{7}}{70}$ 0 0 $\frac{19\sqrt{70}i}{1120}$ 0 0 0 $\frac{\sqrt{105}i}{56}$ 0	
	0 0 $\frac{\sqrt{42}i}{1120}$ 0 0 $\frac{\sqrt{7}}{140}$ 0 $-\frac{\sqrt{7}i}{40}$ 0 0 $\frac{23\sqrt{70}i}{1120}$ 0 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $-\frac{\sqrt{42}i}{1120}$ $-\frac{\sqrt{7}}{140}$ 0 $-\frac{\sqrt{7}i}{40}$ 0 0 0 0 $-\frac{23\sqrt{70}i}{1120}$ $\frac{\sqrt{105}}{140}$ 0	
	0 $\frac{\sqrt{42}i}{1120}$ 0 $-\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{80}$ 0 0 0 0 $\frac{\sqrt{70}i}{224}$ 0 $-\frac{3\sqrt{70}}{280}$ $-\frac{\sqrt{105}i}{560}$ 0	
	$\frac{\sqrt{42}i}{1120}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{80}$ 0 0 $\frac{\sqrt{70}i}{224}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 $\frac{\sqrt{105}i}{560}$	
	0 $-\frac{\sqrt{42}}{140}$ 0 $\frac{29\sqrt{42}i}{1120}$ 0 0 $-\frac{\sqrt{7}i}{40}$ 0 0 $\frac{\sqrt{70}}{140}$ 0 $-\frac{\sqrt{70}i}{224}$ 0 0 0	
	$\frac{\sqrt{42}}{140}$ 0 $\frac{29\sqrt{42}i}{1120}$ 0 0 0 0 $\frac{\sqrt{7}i}{40}$ $-\frac{\sqrt{70}}{140}$ 0 $-\frac{\sqrt{70}i}{224}$ 0 0 0	
	$\frac{9\sqrt{14}i}{160}$ 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{70}$ $\frac{\sqrt{210}i}{1120}$ 0 0 0 0 0	
674 symmetry	1	
	<i>continued ...</i>	

Table 9

No.	multipole	matrix
$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	0	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}i}{70} \end{bmatrix}$
	675	$\text{symmetry } -\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 \\ -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & -\frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & \frac{\sqrt{210}}{140} & \frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{35} \end{bmatrix}$
	676	$\text{symmetry } \frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(1,1;a)}(B_{1u})$	0	$\frac{\sqrt{14}i}{168} \quad 0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad -\frac{\sqrt{210}}{120} \quad -\frac{\sqrt{35}i}{42} \quad 0$
	$\frac{\sqrt{14}i}{168}$	$0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42}$
	0	$\frac{\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{14}}{168}$	$0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	$\frac{5\sqrt{14}i}{168}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{21}}{28} \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420}$
	0	$-\frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420} \quad 0$
	0	$0 \quad 0 \quad \frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{420}$
	0	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{168} \quad -\frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad -\frac{\sqrt{35}}{420} \quad 0$
	0	$0 \quad -\frac{5\sqrt{42}i}{168} \quad 0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$
677 symmetry	$\sqrt{3}xy$	
	0	$\frac{\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad 0 \quad 0$
	$-\frac{\sqrt{14}}{168}$	$0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad -\frac{\sqrt{210}}{120} \quad -\frac{\sqrt{35}i}{42} \quad 0$
	$-\frac{\sqrt{14}i}{168}$	$0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42}$
	0	$0 \quad 0 \quad \frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{420}$
	0	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{168} \quad \frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad \frac{\sqrt{35}}{420} \quad 0$
	$-\frac{5\sqrt{14}i}{168}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{42} \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420}$
	0	$\frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420} \quad 0$
678 symmetry	$\sqrt{3}yz$	
	continued ...	

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,1;a)}(E_u)$	0 0 $-\frac{\sqrt{14}i}{42}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0 $\frac{\sqrt{35}}{42}$	
	0 0 0 $\frac{\sqrt{14}i}{42}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{105}$ $-\frac{\sqrt{35}}{42}$ 0	
	$\frac{\sqrt{14}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ $\frac{\sqrt{210}i}{105}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$	
	0 $-\frac{\sqrt{14}i}{42}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{210}}{120}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0	
	$\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{210}}{120}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{280}$ $\frac{\sqrt{35}i}{105}$ 0	
	$-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{280}$ 0 0 $-\frac{\sqrt{35}i}{105}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 $-\frac{\sqrt{105}i}{105}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ $\frac{\sqrt{105}}{105}$ 0	
679	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,2}^{(1,1;a)}(E_u)$	$\frac{\sqrt{14}i}{42}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0 0 0 $\frac{\sqrt{35}i}{42}$	
	0 $-\frac{\sqrt{14}i}{42}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{210}i}{105}$ 0 0 0 $\frac{\sqrt{35}i}{42}$ 0	
	0 0 $\frac{\sqrt{14}i}{42}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0 0 $\frac{\sqrt{35}}{42}$	
	0 0 0 $-\frac{\sqrt{14}i}{42}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{210}i}{105}$ $-\frac{\sqrt{35}}{42}$ 0	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $-\frac{\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{168}$ $-\frac{\sqrt{35}i}{105}$ 0	
	$-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{210}i}{280}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{35}i}{105}$	
	0 $\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{120}$ 0 0 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{120}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 $\frac{\sqrt{105}i}{105}$	
680	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{2\sqrt{165}i}{165} & 0 & \frac{2\sqrt{165}}{165} & \frac{7\sqrt{110}i}{660} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & \frac{\sqrt{11}}{66} & 0 & 0 \\ \frac{2\sqrt{165}i}{165} & 0 & -\frac{2\sqrt{165}}{165} & 0 & 0 & -\frac{7\sqrt{110}i}{660} & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 \\ 0 & \frac{7\sqrt{165}}{660} & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & -\frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 \\ -\frac{7\sqrt{165}}{660} & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{330} & \frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{165} & 0 & -\frac{\sqrt{110}}{330} & -\frac{5\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} \\ 0 & -\frac{\sqrt{165}i}{220} & 0 & 0 & -\frac{\sqrt{110}i}{165} & 0 & \frac{\sqrt{110}}{330} & 0 & 0 & \frac{5\sqrt{11}i}{132} & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 \\ 0 & 0 & -\frac{\sqrt{165}i}{220} & 0 & 0 & \frac{\sqrt{110}}{165} & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & -\frac{5\sqrt{11}i}{132} & 0 & 0 & \frac{\sqrt{66}}{66} \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{220} & -\frac{\sqrt{110}}{165} & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}i}{132} & -\frac{\sqrt{66}}{66} & 0 \\ 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & \frac{5\sqrt{22}i}{132} & 0 \\ -\frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & -\frac{5\sqrt{22}i}{132} \end{bmatrix}$	
	$681 \quad \text{symmetry}$	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
	$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & -\frac{5\sqrt{231}i}{462} & 0 & -\frac{5\sqrt{231}}{462} & -\frac{19\sqrt{154}i}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{1155} & 0 & \frac{\sqrt{385}}{1155} & 0 & 0 \\ -\frac{5\sqrt{231}i}{462} & 0 & \frac{5\sqrt{231}}{462} & 0 & 0 & \frac{19\sqrt{154}i}{4620} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{1155} & 0 & -\frac{\sqrt{385}}{1155} & 0 & 0 \\ 0 & -\frac{\sqrt{231}}{84} & 0 & \frac{\sqrt{231}i}{84} & 0 & 0 & \frac{\sqrt{154}i}{105} & 0 & 0 & -\frac{\sqrt{385}}{420} & 0 & -\frac{\sqrt{385}i}{420} & 0 & 0 \\ \frac{\sqrt{231}}{84} & 0 & \frac{\sqrt{231}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{105} & \frac{\sqrt{385}}{420} & 0 & -\frac{\sqrt{385}i}{420} & 0 & 0 & 0 \\ -\frac{\sqrt{231}i}{220} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}i}{1155} & 0 & -\frac{\sqrt{154}}{210} & -\frac{5\sqrt{385}i}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{462} \\ 0 & \frac{\sqrt{231}i}{220} & 0 & 0 & -\frac{2\sqrt{154}i}{1155} & 0 & \frac{\sqrt{154}}{210} & 0 & 0 & \frac{5\sqrt{385}i}{924} & 0 & 0 & \frac{\sqrt{2310}i}{462} & 0 \\ 0 & 0 & \frac{\sqrt{231}i}{220} & 0 & 0 & \frac{2\sqrt{154}}{1155} & 0 & -\frac{\sqrt{154}i}{210} & 0 & 0 & -\frac{5\sqrt{385}i}{924} & 0 & 0 & \frac{\sqrt{2310}}{462} \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{220} & -\frac{2\sqrt{154}}{1155} & 0 & -\frac{\sqrt{154}i}{210} & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}i}{924} & -\frac{\sqrt{2310}}{462} & 0 \\ 0 & \frac{\sqrt{77}i}{660} & 0 & -\frac{\sqrt{77}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{308} & 0 & \frac{\sqrt{1155}}{308} & \frac{5\sqrt{770}i}{924} & 0 \\ \frac{\sqrt{77}i}{660} & 0 & \frac{\sqrt{77}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{308} & 0 & -\frac{\sqrt{1155}}{308} & 0 & 0 & -\frac{5\sqrt{770}i}{924} \end{bmatrix}$
682	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{2u})$	0	$-\frac{3\sqrt{11}}{44}$ 0 $\frac{3\sqrt{11}i}{44}$ 0 0 0 $\frac{3\sqrt{66}i}{220}$ 0 0 $-\frac{\sqrt{165}}{660}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0
	$\frac{3\sqrt{11}}{44}$	0 $\frac{3\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{3\sqrt{66}i}{220}$ $\frac{\sqrt{165}}{660}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0 0
	0	$\frac{3\sqrt{11}i}{44}$ 0 $\frac{3\sqrt{11}}{44}$ $\frac{3\sqrt{66}i}{220}$ 0 0 0 0 $-\frac{\sqrt{165}i}{660}$ 0 $\frac{\sqrt{165}}{660}$ 0 0
	$\frac{3\sqrt{11}i}{44}$	0 $-\frac{3\sqrt{11}}{44}$ 0 0 0 $-\frac{3\sqrt{66}i}{220}$ 0 0 $-\frac{\sqrt{165}i}{660}$ 0 $-\frac{\sqrt{165}}{660}$ 0 0
	0	0 $\frac{3\sqrt{11}i}{110}$ 0 0 0 $-\frac{\sqrt{66}}{330}$ 0 $-\frac{\sqrt{66}i}{330}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{3\sqrt{11}i}{110}$ $\frac{\sqrt{66}}{330}$ 0 $-\frac{\sqrt{66}i}{330}$ 0 0 0 0 0 0 0
	$\frac{3\sqrt{11}i}{110}$	0 0 0 0 0 $-\frac{\sqrt{66}i}{330}$ 0 $\frac{\sqrt{66}}{330}$ 0 0 0 0 0 0
	0	$-\frac{3\sqrt{11}i}{110}$ 0 0 $-\frac{\sqrt{66}i}{330}$ 0 $-\frac{\sqrt{66}}{330}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{33}}{330}$ 0 $-\frac{\sqrt{33}i}{330}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{33}}{330}$	0 $-\frac{\sqrt{33}i}{330}$ 0 0 0 0 0 0 0 0 0 0 0
683	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{G}_4^{(1,1;a)}(B_{1u})$	0	$\frac{\sqrt{77}i}{1540}$ 0 $-\frac{\sqrt{77}}{1540}$ 0 0 0 0 0 $-\frac{17\sqrt{1155}i}{4620}$ 0 $-\frac{17\sqrt{1155}}{4620}$ $-\frac{\sqrt{770}i}{220}$ 0
	$\frac{\sqrt{77}i}{1540}$	0 $\frac{\sqrt{77}}{1540}$ 0 0 0 0 0 $-\frac{17\sqrt{1155}i}{4620}$ 0 $\frac{17\sqrt{1155}}{4620}$ 0 0 $\frac{\sqrt{770}i}{220}$
	0	$\frac{\sqrt{77}}{1540}$ 0 $\frac{\sqrt{77}i}{1540}$ 0 0 0 0 0 $-\frac{\sqrt{1155}}{420}$ 0 $\frac{\sqrt{1155}i}{420}$ 0 0
	$-\frac{\sqrt{77}}{1540}$	0 $\frac{\sqrt{77}i}{1540}$ 0 0 0 0 0 $\frac{\sqrt{1155}}{420}$ 0 $\frac{\sqrt{1155}i}{420}$ 0 0 0
	$\frac{\sqrt{77}i}{220}$	0 0 0 0 $-\frac{17\sqrt{462}i}{2310}$ 0 $-\frac{\sqrt{462}}{210}$ $-\frac{\sqrt{1155}i}{220}$ 0 0 0 0 $\frac{\sqrt{770}i}{385}$
	0	$-\frac{\sqrt{77}i}{220}$ 0 0 $-\frac{17\sqrt{462}i}{2310}$ 0 $\frac{\sqrt{462}}{210}$ 0 0 $\frac{\sqrt{1155}i}{220}$ 0 0 $\frac{\sqrt{770}i}{385}$ 0
	0	0 $\frac{\sqrt{77}i}{220}$ 0 0 $-\frac{17\sqrt{462}}{2310}$ 0 $\frac{\sqrt{462}i}{210}$ 0 0 $-\frac{\sqrt{1155}i}{220}$ 0 0 $-\frac{\sqrt{770}}{385}$
	0	0 0 0 $-\frac{\sqrt{77}i}{220}$ $\frac{17\sqrt{462}}{2310}$ 0 $\frac{\sqrt{462}i}{210}$ 0 0 0 0 $-\frac{\sqrt{1155}i}{220}$ $\frac{\sqrt{770}}{385}$ 0
	0	$-\frac{\sqrt{231}i}{165}$ 0 $-\frac{\sqrt{231}}{165}$ $-\frac{3\sqrt{154}i}{220}$ 0 0 0 0 $\frac{3\sqrt{385}i}{770}$ 0 $-\frac{3\sqrt{385}}{770}$ 0 0
	$-\frac{\sqrt{231}i}{165}$	0 $\frac{\sqrt{231}}{165}$ 0 0 $\frac{3\sqrt{154}i}{220}$ 0 0 $\frac{3\sqrt{385}i}{770}$ 0 $\frac{3\sqrt{385}}{770}$ 0 0 0
684	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(B_{2u})$	$0 - \frac{\sqrt{77}}{1540} 0 - \frac{\sqrt{77}i}{1540} 0 0 0 0 0 0 - \frac{\sqrt{1155}}{420} 0 \frac{\sqrt{1155}i}{420} 0 0$	
	$\frac{\sqrt{77}}{1540} 0 - \frac{\sqrt{77}i}{1540} 0 0 0 0 0 0 \frac{\sqrt{1155}}{420} 0 \frac{\sqrt{1155}i}{420} 0 0 0$	
	$0 \frac{\sqrt{77}i}{1540} 0 - \frac{\sqrt{77}}{1540} 0 0 0 0 0 0 \frac{17\sqrt{1155}i}{4620} 0 \frac{17\sqrt{1155}}{4620} \frac{\sqrt{770}i}{220} 0$	
	$\frac{\sqrt{77}i}{1540} 0 \frac{\sqrt{77}}{1540} 0 0 0 0 0 0 \frac{17\sqrt{1155}i}{4620} 0 - \frac{17\sqrt{1155}}{4620} 0 0 - \frac{\sqrt{770}i}{220}$	
	$0 0 - \frac{\sqrt{77}i}{220} 0 0 - \frac{\sqrt{462}}{210} 0 \frac{17\sqrt{462}i}{2310} 0 0 \frac{\sqrt{1155}i}{220} 0 0 - \frac{\sqrt{1155}i}{220} \frac{\sqrt{770}}{385}$	
	$0 0 0 \frac{\sqrt{77}i}{220} \frac{\sqrt{462}}{210} 0 \frac{17\sqrt{462}i}{2310} 0 0 0 0 - \frac{\sqrt{1155}i}{220} \frac{\sqrt{770}}{385} 0$	
	$\frac{\sqrt{77}i}{220} 0 0 0 0 \frac{\sqrt{462}i}{210} 0 \frac{17\sqrt{462}}{2310} \frac{\sqrt{1155}i}{220} 0 0 0 0 0 - \frac{\sqrt{770}i}{385}$	
	$0 - \frac{\sqrt{77}i}{220} 0 0 \frac{\sqrt{462}i}{210} 0 - \frac{17\sqrt{462}}{2310} 0 0 - \frac{\sqrt{1155}i}{220} 0 0 0 - \frac{\sqrt{770}i}{385} 0$	
	$0 - \frac{\sqrt{231}}{165} 0 \frac{\sqrt{231}i}{165} 0 0 \frac{3\sqrt{154}i}{220} 0 0 - \frac{3\sqrt{385}}{770} 0 - \frac{3\sqrt{385}i}{770} 0 0 0$	
	$\frac{\sqrt{231}}{165} 0 \frac{\sqrt{231}i}{165} 0 0 0 0 - \frac{3\sqrt{154}i}{220} \frac{3\sqrt{385}}{770} 0 - \frac{3\sqrt{385}i}{770} 0 0 0 0$	
685	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 1)$	$0 0 - \frac{\sqrt{11}i}{220} 0 0 \frac{7\sqrt{66}}{660} 0 - \frac{3\sqrt{66}i}{440} 0 0 - \frac{\sqrt{165}i}{132} 0 0 \frac{\sqrt{110}}{110}$	
	$0 0 0 \frac{\sqrt{11}i}{220} - \frac{7\sqrt{66}}{660} 0 - \frac{3\sqrt{66}i}{440} 0 0 0 0 \frac{\sqrt{165}i}{132} - \frac{\sqrt{110}}{110} 0$	
	$\frac{\sqrt{11}i}{220} 0 0 0 0 - \frac{3\sqrt{66}i}{440} 0 - \frac{\sqrt{66}}{330} \frac{\sqrt{165}i}{660} 0 0 0 0 0 - \frac{3\sqrt{110}i}{440}$	
	$0 - \frac{\sqrt{11}i}{220} 0 0 - \frac{3\sqrt{66}i}{440} 0 \frac{\sqrt{66}}{330} 0 0 - \frac{\sqrt{165}i}{660} 0 0 0 - \frac{3\sqrt{110}i}{440} 0$	
	$0 \frac{\sqrt{11}}{220} 0 - \frac{3\sqrt{11}i}{440} 0 0 \frac{\sqrt{66}i}{330} 0 0 \frac{\sqrt{165}}{660} 0 - \frac{3\sqrt{165}i}{440} 0 0 0$	
	$-\frac{\sqrt{11}}{220} 0 - \frac{3\sqrt{11}i}{440} 0 0 0 0 - \frac{\sqrt{66}i}{330} - \frac{\sqrt{165}}{660} 0 - \frac{3\sqrt{165}i}{440} 0 0 0 0$	
	$0 - \frac{9\sqrt{11}i}{440} 0 - \frac{\sqrt{11}}{44} - \frac{\sqrt{66}i}{66} 0 0 0 0 - \frac{3\sqrt{165}i}{440} 0 - \frac{\sqrt{165}}{60} - \frac{\sqrt{110}i}{55} 0$	
	$-\frac{9\sqrt{11}i}{440} 0 \frac{\sqrt{11}}{44} 0 0 \frac{\sqrt{66}i}{66} 0 0 - \frac{3\sqrt{165}i}{440} 0 \frac{\sqrt{165}}{60} 0 0 \frac{\sqrt{110}i}{55}$	
	$0 0 - \frac{\sqrt{33}i}{165} 0 0 \frac{3\sqrt{22}}{110} 0 - \frac{9\sqrt{22}i}{440} 0 0 - \frac{3\sqrt{55}i}{110} 0 0 \frac{\sqrt{330}}{132}$	
	$0 0 0 \frac{\sqrt{33}i}{165} - \frac{3\sqrt{22}}{110} 0 - \frac{9\sqrt{22}i}{440} 0 0 0 0 \frac{3\sqrt{55}i}{110} - \frac{\sqrt{330}}{132} 0$	
686	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 1)$	$\frac{\sqrt{11}i}{220}$	0 0 0 0 0 $-\frac{7\sqrt{66}i}{660}$ 0 $-\frac{3\sqrt{66}}{440}$ $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 $\frac{\sqrt{110}i}{110}$
	0	$-\frac{\sqrt{11}i}{220}$ 0 0 $-\frac{7\sqrt{66}i}{660}$ 0 $\frac{3\sqrt{66}}{440}$ 0 0 $\frac{\sqrt{165}i}{132}$ 0 0 $\frac{\sqrt{110}i}{110}$ 0
	0	0 $\frac{\sqrt{11}i}{220}$ 0 0 $-\frac{3\sqrt{66}}{440}$ 0 $\frac{\sqrt{66}i}{330}$ 0 0 $-\frac{\sqrt{165}i}{660}$ 0 0 $\frac{3\sqrt{110}}{440}$
	0	0 0 0 $-\frac{\sqrt{11}i}{220}$ $\frac{3\sqrt{66}}{440}$ 0 $\frac{\sqrt{66}i}{330}$ 0 0 0 $\frac{\sqrt{165}i}{660}$ $-\frac{3\sqrt{110}}{440}$ 0
	0	$-\frac{\sqrt{11}i}{44}$ 0 $-\frac{9\sqrt{11}}{440}$ $-\frac{\sqrt{66}i}{66}$ 0 0 0 0 $\frac{\sqrt{165}i}{60}$ 0 $\frac{3\sqrt{165}}{440}$ $\frac{\sqrt{110}i}{55}$ 0
	$-\frac{\sqrt{11}i}{44}$	0 $\frac{9\sqrt{11}}{440}$ 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{165}i}{60}$ 0 $-\frac{3\sqrt{165}}{440}$ 0 0 $-\frac{\sqrt{110}i}{55}$
	0	$-\frac{3\sqrt{11}}{440}$ 0 $\frac{\sqrt{11}i}{220}$ 0 0 $-\frac{\sqrt{66}i}{330}$ 0 0 $\frac{3\sqrt{165}}{440}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0
	$\frac{3\sqrt{11}}{440}$	0 $\frac{\sqrt{11}i}{220}$ 0 0 0 0 $\frac{\sqrt{66}i}{330}$ $-\frac{3\sqrt{165}}{440}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0 0
	$-\frac{\sqrt{33}i}{165}$	0 0 0 0 $\frac{3\sqrt{22}i}{110}$ 0 $\frac{9\sqrt{22}}{440}$ $\frac{3\sqrt{55}i}{110}$ 0 0 0 0 $-\frac{\sqrt{330}i}{132}$
	0	$\frac{\sqrt{33}i}{165}$ 0 0 $\frac{3\sqrt{22}i}{110}$ 0 $-\frac{9\sqrt{22}}{440}$ 0 0 $-\frac{3\sqrt{55}i}{110}$ 0 0 $-\frac{\sqrt{330}i}{132}$ 0
687	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 2)$	0	0 0 $-\frac{\sqrt{77}i}{1540}$ 0 0 $-\frac{29\sqrt{462}}{4620}$ 0 $\frac{3\sqrt{462}i}{440}$ 0 0 $\frac{\sqrt{1155}i}{420}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{77}i}{1540}$ $\frac{29\sqrt{462}}{4620}$ 0 $\frac{3\sqrt{462}i}{440}$ 0 0 0 0 $-\frac{\sqrt{1155}i}{420}$ 0 0
	$\frac{\sqrt{77}i}{1540}$	0 0 0 0 $\frac{3\sqrt{462}i}{440}$ 0 $\frac{17\sqrt{462}}{2310}$ $\frac{17\sqrt{1155}i}{4620}$ 0 0 0 0 $-\frac{\sqrt{770}i}{440}$
	0	$-\frac{\sqrt{77}i}{1540}$ 0 0 $\frac{3\sqrt{462}i}{440}$ 0 $-\frac{17\sqrt{462}}{2310}$ 0 0 $-\frac{17\sqrt{1155}i}{4620}$ 0 0 0 $-\frac{\sqrt{770}i}{440}$ 0
	0	$-\frac{3\sqrt{77}}{220}$ 0 $\frac{7\sqrt{77}i}{440}$ 0 0 $\frac{17\sqrt{462}i}{2310}$ 0 0 $-\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{440}$ 0 0 0
	$\frac{3\sqrt{77}}{220}$	0 $\frac{7\sqrt{77}i}{440}$ 0 0 0 0 $-\frac{17\sqrt{462}i}{2310}$ $\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{440}$ 0 0 0
	0	$\frac{\sqrt{77}i}{88}$ 0 $\frac{3\sqrt{77}}{220}$ $\frac{\sqrt{462}i}{210}$ 0 0 0 0 $-\frac{\sqrt{1155}i}{440}$ 0 $-\frac{\sqrt{1155}}{924}$ $-\frac{\sqrt{770}i}{385}$ 0
	$\frac{\sqrt{77}i}{88}$	0 $-\frac{3\sqrt{77}}{220}$ 0 0 $-\frac{\sqrt{462}i}{210}$ 0 0 $-\frac{\sqrt{1155}i}{440}$ 0 $\frac{\sqrt{1155}}{924}$ 0 0 $\frac{\sqrt{770}i}{385}$
	0	0 0 $\frac{\sqrt{231}i}{165}$ 0 0 0 0 $-\frac{3\sqrt{154}i}{440}$ 0 0 $-\frac{3\sqrt{385}i}{770}$ 0 0 $\frac{\sqrt{2310}}{924}$
	0	0 0 0 $-\frac{\sqrt{231}i}{165}$ 0 0 $-\frac{3\sqrt{154}i}{440}$ 0 0 0 0 $\frac{3\sqrt{385}i}{770}$ $-\frac{\sqrt{2310}}{924}$ 0
688	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 2)$	$\frac{\sqrt{77}i}{1540}$	0 0 0 0 0 $\frac{29\sqrt{462}i}{4620}$ 0 $\frac{3\sqrt{462}}{440}$ $\frac{\sqrt{1155}i}{420}$ 0 0 0 0 0
	0	$-\frac{\sqrt{77}i}{1540}$ 0 0 0 $\frac{29\sqrt{462}i}{4620}$ 0 $-\frac{3\sqrt{462}}{440}$ 0 0 $-\frac{\sqrt{1155}i}{420}$ 0 0 0 0
	0	0 $\frac{\sqrt{77}i}{1540}$ 0 0 0 $\frac{3\sqrt{462}}{440}$ 0 $-\frac{17\sqrt{462}i}{2310}$ 0 0 $-\frac{17\sqrt{1155}i}{4620}$ 0 0 $\frac{\sqrt{770}}{440}$
	0	0 0 0 $-\frac{\sqrt{77}i}{1540}$ $-\frac{3\sqrt{462}}{440}$ 0 $-\frac{17\sqrt{462}i}{2310}$ 0 0 0 0 $\frac{17\sqrt{1155}i}{4620}$ $-\frac{\sqrt{770}}{440}$ 0
	0	$\frac{3\sqrt{77}i}{220}$ 0 $\frac{\sqrt{77}}{88}$ $\frac{\sqrt{462}i}{210}$ 0 0 0 0 $\frac{\sqrt{1155}i}{924}$ 0 $\frac{\sqrt{1155}}{440}$ $\frac{\sqrt{770}i}{385}$ 0
	$\frac{3\sqrt{77}i}{220}$	0 $-\frac{\sqrt{77}}{88}$ 0 0 0 $-\frac{\sqrt{462}i}{210}$ 0 0 $\frac{\sqrt{1155}i}{924}$ 0 $-\frac{\sqrt{1155}}{440}$ 0 0 $-\frac{\sqrt{770}i}{385}$
	0	$\frac{7\sqrt{77}}{440}$ 0 $-\frac{3\sqrt{77}i}{220}$ 0 0 0 $-\frac{17\sqrt{462}i}{2310}$ 0 0 $\frac{\sqrt{1155}}{440}$ 0 $\frac{\sqrt{1155}i}{924}$ 0 0
	$-\frac{7\sqrt{77}}{440}$	0 $-\frac{3\sqrt{77}i}{220}$ 0 0 0 0 0 $\frac{17\sqrt{462}i}{2310}$ $-\frac{\sqrt{1155}}{440}$ 0 $\frac{\sqrt{1155}i}{924}$ 0 0 0
	$\frac{\sqrt{231}i}{165}$	0 0 0 0 0 0 $\frac{3\sqrt{154}}{440}$ $\frac{3\sqrt{385}i}{770}$ 0 0 0 0 $-\frac{\sqrt{2310}i}{924}$
	0	$-\frac{\sqrt{231}i}{165}$ 0 0 0 0 0 $-\frac{3\sqrt{154}}{440}$ 0 0 $-\frac{3\sqrt{385}i}{770}$ 0 0 $-\frac{\sqrt{2310}i}{924}$ 0
689	symmetry	z
$\mathbb{T}_1^{(a)}(A_{2u})$	0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{35}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{35}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{35}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$	
690	symmetry	x

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(a)}(E_u)$	$\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0
	0 $\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0
	0 0 $\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0
	0 0 0 $\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0
	0 0 0 0 $\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0
	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$
	0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
691	symmetry	y
$\mathbb{T}_{1,2}^{(a)}(E_u)$	0 0 $\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0
	0 0 0 $\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0
	$-\frac{\sqrt{42}i}{28}$ 0 0 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0
	0 $-\frac{\sqrt{42}i}{28}$ 0 0 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0
	0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 $-\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0
	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$
	0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
692	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \end{bmatrix}$
693	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
694	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(B_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
695	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
696	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$	0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 $\frac{11\sqrt{30}i}{240}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 $\frac{11\sqrt{30}i}{240}$ 0 0 0	
	$-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{240}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{240}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{40}$	
	0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0	
	0 0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0	
697	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 0	
698	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(a)}(E_u, 2)$	0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0	
	$-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0	
	0 0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$	
	0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0	
699	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{T}_5^{(a)}(A_{1u})$	0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
700	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$T_5^{(a)}(A_{2u}, 1)$	0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{42}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{42}$	
701	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$T_5^{(a)}(A_{2u}, 2)$	0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
702	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(a)}(B_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$	
	0 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0	
	$-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0	
703 symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
704 symmetry	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 1)$	$\frac{11\sqrt{7}i}{112}$	0 0 0 0 0 0 0 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 0 0 0
	0	$\frac{11\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 0 0
	0	0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0
	0	0 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0
	0	0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0
	0	0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$
	0	0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{21}i}{48}$	0 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{112}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{21}i}{48}$ 0 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{112}$ 0 0 0 0
705	symmetry	$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 1)$	0 0 $\frac{11\sqrt{7}i}{112}$ 0 0 0 0 0 0 $\frac{5\sqrt{105}i}{336}$ 0 0 0	
	0 0 0 $\frac{11\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{105}i}{336}$ 0 0 0	
	$\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0	
	0 $\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0	
	0 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$	
	0 0 $\frac{\sqrt{21}i}{48}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{112}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{21}i}{48}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{112}$ 0 0 0	
706	symmetry	$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 2)$	$\frac{3\sqrt{5}i}{80}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{16}$ 0 0 0 0 0
	0	$\frac{3\sqrt{5}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{16}$ 0 0 0 0 0
	0	0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{30}i}{40}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{30}i}{40}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0
	$\frac{3\sqrt{15}i}{80}$	0 0 0 0 0 0 0 0 $\frac{3i}{16}$ 0 0 0 0 0
	0	$\frac{3\sqrt{15}i}{80}$ 0 0 0 0 0 0 0 $\frac{3i}{16}$ 0 0 0 0 0
707	symmetry	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 2)$	0 0 $\frac{3\sqrt{5}i}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{16}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{5}i}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{16}$ 0 0 0	
	$\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0 0 0 0 0	
	0 $\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{30}i}{40}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{30}i}{40}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$	
	0 0 $-\frac{3\sqrt{15}i}{80}$ 0 0 0 0 0 0 0 $\frac{3i}{16}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{15}i}{80}$ 0 0 0 0 0 0 0 $\frac{3i}{16}$ 0 0 0	
708	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$

continued ..

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 3)$	$-\frac{7\sqrt{15}i}{120}$	$0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{7\sqrt{15}i}{120}$ $0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{15}i}{15} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{15} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{6}i}{12} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{6}i}{12} \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	$-\frac{\sqrt{5}i}{40}$	$0 \quad 0 \quad \frac{\sqrt{3}i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{3}i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
709	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 3)$	0	$0 \quad 0 \quad -\frac{7\sqrt{15}i}{120} \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{7\sqrt{15}i}{120} \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{15}i}{15}$	$0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{15}i}{15} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{6}i}{12} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{6}i}{12}$
	0	$0 \quad 0 \quad \frac{\sqrt{5}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{40} \quad 0 \quad \frac{\sqrt{3}i}{8} \quad 0 \quad 0 \quad 0 \quad 0$
710	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(A_{2u})$		$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{\sqrt{70}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 \end{bmatrix}$
		711 symmetry
		$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{42}}{84} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
		712 symmetry
		$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(B_{2u})$	0	$-\frac{\sqrt{105}i}{84}$
	$\frac{\sqrt{105}i}{84}$	0
	0	$\frac{\sqrt{105}}{84}$
	$-\frac{\sqrt{105}}{84}$	0
	0	$-\frac{\sqrt{105}i}{84}$
	$-\frac{\sqrt{105}}{84}$	0
	0	$-\frac{\sqrt{105}}{84}$
	$\frac{\sqrt{105}}{84}$	0
	0	$\frac{\sqrt{105}}{84}$
	0	0
713	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 1)$	0	$-\frac{\sqrt{7}}{28}$
	0	0
	$\frac{\sqrt{7}}{28}$	0
	0	0
	$\frac{\sqrt{7}}{28}$	0
	0	$-\frac{\sqrt{7}i}{28}$
	$\frac{\sqrt{7}i}{28}$	0
	$-\frac{\sqrt{7}i}{28}$	0
	0	$-\frac{3\sqrt{7}}{56}$
	$\frac{3\sqrt{7}}{56}$	0
714	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} \\ 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & \frac{3\sqrt{70}i}{280} & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & \frac{\sqrt{70}}{70} & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{280} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{280} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
715	symmetry	$\begin{bmatrix} & & & & & & & \frac{\sqrt{15}x(y-z)(y+z)}{2} & & & & & & \\ & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{84} & 0 \\ & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} \\ & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} \\ & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 \\ & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 \\ & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{42} & 0 \\ & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{42} \\ & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
716	symmetry	$\begin{bmatrix} & & & & & & & \frac{\sqrt{15}y(x-z)(x+z)}{2} & & & & & & \\ & & & & & & & & & & & & & & \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 2)$	$\frac{\sqrt{105}}{84}$	0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 $\frac{\sqrt{42}}{84}$
	0	$-\frac{\sqrt{105}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 $\frac{\sqrt{42}}{84}$ 0
	0	0 0 $\frac{\sqrt{105}}{84}$ 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 $\frac{\sqrt{42}i}{168}$
	0	0 0 0 $-\frac{\sqrt{105}}{84}$ $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ $-\frac{\sqrt{42}i}{168}$ 0
	0	$\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{56}$ $\frac{\sqrt{42}}{42}$ 0
	$\frac{\sqrt{105}}{84}$	0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{42}}{42}$
	0	$-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 0
	$\frac{\sqrt{105}i}{168}$	0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0
717	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{T}_5^{(1,-1;a)}(A_{1u})$	0	0 0 0 0 $-\frac{1}{10}$ 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0
	0	0 0 0 0 0 $\frac{1}{10}$ 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0
	0	0 0 0 0 0 0 $\frac{1}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0
	0	0 0 0 0 0 0 0 $-\frac{1}{10}$ $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0
	$\frac{\sqrt{6}}{20}$	0 0 0 0 0 0 $\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{6}}{20}$ 0 0 $\frac{1}{20}$ 0 $-\frac{i}{20}$ 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{6}}{20}$ 0 0 $\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{6}}{20}$ $-\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{2}}{20}$ 0 $\frac{3\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0
718	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 1)$	0	$\frac{\sqrt{210}i}{420}$ 0 $\frac{\sqrt{210}}{420}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}}{42}$ 0 0
	$-\frac{\sqrt{210}i}{420}$	0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}}{42}$ 0 0 0
	0	$-\frac{\sqrt{210}}{420}$ 0 $\frac{\sqrt{210}i}{420}$ $\frac{\sqrt{35}}{42}$ 0 0 0 0 $\frac{\sqrt{14}}{42}$ 0 $\frac{\sqrt{14}i}{42}$ 0 0
	$-\frac{\sqrt{210}}{420}$	0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}}{42}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 0 $\frac{5\sqrt{14}}{84}$ 0 0 $-\frac{\sqrt{21}i}{42}$
	0	0 0 0 0 0 $\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 0 0 $-\frac{5\sqrt{14}}{84}$ $\frac{\sqrt{21}i}{42}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{35}}{60}$ 0 $-\frac{\sqrt{35}i}{60}$ $-\frac{5\sqrt{14}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 0 0 $\frac{\sqrt{35}}{60}$ 0 $\frac{\sqrt{35}i}{60}$ 0 0 0 $\frac{5\sqrt{14}}{84}$ 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
719	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 2)$	0	0 0 0 0 0 0 $\frac{1}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0
	0	0 0 0 0 0 0 0 $-\frac{1}{10}$ $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0
	0	0 0 0 0 $\frac{1}{10}$ 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0
	0	0 0 0 0 0 $-\frac{1}{10}$ 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0
	0	0 0 $-\frac{\sqrt{6}}{20}$ 0 0 $\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{6}}{20}$ $-\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{6}}{20}$	0 0 0 0 $-\frac{1}{20}$ 0 $-\frac{i}{20}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{6}}{20}$ 0 0 $-\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{2}i}{20}$ 0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{2}i}{20}$	0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
720	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,-1;a)}(B_{1u})$	0	$-\frac{\sqrt{2}}{40} \quad 0 \quad -\frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad \frac{\sqrt{5}}{10} \quad 0$
	$-\frac{\sqrt{2}}{40}$	$0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{10}$
	0	$\frac{\sqrt{2}i}{40} \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{2}i}{40}$	$0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{2}}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad \frac{\sqrt{3}i}{20} \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20}$
	0	$-\frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad \frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{20}$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{40} \quad \frac{\sqrt{3}i}{15} \quad 0 \quad \frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad -\frac{\sqrt{5}i}{20} \quad 0 \quad 0$
	0	$\frac{\sqrt{6}}{40} \quad 0 \quad -\frac{\sqrt{6}i}{40} \quad -\frac{1}{5} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{6}}{40}$	$0 \quad \frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad \frac{1}{5} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0$
721	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{T}_5^{(1,-1;a)}(B_{2u})$	0	$\frac{\sqrt{2}i}{40} \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{2}i}{40}$	$0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{2}}{40} \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad \frac{\sqrt{5}}{10} \quad 0 \quad 0$
	$\frac{\sqrt{2}}{40}$	$0 \quad -\frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{10}$
	0	$0 \quad 0 \quad \frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20}$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{40} \quad \frac{\sqrt{3}i}{20} \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad \frac{\sqrt{5}i}{20} \quad 0 \quad 0$
	$-\frac{3\sqrt{2}}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20}$
	0	$\frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad \frac{\sqrt{3}i}{15} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0$
	0	$\frac{\sqrt{6}i}{40} \quad 0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad -\frac{1}{5} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{6}i}{40}$	$0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{5} \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0$
722	symmetry	$\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 1)$	$0 \quad 0 \quad -\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad \frac{\sqrt{35}}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{84}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{560} \quad \frac{\sqrt{35}i}{60} \quad 0 \quad \frac{\sqrt{35}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{336} \quad -\frac{\sqrt{21}i}{84} \quad 0$	
	$\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{35}}{168} \quad 0 \quad \frac{\sqrt{35}i}{60} \quad -\frac{13\sqrt{14}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{21}}{168}$	
	$0 \quad -\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad \frac{5\sqrt{35}}{168} \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad \frac{13\sqrt{14}}{336} \quad 0 \quad 0 \quad -\frac{5\sqrt{21}}{168} \quad 0$	
	$0 \quad \frac{17\sqrt{210}i}{1680} \quad 0 \quad -\frac{5\sqrt{210}}{336} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{336} \quad 0 \quad \frac{5\sqrt{14}}{336} \quad 0 \quad 0$	
	$-\frac{17\sqrt{210}i}{1680} \quad 0 \quad -\frac{5\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad -\frac{\sqrt{14}i}{336} \quad 0 \quad \frac{5\sqrt{14}}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad -\frac{11\sqrt{210}i}{1680} \quad -\frac{\sqrt{35}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}}{168} \quad 0 \quad -\frac{\sqrt{14}i}{336} \quad \frac{\sqrt{21}}{56} \quad 0$	
	$-\frac{\sqrt{210}}{168} \quad 0 \quad \frac{11\sqrt{210}i}{1680} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{120} \quad 0 \quad 0 \quad -\frac{5\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{336} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{56}$	
	$0 \quad 0 \quad \frac{\sqrt{70}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{210} \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{112} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{80} \quad \frac{\sqrt{105}i}{210} \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{112} \quad 0 \quad 0 \quad 0$	
723	symmetry	$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad -\frac{\sqrt{35}i}{84} \quad -\frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{84}$	
	$0 \quad -\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad \frac{\sqrt{35}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{84} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad -\frac{5\sqrt{35}i}{168} \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad \frac{13\sqrt{14}}{336} \quad 0 \quad 0 \quad -\frac{5\sqrt{21}i}{168}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{560} \quad \frac{5\sqrt{35}i}{168} \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{14}}{336} \quad \frac{5\sqrt{21}i}{168} \quad 0$	
	$0 \quad \frac{11\sqrt{210}}{1680} \quad 0 \quad \frac{\sqrt{210}i}{168} \quad -\frac{\sqrt{35}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad -\frac{5\sqrt{14}i}{168} \quad -\frac{\sqrt{21}}{56} \quad 0$	
	$\frac{11\sqrt{210}}{1680} \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad \frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{56}$	
	$0 \quad \frac{5\sqrt{210}i}{336} \quad 0 \quad -\frac{17\sqrt{210}}{1680} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad \frac{5\sqrt{14}i}{336} \quad 0 \quad \frac{\sqrt{14}}{336} \quad 0 \quad 0$	
	$-\frac{5\sqrt{210}i}{336} \quad 0 \quad -\frac{17\sqrt{210}}{1680} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{60} \quad -\frac{5\sqrt{14}i}{336} \quad 0 \quad \frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{70}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{210} \quad 0 \quad \frac{\sqrt{105}}{84} \quad \frac{\sqrt{42}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
724	symmetry	$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 2)$	$0 \quad 0 \quad -\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad -\frac{i}{20} \quad 0 \quad -\frac{1}{20} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{20}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{80} \quad \frac{i}{20} \quad 0 \quad -\frac{1}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{16} \quad \frac{\sqrt{15}i}{20} \quad 0$	
	$\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3}{40} \quad 0 \quad \frac{i}{20} \quad \frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{40}$	
	$0 \quad -\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad \frac{3}{40} \quad 0 \quad -\frac{i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{40} \quad 0$	
	$0 \quad -\frac{\sqrt{6}i}{80} \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad \frac{1}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad \frac{3\sqrt{10}}{80} \quad 0 \quad 0$	
	$\frac{\sqrt{6}i}{80} \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{20} \quad \frac{\sqrt{10}i}{80} \quad 0 \quad \frac{3\sqrt{10}}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{80} \quad \frac{\sqrt{15}}{40} \quad 0$	
	$-\frac{\sqrt{6}}{40} \quad 0 \quad \frac{\sqrt{6}i}{16} \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{40}$	
	$0 \quad 0 \quad -\frac{9\sqrt{2}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{2}}{80} \quad -\frac{\sqrt{3}i}{10} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0$	
725	symmetry	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 2)$	$\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{20} \quad 0 \quad \frac{i}{20} \quad \frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{20}$	
	$0 \quad -\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad -\frac{1}{20} \quad 0 \quad -\frac{i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{20} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad -\frac{3i}{40} \quad 0 \quad \frac{1}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{40}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{80} \quad \frac{3i}{40} \quad 0 \quad \frac{1}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad -\frac{\sqrt{15}i}{40} \quad 0$	
	$0 \quad \frac{\sqrt{6}}{16} \quad 0 \quad \frac{\sqrt{6}i}{40} \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad -\frac{\sqrt{15}}{40} \quad 0$	
	$\frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{40}$	
	$0 \quad -\frac{\sqrt{6}i}{80} \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad -\frac{1}{20} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0$	
	$\frac{\sqrt{6}i}{80} \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{20} \quad -\frac{3\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0$	
	$-\frac{9\sqrt{2}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{10} \quad 0 \quad -\frac{\sqrt{3}i}{20} \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{9\sqrt{2}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{10} \quad 0 \quad \frac{\sqrt{3}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0 \quad 0$	
726	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 3)$	$0 \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{15} \quad 0 \quad -\frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{40} \quad -\frac{\sqrt{3}i}{15} \quad 0 \quad -\frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{60} \quad 0 \quad -\frac{\sqrt{3}i}{15} \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20}$	
	$0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{60} \quad 0 \quad \frac{\sqrt{3}i}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20} \quad 0$	
	$0 \quad -\frac{\sqrt{2}i}{10} \quad 0 \quad \frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{2}i}{10} \quad 0 \quad \frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{2}}{8} \quad 0 \quad \frac{\sqrt{2}i}{10} \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20} \quad 0$	
	$\frac{\sqrt{2}}{8} \quad 0 \quad -\frac{\sqrt{2}i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{20}$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$	
727	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 3)$	$\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad 0 \quad -\frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{60} \quad 0 \quad -\frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{20}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{40} \quad -\frac{\sqrt{3}i}{60} \quad 0 \quad -\frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad \frac{\sqrt{5}i}{20} \quad 0$	
	$0 \quad -\frac{\sqrt{2}}{10} \quad 0 \quad -\frac{\sqrt{2}i}{8} \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad -\frac{\sqrt{5}}{20} \quad 0$	
	$-\frac{\sqrt{2}}{10} \quad 0 \quad \frac{\sqrt{2}i}{8} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20}$	
	$0 \quad -\frac{\sqrt{2}i}{20} \quad 0 \quad \frac{\sqrt{2}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{15} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{2}i}{20} \quad 0 \quad \frac{\sqrt{2}}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{15} \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0$	
728	symmetry	z

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_1^{(1,0;a)}(A_{2u})$	0	$\frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{21}i}{28}$	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{21}}{28}$	$0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0$
729	symmetry	x
$\mathbb{T}_{1,1}^{(1,0;a)}(E_u)$	0	$0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{21}}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{21}}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad \frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}i}{140}$
	0	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad \frac{3\sqrt{70}i}{140} \quad 0$
730	symmetry	y

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{140} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{140}$	
	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{140} \quad 0$	
731	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(1,0;a)}(A_{2u})$	$0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{6}i}{24} \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{6}}{24} \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{60} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{60} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \sqrt{15}xyz \quad 0 \quad 0 \quad 0 \quad 0$	
732	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,0;a)}(B_{1u})$	0	$\frac{\sqrt{10}}{48} \quad 0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad -\frac{1}{6} \quad 0$
	$\frac{\sqrt{10}}{48}$	$0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad \frac{1}{6}$
	0	$-\frac{\sqrt{10}i}{48} \quad 0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{10}i}{48}$	$0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{16} \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{10}}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{24} \quad 0$
	0	$-\frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{1}{24} \quad 0$
	0	$0 \quad \frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{24} \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{24} \quad \frac{i}{24} \quad 0 \quad 0$
	0	$\frac{\sqrt{30}}{48} \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{30}}{48}$	$0 \quad \frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad \frac{\sqrt{2}i}{16} \quad 0 \quad 0 \quad 0 \quad 0$
733	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{T}_3^{(1,0;a)}(B_{2u})$	0	$\frac{\sqrt{10}i}{48} \quad 0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{10}i}{48}$	$0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{16} \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{10}}{48} \quad 0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad \frac{1}{6} \quad 0$
	$\frac{\sqrt{10}}{48}$	$0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad -\frac{1}{6} \quad 0$
	0	$0 \quad -\frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{24} \quad \frac{i}{24} \quad 0 \quad 0$
	$\frac{\sqrt{10}}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{24}$
	0	$-\frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad \frac{1}{24} \quad 0 \quad 0$
	0	$-\frac{\sqrt{30}i}{48} \quad 0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{30}i}{48}$	$0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0$
734	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{160} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{96} \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}}{160} \quad -\frac{\sqrt{15}i}{24} \quad 0$	
	$\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{8} \quad \frac{7\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad -\frac{7\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{8} \quad \frac{3\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}i}{96} \quad -\frac{3}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{10}i}{160} \quad \frac{\sqrt{15}}{240} \quad 0$	
	$0 \quad 0 \quad \frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad \frac{3}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{10}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{240}$	
	$0 \quad 0 \quad \frac{5\sqrt{2}}{32} \quad 0 \quad \frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{20}$	
	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{2}}{32} \quad 0 \quad -\frac{\sqrt{30}}{160} \quad -\frac{\sqrt{5}i}{20} \quad 0$	
735	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24}$	
	$0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad -\frac{7\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{10}}{160} \quad 0 \quad 0$	
	$0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad -\frac{3}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{240} \quad 0$	
	$\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3}{16} \quad 0 \quad 0 \quad \frac{7\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{240}$	
	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}}{160} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad -\frac{3\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{5\sqrt{2}}{32} \quad 0 \quad -\frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{20}$	
736	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$0 \quad 0 \quad -\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad \frac{i}{24}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{96} \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad -\frac{i}{24} \quad 0$	
	$\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{6}$	
	$0 \quad -\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad \frac{1}{6} \quad 0$	
	$0 \quad -\frac{\sqrt{10}i}{96} \quad 0 \quad -\frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{96} \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0$	
	$\frac{\sqrt{10}i}{96} \quad 0 \quad -\frac{\sqrt{10}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad -\frac{\sqrt{6}i}{96} \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}}{24} \quad 0 \quad -\frac{\sqrt{10}i}{96} \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad \frac{\sqrt{6}i}{32} \quad \frac{1}{48} \quad 0$	
	$\frac{\sqrt{10}}{24} \quad 0 \quad \frac{\sqrt{10}i}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad -\frac{\sqrt{6}i}{32} \quad 0 \quad 0 \quad -\frac{1}{48}$	
	$0 \quad 0 \quad -\frac{\sqrt{30}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{12}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{32} \quad -\frac{\sqrt{3}i}{12} \quad 0$	
737	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad -\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{24}$	
	$0 \quad -\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad -\frac{1}{24} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{i}{6}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad -\frac{i}{6} \quad 0$	
	$0 \quad \frac{\sqrt{10}}{96} \quad 0 \quad -\frac{\sqrt{10}i}{24} \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{32} \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad -\frac{1}{48} \quad 0$	
	$\frac{\sqrt{10}}{96} \quad 0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{32} \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad \frac{1}{48}$	
	$0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad \frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad \frac{\sqrt{6}}{96} \quad 0 \quad 0$	
	$-\frac{\sqrt{10}i}{24} \quad 0 \quad \frac{\sqrt{10}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad \frac{\sqrt{6}i}{24} \quad 0 \quad \frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{30}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12}$	
	$0 \quad \frac{\sqrt{30}}{32} \quad 0 \quad \frac{\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12} \quad 0$	
738	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{5} & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{15} & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
739	symmetry	$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{840} & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \end{bmatrix}$
740	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{5} & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{1}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{15} & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{15} & 0 & 0 & \frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
741	symmetry	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{30} & 0 \\ \frac{\sqrt{2}}{120} & 0 & -\frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & -\frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 \\ \frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & -\frac{\sqrt{2}}{60} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & 0 & \frac{\sqrt{2}}{60} & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{60} & \frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{6}i}{30} & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & \frac{1}{10} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
742	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(B_{2u})$	0	$-\frac{\sqrt{2}i}{120}$ 0 $\frac{\sqrt{2}}{120}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{40}$ 0 $\frac{\sqrt{30}}{40}$ 0 0
	$\frac{\sqrt{2}i}{120}$	0 $\frac{\sqrt{2}}{120}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{40}$ 0 $\frac{\sqrt{30}}{40}$ 0 0 0
	0	$-\frac{\sqrt{2}}{120}$ 0 $-\frac{\sqrt{2}i}{120}$ 0 0 0 0 0 $\frac{\sqrt{30}}{120}$ 0 $-\frac{\sqrt{30}i}{120}$ $-\frac{\sqrt{5}}{30}$ 0
	$-\frac{\sqrt{2}}{120}$	0 $\frac{\sqrt{2}i}{120}$ 0 0 0 0 0 0 $\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{120}$ 0 0 $\frac{\sqrt{5}}{30}$
	0	0 $\frac{\sqrt{2}}{60}$ 0 0 0 $\frac{\sqrt{3}i}{10}$ 0 $\frac{\sqrt{3}}{30}$ 0 0 $-\frac{\sqrt{30}}{60}$ 0 0 $-\frac{\sqrt{5}i}{15}$
	0	0 0 $-\frac{\sqrt{2}}{60}$ $-\frac{\sqrt{3}i}{10}$ 0 $\frac{\sqrt{3}}{30}$ 0 0 0 0 $\frac{\sqrt{30}}{60}$ $\frac{\sqrt{5}i}{15}$ 0
	$-\frac{\sqrt{2}}{60}$	0 0 0 0 0 $\frac{\sqrt{3}}{10}$ 0 $-\frac{\sqrt{3}i}{30}$ $-\frac{\sqrt{30}}{60}$ 0 0 0 0 $\frac{\sqrt{5}}{15}$
	0	$\frac{\sqrt{2}}{60}$ 0 0 $\frac{\sqrt{3}}{10}$ 0 $\frac{\sqrt{3}i}{30}$ 0 0 $\frac{\sqrt{30}}{60}$ 0 0 $\frac{\sqrt{5}}{15}$ 0
	0	$\frac{\sqrt{6}i}{30}$ 0 $\frac{\sqrt{6}}{30}$ 0 0 $-\frac{1}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0
	$-\frac{\sqrt{6}i}{30}$	0 $\frac{\sqrt{6}}{30}$ 0 0 0 0 $\frac{1}{10}$ $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0
743	symmetry	$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 1)$	0	$0 0 -\frac{53\sqrt{210}}{3360} 0 0 -\frac{13\sqrt{35}i}{560} 0 0 0 0 \frac{3\sqrt{14}}{224} 0 0 \frac{\sqrt{21}i}{48}$
	0	$0 0 0 \frac{53\sqrt{210}}{3360} \frac{13\sqrt{35}i}{560} 0 0 0 0 0 0 -\frac{3\sqrt{14}}{224} -\frac{\sqrt{21}i}{48} 0$
	$-\frac{13\sqrt{210}}{840}$	$0 0 0 0 0 0 0 \frac{\sqrt{35}i}{70} \frac{\sqrt{14}}{56} 0 0 0 0 0$
	0	$\frac{13\sqrt{210}}{840} 0 0 0 0 0 -\frac{\sqrt{35}i}{70} 0 0 -\frac{\sqrt{14}}{56} 0 0 0 0$
	0	$0 -\frac{\sqrt{210}i}{120} 0 0 0 0 \frac{\sqrt{35}}{70} 0 0 \frac{3\sqrt{14}i}{56} 0 0 0 0$
	$\frac{\sqrt{210}i}{120}$	$0 0 0 0 0 0 0 -\frac{\sqrt{35}}{70} -\frac{3\sqrt{14}i}{56} 0 0 0 0 0$
	0	$0 0 0 \frac{\sqrt{210}i}{240} \frac{3\sqrt{35}}{280} 0 0 0 0 0 -\frac{\sqrt{14}i}{112} -\frac{\sqrt{21}}{168} 0$
	0	$0 0 -\frac{\sqrt{210}i}{240} 0 0 -\frac{3\sqrt{35}}{280} 0 0 0 0 \frac{\sqrt{14}i}{112} 0 0 \frac{\sqrt{21}}{168}$
	0	$0 0 \frac{\sqrt{70}}{160} 0 0 \frac{\sqrt{105}i}{80} 0 0 0 0 -\frac{\sqrt{42}}{224} 0 0 -\frac{5\sqrt{7}i}{112}$
	0	$0 0 0 -\frac{\sqrt{70}}{160} -\frac{\sqrt{105}i}{80} 0 0 0 0 0 0 \frac{\sqrt{42}}{224} \frac{5\sqrt{7}i}{112} 0$
744	symmetry	$\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 1)$	$\frac{53\sqrt{210}}{3360} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{35}}{560} \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{48}$	
	$0 \quad -\frac{53\sqrt{210}}{3360} \quad 0 \quad 0 \quad -\frac{13\sqrt{35}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{48} \quad 0$	
	$0 \quad 0 \quad -\frac{13\sqrt{210}}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{13\sqrt{210}}{840} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{210}}{240} \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{168} \quad 0$	
	$-\frac{\sqrt{210}}{240} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{168}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{56} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{56} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{70}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}}{112}$	
	$0 \quad -\frac{\sqrt{70}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad -\frac{5\sqrt{7}}{112} \quad 0$	
745	symmetry	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 2)$	$0 \quad 0 \quad -\frac{13\sqrt{6}}{480} \quad 0 \quad 0 \quad \frac{3i}{80} \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{240}$	
	$0 \quad 0 \quad 0 \quad \frac{13\sqrt{6}}{480} \quad -\frac{3i}{80} \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{32} \quad \frac{\sqrt{15}i}{240} \quad 0$	
	$-\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad -\frac{i}{10} \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{30}$	
	$0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{30} \quad 0$	
	$0 \quad \frac{\sqrt{6}i}{40} \quad 0 \quad \frac{\sqrt{6}}{60} \quad 0 \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{6}i}{40} \quad 0 \quad \frac{\sqrt{6}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{10} \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}}{20} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad \frac{3\sqrt{10}i}{80} \quad -\frac{\sqrt{15}}{120} \quad 0$	
	$\frac{\sqrt{6}}{20} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad -\frac{3\sqrt{10}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{120}$	
	$0 \quad 0 \quad -\frac{9\sqrt{2}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{80} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{16}$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{2}}{160} \quad \frac{\sqrt{3}i}{80} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{160} \quad \frac{\sqrt{5}i}{16} \quad 0$	
746	symmetry	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 2)$	$\frac{13\sqrt{6}}{480} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3}{80} \quad 0 \quad -\frac{i}{10} \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{240}$	
	$0 \quad -\frac{13\sqrt{6}}{480} \quad 0 \quad 0 \quad \frac{3}{80} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{240} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{30}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{40} \quad \frac{i}{10} \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad -\frac{\sqrt{15}i}{30} \quad 0$	
	$0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{20} \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{80} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad \frac{\sqrt{15}}{120} \quad 0$	
	$\frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{80} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{120}$	
	$0 \quad -\frac{\sqrt{6}i}{60} \quad 0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0$	
	$\frac{\sqrt{6}i}{60} \quad 0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{10} \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$	
	$-\frac{9\sqrt{2}}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{80} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad \frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{16}$	
	$0 \quad \frac{9\sqrt{2}}{160} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{80} \quad 0 \quad -\frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{16} \quad 0$	
747	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 3)$	$0 \quad 0 \quad \frac{37\sqrt{2}}{240} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{120} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{24}$	
	$0 \quad 0 \quad 0 \quad -\frac{37\sqrt{2}}{240} \quad \frac{\sqrt{3}i}{120} \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{240} \quad -\frac{\sqrt{5}i}{24} \quad 0$	
	$\frac{19\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad -\frac{\sqrt{3}i}{30} \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{60}$	
	$0 \quad -\frac{19\sqrt{2}}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{20} \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{60} \quad 0$	
	$0 \quad -\frac{\sqrt{2}i}{120} \quad 0 \quad -\frac{7\sqrt{2}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{24} \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{2}i}{120} \quad 0 \quad -\frac{7\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{30} \quad -\frac{\sqrt{30}i}{24} \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{2}}{24} \quad 0 \quad -\frac{\sqrt{2}i}{30} \quad \frac{\sqrt{3}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{60} \quad 0$	
	$-\frac{\sqrt{2}}{24} \quad 0 \quad \frac{\sqrt{2}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{60} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad \frac{1}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{80} \quad -\frac{i}{8} \quad 0 \quad \frac{1}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad \frac{\sqrt{15}i}{24} \quad 0$	
748	symmetry	$-\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 3)$	$-\frac{37\sqrt{2}}{240}, 0, 0, 0, 0, -\frac{\sqrt{3}}{120}, 0, \frac{\sqrt{3}i}{20}, \frac{\sqrt{30}}{240}, 0, 0, 0, 0, -\frac{\sqrt{5}}{24}$	
	$0, \frac{37\sqrt{2}}{240}, 0, 0, -\frac{\sqrt{3}}{120}, 0, -\frac{\sqrt{3}i}{20}, 0, 0, -\frac{\sqrt{30}}{240}, 0, 0, -\frac{\sqrt{5}}{24}, 0$	
	$0, 0, \frac{19\sqrt{2}}{120}, 0, 0, \frac{\sqrt{3}i}{20}, 0, -\frac{\sqrt{3}}{30}, 0, 0, -\frac{\sqrt{30}}{120}, 0, 0, \frac{\sqrt{5}i}{60}$	
	$0, 0, 0, -\frac{19\sqrt{2}}{120}, -\frac{\sqrt{3}i}{20}, 0, -\frac{\sqrt{3}}{30}, 0, 0, 0, 0, \frac{\sqrt{30}}{120}, -\frac{\sqrt{5}i}{60}, 0$	
	$0, \frac{\sqrt{2}}{30}, 0, \frac{\sqrt{2}i}{24}, \frac{\sqrt{3}}{60}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{30}i}{120}, \frac{\sqrt{5}}{60}, 0$	
	$\frac{\sqrt{2}}{30}, 0, -\frac{\sqrt{2}i}{24}, 0, 0, -\frac{\sqrt{3}}{60}, 0, 0, 0, 0, -\frac{\sqrt{30}i}{120}, 0, 0, -\frac{\sqrt{5}}{60}$	
	$0, \frac{7\sqrt{2}i}{120}, 0, \frac{\sqrt{2}}{120}, 0, 0, -\frac{\sqrt{3}}{30}, 0, 0, \frac{\sqrt{30}i}{120}, 0, \frac{\sqrt{30}}{24}, 0, 0$	
	$-\frac{7\sqrt{2}i}{120}, 0, \frac{\sqrt{2}}{120}, 0, 0, 0, 0, \frac{\sqrt{3}}{30}, -\frac{\sqrt{30}i}{120}, 0, \frac{\sqrt{30}}{24}, 0, 0, 0$	
	$\frac{\sqrt{6}}{80}, 0, 0, 0, 0, -\frac{1}{8}, 0, \frac{i}{20}, \frac{\sqrt{10}}{80}, 0, 0, 0, 0, -\frac{\sqrt{10}}{80}$	
	$0, -\frac{\sqrt{6}}{80}, 0, 0, -\frac{1}{8}, 0, -\frac{i}{20}, 0, 0, -\frac{\sqrt{10}}{80}, 0, 0, -\frac{\sqrt{15}}{24}, 0$	
749	symmetry	z
$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	$0, \frac{\sqrt{42}i}{56}, 0, \frac{\sqrt{42}}{56}, 0, 0, \frac{\sqrt{7}}{14}, 0, 0, \frac{3\sqrt{70}i}{280}, 0, -\frac{3\sqrt{70}}{280}, 0, 0$	
	$-\frac{\sqrt{42}i}{56}, 0, \frac{\sqrt{42}}{56}, 0, 0, 0, 0, -\frac{\sqrt{7}}{14}, -\frac{3\sqrt{70}i}{280}, 0, -\frac{3\sqrt{70}}{280}, 0, 0, 0$	
	$0, -\frac{\sqrt{42}}{56}, 0, \frac{\sqrt{42}i}{56}, -\frac{\sqrt{7}}{14}, 0, 0, 0, 0, \frac{3\sqrt{70}}{280}, 0, \frac{3\sqrt{70}i}{280}, 0, 0$	
	$-\frac{\sqrt{42}}{56}, 0, -\frac{\sqrt{42}i}{56}, 0, 0, \frac{\sqrt{7}}{14}, 0, 0, \frac{3\sqrt{70}}{280}, 0, -\frac{3\sqrt{70}i}{280}, 0, 0, 0$	
	$0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\sqrt{70}}{70}, 0, 0, \frac{\sqrt{105}i}{70}$	
	$0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{70}}{70}, -\frac{\sqrt{105}i}{70}, 0$	
	$0, 0, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{70}}{70}, 0, 0, 0, 0, \frac{\sqrt{105}}{70}$	
	$0, 0, 0, 0, 0, 0, 0, 0, 0, \frac{\sqrt{70}}{70}, 0, 0, \frac{\sqrt{105}}{70}, 0$	
	$0, 0, 0, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{210}i}{140}, 0, -\frac{\sqrt{210}}{140}, 0, 0$	
	$0, 0, 0, 0, 0, 0, 0, 0, \frac{\sqrt{210}i}{140}, 0, -\frac{\sqrt{210}}{140}, 0, 0, 0$	
750	symmetry	x

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(1,1;a)}(E_u)$	0 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{105}i}{140}$ 0	
	$-\frac{\sqrt{42}}{56}$ 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{105}}{140}$	
	0 $\frac{\sqrt{42}}{56}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0	
	$\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{70}$ 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{70}$	
	0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0	
751	symmetry	y
$\mathbb{T}_{1,2}^{(1,1;a)}(E_u)$	$-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $-\frac{3\sqrt{70}}{280}$ 0 0 0 0 $\frac{\sqrt{105}}{140}$	
	0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 $\frac{\sqrt{105}}{140}$ 0	
	0 0 $-\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$	
	0 0 0 $\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{105}i}{140}$ 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $\frac{\sqrt{70}i}{56}$ $-\frac{\sqrt{105}}{70}$ 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $\frac{\sqrt{105}}{70}$	
	0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}}{28}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0	
752	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ..

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{2u})$	0	$-\frac{\sqrt{42}i}{168} \quad 0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{84} \quad 0 \quad \frac{\sqrt{70}}{84} \quad 0 \quad 0$
	$\frac{\sqrt{42}i}{168}$	$0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{21} \quad \frac{\sqrt{70}i}{84} \quad 0 \quad \frac{\sqrt{70}}{84} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{42}}{168} \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad \frac{\sqrt{7}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad -\frac{\sqrt{70}i}{84} \quad 0 \quad 0$
	$\frac{\sqrt{42}}{168}$	$0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad \frac{\sqrt{70}i}{84} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{42} \quad -\frac{\sqrt{105}i}{84} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0 \quad \frac{\sqrt{7}i}{24} \quad -\frac{\sqrt{70}}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84}$
	0	$0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0$
753	symmetry	$\sqrt{15}xyz$
$\mathbb{T}_3^{(1,1;a)}(B_{1u})$	0	$-\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{112} \quad 0 \quad \frac{3\sqrt{42}i}{112} \quad -\frac{\sqrt{7}}{14} \quad 0$
	$-\frac{\sqrt{70}}{560}$	$0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{112} \quad 0 \quad -\frac{3\sqrt{42}i}{112} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14}$
	0	$\frac{\sqrt{70}i}{560} \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0$
	$-\frac{\sqrt{70}i}{560}$	$0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0$
	$-\frac{3\sqrt{70}}{280}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56}$
	0	$\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56} \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{280} \quad \frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0$
	0	$0 \quad \frac{\sqrt{210}}{80} \quad 0 \quad -\frac{\sqrt{210}i}{80} \quad \frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad 0$
	$\frac{\sqrt{210}}{80}$	$0 \quad 0 \quad \frac{\sqrt{210}i}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad \frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0$
754	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(B_{2u})$	0	$-\frac{\sqrt{70}i}{560} \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0$
	$\frac{\sqrt{70}i}{560}$	$0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{112} \quad 0 \quad -\frac{3\sqrt{42}i}{112} \quad \frac{\sqrt{7}}{14} \quad 0$
	$-\frac{\sqrt{70}}{560}$	$0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{112} \quad 0 \quad \frac{3\sqrt{42}i}{112} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad 0$
	0	$0 \quad \frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad 0$
	$-\frac{3\sqrt{70}}{280}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{120} \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56}$
	0	$\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56} \quad 0 \quad 0$
	0	$-\frac{\sqrt{210}i}{80} \quad 0 \quad -\frac{\sqrt{210}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{80}$	$0 \quad -\frac{\sqrt{210}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{35} \quad \frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0$
755	symmetry	$\frac{x(2x^2-3y^2-3z^2)}{2}$
$\mathbb{T}_{3,1}^{(1,1;a)}(E_u, 1)$	0	$0 \quad 0 \quad \frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad \frac{\sqrt{7}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{168}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{224} \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad \frac{\sqrt{7}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{672} \quad \frac{\sqrt{105}i}{168} \quad 0$
	$-\frac{\sqrt{42}}{224}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{84} \quad 0 \quad -\frac{\sqrt{7}i}{24} \quad \frac{13\sqrt{70}}{672} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84}$
	0	$\frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{84} \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad -\frac{13\sqrt{70}}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0$
	0	$0 \quad -\frac{17\sqrt{42}i}{672} \quad 0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{672} \quad 0 \quad \frac{\sqrt{70}}{168} \quad 0 \quad 0$
	$\frac{17\sqrt{42}i}{672}$	$0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{24} \quad \frac{\sqrt{70}i}{672} \quad 0 \quad \frac{\sqrt{70}}{168} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad \frac{11\sqrt{42}i}{672} \quad \frac{\sqrt{7}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad \frac{\sqrt{70}i}{672} \quad -\frac{\sqrt{105}}{112} \quad 0$
	$-\frac{\sqrt{42}}{84}$	$0 \quad -\frac{11\sqrt{42}i}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad -\frac{\sqrt{70}i}{672} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{112} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{14}}{32} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{84} \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{32} \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0$
756	symmetry	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{42}}{224}$	0 0 0 0 0 $\frac{\sqrt{7}}{24}$ 0 $-\frac{\sqrt{7}i}{42}$ $\frac{\sqrt{70}}{672}$ 0 0 0 0 $\frac{\sqrt{105}}{168}$
	0	$\frac{\sqrt{42}}{224}$ 0 0 $\frac{\sqrt{7}}{24}$ 0 $\frac{\sqrt{7}i}{42}$ 0 0 $-\frac{\sqrt{70}}{672}$ 0 0 0 $\frac{\sqrt{105}}{168}$ 0
	0	0 0 $-\frac{\sqrt{42}}{224}$ 0 0 $-\frac{5\sqrt{7}i}{84}$ 0 $-\frac{\sqrt{7}}{24}$ 0 0 $-\frac{13\sqrt{70}}{672}$ 0 0 0 $-\frac{\sqrt{105}i}{84}$
	0	0 0 0 $\frac{\sqrt{42}}{224}$ $\frac{5\sqrt{7}i}{84}$ 0 $-\frac{\sqrt{7}}{24}$ 0 0 0 0 $\frac{13\sqrt{70}}{672}$ $\frac{\sqrt{105}i}{84}$ 0
	0	$-\frac{11\sqrt{42}}{672}$ 0 $\frac{\sqrt{42}i}{84}$ $\frac{\sqrt{7}}{48}$ 0 0 0 0 $\frac{\sqrt{70}}{672}$ 0 $-\frac{\sqrt{70}i}{84}$ $\frac{\sqrt{105}}{112}$ 0
	$-\frac{11\sqrt{42}}{672}$	0 $-\frac{\sqrt{42}i}{84}$ 0 0 $-\frac{\sqrt{7}}{48}$ 0 0 $\frac{\sqrt{70}}{672}$ 0 $\frac{\sqrt{70}i}{84}$ 0 0 $-\frac{\sqrt{105}}{112}$
	0	$\frac{5\sqrt{42}i}{168}$ 0 $\frac{17\sqrt{42}}{672}$ 0 0 $\frac{\sqrt{7}}{24}$ 0 0 $\frac{\sqrt{70}i}{168}$ 0 $-\frac{\sqrt{70}}{672}$ 0 0
	$-\frac{5\sqrt{42}i}{168}$	0 $\frac{17\sqrt{42}}{672}$ 0 0 0 0 $-\frac{\sqrt{7}}{24}$ $-\frac{\sqrt{70}i}{168}$ 0 $-\frac{\sqrt{70}}{672}$ 0 0 0
	$-\frac{\sqrt{14}}{32}$	0 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 $\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{210}}{224}$ 0 0 0 0 0
	0	$\frac{\sqrt{14}}{32}$ 0 0 $-\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{210}}{224}$ 0 0 0 0
757	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
$\mathbb{T}_{3,1}^{(1,1;a)}(E_u, 2)$	0 0 $\frac{\sqrt{70}}{224}$ 0 0 $-\frac{\sqrt{105}i}{120}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 $-\frac{17\sqrt{42}}{672}$ 0 0 $-\frac{3\sqrt{7}i}{56}$	
	0 0 0 $-\frac{\sqrt{70}}{224}$ $\frac{\sqrt{105}i}{120}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $\frac{17\sqrt{42}}{672}$ $\frac{3\sqrt{7}i}{56}$ 0	
	$-\frac{\sqrt{70}}{224}$ 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 $\frac{\sqrt{105}i}{120}$ $\frac{\sqrt{42}}{224}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$	
	0 $\frac{\sqrt{70}}{224}$ 0 0 $-\frac{\sqrt{105}}{420}$ 0 $-\frac{\sqrt{105}i}{120}$ 0 0 $-\frac{\sqrt{42}}{224}$ 0 0 0 $-\frac{\sqrt{7}}{28}$ 0	
	0 $\frac{\sqrt{70}i}{224}$ 0 $\frac{\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{105}}{120}$ 0 0 $-\frac{\sqrt{42}i}{224}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0	
	$-\frac{\sqrt{70}i}{224}$ 0 $\frac{\sqrt{70}}{140}$ 0 0 0 0 $\frac{\sqrt{105}}{120}$ $\frac{\sqrt{42}i}{224}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0	
	0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{23\sqrt{70}i}{1120}$ $\frac{\sqrt{105}}{80}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{224}$ $-\frac{5\sqrt{7}}{112}$ 0	
	$\frac{\sqrt{70}}{56}$ 0 $\frac{23\sqrt{70}i}{1120}$ 0 0 $-\frac{\sqrt{105}}{80}$ 0 0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{224}$ 0 0 $\frac{5\sqrt{7}}{112}$	
	0 0 $\frac{\sqrt{210}}{160}$ 0 0 $\frac{3\sqrt{35}i}{140}$ 0 $\frac{\sqrt{35}}{70}$ 0 0 $\frac{5\sqrt{14}}{224}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{210}}{160}$ $-\frac{3\sqrt{35}i}{140}$ 0 $\frac{\sqrt{35}}{70}$ 0 0 0 0 $-\frac{5\sqrt{14}}{224}$ 0 0 0	
758	symmetry	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ..

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 2)$	$-\frac{\sqrt{70}}{224}$	0 0 0 0 0 $-\frac{\sqrt{105}}{120}$ 0 $\frac{\sqrt{105}i}{70}$ $-\frac{17\sqrt{42}}{672}$ 0 0 0 0 $\frac{3\sqrt{7}}{56}$
	0	$\frac{\sqrt{70}}{224}$ 0 0 $-\frac{\sqrt{105}}{120}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{17\sqrt{42}}{672}$ 0 0 $\frac{3\sqrt{7}}{56}$ 0
	0	0 0 $-\frac{\sqrt{70}}{224}$ 0 0 $\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{105}}{120}$ 0 0 $-\frac{\sqrt{42}}{224}$ 0 0 $-\frac{\sqrt{7}i}{28}$
	0	0 0 0 $\frac{\sqrt{70}}{224}$ $-\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{105}}{120}$ 0 0 0 0 $\frac{\sqrt{42}}{224}$ $\frac{\sqrt{7}i}{28}$ 0
	0	$\frac{23\sqrt{70}}{1120}$ 0 $-\frac{\sqrt{70}i}{56}$ $\frac{\sqrt{105}}{80}$ 0 0 0 0 $\frac{\sqrt{42}}{224}$ 0 $-\frac{\sqrt{42}i}{56}$ $\frac{5\sqrt{7}}{112}$ 0
	$\frac{23\sqrt{70}}{1120}$	0 $\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{105}}{80}$ 0 0 $\frac{\sqrt{42}}{224}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{5\sqrt{7}}{112}$
	0	$-\frac{\sqrt{70}i}{140}$ 0 $-\frac{\sqrt{70}}{224}$ 0 0 $\frac{\sqrt{105}}{120}$ 0 0 $\frac{\sqrt{42}i}{84}$ 0 $-\frac{\sqrt{42}}{224}$ 0 0
	$\frac{\sqrt{70}i}{140}$	0 $-\frac{\sqrt{70}}{224}$ 0 0 0 0 $-\frac{\sqrt{105}}{120}$ $-\frac{\sqrt{42}i}{84}$ 0 $-\frac{\sqrt{42}}{224}$ 0 0 0
	$\frac{\sqrt{210}}{160}$	0 0 0 0 0 $-\frac{3\sqrt{35}}{140}$ 0 $\frac{\sqrt{35}i}{70}$ $-\frac{5\sqrt{14}}{224}$ 0 0 0 0
	0	$-\frac{\sqrt{210}}{160}$ 0 0 $-\frac{3\sqrt{35}}{140}$ 0 $-\frac{\sqrt{35}i}{70}$ 0 0 $\frac{5\sqrt{14}}{224}$ 0 0 0 0
759	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(a)}(A_{1u})$	0 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
760	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(a)}(B_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0	
	0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	$-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0	
761 symmetry	$\sqrt{3}xy$	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0	
762 symmetry	$\sqrt{3}yz$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(a)}(E_u)$	$\sqrt{35i}$	$\frac{\sqrt{35i}}{28} \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{35i}}{28}$	$0 \quad \frac{\sqrt{35i}}{28} \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{35i}}{28}$	$0 \quad 0 \quad \frac{\sqrt{35i}}{28} \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{35i}}{28}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{35i}}{28} \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{14i}}{14} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{14i}}{14}$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7i}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7i}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7i}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
763	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,2}^{(a)}(E_u)$	0	$0 \quad 0 \quad \frac{\sqrt{35i}}{28} \quad 0 \quad -\frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{35i}}{28} \quad 0 \quad -\frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{35i}}{28}$	$0 \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{35i}}{28} \quad 0 \quad \frac{\sqrt{21i}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{14i}}{14} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{14i}}{14}$
	0	$0 \quad 0 \quad -\frac{\sqrt{7i}}{14} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7i}}{14} \quad 0 \quad 0 \quad 0 \quad 0$
764	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
765	$\mathbb{M}_4^{(a)}(A_{1u}, 1)$	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 \\ -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
766	$\mathbb{M}_4^{(a)}(A_{1u}, 2)$	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		<i>continued ...</i>

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
767	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
768	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(a)}(B_{2u})$	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0	
	0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0	
	0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 0 0 0 0 0 0 0	
769	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{M}_{4,1}^{(a)}(E_u, 1)$	$\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{16}$ 0 0	
	0 0 0 0 $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0	
	0 0 0 0 0 $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$	
	0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0	
	$\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0	
	0 $\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0	
770	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 1)$	0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	$-\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0	
	0 0 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$	
	0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0	
771	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{M}_{4,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 $\frac{9\sqrt{14}i}{112}$ 0 0 0 0 0	
	0 $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 $\frac{9\sqrt{14}i}{112}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{14}i}{112}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{14}i}{112}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{56}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{56}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{70}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{70}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0	
	772 symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 2)$	0 0 $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 - $\frac{9\sqrt{14}i}{112}$ 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 0 - $\frac{9\sqrt{14}i}{112}$ 0 0	
	- $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 - $\frac{5\sqrt{14}i}{112}$ 0 0 0 0 0	
	0 - $\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 0 - $\frac{5\sqrt{14}i}{112}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 0 0 0 - $\frac{\sqrt{21}i}{56}$ 0	
	0 0 0 0 0 $\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 0 0 0 - $\frac{\sqrt{21}i}{56}$	
	0 0 $\frac{3\sqrt{70}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{70}i}{80}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0	
773	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(1,-1;a)}(A_{1u})$	0 - $\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{42}}{42}$ 0 0 0 0 $\frac{\sqrt{105}}{420}$ 0 $\frac{\sqrt{105}i}{420}$ 0 0	
	- $\frac{\sqrt{7}}{28}$ 0 - $\frac{\sqrt{7}i}{28}$ 0 0 - $\frac{\sqrt{42}}{42}$ 0 0 0 $\frac{\sqrt{105}}{420}$ 0 - $\frac{\sqrt{105}i}{420}$ 0 0 0	
	0 - $\frac{\sqrt{7}i}{28}$ 0 - $\frac{\sqrt{7}}{28}$ 0 0 $\frac{\sqrt{42}}{42}$ 0 0 - $\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{105}}{420}$ 0 0 0	
	$\frac{\sqrt{7}i}{28}$ 0 - $\frac{\sqrt{7}}{28}$ 0 0 0 0 - $\frac{\sqrt{42}}{42}$ $\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{105}}{420}$ 0 0 0	
	0 0 0 0 0 - $\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{84}$ $\frac{2\sqrt{105}}{105}$ 0 0 0 0 0 $\frac{\sqrt{70}}{140}$	
	0 0 0 0 0 - $\frac{\sqrt{42}}{84}$ 0 - $\frac{\sqrt{42}i}{84}$ 0 0 - $\frac{2\sqrt{105}}{105}$ 0 0 0 $\frac{\sqrt{70}}{140}$	
	0 0 0 0 0 - $\frac{\sqrt{42}i}{84}$ 0 - $\frac{\sqrt{42}}{84}$ 0 0 0 $\frac{2\sqrt{105}}{105}$ 0 0 - $\frac{\sqrt{70}i}{140}$	
	0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 - $\frac{\sqrt{42}}{84}$ 0 0 0 0 - $\frac{2\sqrt{105}}{105}$ $\frac{\sqrt{70}i}{140}$ 0	
	0 0 0 0 0 0 0 0 - $\frac{\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{35}i}{70}$ $\frac{\sqrt{210}}{70}$ 0	
	0 0 0 0 0 0 0 0 - $\frac{\sqrt{35}}{70}$ 0 0 - $\frac{\sqrt{35}i}{70}$ 0 0 - $\frac{\sqrt{210}}{70}$	
774	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,-1;a)}(B_{1u})$	0	$\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	$\frac{\sqrt{21}}{28}$	$0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0$
	$\frac{\sqrt{21}i}{28}$	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0$
775	symmetry	$\sqrt{3}xy$
$\mathbb{M}_2^{(1,-1;a)}(B_{2u})$	0	$-\frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0$
	$\frac{\sqrt{21}i}{28}$	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0$
	$-\frac{\sqrt{21}}{28}$	$0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0$
776	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u)$	0 0 $\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{35}}{140}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{21}}{28}$ $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 0	
	$-\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ $-\frac{\sqrt{35}}{140}$ 0 0 0 0 0	
	0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{35}}{140}$ 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ $\frac{\sqrt{35}i}{35}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ $-\frac{\sqrt{210}}{140}$ 0	
	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{210}}{140}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{3\sqrt{70}i}{140}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{70}$ $\frac{3\sqrt{70}i}{140}$ 0	
777	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u)$	$-\frac{\sqrt{21}}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 $\frac{\sqrt{35}}{140}$ 0 0 0 0 0	
	0 $\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{35}}{140}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 $\frac{\sqrt{210}}{140}$ 0	
	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 $-\frac{\sqrt{210}}{140}$	
	0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $-\frac{3\sqrt{70}}{140}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{3\sqrt{70}}{140}$ 0	
778	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	0	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{10}}{240} & 0 & -\frac{11\sqrt{10}i}{240} & 0 & 0 \\ \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{11\sqrt{10}}{240} & 0 & \frac{11\sqrt{10}i}{240} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}i}{240} & 0 & -\frac{\sqrt{10}}{240} & 0 & 0 \\ -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & \frac{1}{6} & -\frac{\sqrt{10}i}{240} & 0 & -\frac{\sqrt{10}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & \frac{\sqrt{10}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & \frac{\sqrt{15}i}{120} \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & -\frac{\sqrt{15}i}{120} & 0 \\ 0 & -\frac{5\sqrt{2}}{48} & 0 & -\frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & \frac{\sqrt{30}i}{80} & \frac{\sqrt{5}}{15} & 0 \\ -\frac{5\sqrt{2}}{48} & 0 & \frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{5}}{15} \end{bmatrix}$
	779	symmetry
		$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & \frac{\sqrt{14}i}{336} & 0 & 0 \\ \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{13\sqrt{14}i}{336} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 \\ -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{13\sqrt{14}i}{336} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{84} & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{21}i}{168} \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & -\frac{\sqrt{21}i}{168} & 0 \\ 0 & \frac{\sqrt{70}}{48} & 0 & \frac{\sqrt{70}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & \frac{\sqrt{7}}{21} & 0 \\ \frac{\sqrt{70}}{48} & 0 & -\frac{\sqrt{70}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{21} \end{bmatrix}$
		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0	
781	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{M}_4^{(1,-1;a)}(B_{1u})$	0 $\frac{\sqrt{70}}{112}$ 0 $\frac{\sqrt{70}i}{112}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{48}$ 0 $\frac{\sqrt{42}i}{48}$ $\frac{\sqrt{7}}{14}$ 0	
	$\frac{\sqrt{70}}{112}$ 0 $-\frac{\sqrt{70}i}{112}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{48}$ 0 $-\frac{\sqrt{42}i}{48}$ 0 0 $-\frac{\sqrt{7}}{14}$	
	0 $-\frac{\sqrt{70}i}{112}$ 0 $\frac{\sqrt{70}}{112}$ 0 0 0 0 0 $-\frac{5\sqrt{42}i}{336}$ 0 $-\frac{5\sqrt{42}}{336}$ 0 0	
	$\frac{\sqrt{70}i}{112}$ 0 $\frac{\sqrt{70}}{112}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{336}$ 0 $-\frac{5\sqrt{42}}{336}$ 0 0 0	
	$-\frac{\sqrt{70}}{56}$ 0 0 0 0 $-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$	
	0 $\frac{\sqrt{70}}{56}$ 0 0 $-\frac{\sqrt{105}}{168}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0	
	0 0 $-\frac{\sqrt{70}}{56}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{56}$	
	0 0 0 $\frac{\sqrt{70}}{56}$ $-\frac{\sqrt{105}i}{168}$ 0 0 $-\frac{\sqrt{105}}{84}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{56}$ 0	
	0 $-\frac{\sqrt{210}}{336}$ 0 $\frac{\sqrt{210}i}{336}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{112}$ 0 $-\frac{3\sqrt{14}i}{112}$ 0 0	
	$-\frac{\sqrt{210}}{336}$ 0 $-\frac{\sqrt{210}i}{336}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{112}$ 0 $\frac{3\sqrt{14}i}{112}$ 0 0 0	
782	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,-1;a)}(B_{2u})$	$0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad -\frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{70}i}{112} \quad 0 \quad -\frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{48} \quad 0 \quad -\frac{\sqrt{42}i}{48} \quad -\frac{\sqrt{7}}{14} \quad 0 \quad 0$	
	$\frac{\sqrt{70}}{112} \quad 0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{48} \quad 0 \quad \frac{\sqrt{42}i}{48} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14}$	
	$0 \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad \frac{\sqrt{105}i}{84} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad \frac{\sqrt{7}i}{56} \quad 0 \quad 0$	
	$-\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56}$	
	$0 \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad \frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56} \quad 0$	
	$0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad \frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{112} \quad 0 \quad \frac{3\sqrt{14}}{112} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{210}i}{336} \quad 0 \quad \frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{112} \quad 0 \quad \frac{3\sqrt{14}}{112} \quad 0 \quad 0 \quad 0$	
783	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$0 \quad 0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{6}}{96} \quad 0 \quad 0 \quad -\frac{i}{8}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{6}}{96} \quad \frac{i}{8} \quad 0$	
	$-\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad -\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad -\frac{5\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{96} \quad -\frac{1}{16} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{96} \quad 0 \quad 0 \quad \frac{1}{16}$	
	$0 \quad 0 \quad \frac{\sqrt{30}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{12}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{32} \quad -\frac{\sqrt{3}i}{12} \quad 0$	
784	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$-\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{7\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{8}$	
	$0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{1}{8} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{1}{16} \quad 0$	
	$-\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{16}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{10}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{96} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{30}}{96} \quad 0 \quad \frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12} \quad 0$	
	$0 \quad -\frac{\sqrt{30}}{96} \quad 0 \quad -\frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12} \quad 0 \quad 0$	
785	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$0 \quad 0 \quad \frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{7}i}{56}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{224} \quad \frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{672} \quad -\frac{3\sqrt{7}i}{56} \quad 0 \quad 0$	
	$-\frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad -\frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14}$	
	$0 \quad \frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad \frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{70}i}{224} \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{96} \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{70}i}{224} \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{168} \quad \frac{\sqrt{42}i}{96} \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad -\frac{3\sqrt{70}i}{224} \quad \frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad \frac{11\sqrt{42}i}{672} \quad -\frac{\sqrt{7}}{112} \quad 0 \quad 0$	
	$-\frac{\sqrt{70}}{56} \quad 0 \quad \frac{3\sqrt{70}i}{224} \quad 0 \quad 0 \quad -\frac{5\sqrt{105}}{336} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad -\frac{11\sqrt{42}i}{672} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{112} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{210}}{96} \quad 0 \quad -\frac{3\sqrt{14}}{224} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{84} \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{96} \quad 0 \quad \frac{3\sqrt{14}}{224} \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad 0$	
786	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}}{672} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{13\sqrt{42}}{672} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{42}}{672} & \frac{\sqrt{7}i}{14} & 0 \\ 0 & \frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & \frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{112} & 0 \\ \frac{3\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & \frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{112} \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \end{bmatrix}$	
	787	symmetry
$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{231}}{616} & 0 & -\frac{\sqrt{231}i}{616} & -\frac{3\sqrt{154}}{308} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{616} & 0 & -\frac{3\sqrt{385}i}{616} & 0 & 0 \\ \frac{\sqrt{231}}{616} & 0 & \frac{\sqrt{231}i}{616} & 0 & 0 & \frac{3\sqrt{154}}{308} & 0 & 0 & -\frac{3\sqrt{385}}{616} & 0 & \frac{3\sqrt{385}i}{616} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}i}{462} & 0 & -\frac{\sqrt{231}}{462} & 0 & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & -\frac{\sqrt{385}i}{154} & 0 & \frac{\sqrt{385}}{154} & 0 & 0 \\ \frac{\sqrt{231}i}{462} & 0 & -\frac{\sqrt{231}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{77} & \frac{\sqrt{385}i}{154} & 0 & \frac{\sqrt{385}}{154} & 0 & 0 & 0 \\ -\frac{\sqrt{231}}{132} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{308} & 0 & -\frac{\sqrt{154}i}{77} & -\frac{\sqrt{385}}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{924} \\ 0 & \frac{\sqrt{231}}{132} & 0 & 0 & -\frac{3\sqrt{154}}{308} & 0 & \frac{\sqrt{154}i}{77} & 0 & 0 & \frac{\sqrt{385}}{308} & 0 & 0 & -\frac{\sqrt{2310}}{924} & 0 \\ 0 & 0 & \frac{\sqrt{231}}{132} & 0 & 0 & -\frac{3\sqrt{154}i}{308} & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 & \frac{\sqrt{2310}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{132} & \frac{3\sqrt{154}i}{308} & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{308} & -\frac{\sqrt{2310}i}{924} & 0 \\ 0 & -\frac{\sqrt{77}}{88} & 0 & -\frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & \frac{\sqrt{1155}i}{616} & \frac{\sqrt{770}}{308} & 0 \\ -\frac{\sqrt{77}}{88} & 0 & \frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & -\frac{\sqrt{1155}i}{616} & 0 & 0 & -\frac{\sqrt{770}}{308} \end{bmatrix}$	
	788	symmetry

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 2)$	0	$-\frac{\sqrt{33}}{264} \quad 0 \quad \frac{\sqrt{33}i}{264} \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{88} \quad 0 \quad \frac{\sqrt{55}i}{88} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{33}}{264}$	$0 \quad -\frac{\sqrt{33}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad \frac{\sqrt{55}}{88} \quad 0 \quad -\frac{\sqrt{55}i}{88} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	$\frac{\sqrt{33}}{132}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{132}$
	0	$-\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{44} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{132} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{22}i}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{44} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{132}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{132} \quad -\frac{\sqrt{22}i}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{44} \quad -\frac{\sqrt{330}i}{132} \quad 0$
	0	$\frac{\sqrt{11}}{88} \quad 0 \quad \frac{\sqrt{11}i}{88} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{88} \quad 0 \quad \frac{\sqrt{165}i}{88} \quad \frac{\sqrt{110}}{44} \quad 0$
	$\frac{\sqrt{11}}{88}$	$0 \quad -\frac{\sqrt{11}i}{88} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{88} \quad 0 \quad -\frac{\sqrt{165}i}{88} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{44}$
789	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
$\mathbb{M}_6^{(1,-1;a)}(A_{2u})$	0	$-\frac{\sqrt{66}i}{264} \quad 0 \quad -\frac{\sqrt{66}}{264} \quad 0 \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{88} \quad 0 \quad \frac{\sqrt{110}}{88} \quad 0 \quad 0$
	$\frac{\sqrt{66}i}{264}$	$0 \quad -\frac{\sqrt{66}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{11}}{22} \quad \frac{\sqrt{110}i}{88} \quad 0 \quad \frac{\sqrt{110}}{88} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{66}}{264} \quad 0 \quad \frac{\sqrt{66}i}{264} \quad \frac{\sqrt{11}}{22} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}}{88} \quad 0 \quad \frac{\sqrt{110}i}{88} \quad 0 \quad 0$
	$-\frac{\sqrt{66}}{264}$	$0 \quad -\frac{\sqrt{66}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{11}}{22} \quad 0 \quad 0 \quad \frac{\sqrt{110}}{88} \quad 0 \quad -\frac{\sqrt{110}i}{88} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{66}}{66} \quad 0 \quad 0 \quad -\frac{\sqrt{11}i}{22} \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{66} \quad \frac{\sqrt{11}i}{22} \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{66}}{66}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad \frac{\sqrt{11}i}{22} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{66}}{66} \quad 0 \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad -\frac{\sqrt{11}i}{22} \quad 0 \quad 0$
	0	$-\frac{\sqrt{22}i}{44} \quad 0 \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0$
	$\frac{\sqrt{22}i}{44}$	$0 \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0$
790	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_6^{(1,-1;a)}(B_{1u}, 1)$	0	$\frac{7\sqrt{5}}{120} \quad 0 \quad \frac{7\sqrt{5}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{24} \quad 0 \quad -\frac{\sqrt{3}i}{24} \quad -\frac{\sqrt{2}}{12} \quad 0$
	$\frac{7\sqrt{5}}{120}$	$0 \quad -\frac{7\sqrt{5}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{24} \quad 0 \quad \frac{\sqrt{3}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{2}}{12}$
	0	$\frac{\sqrt{5}i}{15} \quad 0 \quad -\frac{\sqrt{5}}{15} \quad 0 \quad 0$
	$-\frac{\sqrt{5}i}{15}$	$0 \quad -\frac{\sqrt{5}}{15} \quad 0 \quad 0$
	$\frac{\sqrt{5}}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{12}$
	0	$-\frac{\sqrt{5}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{12} \quad 0$
	0	$0 \quad \frac{\sqrt{5}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{12}$
	0	$0 \quad 0 \quad -\frac{\sqrt{5}}{60} \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{12} \quad \frac{\sqrt{2}i}{12} \quad 0 \quad 0$
	0	$\frac{\sqrt{15}}{120} \quad 0 \quad -\frac{\sqrt{15}i}{120} \quad -\frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{15}}{120}$	$0 \quad \frac{\sqrt{15}i}{120} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0$
791	symmetry	$\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$
$\mathbb{M}_6^{(1,-1;a)}(B_{1u}, 2)$	0	$\frac{17\sqrt{11}}{264} \quad 0 \quad \frac{17\sqrt{11}i}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{264} \quad 0 \quad \frac{\sqrt{165}i}{264} \quad \frac{\sqrt{110}}{132} \quad 0$
	$\frac{17\sqrt{11}}{264}$	$0 \quad -\frac{17\sqrt{11}i}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{264} \quad 0 \quad -\frac{\sqrt{165}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{132}$
	0	$\frac{2\sqrt{11}i}{33} \quad 0 \quad -\frac{2\sqrt{11}}{33} \quad 0 \quad 0$
	$-\frac{2\sqrt{11}i}{33}$	$0 \quad -\frac{2\sqrt{11}}{33} \quad 0 \quad 0$
	$-\frac{\sqrt{11}}{132}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{165}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}}{132}$
	0	$\frac{\sqrt{11}}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{132} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}}{132} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{11}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{66}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{110}i}{132}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{132} \quad -\frac{\sqrt{66}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{132} \quad -\frac{\sqrt{110}i}{132} \quad 0$
	0	$0 \quad -\frac{\sqrt{33}}{264} \quad 0 \quad \frac{\sqrt{33}i}{264} \quad \frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{88} \quad 0 \quad \frac{\sqrt{55}i}{88} \quad 0 \quad 0$
	$-\frac{\sqrt{33}}{264}$	$0 \quad -\frac{\sqrt{33}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{44} \quad 0 \quad 0 \quad \frac{\sqrt{55}}{88} \quad 0 \quad -\frac{\sqrt{55}i}{88} \quad 0 \quad 0 \quad 0 \quad 0$
792	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(B_{2u}, 1)$	$\begin{bmatrix} 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
793	symmetry	$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ $\begin{bmatrix} 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{660} & 0 & -\frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & \frac{\sqrt{33}i}{66} & \frac{\sqrt{22}}{33} & 0 \\ -\frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & -\frac{\sqrt{22}}{33} \\ 0 & 0 & -\frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & -\frac{\sqrt{22}i}{33} \\ 0 & 0 & 0 & \frac{\sqrt{55}}{165} & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & 0 & -\frac{\sqrt{33}}{33} & \frac{\sqrt{22}i}{33} & 0 & 0 \\ \frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{33} \\ 0 & -\frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{22}}{33} & 0 \\ 0 & -\frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & 0 & 0 & \frac{\sqrt{110}}{55} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 \\ \frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & 0 & 0 & 0 & -\frac{\sqrt{110}}{55} & \frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 \end{bmatrix}$
794	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 1)$	0 0 $-\frac{5\sqrt{66}}{528}$ 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{\sqrt{11}}{44}$ 0 0 $-\frac{\sqrt{110}}{176}$ 0 0 $\frac{\sqrt{165}i}{264}$	
	0 0 0 $\frac{5\sqrt{66}}{528}$ $-\frac{3\sqrt{11}i}{88}$ 0 $-\frac{\sqrt{11}}{44}$ 0 0 0 0 $\frac{\sqrt{110}}{176}$ $-\frac{\sqrt{165}i}{264}$ 0	
	$-\frac{\sqrt{66}}{88}$ 0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{22}$ $-\frac{\sqrt{110}}{88}$ 0 0 0 0 $-\frac{\sqrt{165}}{132}$	
	0 $\frac{\sqrt{66}}{88}$ 0 0 $-\frac{\sqrt{11}}{44}$ 0 $\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{110}}{88}$ 0 0 $-\frac{\sqrt{165}i}{132}$ 0	
	0 $\frac{\sqrt{66}i}{88}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 $-\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0	
	$-\frac{\sqrt{66}i}{88}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 0 $\frac{\sqrt{11}}{22}$ $-\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 0	
	0 $-\frac{\sqrt{66}}{88}$ 0 $-\frac{\sqrt{66}i}{66}$ $-\frac{\sqrt{11}}{44}$ 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 0 $-\frac{\sqrt{165}i}{132}$ 0	
	$-\frac{\sqrt{66}}{88}$ 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{11}}{44}$ 0 0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 $-\frac{\sqrt{165}}{132}$	
	0 0 $-\frac{3\sqrt{22}}{176}$ 0 0 $\frac{\sqrt{33}i}{88}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 $\frac{\sqrt{330}}{176}$ 0 0 $-\frac{\sqrt{55}i}{88}$	
	0 0 0 $\frac{3\sqrt{22}}{176}$ $-\frac{\sqrt{33}i}{88}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 $-\frac{\sqrt{330}}{176}$ $\frac{\sqrt{55}i}{88}$ 0	
795	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$
$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 1)$	$\frac{5\sqrt{66}}{528}$ 0 0 0 0 $\frac{3\sqrt{11}}{88}$ 0 $\frac{\sqrt{11}i}{44}$ $-\frac{\sqrt{110}}{176}$ 0 0 0 0 $-\frac{\sqrt{165}}{264}$	
	0 $-\frac{5\sqrt{66}}{528}$ 0 0 $\frac{3\sqrt{11}}{88}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{110}}{176}$ 0 0 $-\frac{\sqrt{165}}{264}$ 0	
	0 0 $-\frac{\sqrt{66}}{88}$ 0 0 $\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{110}}{88}$ 0 0 $-\frac{\sqrt{165}i}{132}$	
	0 0 0 $\frac{\sqrt{66}}{88}$ $-\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{11}}{22}$ 0 0 0 0 $-\frac{\sqrt{110}}{88}$ $\frac{\sqrt{165}i}{132}$ 0	
	0 $\frac{\sqrt{66}}{66}$ 0 $\frac{\sqrt{66}i}{88}$ $-\frac{\sqrt{11}}{44}$ 0 0 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ $-\frac{\sqrt{165}}{132}$ 0	
	$\frac{\sqrt{66}}{66}$ 0 $-\frac{\sqrt{66}i}{88}$ 0 0 $\frac{\sqrt{11}}{44}$ 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 0 $\frac{\sqrt{165}}{132}$	
	0 $\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{88}$ 0 0 $\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0	
	$-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{88}$ 0 0 0 $-\frac{\sqrt{11}}{22}$ $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0	
	$-\frac{3\sqrt{22}}{176}$ 0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 $-\frac{\sqrt{33}i}{44}$ $-\frac{\sqrt{330}}{176}$ 0 0 0 0 $-\frac{\sqrt{55}}{88}$	
	0 $\frac{3\sqrt{22}}{176}$ 0 0 $-\frac{\sqrt{33}}{88}$ 0 $\frac{\sqrt{33}i}{44}$ 0 0 $\frac{\sqrt{330}}{176}$ 0 0 0 $-\frac{\sqrt{55}}{88}$ 0	
796	symmetry	$\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & \frac{1}{32} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{32} & 0 & 0 & -\frac{\sqrt{10}i}{32} \\ 0 & 0 & 0 & -\frac{1}{32} & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{32} & \frac{\sqrt{10}i}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{16} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & \frac{\sqrt{10}}{16} & 0 \\ 0 & 0 & -\frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & -\frac{\sqrt{10}}{16} \\ 0 & 0 & \frac{\sqrt{3}}{32} & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{32} & 0 & -\frac{\sqrt{30}i}{32} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{32} & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{32} & \frac{\sqrt{30}i}{32} & 0 \end{bmatrix}$
797	symmetry	$-\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} -\frac{1}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{\sqrt{15}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} \\ 0 & \frac{1}{32} & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{32} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{16} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 \\ -\frac{1}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & -\frac{3\sqrt{5}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} \\ 0 & -\frac{\sqrt{3}}{32} & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{32} & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 \end{bmatrix}$
798	symmetry	$\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 3)$	$0 \ 0 \ \frac{17\sqrt{55}}{1056} \ 0 \ 0 \ -\frac{37\sqrt{330}i}{5280} \ 0 \ \frac{\sqrt{330}}{110} \ 0 \ 0 \ -\frac{\sqrt{33}}{96} \ 0 \ 0 \ \frac{\sqrt{22}i}{96}$	
	$0 \ 0 \ 0 \ -\frac{17\sqrt{55}}{1056} \ \frac{37\sqrt{330}i}{5280} \ 0 \ \frac{\sqrt{330}}{110} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{33}}{96} \ -\frac{\sqrt{22}i}{96} \ 0$	
	$\frac{\sqrt{55}}{66} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{330}}{110} \ 0 \ \frac{\sqrt{330}i}{165} \ -\frac{\sqrt{33}}{66} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{22}}{66}$	
	$0 \ -\frac{\sqrt{55}}{66} \ 0 \ 0 \ \frac{\sqrt{330}}{110} \ 0 \ -\frac{\sqrt{330}i}{165} \ 0 \ 0 \ \frac{\sqrt{33}}{66} \ 0 \ 0 \ -\frac{\sqrt{22}}{66} \ 0$	
	$0 \ -\frac{\sqrt{55}i}{66} \ 0 \ \frac{7\sqrt{55}}{330} \ 0 \ 0 \ -\frac{\sqrt{330}}{165} \ 0 \ 0 \ \frac{\sqrt{33}i}{66} \ 0 \ -\frac{\sqrt{33}}{66} \ 0 \ 0$	
	$\frac{\sqrt{55}i}{66} \ 0 \ \frac{7\sqrt{55}}{330} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{330}}{165} \ -\frac{\sqrt{33}i}{66} \ 0 \ -\frac{\sqrt{33}}{66} \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{55}}{66} \ 0 \ \frac{29\sqrt{55}i}{2640} \ -\frac{\sqrt{330}}{240} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}}{66} \ 0 \ -\frac{\sqrt{33}i}{176} \ \frac{5\sqrt{22}}{528} \ 0$	
	$\frac{\sqrt{55}}{66} \ 0 \ -\frac{29\sqrt{55}i}{2640} \ 0 \ 0 \ \frac{\sqrt{330}}{240} \ 0 \ 0 \ -\frac{\sqrt{33}}{66} \ 0 \ \frac{\sqrt{33}i}{176} \ 0 \ 0 \ -\frac{5\sqrt{22}}{528}$	
	$0 \ 0 \ -\frac{9\sqrt{165}}{1760} \ 0 \ 0 \ \frac{\sqrt{110}i}{160} \ 0 \ -\frac{\sqrt{110}}{110} \ 0 \ 0 \ \frac{5\sqrt{11}}{352} \ 0 \ 0 \ -\frac{5\sqrt{66}i}{1056}$	
	$0 \ 0 \ 0 \ \frac{9\sqrt{165}}{1760} \ -\frac{\sqrt{110}i}{160} \ 0 \ -\frac{\sqrt{110}}{110} \ 0 \ 0 \ 0 \ 0 \ -\frac{5\sqrt{11}}{352} \ \frac{5\sqrt{66}i}{1056} \ 0$	
799	symmetry	$-\frac{\sqrt{210}xz(x^4 - 16x^2y^2 + 2x^2z^2 + 16y^4 - 16y^2z^2 + z^4)}{16}$
$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 3)$	$-\frac{17\sqrt{55}}{1056} \ 0 \ 0 \ 0 \ 0 \ -\frac{37\sqrt{330}}{5280} \ 0 \ -\frac{\sqrt{330}i}{110} \ -\frac{\sqrt{33}}{96} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{22}}{96}$	
	$0 \ \frac{17\sqrt{55}}{1056} \ 0 \ 0 \ -\frac{37\sqrt{330}}{5280} \ 0 \ \frac{\sqrt{330}i}{110} \ 0 \ 0 \ \frac{\sqrt{33}}{96} \ 0 \ 0 \ -\frac{\sqrt{22}}{96} \ 0$	
	$0 \ 0 \ \frac{\sqrt{55}}{66} \ 0 \ 0 \ -\frac{\sqrt{330}i}{110} \ 0 \ \frac{\sqrt{330}}{165} \ 0 \ 0 \ \frac{\sqrt{33}}{66} \ 0 \ 0 \ -\frac{\sqrt{22}i}{66}$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{55}}{66} \ \frac{\sqrt{330}i}{110} \ 0 \ \frac{\sqrt{330}}{165} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}}{66} \ \frac{\sqrt{22}i}{66} \ 0 \ 0$	
	$0 \ -\frac{29\sqrt{55}}{2640} \ 0 \ -\frac{\sqrt{55}i}{66} \ -\frac{\sqrt{330}}{240} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}}{176} \ 0 \ -\frac{\sqrt{33}i}{66} \ -\frac{5\sqrt{22}}{528} \ 0$	
	$-\frac{29\sqrt{55}}{2640} \ 0 \ \frac{\sqrt{55}i}{66} \ 0 \ 0 \ \frac{\sqrt{330}}{240} \ 0 \ 0 \ -\frac{\sqrt{33}}{176} \ 0 \ \frac{\sqrt{33}i}{66} \ 0 \ 0 \ \frac{5\sqrt{22}}{528}$	
	$0 \ -\frac{7\sqrt{55}i}{330} \ 0 \ \frac{\sqrt{55}}{66} \ 0 \ 0 \ \frac{\sqrt{330}}{165} \ 0 \ 0 \ -\frac{\sqrt{33}i}{66} \ 0 \ \frac{\sqrt{33}}{66} \ 0 \ 0$	
	$\frac{7\sqrt{55}i}{330} \ 0 \ \frac{\sqrt{55}}{66} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{330}}{165} \ \frac{\sqrt{33}i}{66} \ 0 \ \frac{\sqrt{33}}{66} \ 0 \ 0 \ 0$	
	$-\frac{9\sqrt{165}}{1760} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{110}}{160} \ 0 \ -\frac{\sqrt{110}i}{110} \ -\frac{5\sqrt{11}}{352} \ 0 \ 0 \ 0 \ 0 \ -\frac{5\sqrt{66}}{1056}$	
	$0 \ \frac{9\sqrt{165}}{1760} \ 0 \ 0 \ -\frac{\sqrt{110}}{160} \ 0 \ \frac{\sqrt{110}i}{110} \ 0 \ 0 \ \frac{5\sqrt{11}}{352} \ 0 \ 0 \ -\frac{5\sqrt{66}}{1056} \ 0$	
800	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,0;a)}(A_{1u})$	0	$-\frac{\sqrt{70}}{56} \quad 0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0$
	$-\frac{\sqrt{70}}{56}$	$0 \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{70}i}{56} \quad 0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0$
	$\frac{\sqrt{70}i}{56}$	$0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7}}{14}$
	0	$0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{7}i}{14}$
	0	$0 \quad 0 \quad -\frac{\sqrt{7}i}{14} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$
801	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{M}_2^{(1,0;a)}(B_{1u})$	0	$-\frac{\sqrt{210}}{168} \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad \frac{\sqrt{14}i}{56} \quad -\frac{\sqrt{21}}{42} \quad 0$
	$-\frac{\sqrt{210}}{168}$	$0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42}$
	0	$\frac{\sqrt{210}i}{168} \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0$
	$-\frac{\sqrt{210}i}{168}$	$0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{84}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42}$
	0	$\frac{\sqrt{210}}{84} \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{210}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad \frac{\sqrt{21}i}{42} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad \frac{\sqrt{42}i}{84} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0$
802	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,0;a)}(B_{2u})$	0	$\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0
	$-\frac{\sqrt{210}i}{168}$	0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 0
	0	$\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{21}}{42}$ 0
	$\frac{\sqrt{210}}{168}$	0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{21}}{42}$
	0	0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 $\frac{\sqrt{21}i}{42}$
	0	0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{21}i}{42}$ 0
	$\frac{\sqrt{210}}{84}$	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	$-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{105}}{42}$ $\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
803	symmetry	$\sqrt{3}yz$
$\mathbb{M}_{2,1}^{(1,0;a)}(E_u)$	0	0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 $\frac{\sqrt{21}i}{84}$
	0	0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{56}$ $-\frac{\sqrt{21}i}{84}$ 0
	$-\frac{\sqrt{210}}{168}$	0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 $\frac{\sqrt{21}}{84}$
	0	$\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 $\frac{\sqrt{21}}{84}$ 0
	0	$\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0
	$-\frac{\sqrt{210}i}{168}$	0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0
	0	$-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ $\frac{\sqrt{21}}{42}$ 0
	$-\frac{\sqrt{210}}{168}$	0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0
804	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,2}^{(1,0;a)}(E_u)$	$-\frac{\sqrt{210}}{168}$	0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ $-\frac{\sqrt{14}}{56}$ 0 0 0 0 $-\frac{\sqrt{21}}{84}$
	0	$\frac{\sqrt{210}}{168}$ 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 $\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{21}}{84}$ 0
	0	0 $-\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 $\frac{\sqrt{21}i}{84}$
	0	0 0 0 $\frac{\sqrt{210}}{168}$ $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ $-\frac{\sqrt{21}i}{84}$ 0
	0	$-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{21}}{42}$ 0
	$-\frac{\sqrt{210}}{168}$	0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{21}}{42}$
	0	$-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0
	$\frac{\sqrt{210}i}{168}$	0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ $\frac{\sqrt{42}}{84}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 0
805	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{10}}{80}$ 0 $-\frac{\sqrt{10}i}{80}$ $\frac{\sqrt{15}}{30}$ 0 0 0 0 $\frac{\sqrt{6}}{48}$ 0 $\frac{\sqrt{6}i}{48}$ 0 0
	$\frac{\sqrt{10}}{80}$	0 $\frac{\sqrt{10}i}{80}$ 0 0 0 $-\frac{\sqrt{15}}{30}$ 0 0 $\frac{\sqrt{6}}{48}$ 0 $-\frac{\sqrt{6}i}{48}$ 0 0 0
	0	$\frac{\sqrt{10}i}{80}$ 0 $\frac{\sqrt{10}}{80}$ 0 0 0 $-\frac{\sqrt{15}}{30}$ 0 0 $-\frac{\sqrt{6}i}{16}$ 0 $\frac{\sqrt{6}}{16}$ 0 0
	$-\frac{\sqrt{10}i}{80}$	0 $\frac{\sqrt{10}}{80}$ 0 0 0 0 0 $\frac{\sqrt{15}}{30}$ $\frac{\sqrt{6}i}{16}$ 0 $\frac{\sqrt{6}}{16}$ 0 0 0
	$-\frac{\sqrt{10}}{20}$	0 0 0 0 0 $-\frac{\sqrt{15}}{40}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 $-\frac{1}{8}$
	0	$\frac{\sqrt{10}}{20}$ 0 0 0 $-\frac{\sqrt{15}}{40}$ 0 $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 $-\frac{1}{8}$ 0
	0	0 0 $\frac{\sqrt{10}}{20}$ 0 0 $-\frac{\sqrt{15}i}{40}$ 0 $-\frac{\sqrt{15}}{30}$ 0 0 0 0 0 $\frac{i}{8}$
	0	0 0 0 $-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{15}i}{40}$ 0 $-\frac{\sqrt{15}}{30}$ 0 0 0 0 0 $-\frac{i}{8}$ 0
	0	$\frac{\sqrt{30}}{80}$ 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0
	$\frac{\sqrt{30}}{80}$	0 $-\frac{\sqrt{30}i}{80}$ 0 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 $\frac{\sqrt{2}i}{16}$ 0 0 0
806	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 9

No.	multipole	matrix	
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 2)$	0	$\frac{\sqrt{14}}{112} \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad -\frac{\sqrt{21}}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{17\sqrt{210}}{1680} \quad 0 \quad \frac{17\sqrt{210}i}{1680} \quad 0 \quad 0$	
	$\frac{\sqrt{14}}{112}i$	$0 \quad \frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{30} \quad 0 \quad 0 \quad \frac{17\sqrt{210}}{1680} \quad 0 \quad -\frac{17\sqrt{210}i}{1680} \quad 0 \quad 0 \quad 0$	
	0	$\frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{560} \quad 0 \quad \frac{\sqrt{210}}{560} \quad 0 \quad 0$	
	$-\frac{\sqrt{14}i}{112}$	$0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{30} \quad \frac{\sqrt{210}i}{560} \quad 0 \quad \frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{14}}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{40} \quad 0 \quad \frac{\sqrt{21}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{56}$	
	0	$-\frac{\sqrt{14}}{20}$	$0 \quad 0 \quad -\frac{\sqrt{21}}{40} \quad 0 \quad -\frac{\sqrt{21}i}{40} \quad 0 \quad -\frac{\sqrt{21}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{56} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{14}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{40} \quad 0 \quad -\frac{\sqrt{21}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{56}$	
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{20} \quad \frac{\sqrt{21}i}{40} \quad 0 \quad -\frac{\sqrt{21}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{56} \quad 0$	
	0	$0 \quad -\frac{\sqrt{42}}{80} \quad 0 \quad -\frac{\sqrt{42}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad 0$	
	$-\frac{\sqrt{42}}{80}$	$0 \quad 0 \quad \frac{\sqrt{42}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad 0$	
807	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$	
$\mathbb{M}_4^{(1,0;a)}(A_{2u})$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{5} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0$	
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{5} \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$	
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{5} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0$	
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{5} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0$	
	0	$0 \quad 0 \quad -\frac{\sqrt{6}}{10} \quad 0 \quad 0 \quad -\frac{i}{40} \quad 0 \quad \frac{1}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{10} \quad \frac{i}{40} \quad 0 \quad \frac{1}{40} \quad 0 \quad 0$	
	$-\frac{\sqrt{6}}{10}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{40} \quad 0 \quad \frac{i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	0	$\frac{\sqrt{6}}{10} \quad 0 \quad 0 \quad \frac{1}{40} \quad 0 \quad -\frac{i}{40} \quad 0 \quad 0$	
	0	$-\frac{3\sqrt{2}i}{40} \quad 0 \quad \frac{3\sqrt{2}}{40} \quad 0 \quad 0$	
	$\frac{3\sqrt{2}i}{40}$	$0 \quad \frac{3\sqrt{2}}{40} \quad 0 \quad 0$	
808	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,0;a)}(B_{1u})$	$0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad -\frac{\sqrt{105}}{70} \quad 0$	
	$-\frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{70}$	
	$0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}i}{560} \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{40} \quad 0 \quad \frac{\sqrt{7}i}{20} \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280}$	
	$0 \quad \frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{40} \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280} \quad 0$	
	$0 \quad 0 \quad -\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{40} \quad 0 \quad \frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad \frac{3\sqrt{105}i}{280}$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{280} \quad \frac{\sqrt{7}i}{40} \quad 0 \quad \frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad -\frac{3\sqrt{105}i}{280} \quad 0$	
	$0 \quad -\frac{3\sqrt{14}}{80} \quad 0 \quad \frac{3\sqrt{14}i}{80} \quad \frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{14}}{80} \quad 0 \quad -\frac{3\sqrt{14}i}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0$	
809	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{M}_4^{(1,0;a)}(B_{2u})$	$0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}i}{560} \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad -\frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad \frac{\sqrt{70}i}{560} \quad \frac{\sqrt{105}}{70} \quad 0$	
	$-\frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70}$	
	$0 \quad 0 \quad \frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{20} \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad \frac{3\sqrt{105}i}{280}$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{280} \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad -\frac{3\sqrt{105}i}{280} \quad 0$	
	$-\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{20} \quad 0 \quad \frac{\sqrt{7}i}{40} \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{105}}{280}$	
	$0 \quad \frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{20} \quad 0 \quad -\frac{\sqrt{7}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{105}}{280} \quad 0$	
	$0 \quad \frac{3\sqrt{14}i}{80} \quad 0 \quad \frac{3\sqrt{14}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad \frac{3\sqrt{210}}{560} \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{14}i}{80} \quad 0 \quad \frac{3\sqrt{14}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{35} \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad \frac{3\sqrt{210}}{560} \quad 0 \quad 0 \quad 0 \quad 0$	
810	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 1)$	0 0 $\frac{\sqrt{6}}{160}$ 0 0 $\frac{i}{40}$ 0 $-\frac{1}{10}$ 0 0 $-\frac{\sqrt{10}}{32}$ 0 0 $\frac{\sqrt{15}i}{40}$	
	0 0 0 $-\frac{\sqrt{6}}{160}$ $-\frac{i}{40}$ 0 $-\frac{1}{10}$ 0 0 0 0 $\frac{\sqrt{10}}{32}$ $-\frac{\sqrt{15}i}{40}$ 0	
	$-\frac{\sqrt{6}}{160}$ 0 0 0 0 $\frac{3}{20}$ 0 $-\frac{i}{40}$ $-\frac{\sqrt{10}}{160}$ 0 0 0 0 $\frac{\sqrt{15}}{20}$	
	0 $\frac{\sqrt{6}}{160}$ 0 0 $\frac{3}{20}$ 0 $\frac{i}{40}$ 0 0 $\frac{\sqrt{10}}{160}$ 0 0 $\frac{\sqrt{15}}{20}$ 0	
	0 $\frac{\sqrt{6}i}{160}$ 0 $\frac{\sqrt{6}}{40}$ 0 0 $-\frac{1}{40}$ 0 0 $\frac{\sqrt{10}i}{160}$ 0 $\frac{3\sqrt{10}}{40}$ 0 0	
	$-\frac{\sqrt{6}i}{160}$ 0 $\frac{\sqrt{6}}{40}$ 0 0 0 $\frac{1}{40}$ $-\frac{\sqrt{10}i}{160}$ 0 $\frac{3\sqrt{10}}{40}$ 0 0 0	
	0 $-\frac{\sqrt{6}}{20}$ 0 $\frac{\sqrt{6}i}{32}$ $\frac{1}{16}$ 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{160}$ $-\frac{\sqrt{15}}{80}$ 0	
	$-\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{6}i}{32}$ 0 0 $-\frac{1}{16}$ 0 0 $-\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{160}$ 0 0 $\frac{\sqrt{15}}{80}$	
	0 0 $\frac{9\sqrt{2}}{160}$ 0 0 $-\frac{\sqrt{3}i}{20}$ 0 $-\frac{\sqrt{3}}{10}$ 0 0 $\frac{\sqrt{30}}{160}$ 0 0 0	
	0 0 0 $-\frac{9\sqrt{2}}{160}$ $\frac{\sqrt{3}i}{20}$ 0 $-\frac{\sqrt{3}}{10}$ 0 0 0 $-\frac{\sqrt{30}}{160}$ 0 0 0	
811	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{6}}{160}$ 0 0 0 0 $\frac{1}{40}$ 0 $-\frac{i}{10}$ $-\frac{\sqrt{10}}{32}$ 0 0 0 0 $-\frac{\sqrt{15}}{40}$	
	0 $\frac{\sqrt{6}}{160}$ 0 0 $\frac{1}{40}$ 0 $-\frac{i}{10}$ 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0 $-\frac{\sqrt{15}}{40}$ 0	
	0 0 $-\frac{\sqrt{6}}{160}$ 0 0 $-\frac{3i}{20}$ 0 $-\frac{1}{40}$ 0 0 0 $\frac{\sqrt{10}}{160}$ 0 0 0 $\frac{\sqrt{15}i}{20}$	
	0 0 0 $\frac{\sqrt{6}}{160}$ $\frac{3i}{20}$ 0 $-\frac{1}{40}$ 0 0 0 0 $-\frac{\sqrt{10}}{160}$ 0 $-\frac{\sqrt{10}i}{20}$ $-\frac{\sqrt{15}i}{20}$ 0	
	0 $-\frac{\sqrt{6}}{32}$ 0 $\frac{\sqrt{6}i}{20}$ $\frac{1}{16}$ 0 0 0 0 $-\frac{\sqrt{10}}{160}$ 0 $-\frac{\sqrt{10}i}{20}$ $\frac{\sqrt{15}}{80}$ 0	
	$-\frac{\sqrt{6}}{32}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 $-\frac{1}{16}$ 0 0 $-\frac{\sqrt{10}}{160}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 $-\frac{\sqrt{15}}{80}$	
	0 $-\frac{\sqrt{6}i}{40}$ 0 $-\frac{\sqrt{6}}{160}$ 0 0 $\frac{1}{40}$ 0 0 $\frac{3\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{160}$ 0 0 0	
	$\frac{\sqrt{6}i}{40}$ 0 $-\frac{\sqrt{6}}{160}$ 0 0 0 $-\frac{1}{40}$ $-\frac{3\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{160}$ 0 0 0 0	
	$\frac{9\sqrt{2}}{160}$ 0 0 0 0 $\frac{\sqrt{3}}{20}$ 0 $-\frac{\sqrt{3}i}{10}$ $-\frac{\sqrt{30}}{160}$ 0 0 0 0 0	
	0 $-\frac{9\sqrt{2}}{160}$ 0 0 0 $\frac{\sqrt{3}}{20}$ 0 $\frac{\sqrt{3}i}{10}$ 0 0 $\frac{\sqrt{30}}{160}$ 0 0 0 0	
812	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 $\frac{\sqrt{42}}{1120}$ 0 0 $-\frac{\sqrt{7}i}{40}$ 0 $-\frac{3\sqrt{7}}{70}$ 0 0 $\frac{19\sqrt{70}}{1120}$ 0 0 $\frac{\sqrt{105}i}{56}$	
	0 0 0 $-\frac{\sqrt{42}}{1120}$ $\frac{\sqrt{7}i}{40}$ 0 $-\frac{3\sqrt{7}}{70}$ 0 0 0 0 $-\frac{19\sqrt{70}}{1120}$ $-\frac{\sqrt{105}i}{56}$ 0	
	$-\frac{\sqrt{42}}{1120}$ 0 0 0 0 $-\frac{\sqrt{7}}{140}$ 0 $\frac{\sqrt{7}i}{40}$ $\frac{23\sqrt{70}}{1120}$ 0 0 0 0 $-\frac{\sqrt{105}}{140}$	
	0 $\frac{\sqrt{42}}{1120}$ 0 0 $-\frac{\sqrt{7}}{140}$ 0 $-\frac{\sqrt{7}i}{40}$ 0 0 $-\frac{23\sqrt{70}}{1120}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0	
	0 $\frac{29\sqrt{42}i}{1120}$ 0 $\frac{\sqrt{42}}{140}$ 0 0 $-\frac{\sqrt{7}}{40}$ 0 0 $\frac{\sqrt{70}i}{224}$ 0 $\frac{\sqrt{70}}{140}$ 0 0	
	$-\frac{29\sqrt{42}i}{1120}$ 0 $\frac{\sqrt{42}}{140}$ 0 0 0 0 $\frac{\sqrt{7}}{40}$ $-\frac{\sqrt{70}i}{224}$ 0 $\frac{\sqrt{70}}{140}$ 0 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{1120}$ $-\frac{\sqrt{7}}{80}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{224}$ $-\frac{\sqrt{105}}{560}$ 0	
	$\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{1120}$ 0 0 $\frac{\sqrt{7}}{80}$ 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $\frac{\sqrt{70}i}{224}$ 0 0 $\frac{\sqrt{105}}{560}$	
	0 0 $-\frac{9\sqrt{14}}{160}$ 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{70}$ 0 0 $\frac{\sqrt{210}}{1120}$ 0 0 0	
	0 0 0 $\frac{9\sqrt{14}}{160}$ $\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{70}$ 0 0 0 $-\frac{\sqrt{210}}{1120}$ 0 0	
813	symmetry	$\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 2)$	$-\frac{\sqrt{42}}{1120}$ 0 0 0 0 $-\frac{\sqrt{7}}{40}$ 0 $\frac{3\sqrt{7}i}{70}$ $\frac{19\sqrt{70}}{1120}$ 0 0 0 0 $-\frac{\sqrt{105}}{56}$	
	0 $\frac{\sqrt{42}}{1120}$ 0 0 $-\frac{\sqrt{7}}{40}$ 0 $-\frac{3\sqrt{7}i}{70}$ 0 0 0 $-\frac{19\sqrt{70}}{1120}$ 0 0 $-\frac{\sqrt{105}}{56}$ 0	
	0 0 $-\frac{\sqrt{42}}{1120}$ 0 0 $\frac{\sqrt{7}i}{140}$ 0 $\frac{\sqrt{7}}{40}$ 0 0 $-\frac{23\sqrt{70}}{1120}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $\frac{\sqrt{42}}{1120}$ $-\frac{\sqrt{7}i}{140}$ 0 $\frac{\sqrt{7}}{40}$ 0 0 0 0 $\frac{23\sqrt{70}}{1120}$ $\frac{\sqrt{105}i}{140}$ 0	
	$0 -\frac{\sqrt{42}}{1120}$ 0 $-\frac{\sqrt{42}i}{56}$ $-\frac{\sqrt{7}}{80}$ 0 0 0 0 $-\frac{\sqrt{70}}{224}$ 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{560}$ 0	
	$-\frac{\sqrt{42}}{1120}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}}{80}$ 0 0 $-\frac{\sqrt{70}}{224}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{560}$	
	0 $-\frac{\sqrt{42}i}{140}$ 0 $-\frac{29\sqrt{42}}{1120}$ 0 0 $\frac{\sqrt{7}}{40}$ 0 0 $\frac{\sqrt{70}i}{140}$ 0 $\frac{\sqrt{70}}{224}$ 0 0	
	$\frac{\sqrt{42}i}{140}$ 0 $-\frac{29\sqrt{42}}{1120}$ 0 0 0 $-\frac{\sqrt{7}}{40}$ $-\frac{\sqrt{70}i}{140}$ 0 $\frac{\sqrt{70}}{224}$ 0 0 0	
	$-\frac{9\sqrt{14}}{160}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{70}$ $-\frac{\sqrt{210}}{1120}$ 0 0 0 0	
	0 $\frac{9\sqrt{14}}{160}$ 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{70}$ 0 0 $\frac{\sqrt{210}}{1120}$ 0 0 0	
814	symmetry	1

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_0^{(1,1;a)}(A_{1u})$		$\begin{bmatrix} 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 \\ -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{70}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \end{bmatrix}$
		$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
		$\mathbb{M}_2^{(1,1;a)}(A_{1u})$
815	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
		$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 \\ -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 \\ \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & \frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & \frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{35}}{35} \end{bmatrix}$
		$\sqrt{3}(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,1;a)}(B_{1u})$	0	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{120} & -\frac{\sqrt{35}}{42} & 0 \end{bmatrix}$
	$\frac{\sqrt{14}}{168}$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & \frac{\sqrt{35}}{42} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{280} & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{14}i}{168}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & 0 \end{bmatrix}$
	$\frac{5\sqrt{14}}{168}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{420} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{420} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{420} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{420} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 \end{bmatrix}$
	$-\frac{5\sqrt{42}}{168}$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 \end{bmatrix}$
817	symmetry	$\sqrt{3}xy$
$\mathbb{M}_2^{(1,1;a)}(B_{2u})$	0	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{14}i}{168}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{120} & -\frac{\sqrt{35}}{42} & 0 \end{bmatrix}$
	$-\frac{\sqrt{14}}{168}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & \frac{\sqrt{35}}{42} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{420} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{420} & 0 \end{bmatrix}$
	$-\frac{5\sqrt{14}}{168}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{420} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{420} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 \end{bmatrix}$
	$\frac{5\sqrt{42}i}{168}$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 \end{bmatrix}$
818	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,1;a)}(E_u)$	0 0 $-\frac{\sqrt{14}}{42}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 $-\frac{\sqrt{35}i}{42}$	
	0 0 0 $\frac{\sqrt{14}}{42}$ $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{105}$ $\frac{\sqrt{35}i}{42}$ 0	
	$\frac{\sqrt{14}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{210}}{105}$ 0 0 0 0 $-\frac{\sqrt{35}}{42}$	
	0 $-\frac{\sqrt{14}}{42}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0	
	0 $\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{210}i}{120}$ 0 $\frac{\sqrt{210}}{168}$ 0 0	
	$-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{210}i}{120}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{280}$ $\frac{\sqrt{35}}{105}$ 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{280}$ 0 0 $-\frac{\sqrt{35}}{105}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}}{70}$ 0 0 $\frac{\sqrt{105}i}{105}$	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{70}$ $-\frac{\sqrt{105}i}{105}$ 0	
819	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,2}^{(1,1;a)}(E_u)$	$\frac{\sqrt{14}}{42}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$	
	0 $-\frac{\sqrt{14}}{42}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{210}}{105}$ 0 0 $\frac{\sqrt{35}}{42}$ 0	
	0 0 $\frac{\sqrt{14}}{42}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 $-\frac{\sqrt{35}i}{42}$	
	0 0 0 $-\frac{\sqrt{14}}{42}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{210}}{105}$ $\frac{\sqrt{35}i}{42}$ 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{280}$ 0 $\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{35}}{105}$ 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{210}}{280}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 $\frac{\sqrt{35}}{105}$	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{120}$ 0 0 0	
	$\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{120}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}}{70}$ 0 0 $\frac{\sqrt{105}}{105}$ 0	
820	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 1)$	$0 \quad \frac{2\sqrt{165}}{165} \quad 0 \quad -\frac{2\sqrt{165}i}{165} \quad \frac{7\sqrt{110}}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{11}}{66} \quad 0 \quad -\frac{\sqrt{11}i}{66} \quad 0 \quad 0$	
	$\frac{2\sqrt{165}}{165} \quad 0 \quad \frac{2\sqrt{165}i}{165} \quad 0 \quad 0 \quad -\frac{7\sqrt{110}}{660} \quad 0 \quad 0 \quad -\frac{\sqrt{11}}{66} \quad 0 \quad \frac{\sqrt{11}i}{66} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{7\sqrt{165}i}{660} \quad 0 \quad -\frac{7\sqrt{165}}{660} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{330} \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{132} \quad 0 \quad -\frac{\sqrt{11}}{132} \quad 0 \quad 0$	
	$\frac{7\sqrt{165}i}{660} \quad 0 \quad -\frac{7\sqrt{165}}{660} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}}{330} \quad -\frac{\sqrt{11}i}{132} \quad 0 \quad -\frac{\sqrt{11}}{132} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{165}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{165} \quad 0 \quad \frac{\sqrt{110}i}{330} \quad -\frac{5\sqrt{11}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{66}}{66}$	
	$0 \quad -\frac{\sqrt{165}}{220} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{165} \quad 0 \quad -\frac{\sqrt{110}i}{330} \quad 0 \quad 0 \quad \frac{5\sqrt{11}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{66}}{66} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{165}}{220} \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{165} \quad 0 \quad -\frac{\sqrt{110}}{330} \quad 0 \quad 0 \quad -\frac{5\sqrt{11}}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{66}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{220} \quad \frac{\sqrt{110}i}{165} \quad 0 \quad -\frac{\sqrt{110}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{11}}{132} \quad \frac{\sqrt{66}i}{66} \quad 0$	
	$0 \quad -\frac{\sqrt{55}}{660} \quad 0 \quad -\frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{44} \quad 0 \quad -\frac{\sqrt{33}i}{44} \quad \frac{5\sqrt{22}}{132} \quad 0$	
	$-\frac{\sqrt{55}}{660} \quad 0 \quad \frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{44} \quad 0 \quad \frac{\sqrt{33}i}{44} \quad 0 \quad 0 \quad -\frac{5\sqrt{22}}{132}$	
821	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 2)$	$0 \quad -\frac{5\sqrt{231}}{462} \quad 0 \quad \frac{5\sqrt{231}i}{462} \quad -\frac{19\sqrt{154}}{4620} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{385}}{1155} \quad 0 \quad -\frac{\sqrt{385}i}{1155} \quad 0 \quad 0$	
	$-\frac{5\sqrt{231}}{462} \quad 0 \quad -\frac{5\sqrt{231}i}{462} \quad 0 \quad 0 \quad \frac{19\sqrt{154}}{4620} \quad 0 \quad 0 \quad -\frac{\sqrt{385}}{1155} \quad 0 \quad \frac{\sqrt{385}i}{1155} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{231}i}{84} \quad 0 \quad \frac{\sqrt{231}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{154}}{105} \quad 0 \quad 0 \quad \frac{\sqrt{385}i}{420} \quad 0 \quad -\frac{\sqrt{385}}{420} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{231}i}{84} \quad 0 \quad \frac{\sqrt{231}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{154}}{105} \quad -\frac{\sqrt{385}i}{420} \quad 0 \quad -\frac{\sqrt{385}}{420} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{231}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{2\sqrt{154}}{1155} \quad 0 \quad \frac{\sqrt{154}i}{210} \quad -\frac{5\sqrt{385}}{924} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}}{462}$	
	$0 \quad \frac{\sqrt{231}}{220} \quad 0 \quad 0 \quad -\frac{2\sqrt{154}}{1155} \quad 0 \quad -\frac{\sqrt{154}i}{210} \quad 0 \quad 0 \quad \frac{5\sqrt{385}}{924} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}}{462}$	
	$0 \quad 0 \quad \frac{\sqrt{231}}{220} \quad 0 \quad 0 \quad -\frac{2\sqrt{154}i}{1155} \quad 0 \quad -\frac{\sqrt{154}}{210} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{385}}{924} \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{462}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{231}}{220} \quad \frac{2\sqrt{154}i}{1155} \quad 0 \quad -\frac{\sqrt{154}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{385}}{924} \quad \frac{\sqrt{2310}i}{462} \quad 0$	
	$0 \quad \frac{\sqrt{77}}{660} \quad 0 \quad \frac{\sqrt{77}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}}{308} \quad 0 \quad -\frac{\sqrt{1155}i}{308} \quad \frac{5\sqrt{770}}{924} \quad 0$	
	$\frac{\sqrt{77}}{660} \quad 0 \quad -\frac{\sqrt{77}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}}{308} \quad 0 \quad \frac{\sqrt{1155}i}{308} \quad 0 \quad 0 \quad -\frac{5\sqrt{770}}{924}$	
822	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(A_{2u})$	0	$\frac{3\sqrt{11}i}{44} \quad 0 \quad \frac{3\sqrt{11}}{44} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{66}}{220} \quad 0 \quad 0 \quad \frac{\sqrt{165}i}{660} \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad 0$
	$-\frac{3\sqrt{11}i}{44}$	$0 \quad \frac{3\sqrt{11}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{66}}{220} \quad -\frac{\sqrt{165}i}{660} \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad 0 \quad 0$
	0	$\frac{3\sqrt{11}}{44} \quad 0 \quad -\frac{3\sqrt{11}i}{44} \quad \frac{3\sqrt{66}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad -\frac{\sqrt{165}i}{660} \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{11}}{44}$	$0 \quad \frac{3\sqrt{11}i}{44} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{66}}{220} \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad \frac{\sqrt{165}i}{660} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{11}}{110} \quad 0 \quad 0 \quad \frac{\sqrt{66}i}{330} \quad 0 \quad -\frac{\sqrt{66}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{11}}{110} \quad -\frac{\sqrt{66}i}{330} \quad 0 \quad -\frac{\sqrt{66}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{11}}{110}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{330} \quad 0 \quad -\frac{\sqrt{66}i}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{3\sqrt{11}}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{330} \quad 0 \quad \frac{\sqrt{66}i}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad \frac{\sqrt{33}i}{330} \quad 0 \quad -\frac{\sqrt{33}}{330} \quad 0 \quad 0$
	$-\frac{\sqrt{33}i}{330}$	$0 \quad 0 \quad -\frac{\sqrt{33}}{330} \quad 0 \quad 0$
823	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{M}_4^{(1,1;a)}(B_{1u})$	0	$\frac{\sqrt{77}}{1540} \quad 0 \quad \frac{\sqrt{77}i}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{17\sqrt{1155}}{4620} \quad 0 \quad \frac{17\sqrt{1155}i}{4620} \quad -\frac{\sqrt{770}}{220} \quad 0$
	$\frac{\sqrt{77}}{1540}$	$0 \quad -\frac{\sqrt{77}i}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{17\sqrt{1155}}{4620} \quad 0 \quad -\frac{17\sqrt{1155}i}{4620} \quad 0 \quad 0 \quad \frac{\sqrt{770}}{220}$
	0	$-\frac{\sqrt{77}i}{1540} \quad 0 \quad \frac{\sqrt{77}}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{420} \quad 0 \quad \frac{\sqrt{1155}}{420} \quad 0 \quad 0$
	$\frac{\sqrt{77}i}{1540}$	$0 \quad \frac{\sqrt{77}}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}i}{420} \quad 0 \quad \frac{\sqrt{1155}}{420} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{77}}{220}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{17\sqrt{462}}{2310} \quad 0 \quad \frac{\sqrt{462}i}{210} \quad -\frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}}{385}$
	0	$-\frac{\sqrt{77}}{220} \quad 0 \quad 0 \quad -\frac{17\sqrt{462}}{2310} \quad 0 \quad -\frac{\sqrt{462}i}{210} \quad 0 \quad 0 \quad \frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}}{385} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{77}}{220} \quad 0 \quad 0 \quad \frac{17\sqrt{462}i}{2310} \quad 0 \quad \frac{\sqrt{462}}{210} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{385}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{77}}{220} \quad -\frac{17\sqrt{462}i}{2310} \quad 0 \quad \frac{\sqrt{462}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{220} \quad -\frac{\sqrt{770}i}{385} \quad 0$
	0	$0 \quad -\frac{\sqrt{231}}{165} \quad 0 \quad \frac{\sqrt{231}i}{165} \quad -\frac{3\sqrt{154}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{385}}{770} \quad 0 \quad \frac{3\sqrt{385}i}{770} \quad 0 \quad 0$
	$-\frac{\sqrt{231}}{165}$	$0 \quad 0 \quad -\frac{\sqrt{231}i}{165} \quad 0 \quad 0 \quad \frac{3\sqrt{154}}{220} \quad 0 \quad 0 \quad \frac{3\sqrt{385}}{770} \quad 0 \quad -\frac{3\sqrt{385}i}{770} \quad 0 \quad 0 \quad 0$
824	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(B_{2u})$	0	$\frac{\sqrt{77}i}{1540} \quad 0 \quad -\frac{\sqrt{77}}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{420} \quad 0 \quad \frac{\sqrt{1155}}{420} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{77}i}{1540}$	$0 \quad -\frac{\sqrt{77}}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}i}{420} \quad 0 \quad \frac{\sqrt{1155}}{420} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{77}}{1540} \quad 0 \quad \frac{\sqrt{77}i}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{17\sqrt{1155}}{4620} \quad 0 \quad -\frac{17\sqrt{1155}i}{4620} \quad \frac{\sqrt{770}}{220} \quad 0 \quad 0$
	$\frac{\sqrt{77}}{1540}$	$0 \quad -\frac{\sqrt{77}i}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{17\sqrt{1155}}{4620} \quad 0 \quad \frac{17\sqrt{1155}i}{4620} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{770}}{220}$
	0	$0 \quad -\frac{\sqrt{77}}{220} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{462}i}{210} \quad 0 \quad \frac{17\sqrt{462}}{2310} \quad 0 \quad 0 \quad \frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{385}$
	0	$0 \quad 0 \quad \frac{\sqrt{77}}{220} \quad -\frac{\sqrt{462}i}{210} \quad 0 \quad \frac{17\sqrt{462}}{2310} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{220} \quad -\frac{\sqrt{770}i}{385} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{77}}{220}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{462}}{210} \quad 0 \quad -\frac{17\sqrt{462}i}{2310} \quad \frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{770}}{385}$
	0	$0 \quad -\frac{\sqrt{77}}{220} \quad 0 \quad 0 \quad \frac{\sqrt{462}}{210} \quad 0 \quad \frac{17\sqrt{462}i}{2310} \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{220} \quad 0 \quad 0 \quad -\frac{\sqrt{770}}{385} \quad 0 \quad 0$
	0	$\frac{\sqrt{231}i}{165} \quad 0 \quad \frac{\sqrt{231}}{165} \quad 0 \quad 0 \quad \frac{3\sqrt{154}}{220} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{385}i}{770} \quad 0 \quad -\frac{3\sqrt{385}}{770} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{231}i}{165}$	$0 \quad \frac{\sqrt{231}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{154}}{220} \quad -\frac{3\sqrt{385}i}{770} \quad 0 \quad -\frac{3\sqrt{385}}{770} \quad 0 \quad 0 \quad 0 \quad 0$
825	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 1)$	0	$0 \quad 0 \quad -\frac{\sqrt{11}}{220} \quad 0 \quad 0 \quad -\frac{7\sqrt{66}i}{660} \quad 0 \quad -\frac{3\sqrt{66}}{440} \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{132} \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{110}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{220} \quad \frac{7\sqrt{66}i}{660} \quad 0 \quad -\frac{3\sqrt{66}}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{132} \quad \frac{\sqrt{110}i}{110} \quad 0 \quad 0$
	$\frac{\sqrt{11}}{220}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{66}}{440} \quad 0 \quad \frac{\sqrt{66}i}{330} \quad \frac{\sqrt{165}}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{110}}{440}$
	0	$0 \quad -\frac{\sqrt{11}}{220} \quad 0 \quad 0 \quad -\frac{3\sqrt{66}}{440} \quad 0 \quad -\frac{\sqrt{66}i}{330} \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad 0 \quad -\frac{3\sqrt{110}}{440} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{11}i}{220} \quad 0 \quad -\frac{3\sqrt{11}}{440} \quad 0 \quad 0 \quad \frac{\sqrt{66}}{330} \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{660} \quad 0 \quad -\frac{3\sqrt{165}}{440} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{11}i}{220}$	$0 \quad -\frac{3\sqrt{11}}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{330} \quad \frac{\sqrt{165}i}{660} \quad 0 \quad -\frac{3\sqrt{165}i}{440} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{9\sqrt{11}}{440} \quad 0 \quad \frac{\sqrt{11}i}{44} \quad -\frac{\sqrt{66}}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{165}}{440} \quad 0 \quad \frac{\sqrt{165}i}{60} \quad -\frac{\sqrt{110}}{55} \quad 0 \quad 0$
	$-\frac{9\sqrt{11}}{440}$	$0 \quad -\frac{\sqrt{11}i}{44} \quad 0 \quad 0 \quad \frac{\sqrt{66}}{66} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{165}}{440} \quad 0 \quad -\frac{\sqrt{165}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{110}}{55} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{33}}{165} \quad 0 \quad 0 \quad -\frac{3\sqrt{22}i}{110} \quad 0 \quad -\frac{9\sqrt{22}}{440} \quad 0 \quad 0 \quad -\frac{3\sqrt{55}}{110} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{132}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{165} \quad \frac{3\sqrt{22}i}{110} \quad 0 \quad -\frac{9\sqrt{22}}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{55}}{110} \quad \frac{\sqrt{330}i}{132} \quad 0 \quad 0$
826	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 1)$	$\frac{\sqrt{11}}{220} 0 0 0 0 -\frac{7\sqrt{66}}{660} 0 \frac{3\sqrt{66}i}{440} -\frac{\sqrt{165}}{132} 0 0 0 0 \frac{\sqrt{110}}{110}$	
	$0 -\frac{\sqrt{11}}{220} 0 0 -\frac{7\sqrt{66}}{660} 0 -\frac{3\sqrt{66}i}{440} 0 0 \frac{\sqrt{165}}{132} 0 0 0 \frac{\sqrt{110}}{110} 0$	
	$0 0 \frac{\sqrt{11}}{220} 0 0 \frac{3\sqrt{66}i}{440} 0 \frac{\sqrt{66}}{330} 0 0 -\frac{\sqrt{165}}{660} 0 0 -\frac{3\sqrt{110}i}{440}$	
	$0 0 0 -\frac{\sqrt{11}}{220} -\frac{3\sqrt{66}i}{440} 0 \frac{\sqrt{66}}{330} 0 0 0 0 \frac{\sqrt{165}}{660} \frac{3\sqrt{110}i}{440} 0$	
	$0 -\frac{\sqrt{11}}{44} 0 \frac{9\sqrt{11}i}{440} -\frac{\sqrt{66}}{66} 0 0 0 0 \frac{\sqrt{165}}{60} 0 -\frac{3\sqrt{165}i}{440} \frac{\sqrt{110}}{55} 0$	
	$-\frac{\sqrt{11}}{44} 0 -\frac{9\sqrt{11}i}{440} 0 0 \frac{\sqrt{66}}{66} 0 0 \frac{\sqrt{165}}{60} 0 \frac{3\sqrt{165}i}{440} 0 0 -\frac{\sqrt{110}}{55}$	
	$0 \frac{3\sqrt{11}i}{440} 0 \frac{\sqrt{11}}{220} 0 0 -\frac{\sqrt{66}}{330} 0 0 -\frac{3\sqrt{165}i}{440} 0 -\frac{\sqrt{165}}{660} 0 0 0$	
	$-\frac{3\sqrt{11}i}{440} 0 \frac{\sqrt{11}}{220} 0 0 0 0 \frac{\sqrt{66}}{330} \frac{3\sqrt{165}i}{440} 0 -\frac{\sqrt{165}}{660} 0 0 0$	
	$-\frac{\sqrt{33}}{165} 0 0 0 0 \frac{3\sqrt{22}}{110} 0 -\frac{9\sqrt{22}i}{440} \frac{3\sqrt{55}}{110} 0 0 0 0 -\frac{\sqrt{330}}{132} 0$	
	$0 \frac{\sqrt{33}}{165} 0 0 \frac{3\sqrt{22}}{110} 0 \frac{9\sqrt{22}i}{440} 0 0 -\frac{3\sqrt{55}}{110} 0 0 0 -\frac{\sqrt{330}}{132} 0$	
827	symmetry	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 2)$	$0 0 -\frac{\sqrt{77}}{1540} 0 0 \frac{29\sqrt{462}i}{4620} 0 \frac{3\sqrt{462}}{440} 0 0 \frac{\sqrt{1155}}{420} 0 0 0$	
	$0 0 0 \frac{\sqrt{77}}{1540} -\frac{29\sqrt{462}i}{4620} 0 \frac{3\sqrt{462}}{440} 0 0 0 0 -\frac{\sqrt{1155}}{420} 0 0$	
	$\frac{\sqrt{77}}{1540} 0 0 0 0 \frac{3\sqrt{462}}{440} 0 -\frac{17\sqrt{462}i}{2310} \frac{17\sqrt{1155}}{4620} 0 0 0 0 -\frac{\sqrt{770}}{440}$	
	$0 -\frac{\sqrt{77}}{1540} 0 0 \frac{3\sqrt{462}}{440} 0 \frac{17\sqrt{462}i}{2310} 0 0 -\frac{17\sqrt{1155}}{4620} 0 0 0 -\frac{\sqrt{770}}{440}$	
	$0 \frac{3\sqrt{77}i}{220} 0 \frac{7\sqrt{77}}{440} 0 0 \frac{17\sqrt{462}}{2310} 0 0 \frac{\sqrt{1155}i}{924} 0 -\frac{\sqrt{1155}}{440} 0 0$	
	$-\frac{3\sqrt{77}i}{220} 0 \frac{7\sqrt{77}}{440} 0 0 0 0 -\frac{17\sqrt{462}}{2310} -\frac{\sqrt{1155}i}{924} 0 -\frac{\sqrt{1155}}{440} 0 0 0$	
	$0 \frac{\sqrt{77}}{88} 0 -\frac{3\sqrt{77}i}{220} \frac{\sqrt{462}}{210} 0 0 0 0 -\frac{\sqrt{1155}}{440} 0 \frac{\sqrt{1155}i}{924} -\frac{\sqrt{770}}{385} 0$	
	$\frac{\sqrt{77}}{88} 0 \frac{3\sqrt{77}i}{220} 0 0 -\frac{\sqrt{462}}{210} 0 0 -\frac{\sqrt{1155}}{440} 0 -\frac{\sqrt{1155}i}{924} 0 0 \frac{\sqrt{770}}{385}$	
	$0 0 \frac{\sqrt{231}}{165} 0 0 0 0 -\frac{3\sqrt{154}}{440} 0 0 0 -\frac{3\sqrt{385}}{770} 0 0 -\frac{\sqrt{2310}i}{924}$	
	$0 0 0 -\frac{\sqrt{231}}{165} 0 0 -\frac{3\sqrt{154}}{440} 0 0 0 0 \frac{3\sqrt{385}}{770} \frac{\sqrt{2310}i}{924} 0$	
828	symmetry	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 2)$	$\frac{\sqrt{77}}{1540}$	0 0 0 0 0 $\frac{29\sqrt{462}}{4620}$ 0 $-\frac{3\sqrt{462}i}{440}$ $\frac{\sqrt{1155}}{420}$ 0 0 0 0 0
	0	$-\frac{\sqrt{77}}{1540}$ 0 0 0 $\frac{29\sqrt{462}}{4620}$ 0 $\frac{3\sqrt{462}i}{440}$ 0 0 $-\frac{\sqrt{1155}}{420}$ 0 0 0 0
	0	0 $\frac{\sqrt{77}}{1540}$ 0 0 $-\frac{3\sqrt{462}i}{440}$ 0 $-\frac{17\sqrt{462}}{2310}$ 0 0 $-\frac{17\sqrt{1155}}{4620}$ 0 0 $-\frac{\sqrt{770}i}{440}$
	0	0 0 0 $-\frac{\sqrt{77}}{1540}$ $\frac{3\sqrt{462}i}{440}$ 0 $-\frac{17\sqrt{462}}{2310}$ 0 0 0 $\frac{17\sqrt{1155}}{4620}$ $\frac{\sqrt{770}i}{440}$ 0
	0	$\frac{3\sqrt{77}}{220}$ 0 $-\frac{\sqrt{77}i}{88}$ $\frac{\sqrt{462}}{210}$ 0 0 0 0 $\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{440}$ $\frac{\sqrt{770}}{385}$ 0
	$\frac{3\sqrt{77}}{220}$	0 $\frac{\sqrt{77}i}{88}$ 0 0 $-\frac{\sqrt{462}}{210}$ 0 0 $\frac{\sqrt{1155}}{924}$ 0 $\frac{\sqrt{1155}i}{440}$ 0 0 $-\frac{\sqrt{770}}{385}$
	0	$-\frac{7\sqrt{77}i}{440}$ 0 $-\frac{3\sqrt{77}}{220}$ 0 0 $-\frac{17\sqrt{462}}{2310}$ 0 0 $-\frac{\sqrt{1155}i}{440}$ 0 $\frac{\sqrt{1155}}{924}$ 0 0
	$\frac{7\sqrt{77}i}{440}$	0 $-\frac{3\sqrt{77}}{220}$ 0 0 0 0 $\frac{17\sqrt{462}}{2310}$ $\frac{\sqrt{1155}i}{440}$ 0 $\frac{\sqrt{1155}}{924}$ 0 0 0
	$\frac{\sqrt{231}}{165}$	0 0 0 0 0 0 $-\frac{3\sqrt{154}i}{440}$ $\frac{3\sqrt{385}}{770}$ 0 0 0 0 $-\frac{\sqrt{2310}}{924}$
	0	$-\frac{\sqrt{231}}{165}$ 0 0 0 0 0 $\frac{3\sqrt{154}i}{440}$ 0 0 $-\frac{3\sqrt{385}}{770}$ 0 0 $-\frac{\sqrt{2310}}{924}$ 0

bra: $= \langle f_2, \uparrow |, \langle f_2, \downarrow |, \langle f_1, \uparrow |, \langle f_1, \downarrow |, \langle f_{bz}, \uparrow |, \langle f_{bz}, \downarrow |, \langle f_3, \uparrow |, \langle f_3, \downarrow |, \langle f_{3x}, \uparrow |, \langle f_{3x}, \downarrow |, \langle f_{3y}, \uparrow |, \langle f_{3y}, \downarrow |, \langle f_{az}, \uparrow |, \langle f_{az}, \downarrow |$ ket: $= |f_2, \uparrow \rangle, |f_2, \downarrow \rangle, |f_1, \uparrow \rangle, |f_1, \downarrow \rangle, |f_{bz}, \uparrow \rangle, |f_{bz}, \downarrow \rangle, |f_3, \uparrow \rangle, |f_3, \downarrow \rangle, |f_{3x}, \uparrow \rangle, |f_{3x}, \downarrow \rangle, |f_{3y}, \uparrow \rangle, |f_{3y}, \downarrow \rangle, |f_{az}, \uparrow \rangle, |f_{az}, \downarrow \rangle$

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_0^{(a)}(A_{1g})$	$\frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
830	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(A_{1g})$	$-\frac{5\sqrt{42}}{84}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{5\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{5\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{5\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{5\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{21}$ 0
831	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(B_{1g})$	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{210}}{84}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0
	0	0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0

832 symmetry

 $\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(B_{2g})$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$	
	0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0	
	$\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0	
	0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0	
833	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g)$	0	0 0 0 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0
	0	0 0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0 0
	0	0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0
	0	0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0
	$-\frac{5\sqrt{21}}{84}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0
	0	$-\frac{5\sqrt{21}}{84}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0
834 symmetry		$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,2}^{(a)}(E_g)$	0	0	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0
	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0	0
	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0
	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{21}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{35}}{42}$	0	$\frac{\sqrt{21}}{42}$	0
	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{42}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{21}}{42}$	0	0	0	0	0	0	0
835	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	$\frac{\sqrt{33}}{44} 0 0 0 0 0 0 0 -\frac{\sqrt{55}}{44} 0 0 0 0 0$	
	$0 \frac{\sqrt{33}}{44} 0 0 0 0 0 0 0 -\frac{\sqrt{55}}{44} 0 0 0 0 0$	
	$0 0 \frac{\sqrt{33}}{44} 0 0 0 0 0 0 0 0 \frac{\sqrt{55}}{44} 0 0 0 0$	
	$0 0 0 \frac{\sqrt{33}}{44} 0 0 0 0 0 0 0 0 \frac{\sqrt{55}}{44} 0 0 0$	
	$0 0 0 0 -\frac{\sqrt{33}}{66} 0 0 0 0 0 0 0 0 0 0 0 0$	
	$0 0 0 0 0 -\frac{\sqrt{33}}{66} 0 0 0 0 0 0 0 0 0 0 0$	
	$0 0 0 0 0 0 -\frac{\sqrt{33}}{11} 0 0 0 0 0 0 0 0 0 0$	
	$0 0 0 0 0 0 0 -\frac{\sqrt{33}}{11} 0 0 0 0 0 0 0 0 0$	
	$-\frac{\sqrt{55}}{44} 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{132} 0 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{55}}{44} 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{132} 0 0 0 0 0 0$	
	$0 0 \frac{\sqrt{55}}{44} 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{132} 0 0 0 0 0$	
	$0 0 0 \frac{\sqrt{55}}{44} 0 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{132} 0 0 0$	
	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{22} 0$	
	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \frac{\sqrt{33}}{22}$	
836	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	$\frac{\sqrt{1155}}{308}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{77}}{44}$ 0 0 0 0 0
	0	$\frac{\sqrt{1155}}{308}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{77}}{44}$ 0 0 0 0
	0	0 $\frac{\sqrt{1155}}{308}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{77}}{44}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{1155}}{308}$ 0 0 0 0 0 0 $-\frac{\sqrt{77}}{44}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{1155}}{66}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{1155}}{66}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{77}}{44}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{924}$ 0 0 0 0 0
	0	$\frac{\sqrt{77}}{44}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{924}$ 0 0 0 0
	0	0 $-\frac{\sqrt{77}}{44}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{924}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{77}}{44}$ 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{924}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$
837 symmetry		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{Q}_4^{(a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0												
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0												
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0												
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0												
	0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 0 0												
	0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 0												
	0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 0 0 0 0												
	0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0												
	0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0												
	$-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0												
	0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0												
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0												
838 symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{Q}_4^{(a)}(B_{1g})$	0	0	0	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{231}}{154}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{231}}{154}$	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{385}}{77}$	0	0	0	0	0
	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{385}}{77}$	0	0	0	0
	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	$\frac{\sqrt{385}}{77}$	0	0	0
	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	$\frac{\sqrt{385}}{77}$	0	0
	0	0	0	0	$\frac{\sqrt{231}}{154}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{231}}{154}$	0	0	0	0	0	0	0
839	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$											

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(B_{2g})$	0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{231}}{154}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{231}}{154}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$	
	0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0	
	$-\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0 0 0	
	0 $-\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0	
$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$		

840 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0	
	0 0 0 0 0 $\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$	
	0 0 $\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0	
	0 0 0 $\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0	
	$-\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{330}}{88}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$	
	0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{88}$ 0 0 0	
$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$		
841	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$	0	0	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0	0
	0	0	0	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0
	0	0	0	0	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}}{88}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{330}}{88}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}}{88}$	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	$-\frac{\sqrt{330}}{88}$	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	$-\frac{\sqrt{330}}{88}$	0	0
	0	0	0	0	0	$-\frac{5\sqrt{22}}{88}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{5\sqrt{22}}{88}$	0	0	0	0	0	0	0	0
	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{88}$	0	0	0	0	0	0
	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{88}$	0	0	0	0	0

842 symmetry

$$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 $-\frac{3\sqrt{154}}{88}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 $-\frac{3\sqrt{154}}{88}$	
	0 0 $\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 0 $\frac{\sqrt{154}}{56}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 0 $\frac{\sqrt{154}}{56}$ 0 0 0	
	$-\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{2310}}{616}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{154}}{56}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$ 0	
	0 0 0 0 0 $\frac{\sqrt{154}}{56}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$	
	0 0 $-\frac{3\sqrt{154}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{154}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{616}$ 0 0 0	
843	symmetry	$-\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(a)}(E_g, 2)$	0	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$\frac{3\sqrt{154}}{88}$	0		
	0	0	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$\frac{3\sqrt{154}}{88}$		
	0	0	0	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$-\frac{\sqrt{154}}{56}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$-\frac{\sqrt{154}}{56}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$\frac{3\sqrt{154}}{616}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	0	$\frac{3\sqrt{154}}{616}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{154}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	0	
	0	0	0	0	0	$-\frac{\sqrt{154}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	
	0	0	0	0	0	0	$\frac{3\sqrt{154}}{616}$	0	0	0	0	0	0	0	
	$\frac{3\sqrt{154}}{88}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	0	
	0	$\frac{3\sqrt{154}}{88}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	
844	symmetry	$\frac{\sqrt{2}(2x^6 - 15x^4y^2 - 15x^4z^2 - 15x^2y^4 + 180x^2y^2z^2 - 15x^2z^4 + 2y^6 - 15y^4z^2 - 15y^2z^4 + 2z^6)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(a)}(A_{1g}, 1)$	$-\frac{\sqrt{231}}{1848}$	0	0	0	0	0	0	0	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{231}}{1848}$	0	0	0	0	0	0	0	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{231}}{1848}$	0	0	0	0	0	0	0	$\frac{\sqrt{385}}{88}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{231}}{1848}$	0	0	0	0	0	0	$\frac{\sqrt{385}}{88}$	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{231}}{154}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{2\sqrt{231}}{77}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{2\sqrt{231}}{77}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{231}}{616}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{231}}{616}$	0	0	0	0	0
	0	0	$\frac{\sqrt{385}}{88}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{231}}{616}$	0	0	0	0
	0	0	0	$\frac{\sqrt{385}}{88}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{231}}{616}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{231}}{462}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{231}}{462}$	0
845	symmetry	$-\frac{\sqrt{14}(x^6 - 15x^4z^2 + 15x^2z^4 + y^6 - 15y^4z^2 + 15y^2z^4 - 2z^6)}{8}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_6^{(a)}(A_{1g}, 2)$	$-\frac{\sqrt{33}}{264}$	0	0	0	0	0	0	0	$\frac{\sqrt{55}}{88}$	0	0	0	0	0
	0	$-\frac{\sqrt{33}}{264}$	0	0	0	0	0	0	$\frac{\sqrt{55}}{88}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{33}}{264}$	0	0	0	0	0	0	$-\frac{\sqrt{55}}{88}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{33}}{264}$	0	0	0	0	0	0	$-\frac{\sqrt{55}}{88}$	0	0	0
	0	0	0	0	$\frac{\sqrt{33}}{22}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{33}}{22}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{55}}{88}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{88}$	0	0	0	0	0
	0	$\frac{\sqrt{55}}{88}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{88}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{55}}{88}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{88}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{55}}{88}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{88}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{33}}{66}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{33}}{66}$	0
846	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
847	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{Q}_6^{(a)}(B_{1g}, 1)$		
848	symmetry	$\frac{\sqrt{42}(x-y)(x+y)(x^4 - 9x^2y^2 - 5x^2z^2 + y^4 - 5y^2z^2 + 5z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{Q}_6^{(a)}(B_{1g}, 2)$	$\frac{\sqrt{11}}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{264}$	0	0	0	0
	0	$\frac{\sqrt{11}}{8}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{264}$	0	0	0	0
	0	0	$-\frac{\sqrt{11}}{8}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{264}$	0	0	0
	0	0	0	$-\frac{\sqrt{11}}{8}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{264}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{66}$	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{66}$
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{165}}{264}$	0	0	0	0	0	0	0	$\frac{5\sqrt{11}}{88}$	0	0	0	0
	0	$-\frac{\sqrt{165}}{264}$	0	0	0	0	0	0	$\frac{5\sqrt{11}}{88}$	0	0	0	0
	0	0	$-\frac{\sqrt{165}}{264}$	0	0	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0	0
	0	0	0	$-\frac{\sqrt{165}}{264}$	0	0	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0
	0	0	0	0	$\frac{\sqrt{165}}{66}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{165}}{66}$	0	0	0	0	0	0	0
849	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$											

continued ...

Table 10

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(B_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$	
	0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0	
	$\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0	
	0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0 0 0	
851	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(a)}(E_g, 1)$	0 0 0 0 0 0 $-\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 0 0														
	0 0 0 0 0 0 0 $-\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 0														
	0 0 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{88}$ 0														
	0 0 0 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{88}$														
	0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 0														
	0 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 0														
	$-\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{44}$ 0 0 0 0 0														
	0 $-\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{44}$ 0 0 0 0 0														
	0 0 0 0 0 0 $-\frac{\sqrt{165}}{44}$ 0 0 0 0 0 0 0														
	0 0 0 0 0 0 0 $-\frac{\sqrt{165}}{44}$ 0 0 0 0 0 0														
	0 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{11}}{88}$ 0														
	0 0 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{11}}{88}$ 0														
$-\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$															
852	symmetry														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{6,2}^{(a)}(E_g, 1)$	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0	
	0	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0	0	0	0	0	0
	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0	0	0	0	0
	0	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{44}$	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{44}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0	0	0	0	0	0	0	$\frac{5\sqrt{11}}{88}$	0	0
	0	0	0	0	0	$\frac{\sqrt{165}}{88}$	0	0	0	0	0	0	0	0	$\frac{5\sqrt{11}}{88}$	0
	0	0	0	0	0	0	$-\frac{\sqrt{165}}{44}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{44}$	0	0	0	0	0	0	0	0
853	symmetry															$\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} \\ 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} \\ 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 \end{bmatrix}$
854	symmetry	$\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(a)}(E_g, 2)$	0 0 0 0 $\frac{\sqrt{6}}{32}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{32}$ 0
	0 0 0 0 0	$\frac{\sqrt{6}}{32}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{32}$
	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{6}}{32}$ 0 0 0 0	0 0 0 $-\frac{3\sqrt{10}}{32}$ 0 0 0 0 0 0
	0 $\frac{\sqrt{6}}{32}$ 0 0 0	0 0 0 0 0 $-\frac{3\sqrt{10}}{32}$ 0 0 0 0
	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
	0 0 0 0 $-\frac{3\sqrt{10}}{32}$	0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{6}}{32}$ 0
	0 0 0 0 0	$-\frac{3\sqrt{10}}{32}$ 0 0 0 0 0 0 0 0 $\frac{5\sqrt{6}}{32}$
	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{10}}{32}$ 0 0 0 0	0 0 0 $\frac{5\sqrt{6}}{32}$ 0 0 0 0 0 0
	0 $-\frac{\sqrt{10}}{32}$ 0 0 0	0 0 0 0 0 0 $\frac{5\sqrt{6}}{32}$ 0 0 0 0
855	symmetry	$\frac{\sqrt{210}yz(16x^4 - 16x^2y^2 - 16x^2z^2 + y^4 + 2y^2z^2 + z^4)}{16}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(a)}(E_g, 3)$	0	0	0	0	0	0	$\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0
	0	0	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	0	$-\frac{9\sqrt{22}}{352}$	0	0
	0	0	0	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	0	$-\frac{9\sqrt{22}}{352}$	0
	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{32}$	0	0	0	0
	0	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	$-\frac{\sqrt{22}}{32}$	0	0	0	0
	$\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	0
	0	$\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	0
	0	0	0	0	0	$-\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0
	0	0	$-\frac{9\sqrt{22}}{352}$	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	0	0	0	0
	0	0	0	$-\frac{9\sqrt{22}}{352}$	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	0	0	0
856	symmetry	$\frac{\sqrt{210}xz(x^4 - 16x^2y^2 + 2x^2z^2 + 16y^4 - 16y^2z^2 + z^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,2}^{(a)}(E_g, 3)$	0	0	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	0	$\frac{9\sqrt{22}}{352}$	0	
	0	0	0	0	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	0	$\frac{9\sqrt{22}}{352}$	
	0	0	0	0	0	0	$-\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	0	
	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	0	$\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	
	0	$\frac{17\sqrt{330}}{1056}$	0	0	0	0	0	$\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{330}}{66}$	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{22}}{32}$	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	
	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	0	0	
	$\frac{9\sqrt{22}}{352}$	0	0	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	0	
	0	$\frac{9\sqrt{22}}{352}$	0	0	0	0	0	0	0	$\frac{5\sqrt{330}}{1056}$	0	0	0	0	

857 symmetry

$$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$	0	0	$-\frac{\sqrt{21}i}{14}$	0	0	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{21}i}{14}$	$\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{21}i}{14}$	0	0	0	0	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{21}i}{14}$	0	0	$\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	$-\frac{\sqrt{21}i}{21}$	0	0	$-\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0
	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	$\frac{\sqrt{21}i}{21}$	$\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0	0
	0	$\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	$\frac{\sqrt{21}i}{21}$	0	0	0	0	$\frac{\sqrt{210}i}{168}$	0	$-\frac{\sqrt{210}}{168}$	0	0	0
	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	$-\frac{\sqrt{21}i}{21}$	0	0	$\frac{\sqrt{210}i}{168}$	0	$\frac{\sqrt{210}}{168}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	$-\frac{\sqrt{21}i}{42}$	0	0	0	$-\frac{\sqrt{14}}{28}$
	0	0	0	0	$-\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0	$\frac{\sqrt{21}i}{42}$	$\frac{\sqrt{14}}{28}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{210}i}{168}$	0	$\frac{\sqrt{210}}{168}$	$\frac{\sqrt{21}i}{42}$	0	0	0	0	$\frac{\sqrt{14}i}{28}$	0
	0	0	0	0	$\frac{\sqrt{210}i}{168}$	0	$-\frac{\sqrt{210}}{168}$	0	0	$-\frac{\sqrt{21}i}{42}$	0	0	$\frac{\sqrt{14}i}{28}$	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{14}}{28}$	0	$-\frac{\sqrt{14}i}{28}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{14}}{28}$	0	$-\frac{\sqrt{14}i}{28}$	0	0	0	0

858 symmetry

 $\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(B_{1g})$	0	0 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0
	$-\frac{\sqrt{42}}{56}$	0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0
	0	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0
	$-\frac{\sqrt{42}i}{56}$	0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$
	0	0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0

859 symmetry

 $\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(B_{2g})$	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0	
	0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0	
	$\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$	
	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0	
	0 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$	
	0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $-\frac{\sqrt{42}}{28}$ 0 0 0	

860 symmetry

 $\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)$	0	0	0	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{3\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{7}}{28}$	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0
	$-\frac{3\sqrt{7}}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0	$\frac{\sqrt{7}}{14}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{42}i}{56}$	0	0	$\frac{\sqrt{7}}{14}$	0	0	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{42}i}{56}$	$-\frac{\sqrt{7}}{14}$	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{42}i}{28}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	0	0	$\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}i}{28}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{28}$	0	0	0	0	0	0	0
$\sqrt{3}xz$																

861 symmetry

 $\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)$	0	0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{3\sqrt{7}i}{28}$	0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0
	$-\frac{\sqrt{42}i}{56}$	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0
$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$		

862 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$	0 0 $\frac{i}{6}$ 0 0 $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}}{24}$	
	0 0 0 $-\frac{i}{6}$ $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0	
	$-\frac{i}{6}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$	
	0 $\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0	
	0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 $-\frac{i}{6}$ 0 0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0	
	$\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 $\frac{i}{6}$ $\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0	
	0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ $\frac{i}{6}$ 0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0	
	$-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{6}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 0 $-\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}}{24}$	
	0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 $\frac{i}{6}$ $\frac{\sqrt{6}}{24}$ 0	
	0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ $\frac{i}{6}$ 0 0 0 0 $\frac{\sqrt{6}i}{24}$	
	0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 $-\frac{i}{6}$ 0 0 $\frac{\sqrt{6}i}{24}$ 0	
	0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0	
	$\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0	
$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$		

863 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	0	0	$\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{168}$	0	0	0	0	0	0	$-\frac{\sqrt{14}}{24}$
	0	0	0	$-\frac{\sqrt{35}i}{42}$	$-\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{168}$	0	0	0	0	0	$\frac{\sqrt{14}}{24}$	0	
	$-\frac{\sqrt{35}i}{42}$	0	0	0	0	$-\frac{\sqrt{210}i}{168}$	0	$\frac{\sqrt{210}}{168}$	0	0	0	0	0	$-\frac{\sqrt{14}i}{24}$	
	0	$\frac{\sqrt{35}i}{42}$	0	0	$-\frac{\sqrt{210}i}{168}$	0	$-\frac{\sqrt{210}}{168}$	0	0	0	0	0	$-\frac{\sqrt{14}i}{24}$	0	
	0	$-\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{168}$	0	0	$-\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{14}}{24}$	0	$\frac{\sqrt{14}i}{24}$	0	0	
	$\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{168}$	0	0	0	0	$\frac{\sqrt{35}i}{42}$	$-\frac{\sqrt{14}}{24}$	0	$\frac{\sqrt{14}i}{24}$	0	0	0	
	0	$-\frac{\sqrt{210}i}{168}$	0	$-\frac{\sqrt{210}}{168}$	$\frac{\sqrt{35}i}{42}$	0	0	0	0	$\frac{\sqrt{14}i}{24}$	0	$-\frac{\sqrt{14}}{24}$	0	0	
	$-\frac{\sqrt{210}i}{168}$	0	$\frac{\sqrt{210}}{168}$	0	0	$-\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{14}i}{24}$	0	$\frac{\sqrt{14}}{24}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{14}}{24}$	0	$-\frac{\sqrt{14}i}{24}$	0	0	$-\frac{\sqrt{35}i}{42}$	0	0	$-\frac{\sqrt{210}}{168}$	
	0	0	0	0	$\frac{\sqrt{14}}{24}$	0	$-\frac{\sqrt{14}i}{24}$	0	0	0	$\frac{\sqrt{35}i}{42}$	$\frac{\sqrt{210}}{168}$	0		
	0	0	0	0	0	$-\frac{\sqrt{14}i}{24}$	0	$\frac{\sqrt{14}}{24}$	$\frac{\sqrt{35}i}{42}$	0	0	0	0	$\frac{\sqrt{210}i}{168}$	
	0	0	0	0	$-\frac{\sqrt{14}i}{24}$	0	$-\frac{\sqrt{14}}{24}$	0	0	$-\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{210}i}{168}$	0	
	0	$\frac{\sqrt{14}}{24}$	0	$\frac{\sqrt{14}i}{24}$	0	0	0	0	$\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0	
	$-\frac{\sqrt{14}}{24}$	0	$\frac{\sqrt{14}i}{24}$	0	0	0	0	$-\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0	0	

864 symmetry

 $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_4^{(1,-1;a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$															
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0															
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$															
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0															
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0															
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0															
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0															
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0															
	0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0															
	0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0															
	0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0															
	0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0															
	$\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0															
865	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(B_{1g})$	0	0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}}{168}$
	0	0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{42}}{168}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{42}i}{168}$
	0	0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}i}{168}$ 0
	0	$\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0
	$-\frac{\sqrt{70}}{56}$	0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0
	0	$-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ $\frac{\sqrt{7}i}{14}$ 0
	$-\frac{\sqrt{70}i}{56}$	0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$
	0	0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$
	$\frac{\sqrt{7}i}{14}$	0 0 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0
	0	$-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0
	0	$\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0
	$-\frac{\sqrt{42}}{168}$	0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0

866 symmetry

$$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_4^{(1,-1;a)}(B_{2g})$	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$-\frac{\sqrt{70}}{56}$	$\frac{\sqrt{7}i}{14}$	0	0	0	0	$\frac{\sqrt{42}i}{168}$		
	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{42}i}{168}$	0		
	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{42}}{168}$		
	0	0	0	0	$-\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{42}}{168}$	0		
	0	$\frac{\sqrt{70}i}{56}$	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{168}$	0	$-\frac{\sqrt{42}}{168}$	$\frac{\sqrt{7}i}{14}$	0		
	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{168}$	0	$\frac{\sqrt{42}}{168}$	0	0	$-\frac{\sqrt{7}i}{14}$		
	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0		
	$-\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0	0		
	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$\frac{\sqrt{42}i}{168}$	0	$\frac{\sqrt{42}}{168}$	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$		
	0	$\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{42}i}{168}$	0	$-\frac{\sqrt{42}}{168}$	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0		
	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{42}}{168}$	0	$-\frac{\sqrt{42}i}{168}$	0	0	0	0	0	$-\frac{\sqrt{70}}{56}$		
	0	0	0	$\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{42}}{168}$	0	$-\frac{\sqrt{42}i}{168}$	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	0		
	0	$-\frac{\sqrt{42}i}{168}$	0	$-\frac{\sqrt{42}}{168}$	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0		
	$-\frac{\sqrt{42}i}{168}$	0	$\frac{\sqrt{42}}{168}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	$-\frac{\sqrt{70}}{56}$	0	0	0		

867 symmetry

 $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{15}}{24}$ $\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 0 $-\frac{1}{8}$ $\frac{\sqrt{6}i}{48}$ 0
	0	0 0 $\frac{\sqrt{15}}{24}$ 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 $\frac{1}{8}$ 0 0 $-\frac{\sqrt{6}i}{48}$
	0	$\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0 $\frac{1}{8}$ 0 0 0 0
	$-\frac{\sqrt{15}}{24}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ $-\frac{1}{8}$ 0 0 0 0 0
	$-\frac{\sqrt{10}i}{16}$	0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ $-\frac{\sqrt{6}i}{48}$ 0 0 0 0 0
	0	$\frac{\sqrt{10}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 $\frac{\sqrt{6}i}{48}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 $\frac{\sqrt{6}i}{48}$ 0 0 $\frac{1}{8}$
	0	0 0 0 $\frac{\sqrt{10}i}{16}$ $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{48}$ $-\frac{1}{8}$ 0
	0	0 0 0 $-\frac{1}{8}$ $\frac{\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ $-\frac{\sqrt{10}i}{16}$ 0
	0	$\frac{1}{8}$ 0 0 0 $-\frac{\sqrt{6}i}{48}$ 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 $\frac{\sqrt{10}i}{16}$
	0	$\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{48}$ 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0
	$-\frac{1}{8}$	0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{48}$ $\frac{\sqrt{15}}{24}$ 0 0 0 0 0
	$-\frac{\sqrt{6}i}{48}$	0 0 0 0 0 0 0 $-\frac{1}{8}$ $\frac{\sqrt{10}i}{16}$ 0 0 0 0 0
	0	$\frac{\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{1}{8}$ 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0

868 symmetry

 $\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$\frac{i}{8}$	0	0	0	0
	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{i}{8}$	0	0	0	0	0
	0	$\frac{\sqrt{15}i}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{i}{8}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0
	$\frac{\sqrt{15}i}{24}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$-\frac{i}{8}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0
	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	$\frac{\sqrt{6}i}{48}$	0
	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{i}{8}$	0	0
	0	$\frac{\sqrt{10}i}{16}$	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{i}{8}$	0	0	0	0
	0	0	0	$\frac{i}{8}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	$\frac{\sqrt{15}i}{24}$	0
	0	0	$\frac{i}{8}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	0	0
	0	$-\frac{i}{8}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0
	$-\frac{i}{8}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0
	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	$\frac{i}{8}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0
	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$\frac{i}{8}$	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0

869 symmetry

$$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	0	0	0	$-\frac{\sqrt{105}}{168}$	$\frac{\sqrt{70}i}{112}$	0	0	0	0	$\frac{\sqrt{7}i}{14}$	0	$\frac{3\sqrt{7}}{56}$	$-\frac{\sqrt{42}i}{48}$	0		
	0	0	$\frac{\sqrt{105}}{168}$	0	0	$-\frac{\sqrt{70}i}{112}$	0	0	$\frac{\sqrt{7}i}{14}$	0	$-\frac{3\sqrt{7}}{56}$	0	0	$\frac{\sqrt{42}i}{48}$		
	0	$\frac{\sqrt{105}}{168}$	0	0	0	0	$\frac{\sqrt{70}i}{112}$	0	0	$-\frac{3\sqrt{7}}{56}$	0	$\frac{\sqrt{7}i}{14}$	0	0		
	$-\frac{\sqrt{105}}{168}$	0	0	0	0	0	0	$-\frac{\sqrt{70}i}{112}$	$\frac{3\sqrt{7}}{56}$	0	$\frac{\sqrt{7}i}{14}$	0	0	0		
	$-\frac{\sqrt{70}i}{112}$	0	0	0	0	0	0	$\frac{\sqrt{105}}{168}$	$\frac{\sqrt{42}i}{48}$	0	0	0	0	$\frac{\sqrt{7}i}{14}$		
	0	$\frac{\sqrt{70}i}{112}$	0	0	0	0	$-\frac{\sqrt{105}}{168}$	0	0	$-\frac{\sqrt{42}i}{48}$	0	0	$\frac{\sqrt{7}i}{14}$	0		
	0	0	$-\frac{\sqrt{70}i}{112}$	0	0	$-\frac{\sqrt{105}}{168}$	0	0	0	$-\frac{\sqrt{42}i}{48}$	0	0	$-\frac{3\sqrt{7}}{56}$			
	0	0	0	$\frac{\sqrt{70}i}{112}$	$\frac{\sqrt{105}}{168}$	0	0	0	0	0	$\frac{\sqrt{42}i}{48}$	$\frac{3\sqrt{7}}{56}$	0			
	0	$-\frac{\sqrt{7}i}{14}$	0	$\frac{3\sqrt{7}}{56}$	$-\frac{\sqrt{42}i}{48}$	0	0	0	0	0	$\frac{\sqrt{105}}{168}$	$-\frac{\sqrt{70}i}{112}$	0			
	$-\frac{\sqrt{7}i}{14}$	0	$-\frac{3\sqrt{7}}{56}$	0	0	$\frac{\sqrt{42}i}{48}$	0	0	0	0	$-\frac{\sqrt{105}}{168}$	0	0	$\frac{\sqrt{70}i}{112}$		
	0	$-\frac{3\sqrt{7}}{56}$	0	$-\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{42}i}{48}$	0	0	$-\frac{\sqrt{105}}{168}$	0	0	0	0		
	$\frac{3\sqrt{7}}{56}$	0	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$-\frac{\sqrt{42}i}{48}$	$\frac{\sqrt{105}}{168}$	0	0	0	0	0		
	$\frac{\sqrt{42}i}{48}$	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	0	$\frac{3\sqrt{7}}{56}$	$\frac{\sqrt{70}i}{112}$	0	0	0	0	0		
	0	$-\frac{\sqrt{42}i}{48}$	0	0	$-\frac{\sqrt{7}i}{14}$	0	$-\frac{3\sqrt{7}}{56}$	0	0	$-\frac{\sqrt{70}i}{112}$	0	0	0	0		

870 symmetry

$$-\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{70}i}{112}$ 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 $-\frac{\sqrt{70}i}{112}$ $-\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{105}i}{168}$ 0 0 $-\frac{\sqrt{70}i}{112}$ 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{42}i}{48}$ 0	
	$\frac{\sqrt{105}i}{168}$ 0 0 0 0 $\frac{\sqrt{70}i}{112}$ 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{42}i}{48}$	
	0 0 $\frac{\sqrt{70}i}{112}$ 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{42}i}{48}$ 0 0 $\frac{\sqrt{7}}{14}$	
	0 0 0 $-\frac{\sqrt{70}i}{112}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 $-\frac{\sqrt{42}i}{48}$ $-\frac{\sqrt{7}}{14}$ 0	
	$-\frac{\sqrt{70}i}{112}$ 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{42}i}{48}$ 0 0 0 0 $\frac{3\sqrt{7}i}{56}$	
	0 $\frac{\sqrt{70}i}{112}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 $-\frac{\sqrt{42}i}{48}$ 0 0 $\frac{3\sqrt{7}i}{56}$ 0	
	0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{42}i}{48}$ 0 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0	
	$\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{42}i}{48}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0	
	0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{42}i}{48}$ 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{70}i}{112}$ 0	
	$\frac{3\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{42}i}{48}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 $-\frac{\sqrt{70}i}{112}$	
	0 0 $\frac{\sqrt{42}i}{48}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{70}i}{112}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{48}$ $\frac{\sqrt{7}}{14}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{70}i}{112}$ 0 0 0	

871 symmetry

$$\frac{\sqrt{2}(2x^6 - 15x^4y^2 - 15x^4z^2 - 15x^2y^4 + 180x^2y^2z^2 - 15x^2z^4 + 2y^6 - 15y^4z^2 - 15y^2z^4 + 2z^6)}{8}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 1)$	0	0 $-\frac{\sqrt{154}i}{616}$ 0 0 $\frac{\sqrt{231}}{1848}$ 0 $-\frac{\sqrt{231}i}{308}$ 0 0 $\frac{\sqrt{2310}i}{264}$ 0 0 $\frac{\sqrt{385}}{88}$
	0	0 0 0 $\frac{\sqrt{154}i}{616}$ $-\frac{\sqrt{231}}{1848}$ 0 $-\frac{\sqrt{231}i}{308}$ 0 0 0 0 $-\frac{\sqrt{2310}i}{264}$ $-\frac{\sqrt{385}}{88}$ 0
	$\frac{\sqrt{154}i}{616}$	0 0 0 0 0 $-\frac{\sqrt{231}i}{1848}$ 0 $-\frac{\sqrt{231}}{308}$ $\frac{\sqrt{2310}i}{264}$ 0 0 0 0 $\frac{\sqrt{385}i}{88}$
	0	$-\frac{\sqrt{154}i}{616}$ 0 0 0 $-\frac{\sqrt{231}i}{1848}$ 0 $\frac{\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{2310}i}{264}$ 0 0 $\frac{\sqrt{385}i}{88}$ 0
	0	$-\frac{\sqrt{231}}{1848}$ 0 0 $\frac{\sqrt{231}i}{1848}$ 0 0 $\frac{\sqrt{154}i}{154}$ 0 0 $\frac{5\sqrt{385}}{616}$ 0 $\frac{5\sqrt{385}i}{616}$ 0 0
	$\frac{\sqrt{231}}{1848}$	0 $\frac{\sqrt{231}i}{1848}$ 0 0 0 0 $-\frac{\sqrt{154}i}{154}$ $-\frac{5\sqrt{385}}{616}$ 0 $\frac{5\sqrt{385}i}{616}$ 0 0 0
	0	$\frac{\sqrt{231}i}{308}$ 0 $\frac{\sqrt{231}}{308}$ $-\frac{\sqrt{154}i}{154}$ 0 0 0 0 $\frac{\sqrt{385}i}{308}$ 0 $-\frac{\sqrt{385}}{308}$ 0 0
	$\frac{\sqrt{231}i}{308}$	0 $-\frac{\sqrt{231}}{308}$ 0 0 $\frac{\sqrt{154}i}{154}$ 0 0 $\frac{\sqrt{385}i}{308}$ 0 $\frac{\sqrt{385}}{308}$ 0 0 0
	0	0 $-\frac{\sqrt{2310}i}{264}$ 0 0 $-\frac{5\sqrt{385}}{616}$ 0 $-\frac{\sqrt{385}i}{308}$ 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 0 $-\frac{5\sqrt{231}}{1848}$
	0	0 0 0 $\frac{\sqrt{2310}i}{264}$ $\frac{5\sqrt{385}}{616}$ 0 $-\frac{\sqrt{385}i}{308}$ 0 0 0 0 $\frac{5\sqrt{154}i}{616}$ $\frac{5\sqrt{231}}{1848}$ 0
	$-\frac{\sqrt{2310}i}{264}$	0 0 0 0 0 $-\frac{5\sqrt{385}i}{616}$ 0 $\frac{\sqrt{385}}{308}$ $\frac{5\sqrt{154}i}{616}$ 0 0 0 0 $\frac{5\sqrt{231}i}{1848}$
	0	$\frac{\sqrt{2310}i}{264}$ 0 0 $-\frac{5\sqrt{385}i}{616}$ 0 $-\frac{\sqrt{385}}{308}$ 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 0 $\frac{5\sqrt{231}i}{1848}$ 0
	0	$-\frac{\sqrt{385}}{88}$ 0 $-\frac{\sqrt{385}i}{88}$ 0 0 0 0 0 $\frac{5\sqrt{231}}{1848}$ 0 $-\frac{5\sqrt{231}i}{1848}$ 0 0
	$\frac{\sqrt{385}}{88}$	0 $-\frac{\sqrt{385}i}{88}$ 0 0 0 0 0 0 $-\frac{5\sqrt{231}}{1848}$ 0 $-\frac{5\sqrt{231}i}{1848}$ 0 0

$$-\frac{\sqrt{14}(x^6 - 15x^4z^2 + 15x^2z^4 + y^6 - 15y^4z^2 + 15y^2z^4 - 2z^6)}{8}$$

872 symmetry

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 2)$	0	0	$-\frac{\sqrt{22}i}{88}$	0	0	$-\frac{\sqrt{33}}{88}$	0	$-\frac{\sqrt{33}i}{132}$	0	0	$-\frac{\sqrt{330}i}{264}$	0	0	$-\frac{\sqrt{55}}{88}$			
	0	0	0	$\frac{\sqrt{22}i}{88}$	$\frac{\sqrt{33}}{88}$	0	$-\frac{\sqrt{33}i}{132}$	0	0	0	$\frac{\sqrt{330}i}{264}$	$\frac{\sqrt{55}}{88}$	$\frac{\sqrt{55}}{88}$	0			
	$\frac{\sqrt{22}i}{88}$	0	0	0	0	$\frac{\sqrt{33}i}{88}$	0	$-\frac{\sqrt{33}}{132}$	$-\frac{\sqrt{330}i}{264}$	0	0	0	0	$-\frac{\sqrt{55}i}{88}$			
	0	$-\frac{\sqrt{22}i}{88}$	0	0	$\frac{\sqrt{33}i}{88}$	0	$\frac{\sqrt{33}}{132}$	0	0	$\frac{\sqrt{330}i}{264}$	0	0	$-\frac{\sqrt{55}i}{88}$	0			
	0	$\frac{\sqrt{33}}{88}$	0	$-\frac{\sqrt{33}i}{88}$	0	0	$\frac{\sqrt{22}i}{22}$	0	0	$\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{88}$	0	0	0		
	$-\frac{\sqrt{33}}{88}$	0	$-\frac{\sqrt{33}i}{88}$	0	0	0	0	$-\frac{\sqrt{22}i}{22}$	$-\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{88}$	0	0	0			
	0	$\frac{\sqrt{33}i}{132}$	0	$\frac{\sqrt{33}}{132}$	$-\frac{\sqrt{22}i}{22}$	0	0	0	0	$-\frac{\sqrt{55}i}{44}$	0	$\frac{\sqrt{55}}{44}$	0	0	0		
	$\frac{\sqrt{33}i}{132}$	0	$-\frac{\sqrt{33}}{132}$	0	0	$\frac{\sqrt{22}i}{22}$	0	0	$-\frac{\sqrt{55}i}{44}$	0	$-\frac{\sqrt{55}}{44}$	0	0	0			
	0	0	$\frac{\sqrt{330}i}{264}$	0	0	$-\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{44}$	0	0	$-\frac{5\sqrt{22}i}{88}$	0	0	$-\frac{5\sqrt{33}}{264}$			
	0	0	0	$-\frac{\sqrt{330}i}{264}$	$\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{44}$	0	0	0	0	$\frac{5\sqrt{22}i}{88}$	$\frac{5\sqrt{33}}{264}$	0			
	$\frac{\sqrt{330}i}{264}$	0	0	0	0	$-\frac{\sqrt{55}i}{88}$	0	$-\frac{\sqrt{55}}{44}$	$\frac{5\sqrt{22}i}{88}$	0	0	0	0	$\frac{5\sqrt{33}i}{264}$			
	0	$-\frac{\sqrt{330}i}{264}$	0	0	$-\frac{\sqrt{55}i}{88}$	0	$\frac{\sqrt{55}}{44}$	0	0	$-\frac{5\sqrt{22}i}{88}$	0	0	$\frac{5\sqrt{33}i}{264}$	0			
	0	$\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{88}$	0	0	0	0	$-\frac{5\sqrt{33}}{264}$	0	$-\frac{5\sqrt{33}i}{264}$	0	0	0			
	$-\frac{\sqrt{55}}{88}$	0	$\frac{\sqrt{55}i}{88}$	0	0	0	0	0	$-\frac{5\sqrt{33}}{264}$	0	$-\frac{5\sqrt{33}i}{264}$	0	0	0			

873 symmetry

$$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(A_{2g})$	0 0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ $\frac{\sqrt{165}i}{66}$ 0 0 0 0 $\frac{\sqrt{110}i}{44}$	
	0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{110}i}{44}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{110}i}{44}$	
	0 0 0 0 $\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 $\frac{\sqrt{165}i}{66}$ $\frac{\sqrt{110}}{44}$ 0	
	0 $\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0	
	$\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0	
	0 $\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0	
	$-\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0 0	
	$-\frac{\sqrt{165}i}{66}$ 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{165}i}{66}$ $-\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{110}i}{44}$ 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$		

874 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(B_{1g}, 1)$	0 0 0 0 0 $-\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{12}$ 0 0 $\frac{\sqrt{2}i}{12}$ 0 0 $\frac{\sqrt{3}}{24}$	
	0 0 0 0 $\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{12}$ 0 0 0 0 $-\frac{\sqrt{2}i}{12}$ $-\frac{\sqrt{3}}{24}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{5}i}{24}$ 0 $\frac{\sqrt{5}}{12}$ $-\frac{\sqrt{2}i}{12}$ 0 0 0 0 $-\frac{\sqrt{3}i}{24}$	
	0 0 0 0 $-\frac{\sqrt{5}i}{24}$ 0 $-\frac{\sqrt{5}}{12}$ 0 0 $\frac{\sqrt{2}i}{12}$ 0 0 $-\frac{\sqrt{3}i}{24}$ 0	
	0 $\frac{\sqrt{5}}{24}$ 0 $\frac{\sqrt{5}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{24}$ 0 0	
	$-\frac{\sqrt{5}}{24}$ 0 $\frac{\sqrt{5}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{24}$ 0 0 0	
	0 $\frac{\sqrt{5}i}{12}$ 0 $-\frac{\sqrt{5}}{12}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 $-\frac{\sqrt{3}}{12}$ $\frac{\sqrt{2}i}{6}$ 0	
	$\frac{\sqrt{5}i}{12}$ 0 $\frac{\sqrt{5}}{12}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{3}}{12}$ 0 0 $-\frac{\sqrt{2}i}{6}$	
	0 0 $\frac{\sqrt{2}i}{12}$ 0 0 $\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $\frac{\sqrt{5}}{24}$	
	0 0 0 $-\frac{\sqrt{2}i}{12}$ $-\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $-\frac{\sqrt{5}}{24}$ 0	
	$-\frac{\sqrt{2}i}{12}$ 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{24}$	
	0 $\frac{\sqrt{2}i}{12}$ 0 0 $-\frac{\sqrt{3}i}{24}$ 0 $-\frac{\sqrt{3}}{12}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{24}$ 0	
	0 $-\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{24}$ 0 0 $-\frac{\sqrt{2}i}{6}$ 0 0 $-\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{24}$ 0 0	
	$\frac{\sqrt{3}}{24}$ 0 $\frac{\sqrt{3}i}{24}$ 0 0 0 0 $\frac{\sqrt{2}i}{6}$ $\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{24}$ 0 0 0	

875 symmetry

$$\frac{\sqrt{42}(x-y)(x+y)(x^4 - 9x^2y^2 - 5x^2z^2 + y^4 - 5y^2z^2 + 5z^4)}{8}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(B_{1g}, 2)$	0 0 0 0 0 $-\frac{19\sqrt{11}}{264}$ 0 $-\frac{7\sqrt{11}i}{132}$ 0 0 $-\frac{\sqrt{110}i}{132}$ 0 0 $-\frac{\sqrt{165}}{264}$	
	0 0 0 0 $\frac{19\sqrt{11}}{264}$ 0 $-\frac{7\sqrt{11}i}{132}$ 0 0 0 0 $\frac{\sqrt{110}i}{132}$ $\frac{\sqrt{165}}{264}$ 0 0	
	0 0 0 0 0 $-\frac{19\sqrt{11}i}{264}$ 0 $\frac{7\sqrt{11}}{132}$ $\frac{\sqrt{110}i}{132}$ 0 0 0 0 $\frac{\sqrt{165}i}{264}$	
	0 0 0 0 $-\frac{19\sqrt{11}i}{264}$ 0 $-\frac{7\sqrt{11}}{132}$ 0 0 $-\frac{\sqrt{110}i}{132}$ 0 0 $\frac{\sqrt{165}i}{264}$ 0	
	0 $\frac{19\sqrt{11}}{264}$ 0 $\frac{19\sqrt{11}i}{264}$ 0 0 0 0 0 $\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{264}$ 0 0	
	$-\frac{19\sqrt{11}}{264}$ 0 $\frac{19\sqrt{11}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{264}$ 0 0 0	
	0 $\frac{7\sqrt{11}i}{132}$ 0 $-\frac{7\sqrt{11}}{132}$ 0 0 0 0 0 0 $\frac{\sqrt{165}i}{132}$ 0 $\frac{\sqrt{165}}{132}$ $-\frac{\sqrt{110}i}{66}$ 0	
	$\frac{7\sqrt{11}i}{132}$ 0 $\frac{7\sqrt{11}}{132}$ 0 0 0 0 0 0 $\frac{\sqrt{165}i}{132}$ 0 $-\frac{\sqrt{165}}{132}$ 0 0 $\frac{\sqrt{110}i}{66}$	
	0 0 $-\frac{\sqrt{110}i}{132}$ 0 0 $-\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}}{264}$	
	0 0 0 $\frac{\sqrt{110}i}{132}$ $\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{5\sqrt{11}}{264}$ 0	
	$\frac{\sqrt{110}i}{132}$ 0 0 0 0 $\frac{\sqrt{165}i}{264}$ 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}i}{264}$	
	0 $-\frac{\sqrt{110}i}{132}$ 0 0 $\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}i}{264}$ 0	
	0 $\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{264}$ 0 0 $\frac{\sqrt{110}i}{66}$ 0 0 $\frac{5\sqrt{11}}{264}$ 0 $\frac{5\sqrt{11}i}{264}$ 0 0	
	$-\frac{\sqrt{165}}{264}$ 0 $-\frac{\sqrt{165}i}{264}$ 0 0 0 0 $-\frac{\sqrt{110}i}{66}$ $-\frac{5\sqrt{11}}{264}$ 0 $\frac{5\sqrt{11}i}{264}$ 0 0 0	
$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$		

876 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(B_{2g}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
877	symmetry	$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(B_{2g}, 2)$	0 0 0 0 0 $\frac{\sqrt{55}i}{132}$ 0 $\frac{\sqrt{55}}{132}$ $-\frac{\sqrt{22}i}{33}$ 0 0 0 0 $-\frac{\sqrt{33}i}{66}$	
	0 0 0 0 0 $\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{55}}{132}$ 0 $\frac{\sqrt{55}i}{132}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{33}i}{66}$	
	0 0 0 0 0 $\frac{\sqrt{55}}{132}$ 0 $\frac{\sqrt{55}i}{132}$ 0 0 0 0 $\frac{\sqrt{22}i}{33}$ $\frac{\sqrt{33}}{66}$ 0	
	0 $-\frac{\sqrt{55}i}{132}$ 0 $\frac{\sqrt{55}}{132}$ 0 0 0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 $-\frac{\sqrt{33}}{33}$ $\frac{2\sqrt{22}i}{33}$ 0	
	$-\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ 0 0 0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 $\frac{\sqrt{33}}{33}$ 0 0 $-\frac{2\sqrt{22}i}{33}$	
	0 $-\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0	
	$\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0	
	$\frac{\sqrt{22}i}{33}$ 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 $\frac{\sqrt{55}i}{66}$	
	0 $-\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{33}i}{33}$ 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0 $\frac{\sqrt{55}i}{66}$ 0	
	0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{33}}{33}$ 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 0 0 $-\frac{\sqrt{55}}{66}$	
	0 0 0 $-\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{33}}{33}$ 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 0 0 $\frac{\sqrt{55}}{66}$ 0	
	0 $\frac{\sqrt{33}i}{66}$ 0 $\frac{\sqrt{33}}{66}$ $-\frac{2\sqrt{22}i}{33}$ 0 0 0 0 $-\frac{\sqrt{55}i}{66}$ 0 $\frac{\sqrt{55}}{66}$ 0 0	
	$\frac{\sqrt{33}i}{66}$ 0 $-\frac{\sqrt{33}}{66}$ 0 0 $\frac{2\sqrt{22}i}{33}$ 0 0 0 $-\frac{\sqrt{55}i}{66}$ 0 $-\frac{\sqrt{55}}{66}$ 0 0	
$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$		

878 symmetry

$$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 1)$	0	0	0	$-\frac{\sqrt{11}}{176}$	$-\frac{\sqrt{66}i}{176}$	0	0	0	0	0	$\frac{3\sqrt{165}}{176}$	$-\frac{3\sqrt{110}i}{176}$	0		
	0	0	$\frac{\sqrt{11}}{176}$	0	0	$\frac{\sqrt{66}i}{176}$	0	0	0	0	$-\frac{3\sqrt{165}}{176}$	0	0	$\frac{3\sqrt{110}i}{176}$	
	0	$\frac{\sqrt{11}}{176}$	0	0	0	0	$\frac{\sqrt{66}i}{66}$	0	0	$\frac{5\sqrt{165}}{528}$	0	$\frac{\sqrt{165}i}{66}$	0	0	0
	$-\frac{\sqrt{11}}{176}$	0	0	0	0	0	0	$-\frac{\sqrt{66}i}{66}$	$-\frac{5\sqrt{165}}{528}$	0	$\frac{\sqrt{165}i}{66}$	0	0	0	
	$\frac{\sqrt{66}i}{176}$	0	0	0	0	0	0	$\frac{\sqrt{11}}{44}$	$-\frac{3\sqrt{110}i}{176}$	0	0	0	0	$-\frac{\sqrt{165}i}{66}$	
	0	$-\frac{\sqrt{66}i}{176}$	0	0	0	0	$-\frac{\sqrt{11}}{44}$	0	0	$\frac{3\sqrt{110}i}{176}$	0	0	$-\frac{\sqrt{165}i}{66}$	0	
	0	0	$-\frac{\sqrt{66}i}{66}$	0	0	$-\frac{\sqrt{11}}{44}$	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{132}$	
	0	0	0	$\frac{\sqrt{66}i}{66}$	$\frac{\sqrt{11}}{44}$	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{132}$	0	
	0	0	0	$-\frac{5\sqrt{165}}{528}$	$\frac{3\sqrt{110}i}{176}$	0	0	0	0	0	$-\frac{5\sqrt{11}}{176}$	$\frac{5\sqrt{66}i}{528}$	0		
	0	0	$\frac{5\sqrt{165}}{528}$	0	0	$-\frac{3\sqrt{110}i}{176}$	0	0	0	0	$\frac{5\sqrt{11}}{176}$	0	0	$-\frac{5\sqrt{66}i}{528}$	
	0	$-\frac{3\sqrt{165}}{176}$	0	$-\frac{\sqrt{165}i}{66}$	0	0	0	0	0	$\frac{5\sqrt{11}}{176}$	0	0	0	0	
	$\frac{3\sqrt{165}}{176}$	0	$-\frac{\sqrt{165}i}{66}$	0	0	0	0	0	$-\frac{5\sqrt{11}}{176}$	0	0	0	0	0	
	$\frac{3\sqrt{110}i}{176}$	0	0	0	0	$\frac{\sqrt{165}i}{66}$	0	$-\frac{\sqrt{165}}{132}$	$-\frac{5\sqrt{66}i}{528}$	0	0	0	0	0	
	0	$-\frac{3\sqrt{110}i}{176}$	0	0	$\frac{\sqrt{165}i}{66}$	0	$\frac{\sqrt{165}}{132}$	0	0	$\frac{5\sqrt{66}i}{528}$	0	0	0	0	

879 symmetry

$$-\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{11}i}{176}$ 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{165}}{66}$ 0 $\frac{5\sqrt{165}i}{528}$ 0 0
	0	0 0 $-\frac{\sqrt{11}i}{176}$ 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ $-\frac{\sqrt{165}}{66}$ 0 $\frac{5\sqrt{165}i}{528}$ 0 0 0
	0	$\frac{\sqrt{11}i}{176}$ 0 0 0 $\frac{\sqrt{66}i}{176}$ 0 0 0 0 $\frac{3\sqrt{165}i}{176}$ 0 0 $-\frac{3\sqrt{110}i}{176}$ 0
	$\frac{\sqrt{11}i}{176}$	0 0 0 0 0 $-\frac{\sqrt{66}i}{176}$ 0 0 $\frac{3\sqrt{165}i}{176}$ 0 0 0 0 $\frac{3\sqrt{110}i}{176}$
	0	0 0 $-\frac{\sqrt{66}i}{176}$ 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 $-\frac{3\sqrt{110}i}{176}$ 0 0 $-\frac{\sqrt{165}}{66}$
	0	0 0 0 $\frac{\sqrt{66}i}{176}$ 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 0 $\frac{3\sqrt{110}i}{176}$ $\frac{\sqrt{165}}{66}$ 0
	$-\frac{\sqrt{66}i}{66}$	0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0
	0	$\frac{\sqrt{66}i}{66}$ 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0
	0	$-\frac{\sqrt{165}}{66}$ 0 $-\frac{3\sqrt{165}i}{176}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{11}i}{176}$ 0 0
	$\frac{\sqrt{165}}{66}$	0 $-\frac{3\sqrt{165}i}{176}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{11}i}{176}$ 0 0 0
	0	$-\frac{5\sqrt{165}i}{528}$ 0 0 0 $\frac{3\sqrt{110}i}{176}$ 0 0 0 $\frac{5\sqrt{11}i}{176}$ 0 0 $-\frac{5\sqrt{66}i}{528}$ 0
	$-\frac{5\sqrt{165}i}{528}$	0 0 0 0 0 $-\frac{3\sqrt{110}i}{176}$ 0 0 $\frac{5\sqrt{11}i}{176}$ 0 0 0 0 $\frac{5\sqrt{66}i}{528}$
	0	0 0 $\frac{3\sqrt{110}i}{176}$ 0 0 $\frac{\sqrt{165}}{66}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 $\frac{5\sqrt{66}i}{528}$ 0 0 0
	0	0 0 0 $-\frac{3\sqrt{110}i}{176}$ $-\frac{\sqrt{165}}{66}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 $-\frac{5\sqrt{66}i}{528}$ 0 0
$\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$		

880 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 2)$	0	0 0 0 $-\frac{\sqrt{6}}{64}$ $\frac{3i}{32}$ 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{64}$ $\frac{\sqrt{15}i}{32}$ 0
	0	0 0 $\frac{\sqrt{6}}{64}$ 0 0 $-\frac{3i}{32}$ 0 0 0 0 $\frac{3\sqrt{10}}{64}$ 0 0 $-\frac{\sqrt{15}i}{32}$
	0	$\frac{\sqrt{6}}{64}$ 0 0 0 0 0 $\frac{i}{16}$ 0 0 $\frac{\sqrt{10}}{64}$ 0 0 0 0
	$-\frac{\sqrt{6}}{64}$	0 0 0 0 0 0 0 $-\frac{i}{16}$ $-\frac{\sqrt{10}}{64}$ 0 0 0 0
	$-\frac{3i}{32}$	0 0 0 0 0 0 0 $\frac{\sqrt{6}}{16}$ $-\frac{\sqrt{15}i}{32}$ 0 0 0 0
	0	$\frac{3i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 $\frac{\sqrt{15}i}{32}$ 0 0 0 0
	0	0 0 $-\frac{i}{16}$ 0 0 $-\frac{\sqrt{6}}{16}$ 0 0 0 0 $-\frac{\sqrt{15}i}{16}$ 0 0 $-\frac{\sqrt{10}}{16}$
	0	0 0 0 $\frac{i}{16}$ $\frac{\sqrt{6}}{16}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{16}$ $\frac{\sqrt{10}}{16}$ 0
	0	0 0 0 $-\frac{\sqrt{10}}{64}$ $\frac{\sqrt{15}i}{32}$ 0 0 0 0 0 $-\frac{5\sqrt{6}}{64}$ $\frac{5i}{32}$ 0
	0	$\frac{\sqrt{10}}{64}$ 0 0 0 $-\frac{\sqrt{15}i}{32}$ 0 0 0 0 $\frac{5\sqrt{6}}{64}$ 0 0 $-\frac{5i}{32}$
	0	$\frac{3\sqrt{10}}{64}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{16}$ 0 0 $\frac{5\sqrt{6}}{64}$ 0 0 0 0
	$-\frac{3\sqrt{10}}{64}$	0 0 0 0 0 0 $-\frac{\sqrt{15}i}{16}$ $-\frac{5\sqrt{6}}{64}$ 0 0 0 0
	$-\frac{\sqrt{15}i}{32}$	0 0 0 0 0 0 $\frac{\sqrt{10}}{16}$ $-\frac{5i}{32}$ 0 0 0 0
	0	$\frac{\sqrt{15}i}{32}$ 0 0 0 0 $-\frac{\sqrt{10}}{16}$ 0 0 $\frac{5i}{32}$ 0 0 0 0
$\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$		

881 symmetry

$$\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 2)$	0	0	0	$-\frac{\sqrt{6}i}{64}$	0	0	$\frac{i}{16}$	0	0	0	0	$\frac{\sqrt{10}i}{64}$	0	0	0	
	0	0	$-\frac{\sqrt{6}i}{64}$	0	0	0	0	$-\frac{i}{16}$	0	0	$\frac{\sqrt{10}i}{64}$	0	0	0	0	
	0	$\frac{\sqrt{6}i}{64}$	0	0	$-\frac{3i}{32}$	0	0	0	0	$-\frac{3\sqrt{10}i}{64}$	0	0	$\frac{\sqrt{15}i}{32}$	0	0	
	$\frac{\sqrt{6}i}{64}$	0	0	0	0	$\frac{3i}{32}$	0	0	$-\frac{3\sqrt{10}i}{64}$	0	0	0	0	$-\frac{\sqrt{15}i}{32}$		
	0	0	$\frac{3i}{32}$	0	0	0	0	$\frac{\sqrt{6}i}{16}$	0	0	$-\frac{\sqrt{15}i}{32}$	0	0	0	0	
	0	0	0	$-\frac{3i}{32}$	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	$\frac{\sqrt{15}i}{32}$	0	0	0	0	
	$-\frac{i}{16}$	0	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	$\frac{\sqrt{15}i}{16}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$		
	0	$\frac{i}{16}$	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	0	$-\frac{\sqrt{15}i}{16}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0		
	0	0	0	$\frac{3\sqrt{10}i}{64}$	0	0	$-\frac{\sqrt{15}i}{16}$	0	0	0	0	$-\frac{5\sqrt{6}i}{64}$	0	0	0	
	0	0	$\frac{3\sqrt{10}i}{64}$	0	0	0	0	$\frac{\sqrt{15}i}{16}$	0	0	$-\frac{5\sqrt{6}i}{64}$	0	0	0	0	
	0	$-\frac{\sqrt{10}i}{64}$	0	0	$\frac{\sqrt{15}i}{32}$	0	0	0	0	$\frac{5\sqrt{6}i}{64}$	0	0	$-\frac{5i}{32}$	0		
	$-\frac{\sqrt{10}i}{64}$	0	0	0	0	$-\frac{\sqrt{15}i}{32}$	0	0	$\frac{5\sqrt{6}i}{64}$	0	0	0	0	$\frac{5i}{32}$		
	0	0	$-\frac{\sqrt{15}i}{32}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{5i}{32}$	0	0	0	$-\frac{5i}{32}$	
	0	0	0	$\frac{\sqrt{15}i}{32}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{5i}{32}$	0	0	0	

$$\frac{\sqrt{210}yz(16x^4 - 16x^2y^2 - 16x^2z^2 + y^4 + 2y^2z^2 + z^4)}{16}$$

882 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 3)$	0 0 0 $-\frac{\sqrt{330}}{2112}$ $\frac{19\sqrt{55}i}{1056}$ 0 0 0 0 $\frac{2\sqrt{22}i}{33}$ 0 $-\frac{47\sqrt{22}}{2112}$ $-\frac{9\sqrt{33}i}{352}$ 0	
	0 0 $\frac{\sqrt{330}}{2112}$ 0 0 $-\frac{19\sqrt{55}i}{1056}$ 0 0 $\frac{2\sqrt{22}i}{33}$ 0 $\frac{47\sqrt{22}}{2112}$ 0 0 $\frac{9\sqrt{33}i}{352}$	
	0 $\frac{\sqrt{330}}{2112}$ 0 0 0 0 $-\frac{7\sqrt{55}i}{528}$ 0 0 $-\frac{91\sqrt{22}}{2112}$ 0 $-\frac{\sqrt{22}i}{33}$ 0 0	
	$-\frac{\sqrt{330}}{2112}$ 0 0 0 0 0 $\frac{7\sqrt{55}i}{528}$ $\frac{91\sqrt{22}}{2112}$ 0 $-\frac{\sqrt{22}i}{33}$ 0 0 0	
	$-\frac{19\sqrt{55}i}{1056}$ 0 0 0 0 0 $\frac{\sqrt{330}}{528}$ $-\frac{7\sqrt{33}i}{352}$ 0 0 0 0 $-\frac{\sqrt{22}i}{33}$	
	0 $\frac{19\sqrt{55}i}{1056}$ 0 0 0 0 $-\frac{\sqrt{330}}{528}$ 0 0 $\frac{7\sqrt{33}i}{352}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0	
	0 0 $\frac{7\sqrt{55}i}{528}$ 0 0 $-\frac{\sqrt{330}}{528}$ 0 0 0 0 $\frac{\sqrt{33}i}{176}$ 0 0 $\frac{\sqrt{22}}{48}$	
	0 0 0 $-\frac{7\sqrt{55}i}{528}$ $\frac{\sqrt{330}}{528}$ 0 0 0 0 0 $-\frac{\sqrt{33}i}{176}$ $-\frac{\sqrt{22}}{48}$ 0	
	0 $-\frac{2\sqrt{22}i}{33}$ 0 $\frac{91\sqrt{22}}{2112}$ $\frac{7\sqrt{33}i}{352}$ 0 0 0 0 0 $-\frac{5\sqrt{330}}{2112}$ $\frac{5\sqrt{55}i}{1056}$ 0	
	$-\frac{2\sqrt{22}i}{33}$ 0 $-\frac{91\sqrt{22}}{2112}$ 0 0 $-\frac{7\sqrt{33}i}{352}$ 0 0 0 0 $\frac{5\sqrt{330}}{2112}$ 0 0 $-\frac{5\sqrt{55}i}{1056}$	
	0 $\frac{47\sqrt{22}}{2112}$ 0 $\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{33}i}{176}$ 0 0 $\frac{5\sqrt{330}}{2112}$ 0 0 0 0	
	$-\frac{47\sqrt{22}}{2112}$ 0 $\frac{\sqrt{22}i}{33}$ 0 0 0 0 $\frac{\sqrt{33}i}{176}$ $-\frac{5\sqrt{330}}{2112}$ 0 0 0 0	
	$\frac{9\sqrt{33}i}{352}$ 0 0 0 0 $\frac{\sqrt{22}i}{33}$ 0 $-\frac{\sqrt{22}}{48}$ $-\frac{5\sqrt{55}i}{1056}$ 0 0 0 0	
	0 $-\frac{9\sqrt{33}i}{352}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 $\frac{\sqrt{22}}{48}$ 0 0 $\frac{5\sqrt{55}i}{1056}$ 0 0 0 0	

883 symmetry

$$\frac{\sqrt{210}xz(x^4 - 16x^2y^2 + 2x^2z^2 + 16y^4 - 16y^2z^2 + z^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 3)$	0	0 0 0 $-\frac{\sqrt{330}i}{2112}$ 0 0 $-\frac{7\sqrt{55}i}{528}$ 0 0 $-\frac{\sqrt{22}}{33}$ 0 $-\frac{91\sqrt{22}i}{2112}$ 0 0
	0	0 0 $-\frac{\sqrt{330}i}{2112}$ 0 0 0 0 $\frac{7\sqrt{55}i}{528}$ $\frac{\sqrt{22}}{33}$ 0 $-\frac{91\sqrt{22}i}{2112}$ 0 0 0
	0	$\frac{\sqrt{330}i}{2112}$ 0 0 0 $-\frac{19\sqrt{55}i}{1056}$ 0 0 0 0 $-\frac{47\sqrt{22}i}{2112}$ 0 $\frac{2\sqrt{22}}{33}$ $-\frac{9\sqrt{33}i}{352}$ 0
	$\frac{\sqrt{330}i}{2112}$	0 0 0 0 0 $\frac{19\sqrt{55}i}{1056}$ 0 0 0 $-\frac{47\sqrt{22}i}{2112}$ 0 $-\frac{2\sqrt{22}}{33}$ 0 0 $\frac{9\sqrt{33}i}{352}$
	0	0 0 $\frac{19\sqrt{55}i}{1056}$ 0 0 0 0 $\frac{\sqrt{330}i}{528}$ 0 0 0 $-\frac{7\sqrt{33}i}{352}$ 0 0 $-\frac{\sqrt{22}}{33}$
	0	0 0 0 $-\frac{19\sqrt{55}i}{1056}$ 0 0 $\frac{\sqrt{330}i}{528}$ 0 0 0 0 $\frac{7\sqrt{33}i}{352}$ $\frac{\sqrt{22}}{33}$ 0
	$\frac{7\sqrt{55}i}{528}$	0 0 0 0 0 $-\frac{\sqrt{330}i}{528}$ 0 0 0 $-\frac{\sqrt{33}i}{176}$ 0 0 0 0 $-\frac{\sqrt{22}i}{48}$
	0	$-\frac{7\sqrt{55}i}{528}$ 0 0 $-\frac{\sqrt{330}i}{528}$ 0 0 0 0 $\frac{\sqrt{33}i}{176}$ 0 0 0 $-\frac{\sqrt{22}i}{48}$ 0
	0	$\frac{\sqrt{22}}{33}$ 0 $\frac{47\sqrt{22}i}{2112}$ 0 0 $\frac{\sqrt{33}i}{176}$ 0 0 0 0 $-\frac{5\sqrt{330}i}{2112}$ 0 0 0
	$-\frac{\sqrt{22}}{33}$	0 0 $\frac{47\sqrt{22}i}{2112}$ 0 0 0 0 $-\frac{\sqrt{33}i}{176}$ 0 0 0 $-\frac{5\sqrt{330}i}{2112}$ 0 0 0
	0	$\frac{91\sqrt{22}i}{2112}$ 0 $-\frac{2\sqrt{22}}{33}$ $\frac{7\sqrt{33}i}{352}$ 0 0 0 0 $\frac{5\sqrt{330}i}{2112}$ 0 0 0 $-\frac{5\sqrt{55}i}{1056}$ 0
	$\frac{91\sqrt{22}i}{2112}$	0 $\frac{2\sqrt{22}}{33}$ 0 0 $-\frac{7\sqrt{33}i}{352}$ 0 0 $\frac{5\sqrt{330}i}{2112}$ 0 0 0 0 $\frac{5\sqrt{55}i}{1056}$
	0	0 0 $\frac{9\sqrt{33}i}{352}$ 0 0 $\frac{\sqrt{22}}{33}$ 0 $\frac{\sqrt{22}i}{48}$ 0 0 $\frac{5\sqrt{55}i}{1056}$ 0 0 0
	0	0 0 0 $-\frac{9\sqrt{33}i}{352}$ $-\frac{\sqrt{22}}{33}$ 0 $\frac{\sqrt{22}i}{48}$ 0 0 0 0 $-\frac{5\sqrt{55}i}{1056}$ 0 0

884 symmetry

1

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_0^{(1,1;a)}(A_{1g})$	0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 0														
	0 0 0 $\frac{\sqrt{42}i}{28}$ $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 0 0														
	$\frac{\sqrt{42}i}{28}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 0														
	0 $-\frac{\sqrt{42}i}{28}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 0 0														
	0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0														
	$\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{42}$ $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0														
	0 $-\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ $\frac{\sqrt{42}i}{42}$ 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0														
	$-\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 0														
	0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 $\frac{\sqrt{7}}{14}$														
	0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 $\frac{\sqrt{42}i}{84}$ $-\frac{\sqrt{7}}{14}$ 0														
	0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0														
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0														
885	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,1;a)}(A_{1g})$	0	0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}}{42}$ 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{42}}{42}$ 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{7}i}{14}$	0 0 0 0 0 $\frac{\sqrt{42}i}{42}$ 0 $-\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}i}{42}$ 0 $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}}{42}$ 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{42}}{42}$	0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}i}{42}$ 0 $\frac{\sqrt{42}}{42}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{42}i}{42}$	0 $-\frac{\sqrt{42}}{42}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}}{42}$
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{42}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 $\frac{\sqrt{42}i}{42}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
$\frac{\sqrt{3}(x-y)(x+y)}{2}$		

886 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_2^{(1,1;a)}(B_{1g})$	0	0	0	0	0	$-\frac{\sqrt{14}}{84}$	0	$\frac{\sqrt{14}i}{84}$	0	0	$\frac{\sqrt{35}i}{42}$	0	0	$-\frac{\sqrt{210}}{84}$	
	0	0	0	0	$\frac{\sqrt{14}}{84}$	0	$\frac{\sqrt{14}i}{84}$	0	0	0	$-\frac{\sqrt{35}i}{42}$	$\frac{\sqrt{210}}{84}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{14}i}{84}$	0	$-\frac{\sqrt{14}}{84}$	$-\frac{\sqrt{35}i}{42}$	0	0	0	$\frac{\sqrt{210}i}{84}$	0	
	0	0	0	0	$-\frac{\sqrt{14}i}{84}$	0	$\frac{\sqrt{14}}{84}$	0	0	$\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{210}i}{84}$	0	
	0	$\frac{\sqrt{14}}{84}$	0	$\frac{\sqrt{14}i}{84}$	0	0	0	0	$\frac{\sqrt{210}}{84}$	0	$-\frac{\sqrt{210}i}{84}$	0	0	0	
	$-\frac{\sqrt{14}}{84}$	0	$\frac{\sqrt{14}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{210}}{84}$	0	$-\frac{\sqrt{210}i}{84}$	0	0	0	
	0	$-\frac{\sqrt{14}i}{84}$	0	$\frac{\sqrt{14}}{84}$	0	0	0	0	0	$-\frac{\sqrt{210}i}{84}$	0	$-\frac{\sqrt{210}}{84}$	$-\frac{\sqrt{35}i}{42}$	0	
	$-\frac{\sqrt{14}i}{84}$	0	$-\frac{\sqrt{14}}{84}$	0	0	0	0	0	$-\frac{\sqrt{210}i}{84}$	0	$\frac{\sqrt{210}}{84}$	0	0	$\frac{\sqrt{35}i}{42}$	
	0	0	$\frac{\sqrt{35}i}{42}$	0	0	$-\frac{\sqrt{210}}{84}$	0	$\frac{\sqrt{210}i}{84}$	0	0	0	0	0	$\frac{\sqrt{14}}{84}$	
	0	0	0	$-\frac{\sqrt{35}i}{42}$	$\frac{\sqrt{210}}{84}$	0	$\frac{\sqrt{210}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{14}}{84}$	0	
	$-\frac{\sqrt{35}i}{42}$	0	0	0	0	$\frac{\sqrt{210}i}{84}$	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	$\frac{\sqrt{14}i}{84}$	
	0	$\frac{\sqrt{35}i}{42}$	0	0	$\frac{\sqrt{210}i}{84}$	0	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	$\frac{\sqrt{14}i}{84}$	0	
	0	$\frac{\sqrt{210}}{84}$	0	$-\frac{\sqrt{210}i}{84}$	0	0	$\frac{\sqrt{35}i}{42}$	0	$-\frac{\sqrt{14}}{84}$	0	$-\frac{\sqrt{14}i}{84}$	0	0	0	
	$-\frac{\sqrt{210}}{84}$	0	$-\frac{\sqrt{210}i}{84}$	0	0	0	0	$-\frac{\sqrt{35}i}{42}$	$\frac{\sqrt{14}}{84}$	0	$-\frac{\sqrt{14}i}{84}$	0	0	0	

887 symmetry

 $\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,1;a)}(B_{2g})$	0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ $\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$	
	0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{210}i}{84}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 $\frac{\sqrt{14}i}{84}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{210}}{84}$	
	0 0 0 0 $\frac{\sqrt{14}}{84}$ 0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{210}}{84}$ 0	
	0 $-\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ $\frac{\sqrt{35}i}{42}$ 0	
	$-\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 $-\frac{\sqrt{35}i}{42}$	
	0 $-\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{84}$ 0 0	
	$\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0	
	$-\frac{\sqrt{35}i}{42}$ 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{84}$	
	0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0	
	0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{210}}{84}$ 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{84}$	
	0 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{210}}{84}$ 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0	
	0 $\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ 0 0	
	$\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0	

888 symmetry

 $\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g)$	0	0 0 0 $-\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{14}i}{21}$ 0 0 0 0 $\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0
	0	0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0 $\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{42}$ 0 0 0
	0	$\frac{\sqrt{21}}{42}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{21}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0
	$-\frac{\sqrt{21}}{42}$	0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{21}$ $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0
	$\frac{\sqrt{14}i}{21}$	0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{42}$
	0	$-\frac{\sqrt{14}i}{21}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{42}$ 0
	0	0 0 $\frac{\sqrt{14}i}{21}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{35}}{42}$
	0	0 0 0 $-\frac{\sqrt{14}i}{21}$ $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{35}}{42}$ 0
	0	$-\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ $\frac{\sqrt{14}i}{21}$ 0
	$-\frac{\sqrt{35}i}{42}$	0 $\frac{\sqrt{35}}{42}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{14}i}{21}$
	0	$\frac{\sqrt{35}}{42}$ 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0
	$-\frac{\sqrt{35}}{42}$	0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{14}i}{21}$ 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0 0

889 symmetry

 $\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g)$	0	0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{14}i}{21}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0
	0	0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{14}i}{21}$ $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0
	0	$\frac{\sqrt{21}i}{42}$ 0 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{42}$ 0 0
	$\frac{\sqrt{21}i}{42}$	0 0 0 0 0 $-\frac{\sqrt{14}i}{21}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 0
	0	0 0 $-\frac{\sqrt{14}i}{21}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{35}}{42}$
	0	0 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{42}$ 0
	$\frac{\sqrt{14}i}{21}$	0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{42}$
	0	$-\frac{\sqrt{14}i}{21}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0
	0	$-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0
	$\frac{\sqrt{35}}{42}$	0 $\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0
	0	$-\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 $-\frac{\sqrt{14}i}{21}$ 0
	$-\frac{\sqrt{35}i}{42}$	0 $\frac{\sqrt{35}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{14}i}{21}$
	0	0 0 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 0 0 $-\frac{\sqrt{14}i}{21}$ 0 0

890 symmetry

$$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 1)$	0 0 $-\frac{\sqrt{110}i}{264}$ 0 0 $\frac{\sqrt{165}}{66}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 $-\frac{\sqrt{66}i}{88}$ 0 0 $\frac{\sqrt{11}}{132}$														
	0 0 0 $\frac{\sqrt{110}i}{264}$ $-\frac{\sqrt{165}}{66}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 $\frac{\sqrt{66}i}{88}$ $-\frac{\sqrt{11}}{132}$ 0														
	$\frac{\sqrt{110}i}{264}$ 0 0 0 0 $-\frac{\sqrt{165}i}{66}$ 0 $-\frac{\sqrt{165}}{132}$ $-\frac{\sqrt{66}i}{88}$ 0 0 0 0 $\frac{\sqrt{11}i}{132}$														
	0 $-\frac{\sqrt{110}i}{264}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 $\frac{\sqrt{165}}{132}$ 0 0 $\frac{\sqrt{66}i}{88}$ 0 0 $\frac{\sqrt{11}i}{132}$ 0														
	0 $-\frac{\sqrt{165}}{66}$ 0 $\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{110}i}{66}$ 0 0 $-\frac{\sqrt{11}}{33}$ 0 $-\frac{\sqrt{11}i}{33}$ 0 0														
	$\frac{\sqrt{165}}{66}$ 0 $\frac{\sqrt{165}i}{66}$ 0 0 0 0 $-\frac{\sqrt{110}i}{66}$ $\frac{\sqrt{11}}{33}$ 0 $-\frac{\sqrt{11}i}{33}$ 0 0														
	0 $\frac{\sqrt{165}i}{132}$ 0 $\frac{\sqrt{165}}{132}$ $-\frac{\sqrt{110}i}{66}$ 0 0 0 0 $\frac{5\sqrt{11}i}{132}$ 0 $-\frac{5\sqrt{11}}{132}$ 0 0														
	$\frac{\sqrt{165}i}{132}$ 0 $-\frac{\sqrt{165}}{132}$ 0 0 $\frac{\sqrt{110}i}{66}$ 0 0 $\frac{5\sqrt{11}i}{132}$ 0 $\frac{5\sqrt{11}}{132}$ 0 0														
	0 0 $\frac{\sqrt{66}i}{88}$ 0 0 $\frac{\sqrt{11}}{33}$ 0 $-\frac{5\sqrt{11}i}{132}$ 0 0 $-\frac{5\sqrt{110}i}{264}$ 0 0 $\frac{\sqrt{165}}{132}$														
	0 0 0 $-\frac{\sqrt{66}i}{88}$ $-\frac{\sqrt{11}}{33}$ 0 $-\frac{5\sqrt{11}i}{132}$ 0 0 0 0 $\frac{5\sqrt{110}i}{264}$ $-\frac{\sqrt{165}}{132}$ 0														
	$\frac{\sqrt{66}i}{88}$ 0 0 0 0 $\frac{\sqrt{11}i}{33}$ 0 $\frac{5\sqrt{11}}{132}$ $\frac{5\sqrt{110}i}{264}$ 0 0 0 0 $-\frac{\sqrt{165}i}{132}$														
	0 $-\frac{\sqrt{66}i}{88}$ 0 0 $\frac{\sqrt{11}i}{33}$ 0 $-\frac{5\sqrt{11}}{132}$ 0 0 $-\frac{5\sqrt{110}i}{264}$ 0 0 $-\frac{\sqrt{165}i}{132}$ 0														
	0 $-\frac{\sqrt{11}}{132}$ 0 $-\frac{\sqrt{11}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0														
	$\frac{\sqrt{11}}{132}$ 0 $-\frac{\sqrt{11}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0														
891	symmetry	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 2)$	0	0	$-\frac{5\sqrt{154}i}{1848}$	0	0	$-\frac{2\sqrt{231}}{231}$	0	$\frac{13\sqrt{231}i}{924}$	0	0	$\frac{\sqrt{2310}i}{440}$	0	0	$-\frac{\sqrt{385}}{660}$		
	0	0	0	$\frac{5\sqrt{154}i}{1848}$	$\frac{2\sqrt{231}}{231}$	0	$\frac{13\sqrt{231}i}{924}$	0	0	0	$-\frac{\sqrt{2310}i}{440}$	$\frac{\sqrt{385}}{660}$	0			
	$\frac{5\sqrt{154}i}{1848}$	0	0	0	0	$\frac{2\sqrt{231}i}{231}$	0	$\frac{13\sqrt{231}i}{924}$	$\frac{\sqrt{2310}i}{440}$	0	0	0	$-\frac{\sqrt{385}i}{660}$			
	0	$-\frac{5\sqrt{154}i}{1848}$	0	0	$\frac{2\sqrt{231}i}{231}$	0	$-\frac{13\sqrt{231}}{924}$	0	0	$-\frac{\sqrt{2310}i}{440}$	0	0	$-\frac{\sqrt{385}i}{660}$	0		
	0	$\frac{2\sqrt{231}}{231}$	0	$-\frac{2\sqrt{231}i}{231}$	0	0	$\frac{5\sqrt{154}i}{462}$	0	0	$-\frac{13\sqrt{385}}{2310}$	0	$-\frac{13\sqrt{385}i}{2310}$	0	0	0	
	$-\frac{2\sqrt{231}}{231}$	0	$-\frac{2\sqrt{231}i}{231}$	0	0	0	0	$-\frac{5\sqrt{154}i}{462}$	$\frac{13\sqrt{385}}{2310}$	0	$-\frac{13\sqrt{385}i}{2310}$	0	0	0	0	
	0	$-\frac{13\sqrt{231}i}{924}$	0	$-\frac{13\sqrt{231}}{924}$	$-\frac{5\sqrt{154}i}{462}$	0	0	0	0	$\frac{19\sqrt{385}i}{4620}$	0	$-\frac{19\sqrt{385}}{4620}$	0	0	0	
	$-\frac{13\sqrt{231}i}{924}$	0	$\frac{13\sqrt{231}}{924}$	0	0	$\frac{5\sqrt{154}i}{462}$	0	0	$\frac{19\sqrt{385}i}{4620}$	0	$\frac{19\sqrt{385}}{4620}$	0	0	0	0	
	0	0	$-\frac{\sqrt{2310}i}{440}$	0	0	$\frac{13\sqrt{385}}{2310}$	0	$-\frac{19\sqrt{385}i}{4620}$	0	0	$-\frac{25\sqrt{154}i}{1848}$	0	0	$\frac{5\sqrt{231}}{924}$		
	0	0	0	$\frac{\sqrt{2310}i}{440}$	$-\frac{13\sqrt{385}}{2310}$	0	$-\frac{19\sqrt{385}i}{4620}$	0	0	0	$\frac{25\sqrt{154}i}{1848}$	$-\frac{5\sqrt{231}}{924}$	0			
	$-\frac{\sqrt{2310}i}{440}$	0	0	0	0	$\frac{13\sqrt{385}i}{2310}$	0	$\frac{19\sqrt{385}}{4620}$	$\frac{25\sqrt{154}i}{1848}$	0	0	0	0	$-\frac{5\sqrt{231}i}{924}$		
	0	$\frac{\sqrt{2310}i}{440}$	0	0	$\frac{13\sqrt{385}i}{2310}$	0	$-\frac{19\sqrt{385}}{4620}$	0	0	$-\frac{25\sqrt{154}i}{1848}$	0	0	$-\frac{5\sqrt{231}i}{924}$	0		
	0	$\frac{\sqrt{385}}{660}$	0	$\frac{\sqrt{385}i}{660}$	0	0	0	0	$-\frac{5\sqrt{231}}{924}$	0	$\frac{5\sqrt{231}i}{924}$	0	0	0		
	$-\frac{\sqrt{385}}{660}$	0	$\frac{\sqrt{385}i}{660}$	0	0	0	0	$\frac{5\sqrt{231}}{924}$	0	$\frac{5\sqrt{231}i}{924}$	0	0	0	0		

892 symmetry

 $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{2g})$	0	0	0	0	0	$\frac{3\sqrt{11}i}{44}$	0	$\frac{3\sqrt{11}}{44}$	$\frac{3\sqrt{110}i}{220}$	0	0	0	0	$-\frac{\sqrt{165}i}{330}$	
	0	0	0	0	$\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{165}i}{330}$	0	
	0	0	0	0	0	$\frac{3\sqrt{11}}{44}$	0	$-\frac{3\sqrt{11}i}{44}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$\frac{\sqrt{165}}{330}$	
	0	0	0	0	$-\frac{3\sqrt{11}}{44}$	0	$-\frac{3\sqrt{11}i}{44}$	0	0	0	0	$\frac{3\sqrt{110}i}{220}$	$-\frac{\sqrt{165}}{330}$	0	
	0	$-\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	0	0	0	0	0	$-\frac{\sqrt{165}i}{660}$	0	$\frac{\sqrt{165}}{660}$	0	0	
	$-\frac{3\sqrt{11}i}{44}$	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	0	$-\frac{\sqrt{165}i}{660}$	0	$-\frac{\sqrt{165}}{660}$	0	0	
	0	$-\frac{3\sqrt{11}i}{44}$	0	$\frac{3\sqrt{11}i}{44}$	0	0	0	0	0	$\frac{\sqrt{165}}{660}$	0	$\frac{\sqrt{165}i}{660}$	0	0	
	$\frac{3\sqrt{11}}{44}$	0	$\frac{3\sqrt{11}i}{44}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{660}$	0	$\frac{\sqrt{165}i}{660}$	0	0	
	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	$\frac{\sqrt{165}i}{660}$	0	$-\frac{\sqrt{165}}{660}$	0	0	0	0	0	0	
	0	$\frac{3\sqrt{110}i}{220}$	0	0	$\frac{\sqrt{165}i}{660}$	0	$\frac{\sqrt{165}}{660}$	0	0	0	0	0	0	0	
	0	0	$\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{165}}{660}$	0	$-\frac{\sqrt{165}i}{660}$	0	0	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{110}i}{220}$	$\frac{\sqrt{165}}{660}$	0	$-\frac{\sqrt{165}i}{660}$	0	0	0	0	0	0	0	
	0	$\frac{\sqrt{165}i}{330}$	0	$-\frac{\sqrt{165}}{330}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{165}i}{330}$	0	$\frac{\sqrt{165}}{330}$	0	0	0	0	0	0	0	0	0	0	0	

893 symmetry

$$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_4^{(1,1;a)}(B_{1g})$	0	0	0	0	0	$-\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$-\frac{\sqrt{1155}}{165}$		
	0	0	0	0	$\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	0	$-\frac{\sqrt{770}i}{220}$	$\frac{\sqrt{1155}}{165}$	0			
	0	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	$-\frac{\sqrt{770}i}{220}$	0	0	0	0	$\frac{\sqrt{1155}i}{165}$		
	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{1155}i}{165}$	0		
	0	$\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{924}$	0	$\frac{\sqrt{1155}i}{924}$	0	0		
	$-\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$\frac{\sqrt{1155}i}{924}$	0	0	0		
	0	$-\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	0	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	$\frac{23\sqrt{1155}}{4620}$	$\frac{\sqrt{770}i}{110}$	0		
	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	0	0	0	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	$-\frac{23\sqrt{1155}}{4620}$	0	0	$-\frac{\sqrt{770}i}{110}$		
	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{23\sqrt{1155}i}{4620}$	0	0	0	0	0	$-\frac{\sqrt{77}}{154}$		
	0	0	0	$-\frac{\sqrt{770}i}{220}$	$-\frac{\sqrt{1155}}{924}$	0	$-\frac{23\sqrt{1155}i}{4620}$	0	0	0	0	0	$\frac{\sqrt{77}}{154}$	0		
	$-\frac{\sqrt{770}i}{220}$	0	0	0	0	$-\frac{\sqrt{1155}i}{924}$	0	$-\frac{23\sqrt{1155}}{4620}$	0	0	0	0	0	$-\frac{\sqrt{77}i}{154}$		
	0	$\frac{\sqrt{770}i}{220}$	0	0	$-\frac{\sqrt{1155}i}{924}$	0	$\frac{23\sqrt{1155}}{4620}$	0	0	0	0	0	$-\frac{\sqrt{77}i}{154}$	0		
	0	$\frac{\sqrt{1155}}{165}$	0	$-\frac{\sqrt{1155}i}{165}$	0	0	$-\frac{\sqrt{770}i}{110}$	0	0	$\frac{\sqrt{77}}{154}$	0	$\frac{\sqrt{77}i}{154}$	0	0		
	$-\frac{\sqrt{1155}}{165}$	0	$-\frac{\sqrt{1155}i}{165}$	0	0	0	0	$\frac{\sqrt{770}i}{110}$	$-\frac{\sqrt{77}}{154}$	0	$\frac{\sqrt{77}i}{154}$	0	0	0		
894	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_4^{(1,1;a)}(B_{2g})$	0	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	$-\frac{\sqrt{770}i}{220}$	0	0	0	0	$\frac{\sqrt{1155}i}{165}$		
	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{1155}i}{165}$	0		
	0	0	0	0	0	$\frac{\sqrt{77}}{308}$	0	$-\frac{\sqrt{77}i}{308}$	0	0	$-\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{1155}i}{165}$		
	0	0	0	0	$-\frac{\sqrt{77}}{308}$	0	$-\frac{\sqrt{77}i}{308}$	0	0	0	0	$\frac{\sqrt{770}i}{220}$	$-\frac{\sqrt{1155}i}{165}$	0		
	0	$\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	0	0	0	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	$\frac{23\sqrt{1155}}{4620}$	$\frac{\sqrt{770}i}{110}$	0		
	$\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	0	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	$-\frac{23\sqrt{1155}}{4620}$	0	0	$-\frac{\sqrt{770}i}{110}$		
	0	$\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{\sqrt{1155}i}{924}$	0	0	0	
	$-\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{924}$	0	$-\frac{\sqrt{1155}i}{924}$	0	0	0		
	$\frac{\sqrt{770}i}{220}$	0	0	0	$-\frac{23\sqrt{1155}i}{4620}$	0	$-\frac{\sqrt{1155}}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{77}i}{154}$		
	0	$-\frac{\sqrt{770}i}{220}$	0	0	$-\frac{23\sqrt{1155}i}{4620}$	0	$\frac{\sqrt{1155}}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{77}i}{154}$		
	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$-\frac{23\sqrt{1155}}{4620}$	0	$\frac{\sqrt{1155}i}{924}$	0	$\frac{\sqrt{1155}i}{924}$	0	0	0	$\frac{\sqrt{77}}{154}$		
	0	0	0	$-\frac{\sqrt{770}i}{220}$	$\frac{23\sqrt{1155}}{4620}$	0	$\frac{\sqrt{1155}i}{924}$	0	0	0	0	0	$-\frac{\sqrt{77}}{154}$	0		
	0	$-\frac{\sqrt{1155}i}{165}$	0	$-\frac{\sqrt{1155}}{165}$	$-\frac{\sqrt{770}i}{110}$	0	0	0	0	$\frac{\sqrt{77}i}{154}$	0	$-\frac{\sqrt{77}}{154}$	0	0		
	$-\frac{\sqrt{1155}i}{165}$	0	$\frac{\sqrt{1155}}{165}$	0	0	$\frac{\sqrt{770}i}{110}$	0	0	$\frac{\sqrt{77}i}{154}$	0	$\frac{\sqrt{77}}{154}$	0	0	0		

895 symmetry

 $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 1)$	0	0	0	$-\frac{\sqrt{66}}{264}$	$-\frac{\sqrt{11}i}{44}$	0	0	0	0	0	$-\frac{7\sqrt{110}}{440}$	$-\frac{\sqrt{165}i}{165}$	0			
	0	0	$\frac{\sqrt{66}}{264}$	0	0	$\frac{\sqrt{11}i}{44}$	0	0	0	0	$\frac{7\sqrt{110}}{440}$	0	0	$\frac{\sqrt{165}i}{165}$		
	0	$\frac{\sqrt{66}}{264}$	0	0	0	0	$-\frac{\sqrt{11}i}{44}$	0	0	$\frac{\sqrt{110}}{440}$	0	$\frac{3\sqrt{110}i}{220}$	0	0		
	$-\frac{\sqrt{66}}{264}$	0	0	0	0	0	0	$\frac{\sqrt{11}i}{44}$	$-\frac{\sqrt{110}}{440}$	0	$\frac{3\sqrt{110}i}{220}$	0	0	0		
	$\frac{\sqrt{11}i}{44}$	0	0	0	0	0	0	$\frac{\sqrt{66}}{66}$	$\frac{7\sqrt{165}i}{660}$	0	0	0	0	$-\frac{3\sqrt{110}i}{220}$		
	0	$-\frac{\sqrt{11}i}{44}$	0	0	0	0	$-\frac{\sqrt{66}}{66}$	0	0	$-\frac{7\sqrt{165}i}{660}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0		
	0	0	$\frac{\sqrt{11}i}{44}$	0	0	$-\frac{\sqrt{66}}{66}$	0	0	0	$\frac{\sqrt{165}i}{60}$	0	0	$-\frac{\sqrt{110}}{55}$			
	0	0	0	$-\frac{\sqrt{11}i}{44}$	$\frac{\sqrt{66}}{66}$	0	0	0	0	0	$-\frac{\sqrt{165}i}{60}$	$\frac{\sqrt{110}}{55}$	0			
	0	0	0	$-\frac{\sqrt{110}}{440}$	$-\frac{7\sqrt{165}i}{660}$	0	0	0	0	0	$-\frac{5\sqrt{66}}{264}$	$-\frac{\sqrt{11}i}{22}$	0			
	0	0	$\frac{\sqrt{110}}{440}$	0	0	$\frac{7\sqrt{165}i}{660}$	0	0	0	0	$\frac{5\sqrt{66}}{264}$	0	0	$\frac{\sqrt{11}i}{22}$		
	0	$\frac{7\sqrt{110}}{440}$	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{165}i}{60}$	0	0	$\frac{5\sqrt{66}}{264}$	0	0	0	0		
	$-\frac{7\sqrt{110}}{440}$	0	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	$\frac{\sqrt{165}i}{60}$	$-\frac{5\sqrt{66}}{264}$	0	0	0	0	0		
	$\frac{\sqrt{165}i}{165}$	0	0	0	0	$\frac{3\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{55}$	$\frac{\sqrt{11}i}{22}$	0	0	0	0	0		
	0	$-\frac{\sqrt{165}i}{165}$	0	0	$\frac{3\sqrt{110}i}{220}$	0	$-\frac{\sqrt{110}}{55}$	0	0	$-\frac{\sqrt{11}i}{22}$	0	0	0	0		

896 symmetry

 $\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $\frac{3\sqrt{110}}{220}$ 0 $\frac{\sqrt{110}i}{440}$ 0 0
	0	0 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 $\frac{\sqrt{11}i}{44}$ $-\frac{3\sqrt{110}}{220}$ 0 $\frac{\sqrt{110}i}{440}$ 0 0 0
	0	$\frac{\sqrt{66}i}{264}$ 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{7\sqrt{110}i}{440}$ 0 0 0 $-\frac{\sqrt{165}i}{165}$ 0
	$\frac{\sqrt{66}i}{264}$	0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $-\frac{7\sqrt{110}i}{440}$ 0 0 0 0 $\frac{\sqrt{165}i}{165}$
	0	0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{7\sqrt{165}i}{660}$ 0 0 $-\frac{3\sqrt{110}}{220}$
	0	0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 0 0 $-\frac{7\sqrt{165}i}{660}$ $\frac{3\sqrt{110}}{220}$ 0
	$\frac{\sqrt{11}i}{44}$	0 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0 $-\frac{\sqrt{165}i}{60}$ 0 0 0 0 $\frac{\sqrt{110}i}{55}$
	0	$-\frac{\sqrt{11}i}{44}$ 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0 0 0 $\frac{\sqrt{165}i}{60}$ 0 0 $\frac{\sqrt{110}i}{55}$ 0
	0	$-\frac{3\sqrt{110}}{220}$ 0 $\frac{7\sqrt{110}i}{440}$ 0 0 $\frac{\sqrt{165}i}{60}$ 0 0 0 0 $-\frac{5\sqrt{66}i}{264}$ 0 0
	$\frac{3\sqrt{110}}{220}$	0 $\frac{7\sqrt{110}i}{440}$ 0 0 0 0 $-\frac{\sqrt{165}i}{60}$ 0 0 $-\frac{5\sqrt{66}i}{264}$ 0 0 0
	0	$-\frac{\sqrt{110}i}{440}$ 0 0 $-\frac{7\sqrt{165}i}{660}$ 0 0 0 0 $\frac{5\sqrt{66}i}{264}$ 0 0 $\frac{\sqrt{11}i}{22}$ 0
	$-\frac{\sqrt{110}i}{440}$	0 0 0 0 $\frac{7\sqrt{165}i}{660}$ 0 0 $\frac{5\sqrt{66}i}{264}$ 0 0 0 0 $-\frac{\sqrt{11}i}{22}$
	0	0 0 $\frac{\sqrt{165}i}{165}$ 0 0 $\frac{3\sqrt{110}}{220}$ 0 $-\frac{\sqrt{110}i}{55}$ 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{165}i}{165}$ $-\frac{3\sqrt{110}}{220}$ 0 $-\frac{\sqrt{110}i}{55}$ 0 0 0 0 $\frac{\sqrt{11}i}{22}$ 0 0
$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$		

897 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 2)$	0	0	0	$-\frac{\sqrt{462}}{1848}$	$-\frac{\sqrt{77}i}{308}$	0	0	0	0	$\frac{\sqrt{770}i}{110}$	0	$\frac{3\sqrt{770}}{440}$	$\frac{\sqrt{1155}i}{165}$	0		
	0	0	$\frac{\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{77}i}{308}$	0	0	$\frac{\sqrt{770}i}{110}$	0	$-\frac{3\sqrt{770}}{440}$	0	0	$-\frac{\sqrt{1155}i}{165}$		
	0	$\frac{\sqrt{462}}{1848}$	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	0	$\frac{3\sqrt{770}}{440}$	0	$-\frac{\sqrt{770}i}{220}$	0	0		
	$-\frac{\sqrt{462}}{1848}$	0	0	0	0	0	0	$\frac{\sqrt{77}i}{308}$	$-\frac{3\sqrt{770}}{440}$	0	$-\frac{\sqrt{770}i}{220}$	0	0	0		
	$\frac{\sqrt{77}i}{308}$	0	0	0	0	0	0	$\frac{\sqrt{462}}{462}$	$\frac{23\sqrt{1155}i}{4620}$	0	0	0	0	$-\frac{\sqrt{770}i}{220}$		
	0	$-\frac{\sqrt{77}i}{308}$	0	0	0	0	$-\frac{\sqrt{462}}{462}$	0	0	$-\frac{23\sqrt{1155}i}{4620}$	0	0	$-\frac{\sqrt{770}i}{220}$	0		
	0	0	$\frac{\sqrt{77}i}{308}$	0	0	$-\frac{\sqrt{462}}{462}$	0	0	0	0	$-\frac{\sqrt{1155}i}{924}$	0	0	0		
	0	0	0	$-\frac{\sqrt{77}i}{308}$	$\frac{\sqrt{462}}{462}$	0	0	0	0	0	$\frac{\sqrt{1155}i}{924}$	0	0			
	0	$-\frac{\sqrt{770}i}{110}$	0	$-\frac{3\sqrt{770}}{440}$	$-\frac{23\sqrt{1155}i}{4620}$	0	0	0	0	0	$-\frac{5\sqrt{462}}{1848}$	$-\frac{\sqrt{77}i}{154}$	0			
	$-\frac{\sqrt{770}i}{110}$	0	$\frac{3\sqrt{770}}{440}$	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	0	0	0	$\frac{5\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{77}i}{154}$		
	0	$-\frac{3\sqrt{770}}{440}$	0	$\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{1155}i}{924}$	0	0	$\frac{5\sqrt{462}}{1848}$	0	0	0	0		
	$\frac{3\sqrt{770}}{440}$	0	$\frac{\sqrt{770}i}{220}$	0	0	0	0	$-\frac{\sqrt{1155}i}{924}$	$-\frac{5\sqrt{462}}{1848}$	0	0	0	0	0		
	$-\frac{\sqrt{1155}i}{165}$	0	0	0	0	$\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{77}i}{154}$	0	0	0	0	0		
	0	$\frac{\sqrt{1155}i}{165}$	0	0	$\frac{\sqrt{770}i}{220}$	0	0	0	0	$-\frac{\sqrt{77}i}{154}$	0	0	0	0		
$-\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$																

898 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 2)$	0	0	0	$-\frac{\sqrt{462}i}{1848}$	0	0	$-\frac{\sqrt{77}i}{308}$	0	0	$-\frac{\sqrt{770}}{220}$	0	$\frac{3\sqrt{770}i}{440}$	0	0	0
	0	0	$-\frac{\sqrt{462}i}{1848}$	0	0	0	0	$\frac{\sqrt{77}i}{308}$	$\frac{\sqrt{770}}{220}$	0	$\frac{3\sqrt{770}i}{440}$	0	0	0	0
	0	$\frac{\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{77}i}{308}$	0	0	0	0	$\frac{3\sqrt{770}i}{440}$	0	$\frac{\sqrt{770}}{110}$	$\frac{\sqrt{1155}i}{165}$	0	0
	$\frac{\sqrt{462}i}{1848}$	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	0	$\frac{3\sqrt{770}i}{440}$	0	$-\frac{\sqrt{770}}{110}$	0	0	$-\frac{\sqrt{1155}i}{165}$	0
	0	0	$-\frac{\sqrt{77}i}{308}$	0	0	0	0	$\frac{\sqrt{462}i}{462}$	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	0	$-\frac{\sqrt{770}}{220}$	0
	0	0	0	$\frac{\sqrt{77}i}{308}$	0	0	$\frac{\sqrt{462}i}{462}$	0	0	0	0	$-\frac{23\sqrt{1155}i}{4620}$	$\frac{\sqrt{770}}{220}$	0	0
	$\frac{\sqrt{77}i}{308}$	0	0	0	0	$-\frac{\sqrt{462}i}{462}$	0	0	$\frac{\sqrt{1155}i}{924}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{77}i}{308}$	0	0	$-\frac{\sqrt{462}i}{462}$	0	0	0	0	$-\frac{\sqrt{1155}i}{924}$	0	0	0	0	0
	0	$\frac{\sqrt{770}}{220}$	0	$-\frac{3\sqrt{770}i}{440}$	0	0	$-\frac{\sqrt{1155}i}{924}$	0	0	0	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	0
	$-\frac{\sqrt{770}}{220}$	0	$-\frac{3\sqrt{770}i}{440}$	0	0	0	0	$\frac{\sqrt{1155}i}{924}$	0	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	0	0
	0	$-\frac{3\sqrt{770}i}{440}$	0	$-\frac{\sqrt{770}}{110}$	$-\frac{23\sqrt{1155}i}{4620}$	0	0	0	$\frac{5\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{77}i}{154}$	0	0	0
	$-\frac{3\sqrt{770}i}{440}$	0	$\frac{\sqrt{770}}{110}$	0	0	$\frac{23\sqrt{1155}i}{4620}$	0	0	$\frac{5\sqrt{462}i}{1848}$	0	0	0	$-\frac{\sqrt{77}i}{154}$	0	$-\frac{\sqrt{77}i}{154}$
	0	0	$-\frac{\sqrt{1155}i}{165}$	0	0	$\frac{\sqrt{770}}{220}$	0	0	0	0	$-\frac{\sqrt{77}i}{154}$	0	0	0	0
	0	0	0	$\frac{\sqrt{1155}i}{165}$	$-\frac{\sqrt{770}}{220}$	0	0	0	0	0	$\frac{\sqrt{77}i}{154}$	0	0	0	0

899 symmetry

z

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_1^{(1,0;a)}(A_{2g})$	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0	
	$-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$	
	0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$	
	0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $-\frac{\sqrt{42}}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0	

900 symmetry

x

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{1,1}^{(1,0;a)}(E_g)$	0	0	0	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{3\sqrt{7}}{28}$	0	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0
	$-\frac{3\sqrt{7}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	$\frac{\sqrt{7}}{14}$	0	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{42}i}{56}$	0	0	$\frac{\sqrt{7}}{14}$	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{42}i}{56}$	$-\frac{\sqrt{7}}{14}$	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{42}i}{28}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	$\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{42}i}{28}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	$-\frac{\sqrt{7}}{28}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{42}i}{28}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{28}$	0	0	0	0	0	0

901 symmetry

-y

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{1,2}^{(1,0;a)}(E_g)$	0	0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{3\sqrt{7}i}{28}$	0 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0
	$\frac{\sqrt{42}i}{56}$	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0
$-\frac{z(3x^2+3y^2-2z^2)}{2}$		

902 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(A_{2g})$	0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0	

903 symmetry

 $\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(B_{1g})$	0	0 0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 $\frac{i}{6}$ 0 0 $\frac{\sqrt{6}}{24}$
	0	0 0 0 0 $\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 $-\frac{i}{6}$ $-\frac{\sqrt{6}}{24}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ $-\frac{i}{6}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$
	0	0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 $\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0
	0	$\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0
	$-\frac{\sqrt{10}}{24}$	0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0
	0	$-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{i}{6}$ 0
	$-\frac{\sqrt{10}i}{24}$	0 $-\frac{\sqrt{10}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $\frac{i}{6}$
	0	0 $\frac{i}{6}$ 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}}{24}$
	0	0 0 0 $-\frac{i}{6}$ $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0
	$-\frac{i}{6}$	0 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$
	0	$\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0
	0	$-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 $\frac{i}{6}$ 0 0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0
	$\frac{\sqrt{6}}{24}$	0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{i}{6}$ $\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0

904 symmetry

$$\frac{\sqrt{15}z(x-y)(x+y)}{2}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(B_{2g})$	0	0 0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ $-\frac{i}{6}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$
	0	0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 $\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 $-\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}}{24}$
	0	0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 $\frac{i}{6}$ $\frac{\sqrt{6}}{24}$ 0
	0	$\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{i}{6}$ 0
	$\frac{\sqrt{10}i}{24}$	0 $\frac{\sqrt{10}}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{i}{6}$
	0	$\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0
	$-\frac{\sqrt{10}}{24}$	0 $\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0
	$\frac{i}{6}$	0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$
	0	$-\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0
	0	0 0 $\frac{i}{6}$ 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{24}$
	0	0 0 0 $-\frac{i}{6}$ $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}}{24}$ 0
	0	$\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $\frac{i}{6}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0
	$\frac{\sqrt{6}i}{24}$	0 $-\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{6}$ 0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0

905 symmetry

$$\frac{x(2x^2 - 3y^2 - 3z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0	0	0	$-\frac{1}{8}$	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	0	$\frac{\sqrt{15}}{24}$	$\frac{\sqrt{10}i}{16}$	0			
	0	0	$\frac{1}{8}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{\sqrt{15}}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$		
	0	$\frac{1}{8}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{15}}{24}$	0	0	0	0		
	$-\frac{1}{8}$	0	0	0	0	0	0	$\frac{\sqrt{6}i}{48}$	$\frac{\sqrt{15}}{24}$	0	0	0	0	0		
	$\frac{\sqrt{6}i}{48}$	0	0	0	0	0	0	$\frac{1}{8}$	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	0		
	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{1}{8}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0		
	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{1}{8}$	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$-\frac{\sqrt{15}}{24}$			
	0	0	0	$-\frac{\sqrt{6}i}{48}$	$\frac{1}{8}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	$\frac{\sqrt{15}}{24}$	0			
	0	0	0	$\frac{\sqrt{15}}{24}$	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0	$\frac{1}{8}$	$\frac{\sqrt{6}i}{48}$	0			
	0	0	$-\frac{\sqrt{15}}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{1}{8}$	0	0	$-\frac{\sqrt{6}i}{48}$		
	0	$-\frac{\sqrt{15}}{24}$	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{1}{8}$	0	0	0		
	$\frac{\sqrt{15}}{24}$	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	$\frac{1}{8}$	0	0	0	0	0	0		
	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	0	0	$\frac{\sqrt{15}}{24}$	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	0		
	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{\sqrt{15}}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0		

906 symmetry

$$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	0	0	0	$-\frac{i}{8}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0
	0	0	$-\frac{i}{8}$	0	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0
	0	$\frac{i}{8}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0
	$\frac{i}{8}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$
	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$\frac{i}{8}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0
	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$\frac{i}{8}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0
	$\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{i}{8}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$\frac{\sqrt{15}i}{24}$
	0	$-\frac{\sqrt{6}i}{48}$	0	0	$-\frac{i}{8}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{15}i}{24}$	0
	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$\frac{i}{8}$	0	0
	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{i}{8}$	0	0	0
	0	$\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$-\frac{i}{8}$	0	0	$-\frac{\sqrt{6}i}{48}$	0
	$\frac{\sqrt{15}i}{24}$	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$-\frac{i}{8}$	0	0	0	0	$\frac{\sqrt{6}i}{48}$	0
	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0
	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0

907 symmetry

 $\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	0	0 0 0 $-\frac{\sqrt{15}}{24}$ $-\frac{\sqrt{10}i}{48}$ 0 0 0 0 $-\frac{i}{6}$ 0 $\frac{1}{24}$ $-\frac{\sqrt{6}i}{16}$ 0
	0	0 0 $\frac{\sqrt{15}}{24}$ 0 0 $\frac{\sqrt{10}i}{48}$ 0 0 0 $-\frac{i}{6}$ 0 $-\frac{1}{24}$ 0 0 $\frac{\sqrt{6}i}{16}$
	0	$\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{48}$ 0 0 0 $-\frac{1}{24}$ 0 $-\frac{i}{6}$ 0 0 0
	$-\frac{\sqrt{15}}{24}$	0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{48}$ $\frac{1}{24}$ 0 $-\frac{i}{6}$ 0 0 0 0
	$\frac{\sqrt{10}i}{48}$	0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ $\frac{\sqrt{6}i}{16}$ 0 0 0 0 $-\frac{i}{6}$
	0	$-\frac{\sqrt{10}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 $-\frac{i}{6}$ 0
	0	0 0 $\frac{\sqrt{10}i}{48}$ 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 $-\frac{1}{24}$
	0	0 0 0 $-\frac{\sqrt{10}i}{48}$ $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ $\frac{1}{24}$ 0 0
	0	$\frac{i}{6}$ 0 $\frac{1}{24}$ $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ $\frac{\sqrt{10}i}{48}$ 0
	$\frac{i}{6}$	0 $-\frac{1}{24}$ 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 $-\frac{\sqrt{10}i}{48}$
	0	$-\frac{1}{24}$ 0 $\frac{i}{6}$ 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0
	$\frac{1}{24}$	0 $\frac{i}{6}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ $\frac{\sqrt{15}}{24}$ 0 0 0 0 0
	$\frac{\sqrt{6}i}{16}$	0 0 0 0 0 $\frac{i}{6}$ 0 $\frac{1}{24}$ $-\frac{\sqrt{10}i}{48}$ 0 0 0 0 0
	0	$-\frac{\sqrt{6}i}{16}$ 0 0 $\frac{i}{6}$ 0 $-\frac{1}{24}$ 0 0 0 $\frac{\sqrt{10}i}{48}$ 0 0 0 0

908 symmetry

 $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 2)$	0	0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{\sqrt{10}i}{48}$ 0 0 $-\frac{1}{6}$ 0 $-\frac{i}{24}$ 0 0
	0	0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $\frac{\sqrt{10}i}{48}$ $\frac{1}{6}$ 0 $-\frac{i}{24}$ 0 0 0
	0	$\frac{\sqrt{15}i}{24}$ 0 0 0 $\frac{\sqrt{10}i}{48}$ 0 0 0 0 $\frac{i}{24}$ 0 $-\frac{1}{6}$ $-\frac{\sqrt{6}i}{16}$ 0
	$\frac{\sqrt{15}i}{24}$	0 0 0 0 0 $-\frac{\sqrt{10}i}{48}$ 0 0 $\frac{i}{24}$ 0 $\frac{1}{6}$ 0 0 $\frac{\sqrt{6}i}{16}$
	0	0 0 $-\frac{\sqrt{10}i}{48}$ 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 $-\frac{1}{6}$
	0	0 0 0 $\frac{\sqrt{10}i}{48}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ $\frac{1}{6}$ 0
	$\frac{\sqrt{10}i}{48}$	0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0 $\frac{i}{24}$
	0	$-\frac{\sqrt{10}i}{48}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 $\frac{i}{24}$ 0
	0	$\frac{1}{6}$ 0 $-\frac{i}{24}$ 0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0
	$-\frac{1}{6}$	0 $-\frac{i}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0
	0	$\frac{i}{24}$ 0 $\frac{1}{6}$ $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{\sqrt{10}i}{48}$ 0
	$\frac{i}{24}$	0 $-\frac{1}{6}$ 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $\frac{\sqrt{10}i}{48}$
	0	0 $\frac{\sqrt{6}i}{16}$ 0 0 $\frac{1}{6}$ 0 $-\frac{i}{24}$ 0 0 $\frac{\sqrt{10}i}{48}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{6}i}{16}$ $-\frac{1}{6}$ 0 $-\frac{i}{24}$ 0 0 0 0 $-\frac{\sqrt{10}i}{48}$ 0 0

909 symmetry

 $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{1g})$	0	0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 $-\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}}{20}$
	0	0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 $\frac{\sqrt{15}i}{15}$ $-\frac{\sqrt{10}}{20}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{\sqrt{15}i}{15}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$
	0	0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0
	0	$\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0
	$-\frac{\sqrt{6}}{24}$	0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0
	0	$-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0
	$-\frac{\sqrt{6}i}{24}$	0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0
	0	0 $\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{15}i}{15}$ $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{15}i}{15}$	0 0 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{15}i}{15}$ 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{10}}{20}$	0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0

910 symmetry

$$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 1)$	0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 $\frac{3\sqrt{14}}{56}$ 0 0	
	$-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0	
	0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 $-\frac{3\sqrt{14}i}{56}$ 0 0	
	$-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 $\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$	
	0 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ 0 0 0	
911	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 2)$	0	0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{\sqrt{15}i}{15}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$
	0	0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{10}}{20}$
	0	0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $-\frac{\sqrt{15}i}{15}$ $\frac{\sqrt{10}}{20}$ 0
	0	$-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0
	$-\frac{\sqrt{6}i}{24}$	0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0
	0	$-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0
	$\frac{\sqrt{6}}{24}$	0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0
	$\frac{\sqrt{15}i}{15}$	0 0 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{15}i}{15}$ $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{10}i}{20}$	0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0

912 symmetry

$$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_5^{(1,0;a)}(B_{1g})$	0	0	0	0	0	$-\frac{\sqrt{2}}{24}$	0	$\frac{\sqrt{2}i}{24}$	0	0	$\frac{\sqrt{5}i}{30}$	0	0	$\frac{\sqrt{30}}{30}$	
	0	0	0	0	$\frac{\sqrt{2}}{24}$	0	$\frac{\sqrt{2}i}{24}$	0	0	0	0	$-\frac{\sqrt{5}i}{30}$	$-\frac{\sqrt{30}}{30}$	0	
	0	0	0	0	0	$-\frac{\sqrt{2}i}{24}$	0	$-\frac{\sqrt{2}}{24}$	$-\frac{\sqrt{5}i}{30}$	0	0	0	0	$-\frac{\sqrt{30}i}{30}$	
	0	0	0	0	$-\frac{\sqrt{2}i}{24}$	0	$\frac{\sqrt{2}}{24}$	0	0	$\frac{\sqrt{5}i}{30}$	0	0	$-\frac{\sqrt{30}i}{30}$	0	
	0	$\frac{\sqrt{2}}{24}$	0	$\frac{\sqrt{2}i}{24}$	0	0	0	0	$\frac{\sqrt{30}}{24}$	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	
	$-\frac{\sqrt{2}}{24}$	0	$\frac{\sqrt{2}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{30}}{24}$	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	
	0	$-\frac{\sqrt{2}i}{24}$	0	$\frac{\sqrt{2}}{24}$	0	0	0	0	0	$\frac{\sqrt{30}i}{120}$	0	$\frac{\sqrt{30}}{120}$	$\frac{\sqrt{5}i}{15}$	0	
	$-\frac{\sqrt{2}i}{24}$	0	$-\frac{\sqrt{2}}{24}$	0	0	0	0	0	$\frac{\sqrt{30}i}{120}$	0	$-\frac{\sqrt{30}}{120}$	0	0	$-\frac{\sqrt{5}i}{15}$	
	0	0	$\frac{\sqrt{5}i}{30}$	0	0	$-\frac{\sqrt{30}}{24}$	0	$-\frac{\sqrt{30}i}{120}$	0	0	0	0	0	$-\frac{\sqrt{2}}{12}$	
	0	0	0	$-\frac{\sqrt{5}i}{30}$	$\frac{\sqrt{30}}{24}$	0	$-\frac{\sqrt{30}i}{120}$	0	0	0	0	0	$\frac{\sqrt{2}}{12}$	0	
	$-\frac{\sqrt{5}i}{30}$	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	$-\frac{\sqrt{30}}{120}$	0	0	0	0	0	$-\frac{\sqrt{2}i}{12}$	
	0	$\frac{\sqrt{5}i}{30}$	0	0	$\frac{\sqrt{30}i}{24}$	0	$\frac{\sqrt{30}}{120}$	0	0	0	0	0	$-\frac{\sqrt{2}i}{12}$	0	
	0	$-\frac{\sqrt{30}}{30}$	0	$\frac{\sqrt{30}i}{30}$	0	0	$-\frac{\sqrt{5}i}{15}$	0	0	$\frac{\sqrt{2}}{12}$	0	$\frac{\sqrt{2}i}{12}$	0	0	0
	$\frac{\sqrt{30}}{30}$	0	$\frac{\sqrt{30}i}{30}$	0	0	0	0	$\frac{\sqrt{5}i}{15}$	$-\frac{\sqrt{2}}{12}$	0	$\frac{\sqrt{2}i}{12}$	0	0	0	

913 symmetry

$$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(B_{2g})$	0	0 0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $\frac{\sqrt{2}}{24}$ $\frac{\sqrt{5}i}{30}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$
	0	0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}i}{30}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{2}}{24}$ 0 $\frac{\sqrt{2}i}{24}$ 0 0 $\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}}{30}$
	0	0 0 0 0 $\frac{\sqrt{2}}{24}$ 0 $\frac{\sqrt{2}i}{24}$ 0 0 0 0 $-\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{30}}{30}$ 0
	0	$-\frac{\sqrt{2}i}{24}$ 0 $\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{5}i}{15}$ 0
	$-\frac{\sqrt{2}i}{24}$	0 $-\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{5}i}{15}$
	0	$-\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0
	$\frac{\sqrt{2}}{24}$	0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0
	$-\frac{\sqrt{5}i}{30}$	0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$
	0	$\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$ 0
	0	0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{12}$
	0	0 0 0 $\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}}{12}$ 0
	0	$-\frac{\sqrt{30}i}{30}$ 0 $-\frac{\sqrt{30}}{30}$ $\frac{\sqrt{5}i}{15}$ 0 0 0 0 $-\frac{\sqrt{2}i}{12}$ 0 $\frac{\sqrt{2}}{12}$ 0 0
	$-\frac{\sqrt{30}i}{30}$	0 $\frac{\sqrt{30}}{30}$ 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 $-\frac{\sqrt{2}i}{12}$ 0 $-\frac{\sqrt{2}}{12}$ 0 0 0

914 symmetry

$$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 1)$	0	0	0	$-\frac{\sqrt{35}}{224}$	$-\frac{11\sqrt{210}i}{672}$	0	0	0	0	0	$-\frac{\sqrt{21}}{96}$	$\frac{\sqrt{14}i}{32}$	0		
	0	0	$\frac{\sqrt{35}}{224}$	0	0	$\frac{11\sqrt{210}i}{672}$	0	0	0	0	$\frac{\sqrt{21}}{96}$	0	0	$-\frac{\sqrt{14}i}{32}$	
	0	$\frac{\sqrt{35}}{224}$	0	0	0	0	$\frac{5\sqrt{210}i}{336}$	0	0	$-\frac{5\sqrt{21}}{96}$	0	0	0	0	
	$-\frac{\sqrt{35}}{224}$	0	0	0	0	0	0	$-\frac{5\sqrt{210}i}{336}$	$\frac{5\sqrt{21}}{96}$	0	0	0	0	0	
	$\frac{11\sqrt{210}i}{672}$	0	0	0	0	0	0	$\frac{\sqrt{35}}{56}$	$\frac{5\sqrt{14}i}{224}$	0	0	0	0	0	
	0	$-\frac{11\sqrt{210}i}{672}$	0	0	0	0	$-\frac{\sqrt{35}}{56}$	0	0	$-\frac{5\sqrt{14}i}{224}$	0	0	0	0	
	0	0	$-\frac{5\sqrt{210}i}{336}$	0	0	$-\frac{\sqrt{35}}{56}$	0	0	0	$-\frac{\sqrt{14}i}{112}$	0	0	$\frac{\sqrt{21}}{24}$		
	0	0	0	$\frac{5\sqrt{210}i}{336}$	$\frac{\sqrt{35}}{56}$	0	0	0	0	0	$\frac{\sqrt{14}i}{112}$	$-\frac{\sqrt{21}}{24}$	0		
	0	0	0	$\frac{5\sqrt{21}}{96}$	$-\frac{5\sqrt{14}i}{224}$	0	0	0	0	0	$-\frac{5\sqrt{35}}{224}$	$-\frac{\sqrt{210}i}{672}$	0		
	0	0	$-\frac{5\sqrt{21}}{96}$	0	0	$\frac{5\sqrt{14}i}{224}$	0	0	0	$\frac{5\sqrt{35}}{224}$	0	0	$\frac{\sqrt{210}i}{672}$		
	0	$\frac{\sqrt{21}}{96}$	0	0	0	0	$\frac{\sqrt{14}i}{112}$	0	0	$\frac{5\sqrt{35}}{224}$	0	0	0	0	
	$-\frac{\sqrt{21}}{96}$	0	0	0	0	0	0	$-\frac{\sqrt{14}i}{112}$	$-\frac{5\sqrt{35}}{224}$	0	0	0	0	0	
	$-\frac{\sqrt{14}i}{32}$	0	0	0	0	0	0	$-\frac{\sqrt{21}}{24}$	$\frac{\sqrt{210}i}{672}$	0	0	0	0	0	
	0	$\frac{\sqrt{14}i}{32}$	0	0	0	0	$\frac{\sqrt{21}}{24}$	0	0	$-\frac{\sqrt{210}i}{672}$	0	0	0	0	
915	symmetry	$-\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 1)$	0 0 0 $-\frac{\sqrt{35}i}{224}$ 0 0 $\frac{5\sqrt{210}i}{336}$ 0 0 0 0 $-\frac{5\sqrt{21}i}{96}$ 0 0	
	0 0 $-\frac{\sqrt{35}i}{224}$ 0 0 0 0 $-\frac{5\sqrt{210}i}{336}$ 0 0 $-\frac{5\sqrt{21}i}{96}$ 0 0 0	
	0 $\frac{\sqrt{35}i}{224}$ 0 0 $\frac{11\sqrt{210}i}{672}$ 0 0 0 0 $-\frac{\sqrt{21}i}{96}$ 0 0 $\frac{\sqrt{14}i}{32}$ 0	
	$\frac{\sqrt{35}i}{224}$ 0 0 0 0 $-\frac{11\sqrt{210}i}{672}$ 0 0 $-\frac{\sqrt{21}i}{96}$ 0 0 0 0 $-\frac{\sqrt{14}i}{32}$	
	0 0 $-\frac{11\sqrt{210}i}{672}$ 0 0 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 $\frac{5\sqrt{14}i}{224}$ 0 0 0	
	0 0 0 $\frac{11\sqrt{210}i}{672}$ 0 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 0 $-\frac{5\sqrt{14}i}{224}$ 0 0	
	$-\frac{5\sqrt{210}i}{336}$ 0 0 0 0 $-\frac{\sqrt{35}i}{56}$ 0 0 $\frac{\sqrt{14}i}{112}$ 0 0 0 0 $-\frac{\sqrt{21}i}{24}$	
	0 $\frac{5\sqrt{210}i}{336}$ 0 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{112}$ 0 0 $-\frac{\sqrt{21}i}{24}$ 0	
	0 0 0 $\frac{\sqrt{21}i}{96}$ 0 0 $-\frac{\sqrt{14}i}{112}$ 0 0 0 0 $-\frac{5\sqrt{35}i}{224}$ 0 0	
	0 0 $\frac{\sqrt{21}i}{96}$ 0 0 0 0 $\frac{\sqrt{14}i}{112}$ 0 0 $-\frac{5\sqrt{35}i}{224}$ 0 0 0	
	0 $\frac{5\sqrt{21}i}{96}$ 0 0 $-\frac{5\sqrt{14}i}{224}$ 0 0 0 0 $\frac{5\sqrt{35}i}{224}$ 0 0 $\frac{\sqrt{210}i}{672}$ 0	
	$\frac{5\sqrt{21}i}{96}$ 0 0 0 0 $\frac{5\sqrt{14}i}{224}$ 0 0 $\frac{5\sqrt{35}i}{224}$ 0 0 0 0 $-\frac{\sqrt{210}i}{672}$	
	0 0 $-\frac{\sqrt{14}i}{32}$ 0 0 0 0 $\frac{\sqrt{21}i}{24}$ 0 0 $-\frac{\sqrt{210}i}{672}$ 0 0 0	
	0 0 0 $\frac{\sqrt{14}i}{32}$ 0 0 $\frac{\sqrt{21}i}{24}$ 0 0 0 0 $\frac{\sqrt{210}i}{672}$ 0 0	
$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$		
916	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 2)$	0	0	0	$-\frac{1}{32}$	$-\frac{\sqrt{6}i}{32}$	0	0	0	0	0	$\frac{3\sqrt{15}}{160}$	$-\frac{9\sqrt{10}i}{160}$	0		
	0	0	$\frac{1}{32}$	0	0	$\frac{\sqrt{6}i}{32}$	0	0	0	0	$-\frac{3\sqrt{15}}{160}$	0	0	$\frac{9\sqrt{10}i}{160}$	
	0	$\frac{1}{32}$	0	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$\frac{13\sqrt{15}}{480}$	0	$-\frac{\sqrt{15}i}{15}$	0	0	
	$-\frac{1}{32}$	0	0	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	$-\frac{13\sqrt{15}}{480}$	0	$-\frac{\sqrt{15}i}{15}$	0	0	0	
	$\frac{\sqrt{6}i}{32}$	0	0	0	0	0	$\frac{1}{8}$	$-\frac{3\sqrt{10}i}{160}$	0	0	0	0	$\frac{\sqrt{15}i}{15}$		
	0	$-\frac{\sqrt{6}i}{32}$	0	0	0	0	$-\frac{1}{8}$	0	0	$\frac{3\sqrt{10}i}{160}$	0	0	$\frac{\sqrt{15}i}{15}$	0	
	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	$-\frac{1}{8}$	0	0	0	$\frac{3\sqrt{10}i}{80}$	0	0	0	$-\frac{\sqrt{15}}{120}$	
	0	0	0	$\frac{\sqrt{6}i}{48}$	$\frac{1}{8}$	0	0	0	0	0	$-\frac{3\sqrt{10}i}{80}$	$\frac{\sqrt{15}}{120}$	0		
	0	0	0	$-\frac{13\sqrt{15}}{480}$	$\frac{3\sqrt{10}i}{160}$	0	0	0	0	0	0	$-\frac{5}{32}$	$-\frac{\sqrt{6}i}{96}$	0	
	0	0	$\frac{13\sqrt{15}}{480}$	0	0	$-\frac{3\sqrt{10}i}{160}$	0	0	0	0	$\frac{5}{32}$	0	0	$\frac{\sqrt{6}i}{96}$	
	0	$-\frac{3\sqrt{15}}{160}$	0	$\frac{\sqrt{15}i}{15}$	0	0	$-\frac{3\sqrt{10}i}{80}$	0	0	$\frac{5}{32}$	0	0	0	0	
	$\frac{3\sqrt{15}}{160}$	0	$\frac{\sqrt{15}i}{15}$	0	0	0	0	$\frac{3\sqrt{10}i}{80}$	$-\frac{5}{32}$	0	0	0	0	0	
	$\frac{9\sqrt{10}i}{160}$	0	0	0	0	$-\frac{\sqrt{15}i}{15}$	0	$\frac{\sqrt{15}}{120}$	$\frac{\sqrt{6}i}{96}$	0	0	0	0	0	
	0	$-\frac{9\sqrt{10}i}{160}$	0	0	$-\frac{\sqrt{15}i}{15}$	0	$-\frac{\sqrt{15}}{120}$	0	0	$-\frac{\sqrt{6}i}{96}$	0	0	0	0	
$-\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$															

917 symmetry

$$-\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 2)$	0	0	0	$-\frac{i}{32}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{15}}{15}$	0	$\frac{13\sqrt{15}i}{480}$	0	0	0
	0	0	$-\frac{i}{32}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	$\frac{\sqrt{15}}{15}$	0	$\frac{13\sqrt{15}i}{480}$	0	0	0	0
	0	$\frac{i}{32}$	0	0	$\frac{\sqrt{6}i}{32}$	0	0	0	0	$\frac{3\sqrt{15}i}{160}$	0	0	$-\frac{9\sqrt{10}i}{160}$	0	0
	$\frac{i}{32}$	0	0	0	0	$-\frac{\sqrt{6}i}{32}$	0	0	$\frac{3\sqrt{15}i}{160}$	0	0	0	0	$\frac{9\sqrt{10}i}{160}$	0
	0	0	$-\frac{\sqrt{6}i}{32}$	0	0	0	0	$\frac{i}{8}$	0	0	$-\frac{3\sqrt{10}i}{160}$	0	0	$\frac{\sqrt{15}}{15}$	0
	0	0	0	$\frac{\sqrt{6}i}{32}$	0	0	$\frac{i}{8}$	0	0	0	$\frac{3\sqrt{10}i}{160}$	$-\frac{\sqrt{15}}{15}$	0	0	0
	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{i}{8}$	0	0	$-\frac{3\sqrt{10}i}{80}$	0	0	0	0	$\frac{\sqrt{15}i}{120}$	0
	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{i}{8}$	0	0	0	0	$\frac{3\sqrt{10}i}{80}$	0	0	$\frac{\sqrt{15}i}{120}$	0	0
	0	$\frac{\sqrt{15}}{15}$	0	$-\frac{3\sqrt{15}i}{160}$	0	0	$\frac{3\sqrt{10}i}{80}$	0	0	0	0	$-\frac{5i}{32}$	0	0	0
	$-\frac{\sqrt{15}}{15}$	0	$-\frac{3\sqrt{15}i}{160}$	0	0	0	0	$-\frac{3\sqrt{10}i}{80}$	0	0	$-\frac{5i}{32}$	0	0	0	0
	0	$-\frac{13\sqrt{15}i}{480}$	0	0	$\frac{3\sqrt{10}i}{160}$	0	0	0	0	$\frac{5i}{32}$	0	0	$\frac{\sqrt{6}i}{96}$	0	0
	$-\frac{13\sqrt{15}i}{480}$	0	0	0	0	$-\frac{3\sqrt{10}i}{160}$	0	0	$\frac{5i}{32}$	0	0	0	0	$-\frac{\sqrt{6}i}{96}$	0
	0	0	$\frac{9\sqrt{10}i}{160}$	0	0	$-\frac{\sqrt{15}}{15}$	0	$-\frac{\sqrt{15}i}{120}$	0	0	$-\frac{\sqrt{6}i}{96}$	0	0	0	0
	0	0	0	$-\frac{9\sqrt{10}i}{160}$	$\frac{\sqrt{15}}{15}$	0	$-\frac{\sqrt{15}i}{120}$	0	0	0	$\frac{\sqrt{6}i}{96}$	0	0	0	0

$$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$$

918 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 3)$	0	0	0	$-\frac{\sqrt{3}}{48}$	$\frac{7\sqrt{2}i}{48}$	0	0	0	0	$-\frac{\sqrt{5}i}{15}$	0	$\frac{13\sqrt{5}}{240}$	$\frac{\sqrt{30}i}{80}$	0		
	0	0	$\frac{\sqrt{3}}{48}$	0	0	$-\frac{7\sqrt{2}i}{48}$	0	0	$-\frac{\sqrt{5}i}{15}$	0	$-\frac{13\sqrt{5}}{240}$	0	0	$-\frac{\sqrt{30}i}{80}$		
	0	$\frac{\sqrt{3}}{48}$	0	0	0	0	$-\frac{\sqrt{2}i}{6}$	0	0	$-\frac{7\sqrt{5}}{240}$	0	$\frac{\sqrt{5}i}{30}$	0	0	0	
	$-\frac{\sqrt{3}}{48}$	0	0	0	0	0	0	$\frac{\sqrt{2}i}{6}$	$\frac{7\sqrt{5}}{240}$	0	$\frac{\sqrt{5}i}{30}$	0	0	0	0	
	$-\frac{7\sqrt{2}i}{48}$	0	0	0	0	0	0	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{30}i}{80}$	0	0	0	0	$\frac{\sqrt{5}i}{30}$		
	0	$\frac{7\sqrt{2}i}{48}$	0	0	0	0	$-\frac{\sqrt{3}}{12}$	0	0	$-\frac{\sqrt{30}i}{80}$	0	0	$\frac{\sqrt{5}i}{30}$	0		
	0	0	$\frac{\sqrt{2}i}{6}$	0	0	$-\frac{\sqrt{3}}{12}$	0	0	0	0	0	0	0	$\frac{\sqrt{5}}{12}$		
	0	0	0	$-\frac{\sqrt{2}i}{6}$	$\frac{\sqrt{3}}{12}$	0	0	0	0	0	0	0	$-\frac{\sqrt{5}}{12}$	0		
	0	$\frac{\sqrt{5}i}{15}$	0	$\frac{7\sqrt{5}}{240}$	$-\frac{\sqrt{30}i}{80}$	0	0	0	0	0	0	$-\frac{5\sqrt{3}}{48}$	$-\frac{\sqrt{2}i}{48}$	0		
	$\frac{\sqrt{5}i}{15}$	0	$-\frac{7\sqrt{5}}{240}$	0	0	$\frac{\sqrt{30}i}{80}$	0	0	0	0	$\frac{5\sqrt{3}}{48}$	0	0	$\frac{\sqrt{2}i}{48}$		
	0	$-\frac{13\sqrt{5}}{240}$	0	$-\frac{\sqrt{5}i}{30}$	0	0	0	0	0	$\frac{5\sqrt{3}}{48}$	0	0	0	0		
	$\frac{13\sqrt{5}}{240}$	0	$-\frac{\sqrt{5}i}{30}$	0	0	0	0	0	$-\frac{5\sqrt{3}}{48}$	0	0	0	0	0		
	$-\frac{\sqrt{30}i}{80}$	0	0	0	0	$-\frac{\sqrt{5}i}{30}$	0	$-\frac{\sqrt{5}}{12}$	$\frac{\sqrt{2}i}{48}$	0	0	0	0	0		
	0	$\frac{\sqrt{30}i}{80}$	0	0	$-\frac{\sqrt{5}i}{30}$	0	$\frac{\sqrt{5}}{12}$	0	0	$-\frac{\sqrt{2}i}{48}$	0	0	0	0		

919 symmetry

$$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 3)$	0	0 0 0 $-\frac{\sqrt{3}i}{48}$ 0 0 $-\frac{\sqrt{2}i}{6}$ 0 0 $\frac{\sqrt{5}}{30}$ 0 $-\frac{7\sqrt{5}i}{240}$ 0 0
	0	0 0 $-\frac{\sqrt{3}i}{48}$ 0 0 0 0 $\frac{\sqrt{2}i}{6}$ $-\frac{\sqrt{5}}{30}$ 0 $-\frac{7\sqrt{5}i}{240}$ 0 0 0
	0	$\frac{\sqrt{3}i}{48}$ 0 0 0 $-\frac{7\sqrt{2}i}{48}$ 0 0 0 0 $\frac{13\sqrt{5}i}{240}$ 0 $-\frac{\sqrt{5}}{15}$ $\frac{\sqrt{30}i}{80}$ 0
	$\frac{\sqrt{3}i}{48}$	0 0 0 0 0 $\frac{7\sqrt{2}i}{48}$ 0 0 $\frac{13\sqrt{5}i}{240}$ 0 $\frac{\sqrt{5}}{15}$ 0 0 $-\frac{\sqrt{30}i}{80}$
	0	0 0 $\frac{7\sqrt{2}i}{48}$ 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 $\frac{\sqrt{5}}{30}$
	0	0 0 0 $-\frac{7\sqrt{2}i}{48}$ 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 $-\frac{\sqrt{30}i}{80}$ $-\frac{\sqrt{5}}{30}$ 0
	$\frac{\sqrt{2}i}{6}$	0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{12}$
	0	$-\frac{\sqrt{2}i}{6}$ 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{12}$ 0
	0	$-\frac{\sqrt{5}}{30}$ 0 $-\frac{13\sqrt{5}i}{240}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{3}i}{48}$ 0 0
	$\frac{\sqrt{5}}{30}$	0 $-\frac{13\sqrt{5}i}{240}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{3}i}{48}$ 0 0 0
	0	$\frac{7\sqrt{5}i}{240}$ 0 $\frac{\sqrt{5}}{15}$ $-\frac{\sqrt{30}i}{80}$ 0 0 0 0 $\frac{5\sqrt{3}i}{48}$ 0 0 $\frac{\sqrt{2}i}{48}$ 0
	$\frac{7\sqrt{5}i}{240}$	0 $-\frac{\sqrt{5}}{15}$ 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 $\frac{5\sqrt{3}i}{48}$ 0 0 0 0 $-\frac{\sqrt{2}i}{48}$
	0	0 0 $-\frac{\sqrt{30}i}{80}$ 0 0 $-\frac{\sqrt{5}}{30}$ 0 $\frac{\sqrt{5}i}{12}$ 0 0 $-\frac{\sqrt{2}i}{48}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{30}i}{80}$ $\frac{\sqrt{5}}{30}$ 0 $\frac{\sqrt{5}i}{12}$ 0 0 0 0 $\frac{\sqrt{2}i}{48}$ 0 0

920 symmetry

 $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_2^{(1,0;a)}(A_{1g})$	0	0	0	0	0	$\frac{5\sqrt{42}i}{168}$	0	$-\frac{5\sqrt{42}}{168}$	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{5\sqrt{42}i}{168}$	0	$-\frac{5\sqrt{42}}{168}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{42}}{168}$	0	$\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{42}}{168}$	0	$-\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	0	0	0
	0	$\frac{5\sqrt{42}i}{168}$	0	$\frac{5\sqrt{42}}{168}$	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	$-\frac{\sqrt{70}}{56}$	0	0	0
	$-\frac{5\sqrt{42}i}{168}$	0	$\frac{5\sqrt{42}}{168}$	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0
	0	$-\frac{5\sqrt{42}}{168}$	0	$\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0
	$-\frac{5\sqrt{42}}{168}$	0	$-\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$\frac{\sqrt{42}i}{84}$	
	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{84}$	0	
	0	0	0	0	0	$-\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$\frac{\sqrt{42}}{84}$	
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{42}i}{84}$	0	$\frac{\sqrt{42}}{84}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{84}$	0	$\frac{\sqrt{42}}{84}$	0	0	0	0
$\frac{\sqrt{3}(x-y)(x+y)}{2}$															

921 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_2^{(1,0;a)}(B_{1g})$	0 0 0 0 0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 $\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ $\frac{\sqrt{35}}{42}$ 0 0 0 0 0	
	0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 0	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	$\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{35}}{21}$ 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{35}}{21}$	
	0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{14}i}{84}$	
	0 0 0 $-\frac{\sqrt{35}}{42}$ $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{14}i}{84}$ 0	
	$-\frac{\sqrt{35}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{14}}{84}$	
	0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{14}}{84}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{35}}{21}$ 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{21}$ $\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0	

922 symmetry

 $\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_2^{(1,0;a)}(B_{2g})$	0 0 0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ $-\frac{\sqrt{35}}{42}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{35}}{21}$ 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 $\frac{\sqrt{35}}{21}$	
	0 $\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	$-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	$-\frac{\sqrt{35}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{21}}{21}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$	
	0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 0 $-\frac{\sqrt{14}}{84}$ 0	
	0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{14}}{84}$	
	0 0 0 $\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{14}i}{84}$ 0	
	0 0 0 0 $-\frac{\sqrt{35}}{21}$ 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{35}}{21}$ 0 0 $-\frac{\sqrt{14}}{84}$ 0 $\frac{\sqrt{14}i}{84}$ 0 0 0	

923 symmetry

 $\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g)$	0	$\frac{5\sqrt{21}}{84}$ 0 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0
	$\frac{5\sqrt{21}}{84}$	0 0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{35}}{84}$ 0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 0
	0	0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 $\frac{5\sqrt{14}}{168}$ 0 0 $-\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{84}$ 0 0 0
	0	0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0 $-\frac{5\sqrt{14}}{168}$ $\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{84}$ 0 0 0 0
	$\frac{5\sqrt{14}}{168}$	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $\frac{\sqrt{35}}{42}$
	0	$-\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{35}}{42}$ 0
	0	0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{35}i}{42}$
	0	0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ $\frac{\sqrt{35}i}{42}$ 0
	0	$\frac{\sqrt{35}}{84}$ 0 $-\frac{\sqrt{35}i}{84}$ $\frac{\sqrt{210}}{168}$ 0 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 $\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{14}}{84}$ 0
	$\frac{\sqrt{35}}{84}$	0 $\frac{\sqrt{35}i}{84}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 $-\frac{5\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{14}}{84}$
	0	$\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{84}$ 0 0 0
	$-\frac{\sqrt{35}i}{84}$	0 $\frac{\sqrt{35}}{84}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{84}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 $-\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{14}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{21}$
	0	0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{14}}{84}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0

924 symmetry

 $\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g)$	0	$\frac{5\sqrt{21}i}{84}$	0	0	0	0	$\frac{5\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{35}i}{84}$	0	$\frac{\sqrt{35}}{84}$	0	0	0
	$-\frac{5\sqrt{21}i}{84}$	0	0	0	0	0	0	$-\frac{5\sqrt{14}}{168}$	$\frac{\sqrt{35}i}{84}$	0	$\frac{\sqrt{35}}{84}$	0	0	0	0
	0	0	0	$\frac{5\sqrt{21}i}{84}$	$-\frac{5\sqrt{14}}{168}$	0	0	0	0	$-\frac{\sqrt{35}}{84}$	0	$-\frac{\sqrt{35}i}{84}$	0	0	0
	0	0	$-\frac{5\sqrt{21}i}{84}$	0	0	$\frac{5\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{35}}{84}$	0	$\frac{\sqrt{35}i}{84}$	0	0	0	0
	0	0	$-\frac{5\sqrt{14}}{168}$	0	0	0	0	0	0	0	$\frac{\sqrt{210}}{168}$	0	0	0	$-\frac{\sqrt{35}i}{42}$
	0	0	0	$\frac{5\sqrt{14}}{168}$	0	0	0	0	0	0	$-\frac{\sqrt{210}}{168}$	$\frac{\sqrt{35}i}{42}$	0	0	0
	$\frac{5\sqrt{14}}{168}$	0	0	0	0	0	0	0	$-\frac{\sqrt{210}}{168}$	0	0	0	0	0	$-\frac{\sqrt{35}}{42}$
	0	$-\frac{5\sqrt{14}}{168}$	0	0	0	0	0	0	0	$\frac{\sqrt{210}}{168}$	0	0	$-\frac{\sqrt{35}}{42}$	0	0
	0	$-\frac{\sqrt{35}i}{84}$	0	$-\frac{\sqrt{35}}{84}$	0	0	$-\frac{\sqrt{210}}{168}$	0	0	$-\frac{\sqrt{21}i}{84}$	0	$\frac{\sqrt{21}}{42}$	0	0	0
	$\frac{\sqrt{35}i}{84}$	0	$-\frac{\sqrt{35}}{84}$	0	0	0	$\frac{\sqrt{210}}{168}$	$\frac{\sqrt{21}i}{84}$	0	$\frac{\sqrt{21}}{42}$	0	0	0	0	0
	0	$\frac{\sqrt{35}}{84}$	0	$-\frac{\sqrt{35}i}{84}$	$\frac{\sqrt{210}}{168}$	0	0	0	0	$\frac{\sqrt{21}}{42}$	0	$-\frac{5\sqrt{21}i}{84}$	$-\frac{\sqrt{14}}{84}$	0	0
	$\frac{\sqrt{35}}{84}$	0	$\frac{\sqrt{35}i}{84}$	0	0	$-\frac{\sqrt{210}}{168}$	0	0	$\frac{\sqrt{21}}{42}$	0	$\frac{5\sqrt{21}i}{84}$	0	0	$\frac{\sqrt{14}}{84}$	0
	0	0	0	0	0	$-\frac{\sqrt{35}i}{42}$	0	$-\frac{\sqrt{35}}{42}$	0	0	$-\frac{\sqrt{14}}{84}$	0	0	$-\frac{\sqrt{21}i}{21}$	0
	0	0	0	0	$\frac{\sqrt{35}i}{42}$	0	$-\frac{\sqrt{35}}{42}$	0	0	0	0	$\frac{\sqrt{14}}{84}$	$\frac{\sqrt{21}i}{21}$	0	0
925	symmetry	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 1)$	0	0 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 $\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{66}i}{88}$
	0	0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0 0 $-\frac{\sqrt{11}}{22}$ $-\frac{\sqrt{66}i}{88}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ $\frac{\sqrt{11}}{22}$ 0 0 0 0 $-\frac{\sqrt{66}}{88}$
	0	0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 $-\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{66}}{88}$ 0
	0	$-\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 $-\frac{\sqrt{165}}{66}$ 0 0 $\frac{\sqrt{66}i}{88}$ 0 $-\frac{\sqrt{66}}{88}$ 0 0
	$\frac{\sqrt{110}i}{88}$	0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 $\frac{\sqrt{165}}{66}$ $-\frac{\sqrt{66}i}{88}$ 0 $-\frac{\sqrt{66}}{88}$ 0 0 0
	0	$\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ $-\frac{\sqrt{165}}{66}$ 0 0 0 0 $\frac{5\sqrt{66}}{264}$ 0 $\frac{5\sqrt{66}i}{264}$ 0 0
	$\frac{\sqrt{110}}{88}$	0 $\frac{\sqrt{110}i}{88}$ 0 0 $\frac{\sqrt{165}}{66}$ 0 0 $\frac{5\sqrt{66}}{264}$ 0 $-\frac{5\sqrt{66}i}{264}$ 0 0 0
	0	0 0 $\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{66}i}{88}$ 0 $\frac{5\sqrt{66}}{264}$ 0 0 0 0 $\frac{\sqrt{110}i}{88}$
	0	0 0 0 $-\frac{\sqrt{11}}{22}$ $-\frac{\sqrt{66}i}{88}$ 0 $\frac{5\sqrt{66}}{264}$ 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0
	$\frac{\sqrt{11}}{22}$	0 0 0 0 0 $-\frac{\sqrt{66}}{88}$ 0 $\frac{5\sqrt{66}i}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}}{88}$
	0	$-\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{66}}{88}$ 0 $-\frac{5\sqrt{66}i}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}}{88}$ 0
	0	$\frac{\sqrt{66}i}{88}$ 0 $-\frac{\sqrt{66}}{88}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0
$- \frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$		

926 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$	0 0 0 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 $\frac{5\sqrt{154}}{616}$ 0 0 $-\frac{\sqrt{385}}{110}$ 0 0 $-\frac{\sqrt{2310}i}{440}$	
	0 0 0 0 $\frac{5\sqrt{154}i}{616}$ 0 $\frac{5\sqrt{154}}{616}$ 0 0 0 0 $\frac{\sqrt{385}}{110}$ $\frac{\sqrt{2310}i}{440}$ 0	
	0 0 0 0 0 $-\frac{5\sqrt{154}}{616}$ 0 $-\frac{5\sqrt{154}i}{616}$ $-\frac{\sqrt{385}}{110}$ 0 0 0 $\frac{\sqrt{2310}}{440}$	
	0 0 0 0 $-\frac{5\sqrt{154}}{616}$ 0 $\frac{5\sqrt{154}i}{616}$ 0 0 $\frac{\sqrt{385}}{110}$ 0 0 $\frac{\sqrt{2310}}{440}$ 0	
	0 $-\frac{5\sqrt{154}i}{616}$ 0 $-\frac{5\sqrt{154}}{616}$ 0 0 $\frac{\sqrt{231}}{66}$ 0 0 $\frac{9\sqrt{2310}i}{3080}$ 0 $-\frac{9\sqrt{2310}}{3080}$ 0 0	
	$\frac{5\sqrt{154}i}{616}$ 0 $-\frac{5\sqrt{154}}{616}$ 0 0 0 $-\frac{\sqrt{231}}{66}$ $-\frac{9\sqrt{2310}i}{3080}$ 0 $-\frac{9\sqrt{2310}}{3080}$ 0 0 0	
	0 $\frac{5\sqrt{154}}{616}$ 0 $-\frac{5\sqrt{154}i}{616}$ $\frac{\sqrt{231}}{66}$ 0 0 0 0 $\frac{13\sqrt{2310}}{9240}$ 0 $\frac{13\sqrt{2310}i}{9240}$ 0 0	
	$\frac{5\sqrt{154}}{616}$ 0 $\frac{5\sqrt{154}i}{616}$ 0 0 $-\frac{\sqrt{231}}{66}$ 0 0 $\frac{13\sqrt{2310}}{9240}$ 0 $-\frac{13\sqrt{2310}i}{9240}$ 0 0 0	
	0 0 $-\frac{\sqrt{385}}{110}$ 0 0 $\frac{9\sqrt{2310}i}{3080}$ 0 $\frac{13\sqrt{2310}}{9240}$ 0 0 0 0 0 $\frac{5\sqrt{154}i}{616}$	
	0 0 0 $\frac{\sqrt{385}}{110}$ $-\frac{9\sqrt{2310}i}{3080}$ 0 $\frac{13\sqrt{2310}}{9240}$ 0 0 0 0 0 $-\frac{5\sqrt{154}i}{616}$ 0	
	$-\frac{\sqrt{385}}{110}$ 0 0 0 0 $-\frac{9\sqrt{2310}}{3080}$ 0 $\frac{13\sqrt{2310}i}{9240}$ 0 0 0 0 0 $\frac{5\sqrt{154}}{616}$	
	0 $\frac{\sqrt{385}}{110}$ 0 0 $-\frac{9\sqrt{2310}}{3080}$ 0 $-\frac{13\sqrt{2310}i}{9240}$ 0 0 0 0 0 $\frac{5\sqrt{154}}{616}$ 0	
	0 $-\frac{\sqrt{2310}i}{440}$ 0 $\frac{\sqrt{2310}}{440}$ 0 0 0 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 $\frac{5\sqrt{154}}{616}$ 0 0 0	
	$\frac{\sqrt{2310}i}{440}$ 0 $\frac{\sqrt{2310}}{440}$ 0 0 0 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 $\frac{5\sqrt{154}}{616}$ 0 0 0	
$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$		
927	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	0	0	0	0	$\frac{3\sqrt{110}}{220}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{110}}{220}$	0	0	
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{110}i}{220}$	0	
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	$-\frac{3\sqrt{110}i}{220}$	0	0	
	0	0	0	0	$\frac{\sqrt{11}}{11}$	0	0	0	0	$-\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	
	$-\frac{\sqrt{165}}{55}$	0	0	0	0	$-\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	0	
	0	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{165}}{55}$	$\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	0	
	0	$\frac{3\sqrt{110}}{220}$	0	$\frac{3\sqrt{110}i}{220}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{3\sqrt{110}}{220}$	0	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	0	0	0	0	0	0	0	

928 symmetry

$$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{T}_4^{(1,0;a)}(B_{1g})$	0	0	0	0	0	$-\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{770}i}{440}$			
	0	0	0	0	$\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0	$\frac{3\sqrt{1155}}{770}$	$-\frac{3\sqrt{770}i}{440}$	0			
	0	0	0	0	0	$\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	$\frac{3\sqrt{1155}}{770}$	0	0	0	0	$\frac{3\sqrt{770}}{440}$			
	0	0	0	0	$\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{770}}{440}$	0			
	0	$-\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0		
	$\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0			
	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$\frac{19\sqrt{770}i}{3080}$	$-\frac{\sqrt{1155}}{770}$	0			
	$-\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	0	0	$\frac{\sqrt{1155}}{770}$			
	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	$\frac{\sqrt{770}i}{616}$	0	$-\frac{19\sqrt{770}}{3080}$	0	0	$\frac{\sqrt{77}}{77}$	0	0	$\frac{3\sqrt{462}i}{616}$			
	0	0	0	$-\frac{3\sqrt{1155}}{770}$	$-\frac{\sqrt{770}i}{616}$	0	$-\frac{19\sqrt{770}}{3080}$	0	0	0	0	$-\frac{\sqrt{77}}{77}$	$-\frac{3\sqrt{462}i}{616}$	0			
	$-\frac{3\sqrt{1155}}{770}$	0	0	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{19\sqrt{770}i}{3080}$	$\frac{\sqrt{77}}{77}$	0	0	0	0	$-\frac{3\sqrt{462}}{616}$			
	0	$\frac{3\sqrt{1155}}{770}$	0	0	$\frac{\sqrt{770}}{616}$	0	$-\frac{19\sqrt{770}i}{3080}$	0	0	$-\frac{\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{462}}{616}$	0			
	0	$\frac{3\sqrt{770}i}{440}$	0	$\frac{3\sqrt{770}}{440}$	0	0	$-\frac{\sqrt{1155}}{770}$	0	$\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0			
	$-\frac{3\sqrt{770}i}{440}$	0	$\frac{3\sqrt{770}}{440}$	0	0	0	0	$\frac{\sqrt{1155}}{770}$	$-\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0		

929 symmetry

$$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(B_{2g})$	0	0	0	0	0	$\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	$\frac{3\sqrt{1155}}{770}$	0	0	0	0	$\frac{3\sqrt{770}}{440}$	
	0	0	0	0	$\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{770}}{440}$	0	
	0	0	0	0	0	$\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{3\sqrt{770}i}{440}$	
	0	0	0	0	$-\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0	$-\frac{3\sqrt{1155}}{770}$	$\frac{3\sqrt{770}i}{440}$	0	
	0	$\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$\frac{19\sqrt{770}i}{3080}$	$-\frac{\sqrt{1155}}{770}$	0	
	$\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	0	0	$\frac{\sqrt{1155}}{770}$	
	0	$-\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	
	$\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	
	$\frac{3\sqrt{1155}}{770}$	0	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$-\frac{\sqrt{770}i}{616}$	$\frac{\sqrt{77}}{77}$	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	
	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$\frac{\sqrt{770}i}{616}$	0	0	$-\frac{\sqrt{77}}{77}$	0	0	0	$-\frac{3\sqrt{462}}{616}$	
	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	$\frac{19\sqrt{770}i}{3080}$	0	$-\frac{\sqrt{770}}{616}$	0	0	$-\frac{\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{462}i}{616}$	
	0	0	0	$-\frac{3\sqrt{1155}}{770}$	$-\frac{19\sqrt{770}i}{3080}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$\frac{\sqrt{77}}{77}$	$\frac{3\sqrt{462}i}{616}$	0	
	0	$\frac{3\sqrt{770}}{440}$	0	$-\frac{3\sqrt{770}i}{440}$	$-\frac{\sqrt{1155}}{770}$	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	
	$\frac{3\sqrt{770}}{440}$	0	$\frac{3\sqrt{770}i}{440}$	0	0	$\frac{\sqrt{1155}}{770}$	0	0	$-\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	0	

930 symmetry

 $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$\frac{3\sqrt{11}}{88}$	0	0	$\frac{\sqrt{66}}{176}$	0	0	0	$\frac{\sqrt{165}}{88}$	0	$\frac{\sqrt{165}i}{110}$	$\frac{9\sqrt{110}}{880}$	0		
	$\frac{3\sqrt{11}}{88}$	0	0	0	0	$-\frac{\sqrt{66}}{176}$	0	0	$\frac{\sqrt{165}}{88}$	0	$-\frac{\sqrt{165}i}{110}$	0	0	$-\frac{9\sqrt{110}}{880}$	
	0	0	0	$\frac{3\sqrt{11}}{88}$	0	0	$\frac{\sqrt{66}}{176}$	0	0	$-\frac{\sqrt{165}i}{220}$	0	$\frac{7\sqrt{165}}{440}$	0	0	0
	0	0	$\frac{3\sqrt{11}}{88}$	0	0	0	0	$-\frac{\sqrt{66}}{176}$	$\frac{\sqrt{165}i}{220}$	0	$\frac{7\sqrt{165}}{440}$	0	0	0	0
	$\frac{\sqrt{66}}{176}$	0	0	0	0	$-\frac{3\sqrt{11}}{44}$	0	$-\frac{\sqrt{11}i}{88}$	$-\frac{7\sqrt{110}}{880}$	0	0	0	0	$-\frac{\sqrt{165}}{220}$	
	0	$-\frac{\sqrt{66}}{176}$	0	0	$-\frac{3\sqrt{11}}{44}$	0	$\frac{\sqrt{11}i}{88}$	0	0	$\frac{7\sqrt{110}}{880}$	0	0	$-\frac{\sqrt{165}}{220}$	0	
	0	0	$\frac{\sqrt{66}}{176}$	0	0	$-\frac{\sqrt{11}i}{88}$	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}}{880}$	0	0	$\frac{\sqrt{165}i}{440}$	
	0	0	0	$-\frac{\sqrt{66}}{176}$	$\frac{\sqrt{11}i}{88}$	0	$-\frac{\sqrt{11}}{11}$	0	0	0	$\frac{\sqrt{110}}{880}$	$-\frac{\sqrt{165}i}{440}$	0		
	0	$\frac{\sqrt{165}}{88}$	0	$-\frac{\sqrt{165}i}{220}$	$-\frac{7\sqrt{110}}{880}$	0	0	0	$\frac{5\sqrt{11}}{88}$	0	$-\frac{\sqrt{11}i}{44}$	$-\frac{\sqrt{66}}{176}$	0		
	$\frac{\sqrt{165}}{88}$	0	$\frac{\sqrt{165}i}{220}$	0	0	$\frac{7\sqrt{110}}{880}$	0	0	$\frac{5\sqrt{11}}{88}$	0	$\frac{\sqrt{11}i}{44}$	0	0	$\frac{\sqrt{66}}{176}$	
	0	$\frac{\sqrt{165}i}{110}$	0	$\frac{7\sqrt{165}}{440}$	0	0	$-\frac{\sqrt{110}}{880}$	0	0	$-\frac{\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{88}$	0	0	0
	$-\frac{\sqrt{165}i}{110}$	0	$\frac{7\sqrt{165}}{440}$	0	0	0	0	$\frac{\sqrt{110}}{880}$	$\frac{\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{88}$	0	0	0	
	$\frac{9\sqrt{110}}{880}$	0	0	0	0	$-\frac{\sqrt{165}}{220}$	0	$\frac{\sqrt{165}i}{440}$	$-\frac{\sqrt{66}}{176}$	0	0	0	0	$\frac{3\sqrt{11}}{44}$	
	0	$-\frac{9\sqrt{110}}{880}$	0	0	$-\frac{\sqrt{165}}{220}$	0	$-\frac{\sqrt{165}i}{440}$	0	0	$\frac{\sqrt{66}}{176}$	0	0	$\frac{3\sqrt{11}}{44}$	0	

931 symmetry

 $\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 1)$	0	$\frac{3\sqrt{11}i}{88}$ 0 0 0 0 0 $\frac{\sqrt{66}}{176}$ 0 0 $-\frac{7\sqrt{165}i}{440}$ 0 $\frac{\sqrt{165}}{220}$ 0 0
	$-\frac{3\sqrt{11}i}{88}$	0 0 0 0 0 0 $-\frac{\sqrt{66}}{176}$ $\frac{7\sqrt{165}i}{440}$ 0 $\frac{\sqrt{165}}{220}$ 0 0 0
	0	0 0 0 $\frac{3\sqrt{11}i}{88}$ $-\frac{\sqrt{66}}{176}$ 0 0 0 0 $-\frac{\sqrt{165}}{110}$ 0 $-\frac{\sqrt{165}i}{88}$ $\frac{9\sqrt{110}}{880}$ 0
	0	0 0 $-\frac{3\sqrt{11}i}{88}$ 0 0 $\frac{\sqrt{66}}{176}$ 0 0 $-\frac{\sqrt{165}}{110}$ 0 $\frac{\sqrt{165}i}{88}$ 0 0 $-\frac{9\sqrt{110}}{880}$
	0	0 0 $-\frac{\sqrt{66}}{176}$ 0 0 $-\frac{3\sqrt{11}i}{44}$ 0 $\frac{\sqrt{11}}{88}$ 0 0 $-\frac{7\sqrt{110}}{880}$ 0 0 $\frac{\sqrt{165}i}{220}$
	0	0 0 0 $\frac{\sqrt{66}}{176}$ $\frac{3\sqrt{11}i}{44}$ 0 $\frac{\sqrt{11}}{88}$ 0 0 0 0 $\frac{7\sqrt{110}}{880}$ $-\frac{\sqrt{165}i}{220}$ 0
	$\frac{\sqrt{66}}{176}$	0 0 0 0 0 $\frac{\sqrt{11}}{88}$ 0 $-\frac{\sqrt{11}i}{11}$ $\frac{\sqrt{110}}{880}$ 0 0 0 0 $\frac{\sqrt{165}}{440}$
	0	$-\frac{\sqrt{66}}{176}$ 0 0 $\frac{\sqrt{11}}{88}$ 0 $\frac{\sqrt{11}i}{11}$ 0 0 0 $-\frac{\sqrt{110}}{880}$ 0 0 $\frac{\sqrt{165}}{440}$ 0
	0	$-\frac{7\sqrt{165}i}{440}$ 0 $-\frac{\sqrt{165}}{110}$ 0 0 $\frac{\sqrt{110}}{880}$ 0 0 $-\frac{3\sqrt{11}i}{88}$ 0 $-\frac{\sqrt{11}}{44}$ 0 0
	$\frac{7\sqrt{165}i}{440}$	0 $-\frac{\sqrt{165}}{110}$ 0 0 0 0 $-\frac{\sqrt{110}}{880}$ $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{\sqrt{11}}{44}$ 0 0 0
	0	$\frac{\sqrt{165}}{220}$ 0 $-\frac{\sqrt{165}i}{88}$ $-\frac{7\sqrt{110}}{880}$ 0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $\frac{5\sqrt{11}i}{88}$ $\frac{\sqrt{66}}{176}$ 0
	$\frac{\sqrt{165}}{220}$	0 $\frac{\sqrt{165}i}{88}$ 0 0 $\frac{7\sqrt{110}}{880}$ 0 0 $-\frac{\sqrt{11}}{44}$ 0 $-\frac{5\sqrt{11}i}{88}$ 0 0 $-\frac{\sqrt{66}}{176}$
	0	0 $\frac{9\sqrt{110}}{880}$ 0 0 $\frac{\sqrt{165}i}{220}$ 0 $\frac{\sqrt{165}}{440}$ 0 0 $\frac{\sqrt{66}}{176}$ 0 0 $\frac{3\sqrt{11}i}{44}$
	0	0 0 0 $-\frac{9\sqrt{110}}{880}$ $-\frac{\sqrt{165}i}{220}$ 0 $\frac{\sqrt{165}}{440}$ 0 0 0 $-\frac{\sqrt{66}}{176}$ $-\frac{3\sqrt{11}i}{44}$ 0

932 symmetry

$$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	0	$\frac{3\sqrt{77}}{616}$	0	0	$\frac{\sqrt{462}}{1232}$	0	0	0	$\frac{\sqrt{1155}}{3080}$	0	$\frac{\sqrt{1155}i}{385}$	$-\frac{9\sqrt{770}}{880}$	0				
	$\frac{3\sqrt{77}}{616}$	0	0	0	0	$-\frac{\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{1155}}{3080}$	0	$-\frac{\sqrt{1155}i}{385}$	0	0	$\frac{9\sqrt{770}}{880}$			
	0	0	0	$\frac{3\sqrt{77}}{616}$	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}i}{140}$	0	$-\frac{13\sqrt{1155}}{3080}$	0	0	0		
	0	0	$\frac{3\sqrt{77}}{616}$	0	0	0	$-\frac{\sqrt{462}}{1232}$	$\frac{\sqrt{1155}i}{140}$	0	$-\frac{13\sqrt{1155}}{3080}$	0	0	0	0			
	$\frac{\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{77}}{44}$	0	$\frac{\sqrt{77}i}{88}$	$\frac{17\sqrt{770}}{6160}$	0	0	0	0	$\frac{\sqrt{1155}}{1540}$			
	0	$-\frac{\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{77}}{44}$	0	$-\frac{\sqrt{77}i}{88}$	0	0	$-\frac{17\sqrt{770}}{6160}$	0	0	$\frac{\sqrt{1155}}{1540}$	0			
	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{77}i}{88}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}i}{616}$			
	0	0	0	$-\frac{\sqrt{462}}{1232}$	$-\frac{\sqrt{77}i}{88}$	0	0	0	0	0	$\frac{5\sqrt{770}}{1232}$	$-\frac{\sqrt{1155}i}{616}$	0				
	0	$\frac{\sqrt{1155}}{3080}$	0	$-\frac{\sqrt{1155}i}{140}$	$\frac{17\sqrt{770}}{6160}$	0	0	0	0	$-\frac{3\sqrt{77}}{616}$	0	$-\frac{5\sqrt{77}i}{308}$	$-\frac{\sqrt{462}}{1232}$	0			
	$\frac{\sqrt{1155}}{3080}$	0	$\frac{\sqrt{1155}i}{140}$	0	0	$-\frac{17\sqrt{770}}{6160}$	0	0	$-\frac{3\sqrt{77}}{616}$	0	$\frac{5\sqrt{77}i}{308}$	0	0	$\frac{\sqrt{462}}{1232}$			
	0	$\frac{\sqrt{1155}i}{385}$	0	$-\frac{13\sqrt{1155}}{3080}$	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{5\sqrt{77}i}{308}$	0	$\frac{5\sqrt{77}}{616}$	0	0	0		
	$-\frac{\sqrt{1155}i}{385}$	0	$-\frac{13\sqrt{1155}}{3080}$	0	0	0	0	$\frac{5\sqrt{770}}{1232}$	$\frac{5\sqrt{77}i}{308}$	0	$\frac{5\sqrt{77}}{616}$	0	0	0	0		
	$-\frac{9\sqrt{770}}{880}$	0	0	0	0	$\frac{\sqrt{1155}}{1540}$	0	$\frac{\sqrt{1155}i}{616}$	$-\frac{\sqrt{462}}{1232}$	0	0	0	0	$\frac{3\sqrt{77}}{308}$			
	0	$\frac{9\sqrt{770}}{880}$	0	0	$\frac{\sqrt{1155}}{1540}$	0	$-\frac{\sqrt{1155}i}{616}$	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$\frac{3\sqrt{77}}{308}$	0			

$$-\frac{\sqrt{5}xz(x^2 - 6y^2 + z^2)}{2}$$

933 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 2)$	0	$\frac{3\sqrt{77}i}{616}$	0	0	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$\frac{13\sqrt{1155}i}{3080}$	0	$\frac{\sqrt{1155}}{140}$	0	0	
	$-\frac{3\sqrt{77}i}{616}$	0	0	0	0	0	0	$-\frac{\sqrt{462}}{1232}$	$-\frac{13\sqrt{1155}i}{3080}$	0	$\frac{\sqrt{1155}}{140}$	0	0	0	
	0	0	0	$\frac{3\sqrt{77}i}{616}$	$-\frac{\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{385}$	0	$-\frac{\sqrt{1155}i}{3080}$	$-\frac{9\sqrt{770}}{880}$	0	
	0	0	$-\frac{3\sqrt{77}i}{616}$	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}}{385}$	0	$\frac{\sqrt{1155}i}{3080}$	0	0	$\frac{9\sqrt{770}}{880}$	
	0	0	$-\frac{\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{77}i}{44}$	0	$-\frac{\sqrt{77}}{88}$	0	0	$\frac{17\sqrt{770}}{6160}$	0	0	$-\frac{\sqrt{1155}i}{1540}$	
	0	0	0	$\frac{\sqrt{462}}{1232}$	$\frac{\sqrt{77}i}{44}$	0	$-\frac{\sqrt{77}}{88}$	0	0	0	0	$-\frac{17\sqrt{770}}{6160}$	$\frac{\sqrt{1155}i}{1540}$	0	
	$\frac{\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{77}}{88}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{616}$	
	0	$-\frac{\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{77}}{88}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}}{616}$	0	
	0	$\frac{13\sqrt{1155}i}{3080}$	0	$-\frac{\sqrt{1155}}{385}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{5\sqrt{77}i}{616}$	0	$-\frac{5\sqrt{77}}{308}$	0	0	
	$-\frac{13\sqrt{1155}i}{3080}$	0	$-\frac{\sqrt{1155}}{385}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$-\frac{5\sqrt{77}i}{616}$	0	$-\frac{5\sqrt{77}}{308}$	0	0	0	
	0	$\frac{\sqrt{1155}}{140}$	0	$-\frac{\sqrt{1155}i}{3080}$	$\frac{17\sqrt{770}}{6160}$	0	0	0	0	$-\frac{5\sqrt{77}}{308}$	0	$-\frac{3\sqrt{77}i}{616}$	$\frac{\sqrt{462}}{1232}$	0	
	$\frac{\sqrt{1155}}{140}$	0	$\frac{\sqrt{1155}i}{3080}$	0	0	$-\frac{17\sqrt{770}}{6160}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	$\frac{3\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{462}}{1232}$	
	0	0	$-\frac{9\sqrt{770}}{880}$	0	0	$-\frac{\sqrt{1155}i}{1540}$	0	$\frac{\sqrt{1155}}{616}$	0	0	$\frac{\sqrt{462}}{1232}$	0	0	$\frac{3\sqrt{77}i}{308}$	
	0	0	0	$\frac{9\sqrt{770}}{880}$	$\frac{\sqrt{1155}i}{1540}$	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0	$-\frac{\sqrt{462}}{1232}$	$-\frac{3\sqrt{77}i}{308}$	0	

$$\frac{\sqrt{2}(2x^6 - 15x^4y^2 - 15x^4z^2 - 15x^2y^4 + 180x^2y^2z^2 - 15x^2z^4 + 2y^6 - 15y^4z^2 - 15y^2z^4 + 2z^6)}{8}$$

934 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 1)$	0 0 0 0 0 $-\frac{5\sqrt{33}i}{264}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 $\frac{\sqrt{330}}{132}$ 0 0 $\frac{\sqrt{55}i}{88}$	
	0 0 0 0 $\frac{5\sqrt{33}i}{264}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 $-\frac{\sqrt{330}}{132}$ $-\frac{\sqrt{55}i}{88}$ 0	
	0 0 0 0 0 $-\frac{5\sqrt{33}}{264}$ 0 $\frac{\sqrt{33}i}{44}$ $\frac{\sqrt{330}}{132}$ 0 0 0 0 $-\frac{\sqrt{55}i}{88}$	
	0 0 0 0 $-\frac{5\sqrt{33}}{264}$ 0 $-\frac{\sqrt{33}i}{44}$ 0 0 $-\frac{\sqrt{330}}{132}$ 0 0 $-\frac{\sqrt{55}}{88}$ 0	
	0 $-\frac{5\sqrt{33}i}{264}$ 0 $-\frac{5\sqrt{33}}{264}$ 0 0 $\frac{\sqrt{22}}{22}$ 0 0 $\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{88}$ 0 0	
	$\frac{5\sqrt{33}i}{264}$ 0 $-\frac{5\sqrt{33}}{264}$ 0 0 0 0 $-\frac{\sqrt{22}}{22}$ $-\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{88}$ 0 0	
	0 $-\frac{\sqrt{33}}{44}$ 0 $\frac{\sqrt{33}i}{44}$ $\frac{\sqrt{22}}{22}$ 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 $-\frac{\sqrt{55}i}{44}$ 0 0	
	$-\frac{\sqrt{33}}{44}$ 0 $-\frac{\sqrt{33}i}{44}$ 0 0 $-\frac{\sqrt{22}}{22}$ 0 0 $-\frac{\sqrt{55}}{44}$ 0 $\frac{\sqrt{55}i}{44}$ 0 0	
	0 0 $\frac{\sqrt{330}}{132}$ 0 0 $\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0 0 $\frac{5\sqrt{33}i}{264}$	
	0 0 0 $-\frac{\sqrt{330}}{132}$ $-\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0 0 $-\frac{5\sqrt{33}i}{264}$ 0	
	$\frac{\sqrt{330}}{132}$ 0 0 0 0 $-\frac{\sqrt{55}}{88}$ 0 $-\frac{\sqrt{55}i}{44}$ 0 0 0 0 0 $\frac{5\sqrt{33}}{264}$	
	0 $-\frac{\sqrt{330}}{132}$ 0 0 $-\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{44}$ 0 0 0 0 0 $\frac{5\sqrt{33}}{264}$ 0	
	0 $\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{88}$ 0 0 0 0 0 $\frac{5\sqrt{33}i}{264}$ 0 $\frac{5\sqrt{33}}{264}$ 0 0	
935 symmetry		$-\frac{\sqrt{14}(x^6 - 15x^4z^2 + 15x^2z^4 + y^6 - 15y^4z^2 + 15y^2z^4 - 2z^6)}{8}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 2)$	0	0	0	0	0	$\frac{3\sqrt{231}i}{616}$	0	$\frac{\sqrt{231}}{924}$	0	0	$-\frac{\sqrt{2310}}{924}$	0	0	$-\frac{\sqrt{385}i}{616}$		
	0	0	0	0	$-\frac{3\sqrt{231}i}{616}$	0	$\frac{\sqrt{231}}{924}$	0	0	0	0	$\frac{\sqrt{2310}}{924}$	$\frac{\sqrt{385}i}{616}$	0		
	0	0	0	0	0	$\frac{3\sqrt{231}}{616}$	0	$-\frac{\sqrt{231}i}{924}$	$-\frac{\sqrt{2310}}{924}$	0	0	0	0	$\frac{\sqrt{385}}{616}$		
	0	0	0	0	$\frac{3\sqrt{231}}{616}$	0	$\frac{\sqrt{231}i}{924}$	0	0	$\frac{\sqrt{2310}}{924}$	0	0	$\frac{\sqrt{385}}{616}$	0		
	0	$\frac{3\sqrt{231}i}{616}$	0	$\frac{3\sqrt{231}}{616}$	0	0	$-\frac{\sqrt{154}}{154}$	0	0	$-\frac{5\sqrt{385}i}{616}$	0	$\frac{5\sqrt{385}}{616}$	0	0		
	$-\frac{3\sqrt{231}i}{616}$	0	$\frac{3\sqrt{231}}{616}$	0	0	0	0	$\frac{\sqrt{154}}{154}$	$\frac{5\sqrt{385}i}{616}$	0	$\frac{5\sqrt{385}}{616}$	0	0	0		
	0	$\frac{\sqrt{231}}{924}$	0	$-\frac{\sqrt{231}i}{924}$	$-\frac{\sqrt{154}}{154}$	0	0	0	0	$-\frac{\sqrt{385}}{308}$	0	$-\frac{\sqrt{385}i}{308}$	0	0	0	
	$\frac{\sqrt{231}}{924}$	0	$\frac{\sqrt{231}i}{924}$	0	0	$\frac{\sqrt{154}}{154}$	0	0	$-\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	0		
	0	0	$-\frac{\sqrt{2310}}{924}$	0	0	$-\frac{5\sqrt{385}i}{616}$	0	$-\frac{\sqrt{385}}{308}$	0	0	0	0	0	$\frac{5\sqrt{231}i}{264}$		
	0	0	0	$\frac{\sqrt{2310}}{924}$	$\frac{5\sqrt{385}i}{616}$	0	$-\frac{\sqrt{385}}{308}$	0	0	0	0	0	$-\frac{5\sqrt{231}i}{264}$	0		
	$-\frac{\sqrt{2310}}{924}$	0	0	0	0	$\frac{5\sqrt{385}}{616}$	0	$-\frac{\sqrt{385}i}{308}$	0	0	0	0	0	$\frac{5\sqrt{231}}{264}$		
	0	$\frac{\sqrt{2310}}{924}$	0	0	$\frac{5\sqrt{385}}{616}$	0	$\frac{\sqrt{385}i}{308}$	0	0	0	0	0	$\frac{5\sqrt{231}}{264}$	0		
	0	$-\frac{\sqrt{385}i}{616}$	0	$\frac{\sqrt{385}}{616}$	0	0	0	0	0	$\frac{5\sqrt{231}i}{264}$	0	$\frac{5\sqrt{231}}{264}$	0	0		
	$\frac{\sqrt{385}i}{616}$	0	$\frac{\sqrt{385}}{616}$	0	0	0	0	$-\frac{5\sqrt{231}i}{264}$	0	$\frac{5\sqrt{231}}{264}$	0	0	0	0		

936 symmetry

$$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_6^{(1,0;a)}(A_{2g})$	0	0	0	0	0	$-\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{\sqrt{770}}{308}$	
	0	0	0	0	$-\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}}{308}$	0	
	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}i}{308}$	
	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{\sqrt{770}i}{308}$	0	
	0	$-\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	$\frac{2\sqrt{77}}{77}$	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	
	$-\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	
	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	
	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{2\sqrt{77}}{77}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	
	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{770}}{308}$	0	$-\frac{\sqrt{770}i}{308}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{770}}{308}$	0	$\frac{\sqrt{770}i}{308}$	0	0	0	0	0	0	0	0	0	0	0	

937 symmetry

$$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_6^{(1,0;a)}(B_{1g}, 1)$	0	0	$-\frac{\sqrt{210}}{56}$	0	0	$-\frac{\sqrt{35}i}{168}$	0	$\frac{\sqrt{35}}{84}$	0	0	$\frac{\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{21}i}{56}$	
	0	0	0	$\frac{\sqrt{210}}{56}$	$\frac{\sqrt{35}i}{168}$	0	$\frac{\sqrt{35}}{84}$	0	0	0	$-\frac{\sqrt{14}}{168}$	$\frac{\sqrt{21}i}{56}$	0		
	$-\frac{\sqrt{210}}{56}$	0	0	0	0	$\frac{\sqrt{35}}{168}$	0	$\frac{\sqrt{35}i}{84}$	$-\frac{\sqrt{14}}{168}$	0	0	0	0	$-\frac{\sqrt{21}}{56}$	
	0	$\frac{\sqrt{210}}{56}$	0	0	$\frac{\sqrt{35}}{168}$	0	$-\frac{\sqrt{35}i}{84}$	0	0	$\frac{\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{21}}{56}$	0	
	0	$-\frac{\sqrt{35}i}{168}$	0	$\frac{\sqrt{35}}{168}$	0	0	0	0	0	$-\frac{\sqrt{21}i}{24}$	0	$-\frac{\sqrt{21}}{24}$	0	0	
	$\frac{\sqrt{35}i}{168}$	0	$\frac{\sqrt{35}}{168}$	0	0	0	0	$\frac{\sqrt{21}i}{24}$	0	$-\frac{\sqrt{21}}{24}$	0	0	0	0	
	0	$\frac{\sqrt{35}}{84}$	0	$\frac{\sqrt{35}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{21}}{84}$	0	$\frac{\sqrt{21}i}{84}$	$\frac{\sqrt{14}}{42}$	0	
	$\frac{\sqrt{35}}{84}$	0	$-\frac{\sqrt{35}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{21}}{84}$	0	$-\frac{\sqrt{21}i}{84}$	0	0	$-\frac{\sqrt{14}}{42}$	
	0	0	$-\frac{\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{21}i}{24}$	0	$-\frac{\sqrt{21}}{84}$	0	0	$\frac{\sqrt{210}}{168}$	0	0	$\frac{5\sqrt{35}i}{168}$	
	0	0	0	$\frac{\sqrt{14}}{168}$	$\frac{\sqrt{21}i}{24}$	0	$-\frac{\sqrt{21}}{84}$	0	0	0	0	$-\frac{\sqrt{210}}{168}$	$-\frac{5\sqrt{35}i}{168}$	0	
	$\frac{\sqrt{14}}{168}$	0	0	0	0	$-\frac{\sqrt{21}}{24}$	0	$\frac{\sqrt{21}i}{84}$	$\frac{\sqrt{210}}{168}$	0	0	0	0	$-\frac{5\sqrt{35}}{168}$	
	0	$-\frac{\sqrt{14}}{168}$	0	0	$-\frac{\sqrt{21}}{24}$	0	$-\frac{\sqrt{21}i}{84}$	0	0	$-\frac{\sqrt{210}}{168}$	0	0	$-\frac{5\sqrt{35}}{168}$	0	
	0	$-\frac{\sqrt{21}i}{56}$	0	$-\frac{\sqrt{21}}{56}$	0	0	$\frac{\sqrt{14}}{42}$	$-\frac{5\sqrt{35}i}{168}$	0	$-\frac{5\sqrt{35}}{168}$	0	$-\frac{5\sqrt{35}}{168}$	0	0	
	$\frac{\sqrt{21}i}{56}$	0	$-\frac{\sqrt{21}}{56}$	0	0	0	$-\frac{\sqrt{14}}{42}$	$-\frac{5\sqrt{35}i}{168}$	0	$-\frac{5\sqrt{35}}{168}$	0	$-\frac{5\sqrt{35}}{168}$	0	0	

938 symmetry

$$\frac{\sqrt{42}(x-y)(x+y)(x^4 - 9x^2y^2 - 5x^2z^2 + y^4 - 5y^2z^2 + 5z^4)}{8}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_6^{(1,0;a)}(B_{1g}, 2)$	0	0	$-\frac{\sqrt{462}}{56}$	0	0	$-\frac{19\sqrt{77}i}{1848}$	0	$\frac{\sqrt{77}}{132}$	0	0	$-\frac{\sqrt{770}}{1848}$	0	0	$\frac{\sqrt{1155}i}{616}$		
	0	0	0	$\frac{\sqrt{462}}{56}$	$\frac{19\sqrt{77}i}{1848}$	0	$\frac{\sqrt{77}}{132}$	0	0	0	$\frac{\sqrt{770}}{1848}$	$-\frac{\sqrt{1155}i}{616}$	0			
	$-\frac{\sqrt{462}}{56}$	0	0	0	0	$\frac{19\sqrt{77}}{1848}$	0	$\frac{\sqrt{77}i}{132}$	$\frac{\sqrt{770}}{1848}$	0	0	0	0	$\frac{\sqrt{1155}}{616}$		
	0	$\frac{\sqrt{462}}{56}$	0	0	$\frac{19\sqrt{77}}{1848}$	0	$-\frac{\sqrt{77}i}{132}$	0	0	$-\frac{\sqrt{770}}{1848}$	0	0	$\frac{\sqrt{1155}}{616}$	0		
	0	$-\frac{19\sqrt{77}i}{1848}$	0	$\frac{19\sqrt{77}}{1848}$	0	0	0	0	0	$\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{264}$	0	0	0	
	$\frac{19\sqrt{77}i}{1848}$	0	$\frac{19\sqrt{77}}{1848}$	0	0	0	0	0	$-\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{264}$	0	0	0		
	0	$\frac{\sqrt{77}}{132}$	0	$\frac{\sqrt{77}i}{132}$	0	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{\sqrt{1155}i}{924}$	$-\frac{\sqrt{770}}{462}$	0		
	$\frac{\sqrt{77}}{132}$	0	$-\frac{\sqrt{77}i}{132}$	0	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$\frac{\sqrt{1155}i}{924}$	0	0	$\frac{\sqrt{770}}{462}$		
	0	0	$\frac{\sqrt{770}}{1848}$	0	0	$\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{924}$	0	0	$-\frac{5\sqrt{462}}{1848}$	0	0	$-\frac{25\sqrt{77}i}{1848}$		
	0	0	0	$-\frac{\sqrt{770}}{1848}$	$-\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{924}$	0	0	0	0	$\frac{5\sqrt{462}}{1848}$	$\frac{25\sqrt{77}i}{1848}$	0		
	$-\frac{\sqrt{770}}{1848}$	0	0	0	0	$\frac{\sqrt{1155}}{264}$	0	$-\frac{\sqrt{1155}i}{924}$	$-\frac{5\sqrt{462}}{1848}$	0	0	0	0	$\frac{25\sqrt{77}}{1848}$		
	0	$\frac{\sqrt{770}}{1848}$	0	0	$\frac{\sqrt{1155}}{264}$	0	$\frac{\sqrt{1155}i}{924}$	0	0	$\frac{5\sqrt{462}}{1848}$	0	0	$\frac{25\sqrt{77}}{1848}$	0		
	0	$\frac{\sqrt{1155}i}{616}$	0	$\frac{\sqrt{1155}}{616}$	0	0	$-\frac{\sqrt{770}}{462}$	0	0	$-\frac{25\sqrt{77}i}{1848}$	0	$\frac{25\sqrt{77}}{1848}$	0	0		
	$-\frac{\sqrt{1155}i}{616}$	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0	$\frac{\sqrt{770}}{462}$	$\frac{25\sqrt{77}i}{1848}$	0	$\frac{25\sqrt{77}}{1848}$	0	0	0		

939 symmetry

$$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix	
$\mathbb{T}_6^{(1,0;a)}(B_{2g}, 1)$		$\begin{bmatrix} \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	$\frac{\sqrt{210}xy(x^4 + 2x^2y^2 - 16x^2z^2 + y^4 - 16y^2z^2 + 16z^4)}{16}$

940 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_6^{(1,0;a)}(B_{2g}, 2)$	0 0 0 0 0 $-\frac{\sqrt{385}}{924}$ 0 $\frac{\sqrt{385}i}{924}$ $-\frac{\sqrt{154}}{462}$ 0 0 0 0 $-\frac{\sqrt{231}}{154}$	
	0 0 0 0 $-\frac{\sqrt{385}}{924}$ 0 $-\frac{\sqrt{385}i}{924}$ 0 0 $\frac{\sqrt{154}}{462}$ 0 0 $-\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 0 $-\frac{\sqrt{154}}{462}$ 0 0 $\frac{\sqrt{231}i}{154}$	
	0 0 0 0 $\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 0 0 $\frac{\sqrt{154}}{462}$ $-\frac{\sqrt{231}i}{154}$ 0	
	0 $-\frac{\sqrt{385}}{924}$ 0 $-\frac{\sqrt{385}i}{924}$ 0 0 0 0 0 $-\frac{\sqrt{231}}{231}$ 0 $\frac{\sqrt{231}i}{231}$ $\frac{2\sqrt{154}}{231}$ 0	
	$-\frac{\sqrt{385}}{924}$ 0 $\frac{\sqrt{385}i}{924}$ 0 0 0 0 0 $-\frac{\sqrt{231}}{231}$ 0 $-\frac{\sqrt{231}i}{231}$ 0 0 $-\frac{2\sqrt{154}}{231}$	
	0 $\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 0 0 0 $\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{66}$ 0 0 0	
	$-\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 0 0 0 $-\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{66}$ 0 0 0	
	$-\frac{\sqrt{154}}{462}$ 0 0 0 0 $-\frac{\sqrt{231}}{231}$ 0 $\frac{\sqrt{231}i}{66}$ $\frac{\sqrt{2310}}{462}$ 0 0 0 0 $-\frac{5\sqrt{385}}{462}$	
	0 $\frac{\sqrt{154}}{462}$ 0 0 $-\frac{\sqrt{231}}{231}$ 0 $-\frac{\sqrt{231}i}{66}$ 0 0 $-\frac{\sqrt{2310}}{462}$ 0 0 0 $-\frac{5\sqrt{385}}{462}$	
	0 0 $-\frac{\sqrt{154}}{462}$ 0 0 $\frac{\sqrt{231}i}{231}$ 0 $\frac{\sqrt{231}}{66}$ 0 0 $-\frac{\sqrt{2310}}{462}$ 0 0 0 $-\frac{5\sqrt{385}}{462}$	
	0 0 0 $\frac{\sqrt{154}}{462}$ $-\frac{\sqrt{231}i}{231}$ 0 0 $\frac{\sqrt{231}}{66}$ 0 0 0 0 $\frac{\sqrt{2310}}{462}$ $\frac{5\sqrt{385}i}{462}$ 0	
	0 $-\frac{\sqrt{231}}{154}$ 0 $\frac{\sqrt{231}i}{154}$ $\frac{2\sqrt{154}}{231}$ 0 0 0 0 $-\frac{5\sqrt{385}}{462}$ 0 $-\frac{5\sqrt{385}i}{462}$ 0 0	
	$-\frac{\sqrt{231}}{154}$ 0 $-\frac{\sqrt{231}i}{154}$ 0 0 $-\frac{2\sqrt{154}}{231}$ 0 0 0 $-\frac{5\sqrt{385}}{462}$ 0 $\frac{5\sqrt{385}i}{462}$ 0 0 0	
$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$		

941 symmetry

$$\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 1)$	0	$\frac{3\sqrt{77}}{308}$	0	$-\frac{\sqrt{77}i}{112}$	$-\frac{9\sqrt{462}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{308}$	0	$\frac{\sqrt{1155}i}{1232}$	$-\frac{3\sqrt{770}}{1232}$	0		
	$\frac{3\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{112}$	0	0	$\frac{9\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{1155}}{308}$	0	$-\frac{\sqrt{1155}i}{1232}$	0	0	$\frac{3\sqrt{770}}{1232}$		
	0	$-\frac{\sqrt{77}i}{112}$	0	$-\frac{5\sqrt{77}}{616}$	0	0	$\frac{\sqrt{462}}{132}$	0	0	$-\frac{\sqrt{1155}i}{528}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	0	
	$\frac{\sqrt{77}i}{112}$	0	$-\frac{5\sqrt{77}}{616}$	0	0	0	0	$-\frac{\sqrt{462}}{132}$	$\frac{\sqrt{1155}i}{528}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	0	0	
	$-\frac{9\sqrt{462}}{1232}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	0	$-\frac{\sqrt{77}i}{308}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$		
	0	$\frac{9\sqrt{462}}{1232}$	0	0	$\frac{5\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{308}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}}{924}$	0		
	0	0	$\frac{\sqrt{462}}{132}$	0	0	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{2\sqrt{77}}{77}$	0	0	$\frac{\sqrt{770}}{308}$	0	0	$\frac{5\sqrt{1155}i}{924}$		
	0	0	0	$-\frac{\sqrt{462}}{132}$	$\frac{\sqrt{77}i}{308}$	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	$-\frac{\sqrt{770}}{308}$	$-\frac{5\sqrt{1155}i}{924}$	0		
	0	$\frac{\sqrt{1155}}{308}$	0	$-\frac{\sqrt{1155}i}{528}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	0	$\frac{25\sqrt{77}i}{1232}$	$\frac{5\sqrt{462}}{3696}$	0		
	$\frac{\sqrt{1155}}{308}$	0	$\frac{\sqrt{1155}i}{528}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{5\sqrt{77}}{308}$	0	$-\frac{25\sqrt{77}i}{1232}$	0	0	$-\frac{5\sqrt{462}}{3696}$		
	0	$\frac{\sqrt{1155}i}{1232}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	$\frac{\sqrt{770}}{308}$	0	0	$\frac{25\sqrt{77}i}{1232}$	0	$\frac{5\sqrt{77}}{616}$	0	0		
	$-\frac{\sqrt{1155}i}{1232}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	0	0	$-\frac{\sqrt{770}}{308}$	$-\frac{25\sqrt{77}i}{1232}$	0	$\frac{5\sqrt{77}}{616}$	0	0	0		
	$-\frac{3\sqrt{770}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{5\sqrt{1155}i}{924}$	0	$\frac{5\sqrt{1155}i}{924}$	$\frac{5\sqrt{462}}{3696}$	0	0	0	$-\frac{5\sqrt{77}}{308}$	
	0	$\frac{3\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{5\sqrt{1155}i}{924}$	0	0	$-\frac{5\sqrt{462}}{3696}$	0	0	$-\frac{5\sqrt{77}}{308}$	0		

$$-\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 1)$	0	$-\frac{5\sqrt{77}i}{616}$	0	$-\frac{\sqrt{77}}{112}$	0	0	$\frac{\sqrt{462}}{132}$	0	0	$\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{528}$	0	0	0
	$\frac{5\sqrt{77}i}{616}$	0	$-\frac{\sqrt{77}}{112}$	0	0	0	0	$-\frac{\sqrt{462}}{132}$	$-\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{528}$	0	0	0	
	0	$-\frac{\sqrt{77}}{112}$	0	$\frac{3\sqrt{77}i}{308}$	$\frac{9\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{1232}$	0	$-\frac{\sqrt{1155}i}{308}$	$-\frac{3\sqrt{770}}{1232}$	0	
	$-\frac{\sqrt{77}}{112}$	0	$-\frac{3\sqrt{77}i}{308}$	0	0	$-\frac{9\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}}{1232}$	0	$\frac{\sqrt{1155}i}{308}$	0	0	$\frac{3\sqrt{770}}{1232}$	
	0	0	$\frac{9\sqrt{462}}{1232}$	0	0	$\frac{5\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{1155}i}{924}$	
	0	0	0	$-\frac{9\sqrt{462}}{1232}$	$-\frac{5\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	0	0	$\frac{5\sqrt{770}}{1232}$	$\frac{\sqrt{1155}i}{924}$	0	
	$\frac{\sqrt{462}}{132}$	0	0	0	0	$\frac{\sqrt{77}}{308}$	0	$-\frac{2\sqrt{77}i}{77}$	$-\frac{\sqrt{770}}{308}$	0	0	0	0	$\frac{5\sqrt{1155}}{924}$	
	0	$-\frac{\sqrt{462}}{132}$	0	0	$\frac{\sqrt{77}}{308}$	0	$\frac{2\sqrt{77}i}{77}$	0	0	$\frac{\sqrt{770}}{308}$	0	0	$\frac{5\sqrt{1155}}{924}$	0	
	0	$\frac{\sqrt{1155}i}{264}$	0	$-\frac{\sqrt{1155}}{1232}$	0	0	$-\frac{\sqrt{770}}{308}$	0	0	$\frac{5\sqrt{77}i}{616}$	0	$\frac{25\sqrt{77}}{1232}$	0	0	
	$-\frac{\sqrt{1155}i}{264}$	0	$-\frac{\sqrt{1155}}{1232}$	0	0	0	0	$\frac{\sqrt{770}}{308}$	$-\frac{5\sqrt{77}i}{616}$	0	$\frac{25\sqrt{77}}{1232}$	0	0	0	
	0	$\frac{\sqrt{1155}}{528}$	0	$-\frac{\sqrt{1155}i}{308}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{25\sqrt{77}}{1232}$	0	$\frac{5\sqrt{77}i}{308}$	$-\frac{5\sqrt{462}}{3696}$	0	
	$\frac{\sqrt{1155}}{528}$	0	$\frac{\sqrt{1155}i}{308}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{25\sqrt{77}}{1232}$	0	$-\frac{5\sqrt{77}i}{308}$	0	0	$\frac{5\sqrt{462}}{3696}$	
	0	0	$-\frac{3\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{1155}i}{924}$	0	$\frac{5\sqrt{1155}}{924}$	0	0	$-\frac{5\sqrt{462}}{3696}$	0	0	$-\frac{5\sqrt{77}i}{308}$	
	0	0	0	$\frac{3\sqrt{770}}{1232}$	$\frac{\sqrt{1155}i}{924}$	0	$\frac{5\sqrt{1155}}{924}$	0	0	0	0	$\frac{5\sqrt{462}}{3696}$	$\frac{5\sqrt{77}i}{308}$	0	

943 symmetry

$$\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 2)$	0	0	0	$\frac{\sqrt{42}i}{448}$	$\frac{3\sqrt{7}}{224}$	0	0	0	0	0	0	$\frac{3\sqrt{70}i}{448}$	$\frac{\sqrt{105}}{224}$	0	0		
	0	0	$-\frac{\sqrt{42}i}{448}$	0	0	$-\frac{3\sqrt{7}}{224}$	0	0	0	0	$-\frac{3\sqrt{70}i}{448}$	0	0	$-\frac{\sqrt{105}}{224}$			
	0	$\frac{\sqrt{42}i}{448}$	0	$\frac{\sqrt{42}}{224}$	0	0	$-\frac{\sqrt{7}}{112}$	0	0	$\frac{\sqrt{70}i}{448}$	0	$\frac{3\sqrt{70}}{224}$	0	0	0		
	$-\frac{\sqrt{42}i}{448}$	0	$\frac{\sqrt{42}}{224}$	0	0	0	0	$\frac{\sqrt{7}}{112}$	$-\frac{\sqrt{70}i}{448}$	0	$\frac{3\sqrt{70}}{224}$	0	0	0	0		
	$\frac{3\sqrt{7}}{224}$	0	0	0	0	$-\frac{3\sqrt{42}}{112}$	0	$\frac{\sqrt{42}i}{112}$	$\frac{\sqrt{105}}{224}$	0	0	0	0	$-\frac{3\sqrt{70}}{112}$			
	0	$-\frac{3\sqrt{7}}{224}$	0	0	$-\frac{3\sqrt{42}}{112}$	0	$-\frac{\sqrt{42}i}{112}$	0	0	$-\frac{\sqrt{105}}{224}$	0	0	$-\frac{3\sqrt{70}}{112}$	0			
	0	0	$-\frac{\sqrt{7}}{112}$	0	0	$\frac{\sqrt{42}i}{112}$	0	0	0	0	$-\frac{\sqrt{105}}{112}$	0	0	$\frac{\sqrt{70}i}{112}$			
	0	0	0	$\frac{\sqrt{7}}{112}$	$-\frac{\sqrt{42}i}{112}$	0	0	0	0	0	$\frac{\sqrt{105}}{112}$	$-\frac{\sqrt{70}i}{112}$	0				
	0	0	0	$\frac{\sqrt{70}i}{448}$	$\frac{\sqrt{105}}{224}$	0	0	0	0	0	0	$\frac{5\sqrt{42}i}{448}$	$\frac{5\sqrt{7}}{224}$	0			
	0	0	$-\frac{\sqrt{70}i}{448}$	0	0	$-\frac{\sqrt{105}}{224}$	0	0	0	0	$-\frac{5\sqrt{42}i}{448}$	0	0	$-\frac{5\sqrt{7}}{224}$			
	0	$\frac{3\sqrt{70}i}{448}$	0	$\frac{3\sqrt{70}}{224}$	0	0	$-\frac{\sqrt{105}}{112}$	0	0	$\frac{5\sqrt{42}i}{448}$	0	$\frac{15\sqrt{42}}{224}$	0	0	0		
	$-\frac{3\sqrt{70}i}{448}$	0	$\frac{3\sqrt{70}}{224}$	0	0	0	0	$\frac{\sqrt{105}}{112}$	$-\frac{5\sqrt{42}i}{448}$	0	$\frac{15\sqrt{42}}{224}$	0	0	0	0		
	$\frac{\sqrt{105}}{224}$	0	0	0	0	$-\frac{3\sqrt{70}}{112}$	0	$\frac{\sqrt{70}i}{112}$	$\frac{5\sqrt{7}}{224}$	0	0	0	0	$-\frac{5\sqrt{42}}{112}$			
	0	$-\frac{\sqrt{105}}{224}$	0	0	$-\frac{3\sqrt{70}}{112}$	0	$-\frac{\sqrt{70}i}{112}$	0	0	$-\frac{5\sqrt{7}}{224}$	0	0	$-\frac{5\sqrt{42}}{112}$	0			

944 symmetry

$$\frac{\sqrt{462}xz(x^2 - 3z^2)(3x^2 - z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 2)$	0	$\frac{\sqrt{42}i}{224}$	0	$\frac{\sqrt{42}}{448}$	0	0	$-\frac{\sqrt{7}}{112}$	0	0	$-\frac{3\sqrt{70}i}{224}$	0	$-\frac{\sqrt{70}}{448}$	0	0	0
	$-\frac{\sqrt{42}i}{224}$	0	$\frac{\sqrt{42}}{448}$	0	0	0	0	$\frac{\sqrt{7}}{112}$	$\frac{3\sqrt{70}i}{224}$	0	$-\frac{\sqrt{70}}{448}$	0	0	0	0
	0	$\frac{\sqrt{42}}{448}$	0	0	$-\frac{3\sqrt{7}}{224}$	0	0	0	0	$-\frac{3\sqrt{70}}{448}$	0	0	$\frac{\sqrt{105}}{224}$	0	0
	$\frac{\sqrt{42}}{448}$	0	0	0	0	$\frac{3\sqrt{7}}{224}$	0	0	$-\frac{3\sqrt{70}}{448}$	0	0	0	0	$-\frac{\sqrt{105}}{224}$	0
	0	0	$-\frac{3\sqrt{7}}{224}$	0	0	$-\frac{3\sqrt{42}i}{112}$	0	$-\frac{\sqrt{42}}{112}$	0	0	$\frac{\sqrt{105}}{224}$	0	0	$\frac{3\sqrt{70}i}{112}$	0
	0	0	0	$\frac{3\sqrt{7}}{224}$	$\frac{3\sqrt{42}i}{112}$	0	$-\frac{\sqrt{42}}{112}$	0	0	0	0	$-\frac{\sqrt{105}}{224}$	$-\frac{3\sqrt{70}i}{112}$	0	0
	$-\frac{\sqrt{7}}{112}$	0	0	0	0	$-\frac{\sqrt{42}}{112}$	0	0	$\frac{\sqrt{105}}{112}$	0	0	0	0	$\frac{\sqrt{70}}{112}$	0
	0	$\frac{\sqrt{7}}{112}$	0	0	$-\frac{\sqrt{42}}{112}$	0	0	0	0	$-\frac{\sqrt{105}}{112}$	0	0	$\frac{\sqrt{70}}{112}$	0	0
	0	$-\frac{3\sqrt{70}i}{224}$	0	$-\frac{3\sqrt{70}}{448}$	0	0	$\frac{\sqrt{105}}{112}$	0	0	$\frac{15\sqrt{42}i}{224}$	0	$\frac{5\sqrt{42}}{448}$	0	0	0
	$\frac{3\sqrt{70}i}{224}$	0	$-\frac{3\sqrt{70}}{448}$	0	0	0	0	$-\frac{\sqrt{105}}{112}$	$-\frac{15\sqrt{42}i}{224}$	0	$\frac{5\sqrt{42}}{448}$	0	0	0	0
	0	$-\frac{\sqrt{70}}{448}$	0	0	$\frac{\sqrt{105}}{224}$	0	0	0	0	$\frac{5\sqrt{42}}{448}$	0	0	$-\frac{5\sqrt{7}}{224}$	0	0
	$-\frac{\sqrt{70}}{448}$	0	0	0	0	$-\frac{\sqrt{105}}{224}$	0	0	$\frac{5\sqrt{42}}{448}$	0	0	0	0	$\frac{5\sqrt{7}}{224}$	0
	0	0	$\frac{\sqrt{105}}{224}$	0	0	$\frac{3\sqrt{70}i}{112}$	0	$\frac{\sqrt{70}}{112}$	0	0	$-\frac{5\sqrt{7}}{224}$	0	0	$-\frac{5\sqrt{42}i}{112}$	0
	0	0	0	$-\frac{\sqrt{105}}{224}$	$-\frac{3\sqrt{70}i}{112}$	0	$\frac{\sqrt{70}}{112}$	0	0	0	$\frac{5\sqrt{7}}{224}$	$\frac{5\sqrt{42}i}{112}$	0	0	0

$$\frac{\sqrt{210}yz(16x^4 - 16x^2y^2 - 16x^2z^2 + y^4 + 2y^2z^2 + z^4)}{16}$$

945 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 3)$	0	$-\frac{\sqrt{2310}}{462}$	0	$\frac{\sqrt{2310}i}{448}$	$\frac{83\sqrt{385}}{7392}$	0	0	0	0	$-\frac{\sqrt{154}}{462}$	0	$-\frac{113\sqrt{154}i}{14784}$	$-\frac{9\sqrt{231}}{2464}$	0		
	$-\frac{\sqrt{2310}}{462}$	0	$-\frac{\sqrt{2310}i}{448}$	0	0	$-\frac{83\sqrt{385}}{7392}$	0	0	$-\frac{\sqrt{154}}{462}$	0	$\frac{113\sqrt{154}i}{14784}$	0	0	$\frac{9\sqrt{231}}{2464}$		
	0	$\frac{\sqrt{2310}i}{448}$	0	$\frac{17\sqrt{2310}}{7392}$	0	0	$-\frac{41\sqrt{385}}{3696}$	0	0	$-\frac{17\sqrt{154}i}{1344}$	0	$-\frac{\sqrt{154}}{7392}$	0	0	0	
	$-\frac{\sqrt{2310}i}{448}$	0	$\frac{17\sqrt{2310}}{7392}$	0	0	0	0	$\frac{41\sqrt{385}}{3696}$	$\frac{17\sqrt{154}i}{1344}$	0	$-\frac{\sqrt{154}}{7392}$	0	0	0		
	$\frac{83\sqrt{385}}{7392}$	0	0	0	0	$-\frac{\sqrt{2310}}{1232}$	0	$-\frac{5\sqrt{2310}i}{1232}$	$-\frac{43\sqrt{231}}{7392}$	0	0	0	0	$\frac{17\sqrt{154}}{3696}$		
	0	$-\frac{83\sqrt{385}}{7392}$	0	0	$-\frac{\sqrt{2310}}{1232}$	0	$\frac{5\sqrt{2310}i}{1232}$	0	0	$\frac{43\sqrt{231}}{7392}$	0	0	0	$\frac{17\sqrt{154}}{3696}$	0	
	0	0	$-\frac{41\sqrt{385}}{3696}$	0	0	$-\frac{5\sqrt{2310}i}{1232}$	0	0	0	0	$\frac{19\sqrt{231}}{3696}$	0	0	$\frac{37\sqrt{154}i}{3696}$		
	0	0	0	$\frac{41\sqrt{385}}{3696}$	$\frac{5\sqrt{2310}i}{1232}$	0	0	0	0	0	0	$-\frac{19\sqrt{231}}{3696}$	$-\frac{37\sqrt{154}i}{3696}$	0		
	0	$-\frac{\sqrt{154}}{462}$	0	$-\frac{17\sqrt{154}i}{1344}$	$-\frac{43\sqrt{231}}{7392}$	0	0	0	0	$\frac{\sqrt{2310}}{462}$	0	$\frac{37\sqrt{2310}i}{14784}$	$\frac{5\sqrt{385}}{7392}$	0		
	$-\frac{\sqrt{154}}{462}$	0	$\frac{17\sqrt{154}i}{1344}$	0	0	$\frac{43\sqrt{231}}{7392}$	0	0	$\frac{\sqrt{2310}}{462}$	0	$-\frac{37\sqrt{2310}i}{14784}$	0	0	$-\frac{5\sqrt{385}}{7392}$		
	0	$-\frac{113\sqrt{154}i}{14784}$	0	$-\frac{\sqrt{154}}{7392}$	0	0	$\frac{19\sqrt{231}}{3696}$	0	0	$\frac{37\sqrt{2310}i}{14784}$	0	$-\frac{\sqrt{2310}}{7392}$	0	0		
	$\frac{113\sqrt{154}i}{14784}$	0	$-\frac{\sqrt{154}}{7392}$	0	0	0	0	$-\frac{19\sqrt{231}}{3696}$	$-\frac{37\sqrt{2310}i}{14784}$	0	$-\frac{\sqrt{2310}}{7392}$	0	0	0		
	$-\frac{9\sqrt{231}}{2464}$	0	0	0	0	$\frac{17\sqrt{154}}{3696}$	0	$\frac{37\sqrt{154}i}{3696}$	$\frac{5\sqrt{385}}{7392}$	0	0	0	0	$-\frac{5\sqrt{2310}}{3696}$		
	0	$\frac{9\sqrt{231}}{2464}$	0	0	$\frac{17\sqrt{154}}{3696}$	0	$-\frac{37\sqrt{154}i}{3696}$	0	0	$-\frac{5\sqrt{385}}{7392}$	0	0	0	$-\frac{5\sqrt{2310}}{3696}$	0	

$$\frac{\sqrt{210}xz(x^4 - 16x^2y^2 + 2x^2z^2 + 16y^4 - 16y^2z^2 + z^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 3)$	0	$\frac{17\sqrt{2310}i}{7392}$	0	$\frac{\sqrt{2310}}{448}$	0	0	$-\frac{41\sqrt{385}}{3696}$	0	0	$\frac{\sqrt{154}i}{7392}$	0	$\frac{17\sqrt{154}}{1344}$	0	0	0	
	$-\frac{17\sqrt{2310}i}{7392}$	0	$\frac{\sqrt{2310}}{448}$	0	0	0	0	$\frac{41\sqrt{385}}{3696}$	$-\frac{\sqrt{154}i}{7392}$	0	$\frac{17\sqrt{154}}{1344}$	0	0	0	0	
	0	$\frac{\sqrt{2310}}{448}$	0	$-\frac{\sqrt{2310}i}{462}$	$-\frac{83\sqrt{385}}{7392}$	0	0	0	0	$\frac{113\sqrt{154}}{14784}$	0	$\frac{\sqrt{154}i}{462}$	$-\frac{9\sqrt{231}}{2464}$	0	0	
	$\frac{\sqrt{2310}}{448}$	0	$\frac{\sqrt{2310}i}{462}$	0	0	$\frac{83\sqrt{385}}{7392}$	0	0	$\frac{113\sqrt{154}}{14784}$	0	$-\frac{\sqrt{154}i}{462}$	0	0	$\frac{9\sqrt{231}}{2464}$	0	
	0	0	$-\frac{83\sqrt{385}}{7392}$	0	0	$-\frac{\sqrt{2310}i}{1232}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	$-\frac{43\sqrt{231}}{7392}$	0	0	$-\frac{17\sqrt{154}i}{3696}$	0	
	0	0	0	$\frac{83\sqrt{385}}{7392}$	$\frac{\sqrt{2310}i}{1232}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	$\frac{43\sqrt{231}}{7392}$	$\frac{17\sqrt{154}i}{3696}$	0	0	0	
	$-\frac{41\sqrt{385}}{3696}$	0	0	0	0	$\frac{5\sqrt{2310}}{1232}$	0	0	$-\frac{19\sqrt{231}}{3696}$	0	0	0	0	$\frac{37\sqrt{154}}{3696}$	0	
	0	$\frac{41\sqrt{385}}{3696}$	0	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	$\frac{19\sqrt{231}}{3696}$	0	0	$\frac{37\sqrt{154}}{3696}$	0	0	0	
	0	$\frac{\sqrt{154}i}{7392}$	0	$\frac{113\sqrt{154}}{14784}$	0	0	$-\frac{19\sqrt{231}}{3696}$	0	0	$-\frac{\sqrt{2310}i}{7392}$	0	$\frac{37\sqrt{2310}}{14784}$	0	0	0	
	$-\frac{\sqrt{154}i}{7392}$	0	$\frac{113\sqrt{154}}{14784}$	0	0	0	0	$\frac{19\sqrt{231}}{3696}$	$\frac{\sqrt{2310}i}{7392}$	0	$\frac{37\sqrt{2310}}{14784}$	0	0	0	0	
	0	$\frac{17\sqrt{154}}{1344}$	0	$\frac{\sqrt{154}i}{462}$	$-\frac{43\sqrt{231}}{7392}$	0	0	0	$\frac{37\sqrt{2310}}{14784}$	0	$\frac{\sqrt{2310}i}{462}$	$-\frac{5\sqrt{385}}{7392}$	0	0	0	
	$\frac{17\sqrt{154}}{1344}$	0	$-\frac{\sqrt{154}i}{462}$	0	0	$\frac{43\sqrt{231}}{7392}$	0	0	$\frac{37\sqrt{2310}}{14784}$	0	$-\frac{\sqrt{2310}i}{462}$	0	0	$\frac{5\sqrt{385}}{7392}$	0	
	0	0	$-\frac{9\sqrt{231}}{2464}$	0	0	$-\frac{17\sqrt{154}i}{3696}$	0	$\frac{37\sqrt{154}}{3696}$	0	0	$-\frac{5\sqrt{385}}{7392}$	0	0	$-\frac{5\sqrt{2310}i}{3696}$	0	
	0	0	0	$\frac{9\sqrt{231}}{2464}$	$\frac{17\sqrt{154}i}{3696}$	0	$\frac{37\sqrt{154}}{3696}$	0	0	0	0	$\frac{5\sqrt{385}}{7392}$	$\frac{5\sqrt{2310}i}{3696}$	0	0	

947 symmetry

z

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_1^{(a)}(A_{2g})$	0 0 $-\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
<i>x</i>		

948 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(a)}(E_g)$	0	0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0
	$-\frac{\sqrt{21}i}{28}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{14}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{14}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$ 0 0 0

949 symmetry

 $-y$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,2}^{(a)}(E_g)$	0	0	0	0	$-\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0
	$\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0
	0	$\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	0
	0	0	$\frac{\sqrt{21}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{14}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{14}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{14}$	0
	0	0	0	0	0	0	0	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{21}i}{14}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{21}i}{14}$	0	0	0	0	0
950	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(A_{2g})$	0	0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
951	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(B_{1g})$	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
952	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(B_{2g})$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$	
	0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0	
953	symmetry	$\frac{x(2x^2 - 3y^2 - 3z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 1)$	0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$	
	0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0	
	$-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$	
	0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0	
$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$		
954	symmetry	

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,2}^{(a)}(E_g, 1)$	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0		
	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$		
	0	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0		
	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$		
	0	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	
	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	

955 symmetry

 $\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$	0	0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$
	0	0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0
	$-\frac{\sqrt{30}i}{24}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$
	0	0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0

956 symmetry

 $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(a)}(E_g, 2)$	0	0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0
	$\frac{\sqrt{30}i}{24}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0
	0	$\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{2}i}{8}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0

957 symmetry

 $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
958	symmetry	$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix												
$M_5^{(a)}(A_{2g}, 1)$	0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0													
	$\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0													
	0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{84}$ 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{84}$ 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{42}i}{84}$ 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
959	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$												

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{M}_5^{(a)}(A_{2g}, 2)$		$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
960	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(a)}(B_{1g})$	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{6}i}{12}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0 0
961	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(a)}(B_{2g})$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$	
	0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0	
962	symmetry	$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(a)}(E_g, 1)$	0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{13\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{48}$ 0	
	0 0 0 0 0 $-\frac{13\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{48}$	
	0 0 $\frac{13\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{336}$ 0 0 0	
	0 0 0 $\frac{13\sqrt{7}i}{112}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{336}$ 0 0	
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0	
	0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{105}i}{336}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{112}$ 0	
	0 0 0 0 0 $\frac{\sqrt{105}i}{336}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{112}$	
	0 0 $-\frac{\sqrt{105}i}{48}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{7}i}{112}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{48}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{7}i}{112}$ 0 0 0	
963	symmetry	$-\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,2}^{(a)}(E_g, 1)$	0	0	0	0	$-\frac{13\sqrt{7}i}{112}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{48}$	0	
	0	0	0	0	0	$-\frac{13\sqrt{7}i}{112}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{48}$	
	0	0	0	0	0	0	$\frac{\sqrt{7}i}{14}$	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{7}i}{14}$	0	0	0	0	0	0	0	0	
	$\frac{13\sqrt{7}i}{112}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{336}$	0	0	0	0	0	0	0	
	0	$\frac{13\sqrt{7}i}{112}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{336}$	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{105}i}{336}$	0	0	0	0	0	0	$-\frac{5\sqrt{7}i}{112}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{105}i}{336}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{7}i}{112}$	0	
	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{42}$	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{105}i}{48}$	0	0	0	0	0	0	0	$\frac{5\sqrt{7}i}{112}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{105}i}{48}$	0	0	0	0	0	0	0	$\frac{5\sqrt{7}i}{112}$	0	0	0	0	0	
964	symmetry	$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$														

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}i}{16}$ 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{3}i}{16}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{5}i}{16}$ 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{3}i}{16}$	
	0 0 $\frac{\sqrt{5}i}{16}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{3}i}{16}$ 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{16}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{3}i}{16}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{3}i}{16}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{16}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{3}i}{16}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{16}$	
	0 0 $\frac{3\sqrt{3}i}{16}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{16}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{3}i}{16}$ 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{16}$ 0 0	
965	symmetry	$-\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 \end{bmatrix}$
966	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(a)}(E_g, 3)$	0 0 0 0 0 0 $\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 $\frac{i}{8}$ 0	
	0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 $\frac{i}{8}$	
	0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0	
	$-\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$	
	0 0 $-\frac{i}{8}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0	
	0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0	
967	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(a)}(E_g, 3)$	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	0	$-\frac{i}{8}$	0
	0	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	0	$-\frac{i}{8}$
	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{12}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{12}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	$\frac{i}{8}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	$\frac{i}{8}$	0	0	0	0	0
	0	0	$\frac{\sqrt{15}i}{12}$	0	0	0	0	0	0	0	$\frac{i}{4}$	0	0	0	0
	0	0	0	$\frac{\sqrt{15}i}{12}$	0	0	0	0	0	0	$\frac{i}{4}$	0	0	0	0
	0	0	0	0	$-\frac{i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0
	0	0	0	0	0	$-\frac{i}{8}$	0	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0
	0	0	0	0	0	0	$-\frac{i}{4}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{i}{4}$	0	0	0	0	0	0	0
<i>z</i>															
968	symmetry														

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_1^{(1,-1;a)}(A_{2g})$	$\frac{\sqrt{14}}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	- $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 - $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 - $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 - $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0
<i>x</i>		
969	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)$	0	$\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{14}}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0
970 symmetry		$-y$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)$	0	$\frac{\sqrt{14}i}{14}$
	$-\frac{\sqrt{14}i}{14}$	0
	0	0
	0	$\frac{\sqrt{14}i}{14}$
	0	$-\frac{\sqrt{14}i}{14}$
	0	0
	0	$\frac{\sqrt{14}i}{14}$
	0	$-\frac{\sqrt{14}i}{14}$
	0	0
	0	$-\frac{\sqrt{14}i}{14}$
	0	0
	0	$\frac{\sqrt{14}i}{14}$
971	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,-1;a)}(A_{2g})$	$-\frac{\sqrt{70}}{28}$	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{70}}{28}$	0	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{70}}{28}$	0	0	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{70}}{28}$	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0
	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0
	0	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0
	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	$\frac{3\sqrt{70}}{140}$	0	0	0	0	$-\frac{\sqrt{105}}{210}$	
	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	$-\frac{3\sqrt{70}}{140}$	0	0	$-\frac{\sqrt{105}}{210}$	0	
	0	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{3\sqrt{70}}{140}$	0	0	$\frac{\sqrt{105}i}{210}$	
	0	0	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	$-\frac{3\sqrt{70}}{140}$	$-\frac{\sqrt{105}i}{210}$	0		
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{210}$	0	$\frac{\sqrt{105}i}{210}$	$\frac{\sqrt{70}}{35}$	0		
	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{210}$	0	$-\frac{\sqrt{105}i}{210}$	0	0	$-\frac{\sqrt{70}}{35}$		

972 symmetry

 $\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_3^{(1,-1;a)}(B_{1g})$	0	0	0	0	0	$-\frac{5\sqrt{7}i}{84}$	0	$-\frac{5\sqrt{7}}{84}$	0	0	$\frac{\sqrt{70}}{84}$	0	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{7}i}{84}$	0	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	$-\frac{\sqrt{70}}{84}$	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{7}}{84}$	0	$-\frac{5\sqrt{7}i}{84}$	$-\frac{\sqrt{70}}{84}$	0	0	0	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{7}}{84}$	0	$\frac{5\sqrt{7}i}{84}$	0	0	$\frac{\sqrt{70}}{84}$	0	0	0	0	0	0
	0	$-\frac{5\sqrt{7}i}{84}$	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0
	$\frac{5\sqrt{7}i}{84}$	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0
	0	$-\frac{5\sqrt{7}}{84}$	0	$-\frac{5\sqrt{7}i}{84}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	$-\frac{\sqrt{70}}{42}$	0	0	0
	$-\frac{5\sqrt{7}}{84}$	0	$\frac{5\sqrt{7}i}{84}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	$\frac{\sqrt{70}}{42}$	0	0
	0	0	$-\frac{\sqrt{70}}{84}$	0	0	$-\frac{\sqrt{105}i}{84}$	0	$\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{42}}{42}$	0	0	$-\frac{\sqrt{7}i}{42}$	0	0
	0	0	0	$\frac{\sqrt{70}}{84}$	$\frac{\sqrt{105}i}{84}$	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{42}}{42}$	$\frac{\sqrt{7}i}{42}$	0	0	0
	$\frac{\sqrt{70}}{84}$	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	$\frac{\sqrt{42}}{42}$	0	0	0	0	$\frac{\sqrt{7}}{42}$	0	0
	0	$-\frac{\sqrt{70}}{84}$	0	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	$-\frac{\sqrt{42}}{42}$	0	0	$\frac{\sqrt{7}}{42}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{70}}{42}$	0	0	$-\frac{\sqrt{7}i}{42}$	0	$\frac{\sqrt{7}}{42}$	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{70}}{42}$	$\frac{\sqrt{7}i}{42}$	0	$\frac{\sqrt{7}}{42}$	0	0	0	0	0

973 symmetry

$$\frac{\sqrt{15}z(x-y)(x+y)}{2}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(1,-1;a)}(B_{2g})$	0	0 0 0 0 0 $\frac{5\sqrt{7}}{84}$ 0 $-\frac{5\sqrt{7}i}{84}$ $-\frac{\sqrt{70}}{84}$ 0 0 0 0 0 0
	0	0 0 0 0 $\frac{5\sqrt{7}}{84}$ 0 $\frac{5\sqrt{7}i}{84}$ 0 0 $\frac{\sqrt{70}}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 $\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 $-\frac{\sqrt{70}}{84}$ 0 0 0 0
	0	0 0 0 0 $-\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 $\frac{\sqrt{70}}{84}$ 0 0 0
	0	$\frac{5\sqrt{7}}{84}$ 0 $\frac{5\sqrt{7}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{84}$ $-\frac{\sqrt{70}}{42}$ 0
	$\frac{5\sqrt{7}}{84}$	0 $-\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}}{42}$
	0	$-\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0
	$\frac{5\sqrt{7}i}{84}$	0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0
	$-\frac{\sqrt{70}}{84}$	0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 $\frac{\sqrt{7}}{42}$
	0	$\frac{\sqrt{70}}{84}$ 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 $\frac{\sqrt{7}}{42}$ 0
	0	0 $-\frac{\sqrt{70}}{84}$ 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 $\frac{\sqrt{7}i}{42}$
	0	0 0 0 $\frac{\sqrt{70}}{84}$ $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 $\frac{\sqrt{42}}{42}$ $-\frac{\sqrt{7}i}{42}$ 0
	0	0 0 0 0 $-\frac{\sqrt{70}}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$ 0 $\frac{\sqrt{7}i}{42}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{70}}{42}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 $-\frac{\sqrt{7}i}{42}$ 0 0 0 0

974 symmetry

$$\frac{x(2x^2 - 3y^2 - 3z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{84}$	0	0	
	$\frac{\sqrt{70}}{56}$	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{84}$	0	0	0	
	0	0	0	$\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}i}{84}$	0	$-\frac{\sqrt{42}}{56}$	0	0	
	0	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	$\frac{\sqrt{105}}{84}$	$\frac{\sqrt{42}i}{84}$	0	$-\frac{\sqrt{42}}{56}$	0	0	0	
	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{42}}{28}$	
	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}}{28}$	0	
	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}i}{42}$	0	
	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{42}i}{42}$	0		
	0	$-\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{84}$	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$\frac{3\sqrt{70}}{280}$	0	$\frac{\sqrt{70}i}{70}$	$-\frac{\sqrt{105}}{210}$	0	
	$-\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{84}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	$\frac{3\sqrt{70}}{280}$	0	$-\frac{\sqrt{70}i}{70}$	0	0	$\frac{\sqrt{105}}{210}$	
	0	$\frac{\sqrt{42}i}{84}$	0	$-\frac{\sqrt{42}}{56}$	0	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{70}i}{70}$	0	$-\frac{9\sqrt{70}}{280}$	0	0	
	$-\frac{\sqrt{42}i}{84}$	0	$-\frac{\sqrt{42}}{56}$	0	0	0	0	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{70}i}{70}$	0	$-\frac{9\sqrt{70}}{280}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{42}}{28}$	0	$-\frac{\sqrt{42}i}{42}$	$-\frac{\sqrt{105}}{210}$	0	0	0	0	$-\frac{\sqrt{70}}{70}$	
	0	0	0	0	$-\frac{\sqrt{42}}{28}$	0	$\frac{\sqrt{42}i}{42}$	0	0	$\frac{\sqrt{105}}{210}$	0	0	$-\frac{\sqrt{70}}{70}$	0	
975	symmetry	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{84}$	0	0	0
	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{84}$	0	0	0	0
	0	0	0	$\frac{\sqrt{70}i}{56}$	$\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{42}}{84}$	0	$\frac{\sqrt{42}i}{56}$	0	0	0
	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}}{84}$	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0
	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{42}i}{28}$	0	0
	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{42}i}{28}$	0	0	0
	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{42}}{42}$	0
	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}}{42}$	0	0	0
	0	$\frac{\sqrt{42}i}{56}$	0	$-\frac{\sqrt{42}}{84}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	$-\frac{9\sqrt{70}i}{280}$	0	$\frac{\sqrt{70}}{70}$	0	0	0
	$-\frac{\sqrt{42}i}{56}$	0	$-\frac{\sqrt{42}}{84}$	0	0	0	0	$-\frac{\sqrt{7}}{28}$	$\frac{9\sqrt{70}i}{280}$	0	$\frac{\sqrt{70}}{70}$	0	0	0	0
	0	$\frac{\sqrt{42}}{84}$	0	$\frac{\sqrt{42}i}{56}$	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$\frac{\sqrt{70}}{70}$	0	$\frac{3\sqrt{70}i}{280}$	$\frac{\sqrt{105}}{210}$	0	0
	$\frac{\sqrt{42}}{84}$	0	$-\frac{\sqrt{42}i}{56}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{70}}{70}$	0	$-\frac{3\sqrt{70}i}{280}$	0	0	$-\frac{\sqrt{105}}{210}$	0
	0	0	0	0	0	$\frac{\sqrt{42}i}{28}$	0	$-\frac{\sqrt{42}}{42}$	0	0	$\frac{\sqrt{105}}{210}$	0	0	$-\frac{\sqrt{70}i}{70}$	0
	0	0	0	0	$-\frac{\sqrt{42}i}{28}$	0	$-\frac{\sqrt{42}}{42}$	0	0	0	$-\frac{\sqrt{105}}{210}$	$\frac{\sqrt{70}i}{70}$	0	0	0

976 symmetry

 $\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{5\sqrt{42}}{168}$	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	$\frac{\sqrt{70}}{168}$	0	$-\frac{\sqrt{70}i}{84}$	0	0	0	
	$\frac{5\sqrt{42}}{168}$	0	0	0	0	$\frac{5\sqrt{7}}{84}$	0	0	$\frac{\sqrt{70}}{168}$	0	$\frac{\sqrt{70}i}{84}$	0	0	0	0	
	0	0	0	$\frac{5\sqrt{42}}{168}$	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	$\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{168}$	0	0	0	
	0	0	$\frac{5\sqrt{42}}{168}$	0	0	0	0	$\frac{5\sqrt{7}}{84}$	$-\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{168}$	0	0	0	0	
	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	$\frac{\sqrt{70}}{84}$	
	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	$\frac{\sqrt{70}}{84}$	0	
	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	$\frac{\sqrt{70}i}{42}$	
	0	0	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	$-\frac{\sqrt{70}i}{42}$	0	0	0	
	0	$\frac{\sqrt{70}}{168}$	0	$\frac{\sqrt{70}i}{84}$	$-\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{5\sqrt{42}}{168}$	0	$-\frac{\sqrt{42}i}{42}$	$-\frac{\sqrt{7}}{42}$	0	0	
	$\frac{\sqrt{70}}{168}$	0	$-\frac{\sqrt{70}i}{84}$	0	0	$\frac{\sqrt{105}}{84}$	0	0	$-\frac{5\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{42}$	0	0	$\frac{\sqrt{7}}{42}$	0	
	0	$-\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{168}$	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}i}{42}$	0	$-\frac{\sqrt{42}}{168}$	0	0	0	
	$\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{168}$	0	0	0	0	$\frac{\sqrt{105}}{84}$	$\frac{\sqrt{42}i}{42}$	0	$-\frac{\sqrt{42}}{168}$	0	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{70}}{84}$	0	$\frac{\sqrt{70}i}{42}$	$-\frac{\sqrt{7}}{42}$	0	0	0	0	0	$-\frac{\sqrt{42}}{42}$	
	0	0	0	0	$\frac{\sqrt{70}}{84}$	0	$-\frac{\sqrt{70}i}{42}$	0	0	$\frac{\sqrt{7}}{42}$	0	0	0	$-\frac{\sqrt{42}}{42}$	0	

977 symmetry

 $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	0	$\frac{5\sqrt{42}i}{168}$	0	0	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	$-\frac{\sqrt{70}i}{168}$	0	$-\frac{\sqrt{70}}{84}$	0	0	0	0
	$-\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	0	$\frac{5\sqrt{7}}{84}$	$\frac{\sqrt{70}i}{168}$	0	$-\frac{\sqrt{70}}{84}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{42}i}{168}$	$\frac{5\sqrt{7}}{84}$	0	0	0	0	$\frac{\sqrt{70}}{84}$	0	$-\frac{\sqrt{70}i}{168}$	0	0	0	0
	0	0	$-\frac{5\sqrt{42}i}{168}$	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	$\frac{\sqrt{70}}{84}$	0	$\frac{\sqrt{70}i}{168}$	0	0	0	0	0
	0	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	$-\frac{\sqrt{70}i}{84}$	0
	0	0	0	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	$\frac{\sqrt{70}i}{84}$	0	0	$-\frac{\sqrt{70}i}{84}$	0
	$-\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	0	$\frac{\sqrt{70}}{42}$	0
	0	$\frac{5\sqrt{7}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{70}}{42}$	0	0	0
	0	$-\frac{\sqrt{70}i}{168}$	0	$\frac{\sqrt{70}}{84}$	0	0	$\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}i}{168}$	0	$-\frac{\sqrt{42}}{42}$	0	0	0	0
	$\frac{\sqrt{70}i}{168}$	0	$\frac{\sqrt{70}}{84}$	0	0	0	0	$-\frac{\sqrt{105}}{84}$	$\frac{\sqrt{42}i}{168}$	0	$-\frac{\sqrt{42}}{42}$	0	0	0	0	0
	0	$-\frac{\sqrt{70}}{84}$	0	$-\frac{\sqrt{70}i}{168}$	$-\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{42}}{42}$	0	$-\frac{5\sqrt{42}i}{168}$	$\frac{\sqrt{7}}{42}$	0	0	0
	$-\frac{\sqrt{70}}{84}$	0	$\frac{\sqrt{70}i}{168}$	0	0	$\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{42}}{42}$	0	$\frac{5\sqrt{42}i}{168}$	0	0	0	$-\frac{\sqrt{7}}{42}$	0
	0	0	0	0	0	$-\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{42}$	0	0	$\frac{\sqrt{7}}{42}$	0	0	0	$-\frac{\sqrt{42}i}{42}$	0
	0	0	0	0	$\frac{\sqrt{70}i}{84}$	0	$\frac{\sqrt{70}}{42}$	0	0	0	0	$-\frac{\sqrt{7}}{42}$	$\frac{\sqrt{42}i}{42}$	0	0	0

978 symmetry

 $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	0	0	0	$\frac{3\sqrt{110}i}{110}$	
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	$-\frac{3\sqrt{110}i}{110}$	0		
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$-\frac{3\sqrt{110}i}{110}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	0	$-\frac{3\sqrt{110}i}{110}$	0	
	0	0	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	$-\frac{\sqrt{110}i}{110}$	0	$\frac{\sqrt{110}}{110}$	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	$\frac{\sqrt{110}i}{110}$	0	$\frac{\sqrt{110}}{110}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	
	0	0	$-\frac{\sqrt{165}}{110}$	0	0	$-\frac{\sqrt{110}i}{110}$	0	$\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{165}}{110}$	$\frac{\sqrt{110}i}{110}$	0	$\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0	0	
	0	$\frac{3\sqrt{110}i}{110}$	0	$-\frac{3\sqrt{110}}{110}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{110}i}{110}$	0	$-\frac{3\sqrt{110}}{110}$	0	0	0	0	0	0	0	0	0	0	0	
979	symmetry	$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{385}}{154}$	0	0	0	0	$\frac{\sqrt{2310}}{462}$	0	$\frac{\sqrt{2310}i}{462}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{385}}{154}$	0	0	$\frac{\sqrt{2310}}{462}$	0	$-\frac{\sqrt{2310}i}{462}$	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{385}}{154}$	0	0	$-\frac{\sqrt{2310}i}{462}$	0	$\frac{\sqrt{2310}}{462}$	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{385}}{154}$	$\frac{\sqrt{2310}i}{462}$	0	$\frac{\sqrt{2310}}{462}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{2310}}{462}$	0	$-\frac{\sqrt{2310}i}{462}$	$-\frac{\sqrt{385}}{66}$	0	0	0	0	$-\frac{2\sqrt{154}}{231}$	0	$-\frac{2\sqrt{154}i}{231}$	0	0	0
	$\frac{\sqrt{2310}}{462}$	0	$\frac{\sqrt{2310}i}{462}$	0	0	$\frac{\sqrt{385}}{66}$	0	0	$-\frac{2\sqrt{154}}{231}$	0	$\frac{2\sqrt{154}i}{231}$	0	0	0	0
	0	$\frac{\sqrt{2310}i}{462}$	0	$\frac{\sqrt{2310}}{462}$	0	0	$-\frac{\sqrt{385}}{66}$	0	0	$\frac{2\sqrt{154}i}{231}$	0	$-\frac{2\sqrt{154}}{231}$	0	0	0
	$-\frac{\sqrt{2310}i}{462}$	0	$\frac{\sqrt{2310}}{462}$	0	0	0	0	$\frac{\sqrt{385}}{66}$	$-\frac{2\sqrt{154}i}{231}$	0	$-\frac{2\sqrt{154}}{231}$	0	0	0	0
	0	0	0	0	0	$-\frac{2\sqrt{154}}{231}$	0	$\frac{2\sqrt{154}i}{231}$	$\frac{\sqrt{385}}{462}$	0	0	0	0	$-\frac{\sqrt{2310}}{462}$	0
	0	0	0	0	$-\frac{2\sqrt{154}}{231}$	0	$-\frac{2\sqrt{154}i}{231}$	0	0	$-\frac{\sqrt{385}}{462}$	0	0	$-\frac{\sqrt{2310}}{462}$	0	0
	0	0	0	0	0	$-\frac{2\sqrt{154}i}{231}$	0	$-\frac{2\sqrt{154}}{231}$	0	0	0	$\frac{\sqrt{385}}{462}$	0	0	$\frac{\sqrt{2310}i}{462}$
	0	0	0	0	$\frac{2\sqrt{154}i}{231}$	0	$-\frac{2\sqrt{154}}{231}$	0	0	0	0	$-\frac{\sqrt{385}}{462}$	$-\frac{\sqrt{2310}i}{462}$	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{462}$	0	$\frac{\sqrt{2310}i}{462}$	$\frac{\sqrt{385}}{77}$	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{462}$	0	$-\frac{\sqrt{2310}i}{462}$	0	0	$-\frac{\sqrt{385}}{77}$	0

980 symmetry

$$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$-\frac{3\sqrt{110}}{110}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	$-\frac{3\sqrt{110}}{110}$	0	
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	$-\frac{3\sqrt{110}i}{110}$	
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	$\frac{3\sqrt{110}i}{110}$	0	
	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	
	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	0	$-\frac{\sqrt{110}}{110}$	0	
	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0	
	0	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{165}}{110}$	$-\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	
	0	$-\frac{3\sqrt{110}}{110}$	0	$-\frac{3\sqrt{110}i}{110}$	0	0	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{110}}{110}$	0	$\frac{3\sqrt{110}i}{110}$	0	0	0	0	0	0	0	0	0	0	

981 symmetry

$$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(B_{1g})$	0 0 0 0 0 $-\frac{\sqrt{22}i}{44}$ 0 $-\frac{\sqrt{22}}{44}$ 0 0 $\frac{3\sqrt{55}}{110}$ 0 0 $-\frac{\sqrt{330}i}{220}$														
	0 0 0 0 $\frac{\sqrt{22}i}{44}$ 0 $-\frac{\sqrt{22}}{44}$ 0 0 0 0 $-\frac{3\sqrt{55}}{110}$ $\frac{\sqrt{330}i}{220}$ 0														
	0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 $-\frac{\sqrt{22}i}{44}$ $-\frac{3\sqrt{55}}{110}$ 0 0 0 0 $-\frac{\sqrt{330}i}{220}$														
	0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 $\frac{\sqrt{22}i}{44}$ 0 0 $\frac{3\sqrt{55}}{110}$ 0 0 $-\frac{\sqrt{330}}{220}$ 0														
	0 $-\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{132}$ 0 $\frac{\sqrt{330}}{132}$ 0 0														
	$\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 $\frac{\sqrt{330}}{132}$ 0 0 0														
	0 $-\frac{\sqrt{22}}{44}$ 0 $-\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{220}$ 0 $\frac{\sqrt{330}i}{220}$ $\frac{\sqrt{55}}{110}$ 0														
	$-\frac{\sqrt{22}}{44}$ 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{220}$ 0 $-\frac{\sqrt{330}i}{220}$ 0 0 $-\frac{\sqrt{55}}{110}$														
	0 0 $-\frac{3\sqrt{55}}{110}$ 0 0 $\frac{\sqrt{330}i}{132}$ 0 $-\frac{\sqrt{330}}{220}$ 0 0 $-\frac{\sqrt{33}}{33}$ 0 0 $\frac{\sqrt{22}i}{44}$														
	0 0 0 $\frac{3\sqrt{55}}{110}$ $-\frac{\sqrt{330}i}{132}$ 0 $-\frac{\sqrt{330}}{220}$ 0 0 0 0 $\frac{\sqrt{33}}{33}$ $-\frac{\sqrt{22}i}{44}$ 0														
	$\frac{3\sqrt{55}}{110}$ 0 0 0 0 $\frac{\sqrt{330}}{132}$ 0 $\frac{\sqrt{330}i}{220}$ $-\frac{\sqrt{33}}{33}$ 0 0 0 0 $-\frac{\sqrt{22}}{44}$														
	0 $-\frac{3\sqrt{55}}{110}$ 0 0 $\frac{\sqrt{330}}{132}$ 0 $-\frac{\sqrt{330}i}{220}$ 0 0 $\frac{\sqrt{33}}{33}$ 0 0 $-\frac{\sqrt{22}}{44}$ 0														
	0 $-\frac{\sqrt{330}i}{220}$ 0 $-\frac{\sqrt{330}}{220}$ 0 0 $\frac{\sqrt{55}}{110}$ 0 0 $\frac{\sqrt{22}i}{44}$ 0 $-\frac{\sqrt{22}}{44}$ 0 0														
$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$															

982 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(B_{2g})$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	$\frac{3\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	
	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}}{220}$	0	
	0	0	0	0	0	$-\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{220}$	
	0	0	0	0	$\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	$-\frac{3\sqrt{55}}{110}$	$\frac{\sqrt{330}i}{220}$	0	0	
	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{220}$	$-\frac{\sqrt{55}}{110}$	0	0	
	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$\frac{\sqrt{55}}{110}$	0	
	0	$\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	$\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	
	$-\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	
	$\frac{3\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{132}$	$\frac{\sqrt{33}}{33}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	
	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{132}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{22}}{44}$	0	
	0	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{132}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{22}i}{44}$	
	0	0	0	$-\frac{3\sqrt{55}}{110}$	$\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	$\frac{\sqrt{33}}{33}$	$-\frac{\sqrt{22}i}{44}$	0	0	
	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{220}$	$-\frac{\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	
	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$\frac{\sqrt{55}}{110}$	0	0	$\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	0	

$$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$$

983 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{3\sqrt{385}}{1232}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	$-\frac{65\sqrt{231}}{3696}$	0	$-\frac{\sqrt{231}i}{231}$	$\frac{\sqrt{154}}{88}$	0	0	
	$\frac{3\sqrt{385}}{1232}$	0	0	0	0	$\frac{\sqrt{2310}}{616}$	0	0	$-\frac{65\sqrt{231}}{3696}$	0	$\frac{\sqrt{231}i}{231}$	0	0	$-\frac{\sqrt{154}}{88}$		
	0	0	0	$\frac{3\sqrt{385}}{1232}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$-\frac{5\sqrt{231}i}{462}$	0	$\frac{5\sqrt{231}}{3696}$	0	0	0	
	0	0	$\frac{3\sqrt{385}}{1232}$	0	0	0	0	$\frac{\sqrt{2310}}{616}$	$\frac{5\sqrt{231}i}{462}$	0	$\frac{5\sqrt{231}}{3696}$	0	0	0	0	
	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	$\frac{\sqrt{385}}{264}$	0	$\frac{\sqrt{385}i}{132}$	$\frac{5\sqrt{154}}{1848}$	0	0	0	0	$\frac{5\sqrt{231}}{1848}$		
	0	$\frac{\sqrt{2310}}{616}$	0	0	$\frac{\sqrt{385}}{264}$	0	$-\frac{\sqrt{385}i}{132}$	0	0	$-\frac{5\sqrt{154}}{1848}$	0	0	$\frac{5\sqrt{231}}{1848}$	0		
	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{\sqrt{385}i}{132}$	0	$-\frac{\sqrt{385}}{66}$	0	0	$\frac{19\sqrt{154}}{1848}$	0	0	$\frac{\sqrt{231}i}{924}$		
	0	0	0	$\frac{\sqrt{2310}}{616}$	$-\frac{\sqrt{385}i}{132}$	0	$-\frac{\sqrt{385}}{66}$	0	0	0	$-\frac{19\sqrt{154}}{1848}$	$-\frac{\sqrt{231}i}{924}$	0			
	0	$-\frac{65\sqrt{231}}{3696}$	0	$-\frac{5\sqrt{231}i}{462}$	$\frac{5\sqrt{154}}{1848}$	0	0	0	0	$-\frac{17\sqrt{385}}{3696}$	0	$-\frac{\sqrt{385}i}{462}$	$\frac{\sqrt{2310}}{616}$	0		
	$-\frac{65\sqrt{231}}{3696}$	0	$\frac{5\sqrt{231}i}{462}$	0	0	$-\frac{5\sqrt{154}}{1848}$	0	0	$-\frac{17\sqrt{385}}{3696}$	0	$\frac{\sqrt{385}i}{462}$	0	0	$-\frac{\sqrt{2310}}{616}$		
	0	$-\frac{\sqrt{231}i}{231}$	0	$\frac{5\sqrt{231}}{3696}$	0	0	$\frac{19\sqrt{154}}{1848}$	0	0	$-\frac{\sqrt{385}i}{462}$	0	$\frac{23\sqrt{385}}{3696}$	0	0	0	
	$\frac{\sqrt{231}i}{231}$	0	$\frac{5\sqrt{231}}{3696}$	0	0	0	$-\frac{19\sqrt{154}}{1848}$	$\frac{\sqrt{385}i}{462}$	0	$\frac{23\sqrt{385}}{3696}$	0	0	0	0		
	$\frac{\sqrt{154}}{88}$	0	0	0	0	$\frac{5\sqrt{231}}{1848}$	0	$\frac{\sqrt{231}i}{924}$	$\frac{\sqrt{2310}}{616}$	0	0	0	0	$\frac{3\sqrt{385}}{616}$		
	0	$-\frac{\sqrt{154}}{88}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	$-\frac{\sqrt{231}i}{924}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{3\sqrt{385}}{616}$	0		

$$-\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$$

984 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 1)$	0	$\frac{3\sqrt{385}i}{1232}$	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$-\frac{5\sqrt{231}i}{3696}$	0	$\frac{5\sqrt{231}}{462}$	0	0	0	
	$-\frac{3\sqrt{385}i}{1232}$	0	0	0	0	0	0	$\frac{\sqrt{2310}}{616}$	$\frac{5\sqrt{231}i}{3696}$	0	$\frac{5\sqrt{231}}{462}$	0	0	0	0	
	0	0	0	$\frac{3\sqrt{385}i}{1232}$	$\frac{\sqrt{2310}}{616}$	0	0	0	0	$\frac{\sqrt{231}}{231}$	0	$\frac{65\sqrt{231}i}{3696}$	$\frac{\sqrt{154}}{88}$	0	0	
	0	0	$-\frac{3\sqrt{385}i}{1232}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{\sqrt{231}}{231}$	0	$-\frac{65\sqrt{231}i}{3696}$	0	0	$-\frac{\sqrt{154}}{88}$	0	
	0	0	$\frac{\sqrt{2310}}{616}$	0	0	$\frac{\sqrt{385}i}{264}$	0	$-\frac{\sqrt{385}}{132}$	0	0	$\frac{5\sqrt{154}}{1848}$	0	0	$-\frac{5\sqrt{231}i}{1848}$	0	
	0	0	0	$-\frac{\sqrt{2310}}{616}$	$-\frac{\sqrt{385}i}{264}$	0	$-\frac{\sqrt{385}}{132}$	0	0	0	0	$-\frac{5\sqrt{154}}{1848}$	$\frac{5\sqrt{231}i}{1848}$	0	0	
	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	$-\frac{\sqrt{385}}{132}$	0	$-\frac{\sqrt{385}i}{66}$	$-\frac{19\sqrt{154}}{1848}$	0	0	0	0	0	$\frac{\sqrt{231}}{924}$	
	0	$\frac{\sqrt{2310}}{616}$	0	0	$-\frac{\sqrt{385}}{132}$	0	$\frac{\sqrt{385}i}{66}$	0	0	$\frac{19\sqrt{154}}{1848}$	0	0	$\frac{\sqrt{231}}{924}$	0	0	
	0	$-\frac{5\sqrt{231}i}{3696}$	0	$\frac{\sqrt{231}}{231}$	0	0	$-\frac{19\sqrt{154}}{1848}$	0	0	$\frac{23\sqrt{385}i}{3696}$	0	$-\frac{\sqrt{385}}{462}$	0	0	0	
	$\frac{5\sqrt{231}i}{3696}$	0	$\frac{\sqrt{231}}{231}$	0	0	0	0	$\frac{19\sqrt{154}}{1848}$	$-\frac{23\sqrt{385}i}{3696}$	0	$-\frac{\sqrt{385}}{462}$	0	0	0	0	
	0	$\frac{5\sqrt{231}}{462}$	0	$\frac{65\sqrt{231}i}{3696}$	$\frac{5\sqrt{154}}{1848}$	0	0	0	0	$-\frac{\sqrt{385}}{462}$	0	$-\frac{17\sqrt{385}i}{3696}$	$-\frac{\sqrt{2310}}{616}$	0	0	
	$\frac{5\sqrt{231}}{462}$	0	$-\frac{65\sqrt{231}i}{3696}$	0	0	$-\frac{5\sqrt{154}}{1848}$	0	0	$-\frac{\sqrt{385}}{462}$	0	$\frac{17\sqrt{385}i}{3696}$	0	0	$\frac{\sqrt{2310}}{616}$	0	
	0	0	$\frac{\sqrt{154}}{88}$	0	0	$-\frac{5\sqrt{231}i}{1848}$	0	$\frac{\sqrt{231}}{924}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{3\sqrt{385}i}{616}$	0	
$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$																

985 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{3\sqrt{11}}{176}$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	$\frac{\sqrt{165}}{176}$	0	$-\frac{\sqrt{165}i}{55}$	$-\frac{9\sqrt{110}}{440}$	0	
	$\frac{3\sqrt{11}}{176}$	0	0	0	0	$\frac{\sqrt{66}}{88}$	0	0	$\frac{\sqrt{165}}{176}$	0	$\frac{\sqrt{165}i}{55}$	0	0	$\frac{9\sqrt{110}}{440}$	
	0	0	0	$\frac{3\sqrt{11}}{176}$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$\frac{\sqrt{165}i}{110}$	0	$\frac{7\sqrt{165}}{880}$	0	0	
	0	0	$\frac{3\sqrt{11}}{176}$	0	0	0	0	$\frac{\sqrt{66}}{88}$	$-\frac{\sqrt{165}i}{110}$	0	$\frac{7\sqrt{165}}{880}$	0	0	0	
	$-\frac{\sqrt{66}}{88}$	0	0	0	0	$-\frac{3\sqrt{11}}{88}$	0	$\frac{\sqrt{11}i}{44}$	$\frac{7\sqrt{110}}{440}$	0	0	0	0	$-\frac{\sqrt{165}}{440}$	
	0	$\frac{\sqrt{66}}{88}$	0	0	$-\frac{3\sqrt{11}}{88}$	0	$-\frac{\sqrt{11}i}{44}$	0	0	$-\frac{7\sqrt{110}}{440}$	0	0	$-\frac{\sqrt{165}}{440}$	0	
	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$\frac{\sqrt{11}i}{44}$	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}}{440}$	0	0	$-\frac{\sqrt{165}i}{220}$	
	0	0	0	$\frac{\sqrt{66}}{88}$	$-\frac{\sqrt{11}i}{44}$	0	$-\frac{\sqrt{11}}{22}$	0	0	0	0	$-\frac{\sqrt{110}}{440}$	$\frac{\sqrt{165}i}{220}$	0	
	0	$\frac{\sqrt{165}}{176}$	0	$\frac{\sqrt{165}i}{110}$	$\frac{7\sqrt{110}}{440}$	0	0	0	0	$\frac{5\sqrt{11}}{176}$	0	$\frac{\sqrt{11}i}{22}$	$\frac{\sqrt{66}}{88}$	0	
	$\frac{\sqrt{165}}{176}$	0	$-\frac{\sqrt{165}i}{110}$	0	0	$-\frac{7\sqrt{110}}{440}$	0	0	$\frac{5\sqrt{11}}{176}$	0	$-\frac{\sqrt{11}i}{22}$	0	0	$-\frac{\sqrt{66}}{88}$	
	0	$-\frac{\sqrt{165}i}{55}$	0	$\frac{7\sqrt{165}}{880}$	0	0	$\frac{\sqrt{110}}{440}$	0	0	$\frac{\sqrt{11}i}{22}$	0	$-\frac{3\sqrt{11}}{176}$	0	0	
	$\frac{\sqrt{165}i}{55}$	0	$\frac{7\sqrt{165}}{880}$	0	0	0	0	$-\frac{\sqrt{110}}{440}$	$-\frac{\sqrt{11}i}{22}$	0	$-\frac{3\sqrt{11}}{176}$	0	0	0	
	$-\frac{9\sqrt{110}}{440}$	0	0	0	0	$-\frac{\sqrt{165}}{440}$	0	$-\frac{\sqrt{165}i}{220}$	$\frac{\sqrt{66}}{88}$	0	0	0	0	$\frac{3\sqrt{11}}{88}$	
	0	$\frac{9\sqrt{110}}{440}$	0	0	$-\frac{\sqrt{165}}{440}$	0	$\frac{\sqrt{165}i}{220}$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$\frac{3\sqrt{11}}{88}$	0	
$-\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$															

986 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	0	$\frac{3\sqrt{11}i}{176}$	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$-\frac{7\sqrt{165}i}{880}$	0	$-\frac{\sqrt{165}}{110}$	0	0	0
	$-\frac{3\sqrt{11}i}{176}$	0	0	0	0	0	0	$\frac{\sqrt{66}}{88}$	$\frac{7\sqrt{165}i}{880}$	0	$-\frac{\sqrt{165}}{110}$	0	0	0	0
	0	0	0	$\frac{3\sqrt{11}i}{176}$	$\frac{\sqrt{66}}{88}$	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	$-\frac{\sqrt{165}i}{176}$	$-\frac{9\sqrt{110}}{440}$	0	0
	0	0	$-\frac{3\sqrt{11}i}{176}$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$\frac{\sqrt{165}}{55}$	0	$\frac{\sqrt{165}i}{176}$	0	0	$\frac{9\sqrt{110}}{440}$	0
	0	0	$\frac{\sqrt{66}}{88}$	0	0	$-\frac{3\sqrt{11}i}{88}$	0	$-\frac{\sqrt{11}}{44}$	0	0	$\frac{7\sqrt{110}}{440}$	0	0	$\frac{\sqrt{165}i}{440}$	0
	0	0	0	$-\frac{\sqrt{66}}{88}$	$\frac{3\sqrt{11}i}{88}$	0	$-\frac{\sqrt{11}}{44}$	0	0	0	0	$-\frac{7\sqrt{110}}{440}$	$-\frac{\sqrt{165}i}{440}$	0	0
	$-\frac{\sqrt{66}}{88}$	0	0	0	0	$-\frac{\sqrt{11}}{44}$	0	$-\frac{\sqrt{11}i}{22}$	$-\frac{\sqrt{110}}{440}$	0	0	0	0	$-\frac{\sqrt{165}}{220}$	0
	0	$\frac{\sqrt{66}}{88}$	0	0	$-\frac{\sqrt{11}}{44}$	0	$\frac{\sqrt{11}i}{22}$	0	0	$\frac{\sqrt{110}}{440}$	0	0	$-\frac{\sqrt{165}}{220}$	0	0
	0	$-\frac{7\sqrt{165}i}{880}$	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}}{440}$	0	0	$-\frac{3\sqrt{11}i}{176}$	0	$\frac{\sqrt{11}}{22}$	0	0	0
	$\frac{7\sqrt{165}i}{880}$	0	$\frac{\sqrt{165}}{55}$	0	0	0	0	$\frac{\sqrt{110}}{440}$	$\frac{3\sqrt{11}i}{176}$	0	$\frac{\sqrt{11}}{22}$	0	0	0	0
	0	$-\frac{\sqrt{165}}{110}$	0	$-\frac{\sqrt{165}i}{176}$	$\frac{7\sqrt{110}}{440}$	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	$\frac{5\sqrt{11}i}{176}$	$-\frac{\sqrt{66}}{88}$	0	0
	$-\frac{\sqrt{165}}{110}$	0	$\frac{\sqrt{165}i}{176}$	0	0	$-\frac{7\sqrt{110}}{440}$	0	0	$\frac{\sqrt{11}}{22}$	0	$-\frac{5\sqrt{11}i}{176}$	0	0	$\frac{\sqrt{66}}{88}$	0
	0	0	$-\frac{9\sqrt{110}}{440}$	0	0	$\frac{\sqrt{165}i}{440}$	0	$-\frac{\sqrt{165}}{220}$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	$\frac{3\sqrt{11}i}{88}$	0
	0	0	0	$\frac{9\sqrt{110}}{440}$	$-\frac{\sqrt{165}i}{440}$	0	$-\frac{\sqrt{165}}{220}$	0	0	0	0	$\frac{\sqrt{66}}{88}$	$-\frac{3\sqrt{11}i}{88}$	0	0

$$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$$

987 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	0	$\frac{\sqrt{33}}{88}$	0	0	$-\frac{\sqrt{22}}{44}$	0	0	0	$\frac{\sqrt{55}}{440}$	0	$\frac{\sqrt{55}i}{55}$	$\frac{\sqrt{330}}{220}$	0	0	
	$\frac{\sqrt{33}}{88}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	0	$\frac{\sqrt{55}}{440}$	0	$-\frac{\sqrt{55}i}{55}$	0	0	$-\frac{\sqrt{330}}{220}$	
	0	0	0	$\frac{\sqrt{33}}{88}$	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{\sqrt{55}i}{55}$	0	$-\frac{13\sqrt{55}}{440}$	0	0	
	0	0	$\frac{\sqrt{33}}{88}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	$-\frac{\sqrt{55}i}{55}$	0	$-\frac{13\sqrt{55}}{440}$	0	0	0	
	$-\frac{\sqrt{22}}{44}$	0	0	0	0	$-\frac{7\sqrt{33}}{132}$	0	$-\frac{\sqrt{33}i}{33}$	$\frac{\sqrt{330}}{220}$	0	0	0	0	$\frac{\sqrt{55}}{220}$	
	0	$\frac{\sqrt{22}}{44}$	0	0	$-\frac{7\sqrt{33}}{132}$	0	$\frac{\sqrt{33}i}{33}$	0	0	$-\frac{\sqrt{330}}{220}$	0	0	$\frac{\sqrt{55}}{220}$	0	
	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$-\frac{\sqrt{33}i}{33}$	0	0	0	$\frac{\sqrt{330}}{132}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{22}}{44}$	$\frac{\sqrt{33}i}{33}$	0	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	
	0	$\frac{\sqrt{55}}{440}$	0	$\frac{\sqrt{55}i}{55}$	$\frac{\sqrt{330}}{220}$	0	0	0	0	$-\frac{\sqrt{33}}{88}$	0	0	$\frac{\sqrt{22}}{44}$	0	
	$\frac{\sqrt{55}}{440}$	0	$-\frac{\sqrt{55}i}{55}$	0	0	$-\frac{\sqrt{330}}{220}$	0	0	$-\frac{\sqrt{33}}{88}$	0	0	0	0	$-\frac{\sqrt{22}}{44}$	
	0	$\frac{\sqrt{55}i}{55}$	0	$-\frac{13\sqrt{55}}{440}$	0	0	$\frac{\sqrt{330}}{132}$	0	0	0	0	$\frac{5\sqrt{33}}{264}$	0	0	
	$-\frac{\sqrt{55}i}{55}$	0	$-\frac{13\sqrt{55}}{440}$	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	$\frac{5\sqrt{33}}{264}$	0	0	0	0	
	$\frac{\sqrt{330}}{220}$	0	0	0	$\frac{\sqrt{55}}{220}$	0	0	$\frac{\sqrt{22}}{44}$	0	0	0	0	$\frac{\sqrt{33}}{44}$	0	
	0	$-\frac{\sqrt{330}}{220}$	0	0	$\frac{\sqrt{55}}{220}$	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{\sqrt{33}}{44}$	0	0	

988 symmetry

$$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 3)$	0	$\frac{\sqrt{33}i}{88}$	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{13\sqrt{55}i}{440}$	0	$-\frac{\sqrt{55}}{55}$	0	0	0
	$-\frac{\sqrt{33}i}{88}$	0	0	0	0	0	0	$\frac{\sqrt{22}}{44}$	$-\frac{13\sqrt{55}i}{440}$	0	$-\frac{\sqrt{55}}{55}$	0	0	0	0
	0	0	0	$\frac{\sqrt{33}i}{88}$	$\frac{\sqrt{22}}{44}$	0	0	0	0	$-\frac{\sqrt{55}}{55}$	0	$-\frac{\sqrt{55}i}{440}$	$\frac{\sqrt{33}i}{220}$	0	0
	0	0	$-\frac{\sqrt{33}i}{88}$	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$-\frac{\sqrt{55}}{55}$	0	$\frac{\sqrt{55}i}{440}$	0	0	$-\frac{\sqrt{33}i}{220}$	0
	0	0	$\frac{\sqrt{22}}{44}$	0	0	$-\frac{7\sqrt{33}i}{132}$	0	$\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{33}i}{220}$	0	0	$-\frac{\sqrt{55}i}{220}$	0
	0	0	0	$-\frac{\sqrt{22}}{44}$	$\frac{7\sqrt{33}i}{132}$	0	$\frac{\sqrt{33}}{33}$	0	0	0	0	$-\frac{\sqrt{33}i}{220}$	$\frac{\sqrt{55}i}{220}$	0	0
	$-\frac{\sqrt{22}}{44}$	0	0	0	0	$\frac{\sqrt{33}}{33}$	0	0	$-\frac{\sqrt{33}i}{132}$	0	0	0	0	0	0
	0	$\frac{\sqrt{22}}{44}$	0	0	$\frac{\sqrt{33}}{33}$	0	0	0	0	$\frac{\sqrt{33}i}{132}$	0	0	0	0	0
	0	$\frac{13\sqrt{55}i}{440}$	0	$-\frac{\sqrt{55}}{55}$	0	0	$-\frac{\sqrt{33}i}{132}$	0	0	$\frac{5\sqrt{33}i}{264}$	0	0	0	0	0
	$-\frac{13\sqrt{55}i}{440}$	0	$-\frac{\sqrt{55}}{55}$	0	0	0	0	$\frac{\sqrt{33}i}{132}$	$-\frac{5\sqrt{33}i}{264}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{55}}{55}$	0	$-\frac{\sqrt{55}i}{440}$	$\frac{\sqrt{33}i}{220}$	0	0	0	0	0	0	$-\frac{\sqrt{33}i}{88}$	$-\frac{\sqrt{22}}{44}$	0	0
	$-\frac{\sqrt{55}}{55}$	0	$\frac{\sqrt{55}i}{440}$	0	0	$-\frac{\sqrt{33}i}{220}$	0	0	0	0	$\frac{\sqrt{33}i}{88}$	0	0	$\frac{\sqrt{22}}{44}$	0
	0	0	$\frac{\sqrt{33}i}{220}$	0	0	$-\frac{\sqrt{55}i}{220}$	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{\sqrt{33}i}{44}$	0
	0	0	0	$-\frac{\sqrt{33}i}{220}$	$\frac{\sqrt{55}i}{220}$	0	0	0	0	0	$\frac{\sqrt{22}}{44}$	$-\frac{\sqrt{33}i}{44}$	0	0	0

$$-\frac{\sqrt{231}xyz(x-y)(x+y)(3x^2+3y^2-10z^2)}{4}$$

989 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{1g})$	0	0 0 0 0 0 $-\frac{\sqrt{273}i}{364}$ 0 $-\frac{\sqrt{273}}{364}$ 0 0 $\frac{\sqrt{2730}}{364}$ 0 0 $-\frac{\sqrt{455}i}{182}$
	0	0 0 0 0 $\frac{\sqrt{273}i}{364}$ 0 $-\frac{\sqrt{273}}{364}$ 0 0 0 0 $-\frac{\sqrt{2730}}{364}$ $\frac{\sqrt{455}i}{182}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{273}}{364}$ 0 $\frac{\sqrt{273}i}{364}$ $\frac{\sqrt{2730}}{364}$ 0 0 0 0 $\frac{\sqrt{455}}{182}$
	0	0 0 0 0 $-\frac{\sqrt{273}}{364}$ 0 $-\frac{\sqrt{273}i}{364}$ 0 0 $-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{\sqrt{455}}{182}$ 0
	0	$-\frac{\sqrt{273}i}{364}$ 0 $-\frac{\sqrt{273}}{364}$ 0 0 $\frac{3\sqrt{182}}{182}$ 0 0 $-\frac{3\sqrt{455}i}{364}$ 0 $\frac{3\sqrt{455}}{364}$ 0 0
	$\frac{\sqrt{273}i}{364}$	0 $-\frac{\sqrt{273}}{364}$ 0 0 0 0 $-\frac{3\sqrt{182}}{182}$ $\frac{3\sqrt{455}i}{364}$ 0 $\frac{3\sqrt{455}}{364}$ 0 0 0
	0	$-\frac{\sqrt{273}}{364}$ 0 $\frac{\sqrt{273}i}{364}$ $\frac{3\sqrt{182}}{182}$ 0 0 0 0 $\frac{3\sqrt{455}}{364}$ 0 $\frac{3\sqrt{455}i}{364}$ 0 0
	$-\frac{\sqrt{273}}{364}$	0 $-\frac{\sqrt{273}i}{364}$ 0 0 $-\frac{3\sqrt{182}}{182}$ 0 0 $\frac{3\sqrt{455}}{364}$ 0 $-\frac{3\sqrt{455}i}{364}$ 0 0 0
	0	0 $\frac{\sqrt{2730}}{364}$ 0 0 $-\frac{3\sqrt{455}i}{364}$ 0 $\frac{3\sqrt{455}}{364}$ 0 0 0 0 0 0
	$\frac{\sqrt{2730}}{364}$	0 0 0 0 0 $\frac{3\sqrt{455}}{364}$ 0 $\frac{3\sqrt{455}i}{364}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{3\sqrt{455}}{364}$ 0 $-\frac{3\sqrt{455}i}{364}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{455}i}{182}$ 0 $\frac{\sqrt{455}}{182}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{455}i}{182}$	0 $\frac{\sqrt{455}}{182}$ 0 0 0 0 0 0 0 0 0 0 0 0
990	symmetry	$-\frac{z(35x^6 + 105x^4y^2 - 210x^4z^2 + 105x^2y^4 - 420x^2y^2z^2 + 168x^2z^4 + 35y^6 - 210y^4z^2 + 168y^2z^4 - 16z^6)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad \frac{\sqrt{143}i}{572} \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad \frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{858}}{1716} \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad \frac{\sqrt{143}i}{572} \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{143}}{572} \quad 0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0 \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{286} \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad -\frac{5\sqrt{858}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad -\frac{5\sqrt{858}}{572} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{143}i}{286}$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{858}}{572} \quad -\frac{5\sqrt{143}i}{286} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0 \quad \frac{5\sqrt{143}i}{286} \quad \frac{5\sqrt{858}}{429} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0 \quad -\frac{5\sqrt{143}i}{286} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{858}}{429}$	
991	symmetry	$-\frac{\sqrt{231}z(x^2-2xy-y^2)(x^2+2xy-y^2)(3x^2+3y^2-10z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 2)$	0	0	0	0	0	$-\frac{\sqrt{273}}{364}$	0	$\frac{\sqrt{273}i}{364}$	$\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{\sqrt{455}}{182}$		
	0	0	0	0	$-\frac{\sqrt{273}}{364}$	0	$-\frac{\sqrt{273}i}{364}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{\sqrt{455}}{182}$	0		
	0	0	0	0	0	$\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{\sqrt{455}i}{182}$		
	0	0	0	0	$-\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	0	0	$\frac{\sqrt{2730}}{364}$	$-\frac{\sqrt{455}i}{182}$	0		
	0	$-\frac{\sqrt{273}}{364}$	0	$\frac{\sqrt{273}i}{364}$	$\frac{3\sqrt{182}}{182}$	0	0	0	0	$\frac{3\sqrt{455}}{364}$	0	$\frac{3\sqrt{455}i}{364}$	0	0		
	$-\frac{\sqrt{273}}{364}$	0	$-\frac{\sqrt{273}i}{364}$	0	0	$-\frac{3\sqrt{182}}{182}$	0	0	$\frac{3\sqrt{455}}{364}$	0	$-\frac{3\sqrt{455}i}{364}$	0	0	0		
	0	$\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	$-\frac{3\sqrt{182}}{182}$	0	0	$\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0		
	$-\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	0	0	$\frac{3\sqrt{182}}{182}$	$-\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0		
	$\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{3\sqrt{455}}{364}$	0	$\frac{3\sqrt{455}i}{364}$	0	0	0	0	0	0		
	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{3\sqrt{455}}{364}$	0	$-\frac{3\sqrt{455}i}{364}$	0	0	0	0	0	0	0		
	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0	0	0	0		
	0	0	0	$\frac{\sqrt{2730}}{364}$	$-\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0	0	0	0	0		
	0	$\frac{\sqrt{455}}{182}$	0	$\frac{\sqrt{455}i}{182}$	0	0	0	0	0	0	0	0	0	0		
	$\frac{\sqrt{455}}{182}$	0	$-\frac{\sqrt{455}i}{182}$	0	0	0	0	0	0	0	0	0	0	0		

$$\frac{\sqrt{91}xyz(3x^4 - 5x^2y^2 - 5x^2z^2 + 3y^4 - 5y^2z^2 + 3z^4)}{2}$$

992 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_7^{(1,-1;a)}(B_{1g}, 1)$	0	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{3\sqrt{77}i}{154}$	0	$\frac{5\sqrt{77}}{308}$	0	0	$\frac{\sqrt{770}}{616}$	0	0	$-\frac{\sqrt{1155}i}{924}$	
	0	0	0	$-\frac{\sqrt{462}}{168}$	$\frac{3\sqrt{77}i}{154}$	0	$\frac{5\sqrt{77}}{308}$	0	0	0	$-\frac{\sqrt{770}}{616}$	$\frac{\sqrt{1155}i}{924}$	0	0	
	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	$\frac{5\sqrt{77}i}{308}$	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{924}$	
	0	$-\frac{\sqrt{462}}{168}$	0	0	$\frac{3\sqrt{77}}{154}$	0	$-\frac{5\sqrt{77}i}{308}$	0	0	$\frac{\sqrt{770}}{616}$	0	0	$-\frac{\sqrt{1155}}{924}$	0	
	0	$-\frac{3\sqrt{77}i}{154}$	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{3\sqrt{77}i}{154}$	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0	0	0	
	0	$\frac{5\sqrt{77}}{308}$	0	$\frac{5\sqrt{77}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{308}$	0	$\frac{\sqrt{1155}i}{308}$	$\frac{\sqrt{770}}{154}$	0	
	$\frac{5\sqrt{77}}{308}$	0	$-\frac{5\sqrt{77}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{308}$	0	$-\frac{\sqrt{1155}i}{308}$	0	0	$-\frac{\sqrt{770}}{154}$	
	0	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{308}$	0	0	$\frac{5\sqrt{462}}{616}$	0	0	$-\frac{5\sqrt{77}i}{308}$	
	0	0	0	$\frac{\sqrt{770}}{616}$	0	0	$-\frac{\sqrt{1155}}{308}$	0	0	0	$-\frac{5\sqrt{462}}{616}$	$\frac{5\sqrt{77}i}{308}$	0	0	
	$\frac{\sqrt{770}}{616}$	0	0	0	0	0	0	$\frac{\sqrt{1155}i}{308}$	$\frac{5\sqrt{462}}{616}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	
	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$-\frac{\sqrt{1155}i}{308}$	0	0	$-\frac{5\sqrt{462}}{616}$	0	0	$\frac{5\sqrt{77}}{308}$	0	
	0	$-\frac{\sqrt{1155}i}{924}$	0	$-\frac{\sqrt{1155}}{924}$	0	0	$\frac{\sqrt{770}}{154}$	0	0	$-\frac{5\sqrt{77}i}{308}$	0	$\frac{5\sqrt{77}}{308}$	0	0	
	$\frac{\sqrt{1155}i}{924}$	0	$-\frac{\sqrt{1155}}{924}$	0	0	0	0	$-\frac{\sqrt{770}}{154}$	$\frac{5\sqrt{77}i}{308}$	0	$\frac{5\sqrt{77}}{308}$	0	0	0	
993	symmetry	$\frac{\sqrt{77}xyz(3x^4 - 20x^2y^2 + 10x^2z^2 + 3y^4 + 10y^2z^2 - 6z^4)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_7^{(1,-1;a)}(B_{1g}, 2)$	0	0	$-\frac{\sqrt{546}}{168}$	0	0	$\frac{3\sqrt{91}i}{182}$	0	$-\frac{\sqrt{91}}{52}$	0	0	$\frac{\sqrt{910}}{728}$	0	0	$-\frac{\sqrt{1365}i}{1092}$	
	0	0	0	$\frac{\sqrt{546}}{168}$	$-\frac{3\sqrt{91}i}{182}$	0	$-\frac{\sqrt{91}}{52}$	0	0	0	$-\frac{\sqrt{910}}{728}$	$-\frac{\sqrt{910}}{728}$	$\frac{\sqrt{1365}i}{1092}$	0	
	$-\frac{\sqrt{546}}{168}$	0	0	0	0	$-\frac{3\sqrt{91}}{182}$	0	$-\frac{\sqrt{91}i}{52}$	$-\frac{\sqrt{910}}{728}$	0	0	0	0	$-\frac{\sqrt{1365}}{1092}$	
	0	$\frac{\sqrt{546}}{168}$	0	0	$-\frac{3\sqrt{91}}{182}$	0	$\frac{\sqrt{91}i}{52}$	0	0	$\frac{\sqrt{910}}{728}$	0	0	$-\frac{\sqrt{1365}}{1092}$	0	
	0	$\frac{3\sqrt{91}i}{182}$	0	$-\frac{3\sqrt{91}}{182}$	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{3\sqrt{91}i}{182}$	0	$-\frac{3\sqrt{91}}{182}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{91}}{52}$	0	$-\frac{\sqrt{91}i}{52}$	0	0	0	0	0	$-\frac{\sqrt{1365}}{364}$	0	$\frac{\sqrt{1365}i}{364}$	$\frac{\sqrt{910}}{182}$	0	
	$-\frac{\sqrt{91}}{52}$	0	$\frac{\sqrt{91}i}{52}$	0	0	0	0	0	$-\frac{\sqrt{1365}}{364}$	0	$-\frac{\sqrt{1365}i}{364}$	0	0	$-\frac{\sqrt{910}}{182}$	
	0	0	$-\frac{\sqrt{910}}{728}$	0	0	0	0	$-\frac{\sqrt{1365}}{364}$	0	0	$\frac{5\sqrt{546}}{728}$	0	0	$-\frac{5\sqrt{91}i}{364}$	
	0	0	0	$\frac{\sqrt{910}}{728}$	0	0	$-\frac{\sqrt{1365}}{364}$	0	0	0	$-\frac{5\sqrt{546}}{728}$	$\frac{5\sqrt{91}i}{364}$	0		
	$\frac{\sqrt{910}}{728}$	0	0	0	0	0	0	$\frac{\sqrt{1365}i}{364}$	$\frac{5\sqrt{546}}{728}$	0	0	0	0	$\frac{5\sqrt{91}}{364}$	
	0	$-\frac{\sqrt{910}}{728}$	0	0	0	0	$-\frac{\sqrt{1365}i}{364}$	0	0	$-\frac{5\sqrt{546}}{728}$	0	0	$\frac{5\sqrt{91}}{364}$	0	
	0	$-\frac{\sqrt{1365}i}{1092}$	0	$-\frac{\sqrt{1365}}{1092}$	0	0	$\frac{\sqrt{910}}{182}$	0	0	$-\frac{5\sqrt{91}i}{364}$	0	$\frac{5\sqrt{91}}{364}$	0	0	0
	$\frac{\sqrt{1365}i}{1092}$	0	$-\frac{\sqrt{1365}}{1092}$	0	0	0	$-\frac{\sqrt{910}}{182}$	$\frac{5\sqrt{91}i}{364}$	0	$\frac{5\sqrt{91}}{364}$	0	0	0	0	

994 symmetry

$$\frac{\sqrt{6006z(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}}{32}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(B_{2g}, 1)$	$\begin{bmatrix} \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
995	symmetry	$\frac{\sqrt{42}z(x-y)(x+y)(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(B_{2g}, 2)$	0 0 0 0 0 $\frac{\sqrt{6006}}{4004}$ 0 $-\frac{\sqrt{6006}i}{4004}$ $-\frac{\sqrt{15015}}{2002}$ 0 0 0 0 $-\frac{\sqrt{10010}}{2002}$	
	0 0 0 0 $\frac{\sqrt{6006}}{4004}$ 0 $\frac{\sqrt{6006}i}{4004}$ 0 0 $\frac{\sqrt{15015}}{2002}$ 0 0 $-\frac{\sqrt{10010}}{2002}$ 0	
	0 0 0 0 0 $\frac{\sqrt{6006}i}{4004}$ 0 $\frac{\sqrt{6006}}{4004}$ 0 0 $-\frac{\sqrt{15015}}{2002}$ 0 0 $\frac{\sqrt{10010}i}{2002}$	
	0 0 0 0 $-\frac{\sqrt{6006}i}{4004}$ 0 $\frac{\sqrt{6006}}{4004}$ 0 0 0 0 $\frac{\sqrt{15015}}{2002}$ $-\frac{\sqrt{10010}i}{2002}$ 0	
	0 $\frac{\sqrt{6006}}{4004}$ 0 $\frac{\sqrt{6006}i}{4004}$ 0 0 0 0 $-\frac{3\sqrt{10010}}{2002}$ 0 $\frac{3\sqrt{10010}i}{2002}$ $\frac{2\sqrt{15015}}{1001}$ 0	
	$\frac{\sqrt{6006}}{4004}$ 0 $-\frac{\sqrt{6006}i}{4004}$ 0 0 0 0 0 $-\frac{3\sqrt{10010}}{2002}$ 0 $-\frac{3\sqrt{10010}i}{2002}$ 0 0 $-\frac{2\sqrt{15015}}{1001}$	
	0 $-\frac{\sqrt{6006}i}{4004}$ 0 $\frac{\sqrt{6006}}{4004}$ 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6006}i}{4004}$ 0 $\frac{\sqrt{6006}}{4004}$ 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15015}}{2002}$ 0 0 0 0 $-\frac{3\sqrt{10010}}{2002}$ 0 0 $\frac{15\sqrt{1001}}{2002}$ 0 0 0 0 $\frac{5\sqrt{6006}}{2002}$	
	0 $\frac{\sqrt{15015}}{2002}$ 0 0 $-\frac{3\sqrt{10010}}{2002}$ 0 0 0 0 $-\frac{15\sqrt{1001}}{2002}$ 0 0 $\frac{5\sqrt{6006}}{2002}$ 0	
	0 0 $-\frac{\sqrt{15015}}{2002}$ 0 0 $\frac{3\sqrt{10010}i}{2002}$ 0 0 0 0 $-\frac{15\sqrt{1001}}{2002}$ 0 0 $\frac{5\sqrt{6006}i}{2002}$	
	0 0 0 $\frac{\sqrt{15015}}{2002}$ $-\frac{3\sqrt{10010}i}{2002}$ 0 0 0 0 0 0 $\frac{15\sqrt{1001}}{2002}$ $-\frac{5\sqrt{6006}i}{2002}$ 0	
	0 $-\frac{\sqrt{10010}}{2002}$ 0 $\frac{\sqrt{10010}i}{2002}$ $\frac{2\sqrt{15015}}{1001}$ 0 0 0 0 $\frac{5\sqrt{6006}}{2002}$ 0 $\frac{5\sqrt{6006}i}{2002}$ 0 0	
	$-\frac{\sqrt{10010}}{2002}$ 0 $-\frac{\sqrt{10010}i}{2002}$ 0 0 $-\frac{2\sqrt{15015}}{1001}$ 0 0 $\frac{5\sqrt{6006}}{2002}$ 0 $-\frac{5\sqrt{6006}i}{2002}$ 0 0 0	
$x(16x^6 - 168x^4y^2 - 168x^4z^2 + 210x^2y^4 + 420x^2y^2z^2 + 210x^2z^4 - 35y^6 - 105y^4z^2 - 105y^2z^4 - 35z^6)$ 16		

996 symmetry

$$x(16x^6 - 168x^4y^2 - 168x^4z^2 + 210x^2y^4 + 420x^2y^2z^2 + 210x^2z^4 - 35y^6 - 105y^4z^2 - 105y^2z^4 - 35z^6)$$

continued ...

Table 10

No.	multipole	matrix
$M_{7,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{59\sqrt{858}}{6864} \quad 0 \quad \frac{3\sqrt{858}i}{416} \quad -\frac{19\sqrt{143}}{2288} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{1430}}{2288} \quad 0 \quad -\frac{5\sqrt{1430}i}{4576} \quad \frac{3\sqrt{2145}}{2288} \quad 0$
	$\frac{59\sqrt{858}}{6864}$	$0 \quad -\frac{3\sqrt{858}i}{416} \quad 0 \quad 0 \quad \frac{19\sqrt{143}}{2288} \quad 0 \quad 0 \quad -\frac{7\sqrt{1430}}{2288} \quad 0 \quad \frac{5\sqrt{1430}i}{4576} \quad 0 \quad 0 \quad -\frac{3\sqrt{2145}}{2288}$
	0	$\frac{3\sqrt{858}i}{416} \quad 0 \quad -\frac{113\sqrt{858}}{13728} \quad 0 \quad 0 \quad \frac{7\sqrt{143}}{1144} \quad 0 \quad 0 \quad -\frac{7\sqrt{1430}i}{4576} \quad 0 \quad \frac{7\sqrt{1430}}{4576} \quad 0 \quad 0$
	$-\frac{3\sqrt{858}i}{416}$	$0 \quad -\frac{113\sqrt{858}}{13728} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{143}}{1144} \quad \frac{7\sqrt{1430}i}{4576} \quad 0 \quad \frac{7\sqrt{1430}}{4576} \quad 0 \quad 0 \quad 0$
	$-\frac{19\sqrt{143}}{2288}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{176} \quad 0 \quad -\frac{3\sqrt{858}i}{1144} \quad \frac{7\sqrt{2145}}{2288} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{1430}}{2288}$
	0	$\frac{19\sqrt{143}}{2288} \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{176} \quad 0 \quad \frac{3\sqrt{858}i}{1144} \quad 0 \quad 0 \quad -\frac{7\sqrt{2145}}{2288} \quad 0 \quad 0 \quad \frac{7\sqrt{1430}}{2288} \quad 0$
	0	$0 \quad \frac{7\sqrt{143}}{1144} \quad 0 \quad 0 \quad -\frac{3\sqrt{858}i}{1144} \quad 0 \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad -\frac{\sqrt{2145}}{1144} \quad 0 \quad 0 \quad \frac{\sqrt{1430}i}{1144}$
	0	$0 \quad 0 \quad -\frac{7\sqrt{143}}{1144} \quad \frac{3\sqrt{858}i}{1144} \quad 0 \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{1144} \quad -\frac{\sqrt{1430}i}{1144} \quad 0$
	0	$-\frac{7\sqrt{1430}}{2288} \quad 0 \quad -\frac{7\sqrt{1430}i}{4576} \quad \frac{7\sqrt{2145}}{2288} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{15\sqrt{858}}{2288} \quad 0 \quad \frac{5\sqrt{858}i}{4576} \quad -\frac{25\sqrt{143}}{2288} \quad 0$
	$-\frac{7\sqrt{1430}}{2288}$	$0 \quad \frac{7\sqrt{1430}i}{4576} \quad 0 \quad 0 \quad -\frac{7\sqrt{2145}}{2288} \quad 0 \quad 0 \quad \frac{15\sqrt{858}}{2288} \quad 0 \quad -\frac{5\sqrt{858}i}{4576} \quad 0 \quad 0 \quad \frac{25\sqrt{143}}{2288}$
	0	$-\frac{5\sqrt{1430}i}{4576} \quad 0 \quad \frac{7\sqrt{1430}}{4576} \quad 0 \quad 0 \quad -\frac{\sqrt{2145}}{1144} \quad 0 \quad 0 \quad \frac{5\sqrt{858}i}{4576} \quad 0 \quad -\frac{5\sqrt{858}}{4576} \quad 0 \quad 0$
	$\frac{5\sqrt{1430}i}{4576}$	$0 \quad \frac{7\sqrt{1430}}{4576} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{1144} \quad -\frac{5\sqrt{858}i}{4576} \quad 0 \quad -\frac{5\sqrt{858}}{4576} \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{2145}}{2288}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{1430}}{2288} \quad 0 \quad \frac{\sqrt{1430}i}{1144} \quad -\frac{25\sqrt{143}}{2288} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{25\sqrt{858}}{6864}$
	0	$-\frac{3\sqrt{2145}}{2288} \quad 0 \quad 0 \quad \frac{7\sqrt{1430}}{2288} \quad 0 \quad -\frac{\sqrt{1430}i}{1144} \quad 0 \quad 0 \quad \frac{25\sqrt{143}}{2288} \quad 0 \quad 0 \quad -\frac{25\sqrt{858}}{6864} \quad 0$

$$y(35x^6 - 210x^4y^2 + 105x^4z^2 + 168x^2y^4 - 420x^2y^2z^2 + 105x^2z^4 - 16y^6 + 168y^4z^2 - 210y^2z^4 + 35z^6)$$

16

997 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{113\sqrt{858}i}{13728}$	0	$\frac{3\sqrt{858}}{416}$	0	0	$\frac{7\sqrt{143}}{1144}$	0	0	$-\frac{7\sqrt{1430}i}{4576}$	0	$\frac{7\sqrt{1430}}{4576}$	0	0	0
	$\frac{113\sqrt{858}i}{13728}$	0	$\frac{3\sqrt{858}}{416}$	0	0	0	0	$-\frac{7\sqrt{143}}{1144}$	$\frac{7\sqrt{1430}i}{4576}$	0	$\frac{7\sqrt{1430}}{4576}$	0	0	0	
	0	$\frac{3\sqrt{858}}{416}$	0	$\frac{59\sqrt{858}i}{6864}$	$\frac{19\sqrt{143}}{2288}$	0	0	0	0	$\frac{5\sqrt{1430}}{4576}$	0	$\frac{7\sqrt{1430}i}{2288}$	$\frac{3\sqrt{2145}}{2288}$	0	
	$\frac{3\sqrt{858}}{416}$	0	$-\frac{59\sqrt{858}i}{6864}$	0	0	$-\frac{19\sqrt{143}}{2288}$	0	0	$\frac{5\sqrt{1430}}{4576}$	0	$-\frac{7\sqrt{1430}i}{2288}$	0	0	$-\frac{3\sqrt{2145}}{2288}$	
	0	0	$\frac{19\sqrt{143}}{2288}$	0	0	$-\frac{\sqrt{858}i}{176}$	0	$\frac{3\sqrt{858}}{1144}$	0	0	$\frac{7\sqrt{2145}}{2288}$	0	0	$-\frac{7\sqrt{1430}i}{2288}$	
	0	0	0	$-\frac{19\sqrt{143}}{2288}$	$\frac{\sqrt{858}i}{176}$	0	$\frac{3\sqrt{858}}{1144}$	0	0	0	$-\frac{7\sqrt{2145}}{2288}$	$\frac{7\sqrt{1430}i}{2288}$	0		
	$\frac{7\sqrt{143}}{1144}$	0	0	0	0	$\frac{3\sqrt{858}}{1144}$	0	$\frac{\sqrt{858}i}{286}$	$\frac{\sqrt{2145}}{1144}$	0	0	0	0	$\frac{\sqrt{1430}}{1144}$	
	0	$-\frac{7\sqrt{143}}{1144}$	0	0	$\frac{3\sqrt{858}}{1144}$	0	$-\frac{\sqrt{858}i}{286}$	0	0	$-\frac{\sqrt{2145}}{1144}$	0	0	$\frac{\sqrt{1430}}{1144}$	0	
	0	$-\frac{7\sqrt{1430}i}{4576}$	0	$\frac{5\sqrt{1430}}{4576}$	0	0	$\frac{\sqrt{2145}}{1144}$	0	0	$-\frac{5\sqrt{858}i}{4576}$	0	$\frac{5\sqrt{858}}{4576}$	0	0	
	$\frac{7\sqrt{1430}i}{4576}$	0	$\frac{5\sqrt{1430}}{4576}$	0	0	0	0	$-\frac{\sqrt{2145}}{1144}$	$\frac{5\sqrt{858}i}{4576}$	0	$\frac{5\sqrt{858}}{4576}$	0	0	0	
	0	$\frac{7\sqrt{1430}}{4576}$	0	$\frac{7\sqrt{1430}i}{2288}$	$\frac{7\sqrt{2145}}{2288}$	0	0	0	0	$\frac{5\sqrt{858}}{4576}$	0	$\frac{15\sqrt{858}i}{2288}$	$\frac{25\sqrt{143}}{2288}$	0	
	$\frac{7\sqrt{1430}}{4576}$	0	$-\frac{7\sqrt{1430}i}{2288}$	0	0	$-\frac{7\sqrt{2145}}{2288}$	0	0	$\frac{5\sqrt{858}}{4576}$	0	$-\frac{15\sqrt{858}i}{2288}$	0	0	$-\frac{25\sqrt{143}}{2288}$	
	0	0	$\frac{3\sqrt{2145}}{2288}$	0	0	$-\frac{7\sqrt{1430}i}{2288}$	0	$\frac{\sqrt{1430}}{1144}$	0	0	$\frac{25\sqrt{143}}{2288}$	0	0	$-\frac{25\sqrt{858}i}{6864}$	
	0	0	0	$-\frac{3\sqrt{2145}}{2288}$	$\frac{7\sqrt{1430}i}{2288}$	0	$\frac{\sqrt{1430}}{1144}$	0	0	0	$-\frac{25\sqrt{143}}{2288}$	$\frac{25\sqrt{858}i}{6864}$	0		

998 symmetry

$$\frac{\sqrt{231}x(10x^2 - 3y^2 - 3z^2)(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{9\sqrt{182}}{1456}$ 0 $\frac{29\sqrt{182}i}{2912}$ $\frac{11\sqrt{273}}{1456}$ 0 0 0 0 $\frac{3\sqrt{2730}}{1456}$ 0 $\frac{5\sqrt{2730}i}{2912}$ $-\frac{\sqrt{455}}{1456}$ 0
	$\frac{9\sqrt{182}}{1456}$	0 $-\frac{29\sqrt{182}i}{2912}$ 0 0 $-\frac{11\sqrt{273}}{1456}$ 0 0 $\frac{3\sqrt{2730}}{1456}$ 0 $-\frac{5\sqrt{2730}i}{2912}$ 0 0 $\frac{\sqrt{455}}{1456}$
	0	$\frac{29\sqrt{182}i}{2912}$ 0 $-\frac{15\sqrt{182}}{2912}$ 0 0 $-\frac{\sqrt{273}}{104}$ 0 0 $\frac{\sqrt{2730}i}{416}$ 0 $-\frac{\sqrt{2730}}{416}$ 0 0
	$-\frac{29\sqrt{182}i}{2912}$	0 $-\frac{15\sqrt{182}}{2912}$ 0 0 0 0 $\frac{\sqrt{273}}{104}$ $-\frac{\sqrt{2730}i}{416}$ 0 $-\frac{\sqrt{2730}}{416}$ 0 0
	$\frac{11\sqrt{273}}{1456}$	0 0 0 0 $\frac{15\sqrt{182}}{1456}$ 0 $\frac{9\sqrt{182}i}{728}$ $\frac{3\sqrt{455}}{1456}$ 0 0 0 0 $\frac{\sqrt{2730}}{1456}$
	0	$-\frac{11\sqrt{273}}{1456}$ 0 0 $\frac{15\sqrt{182}}{1456}$ 0 $-\frac{9\sqrt{182}i}{728}$ 0 0 $-\frac{3\sqrt{455}}{1456}$ 0 0 $\frac{\sqrt{2730}}{1456}$ 0
	0	0 $-\frac{\sqrt{273}}{104}$ 0 0 $\frac{9\sqrt{182}i}{728}$ 0 $-\frac{3\sqrt{182}}{182}$ 0 0 0 $\frac{3\sqrt{455}}{728}$ 0 0 $-\frac{\sqrt{2730}i}{728}$
	0	0 0 $\frac{\sqrt{273}}{104}$ $-\frac{9\sqrt{182}i}{728}$ 0 $-\frac{3\sqrt{182}}{182}$ 0 0 0 0 $-\frac{3\sqrt{455}}{728}$ $\frac{\sqrt{2730}i}{728}$ 0
	0	$\frac{3\sqrt{2730}}{1456}$ 0 $\frac{\sqrt{2730}i}{416}$ $\frac{3\sqrt{455}}{1456}$ 0 0 0 0 $\frac{15\sqrt{182}}{1456}$ 0 $-\frac{15\sqrt{182}i}{2912}$ $-\frac{15\sqrt{273}}{1456}$ 0
	$\frac{3\sqrt{2730}}{1456}$	0 $-\frac{\sqrt{2730}i}{416}$ 0 0 $-\frac{3\sqrt{455}}{1456}$ 0 0 $\frac{15\sqrt{182}}{1456}$ 0 $\frac{15\sqrt{182}i}{2912}$ 0 0 $\frac{15\sqrt{273}}{1456}$
	0	$\frac{5\sqrt{2730}i}{2912}$ 0 $-\frac{\sqrt{2730}}{416}$ 0 0 $\frac{3\sqrt{455}}{728}$ 0 0 $-\frac{15\sqrt{182}i}{2912}$ 0 $\frac{15\sqrt{182}}{2912}$ 0 0
	$-\frac{5\sqrt{2730}i}{2912}$	0 $-\frac{\sqrt{2730}}{416}$ 0 0 0 0 $-\frac{3\sqrt{455}}{728}$ $\frac{15\sqrt{182}i}{2912}$ 0 $\frac{15\sqrt{182}}{2912}$ 0 0
	$-\frac{\sqrt{455}}{1456}$	0 0 0 0 $\frac{\sqrt{2730}}{1456}$ 0 $-\frac{\sqrt{2730}i}{728}$ $-\frac{15\sqrt{273}}{1456}$ 0 0 0 0 $-\frac{15\sqrt{182}}{1456}$
	0	$\frac{\sqrt{455}}{1456}$ 0 0 $\frac{\sqrt{2730}}{1456}$ 0 $\frac{\sqrt{2730}i}{728}$ 0 0 $\frac{15\sqrt{273}}{1456}$ 0 0 $-\frac{15\sqrt{182}}{1456}$ 0

999 symmetry

$$\frac{\sqrt{231}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)(3x^2 - 10y^2 + 3z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{15\sqrt{182}i}{2912}$	0	$\frac{29\sqrt{182}}{2912}$	0	0	$-\frac{\sqrt{273}}{104}$	0	0	$\frac{\sqrt{2730}i}{416}$	0	$-\frac{\sqrt{2730}}{416}$	0	0	0	0
	$\frac{15\sqrt{182}i}{2912}$	0	$\frac{29\sqrt{182}}{2912}$	0	0	0	0	$\frac{\sqrt{273}}{104}$	$-\frac{\sqrt{2730}i}{416}$	0	$-\frac{\sqrt{2730}}{416}$	0	0	0	0	0
	0	$\frac{29\sqrt{182}}{2912}$	0	$\frac{9\sqrt{182}i}{1456}$	$-\frac{11\sqrt{273}}{1456}$	0	0	0	0	$-\frac{5\sqrt{2730}}{2912}$	0	$-\frac{3\sqrt{2730}i}{1456}$	$-\frac{\sqrt{455}}{1456}$	0	0	0
	$\frac{29\sqrt{182}}{2912}$	0	$-\frac{9\sqrt{182}i}{1456}$	0	0	$\frac{11\sqrt{273}}{1456}$	0	0	$-\frac{5\sqrt{2730}}{2912}$	0	$\frac{3\sqrt{2730}i}{1456}$	0	0	0	$\frac{\sqrt{455}}{1456}$	0
	0	0	$-\frac{11\sqrt{273}}{1456}$	0	0	$\frac{15\sqrt{182}i}{1456}$	0	$-\frac{9\sqrt{182}}{728}$	0	0	$\frac{3\sqrt{455}}{1456}$	0	0	0	$-\frac{\sqrt{2730}i}{1456}$	0
	0	0	0	$\frac{11\sqrt{273}}{1456}$	$-\frac{15\sqrt{182}i}{1456}$	0	$-\frac{9\sqrt{182}}{728}$	0	0	0	0	$-\frac{3\sqrt{455}}{1456}$	$\frac{\sqrt{2730}i}{1456}$	0	0	0
	$-\frac{\sqrt{273}}{104}$	0	0	0	0	$-\frac{9\sqrt{182}}{728}$	0	$-\frac{3\sqrt{182}i}{182}$	$-\frac{3\sqrt{455}}{728}$	0	0	0	0	0	$-\frac{\sqrt{2730}}{728}$	0
	0	$\frac{\sqrt{273}}{104}$	0	0	$-\frac{9\sqrt{182}}{728}$	0	$\frac{3\sqrt{182}i}{182}$	0	0	$\frac{3\sqrt{455}}{728}$	0	0	$-\frac{\sqrt{2730}}{728}$	0	0	0
	0	$\frac{\sqrt{2730}i}{416}$	0	$-\frac{5\sqrt{2730}}{2912}$	0	0	$-\frac{3\sqrt{455}}{728}$	0	0	$\frac{15\sqrt{182}i}{2912}$	0	$-\frac{15\sqrt{182}}{2912}$	0	0	0	0
	$-\frac{\sqrt{2730}i}{416}$	0	$-\frac{5\sqrt{2730}}{2912}$	0	0	0	0	$\frac{3\sqrt{455}}{728}$	$-\frac{15\sqrt{182}i}{2912}$	0	$-\frac{15\sqrt{182}}{2912}$	0	0	0	0	0
	0	$-\frac{\sqrt{2730}}{416}$	0	$-\frac{3\sqrt{2730}i}{1456}$	$\frac{3\sqrt{455}}{1456}$	0	0	0	0	$-\frac{15\sqrt{182}}{2912}$	0	$\frac{15\sqrt{182}i}{1456}$	$\frac{15\sqrt{273}}{1456}$	0	0	0
	$-\frac{\sqrt{2730}}{416}$	0	$\frac{3\sqrt{2730}i}{1456}$	0	0	$-\frac{3\sqrt{455}}{1456}$	0	0	$-\frac{15\sqrt{182}}{2912}$	0	$-\frac{15\sqrt{182}i}{1456}$	0	0	0	$-\frac{15\sqrt{273}}{1456}$	0
	0	0	$-\frac{\sqrt{455}}{1456}$	0	0	$-\frac{\sqrt{2730}i}{1456}$	0	$-\frac{\sqrt{2730}}{728}$	0	0	$\frac{15\sqrt{273}}{1456}$	0	0	0	$-\frac{15\sqrt{182}i}{1456}$	0
	0	0	0	$\frac{\sqrt{455}}{1456}$	$\frac{\sqrt{2730}i}{1456}$	0	$-\frac{\sqrt{2730}}{728}$	0	0	0	0	$-\frac{15\sqrt{273}}{1456}$	$\frac{15\sqrt{182}i}{1456}$	0	0	0
1000	symmetry	$\frac{\sqrt{6006}x(y-z)(y+z)(y^2-4yz+z^2)(y^2+4yz+z^2)}{32}$														

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 3)$	0	0	0	$-\frac{3\sqrt{7}i}{224}$	$-\frac{3\sqrt{42}}{224}$	0	0	0	0	0	$-\frac{3\sqrt{105}i}{224}$	$-\frac{3\sqrt{70}}{224}$	0				
	0	0	$\frac{3\sqrt{7}i}{224}$	0	0	$\frac{3\sqrt{42}}{224}$	0	0	0	0	$\frac{3\sqrt{105}i}{224}$	0	0	$\frac{3\sqrt{70}}{224}$			
	0	$-\frac{3\sqrt{7}i}{224}$	0	$\frac{\sqrt{7}}{224}$	0	0	$\frac{\sqrt{42}}{112}$	0	0	$-\frac{\sqrt{105}i}{224}$	0	$\frac{\sqrt{105}}{224}$	0	0	0		
	$\frac{3\sqrt{7}i}{224}$	0	$\frac{\sqrt{7}}{224}$	0	0	0	0	$-\frac{\sqrt{42}}{112}$	$\frac{\sqrt{105}i}{224}$	0	$\frac{\sqrt{105}}{224}$	0	0	0	0		
	$-\frac{3\sqrt{42}}{224}$	0	0	0	0	$-\frac{3\sqrt{7}}{112}$	0	$-\frac{3\sqrt{7}i}{56}$	$-\frac{3\sqrt{70}}{224}$	0	0	0	0	$-\frac{\sqrt{105}}{112}$			
	0	$\frac{3\sqrt{42}}{224}$	0	0	$-\frac{3\sqrt{7}}{112}$	0	$\frac{3\sqrt{7}i}{56}$	0	0	0	$\frac{3\sqrt{70}}{224}$	0	0	$-\frac{\sqrt{105}}{112}$	0		
	0	0	$\frac{\sqrt{42}}{112}$	0	0	$-\frac{3\sqrt{7}i}{56}$	0	0	0	0	$\frac{3\sqrt{70}}{112}$	0	0	$-\frac{\sqrt{105}i}{56}$			
	0	0	0	$-\frac{\sqrt{42}}{112}$	$\frac{3\sqrt{7}i}{56}$	0	0	0	0	0	0	$-\frac{3\sqrt{70}}{112}$	$\frac{\sqrt{105}i}{56}$	0			
	0	0	0	$-\frac{\sqrt{105}i}{224}$	$-\frac{3\sqrt{70}}{224}$	0	0	0	0	0	0	$-\frac{15\sqrt{7}i}{224}$	$-\frac{5\sqrt{42}}{224}$	0			
	0	0	$\frac{\sqrt{105}i}{224}$	0	0	$\frac{3\sqrt{70}}{224}$	0	0	0	0	$\frac{15\sqrt{7}i}{224}$	0	0	$\frac{5\sqrt{42}}{224}$			
	0	$-\frac{3\sqrt{105}i}{224}$	0	$\frac{\sqrt{105}}{224}$	0	0	$\frac{3\sqrt{70}}{112}$	0	0	$-\frac{15\sqrt{7}i}{224}$	0	$\frac{15\sqrt{7}}{224}$	0	0	0		
	$\frac{3\sqrt{105}i}{224}$	0	$\frac{\sqrt{105}}{224}$	0	0	0	0	$-\frac{3\sqrt{70}}{112}$	$\frac{15\sqrt{7}i}{224}$	0	$\frac{15\sqrt{7}}{224}$	0	0	0	0		
	$-\frac{3\sqrt{70}}{224}$	0	0	0	$-\frac{\sqrt{105}}{112}$	0	$-\frac{\sqrt{105}i}{56}$	$-\frac{5\sqrt{42}}{224}$	0	0	0	0	$-\frac{5\sqrt{7}}{112}$				
	0	$\frac{3\sqrt{70}}{224}$	0	0	$-\frac{\sqrt{105}}{112}$	0	$\frac{\sqrt{105}i}{56}$	0	0	$\frac{5\sqrt{42}}{224}$	0	0	$-\frac{5\sqrt{7}}{112}$	0			
1001	symmetry	$-\frac{\sqrt{6006}y(x-z)(x+z)(x^2-4xz+z^2)(x^2+4xz+z^2)}{32}$															

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 3)$	0	$\frac{\sqrt{7}i}{224}$ 0 $-\frac{3\sqrt{7}}{224}$ 0 0 $\frac{\sqrt{42}}{112}$ 0 0 $-\frac{\sqrt{105}i}{224}$ 0 $\frac{\sqrt{105}}{224}$ 0 0
	$-\frac{\sqrt{7}i}{224}$	0 $-\frac{3\sqrt{7}}{224}$ 0 0 0 0 $-\frac{\sqrt{42}}{112}$ $\frac{\sqrt{105}i}{224}$ 0 $\frac{\sqrt{105}}{224}$ 0 0 0
	0	$-\frac{3\sqrt{7}}{224}$ 0 0 $\frac{3\sqrt{42}}{224}$ 0 0 0 0 $\frac{3\sqrt{105}}{224}$ 0 0 $-\frac{3\sqrt{70}}{224}$ 0
	$-\frac{3\sqrt{7}}{224}$	0 0 0 0 0 $-\frac{3\sqrt{42}}{224}$ 0 0 $\frac{3\sqrt{105}}{224}$ 0 0 0 $\frac{3\sqrt{70}}{224}$
	0	0 $\frac{3\sqrt{42}}{224}$ 0 0 $-\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 $-\frac{3\sqrt{70}}{224}$ 0 0 $\frac{\sqrt{105}i}{112}$
	0	0 0 0 $-\frac{3\sqrt{42}}{224}$ $\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 $\frac{3\sqrt{70}}{224}$ $-\frac{\sqrt{105}i}{112}$ 0
	$\frac{\sqrt{42}}{112}$	0 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 $-\frac{3\sqrt{70}}{112}$ 0 0 0 0 $-\frac{\sqrt{105}}{56}$
	0	$-\frac{\sqrt{42}}{112}$ 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 0 $\frac{3\sqrt{70}}{112}$ 0 0 $-\frac{\sqrt{105}}{56}$ 0
	0	$-\frac{\sqrt{105}i}{224}$ 0 $\frac{3\sqrt{105}}{224}$ 0 0 $-\frac{3\sqrt{70}}{112}$ 0 0 $\frac{15\sqrt{7}i}{224}$ 0 $-\frac{15\sqrt{7}}{224}$ 0 0
	$\frac{\sqrt{105}i}{224}$	0 $\frac{3\sqrt{105}}{224}$ 0 0 0 0 $\frac{3\sqrt{70}}{112}$ $-\frac{15\sqrt{7}i}{224}$ 0 $-\frac{15\sqrt{7}}{224}$ 0 0 0
	0	$\frac{\sqrt{105}}{224}$ 0 0 $-\frac{3\sqrt{70}}{224}$ 0 0 0 0 $-\frac{15\sqrt{7}}{224}$ 0 0 $\frac{5\sqrt{42}}{224}$ 0
	$\frac{\sqrt{105}}{224}$	0 0 0 0 0 $\frac{3\sqrt{70}}{224}$ 0 0 $-\frac{15\sqrt{7}}{224}$ 0 0 0 0 $-\frac{5\sqrt{42}}{224}$
	0	0 $-\frac{3\sqrt{70}}{224}$ 0 0 $\frac{\sqrt{105}i}{112}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 $\frac{5\sqrt{42}}{224}$ 0 0 $-\frac{5\sqrt{7}i}{112}$
	0	0 0 0 $\frac{3\sqrt{70}}{224}$ $-\frac{\sqrt{105}i}{112}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 0 $-\frac{5\sqrt{42}}{224}$ $\frac{5\sqrt{7}i}{112}$ 0
1002	symmetry	$\frac{\sqrt{42}x(y-z)(y+z)(48x^4 - 80x^2y^2 - 80x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 4)$	0	$-\frac{15\sqrt{1001}}{2002}$	0	$-\frac{23\sqrt{1001}i}{2912}$	$-\frac{\sqrt{6006}}{2464}$	0	0	0	0	$-\frac{\sqrt{15015}}{2002}$	0	$\frac{3\sqrt{15015}i}{32032}$	$\frac{19\sqrt{10010}}{32032}$	0		
	$-\frac{15\sqrt{1001}}{2002}$	0	$\frac{23\sqrt{1001}i}{2912}$	0	0	$\frac{\sqrt{6006}}{2464}$	0	0	$-\frac{\sqrt{15015}}{2002}$	0	$-\frac{3\sqrt{15015}i}{32032}$	0	0	$-\frac{19\sqrt{10010}}{32032}$		
	0	$-\frac{23\sqrt{1001}i}{2912}$	0	$\frac{255\sqrt{1001}}{32032}$	0	0	$-\frac{\sqrt{6006}}{16016}$	0	0	$\frac{\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	0	
	$\frac{23\sqrt{1001}i}{2912}$	0	$\frac{255\sqrt{1001}}{32032}$	0	0	0	0	$\frac{\sqrt{6006}}{16016}$	$-\frac{\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	0	0	
	$-\frac{\sqrt{6006}}{2464}$	0	0	0	0	$-\frac{45\sqrt{1001}}{16016}$	0	$\frac{3\sqrt{1001}i}{8008}$	$\frac{51\sqrt{10010}}{32032}$	0	0	0	0	$\frac{17\sqrt{15015}}{16016}$		
	0	$\frac{\sqrt{6006}}{2464}$	0	0	$-\frac{45\sqrt{1001}}{16016}$	0	$-\frac{3\sqrt{1001}i}{8008}$	0	0	$-\frac{51\sqrt{10010}}{32032}$	0	0	$\frac{17\sqrt{15015}}{16016}$	0		
	0	0	$-\frac{\sqrt{6006}}{16016}$	0	0	$\frac{3\sqrt{1001}i}{8008}$	0	0	0	0	$-\frac{3\sqrt{10010}}{16016}$	0	0	$\frac{\sqrt{15015}i}{8008}$		
	0	0	0	$\frac{\sqrt{6006}}{16016}$	$-\frac{3\sqrt{1001}i}{8008}$	0	0	0	0	0	$\frac{3\sqrt{10010}}{16016}$	$-\frac{\sqrt{15015}i}{8008}$	0			
	0	$-\frac{\sqrt{15015}}{2002}$	0	$\frac{\sqrt{15015}i}{32032}$	$\frac{51\sqrt{10010}}{32032}$	0	0	0	0	$\frac{15\sqrt{1001}}{2002}$	0	$\frac{15\sqrt{1001}i}{32032}$	$-\frac{75\sqrt{6006}}{32032}$	0		
	$-\frac{\sqrt{15015}}{2002}$	0	$-\frac{\sqrt{15015}i}{32032}$	0	0	$-\frac{51\sqrt{10010}}{32032}$	0	0	$\frac{15\sqrt{1001}}{2002}$	0	$-\frac{15\sqrt{1001}i}{32032}$	0	0	$\frac{75\sqrt{6006}}{32032}$		
	0	$\frac{3\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	$-\frac{3\sqrt{10010}}{16016}$	0	0	$\frac{15\sqrt{1001}i}{32032}$	0	$-\frac{15\sqrt{1001}}{32032}$	0	0		
	$-\frac{3\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	0	0	$\frac{3\sqrt{10010}}{16016}$	$-\frac{15\sqrt{1001}i}{32032}$	0	$-\frac{15\sqrt{1001}}{32032}$	0	0	0		
	$\frac{19\sqrt{10010}}{32032}$	0	0	0	0	$\frac{17\sqrt{15015}}{16016}$	0	$\frac{\sqrt{15015}i}{8008}$	$-\frac{75\sqrt{6006}}{32032}$	0	0	0	0	$-\frac{75\sqrt{1001}}{16016}$		
	0	$-\frac{19\sqrt{10010}}{32032}$	0	0	$\frac{17\sqrt{15015}}{16016}$	0	$-\frac{\sqrt{15015}i}{8008}$	0	0	$\frac{75\sqrt{6006}}{32032}$	0	0	$-\frac{75\sqrt{1001}}{16016}$	0		
1003	symmetry	$\frac{\sqrt{42}y(x-z)(x+z)(15x^4 - 80x^2y^2 + 30x^2z^2 + 48y^4 - 80y^2z^2 + 15z^4)}{32}$														

continued ...

Table 10

No.	multipole	matrix														
$M_{7,2}^{(1,-1;a)}(E_g, 4)$	0	$\frac{255\sqrt{1001}i}{32032}$	0	$-\frac{23\sqrt{1001}}{2912}$	0	0	$-\frac{\sqrt{6006}}{16016}$	0	0	$\frac{\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	0	
	$-\frac{255\sqrt{1001}i}{32032}$	0	$-\frac{23\sqrt{1001}}{2912}$	0	0	0	0	$\frac{\sqrt{6006}}{16016}$	$-\frac{\sqrt{15015}i}{32032}$	0	$-\frac{\sqrt{15015}}{32032}$	0	0	0	0	
	0	$-\frac{23\sqrt{1001}}{2912}$	0	$-\frac{15\sqrt{1001}i}{2002}$	$\frac{\sqrt{6006}}{2464}$	0	0	0	0	$-\frac{3\sqrt{15015}}{32032}$	0	$\frac{\sqrt{15015}i}{2002}$	$\frac{19\sqrt{10010}}{32032}$	0	0	
	$-\frac{23\sqrt{1001}}{2912}$	0	$\frac{15\sqrt{1001}i}{2002}$	0	0	$-\frac{\sqrt{6006}}{2464}$	0	0	$-\frac{3\sqrt{15015}}{32032}$	0	$-\frac{\sqrt{15015}i}{2002}$	0	0	$-\frac{19\sqrt{10010}}{32032}$	0	
	0	0	$\frac{\sqrt{6006}}{2464}$	0	0	$-\frac{45\sqrt{1001}i}{16016}$	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	$\frac{51\sqrt{10010}}{32032}$	0	0	$-\frac{17\sqrt{15015}i}{16016}$	0	
	0	0	0	$-\frac{\sqrt{6006}}{2464}$	$\frac{45\sqrt{1001}i}{16016}$	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	0	$-\frac{51\sqrt{10010}}{32032}$	$\frac{17\sqrt{15015}i}{16016}$	0	0	0	0
	$-\frac{\sqrt{6006}}{16016}$	0	0	0	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	$\frac{3\sqrt{10010}}{16016}$	0	0	0	0	$\frac{\sqrt{15015}}{8008}$	0	
	0	$\frac{\sqrt{6006}}{16016}$	0	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	0	$-\frac{3\sqrt{10010}}{16016}$	0	0	0	$\frac{\sqrt{15015}}{8008}$	0	0	
	0	$\frac{\sqrt{15015}i}{32032}$	0	$-\frac{3\sqrt{15015}}{32032}$	0	0	$\frac{3\sqrt{10010}}{16016}$	0	0	$-\frac{15\sqrt{1001}i}{32032}$	0	$\frac{15\sqrt{1001}}{32032}$	0	0	0	0
	$-\frac{\sqrt{15015}i}{32032}$	0	$-\frac{3\sqrt{15015}}{32032}$	0	0	0	0	$-\frac{3\sqrt{10010}}{16016}$	$\frac{15\sqrt{1001}i}{32032}$	0	$\frac{15\sqrt{1001}}{32032}$	0	0	0	0	0
	0	$-\frac{\sqrt{15015}}{32032}$	0	$\frac{\sqrt{15015}i}{2002}$	$\frac{51\sqrt{10010}}{32032}$	0	0	0	0	$\frac{15\sqrt{1001}}{32032}$	0	$\frac{15\sqrt{1001}i}{2002}$	$\frac{75\sqrt{6006}}{32032}$	0	0	0
	$-\frac{\sqrt{15015}}{32032}$	0	$-\frac{\sqrt{15015}i}{2002}$	0	0	$-\frac{51\sqrt{10010}}{32032}$	0	0	$\frac{15\sqrt{1001}}{32032}$	0	$-\frac{15\sqrt{1001}i}{2002}$	0	0	$-\frac{75\sqrt{6006}}{32032}$	0	
	0	0	$\frac{19\sqrt{10010}}{32032}$	0	0	$-\frac{17\sqrt{15015}i}{16016}$	0	$\frac{\sqrt{15015}}{8008}$	0	0	$\frac{75\sqrt{6006}}{32032}$	0	0	$-\frac{75\sqrt{1001}i}{16016}$	0	0
	0	0	0	$-\frac{19\sqrt{10010}}{32032}$	$\frac{17\sqrt{15015}i}{16016}$	0	$\frac{\sqrt{15015}}{8008}$	0	0	0	0	$-\frac{75\sqrt{6006}}{32032}$	$\frac{75\sqrt{1001}i}{16016}$	0	0	0

1004 symmetry

z

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_1^{(1,1;a)}(A_{2g})$	$-\frac{\sqrt{105}}{42}$	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{105}}{42}$	0	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{105}}{42}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{105}}{42}$	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0
	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0
	0	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0
	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	$\frac{\sqrt{105}}{70}$	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{56}$	0	0	$-\frac{\sqrt{105}}{70}$	0	0	$\frac{\sqrt{70}}{140}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	$\frac{\sqrt{105}}{70}$	0	0	$-\frac{\sqrt{70}i}{140}$	0
	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0	$-\frac{\sqrt{105}}{70}$	$\frac{\sqrt{70}i}{140}$	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	$-\frac{\sqrt{70}i}{140}$	$\frac{2\sqrt{105}}{105}$	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	$\frac{\sqrt{70}i}{140}$	0	0	0	$-\frac{2\sqrt{105}}{105}$	0

1005 symmetry

x

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0	$\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0
	$\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0
	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{70}}{56}$	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0
	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{70}}{56}$	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0
	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	0	0	0	0	$-\frac{\sqrt{7}}{14}$
	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	0	0	$-\frac{\sqrt{7}}{14}$	0
	0	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	0	0	$\frac{\sqrt{7}i}{14}$	
	0	0	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	$-\frac{\sqrt{7}i}{14}$	0		
	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	$\frac{\sqrt{42}}{56}$	0	0	0	0	$\frac{\sqrt{105}}{140}$	0	$-\frac{\sqrt{105}i}{70}$	$\frac{\sqrt{70}}{140}$	0	
	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	$-\frac{\sqrt{42}}{56}$	0	0	$\frac{\sqrt{105}}{140}$	0	$\frac{\sqrt{105}i}{70}$	0	0	$-\frac{\sqrt{70}}{140}$	
	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{42}}{56}$	0	0	$-\frac{\sqrt{105}i}{70}$	0	$-\frac{3\sqrt{105}}{140}$	0	0	
	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{42}}{56}$	$\frac{\sqrt{105}i}{70}$	0	$-\frac{3\sqrt{105}}{140}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{7}}{14}$	0	$\frac{\sqrt{7}i}{14}$	$\frac{\sqrt{70}}{140}$	0	0	0	0	$-\frac{\sqrt{105}}{105}$	
	0	0	0	0	$-\frac{\sqrt{7}}{14}$	0	$-\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{70}}{140}$	0	0	0	$-\frac{\sqrt{105}}{105}$	0

1006 symmetry

-y

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0
	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	$-\frac{\sqrt{70}}{56}$	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0
	0	0	0	$\frac{\sqrt{105}i}{84}$	$-\frac{\sqrt{70}}{56}$	0	0	0	$\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0
	0	0	$-\frac{\sqrt{105}i}{84}$	0	0	$\frac{\sqrt{70}}{56}$	0	0	$\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	0
	0	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	0	$\frac{\sqrt{7}i}{14}$	0
	0	0	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	$-\frac{\sqrt{7}i}{14}$	0	0
	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	0	0	0	$\frac{\sqrt{7}}{14}$	0
	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	0	0	$\frac{\sqrt{7}}{14}$	0	0
	0	$\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{42}}{56}$	0	0	$-\frac{3\sqrt{105}i}{140}$	0	$-\frac{\sqrt{105}}{70}$	0	0	0
	$-\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	$\frac{\sqrt{42}}{56}$	$\frac{3\sqrt{105}i}{140}$	0	$-\frac{\sqrt{105}}{70}$	0	0	0	0
	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	$\frac{\sqrt{42}}{56}$	0	0	0	0	$-\frac{\sqrt{105}}{70}$	0	$\frac{\sqrt{105}i}{140}$	$-\frac{\sqrt{70}}{140}$	0	0
	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	$-\frac{\sqrt{42}}{56}$	0	0	$-\frac{\sqrt{105}}{70}$	0	$-\frac{\sqrt{105}i}{140}$	0	0	$\frac{\sqrt{70}}{140}$	0
	0	0	0	0	0	$\frac{\sqrt{7}i}{14}$	0	$\frac{\sqrt{7}}{14}$	0	0	$-\frac{\sqrt{70}}{140}$	0	0	$-\frac{\sqrt{105}i}{105}$	0
	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	0	$\frac{\sqrt{7}}{14}$	0	0	0	0	$\frac{\sqrt{70}}{140}$	$\frac{\sqrt{105}i}{105}$	0	0

1007 symmetry

$$-\frac{z(3x^2+3y^2-2z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{2g})$	$\frac{\sqrt{77}}{77}$	0 0 0 0 0 $-\frac{5\sqrt{462}}{924}$ 0 $-\frac{5\sqrt{462}i}{924}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{77}}{77}$ 0 0 0 $-\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{77}}{77}$ 0 0 0 $\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{77}}{77}$ $-\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 0 0
	0	$-\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ $-\frac{\sqrt{77}}{33}$ 0 0 0 0 $\frac{\sqrt{770}}{231}$ 0 $\frac{\sqrt{770}i}{231}$ 0 0
	$-\frac{5\sqrt{462}}{924}$	0 $-\frac{5\sqrt{462}i}{924}$ 0 0 0 $\frac{\sqrt{77}}{33}$ 0 0 $\frac{\sqrt{770}}{231}$ 0 $-\frac{\sqrt{770}i}{231}$ 0 0 0
	0	$-\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 $-\frac{\sqrt{77}}{33}$ 0 0 $-\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0
	$\frac{5\sqrt{462}i}{924}$	0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 $\frac{\sqrt{77}}{33}$ $\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{770}}{231}$ 0 $-\frac{\sqrt{770}i}{231}$ $\frac{\sqrt{77}}{231}$ 0 0 0 0 $\frac{5\sqrt{462}}{924}$
	0	0 0 0 0 0 $\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 $-\frac{\sqrt{77}}{231}$ 0 0 $\frac{5\sqrt{462}}{924}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 0 0 $-\frac{\sqrt{77}}{231}$ $\frac{5\sqrt{462}i}{924}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 $-\frac{5\sqrt{462}i}{924}$ $\frac{2\sqrt{77}}{77}$ 0
	0	0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ 0 0 $-\frac{2\sqrt{77}}{77}$

1008 symmetry

 $\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_3^{(1,1;a)}(B_{1g})$	0	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	$-\frac{3\sqrt{77}}{154}$	0	0	$-\frac{\sqrt{462}i}{88}$		
	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$\frac{3\sqrt{77}}{154}$	$\frac{\sqrt{462}i}{88}$	0		
	0	0	0	0	0	$\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	$\frac{3\sqrt{77}}{154}$	0	0	0	0	$-\frac{\sqrt{462}}{88}$		
	0	0	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	$-\frac{3\sqrt{77}}{154}$	0	0	$-\frac{\sqrt{462}}{88}$	0		
	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	
	$\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0		
	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	0	0	0	$\frac{\sqrt{462}}{616}$	0	$-\frac{\sqrt{462}i}{616}$	$-\frac{\sqrt{77}}{154}$	0		
	$-\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	0	0	0	$\frac{\sqrt{462}}{616}$	0	$\frac{\sqrt{462}i}{616}$	0	0	$\frac{\sqrt{77}}{154}$		
	0	0	$\frac{3\sqrt{77}}{154}$	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{616}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$\frac{\sqrt{770}i}{616}$		
	0	0	0	$-\frac{3\sqrt{77}}{154}$	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{231}$	$-\frac{\sqrt{770}i}{616}$	0		
	$-\frac{3\sqrt{77}}{154}$	0	0	0	0	$\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{616}$	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$		
	0	$\frac{3\sqrt{77}}{154}$	0	0	$\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{616}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}}{616}$	0		
	0	$-\frac{\sqrt{462}i}{88}$	0	$-\frac{\sqrt{462}}{88}$	0	0	$-\frac{\sqrt{77}}{154}$	0	0	$\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	
	$\frac{\sqrt{462}i}{88}$	0	$-\frac{\sqrt{462}}{88}$	0	0	0	0	$\frac{\sqrt{77}}{154}$	$-\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	
1009	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$														

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_3^{(1,1;a)}(B_{2g})$	0	0	0	0	0	$\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	$\frac{3\sqrt{77}}{154}$	0	0	0	0	$-\frac{\sqrt{462}}{88}$
	0	0	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	$-\frac{3\sqrt{77}}{154}$	0	0	$-\frac{\sqrt{462}}{88}$	0
	0	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	$\frac{3\sqrt{77}}{154}$	0	0	$\frac{\sqrt{462}i}{88}$
	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	$-\frac{3\sqrt{77}}{154}$	$-\frac{\sqrt{462}i}{88}$	0	
	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	0	0	$\frac{\sqrt{462}}{616}$	0	$-\frac{\sqrt{462}i}{616}$	$-\frac{\sqrt{77}}{154}$	0	
	$\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	0	0	$\frac{\sqrt{462}}{616}$	0	$\frac{\sqrt{462}i}{616}$	0	0	$\frac{\sqrt{77}}{154}$	
	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$-\frac{\sqrt{462}}{168}$	0	0
	$\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$-\frac{\sqrt{462}}{168}$	0	0	0	
	$\frac{3\sqrt{77}}{154}$	0	0	0	0	$\frac{\sqrt{462}}{616}$	0	$-\frac{\sqrt{462}i}{168}$	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$
	0	$-\frac{3\sqrt{77}}{154}$	0	0	$\frac{\sqrt{462}}{616}$	0	$\frac{\sqrt{462}i}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}}{616}$	0
	0	0	$\frac{3\sqrt{77}}{154}$	0	0	$-\frac{\sqrt{462}i}{616}$	0	$-\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}i}{616}$
	0	0	0	$-\frac{3\sqrt{77}}{154}$	$\frac{\sqrt{462}i}{616}$	0	$-\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{\sqrt{770}i}{616}$	0
	0	$-\frac{\sqrt{462}}{88}$	0	$\frac{\sqrt{462}i}{88}$	$-\frac{\sqrt{77}}{154}$	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	0
	$-\frac{\sqrt{462}}{88}$	0	$-\frac{\sqrt{462}i}{88}$	0	0	$\frac{\sqrt{77}}{154}$	0	0	$-\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	0

1010 symmetry

$$\frac{x(2x^2 - 3y^2 - 3z^2)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{3\sqrt{77}}{616}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	0	0	$-\frac{13\sqrt{1155}}{1848}$	0	$\frac{\sqrt{1155}i}{462}$	$-\frac{\sqrt{770}}{176}$	0	
	$\frac{3\sqrt{77}}{616}$	0	0	0	0	$-\frac{5\sqrt{462}}{1232}$	0	0	$-\frac{13\sqrt{1155}}{1848}$	0	$-\frac{\sqrt{1155}i}{462}$	0	0	$\frac{\sqrt{770}}{176}$	
	0	0	0	$\frac{3\sqrt{77}}{616}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$\frac{5\sqrt{1155}i}{924}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	
	0	0	$\frac{3\sqrt{77}}{616}$	0	0	0	0	$-\frac{5\sqrt{462}}{1232}$	$-\frac{5\sqrt{1155}i}{924}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	0	
	$\frac{5\sqrt{462}}{1232}$	0	0	0	0	$\frac{\sqrt{77}}{132}$	0	$-\frac{5\sqrt{77}i}{264}$	$-\frac{5\sqrt{770}}{3696}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$	
	0	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{77}}{132}$	0	$\frac{5\sqrt{77}i}{264}$	0	0	$\frac{5\sqrt{770}}{3696}$	0	0	$\frac{\sqrt{1155}}{924}$	0	
	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$-\frac{5\sqrt{77}i}{264}$	0	$-\frac{\sqrt{77}}{33}$	0	0	$-\frac{19\sqrt{770}}{3696}$	0	0	$-\frac{\sqrt{1155}i}{1848}$	
	0	0	0	$-\frac{5\sqrt{462}}{1232}$	$\frac{5\sqrt{77}i}{264}$	0	$-\frac{\sqrt{77}}{33}$	0	0	0	0	$\frac{19\sqrt{770}}{3696}$	$\frac{\sqrt{1155}i}{1848}$	0	
	0	$-\frac{13\sqrt{1155}}{1848}$	0	$\frac{5\sqrt{1155}i}{924}$	$-\frac{5\sqrt{770}}{3696}$	0	0	0	0	$-\frac{17\sqrt{77}}{1848}$	0	$\frac{5\sqrt{77}i}{924}$	$-\frac{5\sqrt{462}}{1232}$	0	
	$-\frac{13\sqrt{1155}}{1848}$	0	$-\frac{5\sqrt{1155}i}{924}$	0	0	$\frac{5\sqrt{770}}{3696}$	0	0	$-\frac{17\sqrt{77}}{1848}$	0	$-\frac{5\sqrt{77}i}{924}$	0	0	$\frac{5\sqrt{462}}{1232}$	
	0	$\frac{\sqrt{1155}i}{462}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	$-\frac{19\sqrt{770}}{3696}$	0	0	$\frac{5\sqrt{77}i}{924}$	0	$\frac{23\sqrt{77}}{1848}$	0	0	0
	$-\frac{\sqrt{1155}i}{462}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	0	0	$\frac{19\sqrt{770}}{3696}$	$-\frac{5\sqrt{77}i}{924}$	0	$\frac{23\sqrt{77}}{1848}$	0	0	0	
	$-\frac{\sqrt{770}}{176}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$	0	$-\frac{\sqrt{1155}i}{1848}$	$-\frac{5\sqrt{462}}{1232}$	0	0	0	0	$\frac{3\sqrt{77}}{308}$	
	0	$\frac{\sqrt{770}}{176}$	0	0	$\frac{\sqrt{1155}}{924}$	0	$\frac{\sqrt{1155}i}{1848}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$\frac{3\sqrt{77}}{308}$	0	
1011	symmetry	$\frac{y(3x^2 - 2y^2 + 3z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{3\sqrt{77}i}{616}$	0	0	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}i}{1848}$	0	$-\frac{5\sqrt{1155}}{924}$	0	0	
	$-\frac{3\sqrt{77}i}{616}$	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{1232}$	$\frac{\sqrt{1155}i}{1848}$	0	$-\frac{5\sqrt{1155}}{924}$	0	0	0	
	0	0	0	$\frac{3\sqrt{77}i}{616}$	$-\frac{5\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{462}$	0	$\frac{13\sqrt{1155}i}{1848}$	$-\frac{\sqrt{770}}{176}$	0	
	0	0	$-\frac{3\sqrt{77}i}{616}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}}{462}$	0	$-\frac{13\sqrt{1155}i}{1848}$	0	0	$\frac{\sqrt{770}}{176}$	
	0	0	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{77}i}{132}$	0	$\frac{5\sqrt{77}}{264}$	0	0	$-\frac{5\sqrt{770}}{3696}$	0	0	$-\frac{\sqrt{1155}i}{924}$	
	0	0	0	$\frac{5\sqrt{462}}{1232}$	$-\frac{\sqrt{77}i}{132}$	0	$\frac{5\sqrt{77}}{264}$	0	0	0	$\frac{5\sqrt{770}}{3696}$	$\frac{\sqrt{1155}i}{924}$	0		
	$\frac{5\sqrt{462}}{1232}$	0	0	0	0	$\frac{5\sqrt{77}}{264}$	0	$-\frac{\sqrt{77}i}{33}$	$\frac{19\sqrt{770}}{3696}$	0	0	0	0	$-\frac{\sqrt{1155}}{1848}$	
	0	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{5\sqrt{77}}{264}$	0	$\frac{\sqrt{77}i}{33}$	0	0	$-\frac{19\sqrt{770}}{3696}$	0	0	$-\frac{\sqrt{1155}}{1848}$	0	
	0	$-\frac{\sqrt{1155}i}{1848}$	0	$-\frac{\sqrt{1155}}{462}$	0	0	$\frac{19\sqrt{770}}{3696}$	0	0	$\frac{23\sqrt{77}i}{1848}$	0	$\frac{5\sqrt{77}}{924}$	0	0	
	$\frac{\sqrt{1155}i}{1848}$	0	$-\frac{\sqrt{1155}}{462}$	0	0	0	0	$-\frac{19\sqrt{770}}{3696}$	$-\frac{23\sqrt{77}i}{1848}$	0	$\frac{5\sqrt{77}}{924}$	0	0	0	
	0	$-\frac{5\sqrt{1155}}{924}$	0	$\frac{13\sqrt{1155}i}{1848}$	$-\frac{5\sqrt{770}}{3696}$	0	0	0	0	$\frac{5\sqrt{77}}{924}$	0	$-\frac{17\sqrt{77}i}{1848}$	$\frac{5\sqrt{462}}{1232}$	0	
	$-\frac{5\sqrt{1155}}{924}$	0	$-\frac{13\sqrt{1155}i}{1848}$	0	0	$\frac{5\sqrt{770}}{3696}$	0	0	$\frac{5\sqrt{77}}{924}$	0	$\frac{17\sqrt{77}i}{1848}$	0	0	$-\frac{5\sqrt{462}}{1232}$	
	0	0	$-\frac{\sqrt{770}}{176}$	0	0	$-\frac{\sqrt{1155}i}{924}$	0	$-\frac{\sqrt{1155}}{1848}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$\frac{3\sqrt{77}i}{308}$	
	0	0	0	$\frac{\sqrt{770}}{176}$	$\frac{\sqrt{1155}i}{924}$	0	$-\frac{\sqrt{1155}}{1848}$	0	0	0	0	$-\frac{5\sqrt{462}}{1232}$	$-\frac{3\sqrt{77}i}{308}$	0	

1012 symmetry

$$\frac{\sqrt{15}x(y-z)(y+z)}{2}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	0	$\frac{\sqrt{1155}}{616}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{\sqrt{77}}{616}$	0	$-\frac{2\sqrt{77}i}{77}$	$\frac{\sqrt{462}}{176}$	0		
	$\frac{\sqrt{1155}}{616}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{77}}{616}$	0	$\frac{2\sqrt{77}i}{77}$	0	0	$-\frac{\sqrt{462}}{176}$		
	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{77}i}{308}$	0	$-\frac{13\sqrt{77}}{616}$	0	0		
	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{13\sqrt{77}}{616}$	0	0	0			
	$\frac{5\sqrt{770}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{132}$	0	$\frac{\sqrt{1155}i}{264}$	$-\frac{9\sqrt{462}}{1232}$	0	0	0	0	$\frac{\sqrt{77}}{308}$		
	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{1155}}{132}$	0	$-\frac{\sqrt{1155}i}{264}$	0	0	$\frac{9\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{77}}{308}$	0		
	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}i}{264}$	0	0	0	0	$-\frac{13\sqrt{462}}{3696}$	0	0	$-\frac{3\sqrt{77}i}{616}$		
	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$-\frac{\sqrt{1155}i}{264}$	0	0	0	0	0	$\frac{13\sqrt{462}}{3696}$	$\frac{3\sqrt{77}i}{616}$	0			
	0	$\frac{\sqrt{77}}{616}$	0	$\frac{\sqrt{77}i}{308}$	$-\frac{9\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	$\frac{\sqrt{1155}i}{308}$	$-\frac{5\sqrt{770}}{1232}$	0		
	$\frac{\sqrt{77}}{616}$	0	$-\frac{\sqrt{77}i}{308}$	0	0	$\frac{9\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{1155}}{616}$	0	$-\frac{\sqrt{1155}i}{308}$	0	0	$\frac{5\sqrt{770}}{1232}$		
	0	$-\frac{2\sqrt{77}i}{77}$	0	$-\frac{13\sqrt{77}}{616}$	0	0	$-\frac{13\sqrt{462}}{3696}$	0	0	$\frac{\sqrt{1155}i}{308}$	0	$\frac{5\sqrt{1155}}{1848}$	0	0		
	$\frac{2\sqrt{77}i}{77}$	0	$-\frac{13\sqrt{77}}{616}$	0	0	0	$\frac{13\sqrt{462}}{3696}$	$-\frac{\sqrt{1155}i}{308}$	0	$\frac{5\sqrt{1155}}{1848}$	0	0	0			
	$\frac{\sqrt{462}}{176}$	0	0	0	0	$\frac{\sqrt{77}}{308}$	0	$-\frac{3\sqrt{77}i}{616}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{308}$		
	0	$-\frac{\sqrt{462}}{176}$	0	0	$\frac{\sqrt{77}}{308}$	0	$\frac{3\sqrt{77}i}{616}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}}{308}$	0		

1013 symmetry

$$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	0	$\frac{\sqrt{1155}i}{616}$	0	0	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{13\sqrt{77}i}{616}$	0	$-\frac{\sqrt{77}}{308}$	0	0	
	$-\frac{\sqrt{1155}i}{616}$	0	0	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$-\frac{13\sqrt{77}i}{616}$	0	$-\frac{\sqrt{77}}{308}$	0	0	0	
	0	0	0	$\frac{\sqrt{1155}i}{616}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	$\frac{2\sqrt{77}}{77}$	0	$-\frac{\sqrt{77}i}{616}$	$\frac{\sqrt{462}}{176}$	0	0	
	0	0	$-\frac{\sqrt{1155}i}{616}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{2\sqrt{77}}{77}$	0	$\frac{\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{462}}{176}$	
	0	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{1155}i}{132}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	$-\frac{9\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{77}i}{308}$	
	0	0	0	$\frac{5\sqrt{770}}{1232}$	$\frac{\sqrt{1155}i}{132}$	0	$-\frac{\sqrt{1155}}{264}$	0	0	0	$\frac{9\sqrt{462}}{1232}$	$\frac{\sqrt{77}i}{308}$	0	0	
	$\frac{5\sqrt{770}}{1232}$	0	0	0	0	$-\frac{\sqrt{1155}}{264}$	0	0	$\frac{13\sqrt{462}}{3696}$	0	0	0	0	$-\frac{3\sqrt{77}}{616}$	
	0	$-\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{1155}}{264}$	0	0	0	$-\frac{13\sqrt{462}}{3696}$	0	0	$-\frac{3\sqrt{77}}{616}$	0	0	
	0	$\frac{13\sqrt{77}i}{616}$	0	$\frac{2\sqrt{77}}{77}$	0	0	$\frac{13\sqrt{462}}{3696}$	0	0	$\frac{5\sqrt{1155}i}{1848}$	0	$\frac{\sqrt{1155}}{308}$	0	0	
	$-\frac{13\sqrt{77}i}{616}$	0	$\frac{2\sqrt{77}}{77}$	0	0	0	0	$-\frac{13\sqrt{462}}{3696}$	$-\frac{5\sqrt{1155}i}{1848}$	0	$\frac{\sqrt{1155}}{308}$	0	0	0	
	0	$-\frac{\sqrt{77}}{308}$	0	$-\frac{\sqrt{77}i}{616}$	$-\frac{9\sqrt{462}}{1232}$	0	0	0	0	$\frac{\sqrt{1155}}{308}$	0	$-\frac{\sqrt{1155}i}{616}$	$\frac{5\sqrt{770}}{1232}$	0	
	$-\frac{\sqrt{77}}{308}$	0	$\frac{\sqrt{77}i}{616}$	0	0	$\frac{9\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{1155}}{308}$	0	$\frac{\sqrt{1155}i}{616}$	0	0	$-\frac{5\sqrt{770}}{1232}$	
	0	0	$\frac{\sqrt{462}}{176}$	0	0	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{3\sqrt{77}}{616}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{1155}i}{308}$	
	0	0	0	$-\frac{\sqrt{462}}{176}$	$\frac{\sqrt{77}i}{308}$	0	$-\frac{3\sqrt{77}}{616}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$-\frac{\sqrt{1155}i}{308}$	0	

1014 symmetry

 $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,1;a)}(A_{1g})$	0	0	0	0	0	$\frac{\sqrt{4290}i}{312}$	0	$\frac{\sqrt{4290}}{312}$	0	0	$\frac{5\sqrt{429}}{858}$	0	0	$\frac{\sqrt{286}i}{572}$	
	0	0	0	0	$-\frac{\sqrt{4290}i}{312}$	0	$\frac{\sqrt{4290}}{312}$	0	0	0	$-\frac{5\sqrt{429}}{858}$	$-\frac{\sqrt{286}i}{572}$	0		
	0	0	0	0	0	$\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	$\frac{5\sqrt{429}}{858}$	0	0	0	0	$-\frac{\sqrt{286}}{572}$	
	0	0	0	0	$\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{\sqrt{286}}{572}$	0	
	0	$\frac{\sqrt{4290}i}{312}$	0	$\frac{\sqrt{4290}}{312}$	0	0	$\frac{\sqrt{715}}{143}$	0	0	$\frac{3\sqrt{286}i}{1144}$	0	$-\frac{3\sqrt{286}}{1144}$	0	0	
	$-\frac{\sqrt{4290}i}{312}$	0	$\frac{\sqrt{4290}}{312}$	0	0	0	0	$-\frac{\sqrt{715}}{143}$	$-\frac{3\sqrt{286}i}{1144}$	0	$-\frac{3\sqrt{286}}{1144}$	0	0	0	
	0	$\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	$\frac{\sqrt{715}}{143}$	0	0	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	
	$\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	0	0	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0	0	
	0	0	$\frac{5\sqrt{429}}{858}$	0	0	$\frac{3\sqrt{286}i}{1144}$	0	$-\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	
	0	0	0	$-\frac{5\sqrt{429}}{858}$	$-\frac{3\sqrt{286}i}{1144}$	0	$-\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	0	
	$\frac{5\sqrt{429}}{858}$	0	0	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	
	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	0	
	0	$\frac{\sqrt{286}i}{572}$	0	$-\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{286}i}{572}$	0	$-\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	0	0	0	0	

$$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$$

1015 symmetry

continued ...

Table 10

No.	multipole	matrix														
$M_5^{(1,1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{1001}}{2002} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad \frac{\sqrt{6006i}}{3432} \quad 0 \quad 0$															
	$0 \quad \frac{\sqrt{1001}}{2002} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad -\frac{\sqrt{6006i}}{3432} \quad 0 \quad 0$															
	$0 \quad 0 \quad -\frac{\sqrt{1001}}{2002} \quad 0 \quad 0 \quad -\frac{\sqrt{6006i}}{3432} \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad 0$															
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{1001}}{2002} \quad \frac{\sqrt{6006i}}{3432} \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad 0$															
	$0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad -\frac{\sqrt{6006i}}{3432} \quad \frac{3\sqrt{1001}}{1001} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad -\frac{\sqrt{10010i}}{1144} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$															
	$\frac{\sqrt{6006}}{3432} \quad 0 \quad \frac{\sqrt{6006i}}{3432} \quad 0 \quad 0 \quad -\frac{3\sqrt{1001}}{1001} \quad 0 \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad \frac{\sqrt{10010i}}{1144} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$															
	$0 \quad \frac{\sqrt{6006i}}{3432} \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad 0 \quad \frac{3\sqrt{1001}}{1001} \quad 0 \quad 0 \quad \frac{\sqrt{10010i}}{1144} \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$															
	$-\frac{\sqrt{6006i}}{3432} \quad 0 \quad \frac{\sqrt{6006}}{3432} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{1001}}{1001} \quad -\frac{\sqrt{10010i}}{1144} \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$															
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad \frac{\sqrt{10010i}}{1144} \quad -\frac{15\sqrt{1001}}{2002} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6006}}{1716}$															
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10010i}}{1144} \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad 0 \quad -\frac{15\sqrt{1001}}{2002} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6006i}}{1716}$															
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10010i}}{1144} \quad 0 \quad -\frac{\sqrt{10010}}{1144} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{15\sqrt{1001}}{2002} \quad \frac{5\sqrt{6006i}}{1716} \quad 0 \quad 0$															
	$0 \quad 0 \quad \frac{5\sqrt{6006}}{1716} \quad 0 \quad -\frac{5\sqrt{6006i}}{1716} \quad \frac{10\sqrt{1001}}{1001} \quad 0 \quad 0 \quad 0$															
	$0 \quad 0 \quad \frac{5\sqrt{6006}}{1716} \quad 0 \quad \frac{5\sqrt{6006i}}{1716} \quad 0 \quad 0 \quad 0 \quad -\frac{10\sqrt{1001}}{1001}$															
1016	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$														

continued ...

Table 10

No.	multipole	matrix													
$M_5^{(1,1;a)}(A_{2g}, 2)$	0	0	0	0	0	$\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	$\frac{5\sqrt{429}}{858}$	0	0	0	0	$-\frac{\sqrt{286}}{572}$	
	0	0	0	0	$\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{\sqrt{286}}{572}$	0	
	0	0	0	0	0	$-\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{\sqrt{286}i}{572}$	
	0	0	0	0	$\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	0	0	$\frac{5\sqrt{429}}{858}$	$\frac{\sqrt{286}i}{572}$	0	
	0	$\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	$\frac{\sqrt{715}}{143}$	0	0	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	
	$\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	0	0	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0	0	
	0	$-\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	
	$\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	0	0	$\frac{\sqrt{715}}{143}$	$\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0	
	$\frac{5\sqrt{429}}{858}$	0	0	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	
	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	0	
	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	
	0	0	0	$\frac{5\sqrt{429}}{858}$	$\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{286}}{572}$	0	$-\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{286}}{572}$	0	$\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	0	0	0	0	0	

1017 symmetry

$$\frac{\sqrt{105xyz(x^2+y^2-2z^2)}}{2}$$

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{M}_5^{(1,1;a)}(B_{1g})$	0	0	0	0	0	$-\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	$-\frac{2\sqrt{143}}{429}$	0	0	$-\frac{\sqrt{858}i}{286}$			
	0	0	0	0	$\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	$\frac{2\sqrt{143}}{429}$	$\frac{\sqrt{858}i}{286}$	0				
	0	0	0	0	0	$\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	$\frac{2\sqrt{143}}{429}$	0	0	0	0	$-\frac{\sqrt{858}}{286}$			
	0	0	0	0	$\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	0	0	$-\frac{2\sqrt{143}}{429}$	0	0	$-\frac{\sqrt{858}}{286}$	0			
	0	$-\frac{\sqrt{1430}i}{3432}$	0	$\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$-\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0		
	$\frac{\sqrt{1430}i}{3432}$	0	$\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0			
	0	$-\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$-\frac{23\sqrt{858}}{3432}$	0	$\frac{23\sqrt{858}i}{3432}$	$-\frac{8\sqrt{143}}{429}$	0			
	$-\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$-\frac{23\sqrt{858}i}{3432}$	0	$-\frac{23\sqrt{858}i}{3432}$	0	0	$\frac{8\sqrt{143}}{429}$			
	0	0	$\frac{2\sqrt{143}}{429}$	0	0	$-\frac{\sqrt{858}i}{264}$	0	$-\frac{23\sqrt{858}}{3432}$	0	0	$-\frac{2\sqrt{2145}}{429}$	0	0	$-\frac{5\sqrt{1430}i}{1716}$			
	0	0	0	$-\frac{2\sqrt{143}}{429}$	$\frac{\sqrt{858}i}{264}$	0	$-\frac{23\sqrt{858}}{3432}$	0	0	0	$\frac{2\sqrt{2145}}{429}$	$\frac{5\sqrt{1430}i}{1716}$	0				
	$-\frac{2\sqrt{143}}{429}$	0	0	0	0	$-\frac{\sqrt{858}}{264}$	0	$\frac{23\sqrt{858}i}{3432}$	$-\frac{2\sqrt{2145}}{429}$	0	0	0	0	$\frac{5\sqrt{1430}}{1716}$			
	0	$\frac{2\sqrt{143}}{429}$	0	0	$-\frac{\sqrt{858}}{264}$	0	$-\frac{23\sqrt{858}i}{3432}$	0	0	$\frac{2\sqrt{2145}}{429}$	0	0	0	$\frac{5\sqrt{1430}}{1716}$	0		
	0	$-\frac{\sqrt{858}i}{286}$	0	$-\frac{\sqrt{858}}{286}$	0	0	$-\frac{8\sqrt{143}}{429}$	0	0	$-\frac{5\sqrt{1430}i}{1716}$	0	$\frac{5\sqrt{1430}}{1716}$	0	0	0		
	$\frac{\sqrt{858}i}{286}$	0	$-\frac{\sqrt{858}}{286}$	0	0	0	0	$\frac{8\sqrt{143}}{429}$	$\frac{5\sqrt{1430}i}{1716}$	0	$\frac{5\sqrt{1430}}{1716}$	0	0	0	0	0	

1018 symmetry

$$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,1;a)}(B_{2g})$	0 0 0 0 0 $-\frac{\sqrt{1430}}{3432}$ 0 $\frac{\sqrt{1430}i}{3432}$ $-\frac{2\sqrt{143}}{429}$ 0 0 0 0 $\frac{\sqrt{858}}{286}$														
	0 0 0 0 $-\frac{\sqrt{1430}}{3432}$ 0 $-\frac{\sqrt{1430}i}{3432}$ 0 0 $\frac{2\sqrt{143}}{429}$ 0 0 $\frac{\sqrt{858}}{286}$ 0														
	0 0 0 0 0 $-\frac{\sqrt{1430}i}{3432}$ 0 $-\frac{\sqrt{1430}}{3432}$ 0 0 $-\frac{2\sqrt{143}}{429}$ 0 0 $-\frac{\sqrt{858}i}{286}$														
	0 0 0 0 $\frac{\sqrt{1430}i}{3432}$ 0 $-\frac{\sqrt{1430}}{3432}$ 0 0 0 0 $\frac{2\sqrt{143}}{429}$ $\frac{\sqrt{858}i}{286}$ 0														
	0 $-\frac{\sqrt{1430}}{3432}$ 0 $-\frac{\sqrt{1430}i}{3432}$ 0 0 0 0 0 $\frac{23\sqrt{858}}{3432}$ 0 $-\frac{23\sqrt{858}i}{3432}$ $\frac{8\sqrt{143}}{429}$ 0														
	$-\frac{\sqrt{1430}}{3432}$ 0 $\frac{\sqrt{1430}i}{3432}$ 0 0 0 0 0 $\frac{23\sqrt{858}}{3432}$ 0 $\frac{23\sqrt{858}i}{3432}$ 0 0 $-\frac{8\sqrt{143}}{429}$														
	0 $\frac{\sqrt{1430}i}{3432}$ 0 $-\frac{\sqrt{1430}}{3432}$ 0 0 0 0 0 $-\frac{\sqrt{858}i}{264}$ 0 $-\frac{\sqrt{858}}{264}$ 0 0 0														
	$-\frac{\sqrt{1430}i}{3432}$ 0 $-\frac{\sqrt{1430}}{3432}$ 0 0 0 0 0 $\frac{\sqrt{858}i}{264}$ 0 $-\frac{\sqrt{858}}{264}$ 0 0 0														
	$-\frac{2\sqrt{143}}{429}$ 0 0 0 0 $\frac{23\sqrt{858}}{3432}$ 0 $-\frac{\sqrt{858}i}{264}$ $\frac{2\sqrt{2145}}{429}$ 0 0 0 0 $-\frac{5\sqrt{1430}}{1716}$														
	0 $\frac{2\sqrt{143}}{429}$ 0 0 $\frac{23\sqrt{858}}{3432}$ 0 $\frac{\sqrt{858}i}{264}$ 0 0 $-\frac{2\sqrt{2145}}{429}$ 0 0 0 $-\frac{5\sqrt{1430}}{1716}$ 0														
	0 0 $-\frac{2\sqrt{143}}{429}$ 0 0 $-\frac{23\sqrt{858}i}{3432}$ 0 $-\frac{\sqrt{858}}{264}$ 0 0 $-\frac{2\sqrt{2145}}{429}$ 0 0 0 $-\frac{5\sqrt{1430}i}{1716}$														
	0 0 0 $\frac{2\sqrt{143}}{429}$ $\frac{23\sqrt{858}i}{3432}$ 0 $-\frac{\sqrt{858}}{264}$ 0 0 0 0 $\frac{2\sqrt{2145}}{429}$ $\frac{5\sqrt{1430}i}{1716}$ 0														
	0 $\frac{\sqrt{858}}{286}$ 0 $-\frac{\sqrt{858}i}{286}$ $\frac{8\sqrt{143}}{429}$ 0 0 0 0 $-\frac{5\sqrt{1430}}{1716}$ 0 $-\frac{5\sqrt{1430}i}{1716}$ 0 0														
	$\frac{\sqrt{858}}{286}$ 0 $\frac{\sqrt{858}i}{286}$ 0 0 $-\frac{8\sqrt{143}}{429}$ 0 0 $-\frac{5\sqrt{1430}}{1716}$ 0 $\frac{5\sqrt{1430}i}{1716}$ 0 0 0														
1019	symmetry	$\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{59\sqrt{1001}}{8008}$	0	$-\frac{3\sqrt{1001}i}{416}$	$\frac{19\sqrt{6006}}{13728}$	0	0	0	0	$-\frac{\sqrt{15015}}{1144}$	0	$\frac{5\sqrt{15015}i}{13728}$	$-\frac{3\sqrt{10010}}{4576}$	0		
	$\frac{59\sqrt{1001}}{8008}$	0	$\frac{3\sqrt{1001}i}{416}$	0	0	$-\frac{19\sqrt{6006}}{13728}$	0	0	$-\frac{\sqrt{15015}}{1144}$	0	$-\frac{5\sqrt{15015}i}{13728}$	0	0	$\frac{3\sqrt{10010}}{4576}$		
	0	$-\frac{3\sqrt{1001}i}{416}$	0	$-\frac{113\sqrt{1001}}{16016}$	0	0	$-\frac{7\sqrt{6006}}{6864}$	0	0	$\frac{7\sqrt{15015}i}{13728}$	0	$\frac{\sqrt{15015}}{2288}$	0	0	0	
	$\frac{3\sqrt{1001}i}{416}$	0	$-\frac{113\sqrt{1001}}{16016}$	0	0	0	0	$\frac{7\sqrt{6006}}{6864}$	$-\frac{7\sqrt{15015}i}{13728}$	0	$\frac{\sqrt{15015}}{2288}$	0	0	0	0	
	$\frac{19\sqrt{6006}}{13728}$	0	0	0	0	$-\frac{3\sqrt{1001}}{616}$	0	$\frac{3\sqrt{1001}i}{1144}$	$-\frac{7\sqrt{10010}}{4576}$	0	0	0	0	$\frac{\sqrt{15015}}{1144}$		
	0	$-\frac{19\sqrt{6006}}{13728}$	0	0	$-\frac{3\sqrt{1001}}{616}$	0	$-\frac{3\sqrt{1001}i}{1144}$	0	0	$\frac{7\sqrt{10010}}{4576}$	0	0	0	$\frac{\sqrt{15015}}{1144}$	0	
	0	0	$-\frac{7\sqrt{6006}}{6864}$	0	0	$\frac{3\sqrt{1001}i}{1144}$	0	$\frac{3\sqrt{1001}}{1001}$	0	0	$\frac{\sqrt{10010}}{2288}$	0	0	$-\frac{\sqrt{15015}i}{3432}$		
	0	0	0	$\frac{7\sqrt{6006}}{6864}$	$-\frac{3\sqrt{1001}i}{1144}$	0	$\frac{3\sqrt{1001}}{1001}$	0	0	0	0	$-\frac{\sqrt{10010}}{2288}$	$\frac{\sqrt{15015}i}{3432}$	0		
	0	$-\frac{\sqrt{15015}}{1144}$	0	$\frac{7\sqrt{15015}i}{13728}$	$-\frac{7\sqrt{10010}}{4576}$	0	0	0	0	$\frac{45\sqrt{1001}}{8008}$	0	$-\frac{5\sqrt{1001}i}{4576}$	$\frac{25\sqrt{6006}}{13728}$	0		
	$-\frac{\sqrt{15015}}{1144}$	0	$-\frac{7\sqrt{15015}i}{13728}$	0	0	$\frac{7\sqrt{10010}}{4576}$	0	0	$\frac{45\sqrt{1001}}{8008}$	0	$\frac{5\sqrt{1001}i}{4576}$	0	0	$-\frac{25\sqrt{6006}}{13728}$		
	0	$\frac{5\sqrt{15015}i}{13728}$	0	$\frac{\sqrt{15015}}{2288}$	0	0	$\frac{\sqrt{10010}}{2288}$	0	0	$-\frac{5\sqrt{1001}i}{4576}$	0	$-\frac{15\sqrt{1001}}{16016}$	0	0	0	
	$-\frac{5\sqrt{15015}i}{13728}$	0	$\frac{\sqrt{15015}}{2288}$	0	0	0	0	$-\frac{\sqrt{10010}}{2288}$	$\frac{5\sqrt{1001}i}{4576}$	0	$-\frac{15\sqrt{1001}}{16016}$	0	0	0		
	$-\frac{3\sqrt{10010}}{4576}$	0	0	0	0	$\frac{\sqrt{15015}}{1144}$	0	$-\frac{\sqrt{15015}i}{3432}$	$\frac{25\sqrt{6006}}{13728}$	0	0	0	0	$-\frac{25\sqrt{1001}}{8008}$		
	0	$\frac{3\sqrt{10010}}{4576}$	0	0	$\frac{\sqrt{15015}}{1144}$	0	$\frac{\sqrt{15015}i}{3432}$	0	0	$-\frac{25\sqrt{6006}}{13728}$	0	0	$-\frac{25\sqrt{1001}}{8008}$	0		

$$-\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$$

1020 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 1)$	0	$-\frac{113\sqrt{1001}i}{16016}$	0	$-\frac{3\sqrt{1001}}{416}$	0	0	$-\frac{7\sqrt{6006}}{6864}$	0	0	$-\frac{\sqrt{15015}i}{2288}$	0	$-\frac{7\sqrt{15015}}{13728}$	0	0	0	
	$\frac{113\sqrt{1001}i}{16016}$	0	$-\frac{3\sqrt{1001}}{416}$	0	0	0	0	$\frac{7\sqrt{6006}}{6864}$	$\frac{\sqrt{15015}i}{2288}$	0	$-\frac{7\sqrt{15015}}{13728}$	0	0	0	0	
	0	$-\frac{3\sqrt{1001}}{416}$	0	$\frac{59\sqrt{1001}i}{8008}$	$-\frac{19\sqrt{6006}}{13728}$	0	0	0	0	$-\frac{5\sqrt{15015}}{13728}$	0	$\frac{\sqrt{15015}i}{1144}$	$-\frac{3\sqrt{10010}}{4576}$	0	0	
	$-\frac{3\sqrt{1001}}{416}$	0	$-\frac{59\sqrt{1001}i}{8008}$	0	0	$\frac{19\sqrt{6006}}{13728}$	0	0	$-\frac{5\sqrt{15015}}{13728}$	0	$-\frac{\sqrt{15015}i}{1144}$	0	0	$\frac{3\sqrt{10010}}{4576}$	0	
	0	0	$-\frac{19\sqrt{6006}}{13728}$	0	0	$-\frac{3\sqrt{1001}i}{616}$	0	$-\frac{3\sqrt{1001}}{1144}$	0	0	$-\frac{7\sqrt{10010}}{4576}$	0	0	$-\frac{\sqrt{15015}i}{1144}$	0	
	0	0	0	$\frac{19\sqrt{6006}}{13728}$	$\frac{3\sqrt{1001}i}{616}$	0	$-\frac{3\sqrt{1001}}{1144}$	0	0	0	0	$\frac{7\sqrt{10010}}{4576}$	$\frac{\sqrt{15015}i}{1144}$	0	0	
	$-\frac{7\sqrt{6006}}{6864}$	0	0	0	0	$-\frac{3\sqrt{1001}}{1144}$	0	$\frac{3\sqrt{1001}i}{1001}$	$-\frac{\sqrt{10010}}{2288}$	0	0	0	0	$-\frac{\sqrt{15015}}{3432}$	0	
	0	$\frac{7\sqrt{6006}}{6864}$	0	0	$-\frac{3\sqrt{1001}}{1144}$	0	$-\frac{3\sqrt{1001}i}{1001}$	0	0	$\frac{\sqrt{10010}}{2288}$	0	0	$-\frac{\sqrt{15015}}{3432}$	0	0	
	0	$-\frac{\sqrt{15015}i}{2288}$	0	$-\frac{5\sqrt{15015}}{13728}$	0	0	$-\frac{\sqrt{10010}}{2288}$	0	0	$-\frac{15\sqrt{1001}i}{16016}$	0	$-\frac{5\sqrt{1001}}{4576}$	0	0	0	
	$\frac{\sqrt{15015}i}{2288}$	0	$-\frac{5\sqrt{15015}}{13728}$	0	0	0	0	$\frac{\sqrt{10010}}{2288}$	$\frac{15\sqrt{1001}i}{16016}$	0	$-\frac{5\sqrt{1001}}{4576}$	0	0	0	0	
	0	$-\frac{7\sqrt{15015}}{13728}$	0	$\frac{\sqrt{15015}i}{1144}$	$-\frac{7\sqrt{10010}}{4576}$	0	0	0	0	$-\frac{5\sqrt{1001}}{4576}$	0	$\frac{45\sqrt{1001}i}{8008}$	$-\frac{25\sqrt{6006}}{13728}$	0	0	
	$-\frac{7\sqrt{15015}}{13728}$	0	$-\frac{\sqrt{15015}i}{1144}$	0	0	$\frac{7\sqrt{10010}}{4576}$	0	0	$-\frac{5\sqrt{1001}}{4576}$	0	$-\frac{45\sqrt{1001}i}{8008}$	0	0	$\frac{25\sqrt{6006}}{13728}$	0	
	0	0	$-\frac{3\sqrt{10010}}{4576}$	0	0	$-\frac{\sqrt{15015}i}{1144}$	0	$-\frac{\sqrt{15015}}{3432}$	0	0	$-\frac{25\sqrt{6006}}{13728}$	0	0	$-\frac{25\sqrt{1001}i}{8008}$	0	
	0	0	0	$\frac{3\sqrt{10010}}{4576}$	$\frac{\sqrt{15015}i}{1144}$	0	$-\frac{\sqrt{15015}}{3432}$	0	0	0	0	$\frac{25\sqrt{6006}}{13728}$	$\frac{25\sqrt{1001}i}{8008}$	0	0	

1021 symmetry

$$\frac{3\sqrt{35}x(y^2 - 2yz - z^2)(y^2 + 2yz - z^2)}{8}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 2)$	0	$\frac{3\sqrt{715}}{1144}$	0	$-\frac{\sqrt{715}i}{416}$	$\frac{3\sqrt{4290}}{4576}$	0	0	0	0	$\frac{5\sqrt{429}}{1144}$	0	$-\frac{31\sqrt{429}i}{4576}$	$\frac{27\sqrt{286}}{4576}$	0		
	$\frac{3\sqrt{715}}{1144}$	0	$\frac{\sqrt{715}i}{416}$	0	0	$-\frac{3\sqrt{4290}}{4576}$	0	0	$\frac{5\sqrt{429}}{1144}$	0	$\frac{31\sqrt{429}i}{4576}$	0	0	$-\frac{27\sqrt{286}}{4576}$		
	0	$-\frac{\sqrt{715}i}{416}$	0	$-\frac{5\sqrt{715}}{2288}$	0	0	$-\frac{\sqrt{4290}}{6864}$	0	0	$-\frac{47\sqrt{429}i}{13728}$	0	$-\frac{35\sqrt{429}}{6864}$	0	0		
	$\frac{\sqrt{715}i}{416}$	0	$-\frac{5\sqrt{715}}{2288}$	0	0	0	0	$\frac{\sqrt{4290}}{6864}$	$\frac{47\sqrt{429}i}{13728}$	0	$-\frac{35\sqrt{429}}{6864}$	0	0	0		
	$\frac{3\sqrt{4290}}{4576}$	0	0	0	0	$\frac{5\sqrt{715}}{1144}$	0	$-\frac{7\sqrt{715}i}{1144}$	$\frac{23\sqrt{286}}{4576}$	0	0	0	0	$\frac{5\sqrt{429}}{3432}$		
	0	$-\frac{3\sqrt{4290}}{4576}$	0	0	$\frac{5\sqrt{715}}{1144}$	0	$\frac{7\sqrt{715}i}{1144}$	0	0	$-\frac{23\sqrt{286}}{4576}$	0	0	$\frac{5\sqrt{429}}{3432}$	0		
	0	0	$-\frac{\sqrt{4290}}{6864}$	0	0	$-\frac{7\sqrt{715}i}{1144}$	0	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{29\sqrt{286}}{2288}$	0	0	$-\frac{23\sqrt{429}i}{3432}$		
	0	0	0	$\frac{\sqrt{4290}}{6864}$	$\frac{7\sqrt{715}i}{1144}$	0	$-\frac{\sqrt{715}}{143}$	0	0	0	0	$\frac{29\sqrt{286}}{2288}$	$\frac{23\sqrt{429}i}{3432}$	0		
	0	$\frac{5\sqrt{429}}{1144}$	0	$-\frac{47\sqrt{429}i}{13728}$	$\frac{23\sqrt{286}}{4576}$	0	0	0	0	$\frac{5\sqrt{715}}{1144}$	0	$-\frac{23\sqrt{715}i}{4576}$	$\frac{35\sqrt{4290}}{13728}$	0		
	$\frac{5\sqrt{429}}{1144}$	0	$\frac{47\sqrt{429}i}{13728}$	0	0	$-\frac{23\sqrt{286}}{4576}$	0	0	$\frac{5\sqrt{715}}{1144}$	0	$\frac{23\sqrt{715}i}{4576}$	0	0	$-\frac{35\sqrt{4290}}{13728}$		
	0	$-\frac{31\sqrt{429}i}{4576}$	0	$-\frac{35\sqrt{429}}{6864}$	0	0	$-\frac{29\sqrt{286}}{2288}$	0	0	$-\frac{23\sqrt{715}i}{4576}$	0	$\frac{5\sqrt{715}}{2288}$	0	0		
	$\frac{31\sqrt{429}i}{4576}$	0	$-\frac{35\sqrt{429}}{6864}$	0	0	0	0	$\frac{29\sqrt{286}}{2288}$	$\frac{23\sqrt{715}i}{4576}$	0	$\frac{5\sqrt{715}}{2288}$	0	0	0		
	$\frac{27\sqrt{286}}{4576}$	0	0	0	0	$\frac{5\sqrt{429}}{3432}$	0	$-\frac{23\sqrt{429}i}{3432}$	$\frac{35\sqrt{4290}}{13728}$	0	0	0	0	$-\frac{5\sqrt{715}}{1144}$		
	0	$-\frac{27\sqrt{286}}{4576}$	0	0	$\frac{5\sqrt{429}}{3432}$	0	$\frac{23\sqrt{429}i}{3432}$	0	0	$-\frac{35\sqrt{4290}}{13728}$	0	0	0	$-\frac{5\sqrt{715}}{1144}$		
1022	symmetry	$-\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 2)$	0	$-\frac{5\sqrt{715}i}{2288}$	0	$-\frac{\sqrt{715}}{416}$	0	0	$-\frac{\sqrt{4290}}{6864}$	0	0	$\frac{35\sqrt{429}i}{6864}$	0	$\frac{47\sqrt{429}}{13728}$	0	0	0	
	$\frac{5\sqrt{715}i}{2288}$	0	$-\frac{\sqrt{715}}{416}$	0	0	0	0	$\frac{\sqrt{4290}}{6864}$	$-\frac{35\sqrt{429}i}{6864}$	0	$\frac{47\sqrt{429}}{13728}$	0	0	0		
	0	$-\frac{\sqrt{715}}{416}$	0	$\frac{3\sqrt{715}i}{1144}$	$-\frac{3\sqrt{4290}}{4576}$	0	0	0	0	$\frac{31\sqrt{429}}{4576}$	0	$-\frac{5\sqrt{429}i}{1144}$	$\frac{27\sqrt{286}}{4576}$	0		
	$-\frac{\sqrt{715}}{416}$	0	$-\frac{3\sqrt{715}i}{1144}$	0	0	$\frac{3\sqrt{4290}}{4576}$	0	0	$\frac{31\sqrt{429}}{4576}$	0	$\frac{5\sqrt{429}i}{1144}$	0	0	$-\frac{27\sqrt{286}}{4576}$		
	0	0	$-\frac{3\sqrt{4290}}{4576}$	0	0	$\frac{5\sqrt{715}i}{1144}$	0	$\frac{7\sqrt{715}}{1144}$	0	0	$\frac{23\sqrt{286}}{4576}$	0	0	$-\frac{5\sqrt{429}i}{3432}$		
	0	0	0	$\frac{3\sqrt{4290}}{4576}$	$-\frac{5\sqrt{715}i}{1144}$	0	$\frac{7\sqrt{715}}{1144}$	0	0	0	$-\frac{23\sqrt{286}}{4576}$	$\frac{5\sqrt{429}i}{3432}$	0			
	$-\frac{\sqrt{4290}}{6864}$	0	0	0	0	$\frac{7\sqrt{715}}{1144}$	0	$-\frac{\sqrt{715}i}{143}$	$\frac{29\sqrt{286}}{2288}$	0	0	0	0	$-\frac{23\sqrt{429}}{3432}$		
	0	$\frac{\sqrt{4290}}{6864}$	0	0	$\frac{7\sqrt{715}}{1144}$	0	$\frac{\sqrt{715}i}{143}$	0	0	$-\frac{29\sqrt{286}}{2288}$	0	0	$-\frac{23\sqrt{429}}{3432}$	0		
	0	$\frac{35\sqrt{429}i}{6864}$	0	$\frac{31\sqrt{429}}{4576}$	0	0	$\frac{29\sqrt{286}}{2288}$	0	0	$\frac{5\sqrt{715}i}{2288}$	0	$-\frac{23\sqrt{715}}{4576}$	0	0		
	$-\frac{35\sqrt{429}i}{6864}$	0	$\frac{31\sqrt{429}}{4576}$	0	0	0	0	$-\frac{29\sqrt{286}}{2288}$	$-\frac{5\sqrt{715}i}{2288}$	0	$-\frac{23\sqrt{715}}{4576}$	0	0	0		
	0	$\frac{47\sqrt{429}}{13728}$	0	$-\frac{5\sqrt{429}i}{1144}$	$\frac{23\sqrt{286}}{4576}$	0	0	0	0	$-\frac{23\sqrt{715}}{4576}$	0	$\frac{5\sqrt{715}i}{1144}$	$-\frac{35\sqrt{4290}}{13728}$	0		
	$\frac{47\sqrt{429}}{13728}$	0	$\frac{5\sqrt{429}i}{1144}$	0	0	$-\frac{23\sqrt{286}}{4576}$	0	0	$-\frac{23\sqrt{715}}{4576}$	0	$-\frac{5\sqrt{715}i}{1144}$	0	0	$\frac{35\sqrt{4290}}{13728}$		
	0	0	$\frac{27\sqrt{286}}{4576}$	0	0	$-\frac{5\sqrt{429}i}{3432}$	0	$-\frac{23\sqrt{429}}{3432}$	0	0	$-\frac{35\sqrt{4290}}{13728}$	0	0	$-\frac{5\sqrt{715}i}{1144}$		
	0	0	0	$-\frac{27\sqrt{286}}{4576}$	$\frac{5\sqrt{429}i}{3432}$	0	$-\frac{23\sqrt{429}}{3432}$	0	0	0	0	$\frac{35\sqrt{4290}}{13728}$	$\frac{5\sqrt{715}i}{1144}$	0		

1023 symmetry

$$\frac{\sqrt{105x(y-z)(y+z)(2x^2-y^2-z^2)}}{4}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 3)$	0	$-\frac{2\sqrt{2145}}{429}$	0	$\frac{\sqrt{2145}i}{208}$	$-\frac{\sqrt{1430}}{528}$	0	0	0	0	$-\frac{2\sqrt{143}}{429}$	0	$\frac{19\sqrt{143}i}{6864}$	$-\frac{3\sqrt{858}}{2288}$	0		
	$-\frac{2\sqrt{2145}}{429}$	0	$-\frac{\sqrt{2145}i}{208}$	0	0	$\frac{\sqrt{1430}}{528}$	0	0	$-\frac{2\sqrt{143}}{429}$	0	$-\frac{19\sqrt{143}i}{6864}$	0	0	$\frac{3\sqrt{858}}{2288}$		
	0	$\frac{\sqrt{2145}i}{208}$	0	$\frac{17\sqrt{2145}}{3432}$	0	0	$\frac{5\sqrt{1430}}{1716}$	0	0	$\frac{41\sqrt{143}i}{6864}$	0	$-\frac{\sqrt{143}}{3432}$	0	0	0	
	$-\frac{\sqrt{2145}i}{208}$	0	$\frac{17\sqrt{2145}}{3432}$	0	0	0	0	$-\frac{5\sqrt{1430}}{1716}$	$-\frac{41\sqrt{143}i}{6864}$	0	$-\frac{\sqrt{143}}{3432}$	0	0	0	0	
	$-\frac{\sqrt{1430}}{528}$	0	0	0	0	$-\frac{\sqrt{2145}}{572}$	0	$\frac{\sqrt{2145}i}{572}$	$-\frac{31\sqrt{858}}{6864}$	0	0	0	0	$\frac{17\sqrt{143}}{1716}$		
	0	$\frac{\sqrt{1430}}{528}$	0	0	$-\frac{\sqrt{2145}}{572}$	0	$-\frac{\sqrt{2145}i}{572}$	0	0	$\frac{31\sqrt{858}}{6864}$	0	0	$\frac{17\sqrt{143}}{1716}$	0		
	0	0	$\frac{5\sqrt{1430}}{1716}$	0	0	$\frac{\sqrt{2145}i}{572}$	0	0	0	0	$-\frac{\sqrt{858}}{1716}$	0	0	$-\frac{\sqrt{143}i}{156}$		
	0	0	0	$-\frac{5\sqrt{1430}}{1716}$	$-\frac{\sqrt{2145}i}{572}$	0	0	0	0	0	$\frac{\sqrt{858}}{1716}$	$\frac{\sqrt{143}i}{156}$	0			
	0	$-\frac{2\sqrt{143}}{429}$	0	$\frac{41\sqrt{143}i}{6864}$	$-\frac{31\sqrt{858}}{6864}$	0	0	0	0	$\frac{2\sqrt{2145}}{429}$	0	$-\frac{\sqrt{2145}i}{624}$	$\frac{35\sqrt{1430}}{6864}$	0		
	$-\frac{2\sqrt{143}}{429}$	0	$-\frac{41\sqrt{143}i}{6864}$	0	0	$\frac{31\sqrt{858}}{6864}$	0	0	$\frac{2\sqrt{2145}}{429}$	0	$\frac{\sqrt{2145}i}{624}$	0	0	$-\frac{35\sqrt{1430}}{6864}$		
	0	$\frac{19\sqrt{143}i}{6864}$	0	$-\frac{\sqrt{143}}{3432}$	0	0	$-\frac{\sqrt{858}}{1716}$	0	0	$-\frac{\sqrt{2145}i}{624}$	0	$-\frac{\sqrt{2145}}{3432}$	0	0	0	
	$-\frac{19\sqrt{143}i}{6864}$	0	$-\frac{\sqrt{143}}{3432}$	0	0	0	0	$\frac{\sqrt{858}}{1716}$	$\frac{\sqrt{2145}i}{624}$	0	$-\frac{\sqrt{2145}}{3432}$	0	0	0	0	
	$-\frac{3\sqrt{858}}{2288}$	0	0	0	0	$\frac{17\sqrt{143}}{1716}$	0	$-\frac{\sqrt{143}i}{156}$	$\frac{35\sqrt{1430}}{6864}$	0	0	0	0	$-\frac{5\sqrt{2145}}{1716}$		
	0	$\frac{3\sqrt{858}}{2288}$	0	0	$\frac{17\sqrt{143}}{1716}$	0	$\frac{\sqrt{143}i}{156}$	0	0	$-\frac{35\sqrt{1430}}{6864}$	0	0	$-\frac{5\sqrt{2145}}{1716}$	0		
1024	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 3)$	0	$\frac{17\sqrt{2145}i}{3432}$	0	$\frac{\sqrt{2145}}{208}$	0	0	$\frac{5\sqrt{1430}}{1716}$	0	0	$\frac{\sqrt{143}i}{3432}$	0	$-\frac{41\sqrt{143}}{6864}$	0	0	
	$-\frac{17\sqrt{2145}i}{3432}$	0	$\frac{\sqrt{2145}}{208}$	0	0	0	0	$-\frac{5\sqrt{1430}}{1716}$	$-\frac{\sqrt{143}i}{3432}$	0	$-\frac{41\sqrt{143}}{6864}$	0	0	0	
	0	$\frac{\sqrt{2145}}{208}$	0	$-\frac{2\sqrt{2145}i}{429}$	$\frac{\sqrt{1430}}{528}$	0	0	0	0	$-\frac{19\sqrt{143}}{6864}$	0	$\frac{2\sqrt{143}i}{429}$	$-\frac{3\sqrt{858}}{2288}$	0	
	$\frac{\sqrt{2145}}{208}$	0	$\frac{2\sqrt{2145}i}{429}$	0	0	$-\frac{\sqrt{1430}}{528}$	0	0	$-\frac{19\sqrt{143}}{6864}$	0	$-\frac{2\sqrt{143}i}{429}$	0	0	$\frac{3\sqrt{858}}{2288}$	
	0	0	$\frac{\sqrt{1430}}{528}$	0	0	$-\frac{\sqrt{2145}i}{572}$	0	$-\frac{\sqrt{2145}}{572}$	0	0	$-\frac{31\sqrt{858}}{6864}$	0	0	$-\frac{17\sqrt{143}i}{1716}$	
	0	0	0	$-\frac{\sqrt{1430}}{528}$	$\frac{\sqrt{2145}i}{572}$	0	$-\frac{\sqrt{2145}}{572}$	0	0	0	$\frac{31\sqrt{858}}{6864}$	$\frac{17\sqrt{143}i}{1716}$	0		
	$\frac{5\sqrt{1430}}{1716}$	0	0	0	0	$-\frac{\sqrt{2145}}{572}$	0	0	$\frac{\sqrt{858}}{1716}$	0	0	0	0	$-\frac{\sqrt{143}}{156}$	
	0	$-\frac{5\sqrt{1430}}{1716}$	0	0	$-\frac{\sqrt{2145}}{572}$	0	0	0	$-\frac{\sqrt{858}}{1716}$	0	0	$-\frac{\sqrt{143}}{156}$	0		
	0	$\frac{\sqrt{143}i}{3432}$	0	$-\frac{19\sqrt{143}}{6864}$	0	0	$\frac{\sqrt{858}}{1716}$	0	0	$-\frac{\sqrt{2145}i}{3432}$	0	$-\frac{\sqrt{2145}}{624}$	0	0	
	$-\frac{\sqrt{143}i}{3432}$	0	$-\frac{19\sqrt{143}}{6864}$	0	0	0	0	$-\frac{\sqrt{858}}{1716}$	$\frac{\sqrt{2145}i}{3432}$	0	$-\frac{\sqrt{2145}}{624}$	0	0	0	
	0	$-\frac{41\sqrt{143}}{6864}$	0	$\frac{2\sqrt{143}i}{429}$	$-\frac{31\sqrt{858}}{6864}$	0	0	0	$-\frac{\sqrt{2145}}{624}$	0	$\frac{2\sqrt{2145}i}{429}$	$-\frac{35\sqrt{1430}}{6864}$	0		
	$-\frac{41\sqrt{143}}{6864}$	0	$-\frac{2\sqrt{143}i}{429}$	0	0	$\frac{31\sqrt{858}}{6864}$	0	0	$-\frac{\sqrt{2145}}{624}$	0	$-\frac{2\sqrt{2145}i}{429}$	0	0	$\frac{35\sqrt{1430}}{6864}$	
	0	0	$-\frac{3\sqrt{858}}{2288}$	0	0	$-\frac{17\sqrt{143}i}{1716}$	0	$-\frac{\sqrt{143}}{156}$	0	0	$-\frac{35\sqrt{1430}}{6864}$	0	0	$-\frac{5\sqrt{2145}i}{1716}$	
	0	0	0	$\frac{3\sqrt{858}}{2288}$	$\frac{17\sqrt{143}i}{1716}$	0	$-\frac{\sqrt{143}}{156}$	0	0	0	$\frac{35\sqrt{1430}}{6864}$	$\frac{5\sqrt{2145}i}{1716}$	0		