

PG No. 20  $D_{3d}$   $\bar{3}m$  (-3m1 setting) [ trigonal ] (jml basis)

bra:  $= \langle \frac{1}{2}, \frac{1}{2}; s |, \langle \frac{1}{2}, -\frac{1}{2}; s |$   
ket:  $= | \frac{1}{2}, \frac{1}{2}; s \rangle, | \frac{1}{2}, -\frac{1}{2}; s \rangle$

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:  $= \langle \frac{1}{2}, \frac{1}{2}; s |, \langle \frac{1}{2}, -\frac{1}{2}; s |$   
ket:  $= | \frac{1}{2}, \frac{1}{2}; p \rangle, | \frac{1}{2}, -\frac{1}{2}; p \rangle, | \frac{3}{2}, \frac{3}{2}; p \rangle, | \frac{3}{2}, \frac{1}{2}; p \rangle, | \frac{3}{2}, -\frac{1}{2}; p \rangle, | \frac{3}{2}, -\frac{3}{2}; p \rangle$

Table 2: (s,p) block.

No.	multipole	matrix
5	symmetry	$z$
	$\mathbb{Q}_1^{(a)}(A_{2u})$	$\begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
6	symmetry	$x$
	$\mathbb{Q}_{1,1}^{(a)}(E_u)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$

*continued ...*

Table 2

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

continued ...

Table 2

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

continued ...

Table 2

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

bra:  $= \langle \frac{1}{2}, \frac{1}{2}; s |, \langle \frac{1}{2}, -\frac{1}{2}; s |$ ket:  $= |\frac{3}{2}, \frac{3}{2}; d \rangle, |\frac{3}{2}, \frac{1}{2}; d \rangle, |\frac{3}{2}, -\frac{1}{2}; d \rangle, |\frac{3}{2}, -\frac{3}{2}; d \rangle, |\frac{5}{2}, \frac{5}{2}; d \rangle, |\frac{5}{2}, \frac{3}{2}; d \rangle, |\frac{5}{2}, \frac{1}{2}; d \rangle, |\frac{5}{2}, -\frac{1}{2}; d \rangle, |\frac{5}{2}, -\frac{3}{2}; d \rangle, |\frac{5}{2}, -\frac{5}{2}; d \rangle$ 

Table 3: (s,d) block.

No.	multipole	matrix
29	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 & 0 \end{bmatrix}$
30	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
31	symmetry	$-\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
32	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
33	symmetry	$-\sqrt{3}xy$
	$\mathbb{Q}_{2,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \end{bmatrix}$
34	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \end{bmatrix}$
35	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{15}i}{15} & 0 \end{bmatrix}$
36	symmetry	$-\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{15}}{20} & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{15}}{15} & 0 \end{bmatrix}$
37	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}}{10} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 \\ -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
38	symmetry	$-\sqrt{3}xy$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 \\ \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{3}i}{6} \end{bmatrix}$
39	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{G}_3^{(1,-1;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
40	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
41	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 3

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

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
51	symmetry	$-\sqrt{3}xz$
	$\mathbb{T}_{2,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
52	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \end{bmatrix}$
53	symmetry	$-\sqrt{3}xy$
	$\mathbb{T}_{2,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{10} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \end{bmatrix}$
54	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \end{bmatrix}$
55	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{20} & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{15}}{15} & 0 \end{bmatrix}$
56	symmetry	$-\sqrt{3}xz$
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{15}i}{20} & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{15}i}{15} & 0 \end{bmatrix}$
57	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 \\ \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
58	symmetry	$-\sqrt{3}xy$
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}}{10} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 \\ \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
59	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 3

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

continued ...

Table 3

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

bra: =  $\langle \frac{1}{2}, \frac{1}{2}; s |, \langle \frac{1}{2}, -\frac{1}{2}; s |$ ket: =  $|\frac{5}{2}, \frac{5}{2}; f \rangle, |\frac{5}{2}, \frac{3}{2}; f \rangle, |\frac{5}{2}, \frac{1}{2}; f \rangle, |\frac{5}{2}, -\frac{1}{2}; f \rangle, |\frac{5}{2}, -\frac{3}{2}; f \rangle, |\frac{5}{2}, -\frac{5}{2}; f \rangle, |\frac{7}{2}, \frac{7}{2}; f \rangle, |\frac{7}{2}, \frac{5}{2}; f \rangle, |\frac{7}{2}, \frac{3}{2}; f \rangle, |\frac{7}{2}, \frac{1}{2}; f \rangle, |\frac{7}{2}, -\frac{1}{2}; f \rangle, |\frac{7}{2}, -\frac{3}{2}; f \rangle, |\frac{7}{2}, -\frac{5}{2}; f \rangle, |\frac{7}{2}, -\frac{7}{2}; f \rangle$ 

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{Q}_3^{(a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
70	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \end{bmatrix}$
71	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \end{bmatrix}$
72	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
73	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,2}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \end{bmatrix}$
74	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 \end{bmatrix}$
75	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \end{bmatrix}$
76	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \end{bmatrix}$
77	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \end{bmatrix}$
78	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{7} & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \end{bmatrix}$
79	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \end{bmatrix}$
80	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \end{bmatrix}$
81	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 \end{bmatrix}$
82	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 \end{bmatrix}$
83	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
84	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
85	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \end{bmatrix}$
86	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 \end{bmatrix}$
87	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 \end{bmatrix}$
88	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
89	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
90	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & -\frac{i}{4} & 0 \end{bmatrix}$
91	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & \frac{1}{4} & 0 \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
93	symmetry	$\sqrt{3}yz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
94	symmetry	$-\sqrt{3}xz$ $\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 1)$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
95	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$ $\begin{bmatrix} -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
96	symmetry	$-\sqrt{3}xy$ $\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 2)$ $\begin{bmatrix} -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
97	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\mathbb{T}_3^{(a)}(A_{1u})$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & \end{bmatrix}$
98	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\mathbb{T}_3^{(a)}(A_{2u}, 1)$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 \end{bmatrix}$
99	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\mathbb{T}_3^{(a)}(A_{2u}, 2)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \end{bmatrix}$
100	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\mathbb{T}_{3,1}^{(a)}(E_u, 1)$ $\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 \end{bmatrix}$
101	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\mathbb{T}_{3,2}^{(a)}(E_u, 1)$ $\begin{bmatrix} 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
102	symmetry	$\sqrt{15}xyz$

*continued ...*

Table 4

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \end{bmatrix}$
103	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \end{bmatrix}$
104	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{7} & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ -\frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \end{bmatrix}$
105	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 \end{bmatrix}$
106	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 \\ \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} \end{bmatrix}$
107	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \end{bmatrix}$
108	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \end{bmatrix}$
109	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{42}}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 \end{bmatrix}$
110	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 \end{bmatrix}$
111	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
112	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \end{bmatrix}$
113	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
114	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 \end{bmatrix}$
115	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 \end{bmatrix}$
116	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
117	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
118	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & \frac{\sqrt{3}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & -\frac{1}{4} & 0 \end{bmatrix}$
119	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & -\frac{i}{4} & 0 \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
121	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
122	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
123	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
124	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{30}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

bra: =  $\langle \frac{1}{2}, \frac{1}{2}; p |, \langle \frac{1}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, \frac{3}{2}; p |, \langle \frac{3}{2}, \frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{3}{2}; p |$ ket: =  $| \frac{1}{2}, \frac{1}{2}; p \rangle, | \frac{1}{2}, -\frac{1}{2}; p \rangle, | \frac{3}{2}, \frac{3}{2}; p \rangle, | \frac{3}{2}, \frac{1}{2}; p \rangle, | \frac{3}{2}, -\frac{1}{2}; p \rangle, | \frac{3}{2}, -\frac{3}{2}; p \rangle$ 

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	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
127	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
128	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
129	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \end{bmatrix}$
130	symmetry	$-\sqrt{3}xy$

continued ...

Table 5

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

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \end{bmatrix}$
135	symmetry	$-\sqrt{3}xy$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \end{bmatrix}$
136	symmetry	$1$
		$\begin{bmatrix} -\frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
137	symmetry	$z$
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
138	symmetry	$x$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
139	symmetry	$\begin{bmatrix} y \\ 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{\sqrt{3}}{4} \\ -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
140	symmetry	$\begin{bmatrix} -\frac{x^2}{2} - \frac{y^2}{2} + z^2 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
141	symmetry	$\begin{bmatrix} \sqrt{3}yz \\ 0 & 0 & \frac{1}{4} & 0 & \frac{\sqrt{3}}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} \\ \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
142	symmetry	$-\sqrt{3}xz$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{4} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & \frac{i}{4} \\ -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
143	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
144	symmetry	$-\sqrt{3}xy$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
145	symmetry	$z$
		$\begin{bmatrix} \frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & -\frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & 0 & \frac{1}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{6} & 0 & 0 & -\frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}$
146	symmetry	$x$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{1}{3} & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & 0 \\ \frac{1}{3} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{6}}{12} \\ -\frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{3}}{6} & 0 & \frac{1}{3} & 0 \\ \frac{\sqrt{2}}{12} & 0 & 0 & \frac{1}{3} & 0 & \frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
147	symmetry	$\begin{bmatrix} & & & y & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$
		$\begin{bmatrix} 0 & -\frac{i}{3} & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 \\ \frac{i}{3} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{6}i}{12} \\ \frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{3}i}{6} & 0 & -\frac{i}{3} & 0 \\ \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{i}{3} & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
148	symmetry	$\begin{bmatrix} & & & z & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$
		$\begin{bmatrix} -\frac{\sqrt{6}}{18} & 0 & 0 & -\frac{2\sqrt{3}}{9} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{18} & 0 & 0 & -\frac{2\sqrt{3}}{9} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ -\frac{2\sqrt{3}}{9} & 0 & 0 & \frac{\sqrt{6}}{18} & 0 & 0 \\ 0 & -\frac{2\sqrt{3}}{9} & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
149	symmetry	$\begin{bmatrix} & & & x & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{18} & \frac{1}{3} & 0 & -\frac{\sqrt{3}}{9} & 0 \\ -\frac{\sqrt{6}}{18} & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{1}{3} \\ \frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{9} & \frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{6}}{9} & 0 \\ -\frac{\sqrt{3}}{9} & 0 & 0 & \frac{\sqrt{6}}{9} & 0 & \frac{\sqrt{2}}{6} \\ 0 & -\frac{1}{3} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 \end{bmatrix}$
150	symmetry	$\begin{bmatrix} & & & y & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{18} & \frac{i}{3} & 0 & \frac{\sqrt{3}i}{9} & 0 \\ -\frac{\sqrt{6}i}{18} & 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{i}{3} \\ -\frac{i}{3} & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{9} & \frac{\sqrt{2}i}{6} & 0 & -\frac{\sqrt{6}i}{9} & 0 \\ -\frac{\sqrt{3}i}{9} & 0 & 0 & \frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{2}i}{6} \\ 0 & -\frac{i}{3} & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 \end{bmatrix}$
151	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{2} & 0 & 0 & 0 \end{bmatrix}$
152	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \end{bmatrix}$
153	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{2} & 0 & 0 & 0 \end{bmatrix}$
154	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{30}}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{10} & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
155	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{30}i}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{10} & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
156	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
157	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
158	symmetry	$z$

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{30}}{9} & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{9} & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{18} & 0 & 0 & -\frac{\sqrt{30}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & \frac{\sqrt{30}}{90} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} \end{bmatrix}$
159	symmetry	$\begin{bmatrix} x \\ 0 & \frac{\sqrt{30}}{9} & \frac{\sqrt{5}}{12} & 0 & -\frac{\sqrt{15}}{36} & 0 \\ \frac{\sqrt{30}}{9} & 0 & 0 & \frac{\sqrt{15}}{36} & 0 & -\frac{\sqrt{5}}{12} \\ \frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{36} & -\frac{\sqrt{10}}{30} & 0 & -\frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{15}}{36} & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & -\frac{\sqrt{10}}{30} \\ 0 & -\frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{10}}{30} & 0 \end{bmatrix}$
160	symmetry	$\begin{bmatrix} y \\ 0 & -\frac{\sqrt{30}i}{9} & \frac{\sqrt{5}i}{12} & 0 & \frac{\sqrt{15}i}{36} & 0 \\ \frac{\sqrt{30}i}{9} & 0 & 0 & \frac{\sqrt{15}i}{36} & 0 & \frac{\sqrt{5}i}{12} \\ -\frac{\sqrt{5}i}{12} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{36} & -\frac{\sqrt{10}i}{30} & 0 & \frac{\sqrt{30}i}{45} & 0 \\ -\frac{\sqrt{15}i}{36} & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 & \frac{\sqrt{10}i}{30} \\ 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & -\frac{\sqrt{10}i}{30} & 0 \end{bmatrix}$

bra: =  $\langle \frac{1}{2}, \frac{1}{2}; p |, \langle \frac{1}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, \frac{3}{2}; p |, \langle \frac{3}{2}, \frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{3}{2}; p |$ ket: =  $| \frac{3}{2}, \frac{3}{2}; d \rangle, | \frac{3}{2}, \frac{1}{2}; d \rangle, | \frac{3}{2}, -\frac{1}{2}; d \rangle, | \frac{3}{2}, -\frac{3}{2}; d \rangle, | \frac{5}{2}, \frac{5}{2}; d \rangle, | \frac{5}{2}, \frac{3}{2}; d \rangle, | \frac{5}{2}, \frac{1}{2}; d \rangle, | \frac{5}{2}, -\frac{1}{2}; d \rangle, | \frac{5}{2}, -\frac{3}{2}; d \rangle, | \frac{5}{2}, -\frac{5}{2}; d \rangle$ 

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	$z$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{10} \end{bmatrix}$
162	symmetry	$x$ $\begin{bmatrix} -\frac{1}{4} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & -\frac{3\sqrt{2}}{20} & 0 & \frac{3}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & -\frac{3}{20} & 0 & \frac{3\sqrt{2}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{30}}{20} \end{bmatrix}$
163	symmetry	$y$ $\begin{bmatrix} -\frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & -\frac{3i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{30}i}{20} \end{bmatrix}$
164	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
165	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 \\ 0 & -\frac{3}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 \end{bmatrix}$
166	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
167	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{2}}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & -\frac{7\sqrt{2}}{60} & 0 & \frac{1}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & -\frac{1}{30} & 0 & \frac{7\sqrt{2}}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{30}}{60} \end{bmatrix}$
168	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & -\frac{i}{6} & 0 \\ 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{7\sqrt{2}i}{60} & 0 & -\frac{i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{i}{30} & 0 & -\frac{7\sqrt{2}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{30}i}{60} \end{bmatrix}$
169	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & -\frac{i}{6} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 \end{bmatrix}$
170	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \end{bmatrix}$
171	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
172	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 \\ \frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{15} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{4}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{4}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}}{15} & 0 \end{bmatrix}$
173	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
174	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{18} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{30} & 0 & -\frac{1}{10} & 0 & 0 & \frac{7\sqrt{3}}{45} & 0 & -\frac{\sqrt{6}}{45} & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{6}}{45} & 0 & -\frac{7\sqrt{3}}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{5}}{15} \end{bmatrix}$
175	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & -\frac{\sqrt{6}i}{18} & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{30} & 0 & \frac{i}{10} & 0 & 0 & \frac{7\sqrt{3}i}{45} & 0 & \frac{\sqrt{6}i}{45} & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & -\frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{6}i}{45} & 0 & \frac{7\sqrt{3}i}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & -\frac{\sqrt{5}i}{15} \end{bmatrix}$
176	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 \\ \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \end{bmatrix}$
177	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{18} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 \end{bmatrix}$
178	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 \end{bmatrix}$
179	symmetry	$\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & \frac{2\sqrt{3}}{15} & 0 & 0 & -\frac{3}{20} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{15} & 0 & \frac{1}{5} & 0 & 0 & -\frac{3\sqrt{2}}{40} & 0 & \frac{3}{20} & 0 \\ 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{15}}{20} \end{bmatrix}$
180	symmetry	$\begin{bmatrix} \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 \\ \frac{i}{5} & 0 & -\frac{2\sqrt{3}i}{15} & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}i}{15} & 0 & -\frac{i}{5} & 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 & -\frac{3i}{20} & 0 \\ 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{15}i}{20} \end{bmatrix}$
181	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
182	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 \\ -\frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 \end{bmatrix}$
183	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
184	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} & 0 & \frac{\sqrt{3}}{9} & 0 \\ 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & \frac{\sqrt{10}}{120} & 0 & -\frac{1}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & -\frac{7\sqrt{6}}{360} & 0 & \frac{\sqrt{3}}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{5} & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{\sqrt{3}}{180} & 0 & \frac{7\sqrt{6}}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{20} & 0 & -\frac{\sqrt{10}}{120} \end{bmatrix}$
185	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{3}i}{9} & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{\sqrt{10}i}{120} & 0 & \frac{i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & -\frac{7\sqrt{6}i}{360} & 0 & -\frac{\sqrt{3}i}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{\sqrt{3}i}{180} & 0 & -\frac{7\sqrt{6}i}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & \frac{\sqrt{10}i}{120} \end{bmatrix}$
186	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{36} & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{36} \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
187	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 & 0 & 0 & \frac{\sqrt{6}}{18} \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{36} & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & 0 & 0 & \frac{\sqrt{3}}{36} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
188	symmetry	$z$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3}{10} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 \\ 0 & 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} \end{bmatrix}$
189	symmetry	$x$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{10} & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 \\ 0 & -\frac{1}{5} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{5}}{20} \end{bmatrix}$
190	symmetry	$\begin{bmatrix} \frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{10} & 0 & \frac{i}{5} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{3}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{5}i}{20} \end{bmatrix}$
191	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
192	symmetry	$\begin{bmatrix} \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & \frac{\sqrt{5}}{15} & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & \frac{\sqrt{5}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{5}}{12} & 0 & \frac{\sqrt{10}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{6}}{12} \end{bmatrix}$
193	symmetry	$\begin{bmatrix} -\sqrt{3}yz \\ -\sqrt{3}xz \end{bmatrix}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,2}^{(a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{10}i}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
194	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{15} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 \end{bmatrix}$
195	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & -\frac{1}{6} \\ 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 \end{bmatrix}$
196	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{3i}{10} & 0 \end{bmatrix}$
197	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{40} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & -\frac{1}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & -\frac{1}{5} & 0 & -\frac{\sqrt{2}}{5} & 0 \\ 0 & \frac{1}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{3\sqrt{6}}{40} & 0 & 0 & 0 \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{1}{20} & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{40} & 0 & -\frac{\sqrt{15}}{20} \end{bmatrix}$
198	symmetry	$\begin{bmatrix} -\frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{i}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & -\frac{i}{5} & 0 & \frac{\sqrt{2}i}{5} & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{6}i}{40} & 0 & 0 & 0 \\ -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{20} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{i}{20} & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{40} & 0 & \frac{\sqrt{15}i}{20} \end{bmatrix}$
199	symmetry	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 \\ \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & \frac{i}{5} & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 \end{bmatrix}$
200	symmetry	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}}{20} & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 \\ \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
201	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
202	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
203	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
204	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & -\frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{14}}{56} \end{bmatrix}$
205	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
206	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
207	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
208	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 \end{bmatrix}$
209	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 \end{bmatrix}$
210	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{15} & 0 & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 \end{bmatrix}$
211	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & -\frac{2\sqrt{30}}{45} & 0 & -\frac{2\sqrt{15}}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & -\frac{2\sqrt{15}}{45} & 0 & -\frac{2\sqrt{30}}{45} & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{1}{12} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{180} & 0 & -\frac{\sqrt{30}}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{30}}{72} & 0 & -\frac{\sqrt{15}}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{1}{12} \end{bmatrix}$
212	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & -\frac{2\sqrt{30}i}{45} & 0 & \frac{2\sqrt{15}i}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{2\sqrt{15}i}{45} & 0 & \frac{2\sqrt{30}i}{45} & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{i}{12} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & \frac{\sqrt{30}i}{72} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{72} & 0 & \frac{\sqrt{15}i}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{i}{12} \end{bmatrix}$
213	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{45} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
214	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & 0 & 0 & \frac{\sqrt{6}}{9} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
215	symmetry	1
	$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
216	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{30} & 0 & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}i}{105} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}i}{105} & 0 \end{bmatrix}$
217	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{42}}{30} & 0 & \frac{\sqrt{14}}{10} & 0 & 0 & -\frac{\sqrt{42}}{90} & 0 & -\frac{\sqrt{21}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{10} & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 & -\frac{\sqrt{21}}{90} & 0 & -\frac{\sqrt{42}}{90} & 0 \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{315} & 0 & -\frac{\sqrt{42}}{126} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & \frac{\sqrt{42}}{126} & 0 & -\frac{\sqrt{21}}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & \frac{\sqrt{35}}{105} \end{bmatrix}$
218	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{42}i}{30} & 0 & -\frac{\sqrt{14}i}{10} & 0 & 0 & -\frac{\sqrt{42}i}{90} & 0 & \frac{\sqrt{21}i}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{10} & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & -\frac{\sqrt{21}i}{90} & 0 & \frac{\sqrt{42}i}{90} & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{14}i}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{315} & 0 & \frac{\sqrt{42}i}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & \frac{\sqrt{42}i}{126} & 0 & \frac{\sqrt{21}i}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{35}i}{105} \end{bmatrix}$
219	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{15} & -\frac{\sqrt{210}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 \\ -\frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{180} \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & \frac{2\sqrt{105}i}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}i}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{315} \\ 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{105} & 0 & 0 & 0 \end{bmatrix}$
220	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}}{15} & -\frac{\sqrt{210}}{180} & 0 & 0 & 0 & \frac{\sqrt{42}}{180} & 0 \\ -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 & 0 & 0 & \frac{\sqrt{210}}{180} \\ 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{30} & \frac{2\sqrt{105}}{315} & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 & 0 & 0 & \frac{2\sqrt{105}}{315} \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 & 0 \end{bmatrix}$
221	symmetry	$z$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 \end{bmatrix}$
222	symmetry	$x$ $\begin{bmatrix} -\frac{i}{4} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & \frac{3i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{30} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{3i}{20} & 0 & \frac{3\sqrt{2}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{30}i}{20} \end{bmatrix}$
223	symmetry	$y$ $\begin{bmatrix} \frac{1}{4} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & \frac{3}{20} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & \frac{3}{20} & 0 & \frac{3\sqrt{2}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{30}}{20} \end{bmatrix}$
224	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
225	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 \\ 0 & -\frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 \end{bmatrix}$
226	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
227	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{i}{6} & 0 \\ 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{10} & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{7\sqrt{2}i}{60} & 0 & \frac{i}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{i}{30} & 0 & \frac{7\sqrt{2}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{30}i}{60} \end{bmatrix}$
228	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{2}}{10} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & \frac{7\sqrt{2}}{60} & 0 & \frac{1}{30} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & \frac{1}{30} & 0 & \frac{7\sqrt{2}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{30}}{60} \end{bmatrix}$
229	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & -\frac{1}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 \end{bmatrix}$
230	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & \frac{i}{6} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 \end{bmatrix}$
231	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
232	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ \frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{15} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{4i}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{4i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{6}i}{15} & 0 \end{bmatrix}$
233	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
234	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & -\frac{\sqrt{3}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{18} & 0 \\ 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & \frac{\sqrt{2}i}{5} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{30} & 0 & -\frac{i}{10} & 0 & 0 & \frac{7\sqrt{3}i}{45} & 0 & -\frac{\sqrt{6}i}{45} & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{6}i}{45} & 0 & -\frac{7\sqrt{3}i}{45} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{5}i}{15} \end{bmatrix}$
235	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & \frac{\sqrt{2}}{5} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{30} & 0 & -\frac{1}{10} & 0 & 0 & -\frac{7\sqrt{3}}{45} & 0 & -\frac{\sqrt{6}}{45} & 0 & 0 \\ 0 & \frac{1}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{6}}{45} & 0 & -\frac{7\sqrt{3}}{45} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{5}}{15} \end{bmatrix}$
236	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} \\ 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}}{15} & 0 & 0 & 0 \end{bmatrix}$
237	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} \\ 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 \\ \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{9} \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{15} & 0 & 0 & 0 \end{bmatrix}$
238	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 \end{bmatrix}$
239	symmetry	$\begin{bmatrix} -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 \\ -\frac{i}{5} & 0 & -\frac{2\sqrt{3}i}{15} & 0 & 0 & \frac{3i}{20} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 \\ 0 & -\frac{2\sqrt{3}i}{15} & 0 & -\frac{i}{5} & 0 & 0 & \frac{3\sqrt{2}i}{40} & 0 & -\frac{3i}{20} & 0 \\ 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{15}i}{20} \end{bmatrix}$
240	symmetry	$\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & -\frac{2\sqrt{3}}{15} & 0 & 0 & -\frac{3}{20} & 0 & -\frac{3\sqrt{2}}{40} & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{15} & 0 & -\frac{1}{5} & 0 & 0 & -\frac{3\sqrt{2}}{40} & 0 & -\frac{3}{20} & 0 \\ 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{15}}{20} \end{bmatrix}$
241	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} \\ 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
242	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 \\ \frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{30} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 \end{bmatrix}$
243	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 \end{bmatrix}$
244	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} & 0 & -\frac{\sqrt{3}i}{9} & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{\sqrt{10}i}{120} & 0 & \frac{i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{15} & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & \frac{7\sqrt{6}i}{360} & 0 & -\frac{\sqrt{3}i}{180} & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{5} & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{\sqrt{3}i}{180} & 0 & -\frac{7\sqrt{6}i}{360} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & -\frac{i}{20} & 0 & \frac{\sqrt{10}i}{120} \end{bmatrix}$
245	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{9} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{9} & 0 & -\frac{\sqrt{3}}{9} & 0 \\ 0 & \frac{\sqrt{6}}{15} & 0 & 0 & \frac{\sqrt{10}}{120} & 0 & \frac{1}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & -\frac{7\sqrt{6}}{360} & 0 & -\frac{\sqrt{3}}{180} & 0 & 0 \\ 0 & \frac{\sqrt{2}}{5} & 0 & \frac{\sqrt{6}}{15} & 0 & 0 & -\frac{\sqrt{3}}{180} & 0 & -\frac{7\sqrt{6}}{360} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{20} & 0 & \frac{\sqrt{10}}{120} \end{bmatrix}$
246	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & \frac{\sqrt{3}}{36} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{180} & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{36} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
247	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & \frac{\sqrt{30}i}{18} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{3}i}{36} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{36} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
248	symmetry	$z$
	$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 \\ 0 & 0 & 0 & \frac{3i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{i}{10} \end{bmatrix}$
249	symmetry	$x$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{10} & 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 \\ 0 & -\frac{i}{5} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{3}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{5}i}{20} \end{bmatrix}$
250	symmetry	$\begin{bmatrix} -\frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{10} & 0 & -\frac{1}{5} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 \\ 0 & \frac{1}{5} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{5}}{20} \end{bmatrix}$
251	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
252	symmetry	$\begin{bmatrix} -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{10}i}{30} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{30} & 0 & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{10}i}{60} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{6}i}{12} \end{bmatrix}$
253	symmetry	$\begin{bmatrix} -\sqrt{3}xz \end{bmatrix}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & -\frac{\sqrt{10}}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & -\frac{\sqrt{5}}{15} & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & -\frac{\sqrt{5}}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{5}}{12} & 0 & -\frac{\sqrt{10}}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{6}}{12} \end{bmatrix}$
254	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}}{10} & \frac{1}{6} & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{1}{6} \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & \frac{\sqrt{10}}{15} & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & 0 & \frac{\sqrt{2}}{6} \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 \end{bmatrix}$
255	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & -\frac{i}{6} & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{i}{6} \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{15} & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 \end{bmatrix}$
256	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{3}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3}{10} & 0 \end{bmatrix}$
257	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & \frac{i}{5} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & \frac{i}{5} & 0 & \frac{\sqrt{2}i}{5} & 0 \\ 0 & -\frac{i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{6}i}{40} & 0 & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{i}{20} & 0 \\ 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{40} & 0 & \frac{\sqrt{15}i}{20} \end{bmatrix}$
258	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & \frac{1}{5} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & -\frac{1}{5} & 0 & \frac{\sqrt{2}}{5} & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{3\sqrt{6}}{40} & 0 & 0 & 0 \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{1}{20} & 0 \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{40} & 0 & \frac{\sqrt{15}}{20} \end{bmatrix}$
259	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 \\ \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 \\ \frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 \end{bmatrix}$
260	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{10} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 \\ -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
261	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
262	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
263	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
264	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
265	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & \frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{14}}{56} \end{bmatrix}$
266	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
267	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
268	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 \end{bmatrix}$
269	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 \end{bmatrix}$
270	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{15} & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 \end{bmatrix}$
271	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & -\frac{2\sqrt{30}i}{45} & 0 & -\frac{2\sqrt{15}i}{45} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{2\sqrt{15}i}{45} & 0 & -\frac{2\sqrt{30}i}{45} & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{180} & 0 & -\frac{\sqrt{30}i}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{72} & 0 & -\frac{\sqrt{15}i}{180} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{i}{12} \end{bmatrix}$
272	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & \frac{2\sqrt{30}}{45} & 0 & -\frac{2\sqrt{15}}{45} & 0 & 0 \\ 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{2\sqrt{15}}{45} & 0 & -\frac{2\sqrt{30}}{45} & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{1}{12} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{180} & 0 & -\frac{\sqrt{30}}{72} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{30}}{72} & 0 & -\frac{\sqrt{15}}{180} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{1}{12} \end{bmatrix}$
273	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{6}}{9} & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{45} & 0 & 0 & \frac{\sqrt{6}}{9} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & \frac{\sqrt{15}}{45} & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{45} & 0 & 0 & 0 & \frac{\sqrt{3}}{18} \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 \end{bmatrix}$
274	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{6}i}{9} & 0 & 0 & 0 & \frac{\sqrt{30}i}{45} & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{45} & 0 & 0 & 0 & \frac{\sqrt{6}i}{9} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 \\ -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{45} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 \end{bmatrix}$
275	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
276	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{30} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{30} & 0 & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{21}}{105} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{105} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{2\sqrt{21}}{105} & 0 \end{bmatrix}$
277	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{42}i}{30} & 0 & -\frac{\sqrt{14}i}{10} & 0 & 0 & \frac{\sqrt{42}i}{90} & 0 & \frac{\sqrt{21}i}{90} & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{10} & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & \frac{\sqrt{21}i}{90} & 0 & \frac{\sqrt{42}i}{90} & 0 \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{14}i}{70} & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{315} & 0 & \frac{\sqrt{42}i}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{\sqrt{42}i}{126} & 0 & \frac{\sqrt{21}i}{315} & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{35}i}{105} \end{bmatrix}$
278	symmetry	$\begin{bmatrix} \frac{\sqrt{42}}{30} & 0 & -\frac{\sqrt{14}}{10} & 0 & 0 & -\frac{\sqrt{42}}{90} & 0 & \frac{\sqrt{21}}{90} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{10} & 0 & \frac{\sqrt{42}}{30} & 0 & 0 & -\frac{\sqrt{21}}{90} & 0 & \frac{\sqrt{42}}{90} & 0 \\ 0 & -\frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{14}}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{315} & 0 & \frac{\sqrt{42}}{126} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & \frac{\sqrt{42}}{126} & 0 & \frac{\sqrt{21}}{315} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{70} & 0 & -\frac{\sqrt{35}}{105} \end{bmatrix}$
279	symmetry	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}}{15} & -\frac{\sqrt{210}}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 \\ -\frac{\sqrt{42}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}}{180} \\ 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{30} & \frac{2\sqrt{105}}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}}{315} & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{4\sqrt{21}}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}}{315} \\ 0 & \frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{105} & 0 & 0 & 0 \end{bmatrix}$
280	symmetry	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{15} & \frac{\sqrt{210}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{180} & 0 \\ \frac{\sqrt{42}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{180} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{180} \\ 0 & 0 & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & -\frac{2\sqrt{105}i}{315} & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 \\ -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{21}i}{315} & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{315} \\ 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{105} & 0 & 0 & 0 \end{bmatrix}$

bra: =  $\langle \frac{1}{2}, \frac{1}{2}; p |, \langle \frac{1}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, \frac{3}{2}; p |, \langle \frac{3}{2}, \frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{1}{2}; p |, \langle \frac{3}{2}, -\frac{3}{2}; p |$

ket: =  $| \frac{5}{2}, \frac{5}{2}; f \rangle, | \frac{5}{2}, \frac{3}{2}; f \rangle, | \frac{5}{2}, \frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{3}{2}; f \rangle, | \frac{5}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{7}{2}; f \rangle, | \frac{7}{2}, \frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{3}{2}; f \rangle, | \frac{7}{2}, \frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{3}{2}; f \rangle, | \frac{7}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, -\frac{7}{2}; f \rangle$

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} \end{bmatrix}$
282	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{42} & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 \\ 0 & -\frac{i}{42} & 0 & \frac{5\sqrt{2}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{6}i}{14} & 0 \\ 0 & 0 & -\frac{5\sqrt{2}i}{84} & 0 & \frac{i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{10}i}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{14} & 0 & -\frac{\sqrt{10}i}{14} \end{bmatrix}$
283	symmetry	$-\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{6} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{42} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & -\frac{\sqrt{2}}{14} & 0 & 0 \\ 0 & \frac{1}{42} & 0 & \frac{5\sqrt{2}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & -\frac{\sqrt{6}}{14} & 0 \\ 0 & 0 & \frac{5\sqrt{2}}{84} & 0 & \frac{1}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{10}}{14} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & -\frac{\sqrt{10}}{14} \end{bmatrix}$
284	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{21} & 0 & 0 & 0 & 0 & -\frac{2}{21} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 \\ 0 & \frac{2}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{21} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \end{bmatrix}$
285	symmetry	$\begin{bmatrix} -\frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{21} & 0 & 0 & 0 & -\frac{2i}{21} & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2i}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{21} & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} \end{bmatrix}$
286	symmetry	$\begin{bmatrix} \frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 \end{bmatrix}$
287	symmetry	$\begin{bmatrix} \frac{\sqrt{70}yz(3x^2-y^2)}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
288	symmetry	$\begin{bmatrix} \frac{\sqrt{70}xz(x^2-3y^2)}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
289	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{6}i}{56} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & \frac{3i}{28} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{56} & 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & -\frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{84} & 0 & -\frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & \frac{3i}{28} & 0 \end{bmatrix}$
290	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ \frac{\sqrt{6}}{56} & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{56} & 0 & \frac{3\sqrt{5}}{28} & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & -\frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{28} & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & -\frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & \frac{3}{28} & 0 \end{bmatrix}$
291	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
293	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 \\ -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{28} & 0 & 0 & 0 & \frac{3}{28} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \end{bmatrix}$
294	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 \\ \frac{3i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & \frac{3i}{28} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} \end{bmatrix}$
295	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 & 0 \end{bmatrix}$
296	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & \frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
298	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{2}i}{112} & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{28} & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{112} & 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{56} & 0 & \frac{\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{14} & 0 & -\frac{3\sqrt{3}i}{28} & 0 \end{bmatrix}$
299	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{2}}{112} & 0 & -\frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & -\frac{\sqrt{15}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{112} & 0 & \frac{\sqrt{15}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{7} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{56} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{\sqrt{3}}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & \frac{\sqrt{2}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & -\frac{3\sqrt{3}}{28} & 0 \end{bmatrix}$
300	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
302	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{56} & 0 & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \end{bmatrix}$
303	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & \frac{11\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 \end{bmatrix}$
305	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}i}{84} & 0 & -\frac{5i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & -\frac{25\sqrt{3}i}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & -\frac{i}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}i}{252} & 0 & -\frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{28} & 0 & \frac{5\sqrt{10}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & -\frac{\sqrt{15}i}{21} & 0 \end{bmatrix}$
306	symmetry	$-\sqrt{3}xz$
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & \frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{10}}{84} & 0 & -\frac{5}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{252} & 0 & -\frac{25\sqrt{3}}{252} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & -\frac{1}{7} & 0 & 0 \\ 0 & 0 & -\frac{25\sqrt{3}}{252} & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & -\frac{\sqrt{15}}{21} & 0 \\ 0 & 0 & 0 & -\frac{5}{28} & 0 & \frac{5\sqrt{10}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & -\frac{\sqrt{15}}{21} & 0 \end{bmatrix}$
307	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ -\frac{5\sqrt{30}}{126} & 0 & 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & \frac{5\sqrt{30}}{126} & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 \\ 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$
308	symmetry	$-\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{30}i}{126} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & \frac{5\sqrt{30}i}{126} & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 \end{bmatrix}$
309	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \end{bmatrix}$
310	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 \\ \frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ 0 & -\frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 \\ \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
312	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{112} & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & \frac{i}{14} & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}i}{112} & 0 & -\frac{15i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15i}{56} & 0 & \frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & \frac{3\sqrt{5}i}{140} & 0 \end{bmatrix}$
313	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 \\ -\frac{\sqrt{30}}{112} & 0 & \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{140} & 0 & \frac{1}{14} & 0 & 0 & 0 \\ 0 & \frac{15\sqrt{2}}{112} & 0 & -\frac{15}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{35} & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{15}{56} & 0 & \frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{84} & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{3}}{56} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 & \frac{3\sqrt{5}}{140} & 0 \end{bmatrix}$
314	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
315	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
316	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}}{56} & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{56} & 0 & 0 & 0 & \frac{15}{56} & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{15}{56} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{56} & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} \end{bmatrix}$
317	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}i}{56} & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{56} & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & \frac{15i}{56} & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{280} & 0 & 0 \\ 0 & \frac{15i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{56} & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 & 0 & \frac{11\sqrt{30}i}{840} & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \end{bmatrix}$
319	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & \frac{\sqrt{6}i}{9} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{5}i}{21} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{3}i}{63} & 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & \frac{2\sqrt{3}i}{63} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & -\frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 \end{bmatrix}$
320	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{9} & 0 & \frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}}{21} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{63} & 0 & \frac{5\sqrt{6}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & \frac{2\sqrt{3}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & -\frac{2\sqrt{5}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 \end{bmatrix}$
321	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}}{21} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{15}}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ 0 & \frac{8\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 \end{bmatrix}$
322	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} \frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 & 0 \\ -\frac{4\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}i}{63} & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{8\sqrt{3}i}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}i}{63} & 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 \end{bmatrix}$
323	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 \end{bmatrix}$
325	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & \\ 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
326	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{35}i}{28} & 0 \end{bmatrix}$
327	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{84} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{35}}{28} & 0 \end{bmatrix}$
328	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
329	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \end{bmatrix}$
330	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{42} & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 \\ -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{42} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 \\ -\frac{\sqrt{10}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \\ 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
331	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{10}i}{105} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}i}{105} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 & 0 \end{bmatrix}$
332	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 \\ \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{42} & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 \\ \frac{\sqrt{10}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
333	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{126} & 0 & -\frac{\sqrt{30}i}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{126} & 0 & \frac{\sqrt{15}i}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 \\ -\frac{\sqrt{2}i}{42} & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{90} & 0 & -\frac{\sqrt{15}i}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{315} & 0 & -\frac{\sqrt{30}i}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & \frac{\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & -\frac{5\sqrt{3}i}{42} & 0 \end{bmatrix}$
334	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{126} & 0 & -\frac{\sqrt{30}}{126} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{126} & 0 & \frac{\sqrt{15}}{126} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{14} & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 \\ \frac{\sqrt{2}}{42} & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{90} & 0 & -\frac{\sqrt{15}}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{315} & 0 & -\frac{\sqrt{30}}{90} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{35} & 0 & \frac{\sqrt{2}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & -\frac{5\sqrt{3}}{42} & 0 \end{bmatrix}$
335	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{30}}{252} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & \frac{\sqrt{5}}{7} & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & \frac{\sqrt{30}}{252} & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{21} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{63} & 0 & 0 & 0 & \frac{\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} \end{bmatrix}$
336	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{252} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{252} & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & \frac{\sqrt{30}i}{252} & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{63} & 0 & 0 & 0 & \frac{\sqrt{3}i}{63} & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{63} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{63} & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} \end{bmatrix}$
337	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{G}_5^{(1,-1;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
339	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{G}_5^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
340	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
341	symmetry	$-\frac{3\sqrt{14}y(5x^4-10x^2y^2+y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
342	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \end{bmatrix}$
343	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \end{bmatrix}$
344	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
345	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
346	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & \frac{\sqrt{30}}{120} \end{bmatrix}$
347	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & \frac{\sqrt{210}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} \end{bmatrix}$
348	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 \\ \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}i}{336} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 \\ \frac{25\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
349	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 \end{bmatrix}$
350	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 \\ -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}}{336} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ -\frac{25\sqrt{14}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
351	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{63} & 0 & \frac{\sqrt{42}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{63} & 0 & -\frac{\sqrt{21}i}{63} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 \\ \frac{5\sqrt{70}i}{336} & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}i}{144} & 0 & \frac{5\sqrt{21}i}{504} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{21}i}{504} & 0 & \frac{5\sqrt{42}i}{144} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & -\frac{5\sqrt{70}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
352	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{63} & 0 & \frac{\sqrt{42}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{336} & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{63} & 0 & -\frac{\sqrt{21}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 \\ -\frac{5\sqrt{70}}{336} & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{42}}{144} & 0 & \frac{5\sqrt{21}}{504} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{504} & 0 & \frac{5\sqrt{42}}{144} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & -\frac{5\sqrt{70}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
353	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{42}}{126} & 0 & 0 & 0 & \frac{\sqrt{210}}{126} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}}{126} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}}{168} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}}{504} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}}{504} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \end{bmatrix}$
354	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{42}i}{126} & 0 & 0 & 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{126} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}i}{168} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ \frac{25\sqrt{21}i}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}i}{504} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & -\frac{5\sqrt{105}i}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}i}{504} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & -\frac{5\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \end{bmatrix}$
355	symmetry	$z$
	$\mathbb{G}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
356	symmetry	$x$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
357	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
358	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3i}{7} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{112} & 0 \\ \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}i}{112} & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ -\frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
359	symmetry	$\begin{bmatrix} 0 & 0 & \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 \end{bmatrix}$
360	symmetry	$\begin{bmatrix} \frac{\sqrt{10}y(3x^2-y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3}{7} & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 \\ -\frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}}{112} & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 \\ \frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
361	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{112} & 0 & -\frac{3\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{7} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{112} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 \\ -\frac{3\sqrt{10}i}{112} & 0 & \frac{9i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9i}{56} & 0 & \frac{3\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{15}i}{84} & 0 \end{bmatrix}$
362	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{7} & 0 & \frac{\sqrt{6}}{7} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{112} & 0 & -\frac{3\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{7} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{112} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 \\ \frac{3\sqrt{10}}{112} & 0 & \frac{9}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9}{56} & 0 & \frac{3\sqrt{10}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{84} & 0 \end{bmatrix}$
363	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & \frac{\sqrt{30}}{14} & 0 & 0 & \frac{3}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{3}{56} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{56} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 \end{bmatrix}$
364	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & \frac{\sqrt{30}i}{14} & 0 & 0 & -\frac{3i}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{3i}{56} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & -\frac{\sqrt{12}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ -\frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 \end{bmatrix}$
366	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{6} & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{42} & 0 & -\frac{5\sqrt{2}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{2}}{84} & 0 & -\frac{1}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & \frac{\sqrt{10}i}{14} & 0 \end{bmatrix}$
367	symmetry	$-\sqrt{3}xz$
	$\mathbb{T}_{2,2}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{6} & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{42} & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{2}i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{42} & 0 & \frac{5\sqrt{2}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{2}i}{84} & 0 & \frac{i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{14} & 0 & -\frac{\sqrt{10}i}{14} & 0 \end{bmatrix}$
368	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & \frac{\sqrt{10}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{21} & 0 & 0 & 0 & -\frac{2i}{21} & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 \\ 0 & \frac{2i}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{21} & 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 \end{bmatrix}$
369	symmetry	$\begin{bmatrix} \frac{\sqrt{10}}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & -\frac{\sqrt{10}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{21} & 0 & 0 & 0 & \frac{2}{21} & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 \\ 0 & \frac{2}{21} & 0 & 0 & 0 & \frac{\sqrt{5}}{21} & 0 & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 \end{bmatrix}$
370	symmetry	$\begin{bmatrix} \frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 \end{bmatrix}$
371	symmetry	$\begin{bmatrix} \frac{\sqrt{70}yz(3x^2-y^2)}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
372	symmetry	$\begin{bmatrix} \frac{\sqrt{70}xz(x^2-3y^2)}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 \\ -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
373	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ \frac{\sqrt{6}}{56} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{56} & 0 & -\frac{3\sqrt{5}}{28} & 0 & 0 & 0 & 0 & \frac{1}{7} & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{28} & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & \frac{1}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{3}{28} & 0 \end{bmatrix}$
374	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ \frac{\sqrt{6}i}{56} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & -\frac{3i}{28} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}i}{56} & 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & 0 & \frac{i}{7} & 0 & -\frac{\sqrt{15}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}i}{28} & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & -\frac{i}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & \frac{3i}{28} & 0 \end{bmatrix}$
375	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
377	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 \\ -\frac{3i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{28} & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{28} & 0 & 0 & 0 & \frac{3i}{28} & 0 & 0 & -\frac{\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \end{bmatrix}$
378	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 \\ -\frac{3}{28} & 0 & 0 & 0 & \frac{3\sqrt{5}}{28} & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{28} & 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \end{bmatrix}$
379	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 & 0 \end{bmatrix}$
380	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
382	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & \frac{\sqrt{15}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{112} & 0 & -\frac{\sqrt{15}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{56} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & -\frac{\sqrt{2}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{14} & 0 & \frac{3\sqrt{3}}{28} & 0 \end{bmatrix}$
383	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ \frac{\sqrt{2}i}{112} & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{28} & 0 & -\frac{\sqrt{15}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{112} & 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{5}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{56} & 0 & -\frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{28} & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & \frac{\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{14} & 0 & -\frac{3\sqrt{3}i}{28} & 0 \end{bmatrix}$
384	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
386	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{56} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \end{bmatrix}$
387	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{30}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{56} & 0 & 0 & -\frac{11\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & \frac{11\sqrt{2}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 \end{bmatrix}$
389	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{9} & 0 & \frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{18} & 0 & \frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}}{84} & 0 & -\frac{5}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{252} & 0 & -\frac{25\sqrt{3}}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & -\frac{1}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}}{252} & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{28} & 0 & \frac{5\sqrt{10}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & -\frac{\sqrt{15}}{21} & 0 \end{bmatrix}$
390	symmetry	$-\sqrt{3}xz$
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{9} & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{18} & 0 & -\frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{10}i}{84} & 0 & \frac{5i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & \frac{25\sqrt{3}i}{252} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & \frac{i}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{25\sqrt{3}i}{252} & 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & 0 & -\frac{i}{7} & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & 0 & 0 & \frac{5i}{28} & 0 & -\frac{5\sqrt{10}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & \frac{\sqrt{15}i}{21} & 0 \end{bmatrix}$
391	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{18} & 0 & 0 & 0 & \frac{\sqrt{15}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ \frac{5\sqrt{30}i}{126} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{63} & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & -\frac{5\sqrt{30}i}{126} & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 \\ 0 & 0 & \frac{5i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
392	symmetry	$-\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{15}}{18} & 0 & 0 & 0 & -\frac{\sqrt{3}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{18} & 0 & 0 & 0 & -\frac{\sqrt{15}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{30}}{126} & 0 & 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{63} & 0 & 0 & 0 & \frac{5\sqrt{30}}{126} & 0 & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$
393	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \end{bmatrix}$
394	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 \\ \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} \\ 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 \\ -\frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
396	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 \\ \frac{\sqrt{30}}{112} & 0 & \frac{5\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & \frac{1}{14} & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}}{112} & 0 & -\frac{15}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15}{56} & 0 & \frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{3\sqrt{5}}{140} & 0 \end{bmatrix}$
397	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{112} & 0 & -\frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{140} & 0 & -\frac{i}{14} & 0 & 0 & 0 \\ 0 & -\frac{15\sqrt{2}i}{112} & 0 & \frac{15i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & \frac{\sqrt{3}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{15i}{56} & 0 & -\frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & \frac{\sqrt{5}i}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{3}i}{56} & 0 & \frac{\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & -\frac{3\sqrt{5}i}{140} & 0 \end{bmatrix}$
398	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
400	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{56} & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{56} & 0 & 0 & 0 & -\frac{15i}{56} & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 \\ 0 & \frac{15i}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{56} & 0 & 0 & \frac{\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{840} & 0 \\ 0 & 0 & -\frac{5\sqrt{6}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} \end{bmatrix}$
401	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}}{56} & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{56} & 0 & 0 & 0 & \frac{15}{56} & 0 & 0 & -\frac{11\sqrt{30}}{840} & 0 & 0 & 0 & -\frac{\sqrt{10}}{280} & 0 & 0 \\ 0 & \frac{15}{56} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{56} & 0 & 0 & \frac{\sqrt{10}}{280} & 0 & 0 & 0 & \frac{11\sqrt{30}}{840} & 0 \\ 0 & 0 & -\frac{5\sqrt{6}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{4\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 \end{bmatrix}$
403	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}}{9} & 0 & -\frac{\sqrt{3}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{9} & 0 & -\frac{\sqrt{6}}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}}{21} & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{3}}{63} & 0 & -\frac{5\sqrt{6}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{63} & 0 & -\frac{2\sqrt{3}}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{2\sqrt{5}}{21} & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & \frac{\sqrt{30}}{84} & 0 & 0 \end{bmatrix}$
404	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{9} & 0 & \frac{\sqrt{3}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{9} & 0 & \frac{\sqrt{6}i}{9} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{5}i}{21} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{3}i}{63} & 0 & \frac{5\sqrt{6}i}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}i}{63} & 0 & \frac{2\sqrt{3}i}{63} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{30}i}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & -\frac{2\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & -\frac{\sqrt{30}i}{84} & 0 \end{bmatrix}$
405	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{18} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{8\sqrt{3}i}{63} & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ 0 & \frac{8\sqrt{3}i}{63} & 0 & 0 & 0 & -\frac{4\sqrt{15}i}{63} & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 \end{bmatrix}$
406	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} -\frac{\sqrt{30}}{18} & 0 & 0 & 0 & \frac{\sqrt{6}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{18} & 0 & 0 & 0 & \frac{\sqrt{30}}{18} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{15}}{63} & 0 & 0 & 0 & \frac{8\sqrt{3}}{63} & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ 0 & \frac{8\sqrt{3}}{63} & 0 & 0 & 0 & \frac{4\sqrt{15}}{63} & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 \end{bmatrix}$
407	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 \end{bmatrix}$
409	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & \frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{35}}{28} & 0 \end{bmatrix}$
411	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{21} & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{24} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{35}i}{28} & 0 \end{bmatrix}$
412	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \end{bmatrix}$
413	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{14}}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \end{bmatrix}$
414	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & \frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 \\ -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{42} & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 \\ -\frac{\sqrt{10}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
415	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{21} & 0 & 0 & 0 \\ 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{10}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 \end{bmatrix}$
416	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{42} & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 \\ -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{42} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 \\ -\frac{\sqrt{10}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & -\frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
417	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{126} & 0 & -\frac{\sqrt{30}}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & -\frac{\sqrt{10}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{126} & 0 & \frac{\sqrt{15}}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{14} & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 \\ -\frac{\sqrt{2}}{42} & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{90} & 0 & -\frac{\sqrt{15}}{315} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{315} & 0 & -\frac{\sqrt{30}}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & \frac{\sqrt{2}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & -\frac{5\sqrt{3}}{42} & 0 \end{bmatrix}$
418	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{126} & 0 & \frac{\sqrt{30}i}{126} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{42} & 0 & \frac{\sqrt{10}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{126} & 0 & -\frac{\sqrt{15}i}{126} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{14} & 0 & \frac{5\sqrt{6}i}{42} & 0 & 0 \\ -\frac{\sqrt{2}i}{42} & 0 & -\frac{\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{42} & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{90} & 0 & \frac{\sqrt{15}i}{315} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{315} & 0 & \frac{\sqrt{30}i}{90} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{35} & 0 & -\frac{\sqrt{2}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & \frac{5\sqrt{3}i}{42} & 0 \end{bmatrix}$
419	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{252} & 0 & 0 & 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & -\frac{\sqrt{5}i}{7} & 0 & 0 & 0 & \frac{\sqrt{15}i}{21} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{252} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{252} & 0 & 0 & -\frac{\sqrt{15}i}{21} & 0 & 0 & 0 & \frac{\sqrt{5}i}{7} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{63} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{63} & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{63} & 0 & 0 & 0 & \frac{\sqrt{15}i}{63} & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{84} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 \end{bmatrix}$
420	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{30}}{252} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{252} & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{252} & 0 & 0 & 0 & \frac{\sqrt{30}}{252} & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{5}}{7} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{21} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{63} & 0 & 0 & 0 & \frac{\sqrt{3}}{63} & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{63} & 0 & 0 & 0 & -\frac{\sqrt{15}}{63} & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & 0 & 0 & \frac{\sqrt{10}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} \end{bmatrix}$
421	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \end{bmatrix}$
423	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{30} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
424	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
425	symmetry	$-\frac{3\sqrt{14}y(5x^4-10x^2y^2+y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
426	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \end{bmatrix}$
427	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 \end{bmatrix}$
428	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{20} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
429	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{20} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
430	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{40} & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} \end{bmatrix}$
431	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & \frac{\sqrt{210}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{40} & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & \frac{\sqrt{30}}{120} \end{bmatrix}$
432	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{21} & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 \\ -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{25\sqrt{14}}{336} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ -\frac{25\sqrt{14}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
433	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \end{bmatrix}$
434	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 \\ -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{25\sqrt{14}i}{336} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{25\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
435	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}}{63} & 0 & -\frac{\sqrt{42}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}}{336} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{63} & 0 & \frac{\sqrt{21}}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{210}}{336} & 0 & 0 \\ -\frac{5\sqrt{70}}{336} & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{42}}{144} & 0 & -\frac{5\sqrt{21}}{504} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{504} & 0 & -\frac{5\sqrt{42}}{144} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & \frac{5\sqrt{70}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
436	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{63} & 0 & \frac{\sqrt{42}i}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{63} & 0 & -\frac{\sqrt{21}i}{63} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 \\ -\frac{5\sqrt{70}i}{336} & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{42}i}{144} & 0 & \frac{5\sqrt{21}i}{504} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}i}{504} & 0 & \frac{5\sqrt{42}i}{144} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & -\frac{5\sqrt{70}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
437	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{126} & 0 & 0 & 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{126} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{126} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{70}i}{168} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}i}{504} & 0 & 0 & 0 & -\frac{5\sqrt{105}i}{504} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}i}{504} & 0 & 0 & 0 & \frac{25\sqrt{21}i}{504} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \end{bmatrix}$
438	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{42}}{126} & 0 & 0 & 0 & -\frac{\sqrt{210}}{126} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{126} & 0 & 0 & 0 & \frac{\sqrt{42}}{126} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{70}}{168} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{25\sqrt{21}}{504} & 0 & 0 & 0 & \frac{5\sqrt{105}}{504} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & \frac{5\sqrt{105}}{504} & 0 & 0 & 0 & -\frac{25\sqrt{21}}{504} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & \frac{5\sqrt{70}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} \end{bmatrix}$
439	symmetry	$z$
	$\mathbb{M}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
440	symmetry	$x$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
441	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
442	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3}{7} & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{112} & 0 \\ \frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{2}}{112} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 \\ -\frac{15\sqrt{2}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
443	symmetry	$\begin{bmatrix} 0 & 0 & \frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 \end{bmatrix}$
444	symmetry	$\begin{bmatrix} \frac{\sqrt{10}y(3x^2-y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{3i}{7} & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 \\ \frac{3i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{2}i}{112} & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 \\ -\frac{15\sqrt{2}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & -\frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
445	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{3}}{7} & 0 & \frac{\sqrt{6}}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{112} & 0 & -\frac{3\sqrt{2}}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{7} & 0 & -\frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{112} & 0 & -\frac{\sqrt{30}}{112} & 0 & 0 \\ -\frac{3\sqrt{10}}{112} & 0 & \frac{9}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{84} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9}{56} & 0 & \frac{3\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{15}}{84} & 0 \end{bmatrix}$
446	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{7} & 0 & -\frac{\sqrt{6}i}{7} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{112} & 0 & \frac{3\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{7} & 0 & \frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{112} & 0 & \frac{\sqrt{30}i}{112} & 0 & 0 \\ -\frac{3\sqrt{10}i}{112} & 0 & -\frac{9i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{84} & 0 & \frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9i}{56} & 0 & -\frac{3\sqrt{10}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{15}i}{84} & 0 \end{bmatrix}$
447	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & -\frac{3i}{56} & 0 & 0 & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{14} & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & 0 & 0 & \frac{3i}{56} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 \\ -\frac{5\sqrt{3}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{56} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{56} & 0 & 0 & 0 & \frac{5\sqrt{3}i}{56} & 0 & 0 & \frac{\sqrt{6}i}{56} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 \end{bmatrix}$
448	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{6}}{14} & 0 & 0 & 0 & \frac{\sqrt{30}}{14} & 0 & 0 & -\frac{3}{56} & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & -\frac{3}{56} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 \\ -\frac{5\sqrt{3}}{56} & 0 & 0 & 0 & \frac{\sqrt{15}}{56} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{3}}{56} & 0 & 0 & \frac{\sqrt{6}}{56} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} \end{bmatrix}$

bra: =  $\langle \frac{3}{2}, \frac{3}{2}; d |, \langle \frac{3}{2}, \frac{1}{2}; d |, \langle \frac{3}{2}, -\frac{1}{2}; d |, \langle \frac{3}{2}, -\frac{3}{2}; d |, \langle \frac{5}{2}, \frac{5}{2}; d |, \langle \frac{5}{2}, \frac{3}{2}; d |, \langle \frac{5}{2}, \frac{1}{2}; d |, \langle \frac{5}{2}, -\frac{1}{2}; d |, \langle \frac{5}{2}, -\frac{3}{2}; d |, \langle \frac{5}{2}, -\frac{5}{2}; d |$

ket: =  $| \frac{3}{2}, \frac{3}{2}; d \rangle, | \frac{3}{2}, \frac{1}{2}; d \rangle, | \frac{3}{2}, -\frac{1}{2}; d \rangle, | \frac{3}{2}, -\frac{3}{2}; d \rangle, | \frac{5}{2}, \frac{5}{2}; d \rangle, | \frac{5}{2}, \frac{3}{2}; d \rangle, | \frac{5}{2}, \frac{1}{2}; d \rangle, | \frac{5}{2}, -\frac{1}{2}; d \rangle, | \frac{5}{2}, -\frac{3}{2}; d \rangle, | \frac{5}{2}, -\frac{5}{2}; d \rangle$

Table 8: (d,d) block.

No.	multipole	matrix
449	symmetry	$\begin{bmatrix} 1 & & & & & & & & & & & & & & & \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
450	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(A_{1g})$	$\sqrt{3}yz$	$\begin{bmatrix} -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{70} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{35} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{70} & 0 & 0 & 0 & 0 & \frac{4\sqrt{7}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \end{bmatrix}$
	$\sqrt{3}xz$	
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	
451	symmetry	$\sqrt{3}yz$
452	symmetry	$-\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(a)}(E_g, 1)$	0	$\frac{\sqrt{7}}{10}$ 0 0 0 $-\frac{\sqrt{105}}{70}$ 0 $\frac{3\sqrt{42}}{140}$ 0 0 0
	$\frac{\sqrt{7}}{10}$	0 0 0 0 0 $\frac{\sqrt{7}}{70}$ 0 $\frac{\sqrt{14}}{28}$ 0 0
	0	0 0 0 $-\frac{\sqrt{7}}{10}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{7}}{70}$ 0
	0	0 0 $-\frac{\sqrt{7}}{10}$ 0 0 0 0 $\frac{3\sqrt{42}}{140}$ 0 $-\frac{\sqrt{105}}{70}$
	$-\frac{\sqrt{105}}{70}$	0 0 0 0 0 $\frac{\sqrt{105}}{35}$ 0 0 0 0
	0	$\frac{\sqrt{7}}{70}$ 0 0 $\frac{\sqrt{105}}{35}$ 0 $\frac{\sqrt{42}}{35}$ 0 0 0 0
	$\frac{3\sqrt{42}}{140}$	0 $\frac{\sqrt{14}}{28}$ 0 0 0 $\frac{\sqrt{42}}{35}$ 0 0 0 0
	0	$\frac{\sqrt{14}}{28}$ 0 $\frac{3\sqrt{42}}{140}$ 0 0 0 0 $-\frac{\sqrt{42}}{35}$ 0 0
	0	0 $\frac{\sqrt{7}}{70}$ 0 0 0 0 $-\frac{\sqrt{42}}{35}$ 0 $-\frac{\sqrt{105}}{35}$ 0
453 symmetry		
$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$		
454	symmetry	$-\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(a)}(E_g, 2)$	0 0 $-\frac{\sqrt{7}i}{10}$ 0 0 0 0 $-\frac{\sqrt{42}i}{70}$ 0 0	
	0 0 0 $-\frac{\sqrt{7}i}{10}$ $-\frac{\sqrt{35}i}{35}$ 0 0 0 $-\frac{2\sqrt{7}i}{35}$ 0	
	$\frac{\sqrt{7}i}{10}$ 0 0 0 0 $-\frac{2\sqrt{7}i}{35}$ 0 0 0 $-\frac{\sqrt{35}i}{35}$	
	0 $\frac{\sqrt{7}i}{10}$ 0 0 0 0 $-\frac{\sqrt{42}i}{70}$ 0 0 0	
	0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 $-\frac{\sqrt{210}i}{70}$ 0 0 0	
	0 0 $\frac{2\sqrt{7}i}{35}$ 0 0 0 0 $-\frac{3\sqrt{42}i}{70}$ 0 0	
	0 0 0 $\frac{\sqrt{42}i}{70}$ $\frac{\sqrt{210}i}{70}$ 0 0 0 $-\frac{3\sqrt{42}i}{70}$ 0	
	$\frac{\sqrt{42}i}{70}$ 0 0 0 0 $\frac{3\sqrt{42}i}{70}$ 0 0 0 $-\frac{\sqrt{210}i}{70}$	
	0 $\frac{2\sqrt{7}i}{35}$ 0 0 0 0 $\frac{3\sqrt{42}i}{70}$ 0 0 0	
	0 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0	
455	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{210}}{35}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{35}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0	
	0 0 0 0 $\frac{\sqrt{35}}{70}$ 0 0 0 0 0	
	$\frac{\sqrt{35}}{35}$ 0 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0	
	0 $-\frac{\sqrt{210}}{35}$ 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0	
	0 0 $\frac{\sqrt{210}}{35}$ 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0	
	0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0	
456	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{Q}_4^{(a)}(A_{2g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
458	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{70}i}{140} \\ \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 \end{bmatrix}$
		$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{70}}{140} \\ \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 \end{bmatrix}$
		$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
461	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
462	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 3)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{Q}_{4,2}^{(a)}(E_g, 3)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{140} \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
464	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
		$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$		$\begin{bmatrix} -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{50} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{75} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{30}}{75} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{30}}{75} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{75} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} \end{bmatrix}$
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 1)$		$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 & \frac{9\sqrt{5}i}{100} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{100} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{30}i}{100} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{100} & 0 & -\frac{3\sqrt{2}i}{20} \\ -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{100} & 0 & 0 & \frac{\sqrt{2}i}{5} & 0 & -\frac{2\sqrt{5}i}{25} & 0 & 0 & 0 \\ -\frac{9\sqrt{5}i}{100} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{2\sqrt{5}i}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{9\sqrt{5}i}{100} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}i}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{100} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{5}i}{25} & 0 & \frac{\sqrt{2}i}{5} \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{5} & 0 \end{bmatrix}$
466	symmetry	$-\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{30}}{50}$ 0 0 0 $-\frac{3\sqrt{2}}{20}$ 0 $\frac{9\sqrt{5}}{100}$ 0 0 0
	$\frac{\sqrt{30}}{50}$	0 0 0 0 0 $\frac{\sqrt{30}}{100}$ 0 $\frac{\sqrt{15}}{20}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{30}}{50}$ 0 0 $\frac{\sqrt{15}}{20}$ 0 0 $\frac{\sqrt{30}}{100}$ 0
	0	0 0 $-\frac{\sqrt{30}}{50}$ 0 0 0 0 $\frac{9\sqrt{5}}{100}$ 0 $-\frac{3\sqrt{2}}{20}$
	$-\frac{3\sqrt{2}}{20}$	0 0 0 0 0 0 $-\frac{\sqrt{2}}{5}$ 0 0 0 0
	0	$\frac{\sqrt{30}}{100}$ 0 0 $-\frac{\sqrt{2}}{5}$ 0 $-\frac{2\sqrt{5}}{25}$ 0 0 0 0
	$\frac{9\sqrt{5}}{100}$	0 $\frac{\sqrt{15}}{20}$ 0 0 0 $-\frac{2\sqrt{5}}{25}$ 0 0 0 0
	0	$\frac{\sqrt{15}}{20}$ 0 $\frac{9\sqrt{5}}{100}$ 0 0 0 0 0 $\frac{2\sqrt{5}}{25}$ 0
	0	0 $\frac{\sqrt{30}}{100}$ 0 0 0 0 0 $\frac{2\sqrt{5}}{25}$ 0 $\frac{\sqrt{2}}{5}$
	0	0 0 0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 $\frac{\sqrt{2}}{5}$ 0
467	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 2)$	0	0 0 $-\frac{\sqrt{30}}{50}$ 0 0 0 0 $-\frac{3\sqrt{5}}{50}$ 0 0
	0	0 0 0 $-\frac{\sqrt{30}}{50}$ $\frac{\sqrt{6}}{10}$ 0 0 0 $-\frac{\sqrt{30}}{25}$ 0
	$-\frac{\sqrt{30}}{50}$	0 0 0 0 0 $\frac{\sqrt{30}}{25}$ 0 0 0 $-\frac{\sqrt{6}}{10}$
	0	$-\frac{\sqrt{30}}{50}$ 0 0 0 0 0 $\frac{3\sqrt{5}}{50}$ 0 0 0
	0	$\frac{\sqrt{6}}{10}$ 0 0 0 0 0 $\frac{1}{5}$ 0 0 0
	0	0 0 $\frac{\sqrt{30}}{25}$ 0 0 0 0 $\frac{3\sqrt{5}}{25}$ 0 0
	0	0 0 0 $\frac{3\sqrt{5}}{50}$ $\frac{1}{5}$ 0 0 0 $\frac{3\sqrt{5}}{25}$ 0
	$-\frac{3\sqrt{5}}{50}$	0 0 0 0 0 $\frac{3\sqrt{5}}{25}$ 0 0 0 $\frac{1}{5}$
	0	$-\frac{\sqrt{30}}{25}$ 0 0 0 0 0 $\frac{3\sqrt{5}}{25}$ 0 0 0
	0	0 0 $-\frac{\sqrt{6}}{10}$ 0 0 0 0 $\frac{1}{5}$ 0 0
468	symmetry	$-\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{50} & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{25} & 0 \\ \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} \\ 0 & \frac{\sqrt{30}i}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{50} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{25} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{50} & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{25} \\ \frac{3\sqrt{5}i}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{25} & 0 & 0 & 0 & \frac{i}{5} \\ 0 & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 \end{bmatrix}$
469	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} \end{bmatrix}$
470	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 \end{bmatrix}$
471	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 \end{bmatrix}$
472	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{28} \quad 0 \quad \frac{\sqrt{70}i}{280}$	
	$\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{35} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{35} \quad 0 \quad -\frac{\sqrt{7}i}{7} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{7}i}{28} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{7} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{7} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{7} \quad 0 \quad -\frac{\sqrt{70}i}{35}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{35} \quad 0$	
473	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad \frac{\sqrt{70}}{280}$	
	$\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{35} \quad 0 \quad -\frac{\sqrt{7}}{7} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{7}}{28} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{7} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{7} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{7} \quad 0 \quad -\frac{\sqrt{70}}{35}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{35} \quad 0$	
474	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 \end{bmatrix}$
475	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 \end{bmatrix}$
476	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 0 $-\frac{\sqrt{21}}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 $\frac{\sqrt{105}}{140}$	
	0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{105}}{140}$ 0 0 0 0 $-\frac{3\sqrt{70}}{70}$ 0 0 0	
	0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0	
	0 0 0 $-\frac{\sqrt{14}}{28}$ $-\frac{3\sqrt{70}}{70}$ 0 0 0 $\frac{\sqrt{14}}{14}$ 0	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 $-\frac{3\sqrt{70}}{70}$	
	0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0	
	0 0 $\frac{\sqrt{105}}{140}$ 0 0 0 0 $-\frac{3\sqrt{70}}{70}$ 0 0	
477	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{105}i}{140}$	
	0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{70}$ 0 0 0	
	0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0	
	0 0 0 $-\frac{\sqrt{14}i}{28}$ $\frac{3\sqrt{70}i}{70}$ 0 0 0 $\frac{\sqrt{14}i}{14}$ 0	
	$-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 $-\frac{3\sqrt{70}i}{70}$	
	0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0	
	0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 $\frac{3\sqrt{70}i}{70}$ 0 0	
478	symmetry	1

*continued ...*

Table 8

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} \end{bmatrix}$
479	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
		$\begin{bmatrix} \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 \\ -\frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{350} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \end{bmatrix}$
480	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{105}i}{25}$
	$\frac{\sqrt{105}i}{25}$	0
	0	$0$
	$\frac{2\sqrt{7}i}{35}$	$0$
	0	$0$
	$0$	$-\frac{2\sqrt{105}i}{525}$
	$0$	$0$
	$0$	$-\frac{\sqrt{210}i}{105}$
	$0$	$0$
	$0$	$0$
481	symmetry	$-\sqrt{3}xz$
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{105}}{25}$
	$-\frac{\sqrt{105}}{25}$	0
	0	$0$
	$0$	$-\frac{2\sqrt{7}}{35}$
	$0$	$0$
	$0$	$0$
	$0$	$\frac{3\sqrt{70}}{175}$
	$0$	$0$
	$0$	$0$
	$0$	$0$
482	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 2)$	0	0 0 $\frac{\sqrt{105}}{25}$ 0 0 0 0 $-\frac{2\sqrt{70}}{175}$ 0 0
	0	0 0 0 $\frac{\sqrt{105}}{25}$ $\frac{4\sqrt{21}}{105}$ 0 0 0 $-\frac{8\sqrt{105}}{525}$ 0
	$\frac{\sqrt{105}}{25}$	0 0 0 0 0 $\frac{8\sqrt{105}}{525}$ 0 0 0 $-\frac{4\sqrt{21}}{105}$
	0	$\frac{\sqrt{105}}{25}$ 0 0 0 0 0 $\frac{2\sqrt{70}}{175}$ 0 0 0
	0	$\frac{4\sqrt{21}}{105}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{140}$ 0 0 0
	0	0 0 $\frac{8\sqrt{105}}{525}$ 0 0 0 0 $-\frac{9\sqrt{70}}{700}$ 0 0
	0	0 0 0 $\frac{2\sqrt{70}}{175}$ $-\frac{3\sqrt{14}}{140}$ 0 0 0 $-\frac{9\sqrt{70}}{700}$ 0
	$-\frac{2\sqrt{70}}{175}$	0 0 0 0 0 $-\frac{9\sqrt{70}}{700}$ 0 0 0 $-\frac{3\sqrt{14}}{140}$
	0	$-\frac{8\sqrt{105}}{525}$ 0 0 0 0 0 $-\frac{9\sqrt{70}}{700}$ 0 0 0
	0	0 0 $-\frac{4\sqrt{21}}{105}$ 0 0 0 0 $-\frac{3\sqrt{14}}{140}$ 0 0
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 2)$	483	symmetry $-\sqrt{3}xy$
	0	0 0 $\frac{\sqrt{105}i}{25}$ 0 0 0 0 $-\frac{2\sqrt{70}i}{175}$ 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{25}$ $-\frac{4\sqrt{21}i}{105}$ 0 0 0 $-\frac{8\sqrt{105}i}{525}$ 0
	$-\frac{\sqrt{105}i}{25}$	0 0 0 0 0 $-\frac{8\sqrt{105}i}{525}$ 0 0 0 $-\frac{4\sqrt{21}i}{105}$
	0	$-\frac{\sqrt{105}i}{25}$ 0 0 0 0 0 $-\frac{2\sqrt{70}i}{175}$ 0 0 0
	0	$\frac{4\sqrt{21}i}{105}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{140}$ 0 0 0
	0	0 0 $\frac{8\sqrt{105}i}{525}$ 0 0 0 0 $-\frac{9\sqrt{70}i}{700}$ 0 0
	0	0 0 0 $\frac{2\sqrt{70}i}{175}$ $\frac{3\sqrt{14}i}{140}$ 0 0 0 $-\frac{9\sqrt{70}i}{700}$ 0
	$\frac{2\sqrt{70}i}{175}$	0 0 0 0 0 $\frac{9\sqrt{70}i}{700}$ 0 0 0 $-\frac{3\sqrt{14}i}{140}$
	0	$\frac{8\sqrt{105}i}{525}$ 0 0 0 0 0 $\frac{9\sqrt{70}i}{700}$ 0 0 0
	0	0 0 $\frac{4\sqrt{21}i}{105}$ 0 0 0 0 $\frac{3\sqrt{14}i}{140}$ 0 0
484	symmetry $z$	
	continued ...	

Table 8

No.	multipole	matrix
$\mathbb{G}_1^{(1,0;a)}(A_{2g})$	0 0 0 0 0 $-\frac{\sqrt{10}i}{10}$ 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 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{10}$ 0	
	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 $\frac{\sqrt{15}i}{10}$ 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 $\frac{\sqrt{10}i}{10}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
485	symmetry	$x$
$\mathbb{G}_{1,1}^{(1,0;a)}(E_g)$	0 0 0 0 $\frac{\sqrt{2}i}{4}$ 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 $-\frac{\sqrt{15}i}{20}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{15}i}{20}$ 0 $-\frac{\sqrt{30}i}{20}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 $-\frac{\sqrt{2}i}{4}$	
	$-\frac{\sqrt{2}i}{4}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{5}i}{20}$ 0 $-\frac{\sqrt{15}i}{20}$ 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 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{4}$ 0 0 0 0 0 0	
486	symmetry	$y$

*continued ...*

Table 8

No.	multipole	matrix
$\mathbb{G}_{1,2}^{(1,0;a)}(E_g)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{2}}{4} \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{G}_3^{(1,0;a)}(A_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 1)$	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
489		
490		

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0	0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{3\sqrt{5}i}{20}$ 0 0 0
	0	0 0 0 0 0 $\frac{7\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{15}i}{60}$ 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{15}i}{60}$ 0 $-\frac{7\sqrt{30}i}{120}$ 0
	0	0 0 0 0 0 0 0 $-\frac{3\sqrt{5}i}{20}$ 0 $\frac{\sqrt{2}i}{8}$
	$\frac{\sqrt{2}i}{8}$	0 0 0 0 0 0 0 0 0 0
	0	$-\frac{7\sqrt{30}i}{120}$ 0 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{5}i}{20}$	0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{15}i}{60}$ 0 $\frac{3\sqrt{5}i}{20}$ 0 0 0 0 0 0 0
	0	0 $\frac{7\sqrt{30}i}{120}$ 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0
491	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	0	0 0 0 0 $\frac{\sqrt{2}}{8}$ 0 $\frac{3\sqrt{5}}{20}$ 0 0 0
	0	0 0 0 0 0 $-\frac{7\sqrt{30}}{120}$ 0 $-\frac{\sqrt{15}}{60}$ 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{15}}{60}$ 0 $-\frac{7\sqrt{30}}{120}$ 0
	0	0 0 0 0 0 0 0 $\frac{3\sqrt{5}}{20}$ 0 $\frac{\sqrt{2}}{8}$
	$\frac{\sqrt{2}}{8}$	0 0 0 0 0 0 0 0 0 0
	0	$-\frac{7\sqrt{30}}{120}$ 0 0 0 0 0 0 0 0 0
	$\frac{3\sqrt{5}}{20}$	0 $-\frac{\sqrt{15}}{60}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{15}}{60}$ 0 $\frac{3\sqrt{5}}{20}$ 0 0 0 0 0 0 0
	0	0 $-\frac{7\sqrt{30}}{120}$ 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0
492	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
493	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
494	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
495	symmetry	$\sqrt{3}yz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & -\frac{\sqrt{70}}{28} \\ \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{28} & 0 & -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{21}}{84} & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
496	symmetry	$-\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)$	0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $-\frac{5\sqrt{21}i}{84}$ 0 0	
	0 0 0 0 0 0 $-\frac{5\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{42}i}{84}$ 0	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 $\frac{\sqrt{70}i}{28}$	
	$-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{7}i}{28}$ 0 $\frac{5\sqrt{21}i}{84}$ 0 0 0 0 0 0 0	
	0 $\frac{5\sqrt{21}i}{84}$ 0 $\frac{3\sqrt{7}i}{28}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0	
497	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{210}i}{42}$ 0 0 0 $\frac{\sqrt{42}i}{21}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$ 0 0 0 $\frac{\sqrt{210}i}{42}$	
	0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 $\frac{\sqrt{210}i}{42}$ 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 $\frac{\sqrt{7}i}{14}$ 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 $-\frac{\sqrt{210}i}{42}$ 0 0 0 0 0 0 0	
498	symmetry	$-\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
499	symmetry	
500	symmetry	

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
501	$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
502	$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{105}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & -\frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{14}}{56} \\ -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
503	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{14}i}{56} \\ \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
504	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
505	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
506	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 3)$	0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{105}i}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{28}$ 0 0 0 $-\frac{\sqrt{21}i}{28}$	
	0 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{105}i}{28}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0	
	$\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{105}i}{28}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0	
507	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 3)$	0 0 0 0 0 0 0 $\frac{\sqrt{70}}{28}$ 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 $-\frac{\sqrt{105}}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{105}}{28}$ 0 0 0 $\frac{\sqrt{21}}{28}$	
	0 0 0 0 0 0 $\frac{\sqrt{70}}{28}$ 0 0 0	
	0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{105}}{28}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0	
	$\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{105}}{28}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0 0	
508	symmetry	$z$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_1^{(a)}(A_{2g})$	$x$	$\begin{bmatrix} \frac{9\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{5}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{25} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$
	$y$	
	symmetry	
	$x$	
	$y$	
$\mathbb{M}_{1,1}^{(a)}(E_g)$	$x$	$\begin{bmatrix} 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & -\frac{1}{10} & 0 & \frac{\sqrt{10}}{100} & 0 & 0 & 0 \\ \frac{3\sqrt{15}}{50} & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 & -\frac{\sqrt{15}}{50} & 0 & \frac{\sqrt{30}}{100} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{25} & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & -\frac{\sqrt{30}}{100} & 0 & \frac{\sqrt{15}}{50} & 0 \\ 0 & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{100} & 0 & \frac{1}{10} \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{50} & 0 & 0 & 0 & \frac{1}{5} & 0 & \frac{2\sqrt{10}}{25} & 0 & 0 \\ \frac{\sqrt{10}}{100} & 0 & -\frac{\sqrt{30}}{100} & 0 & 0 & \frac{2\sqrt{10}}{25} & 0 & \frac{3\sqrt{5}}{25} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{100} & 0 & -\frac{\sqrt{10}}{100} & 0 & 0 & \frac{3\sqrt{5}}{25} & 0 & \frac{2\sqrt{10}}{25} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{50} & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}}{25} & 0 & \frac{1}{5} \\ 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 \end{bmatrix}$
	$y$	
	symmetry	
	$x$	
	$y$	

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,2}^{(a)}(E_g)$	0	$-\frac{3\sqrt{15}i}{50}$
	$\frac{3\sqrt{15}i}{50}$	0
	0	$-\frac{3\sqrt{5}i}{25}$
	0	$-\frac{3\sqrt{15}i}{50}$
	0	$\frac{3\sqrt{5}i}{25}$
	$\frac{i}{10}$	0
	0	0
	0	$\frac{\sqrt{15}i}{50}$
	$\frac{\sqrt{10}i}{100}$	0
	0	$\frac{\sqrt{30}i}{100}$
511	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{M}_3^{(a)}(A_{1g})$	0	0
	0	$-\frac{\sqrt{2}}{5}$
	0	0
	0	$\frac{\sqrt{30}}{20}$
	$-\frac{\sqrt{2}}{5}$	0
	0	0
	0	$\frac{\sqrt{30}}{20}$
	0	$\frac{3\sqrt{2}}{20}$
	0	0
	$-\frac{3\sqrt{2}}{20}$	0
512	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$M_3^{(a)}(A_{2g}, 1)$	$\frac{-\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{3\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}}{25} \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{3\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}}{25} \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{5}}{25} \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{5}}{10} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$-\frac{3\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ \frac{7\sqrt{5}}{50} \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{30}}{25} \ 0 \ 0 \ 0 \ 0 \ \frac{2\sqrt{5}}{25} \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{30}}{25} \ 0 \ 0 \ 0 \ 0 \ -\frac{2\sqrt{5}}{25} \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{3\sqrt{5}}{25} \ 0 \ 0 \ 0 \ 0 \ -\frac{7\sqrt{5}}{50} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}}{10}$	
513	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$M_3^{(a)}(A_{2g}, 2)$	$0 \ 0 \ 0 \ \frac{\sqrt{2}i}{5} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{20} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{20}$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{20} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$-\frac{\sqrt{2}i}{5} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{20} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{30}i}{20} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}i}{10} \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{3\sqrt{2}i}{20} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}i}{5} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}i}{10}$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{5}i}{10} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$-\frac{3\sqrt{2}i}{20} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}i}{5} \ 0 \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{30}i}{20} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{5}i}{10} \ 0 \ 0 \ 0$	
514	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 1)$	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{3\sqrt{15}}{50} & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{25} & 0 & \frac{\sqrt{30}}{25} & 0 & 0 & -\frac{7\sqrt{10}}{100} & 0 & \frac{\sqrt{5}}{50} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{25} & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & -\frac{\sqrt{5}}{50} & 0 & \frac{7\sqrt{10}}{100} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{50} & 0 & -\frac{\sqrt{6}}{20} \\ \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{10}}{100} & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{\sqrt{15}}{50} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}}{50} & 0 & -\frac{\sqrt{5}}{50} & 0 & 0 & \frac{\sqrt{15}}{50} & 0 & \frac{\sqrt{30}}{25} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{50} & 0 & \frac{3\sqrt{15}}{50} & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & \frac{\sqrt{15}}{50} & 0 \\ 0 & 0 & \frac{7\sqrt{10}}{100} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{50} & 0 & -\frac{\sqrt{6}}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{3\sqrt{15}i}{50} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{25} & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 & -\frac{7\sqrt{10}i}{100} & 0 & -\frac{\sqrt{5}i}{50} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{25} & 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & -\frac{\sqrt{5}i}{50} & 0 & -\frac{7\sqrt{10}i}{100} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}i}{50} & 0 & \frac{\sqrt{6}i}{20} \\ -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{10}i}{100} & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & -\frac{\sqrt{15}i}{50} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}i}{50} & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 & \frac{\sqrt{15}i}{50} & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{50} & 0 & -\frac{3\sqrt{15}i}{50} & 0 & 0 & \frac{\sqrt{30}i}{25} & 0 & -\frac{\sqrt{15}i}{50} & 0 \\ 0 & 0 & \frac{7\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{50} & 0 & \frac{\sqrt{6}i}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 \end{bmatrix}$
		$\sqrt{15}xyz$
515	symmetry	
$\mathbb{M}_{3,2}^{(a)}(E_g, 1)$	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{3\sqrt{15}i}{50} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{25} & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 & -\frac{7\sqrt{10}i}{100} & 0 & -\frac{\sqrt{5}i}{50} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{25} & 0 & \frac{\sqrt{10}i}{25} & 0 & 0 & -\frac{\sqrt{5}i}{50} & 0 & -\frac{7\sqrt{10}i}{100} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}i}{50} & 0 & \frac{\sqrt{6}i}{20} \\ -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{10}i}{100} & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & -\frac{\sqrt{15}i}{50} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}i}{50} & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 & \frac{\sqrt{15}i}{50} & 0 & -\frac{\sqrt{30}i}{25} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{50} & 0 & -\frac{3\sqrt{15}i}{50} & 0 & 0 & \frac{\sqrt{30}i}{25} & 0 & -\frac{\sqrt{15}i}{50} & 0 \\ 0 & 0 & \frac{7\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{50} & 0 & \frac{\sqrt{6}i}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 \end{bmatrix}$
		$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{5} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & \frac{i}{10} & 0 \\ -\frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 \\ -\frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
$\mathbb{M}_{3,2}^{(a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & -\frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{5} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & -\frac{1}{10} & 0 \\ -\frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 \\ -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \end{bmatrix}$
518	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} -\frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 \\ 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{10}}{25} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$
519	symmetry	<i>x</i>
		$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & \frac{\sqrt{2}}{5} & 0 & -\frac{\sqrt{5}}{25} & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{50} & 0 & -\frac{\sqrt{10}}{25} & 0 & 0 & \frac{\sqrt{30}}{25} & 0 & -\frac{\sqrt{15}}{25} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{25} & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & \frac{\sqrt{15}}{25} & 0 & -\frac{\sqrt{30}}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{25} & 0 & -\frac{\sqrt{2}}{5} \\ \frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{25} & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & \frac{2\sqrt{5}}{25} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{25} & 0 & \frac{\sqrt{15}}{25} & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{25} & 0 & \frac{\sqrt{5}}{25} & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & \frac{2\sqrt{5}}{25} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & \frac{2\sqrt{5}}{25} & 0 & \frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 \end{bmatrix}$
520	symmetry	<i>y</i>

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)$	0	$\frac{\sqrt{30}i}{50}$ 0 0 $\frac{\sqrt{2}i}{5}$ 0 $\frac{\sqrt{5}i}{25}$ 0 0 0
	$-\frac{\sqrt{30}i}{50}$	0 $\frac{\sqrt{10}i}{25}$ 0 0 $\frac{\sqrt{30}i}{25}$ 0 $\frac{\sqrt{15}i}{25}$ 0 0 0
	0	$-\frac{\sqrt{10}i}{25}$ 0 $\frac{\sqrt{30}i}{50}$ 0 0 0 $\frac{\sqrt{15}i}{25}$ 0 $\frac{\sqrt{30}i}{25}$ 0
	0	0 $-\frac{\sqrt{30}i}{50}$ 0 0 0 0 $\frac{\sqrt{5}i}{25}$ 0 $\frac{\sqrt{2}i}{5}$
	$-\frac{\sqrt{2}i}{5}$	0 0 0 0 0 $-\frac{\sqrt{2}i}{10}$ 0 0 0 0
	0	$-\frac{\sqrt{30}i}{25}$ 0 0 $\frac{\sqrt{2}i}{10}$ 0 $-\frac{2\sqrt{5}i}{25}$ 0 0 0
	$-\frac{\sqrt{5}i}{25}$	0 $-\frac{\sqrt{15}i}{25}$ 0 0 $\frac{2\sqrt{5}i}{25}$ 0 $-\frac{3\sqrt{10}i}{50}$ 0 0 0
	0	$-\frac{\sqrt{15}i}{25}$ 0 $-\frac{\sqrt{5}i}{25}$ 0 0 $\frac{3\sqrt{10}i}{50}$ 0 $-\frac{2\sqrt{5}i}{25}$ 0
	0	0 $-\frac{\sqrt{30}i}{25}$ 0 0 0 0 $\frac{2\sqrt{5}i}{25}$ 0 $-\frac{\sqrt{2}i}{10}$
	0	0 0 0 $-\frac{\sqrt{2}i}{5}$ 0 0 0 0 $\frac{\sqrt{2}i}{10}$ 0
521	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{M}_3^{(1,-1;a)}(A_{1g})$	0 0 0 $\frac{\sqrt{42}}{70}$ 0 0 0 0 $\frac{\sqrt{42}}{35}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}}{35}$	
	0 0 0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0 0	
	$\frac{\sqrt{42}}{70}$ 0 0 0 0 $-\frac{\sqrt{42}}{35}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0 $-\frac{\sqrt{105}}{35}$ 0 0	
	0 0 0 $-\frac{\sqrt{42}}{35}$ 0 0 0 0 $-\frac{2\sqrt{42}}{35}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{35}$	
	0 0 0 0 $-\frac{\sqrt{105}}{35}$ 0 0 0 0 0	
	$\frac{\sqrt{42}}{35}$ 0 0 0 0 0 $-\frac{2\sqrt{42}}{35}$ 0 0 0	
	0 $\frac{\sqrt{70}}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{35}$ 0 0 0	
522	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{105}}{350} \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{105}}{350} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{105}}{350} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{350} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{25} & 0 & 0 & 0 & 0 \\ 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{4\sqrt{70}}{175} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{105}}{175} & 0 & 0 \\ 0 & 0 & 0 & \frac{4\sqrt{105}}{175} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} \end{bmatrix}$	
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	$\frac{\sqrt{10}y(3x^2-y^2)}{4} \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & \frac{2\sqrt{42}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{35} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{42}i}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 \end{bmatrix}$	
524	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	$0 \quad \frac{\sqrt{210}}{350} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{35} \quad 0 \quad \frac{6\sqrt{35}}{175} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{210}}{350} \quad 0 \quad -\frac{3\sqrt{70}}{350} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{75} \quad 0 \quad -\frac{2\sqrt{105}}{525} \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{70}}{350} \quad 0 \quad \frac{\sqrt{210}}{350} \quad 0 \quad 0 \quad \frac{2\sqrt{105}}{525} \quad 0 \quad -\frac{\sqrt{210}}{75} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{6\sqrt{35}}{175} \quad 0 \quad \frac{\sqrt{14}}{35}$	
	$-\frac{\sqrt{14}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{35} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{210}}{75} \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{35} \quad 0 \quad \frac{3\sqrt{35}}{175} \quad 0 \quad 0 \quad 0$	
	$\frac{6\sqrt{35}}{175} \quad 0 \quad \frac{2\sqrt{105}}{525} \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{175} \quad 0 \quad \frac{6\sqrt{70}}{175} \quad 0 \quad 0$	
	$0 \quad -\frac{2\sqrt{105}}{525} \quad 0 \quad -\frac{6\sqrt{35}}{175} \quad 0 \quad 0 \quad \frac{6\sqrt{70}}{175} \quad 0 \quad \frac{3\sqrt{35}}{175} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{210}}{75} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{175} \quad 0 \quad -\frac{3\sqrt{14}}{35}$	
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	$0 \quad -\frac{\sqrt{210}i}{350} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{35} \quad 0 \quad -\frac{6\sqrt{35}i}{175} \quad 0 \quad 0 \quad 0$	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\frac{\sqrt{210}i}{350} \quad 0 \quad \frac{3\sqrt{70}i}{350} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{75} \quad 0 \quad \frac{2\sqrt{105}i}{525} \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{70}i}{350} \quad 0 \quad -\frac{\sqrt{210}i}{350} \quad 0 \quad 0 \quad \frac{2\sqrt{105}i}{525} \quad 0 \quad \frac{\sqrt{210}i}{75} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}i}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{6\sqrt{35}i}{175} \quad 0 \quad -\frac{\sqrt{14}i}{35}$	
	$\frac{\sqrt{14}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{35} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{210}i}{75} \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{35} \quad 0 \quad -\frac{3\sqrt{35}i}{175} \quad 0 \quad 0 \quad 0$	
	$\frac{6\sqrt{35}i}{175} \quad 0 \quad -\frac{2\sqrt{105}i}{525} \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{175} \quad 0 \quad -\frac{6\sqrt{70}i}{175} \quad 0 \quad 0$	
	$0 \quad -\frac{2\sqrt{105}i}{525} \quad 0 \quad \frac{6\sqrt{35}i}{175} \quad 0 \quad 0 \quad \frac{6\sqrt{70}i}{175} \quad 0 \quad -\frac{3\sqrt{35}i}{175} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{210}i}{75} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{175} \quad 0 \quad \frac{3\sqrt{14}i}{35}$	
526	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	0 0 $-\frac{\sqrt{21}i}{70}$ 0 0 0 0 $-\frac{2\sqrt{14}i}{35}$ 0 0	
	0 0 0 $\frac{\sqrt{21}i}{70}$ $-\frac{2\sqrt{105}i}{105}$ 0 0 0 $-\frac{2\sqrt{21}i}{105}$ 0	
	$\frac{\sqrt{21}i}{70}$ 0 0 0 0 $\frac{2\sqrt{21}i}{105}$ 0 0 0 $\frac{2\sqrt{105}i}{105}$	
	0 $-\frac{\sqrt{21}i}{70}$ 0 0 0 0 $\frac{2\sqrt{14}i}{35}$ 0 0 0	
	0 $\frac{2\sqrt{105}i}{105}$ 0 0 0 0 $\frac{3\sqrt{70}i}{70}$ 0 0 0	
	0 0 $-\frac{2\sqrt{21}i}{105}$ 0 0 0 0 $\frac{3\sqrt{14}i}{70}$ 0 0	
	0 0 0 $-\frac{2\sqrt{14}i}{35}$ $-\frac{3\sqrt{70}i}{70}$ 0 0 0 $-\frac{3\sqrt{14}i}{70}$ 0	
	$\frac{2\sqrt{14}i}{35}$ 0 0 0 0 $-\frac{3\sqrt{14}i}{70}$ 0 0 0 $-\frac{3\sqrt{70}i}{70}$	
	0 $\frac{2\sqrt{21}i}{105}$ 0 0 0 0 $\frac{3\sqrt{14}i}{70}$ 0 0 0	
	0 0 $-\frac{2\sqrt{105}i}{105}$ 0 0 0 0 $\frac{3\sqrt{70}i}{70}$ 0 0	
527	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	0 0 $\frac{\sqrt{21}}{70}$ 0 0 0 0 $\frac{2\sqrt{14}}{35}$ 0 0	
	0 0 0 $-\frac{\sqrt{21}}{70}$ $-\frac{2\sqrt{105}}{105}$ 0 0 0 $\frac{2\sqrt{21}}{105}$ 0	
	$\frac{\sqrt{21}}{70}$ 0 0 0 0 $\frac{2\sqrt{21}}{105}$ 0 0 0 $-\frac{2\sqrt{105}}{105}$	
	0 $-\frac{\sqrt{21}}{70}$ 0 0 0 0 $\frac{2\sqrt{14}}{35}$ 0 0 0	
	0 $-\frac{2\sqrt{105}}{105}$ 0 0 0 0 $-\frac{3\sqrt{70}}{70}$ 0 0 0	
	0 0 $\frac{2\sqrt{21}}{105}$ 0 0 0 0 $-\frac{3\sqrt{14}}{70}$ 0 0	
	0 0 0 $\frac{2\sqrt{14}}{35}$ $-\frac{3\sqrt{70}}{70}$ 0 0 0 $\frac{3\sqrt{14}}{70}$ 0	
	$\frac{2\sqrt{14}}{35}$ 0 0 0 0 $-\frac{3\sqrt{14}}{70}$ 0 0 0 $\frac{3\sqrt{70}}{70}$	
	0 $\frac{2\sqrt{21}}{105}$ 0 0 0 0 $\frac{3\sqrt{14}}{70}$ 0 0 0	
	0 0 $-\frac{2\sqrt{105}}{105}$ 0 0 0 0 $\frac{3\sqrt{70}}{70}$ 0 0	
528	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} \\ 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{3} & 0 & 0 & 0 \end{bmatrix}$
529	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} \end{bmatrix}$
530	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{3} \\ 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{3} & 0 & 0 & 0 \end{bmatrix}$
531	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
532	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
533	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & \frac{\sqrt{105}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{21} & 0 & -\frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \end{bmatrix}$
534	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{210}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & -\frac{\sqrt{105}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{21} & 0 & \frac{\sqrt{210}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{42} & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \end{bmatrix}$
535	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
536	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
537	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{12} & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \end{bmatrix}$
538	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \end{bmatrix}$
539	symmetry	$z$
		$\begin{bmatrix} \frac{3\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{175} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{175} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{50} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{50} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} \end{bmatrix}$
540	symmetry	$x$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0	$\frac{\sqrt{210}}{50}$
	$\frac{\sqrt{210}}{50}$	0
	0	$\frac{\sqrt{70}}{25}$
	0	$\frac{\sqrt{210}}{50}$
	$\frac{\sqrt{14}}{20}$	0
	0	$\frac{\sqrt{210}}{100}$
	$-\frac{\sqrt{35}}{100}$	0
	0	$-\frac{\sqrt{105}}{100}$
	0	$-\frac{\sqrt{210}}{100}$
	0	$-\frac{\sqrt{14}}{20}$
541	symmetry	$y$
$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	0	$-\frac{\sqrt{210}i}{50}$
	$\frac{\sqrt{210}i}{50}$	0
	0	$-\frac{\sqrt{70}i}{25}$
	0	$-\frac{\sqrt{210}i}{50}$
	$-\frac{\sqrt{14}i}{20}$	0
	0	$-\frac{\sqrt{210}i}{100}$
	$-\frac{\sqrt{35}i}{100}$	0
	0	$-\frac{\sqrt{105}i}{100}$
	0	$-\frac{\sqrt{210}i}{100}$
	0	$-\frac{\sqrt{14}i}{20}$
542	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{1g})$	0 0 0 $-\frac{6\sqrt{14}}{35}$ 0 0 0 0 $\frac{9\sqrt{14}}{280}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{210}}{280}$	
	0 0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0	
	$-\frac{6\sqrt{14}}{35}$ 0 0 0 0 $-\frac{9\sqrt{14}}{280}$ 0 0 0 0	
	0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{35}}{105}$ 0	
	0 0 0 $-\frac{9\sqrt{14}}{280}$ 0 0 0 0 $\frac{2\sqrt{14}}{105}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{105}$	
	0 0 0 0 $\frac{\sqrt{35}}{105}$ 0 0 0 0 0	
	$\frac{9\sqrt{14}}{280}$ 0 0 0 0 $\frac{2\sqrt{14}}{105}$ 0 0 0 0	
	0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{35}}{105}$ 0 0 0	
543	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 1)$	$-\frac{6\sqrt{35}}{175}$ 0 0 0 0 $\frac{9\sqrt{35}}{350}$ 0 0 0 0	
	0 $\frac{18\sqrt{35}}{175}$ 0 0 0 0 $-\frac{3\sqrt{210}}{350}$ 0 0 0	
	0 0 $-\frac{18\sqrt{35}}{175}$ 0 0 0 0 $-\frac{3\sqrt{210}}{350}$ 0 0	
	0 0 0 $\frac{6\sqrt{35}}{175}$ 0 0 0 0 $\frac{9\sqrt{35}}{350}$ 0	
	0 0 0 0 $\frac{\sqrt{35}}{105}$ 0 0 0 0 0	
	$\frac{9\sqrt{35}}{350}$ 0 0 0 0 $-\frac{\sqrt{35}}{75}$ 0 0 0 0	
	0 $-\frac{3\sqrt{210}}{350}$ 0 0 0 0 $-\frac{4\sqrt{35}}{525}$ 0 0 0	
	0 0 $-\frac{3\sqrt{210}}{350}$ 0 0 0 0 $\frac{4\sqrt{35}}{525}$ 0 0	
	0 0 0 $\frac{9\sqrt{35}}{350}$ 0 0 0 0 $\frac{\sqrt{35}}{75}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{105}$	
544	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	0 0 0 $\frac{6\sqrt{14}i}{35}$ 0 0 0 0 $-\frac{9\sqrt{14}i}{280}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{210}i}{280}$	
	0 0 0 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0	
	$-\frac{6\sqrt{14}i}{35}$ 0 0 0 0 $-\frac{9\sqrt{14}i}{280}$ 0 0 0 0	
	0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0	
	0 0 0 $\frac{9\sqrt{14}i}{280}$ 0 0 0 0 $-\frac{2\sqrt{14}i}{105}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{105}$	
	0 0 0 0 $\frac{\sqrt{35}i}{105}$ 0 0 0 0 0	
	$\frac{9\sqrt{14}i}{280}$ 0 0 0 0 $\frac{2\sqrt{14}i}{105}$ 0 0 0 0	
	0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 $\frac{\sqrt{35}i}{105}$ 0 0 0	
545	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0 $-\frac{6\sqrt{70}}{175}$ 0 0 $-\frac{3\sqrt{42}}{280}$ 0 $\frac{9\sqrt{105}}{700}$ 0 0 0	
	$-\frac{6\sqrt{70}}{175}$ 0 $\frac{6\sqrt{210}}{175}$ 0 0 $\frac{3\sqrt{70}}{200}$ 0 $-\frac{3\sqrt{35}}{700}$ 0 0	
	0 $\frac{6\sqrt{210}}{175}$ 0 $-\frac{6\sqrt{70}}{175}$ 0 0 $\frac{3\sqrt{35}}{700}$ 0 $-\frac{3\sqrt{70}}{200}$ 0	
	0 0 $-\frac{6\sqrt{70}}{175}$ 0 0 0 0 $-\frac{9\sqrt{105}}{700}$ 0 $\frac{3\sqrt{42}}{280}$	
	$-\frac{3\sqrt{42}}{280}$ 0 0 0 0 $\frac{\sqrt{42}}{105}$ 0 0 0 0	
	0 $\frac{3\sqrt{70}}{200}$ 0 0 $\frac{\sqrt{42}}{105}$ 0 $-\frac{\sqrt{105}}{525}$ 0 0 0	
	$\frac{9\sqrt{105}}{700}$ 0 $\frac{3\sqrt{35}}{700}$ 0 0 $-\frac{\sqrt{105}}{525}$ 0 $-\frac{2\sqrt{210}}{525}$ 0 0	
	0 $-\frac{3\sqrt{35}}{700}$ 0 $-\frac{9\sqrt{105}}{700}$ 0 0 $-\frac{2\sqrt{210}}{525}$ 0 $-\frac{\sqrt{105}}{525}$ 0	
	0 0 $-\frac{3\sqrt{70}}{200}$ 0 0 0 0 $-\frac{\sqrt{105}}{525}$ 0 $\frac{\sqrt{42}}{105}$	
	0 0 0 $\frac{3\sqrt{42}}{280}$ 0 0 0 0 0 $\frac{\sqrt{42}}{105}$ 0	
546	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{6\sqrt{70}i}{175}$ 0 0 $-\frac{3\sqrt{42}i}{280}$ 0 $-\frac{9\sqrt{105}i}{700}$ 0 0 0
	$-\frac{6\sqrt{70}i}{175}$	0 $-\frac{6\sqrt{210}i}{175}$ 0 0 $\frac{3\sqrt{70}i}{200}$ 0 $\frac{3\sqrt{35}i}{700}$ 0 0 0
	0	$\frac{6\sqrt{210}i}{175}$ 0 $\frac{6\sqrt{70}i}{175}$ 0 0 $\frac{3\sqrt{35}i}{700}$ 0 $\frac{3\sqrt{70}i}{200}$ 0 0
	0	0 $-\frac{6\sqrt{70}i}{175}$ 0 0 0 0 $-\frac{9\sqrt{105}i}{700}$ 0 $-\frac{3\sqrt{42}i}{280}$
	$\frac{3\sqrt{42}i}{280}$	0 0 0 0 0 $-\frac{\sqrt{42}i}{105}$ 0 0 0 0
	0	$-\frac{3\sqrt{70}i}{200}$ 0 0 $\frac{\sqrt{42}i}{105}$ 0 $\frac{\sqrt{105}i}{525}$ 0 0 0
	$\frac{9\sqrt{105}i}{700}$	0 $-\frac{3\sqrt{35}i}{700}$ 0 0 0 $-\frac{\sqrt{105}i}{525}$ 0 $\frac{2\sqrt{210}i}{525}$ 0 0
	0	$-\frac{3\sqrt{35}i}{700}$ 0 $\frac{9\sqrt{105}i}{700}$ 0 0 0 $-\frac{2\sqrt{210}i}{525}$ 0 $\frac{\sqrt{105}i}{525}$ 0
	0	0 $-\frac{3\sqrt{70}i}{200}$ 0 0 0 0 $-\frac{\sqrt{105}i}{525}$ 0 $-\frac{\sqrt{42}i}{105}$
	0	0 0 0 $\frac{3\sqrt{42}i}{280}$ 0 0 0 0 $\frac{\sqrt{42}i}{105}$ 0
547	symmetry	$\sqrt{15}xyz$
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	0	0 0 $\frac{6\sqrt{7}i}{35}$ 0 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 0
	0	0 0 0 $-\frac{6\sqrt{7}i}{35}$ $-\frac{3\sqrt{35}i}{140}$ 0 0 0 $-\frac{3\sqrt{7}i}{140}$ 0
	$-\frac{6\sqrt{7}i}{35}$	0 0 0 0 0 $\frac{3\sqrt{7}i}{140}$ 0 0 0 $\frac{3\sqrt{35}i}{140}$
	0	$\frac{6\sqrt{7}i}{35}$ 0 0 0 0 0 $\frac{3\sqrt{42}i}{140}$ 0 0 0
	0	$\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{210}$ 0 0 0
	0	0 $-\frac{3\sqrt{7}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{210}$ 0 0
	0	0 0 0 $-\frac{3\sqrt{42}i}{140}$ $\frac{\sqrt{210}i}{210}$ 0 0 0 $\frac{\sqrt{42}i}{210}$ 0
	$\frac{3\sqrt{42}i}{140}$	0 0 0 0 0 $\frac{\sqrt{42}i}{210}$ 0 0 0 $\frac{\sqrt{210}i}{210}$
	0	$\frac{3\sqrt{7}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{210}$ 0 0 0
	0	0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{210}$ 0 0
548	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	0	0 $-\frac{6\sqrt{7}}{35}$ 0 0 0 0 0 $\frac{3\sqrt{42}}{140}$ 0 0
	0	0 0 $\frac{6\sqrt{7}}{35}$ $-\frac{3\sqrt{35}}{140}$ 0 0 0 0 $\frac{3\sqrt{7}}{140}$ 0
	$-\frac{6\sqrt{7}}{35}$	0 0 0 0 0 $\frac{3\sqrt{7}}{140}$ 0 0 0 $-\frac{3\sqrt{35}}{140}$
	0	$\frac{6\sqrt{7}}{35}$ 0 0 0 0 0 $\frac{3\sqrt{42}}{140}$ 0 0 0
	0	$-\frac{3\sqrt{35}}{140}$ 0 0 0 0 0 $\frac{\sqrt{210}}{210}$ 0 0 0
	0	0 $\frac{3\sqrt{7}}{140}$ 0 0 0 0 0 $\frac{\sqrt{42}}{210}$ 0 0
	0	0 0 $\frac{3\sqrt{42}}{140}$ $\frac{\sqrt{210}}{210}$ 0 0 0 $-\frac{\sqrt{42}}{210}$ 0
	$\frac{3\sqrt{42}}{140}$	0 0 0 0 0 $\frac{\sqrt{42}}{210}$ 0 0 0 $-\frac{\sqrt{210}}{210}$
	0	$\frac{3\sqrt{7}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{210}$ 0 0 0
	0	0 0 $-\frac{3\sqrt{35}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{210}$ 0 0

bra:  $= \langle \frac{3}{2}, \frac{3}{2}; d |, \langle \frac{3}{2}, \frac{1}{2}; d |, \langle \frac{3}{2}, -\frac{1}{2}; d |, \langle \frac{3}{2}, -\frac{3}{2}; d |, \langle \frac{5}{2}, \frac{5}{2}; d |, \langle \frac{5}{2}, \frac{3}{2}; d |, \langle \frac{5}{2}, \frac{1}{2}; d |, \langle \frac{5}{2}, -\frac{1}{2}; d |, \langle \frac{5}{2}, -\frac{3}{2}; d |, \langle \frac{5}{2}, -\frac{5}{2}; d |$

ket:  $= | \frac{5}{2}, \frac{5}{2}; f \rangle, | \frac{5}{2}, \frac{3}{2}; f \rangle, | \frac{5}{2}, \frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{3}{2}; f \rangle, | \frac{5}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{3}{2}; f \rangle, | \frac{7}{2}, \frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{3}{2}; f \rangle, | \frac{7}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, -\frac{7}{2}; f \rangle$

Table 9: (d,f) block.

No.	multipole	matrix
549	symmetry	$z$
$\mathbb{Q}_1^{(a)}(A_{2u})$	0	$\frac{1}{5}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{6}}{10}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{6}}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{1}{5}$ 0 0 0 0 0 0 0 0 0
	$-\frac{1}{14}$	0 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0 0 0 0
	0	$-\frac{3}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}}{14}$ 0 0 0 0 0
	0	0 0 $-\frac{1}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 0 0 0 0
	0	0 0 0 $\frac{1}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 0 0 0
	0	0 0 0 0 $\frac{3}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{10}}{14}$ 0 0
	0	0 0 0 0 0 $\frac{1}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0

continued ...

Table 9

No.	multipole	matrix
550	symmetry $\mathbb{Q}_{1,1}^{(a)}(E_u)$	<i>x</i>
		$\begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{35} & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{35} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{42}}{28} & 0 \end{bmatrix}$
		<i>y</i>
		$\begin{bmatrix} -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{70} & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{35} & 0 & \frac{3i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & \frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{30}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
		$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
552	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(a)}(A_{1u})$	0 0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ $-\frac{\sqrt{3}}{12}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0	
	$\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 $-\frac{\sqrt{3}}{12}$	
	0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{210}}{105}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{42}$ $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0	
	$\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{8}$	
	0 $\frac{\sqrt{210}}{105}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0	
553	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$	0 $-\frac{3\sqrt{21}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{14}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{14}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{21}}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0	
	$\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{21}}{30}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{2\sqrt{21}}{105}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0	
	0 0 0 $\frac{2\sqrt{21}}{105}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{30}$ 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 $-\frac{\sqrt{14}}{14}$ 0	
554	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(a)}(A_{2u}, 2)$	0 0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 0	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0	
	$\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$	
	0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0	
	$\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$	
	0 $\frac{\sqrt{210}i}{105}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
555	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(a)}(E_u, 1)$	$\frac{3\sqrt{70}}{280}$ 0 $-\frac{9\sqrt{7}}{140}$ 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0	
	0 $-\frac{\sqrt{42}}{40}$ 0 $\frac{\sqrt{21}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{21}}{140}$ 0 $\frac{\sqrt{42}}{40}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0	
	0 0 0 $\frac{9\sqrt{7}}{140}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{105}}{84}$ 0	
	0 $\frac{\sqrt{70}}{70}$ 0 0 0 0 0 $\frac{\sqrt{3}}{12}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0	
	$\frac{\sqrt{70}}{70}$ 0 $-\frac{\sqrt{7}}{70}$ 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0	
	0 $-\frac{\sqrt{7}}{70}$ 0 $-\frac{\sqrt{14}}{35}$ 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{14}}{35}$ 0 $-\frac{\sqrt{7}}{70}$ 0 0 0 0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{7}}{70}$ 0 $\frac{\sqrt{70}}{70}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{105}}{84}$ 0	
	0 0 0 0 $\frac{\sqrt{70}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{3}}{12}$	
556	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(a)}(E_u, 1)$	$\frac{3\sqrt{70}i}{280}$	0 $\frac{9\sqrt{7}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0
	0	$-\frac{\sqrt{42}i}{40}$ 0 $-\frac{\sqrt{21}i}{140}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0
	0	0 $-\frac{\sqrt{21}i}{140}$ 0 $-\frac{\sqrt{42}i}{40}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0
	0	0 0 $\frac{9\sqrt{7}i}{140}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0
	0	$-\frac{\sqrt{70}i}{70}$ 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{70}i}{70}$	0 $\frac{\sqrt{7}i}{70}$ 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{7}i}{70}$ 0 $\frac{\sqrt{14}i}{35}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0
	0	0 $-\frac{\sqrt{14}i}{35}$ 0 $\frac{\sqrt{7}i}{70}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0
	0	0 0 $-\frac{\sqrt{7}i}{70}$ 0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0
557	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	0	0 0 0 $\frac{3\sqrt{70}i}{140}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0
	$\frac{\sqrt{21}i}{28}$	0 0 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0
	0	$-\frac{\sqrt{105}i}{140}$ 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 $\frac{\sqrt{14}i}{56}$ 0
	0	0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$
	0	0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{42}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0
	$\frac{\sqrt{14}i}{28}$	0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0
	0	$\frac{\sqrt{70}i}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0
	0	0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 $-\frac{\sqrt{6}i}{12}$
	0	0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0
558	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$	
	559 symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{30} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
	560 symmetry	$\begin{bmatrix} z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4) \\ 8 \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 \\ -\frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 \end{bmatrix}$
561	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{30} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{30} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 \\ -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
562	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
563	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
564	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{10}$ 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{10}$ 0 $\frac{\sqrt{3}}{10}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{30}$ 0 $-\frac{\sqrt{3}}{30}$ 0	
	0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 $\frac{\sqrt{5}}{28}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{2}}{28}$ 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 $\frac{23\sqrt{3}}{420}$ 0 $-\frac{13\sqrt{15}}{420}$ 0 0 0 0 0	
	0 $\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{10}}{14}$ 0 0 0 0 $-\frac{11\sqrt{2}}{140}$ 0 $\frac{\sqrt{30}}{420}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{10}}{14}$ 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 $-\frac{\sqrt{30}}{420}$ 0 $\frac{11\sqrt{2}}{140}$ 0 0 0	
	0 0 0 $\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 $\frac{13\sqrt{15}}{420}$ 0 $-\frac{23\sqrt{3}}{420}$ 0	
	0 0 0 0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}}{28}$ 0 $\frac{\sqrt{105}}{420}$	
565	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{30}$ 0 $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{10}$ 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 $-\frac{\sqrt{3}i}{10}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 $\frac{\sqrt{3}i}{30}$ 0	
	0 $\frac{\sqrt{2}i}{28}$ 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0 $-\frac{\sqrt{5}i}{28}$ 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{28}$ 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 $\frac{23\sqrt{3}i}{420}$ 0 $\frac{13\sqrt{15}i}{420}$ 0 0 0 0	
	0 $\frac{\sqrt{5}i}{14}$ 0 $\frac{\sqrt{10}i}{14}$ 0 0 0 0 $-\frac{11\sqrt{2}i}{140}$ 0 $-\frac{\sqrt{30}i}{420}$ 0 0 0	
	0 0 $-\frac{\sqrt{10}i}{14}$ 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 $-\frac{\sqrt{30}i}{420}$ 0 $-\frac{11\sqrt{2}i}{140}$ 0 0	
	0 0 0 $\frac{\sqrt{5}i}{14}$ 0 $\frac{\sqrt{2}i}{28}$ 0 0 0 0 $\frac{13\sqrt{15}i}{420}$ 0 $\frac{23\sqrt{3}i}{420}$ 0	
	0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{28}$ 0 $-\frac{\sqrt{105}i}{420}$	
566	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 3)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 3)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
568	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{3}i}{60}$ 0 0 0 $-\frac{\sqrt{105}i}{60}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 0 0 $\frac{\sqrt{21}i}{20}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{20}$ 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{60}$ 0 0 0 $\frac{\sqrt{3}i}{60}$	
	0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 $-\frac{\sqrt{3}i}{30}$ 0 0 0 $\frac{\sqrt{105}i}{105}$ 0 0 0	
	$-\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $\frac{2\sqrt{42}i}{105}$ 0 0 0 $\frac{\sqrt{14}i}{70}$ 0 0	
	0 $\frac{\sqrt{35}i}{28}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{14}i}{70}$ 0 0 0 $-\frac{2\sqrt{42}i}{105}$ 0	
	0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{105}$ 0 0 0 $\frac{\sqrt{3}i}{30}$	
	0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0	
569	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{3}}{60}$ 0 0 0 $\frac{\sqrt{105}}{60}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{20}$ 0 0 0 $-\frac{\sqrt{21}}{20}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{20}$ 0 0 0 $\frac{\sqrt{7}}{20}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{60}$ 0 0 0 $-\frac{\sqrt{3}}{60}$	
	0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 $-\frac{\sqrt{3}}{30}$ 0 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 0	
	$-\frac{\sqrt{7}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 $\frac{2\sqrt{42}}{105}$ 0 0 0 $-\frac{\sqrt{14}}{70}$ 0 0	
	0 $\frac{\sqrt{35}}{28}$ 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 $-\frac{\sqrt{14}}{70}$ 0 0 0 $\frac{2\sqrt{42}}{105}$ 0	
	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 0 $-\frac{\sqrt{3}}{30}$	
	0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0	
570	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{1u})$	0 0 0 0 $-\frac{\sqrt{15}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0 0	
	0 0 0 0 0 $-\frac{1}{14}$ $-\frac{\sqrt{42}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0	
	$\frac{1}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$	
	0 $\frac{\sqrt{15}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{2}}{14}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}}{28}$ $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $\frac{3}{14}$ 0	
	$\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 $-\frac{3}{14}$ 0 0 0 0 0 $\frac{\sqrt{7}}{14}$	
	0 $\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{14}$ 0 0 0 0 0	
571	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 1)$	0 $-\frac{\sqrt{6}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{14}$ 0 0 0 0 0 0	
	0 0 $\frac{2}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{14}$ 0 0 0 0 0	
	0 0 0 $\frac{2}{35}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{14}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}}{35}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{14}$ 0 0	
	$\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 $\frac{2}{7}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{6}}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{7}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{7}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 0 $\frac{2}{7}$ 0	
572	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 2)$	0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0	
	0 0 0 0 0 $\frac{i}{14}$ $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{14}$ 0	
	$\frac{i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$	
	0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{14}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $-\frac{3i}{14}$ 0	
	$\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{3i}{14}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$	
	0 $\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{14}$ 0 0 0 0 0	
573	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{5}}{70}$ 0 $-\frac{3\sqrt{2}}{70}$ 0 0 0 0 $\frac{\sqrt{30}}{28}$ 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 0	
	0 $-\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{6}}{210}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0	
	0 0 $-\frac{\sqrt{6}}{210}$ 0 $\frac{\sqrt{3}}{30}$ 0 0 0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0 0	
	0 0 0 $\frac{3\sqrt{2}}{70}$ 0 $-\frac{\sqrt{5}}{70}$ 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 $\frac{\sqrt{30}}{28}$ 0	
	0 $\frac{3\sqrt{5}}{70}$ 0 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 $\frac{\sqrt{2}}{7}$ 0 0 0 0 0	
	$\frac{3\sqrt{5}}{70}$ 0 $-\frac{3\sqrt{2}}{140}$ 0 0 0 0 $\frac{\sqrt{30}}{42}$ 0 $\frac{\sqrt{6}}{21}$ 0 0 0 0	
	0 $-\frac{3\sqrt{2}}{140}$ 0 $-\frac{3}{35}$ 0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{3}}{42}$ 0 0 0	
	0 0 $-\frac{3}{35}$ 0 $-\frac{3\sqrt{2}}{140}$ 0 0 0 0 $\frac{\sqrt{3}}{42}$ 0 $-\frac{\sqrt{5}}{14}$ 0 0	
	0 0 0 $-\frac{3\sqrt{2}}{140}$ 0 $\frac{3\sqrt{5}}{70}$ 0 0 0 0 $-\frac{\sqrt{6}}{21}$ 0 $-\frac{\sqrt{30}}{42}$ 0	
	0 0 0 0 $\frac{3\sqrt{5}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{7}$ 0 $\frac{\sqrt{42}}{42}$	
574	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{5}i}{70} 0 \frac{3\sqrt{2}i}{70} 0 0 0 0 \frac{\sqrt{30}i}{28} 0 \frac{\sqrt{6}i}{14} 0 0 0 0$	
	$0 -\frac{\sqrt{3}i}{30} 0 -\frac{\sqrt{6}i}{210} 0 0 0 0 0 0 0 \frac{3\sqrt{2}i}{28} 0 0 0 0$	
	$0 0 -\frac{\sqrt{6}i}{210} 0 -\frac{\sqrt{3}i}{30} 0 0 0 0 0 -\frac{3\sqrt{2}i}{28} 0 0 0 0 0$	
	$0 0 0 \frac{3\sqrt{2}i}{70} 0 \frac{\sqrt{5}i}{70} 0 0 0 0 -\frac{\sqrt{6}i}{14} 0 -\frac{\sqrt{30}i}{28} 0$	
	$0 -\frac{3\sqrt{5}i}{70} 0 0 0 0 -\frac{\sqrt{42}i}{42} 0 -\frac{\sqrt{2}i}{7} 0 0 0 0 0 0 0$	
	$\frac{3\sqrt{5}i}{70} 0 \frac{3\sqrt{2}i}{140} 0 0 0 \frac{\sqrt{30}i}{42} 0 -\frac{\sqrt{6}i}{21} 0 0 0 0 0 0 0$	
	$0 -\frac{3\sqrt{2}i}{140} 0 \frac{3i}{35} 0 0 0 0 \frac{\sqrt{5}i}{14} 0 \frac{\sqrt{3}i}{42} 0 0 0 0 0$	
	$0 0 -\frac{3i}{35} 0 \frac{3\sqrt{2}i}{140} 0 0 0 0 \frac{\sqrt{3}i}{42} 0 \frac{\sqrt{5}i}{14} 0 0 0 0$	
	$0 0 0 -\frac{3\sqrt{2}i}{140} 0 -\frac{3\sqrt{5}i}{70} 0 0 0 0 -\frac{\sqrt{6}i}{21} 0 \frac{\sqrt{30}i}{42} 0$	
	$0 0 0 0 \frac{3\sqrt{5}i}{70} 0 0 0 0 0 0 -\frac{\sqrt{2}i}{7} 0 -\frac{\sqrt{42}i}{42}$	
575	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 2)$	$0 0 0 \frac{\sqrt{5}i}{35} 0 0 -\frac{\sqrt{21}i}{28} 0 0 0 \frac{\sqrt{15}i}{28} 0 0 0 0$	
	$\frac{\sqrt{6}i}{42} 0 0 0 \frac{\sqrt{30}i}{210} 0 0 \frac{3i}{28} 0 0 0 0 \frac{3\sqrt{3}i}{28} 0 0 0$	
	$0 -\frac{\sqrt{30}i}{210} 0 0 0 -\frac{\sqrt{6}i}{42} 0 0 \frac{3\sqrt{3}i}{28} 0 0 0 0 \frac{3i}{28} 0 0$	
	$0 0 -\frac{\sqrt{5}i}{35} 0 0 0 0 0 0 \frac{\sqrt{15}i}{28} 0 0 0 0 -\frac{\sqrt{21}i}{28}$	
	$0 0 -\frac{3i}{28} 0 0 0 0 0 0 0 -\frac{2\sqrt{3}i}{21} 0 0 0 0 0$	
	$0 0 0 -\frac{3\sqrt{5}i}{140} 0 0 -\frac{\sqrt{21}i}{21} 0 0 0 -\frac{\sqrt{15}i}{21} 0 0 0 0$	
	$\frac{3i}{28} 0 0 0 \frac{3\sqrt{5}i}{140} 0 0 -\frac{\sqrt{6}i}{42} 0 0 0 -\frac{\sqrt{2}i}{14} 0 0 0$	
	$0 \frac{3\sqrt{5}i}{140} 0 0 0 \frac{3i}{28} 0 0 \frac{\sqrt{2}i}{14} 0 0 0 0 \frac{\sqrt{6}i}{42} 0$	
	$0 0 -\frac{3\sqrt{5}i}{140} 0 0 0 0 0 0 \frac{\sqrt{15}i}{21} 0 0 0 0 \frac{\sqrt{21}i}{21}$	
	$0 0 0 -\frac{3i}{28} 0 0 0 0 0 0 0 \frac{2\sqrt{3}i}{21} 0 0 0 0$	
576	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{5}}{35}$ 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 $-\frac{\sqrt{15}}{28}$ 0 0 0	
	$\frac{\sqrt{6}}{42}$ 0 0 0 $-\frac{\sqrt{30}}{210}$ 0 0 $\frac{3}{28}$ 0 0 0 $-\frac{3\sqrt{3}}{28}$ 0 0	
	0 $-\frac{\sqrt{30}}{210}$ 0 0 0 $\frac{\sqrt{6}}{42}$ 0 0 $\frac{3\sqrt{3}}{28}$ 0 0 0 $-\frac{3}{28}$ 0	
	0 0 $-\frac{\sqrt{5}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{28}$ 0 0 0 $\frac{\sqrt{21}}{28}$	
	0 0 $\frac{3}{28}$ 0 0 0 0 0 0 $\frac{2\sqrt{3}}{21}$ 0 0 0 0	
	0 0 0 $\frac{3\sqrt{5}}{140}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 0 $\frac{\sqrt{15}}{21}$ 0 0 0	
	$\frac{3}{28}$ 0 0 0 $-\frac{3\sqrt{5}}{140}$ 0 0 $-\frac{\sqrt{6}}{42}$ 0 0 0 $\frac{\sqrt{2}}{14}$ 0 0	
	0 $\frac{3\sqrt{5}}{140}$ 0 0 0 $-\frac{3}{28}$ 0 0 $\frac{\sqrt{2}}{14}$ 0 0 0 $-\frac{\sqrt{6}}{42}$ 0	
	0 0 $-\frac{3\sqrt{5}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{21}$ 0 0 0 $-\frac{\sqrt{21}}{21}$	
	0 0 0 $-\frac{3}{28}$ 0 0 0 0 0 0 $\frac{2\sqrt{3}}{21}$ 0 0 0	
577	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{1u})$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{50}$ 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{5}}{50}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{50}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{50}$ 0 0 0 0 0 $\frac{\sqrt{5}}{50}$	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{50}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}}{105}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{35}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{14}}{42}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{35}}{175}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}}{105}$ $\frac{\sqrt{30}}{25}$ 0 0 0 0 0 $\frac{3\sqrt{210}}{175}$ 0	
	$-\frac{\sqrt{35}}{105}$ 0 0 0 0 0 0 $-\frac{3\sqrt{210}}{175}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{25}$	
	0 $\frac{\sqrt{14}}{42}$ 0 0 0 0 0 0 $-\frac{3\sqrt{35}}{175}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{35}}{105}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{35}$ 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
	$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 \\ -\frac{\sqrt{5}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{35} & 0 \end{bmatrix}$
579	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & \frac{\sqrt{30}i}{25} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{175} & 0 \\ -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{25} \\ 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
580	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
581	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
	$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
582	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{100}$ 0 $\frac{\sqrt{2}}{20}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{10}}{100}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{20}$ 0 $\frac{3\sqrt{10}}{100}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{10}}{100}$ 0	
	0 $-\frac{\sqrt{15}}{210}$ 0 0 0 0 0 $\frac{\sqrt{14}}{70}$ 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 0 0	
	$-\frac{\sqrt{15}}{210}$ 0 $\frac{\sqrt{6}}{42}$ 0 0 0 0 $-\frac{23\sqrt{10}}{350}$ 0 $\frac{13\sqrt{2}}{70}$ 0 0 0 0 0	
	0 $\frac{\sqrt{6}}{42}$ 0 $-\frac{\sqrt{3}}{21}$ 0 0 0 0 0 $\frac{11\sqrt{15}}{175}$ 0 $-\frac{1}{35}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{3}}{21}$ 0 $\frac{\sqrt{6}}{42}$ 0 0 0 0 0 $\frac{1}{35}$ 0 $-\frac{11\sqrt{15}}{175}$ 0 0	
	0 0 0 $\frac{\sqrt{6}}{42}$ 0 $-\frac{\sqrt{15}}{210}$ 0 0 0 0 $-\frac{13\sqrt{2}}{70}$ 0 $\frac{23\sqrt{10}}{350}$ 0	
	0 0 0 0 $-\frac{\sqrt{15}}{210}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 $-\frac{\sqrt{14}}{70}$	
583	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{100}$ 0 $-\frac{\sqrt{2}i}{20}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{10}i}{100}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $-\frac{3\sqrt{10}i}{100}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{10}i}{100}$ 0	
	0 $\frac{\sqrt{15}i}{210}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{70}$ 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{210}$ 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0 0 $-\frac{23\sqrt{10}i}{350}$ 0 $-\frac{13\sqrt{2}i}{70}$ 0 0 0 0 0	
	0 $\frac{\sqrt{6}i}{42}$ 0 $\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 $\frac{11\sqrt{15}i}{175}$ 0 $\frac{i}{35}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{21}$ 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0 0 0 $\frac{i}{35}$ 0 $\frac{11\sqrt{15}i}{175}$ 0 0	
	0 0 0 $\frac{\sqrt{6}i}{42}$ 0 $\frac{\sqrt{15}i}{210}$ 0 0 0 0 0 $-\frac{13\sqrt{2}i}{70}$ 0 $-\frac{23\sqrt{10}i}{350}$ 0	
	0 0 0 0 $-\frac{\sqrt{15}i}{210}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{14}$ 0 $\frac{\sqrt{14}i}{70}$	
584	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{25} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{35} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
585	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
586	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{10}i}{200}$ 0 0 0 $-\frac{\sqrt{14}i}{40}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{200}$ 0 0 0 $\frac{3\sqrt{70}i}{200}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{70}i}{200}$ 0 0 0 $-\frac{\sqrt{210}i}{200}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{40}$ 0 0 0 $\frac{\sqrt{10}i}{200}$	
	0 0 $\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{35}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 $\frac{\sqrt{10}i}{25}$ 0 0 0 $-\frac{2\sqrt{14}i}{35}$ 0 0 0 0	
	$-\frac{\sqrt{210}i}{420}$ 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 $-\frac{8\sqrt{35}i}{175}$ 0 0 0 $-\frac{2\sqrt{105}i}{175}$ 0 0 0	
	0 $\frac{\sqrt{42}i}{84}$ 0 0 0 $-\frac{\sqrt{210}i}{420}$ 0 0 $\frac{2\sqrt{105}i}{175}$ 0 0 0 $\frac{8\sqrt{35}i}{175}$ 0	
	0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 $\frac{2\sqrt{14}i}{35}$ 0 0 0 $-\frac{\sqrt{10}i}{25}$	
	0 0 0 $\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{35}$ 0 0 0 0	
587	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{10}}{200}$ 0 0 0 $\frac{\sqrt{14}}{40}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{200}$ 0 0 0 $-\frac{3\sqrt{70}}{200}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{70}}{200}$ 0 0 0 $\frac{\sqrt{210}}{200}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{40}$ 0 0 0 0 $-\frac{\sqrt{10}}{200}$	
	0 0 $-\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 $\frac{\sqrt{10}}{25}$ 0 0 0 $\frac{2\sqrt{14}}{35}$ 0 0 0 0	
	$-\frac{\sqrt{210}}{420}$ 0 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 $-\frac{8\sqrt{35}}{175}$ 0 0 0 $\frac{2\sqrt{105}}{175}$ 0 0	
	0 $\frac{\sqrt{42}}{84}$ 0 0 0 $\frac{\sqrt{210}}{420}$ 0 0 $\frac{2\sqrt{105}}{175}$ 0 0 0 $-\frac{8\sqrt{35}}{175}$ 0	
	0 0 $-\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 $\frac{2\sqrt{14}}{35}$ 0 0 0 $\frac{\sqrt{10}}{25}$	
	0 0 0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0	
588	symmetry	$z$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,0;a)}(A_{2u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 \end{bmatrix}$
589	symmetry	$\begin{bmatrix} x \\ y \end{bmatrix}$ $\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{70} & 0 & \frac{6}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{6}{35} & 0 & \frac{9\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{9\sqrt{2}}{70} & 0 & \frac{6}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{10}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{6}{35} & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & \frac{\sqrt{15}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & \frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
590	symmetry	$\begin{bmatrix} y \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{10}i}{20}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{3}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{3}i}{20}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{i}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0 0 0
	0	$-\frac{3\sqrt{10}i}{70}$ 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{i}{28}$ 0 0 0 0 0 0 0
	$\frac{3\sqrt{10}i}{70}$	0 $-\frac{6i}{35}$ 0 0 0 0 $-\frac{\sqrt{15}i}{28}$ 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0
	0	$\frac{6i}{35}$ 0 $-\frac{9\sqrt{2}i}{70}$ 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0
	0	0 0 $\frac{9\sqrt{2}i}{70}$ 0 $-\frac{6i}{35}$ 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0
	0	0 0 0 $\frac{6i}{35}$ 0 $-\frac{3\sqrt{10}i}{70}$ 0 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 $-\frac{\sqrt{15}i}{28}$ 0 0
	0	0 0 0 0 $\frac{3\sqrt{10}i}{70}$ 0 0 0 0 0 0 $-\frac{i}{28}$ 0 $-\frac{\sqrt{21}i}{28}$ 0 0
591	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	0 0 0 0 0 $\frac{3\sqrt{70}}{560}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}}{112}$ $-\frac{1}{4}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0	
	$-\frac{\sqrt{42}}{112}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 $-\frac{1}{4}$	
	0 $-\frac{3\sqrt{70}}{560}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ $\frac{\sqrt{6}}{48}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{112}$ 0	
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{48}$	
	0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{168}$ 0 0 0 0 0 0	
592	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{7}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \end{bmatrix}$
593	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & -\frac{3\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} \\ 0 & -\frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
594	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{210}}{560}, 0, \frac{3\sqrt{21}}{280}, 0, 0, 0, 0, \frac{\sqrt{35}}{28}, 0, -\frac{\sqrt{7}}{14}, 0, 0, 0, 0, 0$	
	$0, \frac{\sqrt{14}}{80}, 0, -\frac{\sqrt{7}}{280}, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{21}}{28}, 0, 0, 0, 0$	
	$0, 0, \frac{\sqrt{7}}{280}, 0, -\frac{\sqrt{14}}{80}, 0, 0, 0, 0, -\frac{\sqrt{21}}{28}, 0, 0, 0, 0$	
	$0, 0, 0, -\frac{3\sqrt{21}}{280}, 0, \frac{\sqrt{210}}{560}, 0, 0, 0, 0, -\frac{\sqrt{7}}{14}, 0, \frac{\sqrt{35}}{28}, 0$	
	$0, -\frac{\sqrt{210}}{70}, 0, 0, 0, 0, \frac{1}{24}, 0, -\frac{\sqrt{21}}{84}, 0, 0, 0, 0, 0, 0$	
	$-\frac{\sqrt{210}}{70}, 0, \frac{\sqrt{21}}{70}, 0, 0, 0, 0, -\frac{\sqrt{35}}{168}, 0, -\frac{\sqrt{7}}{84}, 0, 0, 0, 0, 0$	
	$0, \frac{\sqrt{21}}{70}, 0, \frac{\sqrt{42}}{35}, 0, 0, 0, 0, -\frac{\sqrt{210}}{336}, 0, \frac{\sqrt{14}}{336}, 0, 0, 0, 0$	
	$0, 0, \frac{\sqrt{42}}{35}, 0, \frac{\sqrt{21}}{70}, 0, 0, 0, 0, -\frac{\sqrt{14}}{336}, 0, \frac{\sqrt{210}}{336}, 0, 0, 0$	
	$0, 0, 0, \frac{\sqrt{21}}{70}, 0, -\frac{\sqrt{210}}{70}, 0, 0, 0, 0, \frac{\sqrt{7}}{84}, 0, \frac{\sqrt{35}}{168}, 0$	
	$0, 0, 0, 0, -\frac{\sqrt{210}}{70}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{21}}{84}, 0, -\frac{1}{24}$	
595	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{210}i}{560}, 0, -\frac{3\sqrt{21}i}{280}, 0, 0, 0, 0, \frac{\sqrt{35}i}{28}, 0, \frac{\sqrt{7}i}{14}, 0, 0, 0, 0, 0$	
	$0, \frac{\sqrt{14}i}{80}, 0, \frac{\sqrt{7}i}{280}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{21}i}{28}, 0, 0, 0, 0$	
	$0, 0, \frac{\sqrt{7}i}{280}, 0, \frac{\sqrt{14}i}{80}, 0, 0, 0, 0, -\frac{\sqrt{21}i}{28}, 0, 0, 0, 0$	
	$0, 0, 0, -\frac{3\sqrt{21}i}{280}, 0, -\frac{\sqrt{210}i}{560}, 0, 0, 0, 0, -\frac{\sqrt{7}i}{14}, 0, -\frac{\sqrt{35}i}{28}, 0$	
	$0, \frac{\sqrt{210}i}{70}, 0, 0, 0, 0, \frac{i}{24}, 0, \frac{\sqrt{21}i}{84}, 0, 0, 0, 0, 0, 0$	
	$-\frac{\sqrt{210}i}{70}, 0, -\frac{\sqrt{21}i}{70}, 0, 0, 0, 0, -\frac{\sqrt{35}i}{168}, 0, \frac{\sqrt{7}i}{84}, 0, 0, 0, 0, 0$	
	$0, \frac{\sqrt{21}i}{70}, 0, -\frac{\sqrt{42}i}{35}, 0, 0, 0, 0, -\frac{\sqrt{210}i}{336}, 0, -\frac{\sqrt{14}i}{336}, 0, 0, 0, 0$	
	$0, 0, \frac{\sqrt{42}i}{35}, 0, -\frac{\sqrt{21}i}{70}, 0, 0, 0, 0, -\frac{\sqrt{14}i}{336}, 0, -\frac{\sqrt{210}i}{336}, 0, 0, 0$	
	$0, 0, 0, \frac{\sqrt{21}i}{70}, 0, \frac{\sqrt{210}i}{70}, 0, 0, 0, 0, \frac{\sqrt{7}i}{84}, 0, -\frac{\sqrt{35}i}{168}, 0$	
	$0, 0, 0, 0, -\frac{\sqrt{210}i}{70}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{21}i}{84}, 0, \frac{i}{24}$	
596	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{210}i}{280}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0	
	$-\frac{\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{35}i}{280}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{35}i}{280}$ 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0	
	0 0 $\frac{\sqrt{210}i}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 $-\frac{\sqrt{2}i}{8}$	
	0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{2}i}{24}$ 0 0 0 $\frac{\sqrt{70}i}{168}$ 0 0 0	
	$-\frac{\sqrt{42}i}{28}$ 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{7}i}{168}$ 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0	
	0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{\sqrt{7}i}{168}$ 0	
	0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{168}$ 0 0 0 $-\frac{\sqrt{2}i}{24}$	
	0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0	
597	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{210}}{280}$ 0 0 $-\frac{\sqrt{2}}{8}$ 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 0 0	
	$-\frac{\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{35}}{280}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 0	
	0 $\frac{\sqrt{35}}{280}$ 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $\frac{3\sqrt{14}}{56}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ 0	
	0 0 $\frac{\sqrt{210}}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 $\frac{\sqrt{2}}{8}$	
	0 0 $-\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{2}}{24}$ 0 0 0 $-\frac{\sqrt{70}}{168}$ 0 0 0	
	$-\frac{\sqrt{42}}{28}$ 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{7}}{168}$ 0 0 0 $-\frac{\sqrt{21}}{168}$ 0 0	
	0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 $\frac{\sqrt{7}}{168}$ 0	
	0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{168}$ 0 0 0 $\frac{\sqrt{2}}{24}$	
	0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 0 0	
598	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{25}$ 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{5}}{25}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{25}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{25}$ 0 0 0 0 0 $\frac{\sqrt{5}}{25}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{25}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{420}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{700}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ $-\frac{\sqrt{30}}{300}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{700}$ 0	
	$\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{700}$ 0 0 0 0 0 $\frac{\sqrt{30}}{300}$	
	0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{35}}{700}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 0 0 0 0	
599	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 1)$	0 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{10}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{10}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{10}}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{10}$ 0 0 0	
	$\frac{\sqrt{5}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{30}}{420}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}}{14}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{140}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{5}}{7}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{210}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{5}}{7}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{210}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{140}$ 0 0 0	
600	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{25}$ 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{25}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{25}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{25}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{25}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{25}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{700}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ $-\frac{\sqrt{30}i}{300}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{700}$ 0	
	$\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{700}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{300}$	
	0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{35}i}{700}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0 0 0 0 0	
601	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{5}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{3}}{5}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{70}}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}}{420}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{60}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{3}}{60}$ 0 0 0 0 0 0 0	
	$\frac{3\sqrt{70}}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 0 0 0 0	
602	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
603	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{50} & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{10}}{50} & 0 \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{840} & 0 & \frac{\sqrt{6}}{168} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}}{4200} & 0 & -\frac{13\sqrt{2}}{840} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{3}}{7} & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}}{2100} & 0 & \frac{1}{420} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{7} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{420} & 0 & \frac{11\sqrt{15}}{2100} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}}{840} & 0 & -\frac{23\sqrt{10}}{4200} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{168} & 0 & \frac{\sqrt{14}}{840} \end{bmatrix}$
604	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{50}$ 0 $-\frac{\sqrt{2}i}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{10}i}{50}$ 0 $\frac{\sqrt{6}i}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{10}$ 0 $-\frac{3\sqrt{10}i}{50}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{10}$ 0 $\frac{\sqrt{10}i}{50}$ 0	
	0 $-\frac{\sqrt{15}i}{70}$ 0 0 0 0 $-\frac{\sqrt{14}i}{840}$ 0 $-\frac{\sqrt{6}i}{168}$ 0 0 0 0 0	
	$\frac{\sqrt{15}i}{70}$ 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 0 $\frac{23\sqrt{10}i}{4200}$ 0 $\frac{13\sqrt{2}i}{840}$ 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{14}$ 0 $-\frac{\sqrt{3}i}{7}$ 0 0 0 0 $-\frac{11\sqrt{15}i}{2100}$ 0 $-\frac{i}{420}$ 0 0 0 0	
	0 0 $\frac{\sqrt{3}i}{7}$ 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 0 $-\frac{i}{420}$ 0 $-\frac{11\sqrt{15}i}{2100}$ 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 $-\frac{\sqrt{15}i}{70}$ 0 0 0 0 $\frac{13\sqrt{2}i}{840}$ 0 $\frac{23\sqrt{10}i}{4200}$ 0	
	0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{168}$ 0 $-\frac{\sqrt{14}i}{840}$	
605	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{50}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{50}$	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{50}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{50}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{140}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{2100}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{150}$	
	$-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{2100}$ 0 0 0 0 0 0	
	0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{140}$ 0 0 0 0 0	
606	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{50} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{50} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{150} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{2100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{140} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
607	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
	$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{100} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 & \frac{\sqrt{10}i}{100} \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{10}i}{300} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{210} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{2\sqrt{35}i}{525} & 0 & 0 & 0 & \frac{\sqrt{105}i}{1050} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{105}i}{1050} & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{525} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{210} & 0 & 0 & 0 & \frac{\sqrt{10}i}{300} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{420} & 0 & 0 & 0 & 0 \end{bmatrix}$
608	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{10}}{100}$ 0 0 0 $\frac{\sqrt{14}}{20}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{100}$ 0 0 0 $-\frac{3\sqrt{70}}{100}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{70}}{100}$ 0 0 0 $\frac{\sqrt{210}}{100}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{20}$ 0 0 0 $-\frac{\sqrt{10}}{100}$	
	0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{420}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}}{28}$ 0 0 $-\frac{\sqrt{10}}{300}$ 0 0 0 $-\frac{\sqrt{14}}{210}$ 0 0 0	
	$\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 $\frac{2\sqrt{35}}{525}$ 0 0 0 $-\frac{\sqrt{105}}{1050}$ 0 0	
	0 $-\frac{\sqrt{42}}{28}$ 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $-\frac{\sqrt{105}}{1050}$ 0 0 0 $\frac{2\sqrt{35}}{525}$ 0	
	0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{210}$ 0 0 0 $-\frac{\sqrt{10}}{300}$	
	0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{420}$ 0 0 0	
609	symmetry	$z$
$\mathbb{Q}_1^{(1,1;a)}(A_{2u})$	0 $-\frac{1}{5}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{6}}{10}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{10}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{1}{5}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{2}{7}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0	
	0 $-\frac{6}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{10}}{28}$ 0 0 0 0 0	
	0 0 $-\frac{2}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{14}$ 0 0 0 0	
	0 0 0 $\frac{2}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{14}$ 0 0 0	
	0 0 0 0 $\frac{6}{35}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}}{28}$ 0 0	
610	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	$\frac{\sqrt{5}}{10}$	0 $-\frac{\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}}{10}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{3}}{10}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{2\sqrt{5}}{35}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{2}}{56}$ 0 0 0 0 0 0 0
	$-\frac{2\sqrt{5}}{35}$	0 $-\frac{4\sqrt{2}}{35}$ 0 0 0 0 $-\frac{\sqrt{30}}{56}$ 0 $\frac{\sqrt{6}}{56}$ 0 0 0 0 0 0
	0	$-\frac{4\sqrt{2}}{35}$ 0 $-\frac{6}{35}$ 0 0 0 0 $-\frac{\sqrt{5}}{28}$ 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0 0
	0	0 $-\frac{6}{35}$ 0 $-\frac{4\sqrt{2}}{35}$ 0 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 $\frac{\sqrt{5}}{28}$ 0 0 0 0
	0	0 0 $-\frac{4\sqrt{2}}{35}$ 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0 0 $-\frac{\sqrt{6}}{56}$ 0 $\frac{\sqrt{30}}{56}$ 0 0 0
	0	0 0 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0
611	symmetry	$y$
$\mathbb{Q}_{1,2}^{(1,1;a)}(E_u)$	$\frac{\sqrt{5}i}{10}$	0 $\frac{\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}i}{10}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	$\frac{2\sqrt{5}i}{35}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 0 0
	$-\frac{2\sqrt{5}i}{35}$	0 $\frac{4\sqrt{2}i}{35}$ 0 0 0 0 $-\frac{\sqrt{30}i}{56}$ 0 $-\frac{\sqrt{6}i}{56}$ 0 0 0 0 0 0
	0	$-\frac{4\sqrt{2}i}{35}$ 0 $\frac{6i}{35}$ 0 0 0 0 $-\frac{\sqrt{5}i}{28}$ 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0 0
	0	0 $-\frac{6i}{35}$ 0 $\frac{4\sqrt{2}i}{35}$ 0 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 $-\frac{\sqrt{5}i}{28}$ 0 0 0 0
	0	0 0 0 $-\frac{4\sqrt{2}i}{35}$ 0 $\frac{2\sqrt{5}i}{35}$ 0 0 0 0 $-\frac{\sqrt{6}i}{56}$ 0 $-\frac{\sqrt{30}i}{56}$ 0 0
	0	0 0 0 0 $-\frac{2\sqrt{5}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0
612	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{1u})$	0 0 0 0 $\frac{9\sqrt{10}}{112}$ 0 0 0 0 0 0 0 $-\frac{1}{28}$ 0 0	
	0 0 0 0 0 $\frac{15\sqrt{6}}{112}$ $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0	
	$-\frac{15\sqrt{6}}{112}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$	
	0 $-\frac{9\sqrt{10}}{112}$ 0 0 0 0 0 0 $-\frac{1}{28}$ 0 0 0 0 0 0	
	0 0 0 $\frac{5}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{56}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{10}}{21}$ 0 0 0 0 0 0 $-\frac{3}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{5}{42}$ $\frac{\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{6}}{112}$ 0	
	$\frac{5}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{6}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{112}$	
	0 $\frac{\sqrt{10}}{21}$ 0 0 0 0 0 0 $\frac{3}{56}$ 0 0 0 0 0 0	
	0 0 $\frac{5}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{56}$ 0 0 0 0 0	
613 symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$	
	0 $\frac{9}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{6}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{6}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{2}}{28}$ 0 0 0 0	
	0 0 0 0 $\frac{9}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}}{28}$ 0 0	
	$\frac{5}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0 0	
	0 $-\frac{1}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{2}{21}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0 0	
	0 0 0 $\frac{2}{21}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0	
614 symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$	
	0 0 0 0 $-\frac{5}{42}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{2u}, 2)$	0 0 0 0 $-\frac{9\sqrt{10}i}{112}$ 0 0 0 0 0 0 $\frac{i}{28}$ 0 0	
	0 0 0 0 0 $-\frac{15\sqrt{6}i}{112}$ $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 $\frac{i}{14}$ 0	
	$-\frac{15\sqrt{6}i}{112}$ 0 0 0 0 0 0 $-\frac{i}{14}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$	
	0 $-\frac{9\sqrt{10}i}{112}$ 0 0 0 0 0 0 $-\frac{i}{28}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{5i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{56}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $\frac{3i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{5i}{42}$ $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{3\sqrt{6}i}{112}$ 0	
	$\frac{5i}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{6}i}{112}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$	
	0 $\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $\frac{3i}{56}$ 0 0 0 0 0 0	
	0 0 $\frac{5i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{56}$ 0 0 0 0 0 0	
615 symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$	
	$-\frac{3\sqrt{30}}{112}$ 0 $\frac{9\sqrt{3}}{56}$ 0 0 0 0 $\frac{\sqrt{5}}{28}$ 0 $-\frac{1}{14}$ 0 0 0 0 0	
	0 $\frac{3\sqrt{2}}{16}$ 0 $-\frac{3}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0	
	0 0 $\frac{3}{56}$ 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{9\sqrt{3}}{56}$ 0 $\frac{3\sqrt{30}}{112}$ 0 0 0 0 $-\frac{1}{14}$ 0 $\frac{\sqrt{5}}{28}$ 0	
	0 $\frac{\sqrt{30}}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0	
	$\frac{\sqrt{30}}{42}$ 0 $-\frac{\sqrt{3}}{42}$ 0 0 0 0 $-\frac{\sqrt{5}}{56}$ 0 $-\frac{1}{28}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{3}}{42}$ 0 $-\frac{\sqrt{6}}{21}$ 0 0 0 0 $-\frac{\sqrt{30}}{112}$ 0 $\frac{\sqrt{2}}{112}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{6}}{21}$ 0 $-\frac{\sqrt{3}}{42}$ 0 0 0 0 $-\frac{\sqrt{2}}{112}$ 0 $\frac{\sqrt{30}}{112}$ 0 0	
	0 0 0 $-\frac{\sqrt{3}}{42}$ 0 $\frac{\sqrt{30}}{42}$ 0 0 0 0 $\frac{1}{28}$ 0 $\frac{\sqrt{5}}{56}$ 0	
616 symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$	
	<i>continued ...</i>	

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 1)$	$-\frac{3\sqrt{30}i}{112}$	0 $-\frac{9\sqrt{3}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{28}$ 0 $\frac{i}{14}$ 0 0 0 0
	0	$\frac{3\sqrt{2}i}{16}$ 0 $\frac{3i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0
	0	0 $\frac{3i}{56}$ 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0
	0	0 0 $-\frac{9\sqrt{3}i}{56}$ 0 $-\frac{3\sqrt{30}i}{112}$ 0 0 0 0 $-\frac{i}{14}$ 0 $-\frac{\sqrt{5}i}{28}$ 0
	0	$-\frac{\sqrt{30}i}{42}$ 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0
	$\frac{\sqrt{30}i}{42}$	0 $\frac{\sqrt{3}i}{42}$ 0 0 0 0 $-\frac{\sqrt{5}i}{56}$ 0 $\frac{i}{28}$ 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{42}$ 0 $\frac{\sqrt{6}i}{21}$ 0 0 0 0 $-\frac{\sqrt{30}i}{112}$ 0 $-\frac{\sqrt{2}i}{112}$ 0 0 0 0
	0	0 $-\frac{\sqrt{6}i}{21}$ 0 $\frac{\sqrt{3}i}{42}$ 0 0 0 0 $-\frac{\sqrt{2}i}{112}$ 0 $-\frac{\sqrt{30}i}{112}$ 0 0 0
	0	0 0 $-\frac{\sqrt{3}i}{42}$ 0 $-\frac{\sqrt{30}i}{42}$ 0 0 0 0 $\frac{i}{28}$ 0 $-\frac{\sqrt{5}i}{56}$ 0
	0	0 0 0 0 $\frac{\sqrt{30}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{3}i}{28}$ 0 $\frac{\sqrt{7}i}{56}$
617	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 2)$	0	0 0 0 $-\frac{3\sqrt{30}i}{56}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{10}i}{56}$ 0 0 0
	$-\frac{15i}{56}$	0 0 0 0 $-\frac{3\sqrt{5}i}{56}$ 0 0 $\frac{\sqrt{6}i}{56}$ 0 0 0 $\frac{3\sqrt{2}i}{56}$ 0 0
	0	$\frac{3\sqrt{5}i}{56}$ 0 0 0 $\frac{15i}{56}$ 0 0 $\frac{3\sqrt{2}i}{56}$ 0 0 0 $\frac{\sqrt{6}i}{56}$ 0
	0	0 0 $\frac{3\sqrt{30}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{56}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$
	0	0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{28}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{30}i}{84}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{10}i}{56}$ 0 0
	$\frac{5\sqrt{6}i}{84}$	0 0 0 $\frac{\sqrt{30}i}{84}$ 0 0 $\frac{i}{56}$ 0 0 0 $\frac{\sqrt{3}i}{56}$ 0 0
	0	$\frac{\sqrt{30}i}{84}$ 0 0 0 $\frac{5\sqrt{6}i}{84}$ 0 0 $-\frac{\sqrt{3}i}{56}$ 0 0 0 $-\frac{i}{56}$ 0
	0	0 0 $-\frac{\sqrt{30}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$
	0	0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0
618	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 2)$	$0 \ 0 \ 0 \ \frac{3\sqrt{30}}{56} \ 0 \ 0 \ -\frac{\sqrt{14}}{56} \ 0 \ 0 \ 0 \ -\frac{\sqrt{10}}{56} \ 0 \ 0 \ 0$	
	$-\frac{15}{56} \ 0 \ 0 \ 0 \ \frac{3\sqrt{5}}{56} \ 0 \ 0 \ \frac{\sqrt{6}}{56} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{56} \ 0 \ 0$	
	$0 \ \frac{3\sqrt{5}}{56} \ 0 \ 0 \ 0 \ -\frac{15}{56} \ 0 \ 0 \ \frac{3\sqrt{2}}{56} \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}}{56} \ 0$	
	$0 \ 0 \ \frac{3\sqrt{30}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{10}}{56} \ 0 \ 0 \ 0 \ \frac{\sqrt{14}}{56}$	
	$0 \ 0 \ \frac{5\sqrt{6}}{84} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}}{28} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{30}}{84} \ 0 \ 0 \ \frac{\sqrt{14}}{56} \ 0 \ 0 \ 0 \ -\frac{\sqrt{10}}{56} \ 0 \ 0 \ 0$	
	$\frac{5\sqrt{6}}{84} \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}}{84} \ 0 \ 0 \ \frac{1}{56} \ 0 \ 0 \ 0 \ -\frac{\sqrt{3}}{56} \ 0 \ 0$	
	$0 \ \frac{\sqrt{30}}{84} \ 0 \ 0 \ 0 \ -\frac{5\sqrt{6}}{84} \ 0 \ 0 \ -\frac{\sqrt{3}}{56} \ 0 \ 0 \ 0 \ \frac{1}{56} \ 0$	
	$0 \ 0 \ -\frac{\sqrt{30}}{84} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{10}}{56} \ 0 \ 0 \ 0 \ \frac{\sqrt{14}}{56}$	
	$0 \ 0 \ 0 \ -\frac{5\sqrt{6}}{84} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}}{28} \ 0 \ 0 \ 0$	
619	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{G}_2^{(a)}(A_{1u})$	$0 \ \frac{3\sqrt{10}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{i}{14} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{15}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{5}i}{70} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{15}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{5}i}{70} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{10}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{i}{14} \ 0 \ 0$	
	$-\frac{\sqrt{10}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{15}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{10}i}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3i}{14} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{10}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{70} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{10}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}i}{70} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{10}i}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3i}{14} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{10}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{15}i}{14} \ 0$	
620	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(a)}(E_u, 1)$	$\frac{\sqrt{6}}{14} 0 \frac{3\sqrt{15}}{70} 0 0 0 0 \frac{1}{14} 0 \frac{\sqrt{5}}{70} 0 0 0 0 0$	
	$0 -\frac{\sqrt{10}}{70} 0 \frac{\sqrt{5}}{14} 0 0 0 0 \frac{1}{14} 0 \frac{\sqrt{15}}{70} 0 0 0 0 0$	
	$0 0 -\frac{\sqrt{5}}{14} 0 \frac{\sqrt{10}}{70} 0 0 0 0 0 \frac{\sqrt{15}}{70} 0 0 \frac{1}{14} 0 0 0$	
	$0 0 0 -\frac{3\sqrt{15}}{70} 0 -\frac{\sqrt{6}}{14} 0 0 0 0 \frac{\sqrt{5}}{70} 0 0 \frac{1}{14} 0 0$	
	$0 -\frac{\sqrt{6}}{28} 0 0 0 0 0 \frac{\sqrt{35}}{28} 0 \frac{\sqrt{15}}{28} 0 0 0 0 0 0$	
	$\frac{\sqrt{6}}{28} 0 -\frac{\sqrt{15}}{70} 0 0 0 0 \frac{1}{28} 0 \frac{11\sqrt{5}}{140} 0 0 0 0 0 0$	
	$0 \frac{\sqrt{15}}{70} 0 0 0 0 0 0 -\frac{\sqrt{6}}{28} 0 \frac{\sqrt{10}}{20} 0 0 0 0 0$	
	$0 0 0 0 \frac{\sqrt{15}}{70} 0 0 0 0 -\frac{\sqrt{10}}{20} 0 \frac{\sqrt{6}}{28} 0 0 0 0$	
	$0 0 0 -\frac{\sqrt{15}}{70} 0 \frac{\sqrt{6}}{28} 0 0 0 0 0 -\frac{11\sqrt{5}}{140} 0 -\frac{1}{28} 0 0$	
	$0 0 0 0 -\frac{\sqrt{6}}{28} 0 0 0 0 0 0 -\frac{\sqrt{15}}{28} 0 0 -\frac{\sqrt{35}}{28} 0$	
621	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,2}^{(a)}(E_u, 1)$	$\frac{\sqrt{6}i}{14} 0 -\frac{3\sqrt{15}i}{70} 0 0 0 0 \frac{i}{14} 0 -\frac{\sqrt{5}i}{70} 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{10}i}{70} 0 -\frac{\sqrt{5}i}{14} 0 0 0 0 \frac{i}{14} 0 -\frac{\sqrt{15}i}{70} 0 0 0 0 0 0$	
	$0 0 -\frac{\sqrt{5}i}{14} 0 -\frac{\sqrt{10}i}{70} 0 0 0 0 0 \frac{\sqrt{15}i}{70} 0 0 -\frac{i}{14} 0 0 0$	
	$0 0 0 -\frac{3\sqrt{15}i}{70} 0 \frac{\sqrt{6}i}{14} 0 0 0 0 0 \frac{\sqrt{5}i}{70} 0 0 -\frac{i}{14} 0 0$	
	$0 \frac{\sqrt{6}i}{28} 0 0 0 0 0 \frac{\sqrt{35}i}{28} 0 -\frac{\sqrt{15}i}{28} 0 0 0 0 0 0 0$	
	$\frac{\sqrt{6}i}{28} 0 \frac{\sqrt{15}i}{70} 0 0 0 0 \frac{i}{28} 0 -\frac{11\sqrt{5}i}{140} 0 0 0 0 0 0 0$	
	$0 \frac{\sqrt{15}i}{70} 0 0 0 0 0 0 -\frac{\sqrt{6}i}{28} 0 -\frac{\sqrt{10}i}{20} 0 0 0 0 0 0$	
	$0 0 0 0 -\frac{\sqrt{15}i}{70} 0 -\frac{\sqrt{6}i}{28} 0 0 0 0 0 -\frac{11\sqrt{5}i}{140} 0 0 \frac{i}{28} 0$	
	$0 0 0 0 -\frac{\sqrt{6}i}{28} 0 0 0 0 0 0 -\frac{\sqrt{15}i}{28} 0 0 \frac{\sqrt{35}i}{28} 0$	
622	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{15}i}{35}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{5}i}{140}$ 0 0 0	
	$-\frac{\sqrt{2}i}{7}$ 0 0 0 $\frac{2\sqrt{10}i}{35}$ 0 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 $\frac{i}{28}$ 0 0 0	
	0 $-\frac{2\sqrt{10}i}{35}$ 0 0 0 $\frac{\sqrt{2}i}{7}$ 0 0 $\frac{i}{28}$ 0 0 0 $\frac{\sqrt{3}i}{28}$ 0	
	0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{140}$ 0 0 0 $\frac{\sqrt{7}i}{28}$	
	0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0 $\frac{i}{14}$ 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{15}i}{140}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{2\sqrt{5}i}{35}$ 0 0 0	
	$-\frac{\sqrt{3}i}{28}$ 0 0 0 $-\frac{3\sqrt{15}i}{140}$ 0 0 $-\frac{\sqrt{2}i}{7}$ 0 0 0 $\frac{\sqrt{6}i}{14}$ 0 0 0	
	0 $-\frac{3\sqrt{15}i}{140}$ 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 $\frac{\sqrt{2}i}{7}$ 0	
	0 0 $-\frac{3\sqrt{15}i}{140}$ 0 0 0 0 0 0 $-\frac{2\sqrt{5}i}{35}$ 0 0 0 $\frac{\sqrt{7}i}{14}$	
	0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0 0 $-\frac{i}{14}$ 0 0 0	
623	symmetry	$-\sqrt{3}xy$
$\mathbb{G}_{2,2}^{(a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{15}}{35}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 $-\frac{\sqrt{5}}{140}$ 0 0 0	
	$-\frac{\sqrt{2}}{7}$ 0 0 0 $-\frac{2\sqrt{10}}{35}$ 0 0 $\frac{\sqrt{3}}{28}$ 0 0 0 $-\frac{1}{28}$ 0 0 0	
	0 $-\frac{2\sqrt{10}}{35}$ 0 0 0 $-\frac{\sqrt{2}}{7}$ 0 0 $\frac{1}{28}$ 0 0 0 $-\frac{\sqrt{3}}{28}$ 0	
	0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{5}}{140}$ 0 0 0 $-\frac{\sqrt{7}}{28}$	
	0 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0 0 0 0	
	0 0 0 $\frac{3\sqrt{15}}{140}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0	
	$-\frac{\sqrt{3}}{28}$ 0 0 0 $\frac{3\sqrt{15}}{140}$ 0 0 $-\frac{\sqrt{2}}{7}$ 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0	
	0 $-\frac{3\sqrt{15}}{140}$ 0 0 0 $\frac{\sqrt{3}}{28}$ 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 $-\frac{\sqrt{2}}{7}$ 0	
	0 0 $-\frac{3\sqrt{15}}{140}$ 0 0 0 0 0 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0 $-\frac{\sqrt{7}}{14}$	
	0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0 0 0	
624	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(a)}(A_{1u}, 1)$		$\begin{bmatrix} 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 \\ \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{3}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{20} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{3\sqrt{6}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{280} & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
625	symmetry	
626	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(a)}(A_{2u})$	0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{9\sqrt{7}i}{140}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ $-\frac{3i}{20}$ 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{70}$ 0	
	$\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{7}i}{70}$ 0 0 0 0 0 $\frac{3i}{20}$	
	0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0 $\frac{9\sqrt{7}i}{140}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{7}i}{14}$ 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 $-\frac{\sqrt{7}i}{20}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ $\frac{3\sqrt{6}i}{40}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{280}$ 0	
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{280}$ 0 0 0 0 0 $\frac{3\sqrt{6}i}{40}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
627	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,1}^{(a)}(E_u, 1)$	$-\frac{\sqrt{2}}{56}$ 0 $-\frac{\sqrt{5}}{28}$ 0 0 0 0 $-\frac{9\sqrt{3}}{140}$ 0 $-\frac{3\sqrt{15}}{70}$ 0 0 0 0	
	0 $\frac{\sqrt{30}}{56}$ 0 $\frac{\sqrt{15}}{28}$ 0 0 0 0 0 $\frac{3\sqrt{3}}{35}$ 0 $\frac{3\sqrt{5}}{140}$ 0 0 0	
	0 0 $-\frac{\sqrt{15}}{28}$ 0 $-\frac{\sqrt{30}}{56}$ 0 0 0 0 $\frac{3\sqrt{5}}{140}$ 0 $\frac{3\sqrt{3}}{35}$ 0 0	
	0 0 0 $\frac{\sqrt{5}}{28}$ 0 $\frac{\sqrt{2}}{56}$ 0 0 0 0 $-\frac{3\sqrt{15}}{70}$ 0 $-\frac{9\sqrt{3}}{140}$ 0	
	0 $\frac{\sqrt{2}}{14}$ 0 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 $-\frac{\sqrt{5}}{14}$ 0 0 0 0 0	
	$-\frac{\sqrt{2}}{14}$ 0 $-\frac{\sqrt{5}}{14}$ 0 0 0 0 $\frac{13\sqrt{3}}{140}$ 0 $\frac{\sqrt{15}}{70}$ 0 0 0 0	
	0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{280}$ 0 $\frac{\sqrt{30}}{40}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{40}$ 0 $\frac{\sqrt{2}}{280}$ 0 0	
	0 0 0 $-\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{2}}{14}$ 0 0 0 0 $-\frac{\sqrt{15}}{70}$ 0 $-\frac{13\sqrt{3}}{140}$ 0	
	0 0 0 0 $\frac{\sqrt{2}}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 $\frac{\sqrt{105}}{140}$	
628	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(a)}(E_u, 1)$	$-\frac{\sqrt{2}i}{56}$	0 $\frac{\sqrt{5}i}{28}$ 0 0 0 0 0 $-\frac{9\sqrt{3}i}{140}$ 0 $\frac{3\sqrt{15}i}{70}$ 0 0 0 0
	0	$\frac{\sqrt{30}i}{56}$ 0 $-\frac{\sqrt{15}i}{28}$ 0 0 0 0 $\frac{3\sqrt{3}i}{35}$ 0 $-\frac{3\sqrt{5}i}{140}$ 0 0 0 0
	0	0 $-\frac{\sqrt{15}i}{28}$ 0 $\frac{\sqrt{30}i}{56}$ 0 0 0 0 $\frac{3\sqrt{5}i}{140}$ 0 $-\frac{3\sqrt{3}i}{35}$ 0 0 0
	0	0 0 $\frac{\sqrt{5}i}{28}$ 0 $-\frac{\sqrt{2}i}{56}$ 0 0 0 0 $-\frac{3\sqrt{15}i}{70}$ 0 $\frac{9\sqrt{3}i}{140}$ 0
	0	$-\frac{\sqrt{2}i}{14}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 $\frac{\sqrt{5}i}{14}$ 0 0 0 0 0 0
	$-\frac{\sqrt{2}i}{14}$	0 $\frac{\sqrt{5}i}{14}$ 0 0 0 0 $0$ $\frac{13\sqrt{3}i}{140}$ 0 $-\frac{\sqrt{15}i}{70}$ 0 0 0 0
	0	$\frac{\sqrt{5}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{280}$ 0 $-\frac{\sqrt{30}i}{40}$ 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 $-\frac{\sqrt{30}i}{40}$ 0 $-\frac{\sqrt{2}i}{280}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 $\frac{\sqrt{2}i}{14}$ 0 0 0 0 $-\frac{\sqrt{15}i}{70}$ 0 $\frac{13\sqrt{3}i}{140}$ 0
	0	0 0 0 0 $\frac{\sqrt{2}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{14}$ 0 $-\frac{\sqrt{105}i}{140}$
629	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{G}_{4,1}^{(a)}(E_u, 2)$	0	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{20}$
	0	0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{35}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{10}$
	0	0 0 0 0 0 0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{35}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0
630	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
631	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{280} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{28} & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & 0 & \frac{33\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & -\frac{3\sqrt{6}i}{280} & 0 & 0 & 0 & \frac{33\sqrt{2}i}{280} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{280} & 0 \\ 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & \frac{3\sqrt{42}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & -\frac{9\sqrt{3}i}{140} & 0 & 0 & 0 & \frac{17i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & -\frac{17i}{140} & 0 & 0 & 0 & \frac{9\sqrt{3}i}{140} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{140} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
632	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{10}}{28}$ 0 0 $-\frac{3\sqrt{42}}{280}$ 0 0 0 $\frac{9\sqrt{30}}{280}$ 0 0 0	
	$\frac{\sqrt{3}}{28}$ 0 0 0 $-\frac{\sqrt{15}}{28}$ 0 0 $\frac{33\sqrt{2}}{280}$ 0 0 0 $\frac{3\sqrt{6}}{280}$ 0 0 0	
	0 $-\frac{\sqrt{15}}{28}$ 0 0 0 $\frac{\sqrt{3}}{28}$ 0 0 $-\frac{3\sqrt{6}}{280}$ 0 0 0 $-\frac{33\sqrt{2}}{280}$ 0	
	0 0 $\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 $-\frac{9\sqrt{30}}{280}$ 0 0 0 $\frac{3\sqrt{42}}{280}$	
	0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{10}}{28}$ 0 0 $\frac{3\sqrt{42}}{140}$ 0 0 0 $\frac{\sqrt{30}}{140}$ 0 0 0	
	$\frac{3\sqrt{2}}{28}$ 0 0 0 $\frac{\sqrt{10}}{28}$ 0 0 $-\frac{9\sqrt{3}}{140}$ 0 0 0 $-\frac{17}{140}$ 0 0 0	
	0 $-\frac{\sqrt{10}}{28}$ 0 0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 $-\frac{17}{140}$ 0 0 0 $-\frac{9\sqrt{3}}{140}$ 0	
	0 0 $-\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{30}}{140}$ 0 0 0 $\frac{3\sqrt{42}}{140}$	
	0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0	
633	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{G}_2^{(1,-1;a)}(A_{1u})$	0 $-\frac{3\sqrt{6}i}{70}$ 0 0 0 0 0 0 $-\frac{2\sqrt{15}i}{35}$ 0 0 0 0 0	
	0 0 $-\frac{3i}{70}$ 0 0 0 0 0 0 $-\frac{6\sqrt{3}i}{35}$ 0 0 0 0 0	
	0 0 0 $\frac{3i}{70}$ 0 0 0 0 0 0 $-\frac{6\sqrt{3}i}{35}$ 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{6}i}{70}$ 0 0 0 0 0 0 $-\frac{2\sqrt{15}i}{35}$ 0 0 0	
	$\frac{\sqrt{6}i}{21}$ 0 0 0 0 0 0 $\frac{3i}{14}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{105}$ 0 0 0 0 0 0 $\frac{3\sqrt{15}i}{70}$ 0 0 0 0 0	
	0 0 $-\frac{4\sqrt{6}i}{105}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{70}$ 0 0 0 0	
	0 0 0 $-\frac{4\sqrt{6}i}{105}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{70}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}i}{105}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{15}i}{70}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}i}{21}$ 0 0 0 0 0 0 0 $-\frac{3i}{14}$ 0	
634	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{3\sqrt{10}}{140} & 0 & -\frac{9}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & -\frac{2\sqrt{3}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{140} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{35} & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{6}}{140} & 0 & 0 & 0 & 0 & -\frac{6}{35} & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{35} & 0 & -\frac{2\sqrt{15}}{35} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{35} & 0 & \frac{2}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{140} & 0 & \frac{11\sqrt{3}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2}{35} & 0 & -\frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{3}}{140} & 0 & -\frac{\sqrt{15}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
635	symmetry	$\begin{bmatrix} -\frac{3\sqrt{10}i}{140} & 0 & \frac{9i}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & \frac{2\sqrt{3}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{140} & 0 & \frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & \frac{6i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & \frac{\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & -\frac{6i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9i}{140} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{3i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{35} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{140} & 0 & -\frac{11\sqrt{3}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{2i}{35} & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & -\frac{11\sqrt{3}i}{140} & 0 & \frac{\sqrt{15}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
636	symmetry	$\begin{bmatrix} \frac{\sqrt{3}(x-y)(x+y)}{2} \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3i}{70}$ 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 0 $-\frac{\sqrt{3}i}{35}$ 0 0 0	
	$\frac{\sqrt{30}i}{70}$ 0 0 0 $-\frac{\sqrt{6}i}{35}$ 0 0 $-\frac{3\sqrt{5}i}{35}$ 0 0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0	
	0 $\frac{\sqrt{6}i}{35}$ 0 0 0 $-\frac{\sqrt{30}i}{70}$ 0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0 $-\frac{3\sqrt{5}i}{35}$ 0 0	
	0 0 $\frac{3i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{35}$ 0 0 0 $-\frac{\sqrt{105}i}{35}$	
	0 0 $\frac{\sqrt{5}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0	
	0 0 0 $\frac{3i}{35}$ 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 $\frac{2\sqrt{3}i}{35}$ 0 0 0	
	$\frac{\sqrt{5}i}{35}$ 0 0 0 $\frac{3i}{35}$ 0 0 $-\frac{\sqrt{30}i}{35}$ 0 0 0 $\frac{3\sqrt{10}i}{70}$ 0 0	
	0 $\frac{3i}{35}$ 0 0 0 $\frac{\sqrt{5}i}{35}$ 0 0 $-\frac{3\sqrt{10}i}{70}$ 0 0 0 $\frac{\sqrt{30}i}{35}$ 0	
	0 0 $\frac{3i}{35}$ 0 0 0 0 0 0 $-\frac{2\sqrt{3}i}{35}$ 0 0 0 $\frac{\sqrt{105}i}{70}$	
	0 0 0 $\frac{\sqrt{5}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{70}$ 0 0 0	
637	symmetry	$-\sqrt{3}xy$
$\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)$	0 0 0 $\frac{3}{70}$ 0 0 $-\frac{\sqrt{105}}{35}$ 0 0 0 $\frac{\sqrt{3}}{35}$ 0 0 0	
	$\frac{\sqrt{30}}{70}$ 0 0 0 $\frac{\sqrt{6}}{35}$ 0 0 $-\frac{3\sqrt{5}}{35}$ 0 0 0 $\frac{\sqrt{15}}{35}$ 0 0	
	0 $\frac{\sqrt{6}}{35}$ 0 0 0 $\frac{\sqrt{30}}{70}$ 0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0 $\frac{3\sqrt{5}}{35}$ 0	
	0 0 $\frac{3}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{35}$ 0 0 0 $\frac{\sqrt{105}}{35}$	
	0 0 $-\frac{\sqrt{5}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{70}$ 0 0 0 0	
	0 0 0 $-\frac{3}{35}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{2\sqrt{3}}{35}$ 0 0 0	
	$\frac{\sqrt{5}}{35}$ 0 0 0 $-\frac{3}{35}$ 0 0 $-\frac{\sqrt{30}}{35}$ 0 0 0 $-\frac{3\sqrt{10}}{70}$ 0 0	
	0 $\frac{3}{35}$ 0 0 0 $-\frac{\sqrt{5}}{35}$ 0 0 $-\frac{3\sqrt{10}}{70}$ 0 0 0 $-\frac{\sqrt{30}}{35}$ 0	
	0 0 $\frac{3}{35}$ 0 0 0 0 0 0 $-\frac{2\sqrt{3}}{35}$ 0 0 0 $-\frac{\sqrt{105}}{70}$	
	0 0 0 $\frac{\sqrt{5}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{70}$ 0 0 0	
638	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{3}i}{84} \quad 0 \quad \frac{\sqrt{30}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{28} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{3}i}{42}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{3}i}{14} \quad 0 \quad \frac{\sqrt{30}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{3}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5i}{28} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{21} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{2}i}{28} \quad 0 \quad 0$
639	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad -\frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0$
	$\frac{\sqrt{14}}{112}$	$0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{12}$
	0	$0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad -\frac{5\sqrt{7}}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{21}}{24} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad -\frac{3\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0$
	$\frac{\sqrt{21}}{42}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{16}$
	0	$0 \quad 0 \quad \frac{\sqrt{21}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad \frac{5\sqrt{7}}{56} \quad 0 \quad 0 \quad 0 \quad 0$
640	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	0 0 0 0 $\frac{\sqrt{210}i}{336}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{14}i}{112}$ $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0	
	$-\frac{\sqrt{14}i}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$	
	0 $\frac{\sqrt{210}i}{336}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{24}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ $\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{112}$ 0	
	$-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{112}$ 0 0 0 0 0 $\frac{3\sqrt{2}i}{16}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{24}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0 0	
641	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{6}}{336}$ 0 $\frac{\sqrt{15}}{168}$ 0 0 0 0 $\frac{3}{28}$ 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{10}}{112}$ 0 $-\frac{\sqrt{5}}{56}$ 0 0 0 0 $-\frac{1}{7}$ 0 $-\frac{\sqrt{15}}{84}$ 0 0 0 0	
	0 0 $\frac{\sqrt{5}}{56}$ 0 $\frac{\sqrt{10}}{112}$ 0 0 0 0 $-\frac{\sqrt{15}}{84}$ 0 $-\frac{1}{7}$ 0 0	
	0 0 0 $-\frac{\sqrt{15}}{168}$ 0 $-\frac{\sqrt{6}}{336}$ 0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 $\frac{3}{28}$ 0	
	0 $-\frac{\sqrt{6}}{42}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{5\sqrt{15}}{84}$ 0 0 0 0 0	
	$\frac{\sqrt{6}}{42}$ 0 $\frac{\sqrt{15}}{42}$ 0 0 0 0 $\frac{13}{56}$ 0 $\frac{\sqrt{5}}{28}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{336}$ 0 $\frac{\sqrt{10}}{16}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{15}}{42}$ 0 0 0 0 $-\frac{\sqrt{10}}{16}$ 0 $\frac{\sqrt{6}}{336}$ 0 0 0	
	0 0 0 $\frac{\sqrt{15}}{42}$ 0 $\frac{\sqrt{6}}{42}$ 0 0 0 0 $-\frac{\sqrt{5}}{28}$ 0 $-\frac{13}{56}$ 0	
	0 0 0 0 $-\frac{\sqrt{6}}{42}$ 0 0 0 0 0 0 $\frac{5\sqrt{15}}{84}$ 0 $\frac{\sqrt{35}}{56}$	
642	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{6}i}{336} \quad 0 \quad -\frac{\sqrt{15}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3i}{28} \quad 0 \quad -\frac{\sqrt{5}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{10}i}{112} \quad 0 \quad \frac{\sqrt{5}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{7} \quad 0 \quad \frac{\sqrt{15}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{5}i}{56} \quad 0 \quad -\frac{\sqrt{10}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{84} \quad 0 \quad \frac{i}{7} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{168} \quad 0 \quad \frac{\sqrt{6}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{14} \quad 0 \quad -\frac{3i}{28} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{56} \quad 0 \quad \frac{5\sqrt{15}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{6}i}{42} \quad 0 \quad -\frac{\sqrt{15}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13i}{56} \quad 0 \quad -\frac{\sqrt{5}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{15}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{336} \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad -\frac{\sqrt{6}i}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{42} \quad 0 \quad -\frac{\sqrt{6}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{28} \quad 0 \quad \frac{13i}{56} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{15}i}{84} \quad 0 \quad -\frac{\sqrt{35}i}{56} \quad 0$	
643	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}i}{12} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{12} \quad 0 \quad 0$	
	$-\frac{\sqrt{21}i}{84} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{14} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{i}{4}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{4} \quad 0 \quad 0$	
	$-\frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{14}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{210}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
644	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
645	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}i}{168} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 \\ -\frac{i}{56} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{56} & 0 & 0 & 0 & \frac{i}{56} & 0 & 0 & \frac{\sqrt{2}i}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{56} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{56} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & -\frac{9i}{56} & 0 & 0 & 0 & \frac{17\sqrt{3}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & -\frac{17\sqrt{3}i}{168} & 0 & 0 & 0 & \frac{9i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
646	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{1}{56} & 0 & 0 & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 & 0 & -\frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{1}{56} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & \frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & -\frac{9}{56} & 0 & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 & 0 & -\frac{9}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
647	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{132} & 0 \end{bmatrix}$
648	symmetry	$\frac{\sqrt{462}(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
649	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
650	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
651	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
652	symmetry	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
653	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
654	symmetry	$\frac{\sqrt{21}yz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{264} & 0 & \frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{264} & 0 & -\frac{5\sqrt{154}}{264} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{132} & 0 & \frac{5\sqrt{77}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{132} & 0 & -\frac{\sqrt{1155}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{264} & 0 & \frac{\sqrt{770}}{264} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{264} & 0 & -\frac{\sqrt{22}}{264} \end{bmatrix}$
655	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{264} & 0 & -\frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{264} & 0 & \frac{5\sqrt{154}i}{264} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{132} & 0 & -\frac{5\sqrt{77}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}i}{132} & 0 & \frac{\sqrt{1155}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{264} & 0 & -\frac{\sqrt{770}i}{264} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{264} & 0 & \frac{\sqrt{22}i}{264} \end{bmatrix}$
656	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
657	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
	$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
658	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{66} & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 \end{bmatrix}$
659	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 \end{bmatrix}$
660	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(1,0;a)}(A_{1u})$	0	$\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0
	0	0 $\frac{\sqrt{10}i}{70}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{30}i}{70}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{10}i}{70}$ 0 0 0 0 0 0 $-\frac{3\sqrt{30}i}{70}$ 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0
	$-\frac{\sqrt{15}i}{14}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 0
	0	$\frac{\sqrt{15}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0
	0	0 $\frac{2\sqrt{15}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{70}$ 0 0 0 0 0
	0	0 0 0 $\frac{2\sqrt{15}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{70}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{15}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0
661	symmetry	$\sqrt{3}yz$
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 1)$	$\frac{1}{14}$	0 $\frac{3\sqrt{10}}{140}$ 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 $-\frac{\sqrt{30}}{70}$ 0 0 0 0 0
	0	$-\frac{\sqrt{15}}{210}$ 0 $\frac{\sqrt{30}}{84}$ 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 $-\frac{3\sqrt{10}}{70}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{30}}{84}$ 0 $\frac{\sqrt{15}}{210}$ 0 0 0 0 $-\frac{3\sqrt{10}}{70}$ 0 $-\frac{\sqrt{6}}{14}$ 0 0
	0	0 0 0 $-\frac{3\sqrt{10}}{140}$ 0 $-\frac{1}{14}$ 0 0 0 0 $-\frac{\sqrt{30}}{70}$ 0 $-\frac{\sqrt{6}}{14}$ 0
	0	$-\frac{3}{14}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{10}}{56}$ 0 0 0 0 0
	$\frac{3}{14}$	0 $-\frac{3\sqrt{10}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{168}$ 0 $-\frac{11\sqrt{30}}{840}$ 0 0 0 0
	0	$\frac{3\sqrt{10}}{70}$ 0 0 0 0 0 0 $\frac{1}{28}$ 0 $-\frac{\sqrt{15}}{60}$ 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{10}}{70}$ 0 0 0 0 $\frac{\sqrt{15}}{60}$ 0 $-\frac{1}{28}$ 0 0
	0	0 0 0 $-\frac{3\sqrt{10}}{70}$ 0 $\frac{3}{14}$ 0 0 0 0 $\frac{11\sqrt{30}}{840}$ 0 $\frac{\sqrt{6}}{168}$ 0
	0	0 0 0 0 $-\frac{3}{14}$ 0 0 0 0 0 $\frac{\sqrt{10}}{56}$ 0 $\frac{\sqrt{210}}{168}$ 0
662	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 1)$	$\frac{i}{14}$	$0 \quad -\frac{3\sqrt{10}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad \frac{\sqrt{30}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$-\frac{\sqrt{15}i}{210} \quad 0 \quad -\frac{\sqrt{30}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad \frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad -\frac{\sqrt{30}i}{84} \quad 0 \quad -\frac{\sqrt{15}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad \frac{\sqrt{6}i}{14} \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad -\frac{3\sqrt{10}i}{140} \quad 0 \quad \frac{i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{70} \quad 0 \quad \frac{\sqrt{6}i}{14} \quad 0 \quad 0 \quad 0$
	$0$	$\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad \frac{\sqrt{10}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{3i}{14}$	$0 \quad \frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{168} \quad 0 \quad \frac{11\sqrt{30}i}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60} \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60} \quad 0 \quad \frac{i}{28} \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad -\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{30}i}{840} \quad 0 \quad -\frac{\sqrt{6}i}{168} \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{56} \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0$
663	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 2)$	$0$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{3}i}{21}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{2\sqrt{15}i}{105} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{28} \quad 0 \quad 0 \quad 0$
	$0$	$-\frac{2\sqrt{15}i}{105} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad -\frac{\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{28}$
	$0$	$0 \quad 0 \quad -\frac{3\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad -\frac{9\sqrt{10}i}{140} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{105} \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{3\sqrt{2}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{10}i}{140} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{21} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{14} \quad 0 \quad 0 \quad 0$
	$0$	$-\frac{9\sqrt{10}i}{140} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{28} \quad 0 \quad 0 \quad \frac{i}{14} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{21} \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad -\frac{9\sqrt{10}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{84}$
	$0$	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$
664	symmetry	$-\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{30}}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & \frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 \\ 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & \frac{\sqrt{3}}{21} & 0 \\ 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{105} & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{84} & 0 & 0 & 0 \end{bmatrix}$
665	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{27\sqrt{2}i}{140} & 0 & 0 \\ \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{9\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 \end{bmatrix}$
666	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 2)$	0 0 0 0 $-\frac{\sqrt{14}}{112}$ 0 0 0 0 0 0 $\frac{27\sqrt{35}}{700}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{560}$ $-\frac{9\sqrt{5}}{100}$ 0 0 0 0 0 $\frac{9\sqrt{35}}{350}$ 0	
	$-\frac{\sqrt{210}}{560}$ 0 0 0 0 0 0 $\frac{9\sqrt{35}}{350}$ 0 0 0 0 0 $-\frac{9\sqrt{5}}{100}$	
	0 $\frac{\sqrt{14}}{112}$ 0 0 0 0 0 0 $\frac{27\sqrt{35}}{700}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{280}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{200}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}}{70}$ $\frac{3\sqrt{30}}{400}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{2800}$ 0	
	$-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{2800}$ 0 0 0 0 0 $-\frac{3\sqrt{30}}{400}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{200}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 0	
667	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{G}_4^{(1,0;a)}(A_{2u})$	0 0 0 0 $-\frac{\sqrt{14}i}{112}$ 0 0 0 0 0 0 $\frac{27\sqrt{35}i}{700}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}i}{560}$ $\frac{9\sqrt{5}i}{100}$ 0 0 0 0 0 $\frac{9\sqrt{35}i}{350}$ 0	
	$\frac{\sqrt{210}i}{560}$ 0 0 0 0 0 0 $-\frac{9\sqrt{35}i}{350}$ 0 0 0 0 0 $-\frac{9\sqrt{5}i}{100}$	
	0 $-\frac{\sqrt{14}i}{112}$ 0 0 0 0 0 0 $-\frac{27\sqrt{35}i}{700}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{280}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{200}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ $-\frac{3\sqrt{30}i}{400}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{2800}$ 0	
	$\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{2800}$ 0 0 0 0 0 $-\frac{3\sqrt{30}i}{400}$	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{200}$ 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{280}$ 0 0 0 0	
668	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{10}}{560} \quad 0 \quad -\frac{1}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{27\sqrt{15}}{700} \quad 0 \quad \frac{9\sqrt{3}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}}{112} \quad 0 \quad \frac{\sqrt{3}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{15}}{175} \quad 0 \quad -\frac{9}{140} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{3}}{56} \quad 0 \quad -\frac{\sqrt{6}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9}{140} \quad 0 \quad -\frac{9\sqrt{15}}{175} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{1}{56} \quad 0 \quad \frac{\sqrt{10}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{3}}{70} \quad 0 \quad 0 \quad \frac{27\sqrt{15}}{700} \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{280} \quad 0 \quad \frac{1}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{10}}{70} \quad 0 \quad -\frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{15}}{1400} \quad 0 \quad -\frac{\sqrt{3}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{2800} \quad 0 \quad -\frac{\sqrt{6}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{80} \quad 0 \quad -\frac{\sqrt{10}}{2800} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{3}{14} \quad 0 \quad -\frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{140} \quad 0 \quad \frac{13\sqrt{15}}{1400} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{70} \quad 0 \quad -\frac{1}{28} \quad 0 \quad -\frac{\sqrt{21}}{280} \quad 0$	
669	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{10}i}{560} \quad 0 \quad \frac{i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{27\sqrt{15}i}{700} \quad 0 \quad -\frac{9\sqrt{3}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{6}i}{112} \quad 0 \quad -\frac{\sqrt{3}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{15}i}{175} \quad 0 \quad \frac{9i}{140} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{3}i}{56} \quad 0 \quad \frac{\sqrt{6}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9i}{140} \quad 0 \quad \frac{9\sqrt{15}i}{175} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{i}{56} \quad 0 \quad -\frac{\sqrt{10}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{3}i}{70} \quad 0 \quad -\frac{27\sqrt{15}i}{700} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad -\frac{i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{3\sqrt{10}i}{70} \quad 0 \quad \frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{15}i}{1400} \quad 0 \quad \frac{\sqrt{3}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{2800} \quad 0 \quad \frac{\sqrt{6}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{80} \quad 0 \quad \frac{\sqrt{10}i}{2800} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{3i}{14} \quad 0 \quad \frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{140} \quad 0 \quad -\frac{13\sqrt{15}i}{1400} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}i}{70} \quad 0 \quad -\frac{i}{28} \quad 0 \quad \frac{\sqrt{21}i}{280} \quad 0$	
670	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 2)$	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 0 0 $\frac{9\sqrt{210}i}{700}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{9\sqrt{10}i}{100}$
	0	0 0 0 0 0 0 $\frac{9\sqrt{10}i}{100}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{35}i}{140}$	0 0 0 0 0 0 0 $\frac{9\sqrt{210}i}{700}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{140}$ 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{350}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{100}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{15}i}{100}$ 0 0 0 0 0 0 0 0
	$\frac{3\sqrt{35}i}{70}$	0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{350}$ 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{140}$ 0 0 0 0 0 0
671 symmetry		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	0	0 0 0 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 0 0 0 0 $\frac{9\sqrt{210}}{700}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{9\sqrt{10}}{100}$
	0	0 0 0 0 0 0 $-\frac{9\sqrt{10}}{100}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{35}}{140}$	0 0 0 0 0 0 0 $-\frac{9\sqrt{210}}{700}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{140}$ 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{350}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{100}$
	0	0 0 0 0 0 0 $\frac{\sqrt{15}}{100}$ 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{35}}{70}$	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{350}$ 0 0 0 0 0 0 0
672 symmetry		$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{2}i}{56}$ 0 0 $\frac{9\sqrt{210}i}{1400}$ 0 0 0 $\frac{27\sqrt{6}i}{280}$ 0 0 0	$\frac{\sqrt{15}i}{280}$ 0 0 0 $\frac{\sqrt{3}i}{56}$ 0 0 $-\frac{99\sqrt{10}i}{1400}$ 0 0 0 $\frac{9\sqrt{30}i}{1400}$ 0 0 0
	0 $-\frac{\sqrt{3}i}{56}$ 0 0 0 $-\frac{\sqrt{15}i}{280}$ 0 0 0 $\frac{9\sqrt{30}i}{1400}$ 0 0 0 $-\frac{99\sqrt{10}i}{1400}$ 0	0 0 $\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 $\frac{27\sqrt{6}i}{280}$ 0 0 0 $\frac{9\sqrt{210}i}{1400}$
	0 0 $\frac{9\sqrt{10}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{30}i}{140}$ 0 0 0 0 0	$\frac{9\sqrt{10}i}{140}$ 0 0 0 $-\frac{3\sqrt{2}i}{28}$ 0 0 $-\frac{3\sqrt{210}i}{1400}$ 0 0 0 $\frac{\sqrt{6}i}{280}$ 0 0 0
	0 0 0 $-\frac{3\sqrt{2}i}{28}$ 0 0 $-\frac{3\sqrt{2}i}{28}$ 0 0 $-\frac{9\sqrt{15}i}{1400}$ 0 0 0 $-\frac{17\sqrt{5}i}{1400}$ 0 0 0	0 $-\frac{3\sqrt{2}i}{28}$ 0 0 0 $\frac{9\sqrt{10}i}{140}$ 0 0 $\frac{17\sqrt{5}i}{1400}$ 0 0 0 $-\frac{9\sqrt{15}i}{1400}$ 0
	0 0 $-\frac{3\sqrt{2}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{280}$ 0 0 0 0 $\frac{3\sqrt{210}i}{1400}$	0 0 0 $\frac{9\sqrt{10}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{140}$ 0 0 0 0
	673 symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 3)$	
	0 0 0 $\frac{\sqrt{2}}{56}$ 0 0 $\frac{9\sqrt{210}}{1400}$ 0 0 0 $-\frac{27\sqrt{6}}{280}$ 0 0 0	$\frac{\sqrt{15}}{280}$ 0 0 0 $-\frac{\sqrt{3}}{56}$ 0 0 $-\frac{99\sqrt{10}}{1400}$ 0 0 0 $-\frac{9\sqrt{30}}{1400}$ 0 0 0
	0 $-\frac{\sqrt{3}}{56}$ 0 0 0 $\frac{\sqrt{15}}{280}$ 0 0 0 $\frac{9\sqrt{30}}{1400}$ 0 0 0 $\frac{99\sqrt{10}}{1400}$ 0	0 0 $\frac{\sqrt{2}}{56}$ 0 0 0 0 0 $\frac{27\sqrt{6}}{280}$ 0 0 0 $-\frac{9\sqrt{210}}{1400}$
	0 0 $-\frac{9\sqrt{10}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{140}$ 0 0 0 0 0	$0 0 0 \frac{3\sqrt{2}}{28} 0 0 -\frac{3\sqrt{210}}{1400} 0 0 0 -\frac{\sqrt{6}}{280} 0 0 0$
	0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 $\frac{9\sqrt{15}}{1400}$ 0 0 0 $\frac{17\sqrt{5}}{1400}$ 0 0 0	$0 0 0 \frac{9\sqrt{10}}{140} 0 0 0 0 0 0 -\frac{\sqrt{30}}{140} 0 0 0$
674 symmetry	1	

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
675	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & \frac{12i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{12i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{140} & 0 & 0 \\ \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{6i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}i}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{21} & 0 \end{bmatrix}$
676	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	$\frac{2\sqrt{15}}{35} 0 \frac{3\sqrt{6}}{35} 0 0 0 0 -\frac{3\sqrt{10}}{140} 0 -\frac{3\sqrt{2}}{140} 0 0 0 0 0$	
	$0 -\frac{2}{35} 0 \frac{\sqrt{2}}{7} 0 0 0 0 0 -\frac{3\sqrt{10}}{140} 0 -\frac{3\sqrt{6}}{140} 0 0 0 0 0$	
	$0 0 -\frac{\sqrt{2}}{7} 0 \frac{2}{35} 0 0 0 0 0 -\frac{3\sqrt{6}}{140} 0 -\frac{3\sqrt{10}}{140} 0 0 0 0 0$	
	$0 0 0 -\frac{3\sqrt{6}}{35} 0 -\frac{2\sqrt{15}}{35} 0 0 0 0 -\frac{3\sqrt{2}}{140} 0 -\frac{3\sqrt{10}}{140} 0 0 0 0 0$	
	$0 \frac{3\sqrt{15}}{70} 0 0 0 0 -\frac{\sqrt{14}}{42} 0 -\frac{\sqrt{6}}{42} 0 0 0 0 0 0 0 0 0$	
	$-\frac{3\sqrt{15}}{70} 0 \frac{3\sqrt{6}}{70} 0 0 0 0 -\frac{\sqrt{10}}{210} 0 -\frac{11\sqrt{2}}{210} 0 0 0 0 0 0 0 0$	
	$0 -\frac{3\sqrt{6}}{70} 0 0 0 0 0 0 \frac{\sqrt{15}}{105} 0 -\frac{1}{15} 0 -\frac{\sqrt{15}}{105} 0 0 0 0 0 0$	
	$0 0 0 0 -\frac{3\sqrt{6}}{70} 0 0 0 0 0 \frac{1}{15} 0 -\frac{\sqrt{15}}{105} 0 0 0 0 0 0$	
	$0 0 0 \frac{3\sqrt{6}}{70} 0 -\frac{3\sqrt{15}}{70} 0 0 0 0 0 \frac{11\sqrt{2}}{210} 0 \frac{\sqrt{10}}{210} 0 0 0 0 0$	
	$0 0 0 0 0 \frac{3\sqrt{15}}{70} 0 0 0 0 0 0 0 \frac{\sqrt{6}}{42} 0 \frac{\sqrt{14}}{42} 0 0 0 0$	
677	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 1)$	$\frac{2\sqrt{15}i}{35} 0 -\frac{3\sqrt{6}i}{35} 0 0 0 0 -\frac{3\sqrt{10}i}{140} 0 \frac{3\sqrt{2}i}{140} 0 0 0 0 0 0 0$	
	$0 -\frac{2i}{35} 0 -\frac{\sqrt{2}i}{7} 0 0 0 0 0 -\frac{3\sqrt{10}i}{140} 0 \frac{3\sqrt{6}i}{140} 0 0 0 0 0 0$	
	$0 0 -\frac{\sqrt{2}i}{7} 0 -\frac{2i}{35} 0 0 0 0 0 -\frac{3\sqrt{6}i}{140} 0 \frac{3\sqrt{10}i}{140} 0 0 0 0 0$	
	$0 0 0 -\frac{3\sqrt{6}i}{35} 0 \frac{2\sqrt{15}i}{35} 0 0 0 0 0 -\frac{3\sqrt{2}i}{140} 0 \frac{3\sqrt{10}i}{140} 0 0 0 0$	
	$0 -\frac{3\sqrt{15}i}{70} 0 0 0 0 -\frac{\sqrt{14}i}{42} 0 \frac{\sqrt{6}i}{42} 0 0 0 0 0 0 0 0 0 0$	
	$-\frac{3\sqrt{15}i}{70} 0 -\frac{3\sqrt{6}i}{70} 0 0 0 0 -\frac{\sqrt{10}i}{210} 0 \frac{11\sqrt{2}i}{210} 0 0 0 0 0 0 0 0$	
	$0 -\frac{3\sqrt{6}i}{70} 0 0 0 0 0 0 \frac{\sqrt{15}i}{105} 0 \frac{i}{15} 0 \frac{\sqrt{15}i}{105} 0 0 0 0 0$	
	$0 0 0 0 \frac{3\sqrt{6}i}{70} 0 \frac{3\sqrt{15}i}{70} 0 0 0 0 0 \frac{11\sqrt{2}i}{210} 0 -\frac{\sqrt{10}i}{210} 0 0 0$	
	$0 0 0 0 0 \frac{3\sqrt{15}i}{70} 0 0 0 0 0 0 0 \frac{\sqrt{6}i}{42} 0 -\frac{\sqrt{14}i}{42} 0 0 0$	
		$\frac{\sqrt{3}(x-y)(x+y)}{2}$
678	symmetry	

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{8i}{35} & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 \\ 0 & -\frac{8i}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}i}{35} & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & \frac{\sqrt{70}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & \frac{4\sqrt{5}i}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & \frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{105} & 0 & 0 & 0 \end{bmatrix}$
679	symmetry	$\begin{bmatrix} 0 & 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & \frac{3\sqrt{2}}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}}{35} & 0 & 0 & 0 & -\frac{8}{35} & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 & 0 & 0 & \frac{3\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{8}{35} & 0 & 0 & 0 & -\frac{4\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 & 0 & \frac{3\sqrt{30}}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} \\ 0 & 0 & -\frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{6}}{140} & 0 & 0 & \frac{\sqrt{70}}{105} & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & -\frac{9\sqrt{6}}{140} & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & -\frac{3\sqrt{30}}{140} & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 & \frac{\sqrt{70}}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 \end{bmatrix}$
680	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 1)$	0	$-\frac{\sqrt{330}i}{105}$ 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{70}$ 0 0 0 0 0
	0	0 $\frac{2\sqrt{55}i}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{210}$ 0 0 0 0
	0	0 0 0 $-\frac{2\sqrt{55}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{210}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{330}i}{105}$ 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{70}$ 0 0
	$-\frac{\sqrt{330}i}{420}$	0 0 0 0 0 0 0 $\frac{2\sqrt{55}i}{385}$ 0 0 0 0 0 0
	0	$\frac{\sqrt{330}i}{140}$ 0 0 0 0 0 0 $-\frac{8\sqrt{33}i}{1155}$ 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{330}i}{210}$ 0 0 0 0 0 0 $-\frac{\sqrt{110}i}{385}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{330}i}{210}$ 0 0 0 0 0 0 $\frac{\sqrt{110}i}{385}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{330}i}{140}$ 0 0 0 0 0 0 0 $\frac{8\sqrt{33}i}{1155}$ 0 0
	0	0 0 0 0 $-\frac{\sqrt{330}i}{420}$ 0 0 0 0 0 0 0 0 $-\frac{2\sqrt{55}i}{385}$ 0
681	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 2)$	0	0 0 0 0 $-\frac{\sqrt{231}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{2310}}{700}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{385}}{70}$ $-\frac{\sqrt{330}}{300}$ 0 0 0 0 0 $\frac{\sqrt{2310}}{1050}$ 0
	$-\frac{\sqrt{385}}{70}$	0 0 0 0 0 0 0 $\frac{\sqrt{2310}}{1050}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{300}$
	0	$\frac{\sqrt{231}}{42}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2310}}{700}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{2310}}{420}$ 0 0 0 0 0 0 $\frac{\sqrt{770}}{770}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2310}}{1650}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{2310}}{420}$ $\frac{3\sqrt{55}}{550}$ 0 0 0 0 0 $-\frac{\sqrt{385}}{3850}$ 0
	$\frac{\sqrt{2310}}{420}$	0 0 0 0 0 0 0 $\frac{\sqrt{385}}{3850}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{550}$
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{1650}$ 0 0 0 0 0 0
682	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{2u})$	0 0 0 0 $-\frac{\sqrt{231}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{700}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{385}i}{70}$ $\frac{\sqrt{330}i}{300}$ 0 0 0 0 0 $\frac{\sqrt{2310}i}{1050}$ 0	
	$\frac{\sqrt{385}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{1050}$ 0 0 0 0 0 $-\frac{\sqrt{330}i}{300}$	
	0 $-\frac{\sqrt{231}i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{700}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $\frac{\sqrt{770}i}{770}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{1650}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{2310}i}{420}$ $-\frac{3\sqrt{55}i}{550}$ 0 0 0 0 0 $-\frac{\sqrt{385}i}{3850}$ 0	
	$-\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{385}i}{3850}$ 0 0 0 0 0 $-\frac{3\sqrt{55}i}{550}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{1650}$ 0 0 0 0	
	0 0 $\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $\frac{\sqrt{770}i}{770}$ 0 0 0 0	
683	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{165}}{210}$ 0 $-\frac{\sqrt{66}}{42}$ 0 0 0 0 $\frac{3\sqrt{110}}{700}$ 0 $\frac{\sqrt{22}}{70}$ 0 0 0 0 0	
	0 $\frac{\sqrt{11}}{14}$ 0 $\frac{\sqrt{22}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{175}$ 0 $-\frac{\sqrt{66}}{420}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{22}}{14}$ 0 $-\frac{\sqrt{11}}{14}$ 0 0 0 0 $-\frac{\sqrt{66}}{420}$ 0 $-\frac{\sqrt{110}}{175}$ 0 0	
	0 0 0 $\frac{\sqrt{66}}{42}$ 0 $\frac{\sqrt{165}}{210}$ 0 0 0 0 $\frac{\sqrt{22}}{70}$ 0 $\frac{3\sqrt{110}}{700}$ 0	
	0 $-\frac{\sqrt{165}}{210}$ 0 0 0 0 $\frac{\sqrt{154}}{770}$ 0 $\frac{\sqrt{66}}{231}$ 0 0 0 0 0	
	$\frac{\sqrt{165}}{210}$ 0 $\frac{\sqrt{66}}{84}$ 0 0 0 0 $-\frac{13\sqrt{110}}{3850}$ 0 $-\frac{\sqrt{22}}{385}$ 0 0 0 0	
	0 $-\frac{\sqrt{66}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{165}}{11550}$ 0 $-\frac{\sqrt{11}}{110}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{66}}{84}$ 0 0 0 0 $\frac{\sqrt{11}}{110}$ 0 $-\frac{\sqrt{165}}{11550}$ 0 0	
	0 0 0 $\frac{\sqrt{66}}{84}$ 0 $\frac{\sqrt{165}}{210}$ 0 0 0 0 $\frac{\sqrt{22}}{385}$ 0 $\frac{13\sqrt{110}}{3850}$ 0	
	0 0 0 0 $-\frac{\sqrt{165}}{210}$ 0 0 0 0 0 0 $-\frac{\sqrt{66}}{231}$ 0 $-\frac{\sqrt{154}}{770}$	
684	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{165}i}{210} \quad 0 \quad \frac{\sqrt{66}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{110}i}{700} \quad 0 \quad -\frac{\sqrt{22}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{11}i}{14} \quad 0 \quad -\frac{\sqrt{22}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{175} \quad 0 \quad \frac{\sqrt{66}i}{420} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{22}i}{14} \quad 0 \quad \frac{\sqrt{11}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{420} \quad 0 \quad \frac{\sqrt{110}i}{175} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{66}i}{42} \quad 0 \quad -\frac{\sqrt{165}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}i}{70} \quad 0 \quad -\frac{3\sqrt{110}i}{700} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{165}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{154}i}{770} \quad 0 \quad -\frac{\sqrt{66}i}{231} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{165}i}{210} \quad 0 \quad -\frac{\sqrt{66}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{110}i}{3850} \quad 0 \quad \frac{\sqrt{22}i}{385} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{66}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}i}{11550} \quad 0 \quad \frac{\sqrt{11}i}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{66}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{110} \quad 0 \quad \frac{\sqrt{165}i}{11550} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{66}i}{84} \quad 0 \quad -\frac{\sqrt{165}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}i}{385} \quad 0 \quad -\frac{13\sqrt{110}i}{3850} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{231} \quad 0 \quad \frac{\sqrt{154}i}{770} \quad 0$	
685	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{105} \quad 0 \quad \frac{\sqrt{385}i}{350} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{165}i}{150}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}i}{150} \quad 0 \quad 0$	
	$\frac{\sqrt{2310}i}{105} \quad 0 \quad \frac{\sqrt{385}i}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{420} \quad 0 \quad \frac{2\sqrt{231}i}{1155} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{420} \quad 0 \quad \frac{4\sqrt{385}i}{1925} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{110}i}{275}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}i}{275} \quad 0 \quad 0$	
	$-\frac{\sqrt{2310}i}{420} \quad 0 \quad -\frac{4\sqrt{385}i}{1925} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{2310}i}{420} \quad 0 \quad -\frac{2\sqrt{231}i}{1155} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
686	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{350} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{150} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{150} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{350} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{1155} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{1925} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{275} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{275} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{385}}{1925} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{1155} & 0 & 0 & 0 & 0 \end{bmatrix}$
687	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{33}i}{21} & 0 & 0 & \frac{\sqrt{385}i}{700} & 0 & 0 & 0 & \frac{3\sqrt{11}i}{140} & 0 & 0 & 0 \\ \frac{\sqrt{110}i}{70} & 0 & 0 & 0 & \frac{\sqrt{22}i}{14} & 0 & 0 & -\frac{11\sqrt{165}i}{2100} & 0 & 0 & 0 & \frac{\sqrt{55}i}{700} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{22}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{110}i}{70} & 0 & 0 & \frac{\sqrt{55}i}{700} & 0 & 0 & 0 & -\frac{11\sqrt{165}i}{2100} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{33}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{700} \\ 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}i}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & -\frac{3\sqrt{385}i}{1925} & 0 & 0 & 0 & \frac{\sqrt{11}i}{385} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & \frac{9\sqrt{110}i}{3850} & 0 & 0 & 0 & -\frac{17\sqrt{330}i}{11550} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & \frac{17\sqrt{330}i}{11550} & 0 & 0 & 0 & -\frac{9\sqrt{110}i}{3850} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{33}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{385} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{1925} \\ 0 & 0 & 0 & -\frac{\sqrt{165}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}i}{385} & 0 & 0 & 0 & 0 \end{bmatrix}$
688	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{33}}{21}$ 0 0 $\frac{\sqrt{385}}{700}$ 0 0 0 $-\frac{3\sqrt{11}}{140}$ 0 0 0	
	$\frac{\sqrt{110}}{70}$ 0 0 0 $-\frac{\sqrt{22}}{14}$ 0 0 $-\frac{11\sqrt{165}}{2100}$ 0 0 0 $-\frac{\sqrt{55}}{700}$ 0 0	
	0 $-\frac{\sqrt{22}}{14}$ 0 0 0 $\frac{\sqrt{110}}{70}$ 0 0 $\frac{\sqrt{55}}{700}$ 0 0 0 $\frac{11\sqrt{165}}{2100}$ 0	
	0 0 $\frac{\sqrt{33}}{21}$ 0 0 0 0 0 0 $\frac{3\sqrt{11}}{140}$ 0 0 0 $-\frac{\sqrt{385}}{700}$	
	0 0 $\frac{\sqrt{165}}{140}$ 0 0 0 0 0 0 $-\frac{2\sqrt{55}}{385}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{33}}{84}$ 0 0 $-\frac{3\sqrt{385}}{1925}$ 0 0 0 $-\frac{\sqrt{11}}{385}$ 0 0 0	
	$-\frac{\sqrt{165}}{140}$ 0 0 0 $-\frac{\sqrt{33}}{84}$ 0 0 $\frac{9\sqrt{110}}{3850}$ 0 0 0 $\frac{17\sqrt{330}}{11550}$ 0 0	
	0 $\frac{\sqrt{33}}{84}$ 0 0 0 $\frac{\sqrt{165}}{140}$ 0 0 $\frac{17\sqrt{330}}{11550}$ 0 0 0 $\frac{9\sqrt{110}}{3850}$ 0	
	0 0 $\frac{\sqrt{33}}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}}{385}$ 0 0 0 $-\frac{3\sqrt{385}}{1925}$	
	0 0 0 $-\frac{\sqrt{165}}{140}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{55}}{385}$ 0 0 0	
689	symmetry	$z$
$\mathbb{T}_1^{(a)}(A_{2u})$	0 $\frac{i}{5}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}i}{10}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{i}{5}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 0 0 0	
	0 $-\frac{3i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{14}$ 0 0 0 0 0	
	0 0 $-\frac{i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{7}$ 0 0 0 0	
	0 0 0 $\frac{i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{7}$ 0 0 0	
	0 0 0 0 $\frac{3i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{14}$ 0 0	
	0 0 0 0 0 $\frac{i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{14}$ 0	
690	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(a)}(E_u)$	$\begin{bmatrix} -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{70} & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{28} & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{35} & 0 & -\frac{3i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{14} & 0 & \frac{\sqrt{3}i}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{70} & 0 & -\frac{\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{14} & 0 & \frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{35} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{30}i}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{28} & 0 & \frac{\sqrt{42}i}{28} \end{bmatrix}$	
	691	symmetry
	$y$	
	$\mathbb{T}_{1,2}^{(a)}(E_u)$	
	$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{35} & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{70} & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & \frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{35} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{30}}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & \frac{\sqrt{42}}{28} \end{bmatrix}$	
	692	symmetry
		$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$T_3^{(a)}(A_{1u})$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{56} \quad -\frac{\sqrt{3}i}{12} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0$	
	$\frac{3\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{12}$	
	$0 \quad \frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad \frac{\sqrt{2}i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{56} \quad 0 \quad 0$	
	$\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{8}$	
	$0 \quad \frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
693	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$T_3^{(a)}(A_{2u}, 1)$	$0 \quad -\frac{3\sqrt{21}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{21}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{84} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}i}{30} \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{2\sqrt{21}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{2\sqrt{21}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{30} \quad 0 \quad 0$	
694	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(a)}(A_{2u}, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{84} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{56} \quad \frac{\sqrt{3}}{12} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0$	
	$-\frac{3\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{12}$	
	$0 \quad -\frac{3\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad -\frac{\sqrt{2}}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{56} \quad 0$	
	$-\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{8}$	
	$0 \quad -\frac{\sqrt{210}}{105} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0$	
695	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	$\frac{3\sqrt{70}i}{280} \quad 0 \quad -\frac{9\sqrt{7}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{42}i}{40} \quad 0 \quad \frac{\sqrt{21}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{21}i}{140} \quad 0 \quad \frac{\sqrt{42}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{7}i}{140} \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0$	
	$0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{12} \quad 0 \quad -\frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{70}i}{70} \quad 0 \quad -\frac{\sqrt{7}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{7}i}{70} \quad 0 \quad -\frac{\sqrt{14}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}i}{35} \quad 0 \quad -\frac{\sqrt{7}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{70} \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad -\frac{\sqrt{3}i}{12}$	
696	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$	$\sqrt{15}xyz$	$\begin{bmatrix} -\frac{3\sqrt{70}}{280} & 0 & -\frac{9\sqrt{7}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{40} & 0 & \frac{\sqrt{21}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{140} & 0 & \frac{\sqrt{42}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{7}}{140} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{70} & 0 & -\frac{\sqrt{14}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{35} & 0 & -\frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{3}}{12} \end{bmatrix}$
	$\sqrt{15}xyz$	
	$\sqrt{15}x^2 - y^2 - z^2$	
	$\sqrt{15}xz$	
	$\sqrt{15}yz$	
	$\sqrt{15}(x+y)(x-y)$	
	$\sqrt{15}(x+z)(x-z)$	
	$\sqrt{15}(y+z)(y-z)$	
	$\sqrt{15}xy$	
	$\sqrt{15}xz$	
$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\sqrt{15}xyz$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\sqrt{15}xyz$	
	$\sqrt{15}x^2 - y^2 - z^2$	
	$\sqrt{15}xz$	
	$\sqrt{15}yz$	
	$\sqrt{15}(x+y)(x-y)$	
	$\sqrt{15}(x+z)(x-z)$	
	$\sqrt{15}(y+z)(y-z)$	
	$\sqrt{15}xy$	
	$\sqrt{15}xz$	
698	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0	
	$\frac{\sqrt{21}i}{28}$ 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0	
	0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0	
	0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 $\frac{\sqrt{6}i}{24}$	
	0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0	
	$\frac{\sqrt{14}i}{28}$ 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0	
	0 $\frac{\sqrt{70}i}{140}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{21}i}{84}$ 0	
	0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 $\frac{\sqrt{6}i}{12}$	
	0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0	
699	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(a)}(A_{1u})$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{30}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}i}{30}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{30}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{30}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{30}$	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{30}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{140}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ $-\frac{i}{10}$ 0 0 0 0 0 $-\frac{3\sqrt{7}i}{70}$ 0	
	$-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{7}i}{70}$ 0 0 0 0 0 $\frac{i}{10}$	
	0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{140}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 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 0 0 0 0 $\frac{\sqrt{15}i}{30}$ 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 $-\frac{\sqrt{15}i}{30}$ 0 0 0	
	$-\frac{\sqrt{6}i}{84}$ 0 0 0 0 0 0 0 $\frac{i}{14}$ 0 0 0 0 0 0	
	0 $\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 0 $-\frac{3\sqrt{15}i}{70}$ 0 0 0 0 0 0	
	0 0 $-\frac{5\sqrt{6}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{14}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{14}$ 0 0 0 0	
	0 0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 0 $-\frac{3\sqrt{15}i}{70}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}i}{84}$ 0 0 0 0 0 0 0 $\frac{i}{14}$ 0	
701	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
$T_5^{(a)}(A_{2u}, 2)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{30}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{30}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{30}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{30}$ 0 0 0 0 0 $\frac{\sqrt{6}}{30}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{30}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{140}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}}{42}$ $\frac{1}{10}$ 0 0 0 0 0 $-\frac{3\sqrt{7}}{70}$ 0	
	$\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 $-\frac{3\sqrt{7}}{70}$ 0 0 0 0 0 $\frac{1}{10}$	
	0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{140}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0	
702	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
703	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
704	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{10}$ 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 $\frac{\sqrt{3}i}{10}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 $-\frac{\sqrt{3}i}{30}$ 0	
	0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0 $\frac{\sqrt{5}i}{28}$ 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{28}$ 0 $\frac{\sqrt{5}i}{14}$ 0 0 0 0 $\frac{23\sqrt{3}i}{420}$ 0 $-\frac{13\sqrt{15}i}{420}$ 0 0 0 0 0	
	0 $\frac{\sqrt{5}i}{14}$ 0 $-\frac{\sqrt{10}i}{14}$ 0 0 0 0 $-\frac{11\sqrt{2}i}{140}$ 0 $\frac{\sqrt{30}i}{420}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{10}i}{14}$ 0 $\frac{\sqrt{5}i}{14}$ 0 0 0 0 $-\frac{\sqrt{30}i}{420}$ 0 $\frac{11\sqrt{2}i}{140}$ 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{14}$ 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 $\frac{13\sqrt{15}i}{420}$ 0 $-\frac{23\sqrt{3}i}{420}$ 0	
	0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{28}$ 0 $\frac{\sqrt{105}i}{420}$	
705	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 $\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{10}$ 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}}{10}$ 0 $\frac{\sqrt{3}}{10}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{30}$ 0 $-\frac{\sqrt{3}}{30}$ 0	
	0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 $\frac{\sqrt{105}}{420}$ 0 $\frac{\sqrt{5}}{28}$ 0 0 0 0 0 0	
	$\frac{\sqrt{2}}{28}$ 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 $-\frac{23\sqrt{3}}{420}$ 0 $-\frac{13\sqrt{15}}{420}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{10}}{14}$ 0 0 0 0 $\frac{11\sqrt{2}}{140}$ 0 $\frac{\sqrt{30}}{420}$ 0 0 0	
	0 0 $\frac{\sqrt{10}}{14}$ 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 $\frac{\sqrt{30}}{420}$ 0 $\frac{11\sqrt{2}}{140}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{5}}{14}$ 0 $-\frac{\sqrt{2}}{28}$ 0 0 0 0 $-\frac{13\sqrt{15}}{420}$ 0 $-\frac{23\sqrt{3}}{420}$ 0	
	0 0 0 0 $\frac{\sqrt{2}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{5}}{28}$ 0 $\frac{\sqrt{105}}{420}$	
706	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,1}^{(a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
707	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
708	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 4)$	0 0 0 0 0 0 $-\frac{\sqrt{3}}{60}$ 0 0 0 $\frac{\sqrt{105}}{60}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{7}}{20}$ 0 0 0 0 $-\frac{\sqrt{21}}{20}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{20}$ 0 0 0 0 $\frac{\sqrt{7}}{20}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{60}$ 0 0 0 0 $-\frac{\sqrt{3}}{60}$	
	0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}}{28}$ 0 0 $\frac{\sqrt{3}}{30}$ 0 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 0 0	
	$\frac{\sqrt{7}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 $-\frac{2\sqrt{42}}{105}$ 0 0 0 $-\frac{\sqrt{14}}{70}$ 0 0 0	
	0 $-\frac{\sqrt{35}}{28}$ 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 $\frac{\sqrt{14}}{70}$ 0 0 0 0 $\frac{2\sqrt{42}}{105}$ 0	
	0 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{105}$ 0 0 0 0 $-\frac{\sqrt{3}}{30}$	
	0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0	
709	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{3}i}{60}$ 0 0 0 $\frac{\sqrt{105}i}{60}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 0 0 0 $-\frac{\sqrt{21}i}{20}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{20}$ 0 0 0 0 $\frac{\sqrt{7}i}{20}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{60}$ 0 0 0 0 $-\frac{\sqrt{3}i}{60}$	
	0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $-\frac{\sqrt{3}i}{30}$ 0 0 0 $-\frac{\sqrt{105}i}{105}$ 0 0 0 0	
	$-\frac{\sqrt{7}i}{28}$ 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 $\frac{2\sqrt{42}i}{105}$ 0 0 0 $-\frac{\sqrt{14}i}{70}$ 0 0 0	
	0 $\frac{\sqrt{35}i}{28}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{14}i}{70}$ 0 0 0 0 $\frac{2\sqrt{42}i}{105}$ 0	
	0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{105}$ 0 0 0 0 $-\frac{\sqrt{3}i}{30}$	
	0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 0	
710	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(A_{1u})$	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{15}i}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{28} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{i}{14} \ -\frac{\sqrt{42}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{14} \ 0$	
	$\frac{i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}i}{28}$	
	$0 \ \frac{\sqrt{15}i}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}i}{14} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{15}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{6}i}{14} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{6}i}{28} \ -\frac{\sqrt{7}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3i}{14} \ 0$	
	$\frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{7}i}{14}$	
	$0 \ \frac{\sqrt{15}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}i}{14} \ 0 \ 0 \ 0 \ 0$	
711 symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$	
	$0 \ -\frac{\sqrt{6}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{15}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{2i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{3}i}{14} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{2i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{3}i}{14} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{15}i}{14} \ 0 \ 0$	
	$\frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{2i}{7} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{6}i}{20} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{6}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}i}{7} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{6}i}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}i}{7} \ 0 \ 0 \ 0$	
712 symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{2i}{7} \ 0$	

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 \\ -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{28} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & -\frac{\sqrt{15}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \end{bmatrix}$
713	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{70} & 0 & -\frac{3\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{28} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & 0 & \frac{\sqrt{6}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{210} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{70} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{14} & 0 & \frac{\sqrt{30}i}{28} & 0 \\ 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{70} & 0 & -\frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & \frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{140} & 0 & -\frac{3i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3i}{35} & 0 & -\frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{140} & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & -\frac{\sqrt{30}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{7} & 0 & \frac{\sqrt{42}i}{42} \end{bmatrix}$
714	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{28} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{6}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{210} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{70} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 & \frac{\sqrt{30}}{28} & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{70} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & \frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{140} & 0 & -\frac{3}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3}{35} & 0 & -\frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{140} & 0 & \frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{7} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 \end{bmatrix}$	
	$\sqrt{15}xyz$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{35} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & -\frac{\sqrt{30}}{210} & 0 & 0 & -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{210} & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & -\frac{3\sqrt{3}}{28} & 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & \frac{\sqrt{15}}{21} & 0 & 0 & 0 & 0 \\ -\frac{3}{28} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & \frac{\sqrt{2}}{14} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{140} & 0 & 0 & 0 & -\frac{3}{28} & 0 & 0 & -\frac{\sqrt{2}}{14} & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{21} & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & \frac{3}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\sqrt{15}z(x-y)(x+y)$	$\begin{bmatrix} \frac{1}{2} \end{bmatrix}$
	$\sqrt{15}xyz$	$\begin{bmatrix} \frac{1}{2} \end{bmatrix}$
	$\sqrt{15}z(x-y)(x+y)$	$\begin{bmatrix} \frac{1}{2} \end{bmatrix}$
715	symmetry	$\begin{bmatrix} \frac{1}{2} \end{bmatrix}$
716	symmetry	$\begin{bmatrix} \frac{1}{2} \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{5}i}{35}$ 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 $-\frac{\sqrt{15}i}{28}$ 0 0 0	$\frac{\sqrt{6}i}{42}$ 0 0 0 $-\frac{\sqrt{30}i}{210}$ 0 0 $\frac{3i}{28}$ 0 0 0 $-\frac{3\sqrt{3}i}{28}$ 0 0 0
	0 $-\frac{\sqrt{30}i}{210}$ 0 0 0 $\frac{\sqrt{6}i}{42}$ 0 0 $\frac{3\sqrt{3}i}{28}$ 0 0 0 $-\frac{3i}{28}$ 0 0 0	0 0 $-\frac{\sqrt{5}i}{35}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{28}$ 0 0 0 $\frac{\sqrt{21}i}{28}$
	0 0 $\frac{3i}{28}$ 0 0 0 0 0 $\frac{2\sqrt{3}i}{21}$ 0 0 0 0 0 0	0 0 $\frac{3\sqrt{5}i}{140}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 $\frac{\sqrt{15}i}{21}$ 0 0 0 0
	0 0 0 $-\frac{3\sqrt{5}i}{140}$ 0 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0 $\frac{\sqrt{2}i}{14}$ 0 0 0 0	$\frac{3i}{28}$ 0 0 0 $-\frac{3\sqrt{5}i}{140}$ 0 0 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0 $\frac{\sqrt{2}i}{14}$ 0 0 0
	0 0 $-\frac{3\sqrt{5}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{21}$ 0 0 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0	0 0 $-\frac{3i}{28}$ 0 0 0 0 0 $\frac{2\sqrt{3}i}{21}$ 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0
	0 0 0 $-\frac{3i}{28}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 $-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(1,-1;a)}(A_{1u})$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{50}$ 0 0 0	0 0 0 0 0 0 $\frac{\sqrt{5}i}{50}$ 0 0 0 0 0 $-\frac{\sqrt{35}i}{50}$ 0 0 0
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{50}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{50}$ 0 0 0	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{50}$ 0 0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 0 0	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{35}$ 0 0 0 0
	0 0 0 0 $\frac{\sqrt{14}i}{42}$ 0 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{175}$ 0 0 0 0	0 0 0 0 $\frac{\sqrt{14}i}{42}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{175}$ 0 0 0 0
	0 0 0 0 $-\frac{\sqrt{35}i}{105}$ $\frac{\sqrt{30}i}{25}$ 0 0 0 0 0 0 0 0 $\frac{3\sqrt{210}i}{175}$ 0 0 0 0	$-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 $-\frac{3\sqrt{210}i}{175}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{25}$ 0 0 0
	0 $\frac{\sqrt{14}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 $-\frac{3\sqrt{35}i}{175}$ 0 0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{35}$ 0 0 0 0	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{35}$ 0 0 0 0
	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 0 0 0 0 0	$z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)$
	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 0 0 0 0 0 0 0 0 0 0	8

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 \\ -\frac{\sqrt{5}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{2}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{35} & 0 \end{bmatrix}$
719	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{50} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{50} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{50} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{\sqrt{30}}{25} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{175} & 0 \\ \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{25} \\ 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
720	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
721	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
722	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{100} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{100} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{3\sqrt{10}i}{100} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{10}i}{100} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{70} & 0 & -\frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{210} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}i}{350} & 0 & \frac{13\sqrt{2}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}i}{175} & 0 & -\frac{i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{35} & 0 & -\frac{11\sqrt{15}i}{175} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}i}{70} & 0 & \frac{23\sqrt{10}i}{350} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{14}i}{70} & 0 & 0 \end{bmatrix}$
723	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
	$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{100} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{100} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{10}}{100} & 0 \\ 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{70} & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{210} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & \frac{23\sqrt{10}}{350} & 0 & \frac{13\sqrt{2}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{15}}{175} & 0 & -\frac{1}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{21} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{1}{35} & 0 & -\frac{11\sqrt{15}}{175} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2}}{70} & 0 & \frac{23\sqrt{10}}{350} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & -\frac{\sqrt{14}}{70} & 0 & 0 \end{bmatrix}$
724	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{100} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{175} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{15}}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}}{25} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
725	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{100} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{100} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{100} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{100} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{15}i}{25} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{175} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{35} & 0 & 0 & 0 & 0 \end{bmatrix}$
726	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 4)$	0 0 0 0 0 0 $-\frac{\sqrt{10}}{200}$ 0 0 0 $\frac{\sqrt{14}}{40}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{200}$ 0 0 0 $-\frac{3\sqrt{70}}{200}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{70}}{200}$ 0 0 0 $\frac{\sqrt{210}}{200}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{40}$ 0 0 0 $-\frac{\sqrt{10}}{200}$	
	0 0 $-\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{35}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 $-\frac{\sqrt{10}}{25}$ 0 0 0 $\frac{2\sqrt{14}}{35}$ 0 0 0	
	$\frac{\sqrt{210}}{420}$ 0 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 $\frac{8\sqrt{35}}{175}$ 0 0 0 $\frac{2\sqrt{105}}{175}$ 0 0	
	0 $-\frac{\sqrt{42}}{84}$ 0 0 0 $\frac{\sqrt{210}}{420}$ 0 0 $-\frac{2\sqrt{105}}{175}$ 0 0 0 $-\frac{8\sqrt{35}}{175}$ 0	
	0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 $-\frac{2\sqrt{14}}{35}$ 0 0 0 $\frac{\sqrt{10}}{25}$	
	0 0 0 $-\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{35}$ 0 0 0	
727	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{10i}}{200}$ 0 0 0 $\frac{\sqrt{14i}}{40}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210i}}{200}$ 0 0 0 $-\frac{3\sqrt{70i}}{200}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{70i}}{200}$ 0 0 0 $\frac{\sqrt{210i}}{200}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14i}}{40}$ 0 0 0 $-\frac{\sqrt{10i}}{200}$	
	0 0 $-\frac{\sqrt{210i}}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70i}}{35}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{42i}}{84}$ 0 0 $\frac{\sqrt{10i}}{25}$ 0 0 0 $\frac{2\sqrt{14i}}{35}$ 0 0 0	
	$-\frac{\sqrt{210i}}{420}$ 0 0 0 $-\frac{\sqrt{42i}}{84}$ 0 0 $-\frac{8\sqrt{35i}}{175}$ 0 0 0 $\frac{2\sqrt{105i}}{175}$ 0 0	
	0 $\frac{\sqrt{42i}}{84}$ 0 0 0 $\frac{\sqrt{210i}}{420}$ 0 0 $\frac{2\sqrt{105i}}{175}$ 0 0 0 $-\frac{8\sqrt{35i}}{175}$ 0	
	0 0 $-\frac{\sqrt{42i}}{84}$ 0 0 0 0 0 0 $\frac{2\sqrt{14i}}{35}$ 0 0 0 $\frac{\sqrt{10i}}{25}$	
	0 0 0 $\frac{\sqrt{210i}}{420}$ 0 0 0 0 0 0 $-\frac{\sqrt{70i}}{35}$ 0 0 0	
728	symmetry	$z$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_1^{(1,0;a)}(A_{2u})$	0	$\frac{\sqrt{2}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{2}i}{10}$ 0 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{2}i}{14}$	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{14}$ 0 0 0 0 0 0
	0	$-\frac{9\sqrt{2}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 0 0
	0	0 $-\frac{3\sqrt{2}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0
	0	0 0 0 $\frac{3\sqrt{2}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0
	0	0 0 0 0 $\frac{9\sqrt{2}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{2}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{14}$ 0
729	symmetry	$x$
$\mathbb{T}_{1,1}^{(1,0;a)}(E_u)$	$-\frac{\sqrt{10}i}{20}$	0 $\frac{i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{3}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{3}i}{20}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{i}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0 0
	0	$-\frac{3\sqrt{10}i}{70}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 $-\frac{i}{28}$ 0 0 0 0 0
	$-\frac{3\sqrt{10}i}{70}$	0 $-\frac{6i}{35}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{28}$ 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0
	0	$-\frac{6i}{35}$ 0 $-\frac{9\sqrt{2}i}{70}$ 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0
	0	0 0 $-\frac{9\sqrt{2}i}{70}$ 0 $-\frac{6i}{35}$ 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 $-\frac{\sqrt{10}i}{28}$ 0 0
	0	0 0 0 $-\frac{6i}{35}$ 0 $-\frac{3\sqrt{10}i}{70}$ 0 0 0 0 $\frac{\sqrt{3}i}{28}$ 0 $-\frac{\sqrt{15}i}{28}$ 0
	0	0 0 0 0 $-\frac{3\sqrt{10}i}{70}$ 0 0 0 0 0 0 $\frac{i}{28}$ 0 $-\frac{\sqrt{21}i}{28}$
730	symmetry	$y$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{10}}{20}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{6}}{20}$ 0 $\frac{\sqrt{3}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{3}}{20}$ 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{1}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{3\sqrt{10}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 $-\frac{1}{28}$ 0 0 0 0 0 0 0
	$\frac{3\sqrt{10}}{70}$	0 $-\frac{6}{35}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{28}$ 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0 0
	0	$\frac{6}{35}$ 0 $-\frac{9\sqrt{2}}{70}$ 0 0 0 0 $-\frac{\sqrt{10}}{28}$ 0 $-\frac{\sqrt{6}}{28}$ 0 0 0 0 0 0
	0	0 0 $\frac{9\sqrt{2}}{70}$ 0 $-\frac{6}{35}$ 0 0 0 0 $-\frac{\sqrt{6}}{28}$ 0 $-\frac{\sqrt{10}}{28}$ 0 0 0 0
	0	0 0 0 $\frac{6}{35}$ 0 $-\frac{3\sqrt{10}}{70}$ 0 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 $-\frac{\sqrt{15}}{28}$ 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{10}}{70}$ 0 0 0 0 0 0 $-\frac{1}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0
731	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	0	0 0 0 0 $-\frac{3\sqrt{70}i}{560}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{42}i}{112}$ $\frac{i}{4}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0
	$\frac{\sqrt{42}i}{112}$	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{i}{4}$
	0	$\frac{3\sqrt{70}i}{560}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{70}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{112}$ 0
	$\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{48}$
	0	$\frac{\sqrt{70}i}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 0 0
732	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	$\frac{\sqrt{7}i}{14}$	$\begin{bmatrix} 0 & -\frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{7}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$	
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & -\frac{3\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} \\ 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\frac{-\sqrt{6}x(x^2+y^2-4z^2)}{4}$	
733	symmetry	
734	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{210}i}{560} \quad 0 \quad -\frac{3\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{14}i}{80} \quad 0 \quad \frac{\sqrt{7}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{7}i}{280} \quad 0 \quad \frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{21}i}{280} \quad 0 \quad -\frac{\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad -\frac{\sqrt{35}i}{28} \quad 0$	
	$0 \quad \frac{\sqrt{210}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24} \quad 0 \quad \frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{210}i}{70} \quad 0 \quad -\frac{\sqrt{21}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{168} \quad 0 \quad \frac{\sqrt{7}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}i}{70} \quad 0 \quad -\frac{\sqrt{42}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{336} \quad 0 \quad -\frac{\sqrt{14}i}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{42}i}{35} \quad 0 \quad -\frac{\sqrt{21}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{336} \quad 0 \quad -\frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{70} \quad 0 \quad \frac{\sqrt{210}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{84} \quad 0 \quad -\frac{\sqrt{35}i}{168} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad \frac{i}{24}$	
735	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{210}}{560} \quad 0 \quad -\frac{3\sqrt{21}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{28} \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{14}}{80} \quad 0 \quad \frac{\sqrt{7}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{7}}{280} \quad 0 \quad \frac{\sqrt{14}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{21}}{280} \quad 0 \quad -\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad 0 \quad -\frac{\sqrt{35}}{28} \quad 0$	
	$0 \quad \frac{\sqrt{210}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{24} \quad 0 \quad \frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{210}}{70} \quad 0 \quad -\frac{\sqrt{21}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{168} \quad 0 \quad \frac{\sqrt{7}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{21}}{70} \quad 0 \quad -\frac{\sqrt{42}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{42}}{35} \quad 0 \quad -\frac{\sqrt{21}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{336} \quad 0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{70} \quad 0 \quad \frac{\sqrt{210}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{84} \quad 0 \quad -\frac{\sqrt{35}}{168} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad \frac{1}{24}$	
736	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{210}}{280}$ 0 0 $-\frac{\sqrt{2}}{8}$ 0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0	
	$-\frac{\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{35}}{280}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 0 0	
	0 $\frac{\sqrt{35}}{280}$ 0 0 0 $\frac{\sqrt{7}}{56}$ 0 0 $\frac{3\sqrt{14}}{56}$ 0 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 $\frac{\sqrt{210}}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 $-\frac{\sqrt{2}}{8}$ 0 0 0	
	0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{84}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{2}}{24}$ 0 0 0 $\frac{\sqrt{70}}{168}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{42}}{28}$ 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{7}}{168}$ 0 0 0 $\frac{\sqrt{21}}{168}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $-\frac{\sqrt{42}}{28}$ 0 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{\sqrt{7}}{168}$ 0 0 0 0	
	0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{168}$ 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 0 0	
	0 0 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 0 0 0 0 0	
737	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{210}i}{280}$ 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0	
	$\frac{\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{35}i}{280}$ 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0	
	0 $-\frac{\sqrt{35}i}{280}$ 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 $-\frac{\sqrt{210}i}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 $\frac{\sqrt{70}i}{168}$ 0 0 0 0 0	
	$\frac{\sqrt{42}i}{28}$ 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 $-\frac{\sqrt{7}i}{168}$ 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0	
	0 $\frac{\sqrt{210}i}{140}$ 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{\sqrt{7}i}{168}$ 0 0 0	
	0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{168}$ 0 0 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0	
738	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(A_{1u})$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{25}$ 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{5}i}{25}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{25}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{25}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{25}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{25}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{35}i}{700}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{30}i}{300}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{700}$ 0	
	$-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{700}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{300}$	
	0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{700}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{420}$ 0 0 0 0	
739	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
$\mathbb{T}_5^{(1,0;a)}(A_{2u}, 1)$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{10}$ 0 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 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 0 $\frac{\sqrt{2}i}{10}$ 0 0	
	$-\frac{\sqrt{5}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{420}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{5}i}{14}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{140}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{5}i}{7}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{210}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{7}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{210}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{140}$ 0 0	
740	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(A_{2u}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{25}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{5}}{25}$ 0 0 0 0 0 $\frac{\sqrt{35}}{25}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{25}$ 0 0 0 0 0 $-\frac{\sqrt{5}}{25}$	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{25}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{700}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ $-\frac{\sqrt{30}}{300}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{700}$ 0	
	$\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{700}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{300}$	
	0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{35}}{700}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{420}$ 0 0 0 0 0	
741	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{5}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{3}i}{5}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{70}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{420}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{60}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{3}i}{60}$ 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{420}$ 0 0 0 0 0	
742	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{5} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
743	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
	$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{50} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{50} & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & -\frac{3\sqrt{10}i}{50} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{10}i}{50} & 0 \\ 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{840} & 0 & -\frac{\sqrt{6}i}{168} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{10}i}{4200} & 0 & \frac{13\sqrt{2}i}{840} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{3}i}{7} & 0 & 0 & 0 & 0 & \frac{11\sqrt{15}i}{2100} & 0 & -\frac{i}{420} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{7} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & \frac{i}{420} & 0 & -\frac{11\sqrt{15}i}{2100} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{2}i}{840} & 0 & \frac{23\sqrt{10}i}{4200} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{168} & 0 & -\frac{\sqrt{14}i}{840} \end{bmatrix}$
744	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{50}$ 0 $-\frac{\sqrt{2}}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{10}}{50}$ 0 $\frac{\sqrt{6}}{10}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{10}$ 0 $-\frac{3\sqrt{10}}{50}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{10}$ 0 $\frac{\sqrt{10}}{50}$ 0	
	0 $-\frac{\sqrt{15}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{840}$ 0 $-\frac{\sqrt{6}}{168}$ 0 0 0 0 0	
	$\frac{\sqrt{15}}{70}$ 0 $\frac{\sqrt{6}}{14}$ 0 0 0 0 $\frac{23\sqrt{10}}{4200}$ 0 $\frac{13\sqrt{2}}{840}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{14}$ 0 $-\frac{\sqrt{3}}{7}$ 0 0 0 0 0 $-\frac{11\sqrt{15}}{2100}$ 0 $-\frac{1}{420}$ 0 0 0 0	
	0 0 $\frac{\sqrt{3}}{7}$ 0 $\frac{\sqrt{6}}{14}$ 0 0 0 0 0 $-\frac{1}{420}$ 0 $-\frac{11\sqrt{15}}{2100}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{14}$ 0 $-\frac{\sqrt{15}}{70}$ 0 0 0 0 0 $\frac{13\sqrt{2}}{840}$ 0 $\frac{23\sqrt{10}}{4200}$ 0	
	0 0 0 0 $\frac{\sqrt{15}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{168}$ 0 $-\frac{\sqrt{14}}{840}$ 0	
745	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{50}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{50}$	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{50}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{50}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{140}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{2100}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{150}$	
	0 0 0 0 0 0 0 $\frac{\sqrt{15}}{150}$ 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{2100}$ 0 0 0 0 0 0	
	0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{140}$ 0 0 0 0 0	
746	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{210}i}{50} 0$
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$0 \frac{3\sqrt{10}i}{50}$
	0 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{50}$ 0 0 0 0 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{50}$ 0 0 0 0 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{140}$ 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{2100}$ 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{150}$ 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{150}$ 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	$-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{2100}$ 0 0 0 0 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{140}$ 0 0 0 0 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
		$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
747	symmetry	
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 4)$	0 0 0 0 0 0 $\frac{\sqrt{10}}{100}$ 0 0 0 0 $-\frac{\sqrt{14}}{20}$ 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 $-\frac{\sqrt{210}}{100}$ 0 0 0 0 $\frac{3\sqrt{70}}{100}$ 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{70}}{100}$ 0 0 0 0 $-\frac{\sqrt{210}}{100}$ 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{20}$ 0 0 0 0 0 $\frac{\sqrt{10}}{100}$ 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{420}$ 0 0 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 $-\frac{\sqrt{10}}{300}$ 0 0 0 0 $\frac{\sqrt{14}}{210}$ 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	$\frac{\sqrt{210}}{140}$ 0 0 0 $-\frac{\sqrt{42}}{28}$ 0 0 $\frac{2\sqrt{35}}{525}$ 0 0 0 0 $\frac{\sqrt{105}}{1050}$ 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 $\frac{\sqrt{210}}{140}$ 0 0 $-\frac{\sqrt{105}}{1050}$ 0 0 0 0 $-\frac{2\sqrt{35}}{525}$ 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 $-\frac{\sqrt{14}}{210}$ 0 0 0 0 $\frac{\sqrt{10}}{300}$ 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
	0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{420}$ 0 0 0 0	$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$
748	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 4)$	0 0 0 0 0 0 $-\frac{\sqrt{10}i}{100}$ 0 0 0 $-\frac{\sqrt{14}i}{20}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{100}$ 0 0 0 $\frac{3\sqrt{70}i}{100}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{70}i}{100}$ 0 0 0 $-\frac{\sqrt{210}i}{100}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{20}$ 0 0 0 $\frac{\sqrt{10}i}{100}$	
	0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{420}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 $\frac{\sqrt{10}i}{300}$ 0 0 0 $\frac{\sqrt{14}i}{210}$ 0 0 0	
	$-\frac{\sqrt{210}i}{140}$ 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 $-\frac{2\sqrt{35}i}{525}$ 0 0 0 $\frac{\sqrt{105}i}{1050}$ 0 0	
	0 $\frac{\sqrt{42}i}{28}$ 0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{105}i}{1050}$ 0 0 0 $-\frac{2\sqrt{35}i}{525}$ 0	
	0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{210}$ 0 0 0 $\frac{\sqrt{10}i}{300}$	
	0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{420}$ 0 0 0	
749	symmetry	$z$
$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	0 $-\frac{i}{5}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{6}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{10}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{i}{5}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{2i}{7}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0	
	0 $-\frac{6i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0 0 0	
	0 0 $-\frac{2i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{14}$ 0 0 0 0	
	0 0 0 $\frac{2i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{14}$ 0 0 0	
	0 0 0 0 $\frac{6i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0	
	0 0 0 0 0 $\frac{2i}{7}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0	
750	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(1,1;a)}(E_u)$	$\frac{\sqrt{5}i}{10}$	0 $-\frac{\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}i}{10}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{6}i}{20}$ 0 $-\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{2\sqrt{5}i}{35}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 0 0
	$-\frac{2\sqrt{5}i}{35}$	0 $-\frac{4\sqrt{2}i}{35}$ 0 0 0 0 $-\frac{\sqrt{30}i}{56}$ 0 $\frac{\sqrt{6}i}{56}$ 0 0 0 0 0 0
	0	$-\frac{4\sqrt{2}i}{35}$ 0 $-\frac{6i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{28}$ 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0
	0	0 $-\frac{6i}{35}$ 0 $-\frac{4\sqrt{2}i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 $\frac{\sqrt{5}i}{28}$ 0 0 0
	0	0 0 $-\frac{4\sqrt{2}i}{35}$ 0 $-\frac{2\sqrt{5}i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{56}$ 0 $\frac{\sqrt{30}i}{56}$ 0
	0	0 0 0 0 $-\frac{2\sqrt{5}i}{35}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{56}$ 0 $\frac{\sqrt{42}i}{56}$
751	symmetry	$y$
$\mathbb{T}_{1,2}^{(1,1;a)}(E_u)$	$-\frac{\sqrt{5}}{10}$	0 $-\frac{\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}}{10}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{3}}{10}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{2\sqrt{5}}{35}$ 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{2}}{56}$ 0 0 0 0 0 0 0
	$\frac{2\sqrt{5}}{35}$	0 $-\frac{4\sqrt{2}}{35}$ 0 0 0 0 $\frac{\sqrt{30}}{56}$ 0 $\frac{\sqrt{6}}{56}$ 0 0 0 0 0 0
	0	$\frac{4\sqrt{2}}{35}$ 0 $-\frac{6}{35}$ 0 0 0 0 0 $\frac{\sqrt{5}}{28}$ 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0
	0	0 0 $\frac{6}{35}$ 0 $-\frac{4\sqrt{2}}{35}$ 0 0 0 0 $\frac{\sqrt{3}}{28}$ 0 $\frac{\sqrt{5}}{28}$ 0 0 0
	0	0 0 0 $\frac{4\sqrt{2}}{35}$ 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0 0 0 $\frac{\sqrt{6}}{56}$ 0 $\frac{\sqrt{30}}{56}$ 0
	0	0 0 0 0 $\frac{2\sqrt{5}}{35}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{56}$ 0 $\frac{\sqrt{42}}{56}$
752	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{1u})$	0 0 0 0 $\frac{9\sqrt{10}i}{112}$ 0 0 0 0 0 0 $-\frac{i}{28}$ 0 0	
	0 0 0 0 0 $\frac{15\sqrt{6}i}{112}$ $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 $-\frac{i}{14}$ 0	
	$-\frac{15\sqrt{6}i}{112}$ 0 0 0 0 0 0 $-\frac{i}{14}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$	
	0 $-\frac{9\sqrt{10}i}{112}$ 0 0 0 0 0 0 $-\frac{i}{28}$ 0 0 0 0 0 0	
	0 0 0 $\frac{5i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{56}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $-\frac{3i}{56}$ 0 0 0 0	
	0 0 0 0 0 $\frac{5i}{42}$ $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{6}i}{112}$ 0	
	$\frac{5i}{42}$ 0 0 0 0 0 0 $\frac{3\sqrt{6}i}{112}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{112}$	
	0 $\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $\frac{3i}{56}$ 0 0 0 0 0 0	
	0 0 $\frac{5i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{56}$ 0 0 0 0 0 0	
$-\frac{z(3x^2+3y^2-2z^2)}{2}$		
$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 1)$	0 $\frac{9i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{6}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{28}$ 0 0 0 0 0	
	0 0 0 0 $\frac{9i}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0	
	$\frac{5i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{2i}{21}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0 0	
	0 0 0 $\frac{2i}{21}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{28}$ 0 0 0	
	0 0 0 0 $\frac{i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{5i}{42}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0	
$\frac{\sqrt{10}y(3x^2-y^2)}{4}$		

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{6}}{112} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{14} & 0 \\ \frac{15\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & \frac{9\sqrt{10}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5}{42} & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{112} & 0 \\ -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} \\ 0 & -\frac{\sqrt{10}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
755	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{3\sqrt{30}i}{112} & 0 & \frac{9\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{28} & 0 & -\frac{i}{14} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & -\frac{3i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{56} & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{3}i}{56} & 0 & \frac{3\sqrt{30}i}{112} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & \frac{\sqrt{5}i}{28} & 0 \\ 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{3}i}{28} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{42} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{56} & 0 & -\frac{i}{28} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{42} & 0 & -\frac{\sqrt{6}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{112} & 0 & \frac{\sqrt{2}i}{112} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{21} & 0 & -\frac{\sqrt{3}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{112} & 0 & \frac{\sqrt{30}i}{112} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{42} & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & \frac{i}{28} & 0 & \frac{\sqrt{5}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{28} & 0 & -\frac{\sqrt{7}i}{56} \end{bmatrix}$
756	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{3\sqrt{30}}{112} & 0 & \frac{9\sqrt{3}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{16} & 0 & -\frac{3}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{56} & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{3}}{56} & 0 & \frac{3\sqrt{30}}{112} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & \frac{\sqrt{5}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{3}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{42} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{56} & 0 & -\frac{1}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{42} & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{112} & 0 & \frac{\sqrt{2}}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{21} & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{112} & 0 & \frac{\sqrt{30}}{112} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{42} & 0 & \frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & -\frac{1}{28} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{28} & 0 & -\frac{\sqrt{7}}{56} & 0 \end{bmatrix}$
757	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{30}}{56} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 \\ \frac{15}{56} & 0 & 0 & 0 & \frac{3\sqrt{5}}{56} & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{56} & 0 & 0 & 0 & -\frac{15}{56} & 0 & 0 & -\frac{3\sqrt{2}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{30}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & -\frac{1}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{84} & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{1}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
758	symmetry	$\sqrt{15}z(x-y)(x+y)$ $\frac{2}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 2)$	0 0 0 $\frac{3\sqrt{30}i}{56}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0	
	$-\frac{15i}{56}$ 0 0 0 $\frac{3\sqrt{5}i}{56}$ 0 0 $\frac{\sqrt{6}i}{56}$ 0 0 0 $-\frac{3\sqrt{2}i}{56}$ 0 0 0	
	0 $\frac{3\sqrt{5}i}{56}$ 0 0 0 $-\frac{15i}{56}$ 0 0 $\frac{3\sqrt{2}i}{56}$ 0 0 0 $-\frac{\sqrt{6}i}{56}$ 0 0 0	
	0 0 $\frac{3\sqrt{30}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{56}$ 0 0 0 $\frac{\sqrt{14}i}{56}$	
	0 0 $\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{84}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0	
	$\frac{5\sqrt{6}i}{84}$ 0 0 0 $-\frac{\sqrt{30}i}{84}$ 0 0 $\frac{i}{56}$ 0 0 0 $-\frac{\sqrt{3}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{30}i}{84}$ 0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 $-\frac{\sqrt{3}i}{56}$ 0 0 0 $\frac{i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{30}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0 $\frac{\sqrt{14}i}{56}$	
	0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{28}$ 0 0 0	
759	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(a)}(A_{1u})$	0 $\frac{3\sqrt{10}}{35}$ 0 0 0 0 0 0 $\frac{1}{14}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $\frac{3\sqrt{5}}{70}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $\frac{3\sqrt{5}}{70}$ 0 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{10}}{35}$ 0 0 0 0 0 0 0 $\frac{1}{14}$ 0 0 0	
	$-\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{14}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{10}}{140}$ 0 0 0 0 0 0 $\frac{3}{14}$ 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{10}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{30}}{70}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{10}}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{70}$ 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{10}}{140}$ 0 0 0 0 0 0 0 $-\frac{3}{14}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{14}$ 0	
760	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{14} & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{5}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{70} & 0 & -\frac{\sqrt{5}i}{14} & 0 & 0 & 0 & 0 & -\frac{i}{14} & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{14} & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & -\frac{i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{15}i}{70} & 0 & \frac{\sqrt{6}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{70} & 0 & -\frac{i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{15}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{28} & 0 & \frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & -\frac{11\sqrt{5}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{70} & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & \frac{11\sqrt{5}i}{140} & 0 & \frac{i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 \end{bmatrix}$	
	761 symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,2}^{(a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{6}}{14} & 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{70} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{14} & 0 & -\frac{\sqrt{10}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{70} & 0 & -\frac{1}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{70} & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{70} & 0 & -\frac{1}{14} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{15}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{28} & 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & -\frac{11\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{70} & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{5}}{140} & 0 & \frac{1}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \end{bmatrix}$
	762 symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{15}}{35}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 $\frac{\sqrt{5}}{140}$ 0 0 0	
	$-\frac{\sqrt{2}}{7}$ 0 0 0 $\frac{2\sqrt{10}}{35}$ 0 0 $\frac{\sqrt{3}}{28}$ 0 0 0 $\frac{1}{28}$ 0 0 0	
	0 $-\frac{2\sqrt{10}}{35}$ 0 0 0 $\frac{\sqrt{2}}{7}$ 0 0 $\frac{1}{28}$ 0 0 0 $\frac{\sqrt{3}}{28}$ 0	
	0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{5}}{140}$ 0 0 0 $\frac{\sqrt{7}}{28}$	
	0 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0 0 $\frac{1}{14}$ 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{15}}{140}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{2\sqrt{5}}{35}$ 0 0 0	
	$-\frac{\sqrt{3}}{28}$ 0 0 0 $-\frac{3\sqrt{15}}{140}$ 0 0 $-\frac{\sqrt{2}}{7}$ 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0	
	0 $-\frac{3\sqrt{15}}{140}$ 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 $\frac{\sqrt{2}}{7}$ 0	
	0 0 $-\frac{3\sqrt{15}}{140}$ 0 0 0 0 0 0 $-\frac{2\sqrt{5}}{35}$ 0 0 0 $\frac{\sqrt{7}}{14}$	
	0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0 0 0	
763	symmetry	$-\sqrt{3}xy$
$\mathbb{M}_{2,2}^{(a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{15}i}{35}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{5}i}{140}$ 0 0 0	
	$\frac{\sqrt{2}i}{7}$ 0 0 0 $\frac{2\sqrt{10}i}{35}$ 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 $\frac{i}{28}$ 0 0 0	
	0 $\frac{2\sqrt{10}i}{35}$ 0 0 0 $\frac{\sqrt{2}i}{7}$ 0 0 $-\frac{i}{28}$ 0 0 0 $\frac{\sqrt{3}i}{28}$ 0	
	0 0 $\frac{\sqrt{15}i}{35}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{140}$ 0 0 0 $\frac{\sqrt{7}i}{28}$	
	0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0 $\frac{i}{14}$ 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{15}i}{140}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{2\sqrt{5}i}{35}$ 0 0 0	
	$\frac{\sqrt{3}i}{28}$ 0 0 0 $-\frac{3\sqrt{15}i}{140}$ 0 0 $\frac{\sqrt{2}i}{7}$ 0 0 0 $\frac{\sqrt{6}i}{14}$ 0 0 0	
	0 $\frac{3\sqrt{15}i}{140}$ 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 $\frac{\sqrt{2}i}{7}$ 0	
	0 0 $\frac{3\sqrt{15}i}{140}$ 0 0 0 0 0 0 $\frac{2\sqrt{5}i}{35}$ 0 0 0 $\frac{\sqrt{7}i}{14}$	
	0 0 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0 0 0 $\frac{i}{14}$ 0 0 0	
764	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & -\frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}}{140} & 0 & 0 \\ \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{7} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{10}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{14} & 0 \end{bmatrix}$
765	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{3i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{20} \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{3\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{280} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
766	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(a)}(A_{2u})$	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{70}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{9\sqrt{7}}{140} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{42}}{56} \ -\frac{3}{20} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{7}}{70} \ 0$	
	$\frac{\sqrt{42}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{7}}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3}{20}$	
	$0 \ -\frac{\sqrt{70}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{9\sqrt{7}}{140} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{21}}{28} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}}{20} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}}{14} \ \frac{3\sqrt{6}}{40} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{42}}{280} \ 0$	
	$\frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{12}}{280} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{6}}{40}$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}}{20} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ 0$	
767 symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$	
	$\frac{\sqrt{2}i}{56} \ 0 \ \frac{\sqrt{5}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{9\sqrt{3}i}{140} \ 0 \ \frac{3\sqrt{15}i}{70} \ 0 \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{30}i}{56} \ 0 \ -\frac{\sqrt{15}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{3}i}{35} \ 0 \ -\frac{3\sqrt{5}i}{140} \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{15}i}{28} \ 0 \ \frac{\sqrt{30}i}{56} \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{5}i}{140} \ 0 \ -\frac{3\sqrt{3}i}{35} \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{5}i}{28} \ 0 \ -\frac{\sqrt{2}i}{56} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{15}i}{70} \ 0 \ \frac{9\sqrt{3}i}{140} \ 0$	
	$0 \ -\frac{\sqrt{2}i}{14} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{105}i}{140} \ 0 \ \frac{\sqrt{5}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$\frac{\sqrt{2}i}{14} \ 0 \ \frac{\sqrt{5}i}{14} \ 0 \ 0 \ 0 \ 0 \ -\frac{13\sqrt{3}i}{140} \ 0 \ -\frac{\sqrt{15}i}{70} \ 0 \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{5}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}i}{280} \ 0 \ -\frac{\sqrt{30}i}{40} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{5}i}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{40} \ 0 \ -\frac{\sqrt{2}i}{280} \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{5}i}{14} \ 0 \ \frac{\sqrt{2}i}{14} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{15}i}{70} \ 0 \ \frac{13\sqrt{3}i}{140} \ 0$	
768 symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 1)$	$\frac{-\sqrt{2}}{56} \ 0 \ \frac{\sqrt{5}}{28} \ 0 \ 0 \ 0 \ 0 \ -\frac{9\sqrt{3}}{140} \ 0 \ \frac{3\sqrt{15}}{70} \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{30}}{56} \ 0 \ -\frac{\sqrt{15}}{28} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{3}}{35} \ 0 \ -\frac{3\sqrt{5}}{140} \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{15}}{28} \ 0 \ \frac{\sqrt{30}}{56} \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{5}}{140} \ 0 \ -\frac{3\sqrt{3}}{35} \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{5}}{28} \ 0 \ -\frac{\sqrt{2}}{56} \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{15}}{70} \ 0 \ \frac{9\sqrt{3}}{140} \ 0$	
	$0 \ -\frac{\sqrt{2}}{14} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{105}}{140} \ 0 \ \frac{\sqrt{5}}{14} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$-\frac{\sqrt{2}}{14} \ 0 \ \frac{\sqrt{5}}{14} \ 0 \ 0 \ 0 \ 0 \ \frac{13\sqrt{3}}{140} \ 0 \ -\frac{\sqrt{15}}{70} \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{5}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2}}{280} \ 0 \ -\frac{\sqrt{30}}{40} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{5}}{14} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}}{40} \ 0 \ -\frac{\sqrt{2}}{280} \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{5}}{14} \ 0 \ \frac{\sqrt{2}}{14} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{15}}{70} \ 0 \ \frac{13\sqrt{3}}{140} \ 0$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{2}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}}{14} \ 0 \ -\frac{\sqrt{105}}{140}$	
769	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{4,1}^{(a)}(E_u, 2)$	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{42}}{140} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{20}$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{20} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$\frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{42}}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{70}}{70} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{35} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{3}}{10}$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{3}}{10} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$\frac{\sqrt{7}}{14} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{42}}{35} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
770	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 2)$	0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{3\sqrt{42}i}{140}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{2}i}{20}$	
	0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{20}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{35}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{10}$	
	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{10}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{35}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0	
771	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{M}_{4,1}^{(a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 $-\frac{3\sqrt{42}}{280}$ 0 0 0 $-\frac{9\sqrt{30}}{280}$ 0 0 0	
	$\frac{\sqrt{3}}{28}$ 0 0 0 $\frac{\sqrt{15}}{28}$ 0 0 $\frac{33\sqrt{2}}{280}$ 0 0 0 0 $-\frac{3\sqrt{6}}{280}$ 0 0	
	0 $-\frac{\sqrt{15}}{28}$ 0 0 0 $-\frac{\sqrt{3}}{28}$ 0 0 $-\frac{3\sqrt{6}}{280}$ 0 0 0 0 $\frac{33\sqrt{2}}{280}$ 0	
	0 0 $\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 $-\frac{9\sqrt{30}}{280}$ 0 0 0 0 $-\frac{3\sqrt{42}}{280}$	
	0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{14}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 $\frac{3\sqrt{42}}{140}$ 0 0 0 $-\frac{\sqrt{30}}{140}$ 0 0 0	
	$\frac{3\sqrt{2}}{28}$ 0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 $-\frac{9\sqrt{3}}{140}$ 0 0 0 $\frac{17}{140}$ 0 0	
	0 $-\frac{\sqrt{10}}{28}$ 0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 $-\frac{17}{140}$ 0 0 0 0 $\frac{9\sqrt{3}}{140}$ 0	
	0 0 $-\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{30}}{140}$ 0 0 0 $-\frac{3\sqrt{42}}{140}$	
	0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{14}$ 0 0 0	
772	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 $\frac{3\sqrt{42}i}{280}$ 0 0 0 $-\frac{9\sqrt{30}i}{280}$ 0 0 0	$-\frac{\sqrt{3}i}{28}$ 0 0 0 $\frac{\sqrt{15}i}{28}$ 0 0 $-\frac{33\sqrt{2}i}{280}$ 0 0 0 $-\frac{3\sqrt{6}i}{280}$ 0 0
	0 $\frac{\sqrt{15}i}{28}$ 0 0 0 $-\frac{\sqrt{3}i}{28}$ 0 0 $\frac{3\sqrt{6}i}{280}$ 0 0 0 $\frac{33\sqrt{2}i}{280}$ 0 0	0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 $\frac{9\sqrt{30}i}{280}$ 0 0 0 $-\frac{3\sqrt{42}i}{280}$
	0 0 $\frac{3\sqrt{2}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0	0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 0 0 $-\frac{\sqrt{30}i}{140}$ 0 0 0
	$-\frac{3\sqrt{2}i}{28}$ 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 $\frac{9\sqrt{3}i}{140}$ 0 0 0 $\frac{17i}{140}$ 0 0	0 0 $\frac{\sqrt{10}i}{28}$ 0 0 $\frac{3\sqrt{2}i}{28}$ 0 0 $\frac{17i}{140}$ 0 0 0 $\frac{9\sqrt{3}i}{140}$ 0
	0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{140}$ 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 0 0	0 0 0 $-\frac{3\sqrt{2}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0
	773 symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_{1u})$	0 $-\frac{3\sqrt{6}}{70}$ 0 0 0 0 0 0 $-\frac{2\sqrt{15}}{35}$ 0 0 0 0 0
		0 0 $-\frac{3}{70}$ 0 0 0 0 0 0 $-\frac{6\sqrt{3}}{35}$ 0 0 0 0
		0 0 0 $\frac{3}{70}$ 0 0 0 0 0 0 $-\frac{6\sqrt{3}}{35}$ 0 0 0
		0 0 0 0 $\frac{3\sqrt{6}}{70}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{15}}{35}$ 0 0
		$\frac{\sqrt{6}}{21}$ 0 0 0 0 0 0 0 $\frac{3}{14}$ 0 0 0 0 0
		0 $-\frac{\sqrt{6}}{105}$ 0 0 0 0 0 0 $\frac{3\sqrt{15}}{70}$ 0 0 0 0 0
		0 0 $-\frac{4\sqrt{6}}{105}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}}{70}$ 0 0 0 0
		0 0 0 $-\frac{4\sqrt{6}}{105}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{70}$ 0 0 0
		0 0 0 0 $-\frac{\sqrt{6}}{105}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{15}}{70}$ 0 0
774	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)$	$\frac{3\sqrt{10}i}{140}$	0 $\frac{9i}{140}$ 0 0 0 0 0 $\frac{2\sqrt{15}i}{35}$ 0 $\frac{2\sqrt{3}i}{35}$ 0 0 0 0
	0	$-\frac{\sqrt{6}i}{140}$ 0 $\frac{\sqrt{3}i}{28}$ 0 0 0 0 $\frac{2\sqrt{15}i}{35}$ 0 $\frac{6i}{35}$ 0 0 0 0
	0	0 $-\frac{\sqrt{3}i}{28}$ 0 $\frac{\sqrt{6}i}{140}$ 0 0 0 0 0 $\frac{6i}{35}$ 0 $\frac{2\sqrt{15}i}{35}$ 0 0 0
	0	0 0 $-\frac{9i}{140}$ 0 $-\frac{3\sqrt{10}i}{140}$ 0 0 0 0 $\frac{2\sqrt{3}i}{35}$ 0 $\frac{2\sqrt{15}i}{35}$ 0 0
	0	$-\frac{\sqrt{10}i}{35}$ 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{3i}{28}$ 0 0 0 0 0 0
	$\frac{\sqrt{10}i}{35}$	0 $-\frac{2i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{140}$ 0 $-\frac{11\sqrt{3}i}{140}$ 0 0 0 0 0
	0	$\frac{2i}{35}$ 0 0 0 0 0 0 $\frac{3\sqrt{10}i}{140}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 0 0
	0	0 0 0 $\frac{2i}{35}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{20}$ 0 $-\frac{3\sqrt{10}i}{140}$ 0 0 0
	0	0 0 0 $-\frac{2i}{35}$ 0 $\frac{\sqrt{10}i}{35}$ 0 0 0 0 $\frac{11\sqrt{3}i}{140}$ 0 $\frac{\sqrt{15}i}{140}$ 0 0
	0	0 0 0 0 $-\frac{\sqrt{10}i}{35}$ 0 0 0 0 0 0 $\frac{3i}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0
775	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)$	$-\frac{3\sqrt{10}}{140}$	0 $\frac{9}{140}$ 0 0 0 0 0 $-\frac{2\sqrt{15}}{35}$ 0 $\frac{2\sqrt{3}}{35}$ 0 0 0 0
	0	$\frac{\sqrt{6}}{140}$ 0 $\frac{\sqrt{3}}{28}$ 0 0 0 0 0 $-\frac{2\sqrt{15}}{35}$ 0 $\frac{6}{35}$ 0 0 0 0
	0	0 $\frac{\sqrt{3}}{28}$ 0 $\frac{\sqrt{6}}{140}$ 0 0 0 0 0 $-\frac{6}{35}$ 0 $\frac{2\sqrt{15}}{35}$ 0 0
	0	0 0 $\frac{9}{140}$ 0 $-\frac{3\sqrt{10}}{140}$ 0 0 0 0 0 $-\frac{2\sqrt{3}}{35}$ 0 $\frac{2\sqrt{15}}{35}$ 0
	0	$-\frac{\sqrt{10}}{35}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{3}{28}$ 0 0 0 0 0 0
	$-\frac{\sqrt{10}}{35}$	0 $-\frac{2}{35}$ 0 0 0 0 0 $\frac{\sqrt{15}}{140}$ 0 $-\frac{11\sqrt{3}}{140}$ 0 0 0 0
	0	$-\frac{2}{35}$ 0 0 0 0 0 0 $-\frac{3\sqrt{10}}{140}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0
	0	0 0 0 $\frac{2}{35}$ 0 $\frac{\sqrt{10}}{35}$ 0 0 0 0 $-\frac{\sqrt{6}}{20}$ 0 $-\frac{3\sqrt{10}}{140}$ 0 0
	0	0 0 0 0 $\frac{\sqrt{10}}{35}$ 0 0 0 0 0 0 $-\frac{11\sqrt{3}}{140}$ 0 $\frac{\sqrt{15}}{140}$ 0
	0	0 0 0 0 $-\frac{\sqrt{10}}{35}$ 0 0 0 0 0 0 $-\frac{3}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0
776	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3}{70}$ 0 0 $-\frac{\sqrt{105}}{35}$ 0 0 0 $-\frac{\sqrt{3}}{35}$ 0 0 0	$\frac{\sqrt{30}}{70}$ 0 0 0 $-\frac{\sqrt{6}}{35}$ 0 0 $-\frac{3\sqrt{5}}{35}$ 0 0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0
	0 $\frac{\sqrt{6}}{35}$ 0 0 0 $-\frac{\sqrt{30}}{70}$ 0 0 $-\frac{\sqrt{15}}{35}$ 0 0 0 $-\frac{3\sqrt{5}}{35}$ 0	0 0 $\frac{3}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{35}$ 0 0 0 $-\frac{\sqrt{105}}{35}$
	0 0 $\frac{\sqrt{5}}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{70}$ 0 0 0 0	0 0 0 $\frac{3}{35}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $\frac{2\sqrt{3}}{35}$ 0 0 0
	$\frac{\sqrt{5}}{35}$ 0 0 0 $\frac{3}{35}$ 0 0 $-\frac{\sqrt{30}}{35}$ 0 0 0 $\frac{3\sqrt{10}}{70}$ 0 0 0	0 $\frac{3}{35}$ 0 0 0 $\frac{\sqrt{5}}{35}$ 0 0 $-\frac{3\sqrt{10}}{70}$ 0 0 0 $\frac{\sqrt{30}}{35}$ 0
	0 0 $\frac{3}{35}$ 0 0 0 0 0 0 $-\frac{2\sqrt{3}}{35}$ 0 0 0 $\frac{\sqrt{105}}{70}$	0 0 0 $\frac{\sqrt{5}}{35}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{70}$ 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3i}{70}$ 0 0 $\frac{\sqrt{105}i}{35}$ 0 0 0 $-\frac{\sqrt{3}i}{35}$ 0 0 0	$-\frac{\sqrt{30}i}{70}$ 0 0 0 $-\frac{\sqrt{6}i}{35}$ 0 0 $\frac{3\sqrt{5}i}{35}$ 0 0 0 $-\frac{\sqrt{15}i}{35}$ 0 0 0
	0 $-\frac{\sqrt{6}i}{35}$ 0 0 0 $-\frac{\sqrt{30}i}{70}$ 0 0 $\frac{\sqrt{15}i}{35}$ 0 0 0 $-\frac{3\sqrt{5}i}{35}$ 0	0 0 $-\frac{3i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{35}$ 0 0 0 $-\frac{\sqrt{105}i}{35}$
	0 0 $\frac{\sqrt{5}i}{35}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0	0 0 0 $\frac{3i}{35}$ 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 $\frac{2\sqrt{3}i}{35}$ 0 0 0
	$-\frac{\sqrt{5}i}{35}$ 0 0 0 $\frac{3i}{35}$ 0 0 $\frac{\sqrt{30}i}{35}$ 0 0 0 $\frac{3\sqrt{10}i}{70}$ 0 0 0	0 $-\frac{3i}{35}$ 0 0 0 $\frac{\sqrt{5}i}{35}$ 0 0 $-\frac{3\sqrt{10}i}{70}$ 0 0 0 $\frac{\sqrt{30}i}{35}$ 0
	0 0 $-\frac{3i}{35}$ 0 0 0 0 0 0 $\frac{2\sqrt{3}i}{35}$ 0 0 0 $\frac{\sqrt{105}i}{70}$	0 0 0 $-\frac{\sqrt{5}i}{35}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{70}$ 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
778	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{28} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 \end{bmatrix}$
779	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
780	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	0 0 0 0 $\frac{\sqrt{210}}{336}$ 0 0 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{14}}{112}$ $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0	
	$-\frac{\sqrt{14}}{112}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{12}$	
	0 $\frac{\sqrt{210}}{336}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{24}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{42}$ $\frac{3\sqrt{2}}{16}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{112}$ 0	
	$-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{112}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}}{16}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}}{24}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0 0 0 0 0	
781	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$-\frac{\sqrt{6}i}{336}$ 0 $-\frac{\sqrt{15}i}{168}$ 0 0 0 0 $-\frac{3i}{28}$ 0 $-\frac{\sqrt{5}i}{14}$ 0 0 0 0 0	
	0 $\frac{\sqrt{10}i}{112}$ 0 $\frac{\sqrt{5}i}{56}$ 0 0 0 0 $\frac{i}{7}$ 0 $\frac{\sqrt{15}i}{84}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{5}i}{56}$ 0 $-\frac{\sqrt{10}i}{112}$ 0 0 0 0 $\frac{\sqrt{15}i}{84}$ 0 $\frac{i}{7}$ 0 0	
	0 0 0 $\frac{\sqrt{15}i}{168}$ 0 $\frac{\sqrt{6}i}{336}$ 0 0 0 0 $-\frac{\sqrt{5}i}{14}$ 0 $-\frac{3i}{28}$ 0	
	0 $\frac{\sqrt{6}i}{42}$ 0 0 0 0 $\frac{\sqrt{35}i}{56}$ 0 $\frac{5\sqrt{15}i}{84}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{6}i}{42}$ 0 $-\frac{\sqrt{15}i}{42}$ 0 0 0 0 $-\frac{13i}{56}$ 0 $-\frac{\sqrt{5}i}{28}$ 0 0 0 0 0	
	0 $\frac{\sqrt{15}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{336}$ 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}i}{42}$ 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 $-\frac{\sqrt{6}i}{336}$ 0 0	
	0 0 0 $-\frac{\sqrt{15}i}{42}$ 0 $-\frac{\sqrt{6}i}{42}$ 0 0 0 0 $\frac{\sqrt{5}i}{28}$ 0 $\frac{13i}{56}$ 0	
	0 0 0 0 $\frac{\sqrt{6}i}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{15}i}{84}$ 0 $-\frac{\sqrt{35}i}{56}$	
782	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{6}}{336} \begin{bmatrix} 0 & -\frac{\sqrt{15}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{3}{28} & 0 & -\frac{\sqrt{5}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{112} & 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & 0 & -\frac{1}{7} & 0 & \frac{\sqrt{15}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{56} & 0 & -\frac{\sqrt{10}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{84} & 0 & \frac{1}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{168} & 0 & \frac{\sqrt{6}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{14} & 0 & -\frac{3}{28} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & \frac{5\sqrt{15}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & \frac{13}{56} & 0 & -\frac{\sqrt{5}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{336} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{6}}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{42} & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{28} & 0 & \frac{13}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{15}}{84} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 \end{bmatrix}$	
		$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 \end{bmatrix}$
785	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{30}}{168} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{1}{56} & 0 & 0 & 0 & -\frac{\sqrt{5}}{56} & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{56} & 0 & 0 & 0 & \frac{1}{56} & 0 & 0 & \frac{\sqrt{2}}{56} & 0 & 0 & 0 & -\frac{11\sqrt{6}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{56} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{10}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & -\frac{9}{56} & 0 & 0 & 0 & \frac{17\sqrt{3}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & -\frac{17\sqrt{3}}{168} & 0 & 0 & 0 & \frac{9}{56} & 0 \\ 0 & 0 & \frac{\sqrt{30}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}}{28} & 0 & 0 & 0 \end{bmatrix}$
786	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{30}i}{168}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{3\sqrt{10}i}{56}$ 0 0 0	
	$\frac{i}{56}$ 0 0 0 $-\frac{\sqrt{5}i}{56}$ 0 0 $\frac{11\sqrt{6}i}{168}$ 0 0 0 $\frac{\sqrt{2}i}{56}$ 0 0	
	0 $-\frac{\sqrt{5}i}{56}$ 0 0 0 $\frac{i}{56}$ 0 0 $-\frac{\sqrt{2}i}{56}$ 0 0 0 $-\frac{11\sqrt{6}i}{168}$ 0	
	0 0 $\frac{\sqrt{30}i}{168}$ 0 0 0 0 0 0 $-\frac{3\sqrt{10}i}{56}$ 0 0 0 $\frac{\sqrt{14}i}{56}$	
	0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{84}$ 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0	
	$\frac{\sqrt{6}i}{28}$ 0 0 0 $\frac{\sqrt{30}i}{84}$ 0 0 $\frac{9i}{56}$ 0 0 0 $\frac{17\sqrt{3}i}{168}$ 0 0	
	0 $-\frac{\sqrt{30}i}{84}$ 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 $\frac{17\sqrt{3}i}{168}$ 0 0 0 $\frac{9i}{56}$ 0	
	0 0 $-\frac{\sqrt{30}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{56}$ 0 0 0 $-\frac{3\sqrt{14}i}{56}$	
	0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0	
787	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{132} \end{bmatrix}$
788	symmetry	$\frac{\sqrt{462}(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
789	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
790	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
791	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
792	symmetry	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
793	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
794	symmetry	$\frac{\sqrt{21}yz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{264} & 0 & -\frac{\sqrt{462}i}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{264} & 0 & \frac{5\sqrt{154}i}{264} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{132} & 0 & -\frac{5\sqrt{77}i}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}i}{132} & 0 & \frac{\sqrt{1155}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{264} & 0 & -\frac{\sqrt{770}i}{264} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{264} & 0 & \frac{\sqrt{22}i}{264} \end{bmatrix}$
795	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{264} & 0 & -\frac{\sqrt{462}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{264} & 0 & \frac{5\sqrt{154}}{264} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{132} & 0 & -\frac{5\sqrt{77}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{132} & 0 & \frac{\sqrt{1155}}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{264} & 0 & -\frac{\sqrt{770}}{264} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{264} & 0 & \frac{\sqrt{22}}{264} \end{bmatrix}$
796	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
797	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{44} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
798	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{66} & 0 & 0 & 0 & \frac{\sqrt{462}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{66} & 0 & 0 & 0 & 0 \end{bmatrix}$
799	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$
	$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{66} & 0 & 0 & 0 & -\frac{\sqrt{154}i}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{66} & 0 & 0 & 0 & 0 \end{bmatrix}$
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	$-\frac{\sqrt{15}}{35} \quad 0 \quad \frac{\sqrt{6}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{70} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{14} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{15}}{14}$	$0 \quad 0 \quad \frac{\sqrt{10}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{15}}{70} \quad 0 \quad \frac{\sqrt{6}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{2\sqrt{15}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{2\sqrt{15}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{70} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{28} \quad 0$
801	symmetry	$\sqrt{3}yz$
$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 1)$	$\frac{i}{14}$	$0 \quad \frac{3\sqrt{10}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad -\frac{\sqrt{30}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{15}i}{210} \quad 0 \quad \frac{\sqrt{30}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{30}i}{84} \quad 0 \quad \frac{\sqrt{15}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{140} \quad 0 \quad -\frac{i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{70} \quad 0 \quad -\frac{\sqrt{6}i}{14} \quad 0 \quad 0$
	0	$-\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad -\frac{\sqrt{10}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{3i}{14}$	$0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{168} \quad 0 \quad -\frac{11\sqrt{30}i}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{28} \quad 0 \quad -\frac{\sqrt{15}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60} \quad 0 \quad -\frac{i}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{10}i}{70} \quad 0 \quad \frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{30}i}{840} \quad 0 \quad \frac{\sqrt{6}i}{168} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{56} \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0$
802	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,2}^{(1,0;a)}(E_u, 1)$	$\frac{-1}{14} \quad 0 \quad \frac{3\sqrt{10}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{14} \quad 0 \quad -\frac{\sqrt{30}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{15}}{210} \quad 0 \quad \frac{\sqrt{30}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{14} \quad 0 \quad -\frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{30}}{84} \quad 0 \quad \frac{\sqrt{15}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{70} \quad 0 \quad -\frac{\sqrt{6}}{14} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{140} \quad 0 \quad -\frac{1}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{70} \quad 0 \quad -\frac{\sqrt{6}}{14} \quad 0 \quad 0$	
	$0 \quad -\frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad -\frac{\sqrt{10}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{3}{14} \quad 0 \quad -\frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{168} \quad 0 \quad -\frac{11\sqrt{30}}{840} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{28} \quad 0 \quad -\frac{\sqrt{15}}{60} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{60} \quad 0 \quad -\frac{1}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{10}}{70} \quad 0 \quad \frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{30}}{840} \quad 0 \quad \frac{\sqrt{6}}{168} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{56} \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0$	
803	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 2)$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{70} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{140} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{3}}{21} \quad 0 \quad 0 \quad 0 \quad -\frac{2\sqrt{15}}{105} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{2\sqrt{15}}{105} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{21} \quad 0 \quad 0 \quad \frac{\sqrt{6}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{10}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{28}$	
	$0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{10}}{140} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{105} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{2}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{10}}{140} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{21} \quad 0 \quad 0 \quad 0 \quad \frac{1}{14} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{9\sqrt{10}}{140} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0 \quad -\frac{1}{14} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{21} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{9\sqrt{10}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{105} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0$	
804	symmetry	$-\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,2}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{10}i}{70}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 $\frac{\sqrt{30}i}{140}$ 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & \frac{\sqrt{30}i}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{21} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{\sqrt{6}i}{28} & 0 & 0 \\ 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{21} & 0 & 0 & -\frac{\sqrt{6}i}{28} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{30}i}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & \frac{9\sqrt{10}i}{140} & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 & 0 & 0 & \frac{i}{14} & 0 & 0 \\ 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{28} & 0 & 0 & \frac{i}{14} & 0 & 0 & 0 & \frac{\sqrt{3}i}{21} & 0 \\ 0 & 0 & -\frac{9\sqrt{10}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{105} & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{84} & 0 & 0 & 0 & 0 \end{bmatrix}$
	805 symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{2}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{10}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{27\sqrt{2}}{140} & 0 & 0 \\ -\frac{3\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{9\sqrt{5}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{35} & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
806	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad \frac{27\sqrt{35}i}{700} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{560} \quad -\frac{9\sqrt{5}i}{100} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{35}i}{350} \quad 0 \quad 0$	
	$-\frac{\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{35}i}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{5}i}{100}$	
	$0 \quad \frac{\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{27\sqrt{35}i}{700} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{35}i}{200} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}i}{70} \quad \frac{3\sqrt{30}i}{400} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{2800} \quad 0$	
	$-\frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{2800} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{400}$	
	$0 \quad 0 \quad -\frac{\sqrt{35}i}{200} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad 0 \quad 0$	
807	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{M}_4^{(1,0;a)}(A_{2u})$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{27\sqrt{35}}{700} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{560} \quad -\frac{9\sqrt{5}}{100} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{35}}{350} \quad 0$	
	$-\frac{\sqrt{210}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{35}}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{5}}{100}$	
	$0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{27\sqrt{35}}{700} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{35}}{200} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad \frac{3\sqrt{30}}{400} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{2800} \quad 0$	
	$-\frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{2800} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{400}$	
	$0 \quad 0 \quad -\frac{\sqrt{35}}{200} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad -\frac{\sqrt{105}}{280} \quad 0 \quad 0 \quad 0 \quad 0$	
808	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{560} & 0 & -\frac{i}{56} & 0 & 0 & 0 & 0 & \frac{27\sqrt{15}i}{700} & 0 & \frac{9\sqrt{3}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{112} & 0 & \frac{\sqrt{3}i}{56} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{15}i}{175} & 0 & -\frac{9i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{56} & 0 & -\frac{\sqrt{6}i}{112} & 0 & 0 & 0 & 0 & -\frac{9i}{140} & 0 & -\frac{9\sqrt{15}i}{175} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{56} & 0 & \frac{\sqrt{10}i}{560} & 0 & 0 & 0 & 0 & \frac{9\sqrt{3}i}{70} & 0 & \frac{27\sqrt{15}i}{700} & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{280} & 0 & \frac{i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{70} & 0 & -\frac{3i}{14} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{15}i}{1400} & 0 & -\frac{\sqrt{3}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{2800} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{80} & 0 & -\frac{\sqrt{10}i}{2800} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{14} & 0 & -\frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{140} & 0 & \frac{13\sqrt{15}i}{1400} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{28} & 0 & 0 & -\frac{\sqrt{21}i}{280} \end{bmatrix}$	
	809	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{10}}{560} & 0 & -\frac{1}{56} & 0 & 0 & 0 & 0 & -\frac{27\sqrt{15}}{700} & 0 & \frac{9\sqrt{3}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{112} & 0 & \frac{\sqrt{3}}{56} & 0 & 0 & 0 & 0 & \frac{9\sqrt{15}}{175} & 0 & -\frac{9}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{56} & 0 & -\frac{\sqrt{6}}{112} & 0 & 0 & 0 & 0 & \frac{9}{140} & 0 & -\frac{9\sqrt{15}}{175} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{56} & 0 & \frac{\sqrt{10}}{560} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{3}}{70} & 0 & \frac{27\sqrt{15}}{700} & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{280} & 0 & \frac{1}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{70} & 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & \frac{13\sqrt{15}}{1400} & 0 & -\frac{\sqrt{3}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{2800} & 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{10}}{2800} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{14} & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{140} & 0 & \frac{13\sqrt{15}}{1400} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{28} & 0 & 0 & -\frac{\sqrt{21}}{280} \end{bmatrix}$
	810	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 $\frac{\sqrt{35}}{140}$ 0 0 0 0 0 0 $-\frac{9\sqrt{210}}{700}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{9\sqrt{10}}{100}$	
	0 0 0 0 0 0 $-\frac{9\sqrt{10}}{100}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{35}}{140}$ 0 0 0 0 0 0 0 $-\frac{9\sqrt{210}}{700}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{140}$ 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{350}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{100}$	
	0 0 0 0 0 0 $\frac{\sqrt{15}}{100}$ 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{350}$ 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{140}$ 0 0 0 0 0 0	
811	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 0 0 $\frac{9\sqrt{210}i}{700}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{9\sqrt{10}i}{100}$	
	0 0 0 0 0 0 $-\frac{9\sqrt{10}i}{100}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{35}i}{140}$ 0 0 0 0 0 0 0 $-\frac{9\sqrt{210}i}{700}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{140}$ 0 0	
	0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{350}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{100}$	
	0 0 0 0 0 0 $\frac{\sqrt{15}i}{100}$ 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{350}$ 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{140}$ 0 0 0 0 0 0	
812	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 3)$	$0 \ 0 \ 0 \ \frac{\sqrt{2}}{56} \ 0 \ 0 \ -\frac{9\sqrt{210}}{1400} \ 0 \ 0 \ 0 \ -\frac{27\sqrt{6}}{280} \ 0 \ 0 \ 0$	
	$-\frac{\sqrt{15}}{280} \ 0 \ 0 \ 0 \ -\frac{\sqrt{3}}{56} \ 0 \ 0 \ \frac{99\sqrt{10}}{1400} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{30}}{1400} \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{3}}{56} \ 0 \ 0 \ 0 \ \frac{\sqrt{15}}{280} \ 0 \ 0 \ -\frac{9\sqrt{30}}{1400} \ 0 \ 0 \ 0 \ \frac{99\sqrt{10}}{1400} \ 0$	
	$0 \ 0 \ -\frac{\sqrt{2}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{27\sqrt{6}}{280} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{210}}{1400}$	
	$0 \ 0 \ -\frac{9\sqrt{10}}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}}{140} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{3\sqrt{2}}{28} \ 0 \ 0 \ \frac{3\sqrt{210}}{1400} \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}}{280} \ 0 \ 0 \ 0$	
	$-\frac{9\sqrt{10}}{140} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}}{28} \ 0 \ 0 \ -\frac{9\sqrt{15}}{1400} \ 0 \ 0 \ 0 \ \frac{17\sqrt{5}}{1400} \ 0 \ 0 \ 0$	
	$0 \ \frac{3\sqrt{2}}{28} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{10}}{140} \ 0 \ 0 \ -\frac{17\sqrt{5}}{1400} \ 0 \ 0 \ 0 \ \frac{9\sqrt{15}}{1400} \ 0$	
	$0 \ 0 \ \frac{3\sqrt{2}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{6}}{280} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{210}}{1400}$	
	$0 \ 0 \ 0 \ -\frac{9\sqrt{10}}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}}{140} \ 0 \ 0 \ 0$	
813	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 3)$	$0 \ 0 \ 0 \ \frac{\sqrt{2}i}{56} \ 0 \ 0 \ \frac{9\sqrt{210}i}{1400} \ 0 \ 0 \ 0 \ -\frac{27\sqrt{6}i}{280} \ 0 \ 0 \ 0$	
	$\frac{\sqrt{15}i}{280} \ 0 \ 0 \ 0 \ -\frac{\sqrt{3}i}{56} \ 0 \ 0 \ -\frac{99\sqrt{10}i}{1400} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{30}i}{1400} \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{3}i}{56} \ 0 \ 0 \ 0 \ \frac{\sqrt{15}i}{280} \ 0 \ 0 \ \frac{9\sqrt{30}i}{1400} \ 0 \ 0 \ 0 \ \frac{99\sqrt{10}i}{1400} \ 0$	
	$0 \ 0 \ \frac{\sqrt{2}i}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{27\sqrt{6}i}{280} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{210}i}{1400}$	
	$0 \ 0 \ -\frac{9\sqrt{10}i}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}i}{140} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{28} \ 0 \ 0 \ -\frac{3\sqrt{210}i}{1400} \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{280} \ 0 \ 0 \ 0$	
	$\frac{9\sqrt{10}i}{140} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{28} \ 0 \ 0 \ \frac{9\sqrt{15}i}{1400} \ 0 \ 0 \ 0 \ \frac{17\sqrt{5}i}{1400} \ 0 \ 0 \ 0$	
	$0 \ -\frac{3\sqrt{2}i}{28} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{10}i}{140} \ 0 \ 0 \ \frac{17\sqrt{5}i}{1400} \ 0 \ 0 \ 0 \ \frac{9\sqrt{15}i}{1400} \ 0$	
	$0 \ 0 \ -\frac{3\sqrt{2}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{6}i}{280} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{210}i}{1400}$	
	$0 \ 0 \ 0 \ \frac{9\sqrt{10}i}{140} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}i}{140} \ 0 \ 0 \ 0$	
814	symmetry	1

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
815	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & \frac{12}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{12}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & 0 & 0 \\ \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{3}}{105} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{6}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{3}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{21} & 0 & 0 \end{bmatrix}$
816	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{2\sqrt{15}i}{35} & 0 & -\frac{3\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{2i}{35} & 0 & -\frac{\sqrt{2}i}{7} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 & \frac{3\sqrt{6}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{7} & 0 & -\frac{2i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{140} & 0 & \frac{3\sqrt{10}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}i}{35} & 0 & \frac{2\sqrt{15}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{140} & 0 & 0 & \frac{3\sqrt{10}i}{140} & 0 \\ 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & \frac{\sqrt{6}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}i}{70} & 0 & -\frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{210} & 0 & \frac{11\sqrt{2}i}{210} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{105} & 0 & \frac{i}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{70} & 0 & 0 & 0 & 0 & -\frac{i}{15} & 0 & \frac{\sqrt{15}i}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}i}{70} & 0 & \frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{2}i}{210} & 0 & -\frac{\sqrt{10}i}{210} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{42} & 0 & -\frac{\sqrt{14}i}{42} & 0 \end{bmatrix}$	
	817	symmetry
	$-\sqrt{3}xz$	
	$\mathbb{M}_{2,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{2\sqrt{15}}{35} & 0 & -\frac{3\sqrt{6}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{3\sqrt{2}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{2}{35} & 0 & -\frac{\sqrt{2}}{7} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{140} & 0 & \frac{3\sqrt{6}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{7} & 0 & -\frac{2}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{35} & 0 & \frac{2\sqrt{15}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{140} & 0 & \frac{3\sqrt{10}}{140} & 0 & 0 \\ 0 & -\frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & \frac{\sqrt{6}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{15}}{70} & 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{210} & 0 & \frac{11\sqrt{2}}{210} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{105} & 0 & \frac{1}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & 0 & 0 & 0 & \frac{1}{15} & 0 & \frac{\sqrt{15}}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{70} & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & \frac{11\sqrt{2}}{210} & 0 & -\frac{\sqrt{10}}{210} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 \end{bmatrix}$
		818 symmetry
	$\frac{\sqrt{3}(x-y)(x+y)}{2}$	

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}}{35} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 \\ -\frac{4\sqrt{5}}{35} & 0 & 0 & 0 & \frac{8}{35} & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 \\ 0 & -\frac{8}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}}{35} & 0 & 0 & -\frac{3\sqrt{10}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}}{280} & 0 \\ 0 & 0 & -\frac{2\sqrt{6}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} \\ 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & \frac{\sqrt{70}}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}}{105} & 0 & 0 & 0 \\ \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & \frac{4\sqrt{5}}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}}{105} & 0 & 0 \\ 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & \frac{2\sqrt{15}}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}}{105} & 0 \\ 0 & 0 & \frac{9\sqrt{6}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{4\sqrt{2}}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}}{105} \\ 0 & 0 & 0 & \frac{3\sqrt{30}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{105} & 0 & 0 & 0 \end{bmatrix}$
819	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{280} & 0 & 0 & 0 \\ \frac{4\sqrt{5}i}{35} & 0 & 0 & 0 & \frac{8i}{35} & 0 & 0 & \frac{3\sqrt{30}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{280} & 0 & 0 \\ 0 & \frac{8i}{35} & 0 & 0 & 0 & \frac{4\sqrt{5}i}{35} & 0 & 0 & \frac{3\sqrt{10}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{280} & 0 \\ 0 & 0 & \frac{2\sqrt{6}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{280} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & -\frac{\sqrt{70}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 \\ -\frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & \frac{9\sqrt{6}i}{140} & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 \\ 0 & -\frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & \frac{3\sqrt{30}i}{140} & 0 & 0 & -\frac{2\sqrt{15}i}{105} & 0 & 0 & 0 & -\frac{4\sqrt{5}i}{105} & 0 \\ 0 & 0 & -\frac{9\sqrt{6}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{4\sqrt{2}i}{105} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{105} \\ 0 & 0 & 0 & -\frac{3\sqrt{30}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{105} & 0 & 0 & 0 \end{bmatrix}$
820	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{330}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{55}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{55}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{210} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{105} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{330}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{55}}{385} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{8\sqrt{33}}{1155} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{385} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{385} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{8\sqrt{33}}{1155} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{55}}{385} & 0 & 0 \end{bmatrix}$
821	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{70} & \frac{\sqrt{330}i}{300} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1050} & 0 \\ \frac{\sqrt{385}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1050} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{300} \\ 0 & -\frac{\sqrt{231}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{700} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{770} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{1650} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{420} & -\frac{3\sqrt{55}i}{550} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{3850} & 0 & 0 \\ -\frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{3850} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}i}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{1650} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
822	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{700} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{70} & \frac{\sqrt{330}}{300} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1050} & 0 \\ \frac{\sqrt{385}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1050} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{300} \\ 0 & -\frac{\sqrt{231}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{700} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{770} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1650} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{420} & -\frac{3\sqrt{55}}{550} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{3850} & 0 \\ -\frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{3850} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{550} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{1650} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{770} & 0 & 0 & 0 & 0 \end{bmatrix}$
823	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} \frac{\sqrt{165}i}{210} & 0 & \frac{\sqrt{66}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{700} & 0 & -\frac{\sqrt{22}i}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{11}i}{14} & 0 & -\frac{\sqrt{22}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{175} & 0 & \frac{\sqrt{66}i}{420} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{22}i}{14} & 0 & \frac{\sqrt{11}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{420} & 0 & \frac{\sqrt{110}i}{175} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{42} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{70} & 0 & -\frac{3\sqrt{110}i}{700} & 0 \\ 0 & \frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{770} & 0 & -\frac{\sqrt{66}i}{231} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{210} & 0 & -\frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & \frac{13\sqrt{110}i}{3850} & 0 & \frac{\sqrt{22}i}{385} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{11550} & 0 & \frac{\sqrt{11}i}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{110} & 0 & \frac{\sqrt{165}i}{11550} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{84} & 0 & -\frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{385} & 0 & -\frac{13\sqrt{110}i}{3850} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{231} & 0 & \frac{\sqrt{154}i}{770} \end{bmatrix}$
824	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{165}}{210} \quad 0 \quad \frac{\sqrt{66}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{110}}{700} \quad 0 \quad -\frac{\sqrt{22}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{11}}{14} \quad 0 \quad -\frac{\sqrt{22}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{175} \quad 0 \quad \frac{\sqrt{66}}{420} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{22}}{14} \quad 0 \quad \frac{\sqrt{11}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{420} \quad 0 \quad \frac{\sqrt{110}}{175} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{66}}{42} \quad 0 \quad -\frac{\sqrt{165}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{70} \quad 0 \quad -\frac{3\sqrt{110}}{700} \quad 0$	
	$0 \quad \frac{\sqrt{165}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{154}}{770} \quad 0 \quad -\frac{\sqrt{66}}{231} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{165}}{210} \quad 0 \quad -\frac{\sqrt{66}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{110}}{3850} \quad 0 \quad \frac{\sqrt{22}}{385} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{66}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{11550} \quad 0 \quad \frac{\sqrt{11}}{110} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{66}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{110} \quad 0 \quad \frac{\sqrt{165}}{11550} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{66}}{84} \quad 0 \quad -\frac{\sqrt{165}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{385} \quad 0 \quad -\frac{13\sqrt{110}}{3850} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}}{231} \quad 0 \quad \frac{\sqrt{154}}{770} \quad 0$	
825	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{105} \quad 0 \quad \frac{\sqrt{385}}{350} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{165}}{150}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{150} \quad 0 \quad 0$	
	$\frac{\sqrt{2310}}{105} \quad 0 \quad \frac{\sqrt{385}}{350} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{420} \quad 0 \quad \frac{2\sqrt{231}}{1155} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{420} \quad 0 \quad \frac{4\sqrt{385}}{1925} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{110}}{275}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{275} \quad 0 \quad 0$	
	$-\frac{\sqrt{2310}}{420} \quad 0 \quad -\frac{4\sqrt{385}}{1925} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
826	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 2)$	0 0 0 0 0 $\frac{\sqrt{2310}i}{105}$ 0 0 0 0 0 0 $-\frac{\sqrt{385}i}{350}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{150}$	
	0 0 0 0 0 0 $\frac{\sqrt{165}i}{150}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{2310}i}{105}$ 0 0 0 0 0 0 $\frac{\sqrt{385}i}{350}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $-\frac{2\sqrt{231}i}{1155}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $-\frac{4\sqrt{385}i}{1925}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}i}{275}$	
	0 0 0 0 0 0 $-\frac{\sqrt{110}i}{275}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $-\frac{4\sqrt{385}i}{1925}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2310}i}{420}$ 0 0 0 0 0 0 $-\frac{2\sqrt{231}i}{1155}$ 0 0 0 0 0 0	
827	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{33}}{21}$ 0 0 $\frac{\sqrt{385}}{700}$ 0 0 0 $\frac{3\sqrt{11}}{140}$ 0 0 0	
	$\frac{\sqrt{110}}{70}$ 0 0 0 $\frac{\sqrt{22}}{14}$ 0 0 $-\frac{11\sqrt{165}}{2100}$ 0 0 0 $\frac{\sqrt{55}}{700}$ 0 0	
	0 $-\frac{\sqrt{22}}{14}$ 0 0 0 $-\frac{\sqrt{110}}{70}$ 0 0 $\frac{\sqrt{55}}{700}$ 0 0 0 $-\frac{11\sqrt{165}}{2100}$ 0	
	0 0 $\frac{\sqrt{33}}{21}$ 0 0 0 0 0 0 $\frac{3\sqrt{11}}{140}$ 0 0 0 $\frac{\sqrt{385}}{700}$	
	0 0 $-\frac{\sqrt{165}}{140}$ 0 0 0 0 0 0 $\frac{2\sqrt{55}}{385}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{33}}{84}$ 0 0 $-\frac{3\sqrt{385}}{1925}$ 0 0 0 $\frac{\sqrt{11}}{385}$ 0 0 0	
	$-\frac{\sqrt{165}}{140}$ 0 0 0 $\frac{\sqrt{33}}{84}$ 0 0 $\frac{9\sqrt{110}}{3850}$ 0 0 0 $-\frac{17\sqrt{330}}{11550}$ 0 0	
	0 $\frac{\sqrt{33}}{84}$ 0 0 0 $-\frac{\sqrt{165}}{140}$ 0 0 $\frac{17\sqrt{330}}{11550}$ 0 0 0 $-\frac{9\sqrt{110}}{3850}$ 0	
	0 0 $\frac{\sqrt{33}}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}}{385}$ 0 0 0 $\frac{3\sqrt{385}}{1925}$	
	0 0 0 $-\frac{\sqrt{165}}{140}$ 0 0 0 0 0 0 $-\frac{2\sqrt{55}}{385}$ 0 0 0 0	
828	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix													
$M_{4,2}^{(1,1;a)}(E_u, 3)$	0	0	0	$-\frac{\sqrt{33}i}{21}$	0	0	$-\frac{\sqrt{385}i}{700}$	0	0	0	$\frac{3\sqrt{11}i}{140}$	0	0	0	0
	$-\frac{\sqrt{110}i}{70}$	0	0	0	$\frac{\sqrt{22}i}{14}$	0	0	$\frac{11\sqrt{165}i}{2100}$	0	0	$\frac{\sqrt{55}i}{700}$	0	0	0	0
	0	$\frac{\sqrt{22}i}{14}$	0	0	0	$-\frac{\sqrt{110}i}{70}$	0	0	$-\frac{\sqrt{55}i}{700}$	0	0	0	$-\frac{11\sqrt{165}i}{2100}$	0	0
	0	0	$-\frac{\sqrt{33}i}{21}$	0	0	0	0	0	0	$-\frac{3\sqrt{11}i}{140}$	0	0	0	$\frac{\sqrt{385}i}{700}$	0
	0	0	$-\frac{\sqrt{165}i}{140}$	0	0	0	0	0	0	$\frac{2\sqrt{55}i}{385}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{33}i}{84}$	0	0	$\frac{3\sqrt{385}i}{1925}$	0	0	0	$\frac{\sqrt{11}i}{385}$	0	0	0	0
	$\frac{\sqrt{165}i}{140}$	0	0	0	$\frac{\sqrt{33}i}{84}$	0	0	$-\frac{9\sqrt{110}i}{3850}$	0	0	0	$-\frac{17\sqrt{330}i}{11550}$	0	0	0
	0	$-\frac{\sqrt{33}i}{84}$	0	0	0	$-\frac{\sqrt{165}i}{140}$	0	0	$-\frac{17\sqrt{330}i}{11550}$	0	0	0	$-\frac{9\sqrt{110}i}{3850}$	0	0
	0	0	$-\frac{\sqrt{33}i}{84}$	0	0	0	0	0	0	$\frac{\sqrt{11}i}{385}$	0	0	0	$\frac{3\sqrt{385}i}{1925}$	0
	0	0	0	$\frac{\sqrt{165}i}{140}$	0	0	0	0	0	$\frac{2\sqrt{55}i}{385}$	0	0	0	0	0

$$\begin{aligned} \text{bra: } & \langle \frac{5}{2}, \frac{5}{2}; f |, \langle \frac{5}{2}, \frac{3}{2}; f |, \langle \frac{5}{2}, \frac{1}{2}; f |, \langle \frac{5}{2}, -\frac{1}{2}; f |, \langle \frac{5}{2}, -\frac{3}{2}; f |, \langle \frac{5}{2}, -\frac{5}{2}; f |, \langle \frac{7}{2}, \frac{7}{2}; f |, \langle \frac{7}{2}, \frac{5}{2}; f |, \langle \frac{7}{2}, \frac{3}{2}; f |, \langle \frac{7}{2}, \frac{1}{2}; f |, \langle \frac{7}{2}, -\frac{1}{2}; f |, \langle \frac{7}{2}, -\frac{3}{2}; f |, \langle \frac{7}{2}, -\frac{5}{2}; f |, \langle \frac{7}{2}, -\frac{7}{2}; f | \\ \text{ket: } & | \frac{5}{2}, \frac{5}{2}; f \rangle, | \frac{5}{2}, \frac{3}{2}; f \rangle, | \frac{5}{2}, \frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{1}{2}; f \rangle, | \frac{5}{2}, -\frac{3}{2}; f \rangle, | \frac{5}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{7}{2}; f \rangle, | \frac{7}{2}, \frac{5}{2}; f \rangle, | \frac{7}{2}, \frac{3}{2}; f \rangle, | \frac{7}{2}, \frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{1}{2}; f \rangle, | \frac{7}{2}, -\frac{3}{2}; f \rangle, | \frac{7}{2}, -\frac{5}{2}; f \rangle, | \frac{7}{2}, -\frac{7}{2}; f \rangle \end{aligned}$$

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

*continued ..*

Table 10

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_2^{(a)}(A_{1g})$	$-\frac{5\sqrt{42}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0	0
	0	0	$\frac{2\sqrt{42}}{49}$	0	0	0	0	0	0	$-\frac{\sqrt{14}}{98}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{42}}{49}$	0	0	0	0	0	$\frac{\sqrt{14}}{98}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	$\frac{\sqrt{105}}{98}$	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{42}}{98}$	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0
	0	0	0	0	0	0	$-\frac{5\sqrt{42}}{84}$	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{42}}{588}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0	0	$\frac{5\sqrt{42}}{196}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{14}}{98}$	0	0	0	0	0	0	$\frac{25\sqrt{42}}{588}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{14}}{98}$	0	0	0	0	0	0	$\frac{25\sqrt{42}}{588}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{105}}{98}$	0	0	0	0	0	0	$\frac{5\sqrt{42}}{196}$	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0	$-\frac{5\sqrt{42}}{588}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{42}}{84}$	0	0	0
$\sqrt{3}yz$															

831 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	0	$\frac{3\sqrt{70}i}{98}$ 0 0 0 0 0 $\frac{5\sqrt{3}i}{84}$ 0 $\frac{5\sqrt{7}i}{196}$ 0 0 0 0 0
	$-\frac{3\sqrt{70}i}{98}$	0 $\frac{3\sqrt{7}i}{49}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{588}$ 0 $\frac{11\sqrt{21}i}{588}$ 0 0 0 0 0
	0	$-\frac{3\sqrt{7}i}{49}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{196}$ 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0
	0	0 0 0 0 $-\frac{3\sqrt{7}i}{49}$ 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{70}i}{196}$ 0 0
	0	0 0 0 $\frac{3\sqrt{7}i}{49}$ 0 $-\frac{3\sqrt{70}i}{98}$ 0 0 0 0 $-\frac{11\sqrt{21}i}{588}$ 0 $-\frac{\sqrt{105}i}{588}$ 0
	0	0 0 0 0 $\frac{3\sqrt{70}i}{98}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{196}$ 0 $-\frac{5\sqrt{3}i}{84}$ 0
	$-\frac{5\sqrt{3}i}{84}$	0 0 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{105}i}{588}$ 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 $\frac{5\sqrt{42}i}{147}$ 0 0 0 0 0
	$-\frac{5\sqrt{7}i}{196}$	0 $\frac{\sqrt{70}i}{196}$ 0 0 0 0 $-\frac{5\sqrt{42}i}{147}$ 0 $\frac{5\sqrt{210}i}{588}$ 0 0 0 0
	0	$-\frac{11\sqrt{21}i}{588}$ 0 $\frac{\sqrt{42}i}{84}$ 0 $\frac{11\sqrt{21}i}{588}$ 0 0 0 $-\frac{5\sqrt{210}i}{588}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{11\sqrt{21}i}{588}$ 0 0 0 0 0 $-\frac{5\sqrt{210}i}{588}$ 0 0
	0	0 0 0 $-\frac{\sqrt{70}i}{196}$ 0 $\frac{5\sqrt{7}i}{196}$ 0 0 0 0 $\frac{5\sqrt{210}i}{588}$ 0 $-\frac{5\sqrt{42}i}{147}$ 0
	0	0 0 0 0 $\frac{\sqrt{105}i}{588}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{147}$ 0 $-\frac{5\sqrt{2}i}{28}$ 0
	0	0 0 0 0 0 $\frac{5\sqrt{3}i}{84}$ 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 0
832 symmetry		$-\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(a)}(E_g, 1)$	0	$\frac{3\sqrt{70}}{98} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{3}}{84} \quad 0 \quad \frac{5\sqrt{7}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{3\sqrt{70}}{98}$	$0 \quad \frac{3\sqrt{7}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{588} \quad 0 \quad \frac{11\sqrt{21}}{588} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{3\sqrt{7}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{7}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{7}}{49} \quad 0 \quad -\frac{3\sqrt{70}}{98} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{21}}{588} \quad 0 \quad -\frac{\sqrt{105}}{588} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{98} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{196} \quad 0 \quad -\frac{5\sqrt{3}}{84}$
	$-\frac{5\sqrt{3}}{84}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{2}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{105}}{588} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{2}}{28} \quad 0 \quad \frac{5\sqrt{42}}{147} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{5\sqrt{7}}{196}$	$0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{147} \quad 0 \quad \frac{5\sqrt{210}}{588} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{11\sqrt{21}}{588} \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{210}}{588} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad \frac{11\sqrt{21}}{588} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{210}}{588} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad \frac{5\sqrt{7}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{210}}{588} \quad 0 \quad -\frac{5\sqrt{42}}{147} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{588} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{147} \quad 0 \quad -\frac{5\sqrt{2}}{28} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{3}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{2}}{28} \quad 0$
833	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{294}$ 0 0 0 0	
	0 0 0 $-\frac{9\sqrt{7}}{98}$ 0 0 $\frac{\sqrt{15}}{42}$ 0 0 0 $-\frac{2\sqrt{21}}{147}$ 0 0 0	
	$-\frac{3\sqrt{35}}{98}$ 0 0 0 $-\frac{9\sqrt{7}}{98}$ 0 0 $\frac{\sqrt{210}}{147}$ 0 0 0 $-\frac{\sqrt{70}}{98}$ 0 0	
	0 $-\frac{9\sqrt{7}}{98}$ 0 0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 $\frac{\sqrt{70}}{98}$ 0 0 0 $-\frac{\sqrt{210}}{147}$ 0	
	0 0 $-\frac{9\sqrt{7}}{98}$ 0 0 0 0 0 0 $\frac{2\sqrt{21}}{147}$ 0 0 0 $-\frac{\sqrt{15}}{42}$	
	0 0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{294}$ 0 0 0	
	0 $\frac{\sqrt{15}}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{6}}{84}$ 0 0 0 0	
	0 0 $\frac{\sqrt{210}}{147}$ 0 0 0 0 0 0 $-\frac{5\sqrt{70}}{196}$ 0 0 0	
	0 0 0 $\frac{\sqrt{70}}{98}$ 0 0 $-\frac{5\sqrt{6}}{84}$ 0 0 0 $-\frac{5\sqrt{210}}{294}$ 0 0	
	$-\frac{\sqrt{105}}{294}$ 0 0 0 $\frac{2\sqrt{21}}{147}$ 0 0 $-\frac{5\sqrt{70}}{196}$ 0 0 0 $-\frac{5\sqrt{210}}{294}$ 0	
	0 $-\frac{2\sqrt{21}}{147}$ 0 0 0 $\frac{\sqrt{105}}{294}$ 0 0 $-\frac{5\sqrt{210}}{294}$ 0 0 0 $-\frac{5\sqrt{70}}{196}$	
	0 0 $-\frac{\sqrt{70}}{98}$ 0 0 0 0 0 0 $-\frac{5\sqrt{210}}{294}$ 0 0 0 $-\frac{5\sqrt{6}}{84}$	
	0 0 0 $-\frac{\sqrt{210}}{147}$ 0 0 0 0 0 0 $-\frac{5\sqrt{70}}{196}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{15}}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{6}}{84}$ 0 0 0	
834 symmetry		$-\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,2}^{(a)}(E_g, 2)$	0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{294}$ 0 0 0 0 0														
	0 0 0 $-\frac{9\sqrt{7}i}{98}$ 0 0 $-\frac{\sqrt{15}i}{42}$ 0 0 0 $-\frac{2\sqrt{21}i}{147}$ 0 0 0 0														
	$\frac{3\sqrt{35}i}{98}$ 0 0 0 $-\frac{9\sqrt{7}i}{98}$ 0 0 $-\frac{\sqrt{210}i}{147}$ 0 0 0 $-\frac{\sqrt{70}i}{98}$ 0 0 0														
	0 $\frac{9\sqrt{7}i}{98}$ 0 0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0 $-\frac{\sqrt{70}i}{98}$ 0 0 0 $-\frac{\sqrt{210}i}{147}$ 0 0 0														
	0 0 $\frac{9\sqrt{7}i}{98}$ 0 0 0 0 0 0 $-\frac{2\sqrt{21}i}{147}$ 0 0 0 0 $-\frac{\sqrt{15}i}{42}$														
	0 0 0 $\frac{3\sqrt{35}i}{98}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{294}$ 0 0 0 0														
	0 $\frac{\sqrt{15}i}{42}$ 0 0 0 0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0 0 0 0														
	0 0 $\frac{\sqrt{210}i}{147}$ 0 0 0 0 0 0 $-\frac{5\sqrt{70}i}{196}$ 0 0 0 0 0 0														
	0 0 0 $\frac{\sqrt{70}i}{98}$ 0 0 $\frac{5\sqrt{6}i}{84}$ 0 0 0 $-\frac{5\sqrt{210}i}{294}$ 0 0 0 0														
	$\frac{\sqrt{105}i}{294}$ 0 0 0 $\frac{2\sqrt{21}i}{147}$ 0 0 $\frac{5\sqrt{70}i}{196}$ 0 0 0 $-\frac{5\sqrt{210}i}{294}$ 0 0 0														
	0 $\frac{2\sqrt{21}i}{147}$ 0 0 0 $\frac{\sqrt{105}i}{294}$ 0 0 $\frac{5\sqrt{210}i}{294}$ 0 0 0 $-\frac{5\sqrt{70}i}{196}$ 0 0 0														
	0 0 $\frac{\sqrt{70}i}{98}$ 0 0 0 0 0 0 $-\frac{5\sqrt{210}i}{294}$ 0 0 0 $-\frac{5\sqrt{6}i}{84}$ 0 0 0														
	0 0 0 $\frac{\sqrt{210}i}{147}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{70}i}{196}$ 0 0 0 0														
	0 0 0 0 $\frac{\sqrt{15}i}{42}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{6}i}{84}$ 0 0 0														
835	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	$\frac{\sqrt{77}}{98}$	0	0	0	0	0	0	$\frac{5\sqrt{462}}{539}$	0	0	0	0	0	0
	0	$-\frac{3\sqrt{77}}{98}$	0	0	0	0	0	$-\frac{4\sqrt{770}}{539}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{77}}{49}$	0	0	0	0	0	$-\frac{5\sqrt{231}}{539}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{77}}{49}$	0	0	0	0	0	$\frac{5\sqrt{231}}{539}$	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{77}}{98}$	0	0	0	0	0	$\frac{4\sqrt{770}}{539}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{77}}{98}$	0	0	0	0	0	$-\frac{5\sqrt{462}}{539}$	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0
	$\frac{5\sqrt{462}}{539}$	0	0	0	0	0	0	$-\frac{39\sqrt{77}}{1078}$	0	0	0	0	0	0
	0	$-\frac{4\sqrt{770}}{539}$	0	0	0	0	0	$-\frac{9\sqrt{77}}{1078}$	0	0	0	0	0	0
	0	0	$-\frac{5\sqrt{231}}{539}$	0	0	0	0	0	$\frac{27\sqrt{77}}{1078}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{231}}{539}$	0	0	0	0	0	$\frac{27\sqrt{77}}{1078}$	0	0	0	0
	0	0	0	0	$\frac{4\sqrt{770}}{539}$	0	0	0	0	0	$-\frac{9\sqrt{77}}{1078}$	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{462}}{539}$	0	0	0	0	0	$-\frac{39\sqrt{77}}{1078}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0
836	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	0	0	0	$-\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}i}{154}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{11}i}{22}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{11}i}{14}$	$-\frac{3\sqrt{462}i}{308}$	0	0	0	0	0	$\frac{\sqrt{66}i}{308}$	0	0
	$\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{66}i}{308}$	0	0	0	0	0	$\frac{3\sqrt{462}i}{308}$	0
	0	0	0	0	0	0	0	$\frac{\sqrt{11}i}{22}$	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{11}i}{14}$	0	0	0	0	0	$0$	$\frac{5\sqrt{33}i}{154}$	0	0	0	0	0
	0	0	$\frac{3\sqrt{462}i}{308}$	0	0	0	0	0	0	$-\frac{3\sqrt{154}i}{154}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{66}i}{308}$	0	0	0	0	0	$-\frac{3\sqrt{22}i}{77}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{11}i}{22}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{33}i}{154}$	$\frac{3\sqrt{154}i}{154}$	0	0	0	0	0	$\frac{3\sqrt{22}i}{77}$	0	0
	$\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{22}i}{77}$	0	0	0	0	0	$\frac{3\sqrt{154}i}{154}$	0
	0	$\frac{\sqrt{11}i}{22}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{66}i}{308}$	0	0	0	0	0	0	$-\frac{3\sqrt{22}i}{77}$	0	0	0	0	0
	0	0	0	$-\frac{3\sqrt{462}i}{308}$	0	0	0	0	0	$-\frac{3\sqrt{154}i}{154}$	0	0	0	0	0
837	symmetry	$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_4^{(a)}(A_{2g})$	0	0	0	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	0	0	
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{14}$	$-\frac{3\sqrt{462}}{308}$	0	0	0	0	$-\frac{\sqrt{66}}{308}$	0	
	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{66}}{308}$	0	0	0	0	$-\frac{3\sqrt{462}}{308}$	
	0	0	0	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	0	
	0	0	$-\frac{\sqrt{11}}{14}$	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	0	0	0	
	0	0	$-\frac{3\sqrt{462}}{308}$	0	0	0	0	0	$\frac{3\sqrt{154}}{154}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{66}}{308}$	0	0	0	0	0	$\frac{3\sqrt{22}}{77}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	$\frac{3\sqrt{154}}{154}$	0	0	0	0	$-\frac{3\sqrt{22}}{77}$	0	
	$\frac{5\sqrt{33}}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{22}}{77}$	0	0	0	0	$-\frac{3\sqrt{154}}{154}$	
	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	0	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{66}}{308}$	0	0	0	0	0	$-\frac{3\sqrt{22}}{77}$	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{462}}{308}$	0	0	0	0	0	$-\frac{3\sqrt{154}}{154}$	0	0	0	
838	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	0	$-\frac{\sqrt{154}i}{98}$	0	0	0	0	$-\frac{\sqrt{165}i}{154}$	0	$-\frac{5\sqrt{385}i}{539}$	0	0	0	0	0	0
	$\frac{\sqrt{154}i}{98}$	0	$\frac{\sqrt{385}i}{98}$	0	0	0	0	$\frac{13\sqrt{231}i}{1078}$	0	$\frac{\sqrt{1155}i}{539}$	0	0	0	0	0
	0	$-\frac{\sqrt{385}i}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{154}i}{2156}$	0	$\frac{\sqrt{2310}i}{308}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{385}i}{98}$	0	0	0	0	$-\frac{\sqrt{2310}i}{308}$	0	$\frac{\sqrt{154}i}{2156}$	0	0	0
	0	0	0	$\frac{\sqrt{385}i}{98}$	0	$\frac{\sqrt{154}i}{98}$	0	0	0	0	$-\frac{\sqrt{1155}i}{539}$	0	$-\frac{13\sqrt{231}i}{1078}$	0	0
	0	0	0	0	$-\frac{\sqrt{154}i}{98}$	0	0	0	0	0	$\frac{5\sqrt{385}i}{539}$	0	0	$\frac{\sqrt{165}i}{154}$	0
	$\frac{\sqrt{165}i}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{110}i}{154}$	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{231}i}{1078}$	0	0	0	0	$\frac{3\sqrt{110}i}{154}$	0	$\frac{3\sqrt{2310}i}{1078}$	0	0	0	0	0	0
	$\frac{5\sqrt{385}i}{539}$	0	$\frac{\sqrt{154}i}{2156}$	0	0	0	0	$-\frac{3\sqrt{2310}i}{1078}$	0	$\frac{9\sqrt{462}i}{1078}$	0	0	0	0	0
	0	$-\frac{\sqrt{1155}i}{539}$	0	$\frac{\sqrt{2310}i}{308}$	0	0	0	0	$-\frac{9\sqrt{462}i}{1078}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{2310}i}{308}$	0	$\frac{\sqrt{1155}i}{539}$	0	0	0	0	0	0	$-\frac{9\sqrt{462}i}{1078}$	0	0	0
	0	0	0	$-\frac{\sqrt{154}i}{2156}$	0	$-\frac{5\sqrt{385}i}{539}$	0	0	0	0	$\frac{9\sqrt{462}i}{1078}$	0	$-\frac{3\sqrt{2310}i}{1078}$	0	0
	0	0	0	0	$\frac{13\sqrt{231}i}{1078}$	0	0	0	0	0	$\frac{3\sqrt{2310}i}{1078}$	0	0	$\frac{3\sqrt{110}i}{154}$	0
	0	0	0	0	0	$-\frac{\sqrt{165}i}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{110}i}{154}$	0	0
839	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$	0	$-\frac{\sqrt{154}}{98}$	0	0	0	0	$\frac{\sqrt{165}}{154}$	0	$-\frac{5\sqrt{385}}{539}$	0	0	0	0	0	0
	$-\frac{\sqrt{154}}{98}$	0	$\frac{\sqrt{385}}{98}$	0	0	0	0	$-\frac{13\sqrt{231}}{1078}$	0	$\frac{\sqrt{1155}}{539}$	0	0	0	0	0
	0	$\frac{\sqrt{385}}{98}$	0	0	0	0	0	0	$\frac{\sqrt{154}}{2156}$	0	$\frac{\sqrt{2310}}{308}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{385}}{98}$	0	0	0	0	$\frac{\sqrt{2310}}{308}$	0	$\frac{\sqrt{154}}{2156}$	0	0	0
	0	0	0	$-\frac{\sqrt{385}}{98}$	0	$\frac{\sqrt{154}}{98}$	0	0	0	0	$\frac{\sqrt{1155}}{539}$	0	$-\frac{13\sqrt{231}}{1078}$	0	0
	0	0	0	0	$\frac{\sqrt{154}}{98}$	0	0	0	0	0	$-\frac{5\sqrt{385}}{539}$	0	$\frac{\sqrt{165}}{154}$	0	0
	$\frac{\sqrt{165}}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{110}}{154}$	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{231}}{1078}$	0	0	0	0	$-\frac{3\sqrt{110}}{154}$	0	$\frac{3\sqrt{2310}}{1078}$	0	0	0	0	0	0
	$-\frac{5\sqrt{385}}{539}$	0	$\frac{\sqrt{154}}{2156}$	0	0	0	0	$\frac{3\sqrt{2310}}{1078}$	0	$\frac{9\sqrt{462}}{1078}$	0	0	0	0	0
	0	$\frac{\sqrt{1155}}{539}$	0	$\frac{\sqrt{2310}}{308}$	0	0	0	0	$\frac{9\sqrt{462}}{1078}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{2310}}{308}$	0	$\frac{\sqrt{1155}}{539}$	0	0	0	0	0	$-\frac{9\sqrt{462}}{1078}$	0	0	0	0
	0	0	0	$\frac{\sqrt{154}}{2156}$	0	$-\frac{5\sqrt{385}}{539}$	0	0	0	0	$-\frac{9\sqrt{462}}{1078}$	0	$-\frac{3\sqrt{2310}}{1078}$	0	0
	0	0	0	0	$-\frac{13\sqrt{231}}{1078}$	0	0	0	0	0	$-\frac{3\sqrt{2310}}{1078}$	0	$\frac{3\sqrt{110}}{154}$	0	0
	0	0	0	0	0	$\frac{\sqrt{165}}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{110}}{154}$	0	0
840	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	0	0	0	0	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	$\frac{\sqrt{110}}{77}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	$\frac{2\sqrt{66}}{77}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{231}}{77}$	0	
	0	0	0	0	0	0	$-\frac{\sqrt{231}}{77}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	0	$-\frac{2\sqrt{66}}{77}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{11}}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{110}}{77}$	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{231}}{77}$	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	
	0	0	0	0	$-\frac{2\sqrt{66}}{77}$	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{110}}{77}$	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	
	0	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	
	$\frac{\sqrt{110}}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	0	0	0	
	0	$\frac{2\sqrt{66}}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{231}}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	
841	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(a)}(E_g, 2)$	0	0	0	0	$-\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{77}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{2\sqrt{66}i}{77}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}i}{77}$	
	0	0	0	0	0	0	$-\frac{\sqrt{231}i}{77}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{2\sqrt{66}i}{77}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{11}i}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{77}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{231}i}{77}$	0	0	0	0	0	0	$-\frac{3\sqrt{77}i}{154}$	0	0	0	
	0	0	0	0	$\frac{2\sqrt{66}i}{77}$	0	0	0	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{110}i}{77}$	0	0	0	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	$-\frac{3\sqrt{77}i}{154}$	0	0	
	0	0	0	0	0	0	$\frac{3\sqrt{77}i}{154}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{110}i}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0	0	0	0	0	
	0	$\frac{2\sqrt{66}i}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{231}i}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{77}i}{154}$	0	0	0	0	
842	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(a)}(E_g, 3)$	0	0	$\frac{3\sqrt{154}}{196}$	0	0	0	0	0	$\frac{5\sqrt{462}}{539}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{770}}{196}$	0	0	$-\frac{3\sqrt{66}}{154}$	0	0	$\frac{\sqrt{2310}}{1078}$	0	0	0	0	0
	$\frac{3\sqrt{154}}{196}$	0	0	0	$-\frac{\sqrt{770}}{196}$	0	0	$\frac{9\sqrt{231}}{1078}$	0	0	$-\frac{17\sqrt{77}}{1078}$	0	0	0	0
	0	$-\frac{\sqrt{770}}{196}$	0	0	0	$\frac{3\sqrt{154}}{196}$	0	0	$\frac{17\sqrt{77}}{1078}$	0	0	0	$-\frac{9\sqrt{231}}{1078}$	0	0
	0	0	$-\frac{\sqrt{770}}{196}$	0	0	0	0	0	$-\frac{\sqrt{2310}}{1078}$	0	0	0	$\frac{3\sqrt{66}}{154}$	0	0
	0	0	0	$\frac{3\sqrt{154}}{196}$	0	0	0	0	0	$-\frac{5\sqrt{462}}{539}$	0	0	0	0	0
	0	$-\frac{3\sqrt{66}}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{231}}{1078}$	0	0	0	0	0	$\frac{3\sqrt{77}}{1078}$	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{77}}{1078}$	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	$-\frac{6\sqrt{231}}{539}$	0	0	0	0
	$\frac{5\sqrt{462}}{539}$	0	0	0	$-\frac{\sqrt{2310}}{1078}$	0	0	$\frac{3\sqrt{77}}{1078}$	0	0	0	$-\frac{6\sqrt{231}}{539}$	0	0	0
	0	$\frac{\sqrt{2310}}{1078}$	0	0	0	$-\frac{5\sqrt{462}}{539}$	0	0	$-\frac{6\sqrt{231}}{539}$	0	0	0	$\frac{3\sqrt{77}}{1078}$	0	0
	0	0	$-\frac{17\sqrt{77}}{1078}$	0	0	0	0	0	$-\frac{6\sqrt{231}}{539}$	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0
	0	0	0	$-\frac{9\sqrt{231}}{1078}$	0	0	0	0	0	$\frac{3\sqrt{77}}{1078}$	0	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{66}}{154}$	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	0
843	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,2}^{(a)}(E_g, 3)$	0	0	$\frac{3\sqrt{154}i}{196}$	0	0	0	0	0	0	$\frac{5\sqrt{462}i}{539}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{770}i}{196}$	0	0	$\frac{3\sqrt{66}i}{154}$	0	0	0	$\frac{\sqrt{2310}i}{1078}$	0	0	0	0	0
	$-\frac{3\sqrt{154}i}{196}$	0	0	0	$-\frac{\sqrt{770}i}{196}$	0	0	$-\frac{9\sqrt{231}i}{1078}$	0	0	0	$-\frac{17\sqrt{77}i}{1078}$	0	0	0	0
	0	$\frac{\sqrt{770}i}{196}$	0	0	0	$\frac{3\sqrt{154}i}{196}$	0	0	$-\frac{17\sqrt{77}i}{1078}$	0	0	0	$-\frac{9\sqrt{231}i}{1078}$	0	0	0
	0	0	$\frac{\sqrt{770}i}{196}$	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{1078}$	0	0	0	$\frac{3\sqrt{66}i}{154}$	0	0
	0	0	0	$-\frac{3\sqrt{154}i}{196}$	0	0	0	0	0	$\frac{5\sqrt{462}i}{539}$	0	0	0	0	0	0
	0	$-\frac{3\sqrt{66}i}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{231}i}{1078}$	0	0	0	0	0	0	$\frac{3\sqrt{77}i}{1078}$	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{77}i}{1078}$	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0	0	$-\frac{6\sqrt{231}i}{539}$	0	0	0	0	0
	$-\frac{5\sqrt{462}i}{539}$	0	0	0	$-\frac{\sqrt{2310}i}{1078}$	0	0	$-\frac{3\sqrt{77}i}{1078}$	0	0	0	$-\frac{6\sqrt{231}i}{539}$	0	0	0	0
	0	$-\frac{\sqrt{2310}i}{1078}$	0	0	0	$-\frac{5\sqrt{462}i}{539}$	0	0	$\frac{6\sqrt{231}i}{539}$	0	0	0	$\frac{3\sqrt{77}i}{1078}$	0	0	0
	0	0	$\frac{17\sqrt{77}i}{1078}$	0	0	0	0	0	0	$\frac{6\sqrt{231}i}{539}$	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0
	0	0	0	$\frac{9\sqrt{231}i}{1078}$	0	0	0	0	0	0	$-\frac{3\sqrt{77}i}{1078}$	0	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{66}i}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0	0	0
844	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$														

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{1g}, 1)$	0 0 0 0 0 0 0 $-\frac{\sqrt{77}}{154}$ 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 0 $-\frac{5\sqrt{154}}{154}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{154}}{154}$ 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 0 $\frac{\sqrt{77}}{154}$ 0	
	0 0 0 0 0 0 $-\frac{\sqrt{462}}{924}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{77}}{154}$ 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 $-\frac{3\sqrt{462}}{308}$ 0 0 0 0 0 0	
	0 0 $-\frac{5\sqrt{154}}{154}$ 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 0 0 0	
	0 0 0 $\frac{5\sqrt{154}}{154}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{462}}{308}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{77}}{154}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}}{924}$	
845	symmetry	$\frac{\sqrt{462}(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{1g}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{42}}{14}$
	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 0 0 0 0 0 0 0 0 0 0 0 0 0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{42}}{14}$
	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	$-\frac{\sqrt{7}}{14}$
	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 0 0 0 0 0 0 0 0 0 0 0 0 0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0
846	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{1g}, 3)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{66}i}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{22}i}{44}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{231}i}{154}$ 0 0 0 0 0 $\frac{\sqrt{33}i}{22}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{33}i}{22}$ 0 0 0 0 0 $-\frac{\sqrt{231}i}{154}$	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}i}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{44}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{231}i}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{77}i}{77}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{33}i}{22}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{66}i}{44}$ $-\frac{\sqrt{77}i}{77}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{22}$ 0	
	$-\frac{\sqrt{66}i}{44}$ 0 0 0 0 0 0 $\frac{\sqrt{11}i}{22}$ 0 0 0 0 0 $-\frac{\sqrt{77}i}{77}$	
	0 $\frac{3\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{33}i}{22}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{231}i}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{77}i}{77}$ 0 0 0	
$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$		
847	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{2g}, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{14}$	
	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 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{14}$ 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 $\frac{\sqrt{7}i}{14}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{42}i}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0	
848	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{44}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 $\frac{\sqrt{231}}{154}$	
	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{44}$ 0 0 0 0	
	0 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{77}}{77}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0	
	0 0 0 0 $\frac{3\sqrt{22}}{44}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{66}}{44}$ $-\frac{\sqrt{77}}{77}$ 0 0 0 0 0 $-\frac{\sqrt{11}}{22}$ 0	
	$-\frac{\sqrt{66}}{44}$ 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0 0 0 $\frac{\sqrt{77}}{77}$	
	0 $\frac{3\sqrt{22}}{44}$ 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 $-\frac{\sqrt{11}}{22}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $\frac{\sqrt{77}}{77}$ 0 0 0	
849	symmetry	$\frac{3\sqrt{154}yz(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 1)$	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 $-\frac{\sqrt{70}i}{28}$	
	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 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 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 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 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 $-\frac{\sqrt{7}i}{14}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 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	
	$-\frac{\sqrt{2}i}{4}$ 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 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0	
850	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(a)}(E_g, 1)$	0 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 $\frac{\sqrt{70}}{28}$
	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 $\frac{\sqrt{70}}{28}$ 0 0 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 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 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 $\frac{\sqrt{7}}{14}$
	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 0	0 0
	0 0 0 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 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0	0 0
851	symmetry	$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 $\frac{\sqrt{231}i}{924}$ 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0 $-\frac{5\sqrt{33}i}{132}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{110}i}{44}$ 0 $\frac{5\sqrt{66}i}{132}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{66}i}{132}$ 0 $-\frac{\sqrt{110}i}{44}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{33}i}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{231}i}{924}$ 0 0	
	$-\frac{\sqrt{231}i}{924}$ 0 0 0 0 0 0 $\frac{\sqrt{154}i}{308}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 $-\frac{\sqrt{154}i}{308}$ 0 $-\frac{\sqrt{66}i}{66}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{110}i}{44}$ 0 0 0 0 $\frac{\sqrt{66}i}{66}$ 0 $\frac{\sqrt{330}i}{132}$ 0 0 0 0 0 0	
	0 $\frac{5\sqrt{33}i}{132}$ 0 $\frac{5\sqrt{66}i}{132}$ 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 0 0 0 0 0 0	
	0 0 $-\frac{5\sqrt{66}i}{132}$ 0 $-\frac{5\sqrt{33}i}{132}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 0	
	0 0 0 $\frac{\sqrt{110}i}{44}$ 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{132}$ 0 $\frac{\sqrt{66}i}{66}$ 0	
	0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 $-\frac{\sqrt{154}i}{308}$ 0	
	0 0 0 0 0 $\frac{\sqrt{231}i}{924}$ 0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{308}$ 0	
852	symmetry	$-\frac{\sqrt{21}xz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,2}^{(a)}(E_g, 2)$	0	0	0	0	0	0	$-\frac{\sqrt{231}}{924}$	0	$\frac{\sqrt{11}}{44}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{132}$	0	$-\frac{5\sqrt{33}}{132}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{110}}{44}$	0	$\frac{5\sqrt{66}}{132}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{66}}{132}$	0	$-\frac{\sqrt{110}}{44}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{132}$	0	$\frac{\sqrt{165}}{132}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{11}}{44}$	0	$-\frac{\sqrt{231}}{924}$	0
	$-\frac{\sqrt{231}}{924}$	0	0	0	0	0	0	$\frac{\sqrt{154}}{308}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{165}}{132}$	0	0	0	0	$\frac{\sqrt{154}}{308}$	0	$-\frac{\sqrt{66}}{66}$	0	0	0	0	0	0
	$\frac{\sqrt{11}}{44}$	0	$-\frac{\sqrt{110}}{44}$	0	0	0	0	$-\frac{\sqrt{66}}{66}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	0	0
	0	$-\frac{5\sqrt{33}}{132}$	0	$\frac{5\sqrt{66}}{132}$	0	0	0	0	$\frac{\sqrt{330}}{132}$	0	0	0	0	0	0
	0	0	$\frac{5\sqrt{66}}{132}$	0	$-\frac{5\sqrt{33}}{132}$	0	0	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0
	0	0	0	$-\frac{\sqrt{110}}{44}$	0	$\frac{\sqrt{11}}{44}$	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	$\frac{\sqrt{66}}{66}$	0	0
	0	0	0	0	$\frac{\sqrt{165}}{132}$	0	0	0	0	0	0	$\frac{\sqrt{66}}{66}$	0	$-\frac{\sqrt{154}}{308}$	0
	0	0	0	0	0	$-\frac{\sqrt{231}}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{154}}{308}$	0	0
853	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 3)$	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 $\frac{\sqrt{55}}{22}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{770}}{154}$	
	0 0 0 0 0 0 $\frac{\sqrt{770}}{154}$ 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 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{770}}{154}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$	
	0 0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{770}}{154}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 0 0 0 0	
854	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,2}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{33}i}{22}$	0	0											
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		$-\frac{\sqrt{55}i}{22}$	0											
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			$\frac{\sqrt{770}i}{154}$	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				$\frac{\sqrt{770}i}{154}$	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					$-\frac{\sqrt{55}i}{22}$	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						$\frac{\sqrt{33}i}{22}$	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							$\frac{\sqrt{2310}i}{308}$	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0								$-\frac{\sqrt{22}i}{44}$	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									$-\frac{\sqrt{22}i}{44}$	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0										$\frac{\sqrt{2310}i}{308}$	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0											$-\frac{\sqrt{2310}i}{308}$	0	0	0
	$-\frac{\sqrt{33}i}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0												0	0	0
	0 $\frac{\sqrt{55}i}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0												0	0	0
	0 0 $-\frac{\sqrt{770}i}{154}$ 0 0 0 0 0 0 0 0 0 0 0 0 0												0	0	0
855	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 4)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{66}$ 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{462}}{462}$ 0 0 0 $\frac{\sqrt{330}}{66}$ 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{33}$ 0 0 0 $-\frac{\sqrt{11}}{11}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{11}$ 0 0 0 $\frac{\sqrt{33}}{33}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{66}$ 0 0 0 $-\frac{\sqrt{462}}{462}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{66}$ 0 0 0 0	
	0 $\frac{\sqrt{462}}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{1155}}{462}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{33}}{33}$ 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{11}}{11}$ 0 0 $-\frac{\sqrt{1155}}{462}$ 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0	
	$-\frac{\sqrt{66}}{66}$ 0 0 0 $-\frac{\sqrt{330}}{66}$ 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0	
	0 $\frac{\sqrt{330}}{66}$ 0 0 0 $\frac{\sqrt{66}}{66}$ 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 $\frac{\sqrt{11}}{22}$ 0	
	0 0 $-\frac{\sqrt{11}}{11}$ 0 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 $-\frac{\sqrt{1155}}{462}$	
	0 0 0 $\frac{\sqrt{33}}{33}$ 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{462}}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{1155}}{462}$ 0 0	
856	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													
$\mathbb{Q}_{6,2}^{(a)}(E_g, 4)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0 0 0 0														
	0 0 0 0 0 0 $-\frac{\sqrt{462}i}{462}$ 0 0 0 $\frac{\sqrt{330}i}{66}$ 0 0 0 0														
	0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 0 0 $-\frac{\sqrt{11}i}{11}$ 0 0 0 0														
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{11}$ 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 0														
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{66}$ 0 0 0 $-\frac{\sqrt{462}i}{462}$ 0														
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0 0 0														
	0 $\frac{\sqrt{462}i}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{1155}i}{462}$ 0 0 0 0 0 0														
	0 0 $-\frac{\sqrt{33}i}{33}$ 0 0 0 0 0 0 $\frac{\sqrt{11}i}{22}$ 0 0 0 0 0														
	0 0 0 $\frac{\sqrt{11}i}{11}$ 0 0 $\frac{\sqrt{1155}i}{462}$ 0 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 0														
	$\frac{\sqrt{66}i}{66}$ 0 0 0 $-\frac{\sqrt{330}i}{66}$ 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0														
	0 $-\frac{\sqrt{330}i}{66}$ 0 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 $\frac{\sqrt{11}i}{22}$ 0														
	0 0 $\frac{\sqrt{11}i}{11}$ 0 0 0 0 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 $-\frac{\sqrt{1155}i}{462}$ 0														
	0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{22}$ 0 0 0 0														
	0 0 0 0 $\frac{\sqrt{462}i}{462}$ 0 0 0 0 0 0 $\frac{\sqrt{1155}i}{462}$ 0 0 0														
857	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$	$-\frac{5\sqrt{21}}{147}$	0	0	0	0	0	0	$-\frac{15\sqrt{14}}{196}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{21}}{147}$	0	0	0	0	0	0	$-\frac{3\sqrt{210}}{196}$	0	0	0	0	0	0
	0	0	$\frac{4\sqrt{21}}{147}$	0	0	0	0	0	0	$-\frac{3\sqrt{7}}{98}$	0	0	0	0	0
	0	0	0	$\frac{4\sqrt{21}}{147}$	0	0	0	0	0	$\frac{3\sqrt{7}}{98}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{21}}{147}$	0	0	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{21}}{147}$	0	0	0	0	0	$\frac{15\sqrt{14}}{196}$	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{21}}{14}$	0	0	0	0	0	0	0	0
	$-\frac{15\sqrt{14}}{196}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	0	0	0	0	0
	0	$-\frac{3\sqrt{210}}{196}$	0	0	0	0	0	0	$-\frac{3\sqrt{21}}{98}$	0	0	0	0	0	0
	0	0	$-\frac{3\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{21}}{98}$	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{21}}{98}$	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0	0	0	0	0	$-\frac{3\sqrt{21}}{98}$	0	0	0
	0	0	0	0	0	$\frac{15\sqrt{14}}{196}$	0	0	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{21}}{14}$	0	0	0
$\sqrt{3}yz$															

858 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{35}i}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{56} \quad 0 \quad \frac{15\sqrt{14}i}{392} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{35}i}{49}$	$0 \quad \frac{\sqrt{14}i}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{392} \quad 0 \quad \frac{11\sqrt{42}i}{392} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$- \frac{\sqrt{14}i}{49} \quad 0 \quad - \frac{3\sqrt{35}i}{196} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad - \frac{\sqrt{14}i}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{\sqrt{21}i}{28} \quad 0 \quad \frac{3\sqrt{35}i}{196} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{49} \quad 0 \quad - \frac{\sqrt{35}i}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{11\sqrt{42}i}{392} \quad 0 \quad - \frac{\sqrt{210}i}{392} \quad 0$
	$-\frac{5\sqrt{6}i}{56}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{3i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$- \frac{\sqrt{210}i}{392} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3i}{14} \quad 0 \quad - \frac{2\sqrt{21}i}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{15\sqrt{14}i}{392}$	$0 \quad \frac{3\sqrt{35}i}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{2\sqrt{21}i}{49} \quad 0 \quad - \frac{\sqrt{105}i}{98} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$- \frac{11\sqrt{42}i}{392} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{98} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad - \frac{\sqrt{21}i}{28} \quad 0 \quad \frac{11\sqrt{42}i}{392} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{\sqrt{105}i}{98} \quad 0 \quad \frac{2\sqrt{21}i}{49} \quad 0$
	0	$0 \quad 0 \quad 0 \quad - \frac{3\sqrt{35}i}{196} \quad 0 \quad \frac{15\sqrt{14}i}{392} \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{\sqrt{105}i}{98} \quad 0 \quad - \frac{2\sqrt{21}i}{49} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{392} \quad 0 \quad - \frac{3i}{14} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad - \frac{3i}{14} \quad 0$
		$-\sqrt{3}xz$

859 symmetry

 $-\sqrt{3}xz$ 

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{35}}{49}$	0	0	0	0	$-\frac{5\sqrt{6}}{56}$	0	$\frac{15\sqrt{14}}{392}$	0	0	0	0	0	0	0
	$\frac{\sqrt{35}}{49}$	0	$\frac{\sqrt{14}}{49}$	0	0	0	0	$-\frac{\sqrt{210}}{392}$	0	$\frac{11\sqrt{42}}{392}$	0	0	0	0	0	0
	0	$\frac{\sqrt{14}}{49}$	0	0	0	0	0	0	$\frac{3\sqrt{35}}{196}$	0	$\frac{\sqrt{21}}{28}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{14}}{49}$	0	0	0	0	$\frac{\sqrt{21}}{28}$	0	$\frac{3\sqrt{35}}{196}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{14}}{49}$	0	$-\frac{\sqrt{35}}{49}$	0	0	0	0	$\frac{11\sqrt{42}}{392}$	0	$-\frac{\sqrt{210}}{392}$	0	0	0
	0	0	0	0	$-\frac{\sqrt{35}}{49}$	0	0	0	0	0	$\frac{15\sqrt{14}}{392}$	0	$-\frac{5\sqrt{6}}{56}$	0	0	0
	$-\frac{5\sqrt{6}}{56}$	0	0	0	0	0	0	$-\frac{3}{14}$	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{210}}{392}$	0	0	0	0	$-\frac{3}{14}$	0	$-\frac{2\sqrt{21}}{49}$	0	0	0	0	0	0	0
	$\frac{15\sqrt{14}}{392}$	0	$\frac{3\sqrt{35}}{196}$	0	0	0	0	$-\frac{2\sqrt{21}}{49}$	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0	0
	0	$\frac{11\sqrt{42}}{392}$	0	$\frac{\sqrt{21}}{28}$	0	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{21}}{28}$	0	$\frac{11\sqrt{42}}{392}$	0	0	0	0	0	$\frac{\sqrt{105}}{98}$	0	$\frac{2\sqrt{21}}{49}$	0	0	0
	0	0	0	$\frac{3\sqrt{35}}{196}$	0	$\frac{15\sqrt{14}}{392}$	0	0	0	0	$\frac{\sqrt{105}}{98}$	0	$\frac{2\sqrt{21}}{49}$	0	0	0
	0	0	0	0	$-\frac{\sqrt{210}}{392}$	0	0	0	0	0	$\frac{2\sqrt{21}}{49}$	0	$\frac{3}{14}$	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{6}}{56}$	0	0	0	0	0	0	$\frac{3}{14}$	0	0	0
$\frac{\sqrt{3}(x-y)(x+y)}{2}$																

860 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 2)$	0	0	$-\frac{\sqrt{70}}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{210}}{196}$	0	0	0	0	0
	0	0	0	$-\frac{3\sqrt{14}}{98}$	0	0	$\frac{\sqrt{30}}{28}$	0	0	0	$-\frac{\sqrt{42}}{49}$	0	0	0	0
	$-\frac{\sqrt{70}}{98}$	0	0	0	$-\frac{3\sqrt{14}}{98}$	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	$-\frac{3\sqrt{35}}{98}$	0	0	0
	0	$-\frac{3\sqrt{14}}{98}$	0	0	0	$-\frac{\sqrt{70}}{98}$	0	0	$\frac{3\sqrt{35}}{98}$	0	0	0	$-\frac{\sqrt{105}}{49}$	0	0
	0	0	$-\frac{3\sqrt{14}}{98}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{49}$	0	0	0	0	$-\frac{\sqrt{30}}{28}$
	0	0	0	$-\frac{\sqrt{70}}{98}$	0	0	0	0	0	0	$\frac{\sqrt{210}}{196}$	0	0	0	0
	0	$\frac{\sqrt{30}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{3}}{14}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	0	0	0	$\frac{3\sqrt{35}}{98}$	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{35}}{98}$	0	0	$\frac{\sqrt{3}}{14}$	0	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	0
	$-\frac{\sqrt{210}}{196}$	0	0	0	$\frac{\sqrt{42}}{49}$	0	0	$\frac{3\sqrt{35}}{98}$	0	0	0	$\frac{\sqrt{105}}{49}$	0	0	0
	0	$-\frac{\sqrt{42}}{49}$	0	0	0	$\frac{\sqrt{210}}{196}$	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	$\frac{3\sqrt{35}}{98}$	0	0
	0	0	$-\frac{3\sqrt{35}}{98}$	0	0	0	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	$\frac{\sqrt{3}}{14}$	0	0
	0	0	0	$-\frac{\sqrt{105}}{49}$	0	0	0	0	0	$\frac{3\sqrt{35}}{98}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{30}}{28}$	0	0	0	0	0	$\frac{\sqrt{3}}{14}$	0	0	0	0

861 symmetry

 $-\sqrt{3}xy$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 2)$	0 0 $-\frac{\sqrt{70}i}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{196}$ 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{14}i}{98}$ 0 0 $-\frac{\sqrt{30}i}{28}$ 0 0 0 $-\frac{\sqrt{42}i}{49}$ 0 0 0	
	$\frac{\sqrt{70}i}{98}$ 0 0 0 $-\frac{3\sqrt{14}i}{98}$ 0 0 $-\frac{\sqrt{105}i}{49}$ 0 0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0	
	0 $\frac{3\sqrt{14}i}{98}$ 0 0 0 $-\frac{\sqrt{70}i}{98}$ 0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0 0 $-\frac{\sqrt{105}i}{49}$ 0	
	0 0 $\frac{3\sqrt{14}i}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{49}$ 0 0 0 $-\frac{\sqrt{30}i}{28}$	
	0 0 0 $\frac{\sqrt{70}i}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{196}$ 0 0 0	
	0 $\frac{\sqrt{30}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{14}$ 0 0 0 0	
	0 0 $\frac{\sqrt{105}i}{49}$ 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{98}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{35}i}{98}$ 0 0 $-\frac{\sqrt{3}i}{14}$ 0 0 0 $\frac{\sqrt{105}i}{49}$ 0 0	
	$\frac{\sqrt{210}i}{196}$ 0 0 0 $\frac{\sqrt{42}i}{49}$ 0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0 0 $\frac{\sqrt{105}i}{49}$ 0	
	0 $\frac{\sqrt{42}i}{49}$ 0 0 0 $\frac{\sqrt{210}i}{196}$ 0 0 $-\frac{\sqrt{105}i}{49}$ 0 0 0 $\frac{3\sqrt{35}i}{98}$ 0	
	0 0 0 $\frac{3\sqrt{35}i}{98}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{49}$ 0 0 0 $\frac{\sqrt{3}i}{14}$	
	0 0 0 $\frac{\sqrt{105}i}{49}$ 0 0 0 0 0 0 $-\frac{3\sqrt{35}i}{98}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{30}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{14}$ 0 0	
862	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$	$\frac{\sqrt{21}}{147}$	0	0	0	0	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{21}}{49}$	0	0	0	0	0	0	$-\frac{2\sqrt{210}}{147}$	0	0	0	0	0	0
	0	0	$\frac{2\sqrt{21}}{147}$	0	0	0	0	0	0	$-\frac{5\sqrt{7}}{98}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{21}}{147}$	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{21}}{49}$	0	0	0	0	0	$\frac{2\sqrt{210}}{147}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{21}}{147}$	0	0	0	0	0	$-\frac{5\sqrt{14}}{98}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	0	0	0	0	0	0	0
	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0	0	$\frac{13\sqrt{21}}{147}$	0	0	0	0	0	0	0
	0	$-\frac{2\sqrt{210}}{147}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{49}$	0	0	0	0	0	0
	0	0	$-\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{3\sqrt{21}}{49}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{3\sqrt{21}}{49}$	0	0	0	0
	0	0	0	0	$\frac{2\sqrt{210}}{147}$	0	0	0	0	0	$\frac{\sqrt{21}}{49}$	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{14}}{98}$	0	0	0	0	0	$\frac{13\sqrt{21}}{147}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	0
863	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	0 0 0 $-\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 0 $-\frac{5i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{3}i}{21}$ $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{56}$ 0	
	$\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 $\frac{5i}{28}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 0 $\frac{2\sqrt{6}i}{21}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{5i}{28}$ $-\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 $-\frac{2\sqrt{6}i}{21}$ 0	
	$\frac{5i}{28}$ 0 0 0 0 0 0 $-\frac{2\sqrt{6}i}{21}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$	
	0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{2}i}{56}$ 0 0 0 0 0 0 $\frac{2\sqrt{6}i}{21}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0	
$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$		
864	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,-1;a)}(A_{2g})$	0 0 0 $\frac{\sqrt{3}}{21}$ 0 0 0 0 0 0 0 0 $\frac{5}{28}$ 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{12}$ 0 0 0	0 0 0 0 0 $-\frac{\sqrt{3}}{21}$ $-\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{56}$ 0	$\frac{\sqrt{3}}{21}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0	0 0 $-\frac{\sqrt{3}}{21}$ 0 0 0 0 0 0 0 $\frac{5}{28}$ 0 0 0 0 0	0 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{21}$ 0 0 0 0 0	0 0 0 $-\frac{\sqrt{2}}{56}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0 0 0 0	0 0 0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 $-\frac{\sqrt{42}}{21}$ 0 0 0 0 0 0 $\frac{2\sqrt{6}}{21}$ 0	$\frac{5}{28}$ 0 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0 0 0 0 0 $\frac{\sqrt{42}}{21}$	0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{2}}{56}$ 0 0 0 0 0 0 0 $\frac{2\sqrt{6}}{21}$ 0 0 0 0	0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{21}$ 0 0 0 0	
	865 symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{42}i}{147}$	0	0	0	0	$-\frac{\sqrt{5}i}{28}$	0	$-\frac{5\sqrt{105}i}{294}$	0	0	0	0	0	0
	$\frac{\sqrt{42}i}{147}$	0	$\frac{\sqrt{105}i}{147}$	0	0	0	0	$\frac{13\sqrt{7}i}{196}$	0	$\frac{\sqrt{35}i}{98}$	0	0	0	0	0
	0	$-\frac{\sqrt{105}i}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{1176}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{105}i}{147}$	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{42}i}{1176}$	0	0	0
	0	0	0	$\frac{\sqrt{105}i}{147}$	0	$\frac{\sqrt{42}i}{147}$	0	0	0	0	$-\frac{\sqrt{35}i}{98}$	0	$-\frac{13\sqrt{7}i}{196}$	0	0
	0	0	0	0	$-\frac{\sqrt{42}i}{147}$	0	0	0	0	0	$\frac{5\sqrt{105}i}{294}$	0	0	$\frac{\sqrt{5}i}{28}$	0
	$\frac{\sqrt{5}i}{28}$	0	0	0	0	0	0	$\frac{\sqrt{30}i}{21}$	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{7}i}{196}$	0	0	0	0	$-\frac{\sqrt{30}i}{21}$	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	0	0	0
	$\frac{5\sqrt{105}i}{294}$	0	$\frac{\sqrt{42}i}{1176}$	0	0	0	0	$\frac{\sqrt{70}i}{49}$	0	$-\frac{3\sqrt{14}i}{49}$	0	0	0	0	0
	0	$-\frac{\sqrt{35}i}{98}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	$\frac{3\sqrt{14}i}{49}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{35}i}{98}$	0	0	0	0	0	$\frac{3\sqrt{14}i}{49}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{42}i}{1176}$	0	$-\frac{5\sqrt{105}i}{294}$	0	0	0	0	$-\frac{3\sqrt{14}i}{49}$	0	$\frac{\sqrt{70}i}{49}$	0	0
	0	0	0	0	$\frac{13\sqrt{7}i}{196}$	0	0	0	0	0	$-\frac{\sqrt{70}i}{49}$	0	$-\frac{\sqrt{30}i}{21}$	0	0
	0	0	0	0	0	$-\frac{\sqrt{5}i}{28}$	0	0	0	0	0	$\frac{\sqrt{30}i}{21}$	0	0	0
866	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{42}}{147}$	0	0	0	0	$\frac{\sqrt{5}}{28}$	0	$-\frac{5\sqrt{105}}{294}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{42}}{147}$	0	$\frac{\sqrt{105}}{147}$	0	0	0	0	$-\frac{13\sqrt{7}}{196}$	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	0
	0	$\frac{\sqrt{105}}{147}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{1176}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{105}}{147}$	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{42}}{1176}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{105}}{147}$	0	$\frac{\sqrt{42}}{147}$	0	0	0	0	$\frac{\sqrt{35}}{98}$	0	$-\frac{13\sqrt{7}}{196}$	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{147}$	0	0	0	0	0	$-\frac{5\sqrt{105}}{294}$	0	$\frac{\sqrt{5}}{28}$			
	$\frac{\sqrt{5}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{30}}{21}$	0	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{7}}{196}$	0	0	0	0	$\frac{\sqrt{30}}{21}$	0	$-\frac{\sqrt{70}}{49}$	0	0	0	0	0	0	0
	$-\frac{5\sqrt{105}}{294}$	0	$\frac{\sqrt{42}}{1176}$	0	0	0	0	$-\frac{\sqrt{70}}{49}$	0	$-\frac{3\sqrt{14}}{49}$	0	0	0	0	0	0
	0	$\frac{\sqrt{35}}{98}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	$-\frac{3\sqrt{14}}{49}$	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	$\frac{3\sqrt{14}}{49}$	0	$\frac{\sqrt{70}}{49}$	0	0	0
	0	0	0	$\frac{\sqrt{42}}{1176}$	0	$-\frac{5\sqrt{105}}{294}$	0	0	0	0	$\frac{3\sqrt{14}}{49}$	0	$\frac{\sqrt{70}}{49}$	0	$\frac{\sqrt{70}}{21}$	0
	0	0	0	0	$-\frac{13\sqrt{7}}{196}$	0	0	0	0	0	$\frac{\sqrt{70}}{49}$	0	$-\frac{\sqrt{30}}{21}$	0	$-\frac{\sqrt{30}}{21}$	0
867	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	0	0	0	0	$\frac{\sqrt{3}}{21}$	0	0	0	0	0	0	$\frac{\sqrt{30}}{42}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{3}}{21}$	0	0	0	0	0	0	$\frac{\sqrt{2}}{7}$	0	
	0	0	0	0	0	0	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	
	$\frac{\sqrt{3}}{21}$	0	0	0	0	0	0	$-\frac{\sqrt{2}}{7}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{3}}{21}$	0	0	0	0	0	0	$-\frac{\sqrt{30}}{42}$	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{7}}{14}$	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{2}}{7}$	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{30}}{42}$	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	
	0	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{30}}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{2}}{7}$	0	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{7}}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{21}}{21}$	0	0	0	0	

868 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 2)$	0	0 0 0 0 $-\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{42}$ 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{7}$ 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 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0
	$\frac{\sqrt{3}i}{21}$	0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{7}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}i}{21}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{42}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{21}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{2}i}{7}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{7}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{30}i}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{5}i}{7}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{21}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 0 0
	$\frac{\sqrt{30}i}{42}$	0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{7}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{2}i}{7}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{7}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 0
869	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 3)$	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{210}}{294}$	0	0	$-\frac{3\sqrt{2}}{28}$	0	0	$\frac{\sqrt{70}}{196}$	0	0	0	0	0
	$\frac{\sqrt{42}}{98}$	0	0	0	$-\frac{\sqrt{210}}{294}$	0	0	$\frac{9\sqrt{7}}{196}$	0	0	$-\frac{17\sqrt{21}}{588}$	0	0	0	0
	0	$-\frac{\sqrt{210}}{294}$	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	$\frac{17\sqrt{21}}{588}$	0	0	0	$-\frac{9\sqrt{7}}{196}$	0	0
	0	0	$-\frac{\sqrt{210}}{294}$	0	0	0	0	0	$-\frac{\sqrt{70}}{196}$	0	0	0	$\frac{3\sqrt{2}}{28}$	0	0
	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	$-\frac{5\sqrt{14}}{98}$	0	0	0	0	0
	0	$-\frac{3\sqrt{2}}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{7}}{196}$	0	0	0	0	0	$-\frac{\sqrt{21}}{147}$	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{21}}{588}$	0	0	$-\frac{\sqrt{5}}{7}$	0	0	$\frac{4\sqrt{7}}{49}$	0	0	0	0	0
	$\frac{5\sqrt{14}}{98}$	0	0	0	$-\frac{\sqrt{70}}{196}$	0	0	$-\frac{\sqrt{21}}{147}$	0	0	$\frac{4\sqrt{7}}{49}$	0	0	0	0
	0	$\frac{\sqrt{70}}{196}$	0	0	0	$-\frac{5\sqrt{14}}{98}$	0	0	$\frac{4\sqrt{7}}{49}$	0	0	0	$-\frac{\sqrt{21}}{147}$	0	0
	0	0	$-\frac{17\sqrt{21}}{588}$	0	0	0	0	0	$\frac{4\sqrt{7}}{49}$	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0
	0	0	0	$-\frac{9\sqrt{7}}{196}$	0	0	0	0	0	$-\frac{\sqrt{21}}{147}$	0	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{2}}{28}$	0	0	0	0	0	$-\frac{\sqrt{5}}{7}$	0	0	0	0
870	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 3)$	0	0	$\frac{\sqrt{42}i}{98}$	0	0	0	0	0	$\frac{5\sqrt{14}i}{98}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{210}i}{294}$	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	$\frac{\sqrt{70}i}{196}$	0	0	0	0	0
	$-\frac{\sqrt{42}i}{98}$	0	0	0	$-\frac{\sqrt{210}i}{294}$	0	0	$-\frac{9\sqrt{7}i}{196}$	0	0	$-\frac{17\sqrt{21}i}{588}$	0	0	0	0
	0	$\frac{\sqrt{210}i}{294}$	0	0	0	$\frac{\sqrt{42}i}{98}$	0	0	$-\frac{17\sqrt{21}i}{588}$	0	0	0	$-\frac{9\sqrt{7}i}{196}$	0	0
	0	0	$\frac{\sqrt{210}i}{294}$	0	0	0	0	0	$\frac{\sqrt{70}i}{196}$	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0
	0	0	0	$-\frac{\sqrt{42}i}{98}$	0	0	0	0	0	$\frac{5\sqrt{14}i}{98}$	0	0	0	0	0
	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{5}i}{7}$	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{7}i}{196}$	0	0	0	0	0	$-\frac{\sqrt{21}i}{147}$	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{21}i}{588}$	0	0	$\frac{\sqrt{5}i}{7}$	0	0	0	$\frac{4\sqrt{7}i}{49}$	0	0	0	0
	$-\frac{5\sqrt{14}i}{98}$	0	0	0	$-\frac{\sqrt{70}i}{196}$	0	0	$\frac{\sqrt{21}i}{147}$	0	0	0	$\frac{4\sqrt{7}i}{49}$	0	0	0
	0	$-\frac{\sqrt{70}i}{196}$	0	0	0	$-\frac{5\sqrt{14}i}{98}$	0	0	$-\frac{4\sqrt{7}i}{49}$	0	0	0	$-\frac{\sqrt{21}i}{147}$	0	0
	0	0	$\frac{17\sqrt{21}i}{588}$	0	0	0	0	0	$-\frac{4\sqrt{7}i}{49}$	0	0	0	$-\frac{\sqrt{5}i}{7}$	0	0
	0	0	0	$\frac{9\sqrt{7}i}{196}$	0	0	0	0	0	$\frac{\sqrt{21}i}{147}$	0	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	$\frac{\sqrt{5}i}{7}$	0	0	0	0
871	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 1)$	0 0 0 0 0 0 0 $-\frac{\sqrt{462}}{924}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{770}}{308}$ 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 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{770}}{308}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{462}}{924}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{77}}{154}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{462}}{924}$ 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{154}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{770}}{308}$ 0 0 0 0 0 0 $\frac{9\sqrt{77}}{154}$ 0 0 0 0 0 0	
	0 0 $-\frac{5\sqrt{231}}{462}$ 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{154}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{231}}{462}$ 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{154}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{770}}{308}$ 0 0 0 0 0 0 $\frac{9\sqrt{77}}{154}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{462}}{924}$ 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{154}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{77}}{154}$	
872	symmetry	$\frac{\sqrt{462}(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 2) & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
873	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 3)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0													
	0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{308}$ 0 0 0 0 0 $\frac{\sqrt{22}i}{44}$ 0	0 0 0 0 0 0 0 $-\frac{\sqrt{22}i}{44}$ 0 0 0 0 $-\frac{\sqrt{154}i}{308}$													
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 0 0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0													
	0 0 $-\frac{\sqrt{154}i}{308}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{77}$ 0 0 0 0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{77}$ 0 0 0 0													
	0 0 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 $\frac{\sqrt{66}i}{22}$ 0 0 0 0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{22}$ 0 0 0 0													
	0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ $\frac{\sqrt{462}i}{77}$ 0 0 0 0 $-\frac{\sqrt{66}i}{22}$													
	$-\frac{\sqrt{11}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{462}i}{77}$	0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{22}$ 0 0 0 0 0 0													
	0 $\frac{\sqrt{33}i}{44}$ 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 $-\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 $\frac{\sqrt{66}i}{22}$ 0 0 0 0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{77}$ 0 0 0 0													
	0 0 0 $\frac{\sqrt{154}i}{308}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{77}$ 0 0 0 0	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$													

874 symmetry

continued ...

Table 10

No.	multipole	matrix													
		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	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	$\frac{\sqrt{7}i}{14}$	0	0	0	0	0	0	0
		0	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{14}$	0	
		0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{14}$	
		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	0	0	0	$\frac{\sqrt{42}i}{14}$	0	0	0	0	0	0	0
		$-\frac{\sqrt{7}i}{14}$	0	0	0	0	0	$\frac{\sqrt{42}i}{14}$	0	0	0	0	0	0	0
875	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 - $\frac{\sqrt{11}}{44}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{44}$ 0 0 0														
	0 0 0 0 0 0 $\frac{\sqrt{154}}{308}$ 0 0 0 0 0 0 - $\frac{\sqrt{22}}{44}$ 0														
	0 0 0 0 0 0 0 0 - $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 $\frac{\sqrt{154}}{308}$														
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{44}$ 0 0 0 0 0														
	0 0 0 0 0 0 0 0 0 0 - $\frac{\sqrt{11}}{44}$ 0 0 0 0														
	0 0 $\frac{\sqrt{154}}{308}$ 0 0 0 0 0 0 0 $\frac{\sqrt{462}}{77}$ 0 0 0 0														
	0 0 0 - $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 0 0 - $\frac{\sqrt{66}}{22}$ 0 0 0														
	0 0 0 0 $\frac{\sqrt{33}}{44}$ 0 0 0 0 0 0 0 0 0 0														
	0 0 0 0 0 0 - $\frac{\sqrt{11}}{44}$ $\frac{\sqrt{462}}{77}$ 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0														
	- $\frac{\sqrt{11}}{44}$ 0 0 0 0 0 0 0 - $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 - $\frac{\sqrt{462}}{77}$														
	0 $\frac{\sqrt{33}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 - $\frac{\sqrt{22}}{44}$ 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0														
	0 0 0 $\frac{\sqrt{154}}{308}$ 0 0 0 0 0 0 0 - $\frac{\sqrt{462}}{77}$ 0 0 0														
876	symmetry	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 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 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
877	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{3}}{12} 0$
	0 0 0 0 0 0 0 0 0 0 0 0 0	$0 \frac{\sqrt{105}}{84}$
	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 $\frac{\sqrt{105}}{84}$ 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 $-\frac{\sqrt{3}}{12}$ 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 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{42}}{14}$ 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 $-\frac{\sqrt{3}}{12}$ 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 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{14}$ 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}}{12}$ 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 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{14}$ 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
878	symmetry	$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 2)$	0 0 0 0 0 0 $\frac{\sqrt{154}i}{1848}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{110}i}{264}$ 0 $-\frac{5\sqrt{22}i}{264}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{165}i}{132}$ 0 $\frac{5\sqrt{11}i}{132}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{11}i}{132}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{22}i}{264}$ 0 $\frac{\sqrt{110}i}{264}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{154}i}{1848}$ 0	
	$-\frac{\sqrt{154}i}{1848}$ 0 0 0 0 0 0 $-\frac{\sqrt{231}i}{154}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{110}i}{264}$ 0 0 0 0 $\frac{\sqrt{231}i}{154}$ 0 $\frac{\sqrt{11}i}{11}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 $-\frac{\sqrt{11}i}{11}$ 0 $-\frac{\sqrt{55}i}{22}$ 0 0 0 0 0	
	0 $\frac{5\sqrt{22}i}{264}$ 0 $\frac{5\sqrt{11}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{55}i}{22}$ 0 0 0 0 0	
	0 0 $-\frac{5\sqrt{11}i}{132}$ 0 $-\frac{5\sqrt{22}i}{264}$ 0 0 0 0 0 0 $\frac{\sqrt{55}i}{22}$ 0 0 0	
	0 0 0 $\frac{\sqrt{165}i}{132}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{55}i}{22}$ 0 $-\frac{\sqrt{11}i}{11}$ 0	
	0 0 0 0 $-\frac{\sqrt{110}i}{264}$ 0 0 0 0 0 0 $\frac{\sqrt{11}i}{11}$ 0 $\frac{\sqrt{231}i}{154}$ 0	
	0 0 0 0 0 $\frac{\sqrt{154}i}{1848}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{231}i}{154}$ 0	
879	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 2)$	0	0	0	0	0	0	$-\frac{\sqrt{154}}{1848}$	0	$\frac{\sqrt{66}}{264}$	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{110}}{264}$	0	$-\frac{5\sqrt{22}}{264}$	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{132}$	0	$\frac{5\sqrt{11}}{132}$	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{11}}{132}$	0	$-\frac{\sqrt{165}}{132}$	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{22}}{264}$	0	$\frac{\sqrt{110}}{264}$	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{66}}{264}$	0	$-\frac{\sqrt{154}}{1848}$
	$-\frac{\sqrt{154}}{1848}$	0	0	0	0	0	0	$-\frac{\sqrt{231}}{154}$	0	0	0	0	0	0
	0	$\frac{\sqrt{110}}{264}$	0	0	0	0	$-\frac{\sqrt{231}}{154}$	0	$\frac{\sqrt{11}}{11}$	0	0	0	0	0
	$\frac{\sqrt{66}}{264}$	0	$-\frac{\sqrt{165}}{132}$	0	0	0	0	$\frac{\sqrt{11}}{11}$	0	$-\frac{\sqrt{55}}{22}$	0	0	0	0
	0	$-\frac{5\sqrt{22}}{264}$	0	$\frac{5\sqrt{11}}{132}$	0	0	0	0	$-\frac{\sqrt{55}}{22}$	0	0	0	0	0
	0	0	$\frac{5\sqrt{11}}{132}$	0	$-\frac{5\sqrt{22}}{264}$	0	0	0	0	0	0	$\frac{\sqrt{55}}{22}$	0	0
	0	0	0	$-\frac{\sqrt{165}}{132}$	0	$\frac{\sqrt{66}}{264}$	0	0	0	0	$\frac{\sqrt{55}}{22}$	0	$-\frac{\sqrt{11}}{11}$	0
	0	0	0	0	$\frac{\sqrt{110}}{264}$	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	$\frac{\sqrt{231}}{154}$	0
	0	0	0	0	0	$-\frac{\sqrt{154}}{1848}$	0	0	0	0	0	$\frac{\sqrt{231}}{154}$	0	0
880	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$												

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{330}}{132}$	0	0	
	0	0	0	0	0	0	0	0	0	0	$0$	$-\frac{\sqrt{1155}}{462}$	0	
	0	0	0	0	0	0	$\frac{\sqrt{1155}}{462}$	0	0	0	0	0	0	
	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	0	0	
	0	0	0	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{1155}}{462}$	0	0	0	0	0	$\frac{3\sqrt{385}}{154}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	0	0	$-\frac{\sqrt{33}}{22}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	0	0	0	$0$	$-\frac{\sqrt{33}}{22}$	0	
	0	0	0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{385}}{154}$	0	
	0	0	0	0	0	0	$\frac{3\sqrt{385}}{154}$	0	0	0	0	0	0	
	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	0	$-\frac{\sqrt{33}}{22}$	0	0	0	0	0	0
881	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{22}i}{44}$ 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 $-\frac{\sqrt{330}i}{132}$ 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 $\frac{\sqrt{1155}i}{462}$
	0 0 0 0 0 0 0 $\frac{\sqrt{1155}i}{462}$ 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0	0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{1155}i}{462}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 $\frac{\sqrt{330}i}{132}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 $-\frac{\sqrt{22}i}{44}$ 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 0 0 0 0 0 0 0 0	$-\frac{3\sqrt{385}i}{154}$ 0 0 0
	$-\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 $\frac{\sqrt{330}i}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 $-\frac{\sqrt{1155}i}{462}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
882	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{11}}{66}$	0	0	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{77}}{462}$	0	0	0	$\frac{\sqrt{55}}{66}$	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{22}}{66}$	0	0	0	$-\frac{\sqrt{66}}{66}$	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{66}}{66}$	0	0	0	$\frac{\sqrt{22}}{66}$	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{55}}{66}$	0	0	0	0	$-\frac{\sqrt{77}}{462}$
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{11}}{66}$	0	0	0	0	0
	0	$\frac{\sqrt{77}}{462}$	0	0	0	0	0	0	$\frac{\sqrt{770}}{154}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{22}}{66}$	0	0	0	0	0	0	$-\frac{\sqrt{66}}{22}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{66}}{66}$	0	0	$\frac{\sqrt{770}}{154}$	0	0	0	$\frac{\sqrt{22}}{22}$	0	0	0	0
	$-\frac{\sqrt{11}}{66}$	0	0	0	$-\frac{\sqrt{55}}{66}$	0	0	$-\frac{\sqrt{66}}{22}$	0	0	0	$\frac{\sqrt{22}}{22}$	0	0	0
	0	$\frac{\sqrt{55}}{66}$	0	0	0	$\frac{\sqrt{11}}{66}$	0	0	$\frac{\sqrt{22}}{22}$	0	0	0	$-\frac{\sqrt{66}}{22}$	0	0
	0	0	$-\frac{\sqrt{66}}{66}$	0	0	0	0	0	$\frac{\sqrt{22}}{22}$	0	0	0	$\frac{\sqrt{770}}{154}$	0	0
	0	0	0	$\frac{\sqrt{22}}{66}$	0	0	0	0	0	$-\frac{\sqrt{66}}{22}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{77}}{462}$	0	0	0	0	0	$\frac{\sqrt{770}}{154}$	0	0	0	0
883	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
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 4)$	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{66}$ 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{77}i}{462}$ 0 0 0 $\frac{\sqrt{55}i}{66}$ 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{22}i}{66}$ 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 0 0 $\frac{\sqrt{22}i}{66}$ 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{55}i}{66}$ 0 0 0 $-\frac{\sqrt{77}i}{462}$
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{11}i}{66}$ 0 0 0 0
	0	$\frac{\sqrt{77}i}{462}$ 0 0 0 0 0 0 0 $\frac{\sqrt{770}i}{154}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{22}i}{66}$ 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{22}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 $-\frac{\sqrt{770}i}{154}$ 0 0 0 $\frac{\sqrt{22}i}{22}$ 0 0 0
	$\frac{\sqrt{11}i}{66}$	0 0 0 $-\frac{\sqrt{55}i}{66}$ 0 0 $\frac{\sqrt{66}i}{22}$ 0 0 0 $\frac{\sqrt{22}i}{22}$ 0 0
	0	$-\frac{\sqrt{55}i}{66}$ 0 0 0 $\frac{\sqrt{11}i}{66}$ 0 0 $-\frac{\sqrt{22}i}{22}$ 0 0 0 $-\frac{\sqrt{66}i}{22}$ 0
	0	0 0 0 $\frac{\sqrt{66}i}{66}$ 0 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ 0 0 0 $\frac{\sqrt{770}i}{154}$
	0	0 0 0 $-\frac{\sqrt{22}i}{66}$ 0 0 0 0 0 0 $\frac{\sqrt{66}i}{22}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{77}i}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{770}i}{154}$ 0 0

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_0^{(1,1;a)}(A_{1g})$	$-\frac{\sqrt{42}}{21}$	0 0 0 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 0
	0	0 $-\frac{\sqrt{42}}{21}$ 0 0 0 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	0 0 0 $-\frac{\sqrt{42}}{21}$ 0 0 0 0 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 0 0 0 0 $-\frac{\sqrt{42}}{21}$ 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 0 0 0 $\frac{\sqrt{42}}{28}$ 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 0 0 0 $\frac{\sqrt{42}}{28}$ 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
885 symmetry		$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,1;a)}(A_{1g})$	$\frac{15\sqrt{7}}{98}$	0 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{147}$ 0 0 0 0 0 0
	0	$-\frac{3\sqrt{7}}{98}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{49}$ 0 0 0 0 0 0
	0	0 $-\frac{6\sqrt{7}}{49}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{21}}{147}$ 0 0 0 0 0
	0	0 0 $-\frac{6\sqrt{7}}{49}$ 0 0 0 0 0 0 0 $\frac{2\sqrt{21}}{147}$ 0 0 0 0
	0	0 0 0 $-\frac{3\sqrt{7}}{98}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}}{49}$ 0 0 0
	0	0 0 0 0 $\frac{15\sqrt{7}}{98}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{42}}{147}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0 0
	$-\frac{5\sqrt{42}}{147}$	0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{98}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{70}}{49}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{7}}{98}$ 0 0 0 0 0 0
	0	0 0 $-\frac{2\sqrt{21}}{147}$ 0 0 0 0 0 0 $\frac{5\sqrt{7}}{98}$ 0 0 0 0 0
	0	0 0 0 $\frac{2\sqrt{21}}{147}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{7}}{98}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{70}}{49}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{7}}{98}$ 0 0
	0	0 0 0 0 0 $\frac{5\sqrt{42}}{147}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{98}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$
886 symmetry		$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 1)$	0	$-\frac{3\sqrt{105}i}{98}$	0	0	0	0	$\frac{5\sqrt{2}i}{42}$	0	$\frac{5\sqrt{42}i}{294}$	0	0	0	0	0	0
	$\frac{3\sqrt{105}i}{98}$	0	$-\frac{3\sqrt{42}i}{98}$	0	0	0	0	$\frac{\sqrt{70}i}{294}$	0	$\frac{11\sqrt{14}i}{294}$	0	0	0	0	0
	0	$\frac{3\sqrt{42}i}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{147}$	0	$\frac{\sqrt{7}i}{21}$	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{42}i}{98}$	0	0	0	0	$-\frac{\sqrt{7}i}{21}$	0	$\frac{\sqrt{105}i}{147}$	0	0	0
	0	0	0	$-\frac{3\sqrt{42}i}{98}$	0	$\frac{3\sqrt{105}i}{98}$	0	0	0	0	$-\frac{11\sqrt{14}i}{294}$	0	$-\frac{\sqrt{70}i}{294}$	0	0
	0	0	0	0	$-\frac{3\sqrt{105}i}{98}$	0	0	0	0	0	$-\frac{5\sqrt{42}i}{294}$	0	$-\frac{5\sqrt{2}i}{42}$	0	0
	$-\frac{5\sqrt{2}i}{42}$	0	0	0	0	0	0	$\frac{\sqrt{3}i}{14}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{70}i}{294}$	0	0	0	0	$-\frac{\sqrt{3}i}{14}$	0	$\frac{2\sqrt{7}i}{49}$	0	0	0	0	0	0
	$-\frac{5\sqrt{42}i}{294}$	0	$\frac{\sqrt{105}i}{147}$	0	0	0	0	$-\frac{2\sqrt{7}i}{49}$	0	$\frac{\sqrt{35}i}{98}$	0	0	0	0	0
	0	$-\frac{11\sqrt{14}i}{294}$	0	$\frac{\sqrt{7}i}{21}$	0	0	0	0	$-\frac{\sqrt{35}i}{98}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{7}i}{21}$	0	$\frac{11\sqrt{14}i}{294}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{98}$	0	$-\frac{\sqrt{35}i}{98}$	0	0
	0	0	0	$-\frac{\sqrt{105}i}{147}$	0	$\frac{5\sqrt{42}i}{294}$	0	0	0	0	$\frac{\sqrt{35}i}{98}$	0	$-\frac{2\sqrt{7}i}{49}$	0	0
	0	0	0	0	$\frac{\sqrt{70}i}{294}$	0	0	0	0	0	$\frac{2\sqrt{7}i}{49}$	0	$-\frac{\sqrt{3}i}{14}$	0	0
	0	0	0	0	0	$\frac{5\sqrt{2}i}{42}$	0	0	0	0	0	$\frac{\sqrt{3}i}{14}$	0	0	0
887	symmetry	$-\sqrt{3}xz$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 1)$	0	$-\frac{3\sqrt{105}}{98}$	0	0	0	0	$-\frac{5\sqrt{2}}{42}$	0	$\frac{5\sqrt{42}}{294}$	0	0	0	0	0	0
	$-\frac{3\sqrt{105}}{98}$	0	$-\frac{3\sqrt{42}}{98}$	0	0	0	0	$-\frac{\sqrt{70}}{294}$	0	$\frac{11\sqrt{14}}{294}$	0	0	0	0	0
	0	$-\frac{3\sqrt{42}}{98}$	0	0	0	0	0	0	$\frac{\sqrt{105}}{147}$	0	$\frac{\sqrt{7}}{21}$	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{42}}{98}$	0	0	0	0	$\frac{\sqrt{7}}{21}$	0	$\frac{\sqrt{105}}{147}$	0	0	0
	0	0	0	$\frac{3\sqrt{42}}{98}$	0	$\frac{3\sqrt{105}}{98}$	0	0	0	$\frac{11\sqrt{14}}{294}$	0	$-\frac{\sqrt{70}}{294}$	0	0	0
	0	0	0	0	$\frac{3\sqrt{105}}{98}$	0	0	0	0	0	$\frac{5\sqrt{42}}{294}$	0	$-\frac{5\sqrt{2}}{42}$	0	0
	$-\frac{5\sqrt{2}}{42}$	0	0	0	0	0	0	$\frac{\sqrt{3}}{14}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{70}}{294}$	0	0	0	0	$\frac{\sqrt{3}}{14}$	0	$\frac{2\sqrt{7}}{49}$	0	0	0	0	0	0
	$\frac{5\sqrt{42}}{294}$	0	$\frac{\sqrt{105}}{147}$	0	0	0	0	$\frac{2\sqrt{7}}{49}$	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0
	0	$\frac{11\sqrt{14}}{294}$	0	$\frac{\sqrt{7}}{21}$	0	0	0	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{7}}{21}$	0	$\frac{11\sqrt{14}}{294}$	0	0	0	0	0	$-\frac{\sqrt{35}}{98}$	0	0	0	0
	0	0	0	$\frac{\sqrt{105}}{147}$	0	$\frac{5\sqrt{42}}{294}$	0	0	0	0	$-\frac{\sqrt{35}}{98}$	0	$-\frac{2\sqrt{7}}{49}$	0	0
	0	0	0	0	$-\frac{\sqrt{70}}{294}$	0	0	0	0	0	$-\frac{2\sqrt{7}}{49}$	0	$-\frac{\sqrt{3}}{14}$	0	0
	0	0	0	0	0	$-\frac{5\sqrt{2}}{42}$	0	0	0	0	0	$-\frac{\sqrt{3}}{14}$	0	0	0

888 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 2)$	0	0	$\frac{3\sqrt{210}}{196}$	0	0	0	0	0	0	$-\frac{\sqrt{70}}{147}$	0	0	0	0	0
	0	0	0	$\frac{9\sqrt{42}}{196}$	0	0	$\frac{\sqrt{10}}{21}$	0	0	0	$-\frac{4\sqrt{14}}{147}$	0	0	0	0
	$\frac{3\sqrt{210}}{196}$	0	0	0	$\frac{9\sqrt{42}}{196}$	0	0	$\frac{4\sqrt{35}}{147}$	0	0	0	$-\frac{2\sqrt{105}}{147}$	0	0	0
	0	$\frac{9\sqrt{42}}{196}$	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0	$\frac{2\sqrt{105}}{147}$	0	0	0	$-\frac{4\sqrt{35}}{147}$	0	0
	0	0	$\frac{9\sqrt{42}}{196}$	0	0	0	0	0	0	$\frac{4\sqrt{14}}{147}$	0	0	0	$-\frac{\sqrt{10}}{21}$	0
	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0	0	0	0	0	$\frac{\sqrt{70}}{147}$	0	0	0	0
	0	$\frac{\sqrt{10}}{21}$	0	0	0	0	0	0	$-\frac{1}{14}$	0	0	0	0	0	0
	0	0	$\frac{4\sqrt{35}}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{105}}{147}$	0	0	$-\frac{1}{14}$	0	0	0	$-\frac{\sqrt{35}}{49}$	0	0	0	0
	$-\frac{\sqrt{70}}{147}$	0	0	0	$\frac{4\sqrt{14}}{147}$	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	$-\frac{\sqrt{35}}{49}$	0	0	0
	0	$-\frac{4\sqrt{14}}{147}$	0	0	0	$\frac{\sqrt{70}}{147}$	0	0	$-\frac{\sqrt{35}}{49}$	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0
	0	0	$-\frac{2\sqrt{105}}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{35}}{49}$	0	0	0	$-\frac{1}{14}$	0
	0	0	0	$-\frac{4\sqrt{35}}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{10}}{21}$	0	0	0	0	0	$-\frac{1}{14}$	0	0	0	0

889 symmetry

 $-\sqrt{3}xy$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 2)$	0 0 $\frac{3\sqrt{210}i}{196}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{147}$ 0 0 0 0	
	0 0 0 $\frac{9\sqrt{42}i}{196}$ 0 0 $-\frac{\sqrt{10}i}{21}$ 0 0 0 $-\frac{4\sqrt{14}i}{147}$ 0 0 0	
	$-\frac{3\sqrt{210}i}{196}$ 0 0 0 $\frac{9\sqrt{42}i}{196}$ 0 0 $-\frac{4\sqrt{35}i}{147}$ 0 0 0 $-\frac{2\sqrt{105}i}{147}$ 0 0	
	0 $-\frac{9\sqrt{42}i}{196}$ 0 0 0 $\frac{3\sqrt{210}i}{196}$ 0 0 $-\frac{2\sqrt{105}i}{147}$ 0 0 0 $-\frac{4\sqrt{35}i}{147}$ 0	
	0 0 $-\frac{9\sqrt{42}i}{196}$ 0 0 0 0 0 0 $-\frac{4\sqrt{14}i}{147}$ 0 0 0 $-\frac{\sqrt{10}i}{21}$	
	0 0 0 $-\frac{3\sqrt{210}i}{196}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{147}$ 0 0 0	
	0 $\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $-\frac{i}{14}$ 0 0 0 0 0	
	0 0 $\frac{4\sqrt{35}i}{147}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{98}$ 0 0 0 0	
	0 0 0 $\frac{2\sqrt{105}i}{147}$ 0 0 $\frac{i}{14}$ 0 0 0 $-\frac{\sqrt{35}i}{49}$ 0 0 0	
	$\frac{\sqrt{70}i}{147}$ 0 0 0 $\frac{4\sqrt{14}i}{147}$ 0 0 $\frac{\sqrt{105}i}{98}$ 0 0 0 $-\frac{\sqrt{35}i}{49}$ 0 0	
	0 $\frac{4\sqrt{14}i}{147}$ 0 0 0 $\frac{\sqrt{70}i}{147}$ 0 0 $\frac{\sqrt{35}i}{49}$ 0 0 0 $-\frac{\sqrt{105}i}{98}$ 0	
	0 0 $\frac{2\sqrt{105}i}{147}$ 0 0 0 0 0 0 $\frac{\sqrt{35}i}{49}$ 0 0 0 $-\frac{i}{14}$	
	0 0 0 $\frac{4\sqrt{35}i}{147}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{98}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{10}i}{21}$ 0 0 0 0 0 0 $0$ $\frac{i}{14}$ 0 0	
890	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 1)$	$-\frac{\sqrt{2310}}{294}$	0	0	0	0	0	0	$\frac{4\sqrt{385}}{539}$	0	0	0	0	0	0
	0	$\frac{\sqrt{2310}}{98}$	0	0	0	0	0	0	$-\frac{16\sqrt{231}}{1617}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{2310}}{147}$	0	0	0	0	0	0	$-\frac{2\sqrt{770}}{539}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{2310}}{147}$	0	0	0	0	0	$\frac{2\sqrt{770}}{539}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{2310}}{98}$	0	0	0	0	0	$\frac{16\sqrt{231}}{1617}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{2310}}{294}$	0	0	0	0	0	$-\frac{4\sqrt{385}}{539}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0	0	0	0	0	0	0
	$\frac{4\sqrt{385}}{539}$	0	0	0	0	0	0	$-\frac{13\sqrt{2310}}{6468}$	0	0	0	0	0	0
	0	$-\frac{16\sqrt{231}}{1617}$	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{2156}$	0	0	0	0	0
	0	0	$-\frac{2\sqrt{770}}{539}$	0	0	0	0	0	$\frac{3\sqrt{2310}}{2156}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{770}}{539}$	0	0	0	0	0	$\frac{3\sqrt{2310}}{2156}$	0	0	0	0
	0	0	0	0	$\frac{16\sqrt{231}}{1617}$	0	0	0	0	0	$-\frac{\sqrt{2310}}{2156}$	0	0	0
	0	0	0	0	0	$-\frac{4\sqrt{385}}{539}$	0	0	0	0	0	$-\frac{13\sqrt{2310}}{6468}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0
891	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 2)$	0	0	0	$\frac{\sqrt{330}i}{42}$	0	0	0	0	0	$-\frac{\sqrt{110}i}{77}$	0	0	0	0	
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{330}i}{165}$	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{330}i}{42}$	$-\frac{3\sqrt{385}i}{385}$	0	0	0	0	$\frac{\sqrt{55}i}{385}$	0	0	
	$-\frac{\sqrt{330}i}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{55}i}{385}$	0	0	0	0	0	$\frac{3\sqrt{385}i}{385}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{330}i}{165}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{330}i}{42}$	0	0	0	0	0	$\frac{\sqrt{110}i}{77}$	0	0	0	0	0	
	0	0	$\frac{3\sqrt{385}i}{385}$	0	0	0	0	0	0	$-\frac{\sqrt{1155}i}{462}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{55}i}{385}$	0	0	0	0	0	$-\frac{\sqrt{165}i}{231}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{330}i}{165}$	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{110}i}{77}$	$\frac{\sqrt{1155}i}{462}$	0	0	0	0	$\frac{\sqrt{165}i}{231}$	0	0	
	$\frac{\sqrt{110}i}{77}$	0	0	0	0	0	0	$\frac{\sqrt{165}i}{231}$	0	0	0	0	0	$\frac{\sqrt{1155}i}{462}$	
	0	$\frac{\sqrt{330}i}{165}$	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{55}i}{385}$	0	0	0	0	0	0	$-\frac{\sqrt{165}i}{231}$	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{385}i}{385}$	0	0	0	0	0	$-\frac{\sqrt{1155}i}{462}$	0	0	0	0	
892	symmetry	$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{2g})$	0	0	0	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	$\frac{\sqrt{110}}{77}$	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{330}}{165}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{330}}{42}$	$-\frac{3\sqrt{385}}{385}$	0	0	0	0	0	$-\frac{\sqrt{55}}{385}$	0	
	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{55}}{385}$	0	0	0	0	0	$-\frac{3\sqrt{385}}{385}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{330}}{165}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{330}}{42}$	0	0	0	0	0	0	$\frac{\sqrt{110}}{77}$	0	0	0	0	
	0	0	$-\frac{3\sqrt{385}}{385}$	0	0	0	0	0	0	$\frac{\sqrt{1155}}{462}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{55}}{385}$	0	0	0	0	0	0	$\frac{\sqrt{165}}{231}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{330}}{165}$	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{110}}{77}$	$\frac{\sqrt{1155}}{462}$	0	0	0	0	0	$-\frac{\sqrt{165}}{231}$	0	
	$\frac{\sqrt{110}}{77}$	0	0	0	0	0	0	$\frac{\sqrt{165}}{231}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{462}$	
	0	$\frac{\sqrt{330}}{165}$	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{55}}{385}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{231}$	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{385}}{385}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{462}$	0	0	0	0	
893	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{1155}i}{147}$	0	0	0	0	$-\frac{\sqrt{22}i}{77}$	0	$-\frac{10\sqrt{462}i}{1617}$	0	0	0	0	0	0
	$-\frac{\sqrt{1155}i}{147}$	0	$-\frac{5\sqrt{462}i}{294}$	0	0	0	0	$\frac{13\sqrt{770}i}{2695}$	0	$\frac{2\sqrt{154}i}{539}$	0	0	0	0	0
	0	$\frac{5\sqrt{462}i}{294}$	0	0	0	0	0	0	$-\frac{\sqrt{1155}i}{8085}$	0	$\frac{\sqrt{77}i}{77}$	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{462}i}{294}$	0	0	0	0	$-\frac{\sqrt{77}i}{77}$	0	$\frac{\sqrt{1155}i}{8085}$	0	0	0
	0	0	0	$-\frac{5\sqrt{462}i}{294}$	0	$-\frac{\sqrt{1155}i}{147}$	0	0	0	0	$-\frac{2\sqrt{154}i}{539}$	0	$-\frac{13\sqrt{770}i}{2695}$	0	0
	0	0	0	0	$\frac{\sqrt{1155}i}{147}$	0	0	0	0	0	$\frac{10\sqrt{462}i}{1617}$	0	0	$\frac{\sqrt{22}i}{77}$	
	$\frac{\sqrt{22}i}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}i}{462}$	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{770}i}{2695}$	0	0	0	0	$\frac{5\sqrt{33}i}{462}$	0	$\frac{5\sqrt{77}i}{1078}$	0	0	0	0	0	0
	$\frac{10\sqrt{462}i}{1617}$	0	$\frac{\sqrt{1155}i}{8085}$	0	0	0	0	$-\frac{5\sqrt{77}i}{1078}$	0	$\frac{3\sqrt{385}i}{1078}$	0	0	0	0	0
	0	$-\frac{2\sqrt{154}i}{539}$	0	$\frac{\sqrt{77}i}{77}$	0	0	0	0	$-\frac{3\sqrt{385}i}{1078}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{77}i}{77}$	0	$\frac{2\sqrt{154}i}{539}$	0	0	0	0	0	0	$-\frac{3\sqrt{385}i}{1078}$	0	0	0
	0	0	0	$-\frac{\sqrt{1155}i}{8085}$	0	$-\frac{10\sqrt{462}i}{1617}$	0	0	0	0	$\frac{3\sqrt{385}i}{1078}$	0	$-\frac{5\sqrt{77}i}{1078}$	0	
	0	0	0	0	$\frac{13\sqrt{770}i}{2695}$	0	0	0	0	0	$\frac{5\sqrt{77}i}{1078}$	0	$\frac{5\sqrt{33}i}{462}$		
	0	0	0	0	0	$-\frac{\sqrt{22}i}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}i}{462}$	0	
894	symmetry	$\frac{\sqrt{10xz}(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{1155}}{147}$	0	0	0	0	$\frac{\sqrt{22}}{77}$	0	$-\frac{10\sqrt{462}}{1617}$	0	0	0	0	0	0
	$\frac{\sqrt{1155}}{147}$	0	$-\frac{5\sqrt{462}}{294}$	0	0	0	0	$-\frac{13\sqrt{770}}{2695}$	0	$\frac{2\sqrt{154}}{539}$	0	0	0	0	0
	0	$-\frac{5\sqrt{462}}{294}$	0	0	0	0	0	0	$\frac{\sqrt{1155}}{8085}$	0	$\frac{\sqrt{77}}{77}$	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{462}}{294}$	0	0	0	0	$\frac{\sqrt{77}}{77}$	0	$\frac{\sqrt{1155}}{8085}$	0	0	0
	0	0	0	$\frac{5\sqrt{462}}{294}$	0	$-\frac{\sqrt{1155}}{147}$	0	0	0	0	$\frac{2\sqrt{154}}{539}$	0	$-\frac{13\sqrt{770}}{2695}$	0	0
	0	0	0	0	$-\frac{\sqrt{1155}}{147}$	0	0	0	0	0	$-\frac{10\sqrt{462}}{1617}$	0	$\frac{\sqrt{22}}{77}$		
	$\frac{\sqrt{22}}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{462}$	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{770}}{2695}$	0	0	0	0	$-\frac{5\sqrt{33}}{462}$	0	$\frac{5\sqrt{77}}{1078}$	0	0	0	0	0	0
	$-\frac{10\sqrt{462}}{1617}$	0	$\frac{\sqrt{1155}}{8085}$	0	0	0	0	$\frac{5\sqrt{77}}{1078}$	0	$\frac{3\sqrt{385}}{1078}$	0	0	0	0	0
	0	$\frac{2\sqrt{154}}{539}$	0	$\frac{\sqrt{77}}{77}$	0	0	0	0	$\frac{3\sqrt{385}}{1078}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{77}}{77}$	0	$\frac{2\sqrt{154}}{539}$	0	0	0	0	0	$-\frac{3\sqrt{385}}{1078}$	0	0	0	0
	0	0	0	$\frac{\sqrt{1155}}{8085}$	0	$-\frac{10\sqrt{462}}{1617}$	0	0	0	0	$-\frac{3\sqrt{385}}{1078}$	0	$-\frac{5\sqrt{77}}{1078}$	0	
	0	0	0	0	$-\frac{13\sqrt{770}}{2695}$	0	0	0	0	0	$-\frac{5\sqrt{77}}{1078}$	0	$\frac{5\sqrt{33}}{462}$		
	0	0	0	0	0	$\frac{\sqrt{22}}{77}$	0	0	0	0	0	0	0	$\frac{5\sqrt{33}}{462}$	0
895	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 2)$	0	0	0	0	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	$\frac{4\sqrt{33}}{231}$	0	0		
	0	0	0	0	0	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	$\frac{8\sqrt{55}}{385}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{2\sqrt{770}}{385}$	0	
	0	0	0	0	0	0	$-\frac{2\sqrt{770}}{385}$	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	0	$-\frac{8\sqrt{55}}{385}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{330}}{42}$	0	0	0	0	0	0	$-\frac{4\sqrt{33}}{231}$	0	0	0	0	0	0
	0	0	0	$-\frac{2\sqrt{770}}{385}$	0	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0	0	0	
	0	0	0	$-\frac{8\sqrt{55}}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0	
	0	0	0	0	$-\frac{4\sqrt{33}}{231}$	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0	
	$\frac{4\sqrt{33}}{231}$	0	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0	0	0	0	
	0	$\frac{8\sqrt{55}}{385}$	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0	0	0	0	
	0	0	$\frac{2\sqrt{770}}{385}$	0	0	0	0	0	$\frac{\sqrt{2310}}{924}$	0	0	0	0	0	
896	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 2)$	0	0	0	0	$\frac{\sqrt{330}i}{42}$	0	0	0	0	0	$-\frac{4\sqrt{33}i}{231}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{330}i}{42}$	0	0	0	0	0	$-\frac{8\sqrt{55}i}{385}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{2\sqrt{770}i}{385}$	
	0	0	0	0	0	0	$-\frac{2\sqrt{770}i}{385}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{330}i}{42}$	0	0	0	0	0	0	$-\frac{8\sqrt{55}i}{385}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{330}i}{42}$	0	0	0	0	0	0	$-\frac{4\sqrt{33}i}{231}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{770}i}{385}$	0	0	0	0	0	$-\frac{\sqrt{2310}i}{924}$	0	0	0	
	0	0	0	0	$\frac{8\sqrt{55}i}{385}$	0	0	0	0	0	$-\frac{5\sqrt{22}i}{308}$	0	0	
	0	0	0	0	0	$\frac{4\sqrt{33}i}{231}$	0	0	0	0	0	$-\frac{5\sqrt{22}i}{308}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}i}{924}$	
	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{924}$	0	0	0	0	0	0	0
	$\frac{4\sqrt{33}i}{231}$	0	0	0	0	0	0	$\frac{5\sqrt{22}i}{308}$	0	0	0	0	0	0
	0	$\frac{8\sqrt{55}i}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{22}i}{308}$	0	0	0	0	0
	0	0	$\frac{2\sqrt{770}i}{385}$	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{924}$	0	0	0	0
897	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 3)$	0	0	$-\frac{\sqrt{1155}}{98}$	0	0	0	0	0	$\frac{4\sqrt{385}}{539}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{231}}{294}$	0	0	$-\frac{6\sqrt{55}}{385}$	0	0	$\frac{2\sqrt{77}}{539}$	0	0	0	0
	$-\frac{\sqrt{1155}}{98}$	0	0	0	$\frac{5\sqrt{231}}{294}$	0	0	$\frac{9\sqrt{770}}{2695}$	0	0	$-\frac{17\sqrt{2310}}{8085}$	0	0	0
	0	$\frac{5\sqrt{231}}{294}$	0	0	0	$-\frac{\sqrt{1155}}{98}$	0	0	$\frac{17\sqrt{2310}}{8085}$	0	0	0	$-\frac{9\sqrt{770}}{2695}$	0
	0	0	$\frac{5\sqrt{231}}{294}$	0	0	0	0	0	$-\frac{2\sqrt{77}}{539}$	0	0	0	$\frac{6\sqrt{55}}{385}$	0
	0	0	0	$-\frac{\sqrt{1155}}{98}$	0	0	0	0	0	$-\frac{4\sqrt{385}}{539}$	0	0	0	0
	0	$-\frac{6\sqrt{55}}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0	0	0
	0	0	$\frac{9\sqrt{770}}{2695}$	0	0	0	0	0	$\frac{\sqrt{2310}}{6468}$	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{2310}}{8085}$	0	0	$\frac{5\sqrt{22}}{308}$	0	0	$-\frac{\sqrt{770}}{539}$	0	0	0	0
	$\frac{4\sqrt{385}}{539}$	0	0	0	$-\frac{2\sqrt{77}}{539}$	0	0	$\frac{\sqrt{2310}}{6468}$	0	0	$-\frac{\sqrt{770}}{539}$	0	0	0
	0	$\frac{2\sqrt{77}}{539}$	0	0	0	$-\frac{4\sqrt{385}}{539}$	0	0	$-\frac{\sqrt{770}}{539}$	0	0	0	$\frac{\sqrt{2310}}{6468}$	0
	0	0	$-\frac{17\sqrt{2310}}{8085}$	0	0	0	0	0	$-\frac{\sqrt{770}}{539}$	0	0	0	$\frac{5\sqrt{22}}{308}$	0
	0	0	0	$-\frac{9\sqrt{770}}{2695}$	0	0	0	0	0	$\frac{\sqrt{2310}}{6468}$	0	0	0	0
	0	0	0	0	$\frac{6\sqrt{55}}{385}$	0	0	0	0	0	$\frac{5\sqrt{22}}{308}$	0	0	0
898	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$												

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 3)$	0	0	$-\frac{\sqrt{1155}i}{98}$	0	0	0	0	0	0	$\frac{4\sqrt{385}i}{539}$	0	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{231}i}{294}$	0	0	$\frac{6\sqrt{55}i}{385}$	0	0	0	$\frac{2\sqrt{77}i}{539}$	0	0	0	0	0
	$\frac{\sqrt{1155}i}{98}$	0	0	0	$\frac{5\sqrt{231}i}{294}$	0	0	$-\frac{9\sqrt{770}i}{2695}$	0	0	0	$-\frac{17\sqrt{2310}i}{8085}$	0	0	0	0
	0	$-\frac{5\sqrt{231}i}{294}$	0	0	0	$-\frac{\sqrt{1155}i}{98}$	0	0	$-\frac{17\sqrt{2310}i}{8085}$	0	0	0	$-\frac{9\sqrt{770}i}{2695}$	0	0	0
	0	0	$-\frac{5\sqrt{231}i}{294}$	0	0	0	0	0	0	$\frac{2\sqrt{77}i}{539}$	0	0	0	$\frac{6\sqrt{55}i}{385}$	0	0
	0	0	0	$\frac{\sqrt{1155}i}{98}$	0	0	0	0	0	$\frac{4\sqrt{385}i}{539}$	0	0	0	0	0	0
	0	$-\frac{6\sqrt{55}i}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{22}i}{308}$	0	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{770}i}{2695}$	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{6468}$	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{2310}i}{8085}$	0	0	$-\frac{5\sqrt{22}i}{308}$	0	0	0	$-\frac{\sqrt{770}i}{539}$	0	0	0	0	0
	$-\frac{4\sqrt{385}i}{539}$	0	0	0	$-\frac{2\sqrt{77}i}{539}$	0	0	$-\frac{\sqrt{2310}i}{6468}$	0	0	0	$-\frac{\sqrt{770}i}{539}$	0	0	0	0
	0	$-\frac{2\sqrt{77}i}{539}$	0	0	0	$-\frac{4\sqrt{385}i}{539}$	0	0	$\frac{\sqrt{770}i}{539}$	0	0	0	$\frac{\sqrt{2310}i}{6468}$	0	0	0
	0	0	$\frac{17\sqrt{2310}i}{8085}$	0	0	0	0	0	0	$\frac{\sqrt{770}i}{539}$	0	0	0	$\frac{5\sqrt{22}i}{308}$	0	0
	0	0	0	$\frac{9\sqrt{770}i}{2695}$	0	0	0	0	0	0	$-\frac{\sqrt{2310}i}{6468}$	0	0	0	0	0
	0	0	0	0	$-\frac{6\sqrt{55}i}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}i}{308}$	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	0	0	$-\frac{\sqrt{42}i}{28}$	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	$-\frac{\sqrt{21}i}{14}$	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
	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	$-\frac{\sqrt{42}i}{28}$	0	0	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	$\frac{\sqrt{70}i}{28}$	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	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	$\frac{\sqrt{42}i}{28}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

900 symmetry

x

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{1,1}^{(1,0;a)}(E_g)$	0	0	0	0	0	0	$\frac{\sqrt{6}i}{8}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{210}i}{56}$	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{35}i}{28}$	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	$-\frac{\sqrt{35}i}{28}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	$-\frac{\sqrt{210}i}{56}$	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{6}i}{8}$	0	0
	$-\frac{\sqrt{6}i}{8}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{210}i}{56}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{42}i}{56}$	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	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{35}i}{28}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{210}i}{56}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{6}i}{8}$	0	0	0	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	0	0	$-\frac{\sqrt{6}}{8}$	0	$-\frac{\sqrt{14}}{56}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{210}}{56}$	0	$-\frac{\sqrt{42}}{56}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{35}}{28}$	0	$-\frac{\sqrt{21}}{28}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{21}}{28}$	0	$-\frac{\sqrt{35}}{28}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{210}}{56}$	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{6}}{8}$	0	0
	$-\frac{\sqrt{6}}{8}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{210}}{56}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{35}}{28}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{21}}{28}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{21}}{28}$	0	$-\frac{\sqrt{42}}{56}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{35}}{28}$	0	$-\frac{\sqrt{14}}{56}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{210}}{56}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{6}}{8}$	0	0	0	0	0	0	0	0	0
902	symmetry	$\frac{\sqrt{10x(x^2-3y^2)}}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 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 $-\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{8}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{24}$	
	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 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}i}{8}$ 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	
	0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{3}i}{12}$ 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 0 0	
	0 0 $-\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0	
903	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
904	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

*continued ...*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
905	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0	0	0	0	0	0	$-\frac{\sqrt{7}i}{12}$	0	$\frac{\sqrt{3}i}{6}$	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{5}i}{12}$	0	$\frac{i}{6}$	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	$-\frac{\sqrt{2}i}{24}$	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2}i}{24}$	0	$-\frac{\sqrt{30}i}{24}$	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{i}{6}$	0	$-\frac{\sqrt{5}i}{12}$	0
	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{3}i}{6}$	0	$\frac{\sqrt{7}i}{12}$
	$\frac{\sqrt{7}i}{12}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{5}i}{12}$	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{3}i}{6}$	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{i}{6}$	0	$-\frac{\sqrt{2}i}{24}$	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{2}i}{24}$	0	$\frac{i}{6}$	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{30}i}{24}$	0	$\frac{\sqrt{3}i}{6}$	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{5}i}{12}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{7}i}{12}$	0	0	0	0	0	0	0	0
906	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	0 0 0 0 0 0 $\frac{\sqrt{7}}{12}$ 0 $\frac{\sqrt{3}}{6}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{12}$ 0 $\frac{1}{6}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{1}{6}$ 0 $-\frac{\sqrt{5}}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{6}$ 0 $\frac{\sqrt{7}}{12}$	
	$\frac{\sqrt{7}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{3}}{6}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{1}{6}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{2}}{24}$ 0 $\frac{1}{6}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}}{12}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}}{12}$ 0 0 0 0 0 0 0 0 0	
907	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{6}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{12}$ 0 0 0 0 $\frac{\sqrt{10}}{12}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{1}{12}$ 0 0 0 0 $\frac{\sqrt{3}}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}}{12}$ 0 0 0 0 $-\frac{1}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{12}$ 0 0 0 0 $-\frac{\sqrt{14}}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}}{6}$ 0 0 0 0	
	0 $\frac{\sqrt{14}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{1}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{2}}{6}$ 0 0 0 $-\frac{\sqrt{10}}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{10}}{12}$ 0 0 0 $-\frac{\sqrt{2}}{6}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{1}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
$\frac{\sqrt{15}z(x-y)(x+y)}{2}$		
908	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{6}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{14}i}{12}$ 0 0 0 $\frac{\sqrt{10}i}{12}$ 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{i}{12}$ 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 $-\frac{i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{12}$ 0 0 0 $-\frac{\sqrt{14}i}{12}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{6}$ 0 0 0 0	
	0 $\frac{\sqrt{14}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{6}$ 0 0 0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 $-\frac{\sqrt{2}i}{6}$ 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{14}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
909	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{1g})$	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 0 0 $\frac{\sqrt{5}i}{20}$ 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{210}i}{60}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{60}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 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 $-\frac{\sqrt{210}i}{60}$ 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 $\frac{\sqrt{5}i}{20}$ 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 0	
	$\frac{\sqrt{15}i}{12}$ 0 0 0 0 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 0 0	
	0 0 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{60}$ 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 0 0 0 $-\frac{\sqrt{210}i}{84}$ 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 $-\frac{\sqrt{105}i}{42}$ 0 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 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 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0
	$\frac{\sqrt{210}i}{84}$	0 0
	0	$-\frac{3\sqrt{14}i}{28}$ 0
	0	0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0
911	symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{15}}{12}$ 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
	0 0 0 0 0 0 $-\frac{\sqrt{210}}{60}$ 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 $\frac{\sqrt{30}}{20}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{60}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}}{20}$ 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 $-\frac{\sqrt{15}}{12}$ 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 $-\frac{\sqrt{210}}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 $\frac{\sqrt{30}}{20}$ 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 $\frac{\sqrt{5}}{20}$ 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 $-\frac{\sqrt{15}}{12}$ 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{15}}{12}$ 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 $\frac{\sqrt{5}}{20}$ 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 $\frac{\sqrt{30}}{20}$ 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 $-\frac{\sqrt{210}}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
912	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
913	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
914	symmetry	$\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)$

*continued ..*

Table 10

No.	multipole	matrix												
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 2)$	0	0	0	0	0	0	$\frac{\sqrt{2}i}{24}$	0	$-\frac{5\sqrt{42}i}{168}$	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{23\sqrt{70}i}{840}$	0	$\frac{13\sqrt{14}i}{168}$	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{11\sqrt{105}i}{420}$	0	$-\frac{\sqrt{7}i}{84}$	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{7}i}{84}$	0	$-\frac{11\sqrt{105}i}{420}$	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{13\sqrt{14}i}{168}$	0	$\frac{23\sqrt{70}i}{840}$	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{42}i}{168}$	0	$-\frac{\sqrt{2}i}{24}$	0
	$-\frac{\sqrt{2}i}{24}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{23\sqrt{70}i}{840}$	0	0	0	0	0	0	0	0	0	0	0	0
	$\frac{5\sqrt{42}i}{168}$	0	$-\frac{11\sqrt{105}i}{420}$	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{14}i}{168}$	0	$-\frac{\sqrt{7}i}{84}$	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{7}i}{84}$	0	$\frac{13\sqrt{14}i}{168}$	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{11\sqrt{105}i}{420}$	0	$-\frac{5\sqrt{42}i}{168}$	0	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{23\sqrt{70}i}{840}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{2}i}{24}$	0	0	0	0	0	0	0	0
915	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 2)$	0	0	0	0	0	0	$-\frac{\sqrt{2}}{24}$	0	$-\frac{5\sqrt{42}}{168}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{23\sqrt{70}}{840}$	0	$\frac{13\sqrt{14}}{168}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{11\sqrt{105}}{420}$	0	$-\frac{\sqrt{7}}{84}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{7}}{84}$	0	$-\frac{11\sqrt{105}}{420}$	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{13\sqrt{14}}{168}$	0	$\frac{23\sqrt{70}}{840}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{42}}{168}$	0	$-\frac{\sqrt{2}}{24}$	0	0
	$-\frac{\sqrt{2}}{24}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{23\sqrt{70}}{840}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{42}}{168}$	0	$-\frac{11\sqrt{105}}{420}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{13\sqrt{14}}{168}$	0	$-\frac{\sqrt{7}}{84}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{7}}{84}$	0	$\frac{13\sqrt{14}}{168}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{11\sqrt{105}}{420}$	0	$-\frac{5\sqrt{42}}{168}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{23\sqrt{70}}{840}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{2}}{24}$	0	0	0	0	0	0	0	0	0
$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$															

916 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 3)$	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 $\frac{\sqrt{30}}{60}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{30}$	
	0 0 0 0 0 0 $\frac{\sqrt{105}}{30}$ 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 $-\frac{\sqrt{2}}{4}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{105}}{30}$ 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 $-\frac{\sqrt{2}}{4}$ 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	
	$\frac{\sqrt{2}}{4}$ 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 $-\frac{\sqrt{105}}{30}$ 0 0 0 0 0 0 0 0 0 0 0	
917	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 3)$	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		$-\frac{\sqrt{30}i}{60}$	0									
	0 0 0 0 0 0 0 0 0 0 0 0 0 0			$\frac{\sqrt{105}i}{30}$	0								
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{105}i}{30}$	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		$-\frac{\sqrt{2}i}{4}$	0	0	0							
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{105}i}{30}$	0	0	0	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 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							
	$\frac{\sqrt{2}i}{4}$ 0 0 0 0 0 0 0 0 0 0 0 0 0				0	0	0	0	0	0	0	0	0
	0 $\frac{\sqrt{30}i}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0					0	0	0	0	0	0	0	0
	0 0 $-\frac{\sqrt{105}i}{30}$ 0 0 0 0 0 0 0 0 0 0 0						0	0	0	0	0	0	0

918 symmetry

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

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 4)$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{10}}{12}$	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{70}}{60}$	0	0	0	$\frac{\sqrt{2}}{6}$	0	0	0
	0	0	0	0	0	0	0	$\frac{2\sqrt{5}}{15}$	0	0	0	$\frac{\sqrt{15}}{30}$	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{15}}{30}$	0	0	0	$-\frac{2\sqrt{5}}{15}$	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2}}{6}$	0	0	0	$\frac{\sqrt{70}}{60}$
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{10}}{12}$	0	0	0
	0	$-\frac{\sqrt{70}}{60}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{2\sqrt{5}}{15}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{10}}{12}$	0	0	0	$-\frac{\sqrt{2}}{6}$	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{2}}{6}$	0	0	0	$\frac{\sqrt{10}}{12}$	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{2\sqrt{5}}{15}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{70}}{60}$	0	0	0	0	0	0	0	0	0
919	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 4)$	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{70}i}{60}$ 0 0 0 $\frac{\sqrt{2}i}{6}$ 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{2\sqrt{5}i}{15}$ 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 $-\frac{2\sqrt{5}i}{15}$ 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{6}$ 0 0 0 $\frac{\sqrt{70}i}{60}$
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 0
	0	$-\frac{\sqrt{70}i}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{2\sqrt{5}i}{15}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{10}i}{12}$	0 0 0 $-\frac{\sqrt{2}i}{6}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{2}i}{6}$ 0 0 0 $\frac{\sqrt{10}i}{12}$ 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{2\sqrt{5}i}{15}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 0 0 0 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 0 0 0 $\frac{5\sqrt{42}i}{84}$ 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 $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 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 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{84}$ 0
	$-\frac{5\sqrt{42}i}{84}$	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 0 0 0 0 0
	0	0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{21}i}{42}$ 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 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 0 0 0 0 0 0

921 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)$	0	0 0 0 0 0 0 $\frac{5\sqrt{2}}{24}$ 0 $\frac{5\sqrt{42}}{168}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{70}}{168}$ 0 $\frac{11\sqrt{14}}{168}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{7}}{12}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{12}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{11\sqrt{14}}{168}$ 0 $-\frac{\sqrt{70}}{168}$ 0
	$\frac{5\sqrt{2}}{24}$	0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{168}$ 0 $-\frac{5\sqrt{2}}{24}$ 0 0 0
	0	$\frac{\sqrt{70}}{168}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{5\sqrt{42}}{168}$	0 $-\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{11\sqrt{14}}{168}$ 0 $-\frac{\sqrt{7}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{7}}{12}$ 0 $-\frac{11\sqrt{14}}{168}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{5\sqrt{42}}{168}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{70}}{168}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{2}}{24}$ 0 0 0 0 0 0 0 0 0 0 0
922 symmetry $-\sqrt{3}xz$		

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)$	0	0 0 0 0 0 0 $\frac{5\sqrt{2}i}{24}$ 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{168}$ 0 $-\frac{11\sqrt{14}i}{168}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{7}i}{12}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{12}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{11\sqrt{14}i}{168}$ 0 $\frac{\sqrt{70}i}{168}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 $\frac{5\sqrt{2}i}{24}$
	$-\frac{5\sqrt{2}i}{24}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{70}i}{168}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{5\sqrt{42}i}{168}$	0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{11\sqrt{14}i}{168}$ 0 $\frac{\sqrt{7}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{7}i}{12}$ 0 $\frac{11\sqrt{14}i}{168}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{70}i}{168}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{2}i}{24}$ 0 0 0 0 0 0 0 0 0
$\frac{\sqrt{3}(x-y)(x+y)}{2}$		
923	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{84}$ 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{21}$ 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 $\frac{\sqrt{35}i}{21}$ 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{21}$ 0 0 0 $\frac{\sqrt{10}i}{12}$
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{84}$ 0 0 0
	0	$\frac{\sqrt{10}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{35}i}{21}$ 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
	$-\frac{\sqrt{70}i}{84}$	0 0 0 $\frac{\sqrt{14}i}{21}$ 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{14}i}{21}$ 0 0 0 $\frac{\sqrt{70}i}{84}$ 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 $-\frac{\sqrt{35}i}{21}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{10}i}{12}$ 0 0 0 0 0 0 0 0 0 0
924 symmetry		$-\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{84}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{10}}{12}$ 0 0 0 $-\frac{\sqrt{14}}{21}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{21}$ 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 $-\frac{\sqrt{35}}{21}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{21}$ 0 0 0 $-\frac{\sqrt{10}}{12}$	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{84}$ 0 0 0	
	0 $-\frac{\sqrt{10}}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{35}}{21}$ 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	
	$-\frac{\sqrt{70}}{84}$ 0 0 0 $-\frac{\sqrt{14}}{21}$ 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{14}}{21}$ 0 0 0 $-\frac{\sqrt{70}}{84}$ 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 $-\frac{\sqrt{35}}{21}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{10}}{12}$ 0 0 0 0 0 0 0 0 0	
925	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 10

No.	multipole	matrix												
$T_4^{(1,0;a)}(A_{1g}, 1)$	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}i}{154}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{2\sqrt{154}i}{77}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{1155}i}{154}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{1155}i}{154}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{2\sqrt{154}i}{77}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{154}$	0	0
	$\frac{\sqrt{2310}i}{154}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{2\sqrt{154}i}{77}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{1155}i}{154}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{1155}i}{154}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{2\sqrt{154}i}{77}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{2310}i}{154}$	0	0	0	0	0	0	0	0
926	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$T_4^{(1,0;a)}(A_{1g}, 2)$	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	$-\frac{7\sqrt{55}}{220}$	0	0	0	0
	0	0	0	0	0	0	$-\frac{3\sqrt{2310}}{440}$	0	0	0	0	0	$\frac{\sqrt{330}}{440}$	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{440}$	0	0	0	0	0	$\frac{3\sqrt{2310}}{440}$	0
	0	0	0	0	0	0	0	0	$\frac{7\sqrt{55}}{220}$	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	$-\frac{3\sqrt{2310}}{440}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{330}}{440}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{7\sqrt{55}}{220}$	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	0
	$-\frac{\sqrt{165}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{7\sqrt{55}}{220}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{330}}{440}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{2310}}{440}$	0	0	0	0	0	0	0	0	0	0	0
927	symmetry	$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{44}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 0 $-\frac{7\sqrt{55}i}{220}$ 0 0														
	0 0 0 0 0 0 $\frac{3\sqrt{2310}i}{440}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{440}$														
	0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{440}$ 0 0 0 0 0 $\frac{3\sqrt{2310}i}{440}$														
	0 0 0 0 0 0 0 0 $-\frac{7\sqrt{55}i}{220}$ 0 0 0 0 0														
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{165}i}{44}$ 0 0 0 0														
	0 0 $-\frac{3\sqrt{2310}i}{440}$ 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 $-\frac{\sqrt{330}i}{440}$ 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 0 $\frac{7\sqrt{55}i}{220}$ 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 0 0 $\frac{\sqrt{165}i}{44}$ 0 0 0 0 0 0 0 0 0														
	$\frac{\sqrt{165}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 $\frac{7\sqrt{55}i}{220}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 $-\frac{\sqrt{330}i}{440}$ 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 $-\frac{3\sqrt{2310}i}{440}$ 0 0 0 0 0 0 0 0 0 0 0 0														
928	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	0	0	0	0	0	$-\frac{\sqrt{33}}{44}$	0	$-\frac{5\sqrt{77}}{154}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{13\sqrt{1155}}{1540}$	0	$\frac{\sqrt{231}}{154}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{770}}{3080}$	0	$\frac{\sqrt{462}}{88}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{462}}{88}$	0	$\frac{\sqrt{770}}{3080}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}}{154}$	0	$-\frac{13\sqrt{1155}}{1540}$	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{77}}{154}$	0	0	$\frac{\sqrt{33}}{44}$	
	$-\frac{\sqrt{33}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{13\sqrt{1155}}{1540}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{77}}{154}$	0	$-\frac{\sqrt{770}}{3080}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{231}}{154}$	0	$-\frac{\sqrt{462}}{88}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{462}}{88}$	0	$-\frac{\sqrt{231}}{154}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{770}}{3080}$	0	$\frac{5\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{13\sqrt{1155}}{1540}$	0	0	0	0	0	0	0	0	0	0
$\frac{\sqrt{10xz}(3x^2+3y^2-4z^2)}{4}$															
929	symmetry														

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 1)$	0	0	0	0	0	0	$-\frac{\sqrt{33}i}{44}$	0	$\frac{5\sqrt{77}i}{154}$	0	0	0	0
	0	0	0	0	0	0	0	$\frac{13\sqrt{1155}i}{1540}$	0	$-\frac{\sqrt{231}i}{154}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{770}i}{3080}$	0	$-\frac{\sqrt{462}i}{88}$	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{462}i}{88}$	0	$-\frac{\sqrt{770}i}{3080}$	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}i}{154}$	0	$\frac{13\sqrt{1155}i}{1540}$
	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{77}i}{154}$	0	$-\frac{\sqrt{33}i}{44}$
	$\frac{\sqrt{33}i}{44}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{13\sqrt{1155}i}{1540}$	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{77}i}{154}$	0	$\frac{\sqrt{770}i}{3080}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{231}i}{154}$	0	$\frac{\sqrt{462}i}{88}$	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{462}i}{88}$	0	$\frac{\sqrt{231}i}{154}$	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{770}i}{3080}$	0	$-\frac{5\sqrt{77}i}{154}$	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{13\sqrt{1155}i}{1540}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{33}i}{44}$	0	0	0	0	0	0	0
930	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$											

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{22}i}{22}$ 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 $-\frac{\sqrt{330}i}{55}$ 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 $-\frac{\sqrt{1155}i}{110}$
	0 0 0 0 0 0 0 $\frac{\sqrt{1155}i}{110}$ 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{55}$ 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{22}i}{22}$ 0 0 0 0	0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{1155}i}{110}$ 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 $-\frac{\sqrt{330}i}{55}$ 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ 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 0 0 0
	$\frac{\sqrt{22}i}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 $\frac{\sqrt{330}i}{55}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 $\frac{\sqrt{1155}i}{110}$ 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
931	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 2)$	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 0 0 0 0	$-\frac{\sqrt{330}}{55}$ 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{1155}}{110}$
	0 0 0 0 0 0 $-\frac{\sqrt{1155}}{110}$ 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 $-\frac{\sqrt{330}}{55}$ 0 0 0 0 0 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 0
	0 0 0 $-\frac{\sqrt{1155}}{110}$ 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 $-\frac{\sqrt{330}}{55}$ 0 0 0 0 0 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 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	$-\frac{\sqrt{22}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 $-\frac{\sqrt{330}}{55}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
	0 0 $-\frac{\sqrt{1155}}{110}$ 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0
932	symmetry	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}i}{154}$	0	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{330}i}{220}$	0	0	0	$-\frac{\sqrt{462}i}{308}$	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{9\sqrt{1155}i}{1540}$	0	0	0	$\frac{17\sqrt{385}i}{1540}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{17\sqrt{385}i}{1540}$	0	0	0	$\frac{9\sqrt{1155}i}{1540}$	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}i}{308}$	0	0	0	$-\frac{3\sqrt{330}i}{220}$	0
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{154}$	0	0	0	0
	0	$-\frac{3\sqrt{330}i}{220}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{1155}i}{1540}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{17\sqrt{385}i}{1540}$	0	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{2310}i}{154}$	0	0	0	$-\frac{\sqrt{462}i}{308}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{462}i}{308}$	0	0	0	$-\frac{\sqrt{2310}i}{154}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{17\sqrt{385}i}{1540}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{9\sqrt{1155}i}{1540}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{330}i}{220}$	0	0	0	0	0	0	0	0	0	0
933	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{330}}{220}$	0	0	$\frac{\sqrt{462}}{308}$	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{9\sqrt{1155}}{1540}$	0	0	$-\frac{17\sqrt{385}}{1540}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{17\sqrt{385}}{1540}$	0	0	0	$-\frac{9\sqrt{1155}}{1540}$	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}}{308}$	0	0	0	$\frac{3\sqrt{330}}{220}$
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	0
	0	$\frac{3\sqrt{330}}{220}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{9\sqrt{1155}}{1540}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{17\sqrt{385}}{1540}$	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{2310}}{154}$	0	0	0	$\frac{\sqrt{462}}{308}$	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{462}}{308}$	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	0	0	0	0	0
	0	0	$-\frac{17\sqrt{385}}{1540}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{9\sqrt{1155}}{1540}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{330}}{220}$	0	0	0	0	0	0	0	0	0
934	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$												

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{132} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
935	symmetry	$\frac{\sqrt{462}(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
936	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$

*continued ...*

Table 10

No.	multipole	matrix													
$T_6^{(1,0;a)}(A_{1g}, 3)$	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{77}}{44}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}}{44}$	0	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{154}}{44}$	0	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$
	0	0	0	0	0	0	0	0	$\frac{\sqrt{231}}{44}$	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	$\frac{\sqrt{22}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{154}}{44}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{231}}{44}$	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	0
	$\frac{\sqrt{77}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{231}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{154}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	0	0	0	0	0	0
937	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$													

continued ...

Table 10

*continued ..*

Table 10

No.	multipole	matrix
$T_6^{(1,0;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{77}i}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}i}{44}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 $\frac{\sqrt{154}i}{44}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{44}$ 0 0 0 0 0 $-\frac{\sqrt{22}i}{44}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}i}{44}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{77}i}{44}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{154}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{231}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{77}i}{44}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{77}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{231}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{154}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{22}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
939	symmetry	$\frac{3\sqrt{154}yz(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 1)$		$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$

940 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{21}i}{12}$ 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 0 0 0 0 0 0	0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0
	0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0	0 0
	0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{12}$ 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
	0 0 0 0 0 $-\frac{\sqrt{21}i}{12}$ 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
	$-\frac{\sqrt{21}i}{12}$ 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 0 0 0 0	0 0
941	symmetry	$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 2)$	0	0 0 0 0 0 0 $\frac{\sqrt{22}}{264}$ 0 $\frac{\sqrt{462}}{264}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{770}}{264}$ 0 $-\frac{5\sqrt{154}}{264}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{132}$ 0 $\frac{5\sqrt{77}}{132}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{132}$ 0 $-\frac{\sqrt{1155}}{132}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{154}}{264}$ 0 $\frac{\sqrt{770}}{264}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}}{264}$ 0 $-\frac{\sqrt{22}}{264}$
	$\frac{\sqrt{22}}{264}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{770}}{264}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{462}}{264}$	0 $\frac{\sqrt{1155}}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{5\sqrt{154}}{264}$ 0 $-\frac{5\sqrt{77}}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{5\sqrt{77}}{132}$ 0 $\frac{5\sqrt{154}}{264}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{1155}}{132}$ 0 $-\frac{\sqrt{462}}{264}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{770}}{264}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{22}}{264}$ 0 0 0 0 0 0 0 0 0
$- \frac{\sqrt{21}xz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$		

942 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 2)$	0	0 0 0 0 0 0 $\frac{\sqrt{22}i}{264}$ 0 $-\frac{\sqrt{462}i}{264}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{770}i}{264}$ 0 $\frac{5\sqrt{154}i}{264}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}i}{132}$ 0 $-\frac{5\sqrt{77}i}{132}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{77}i}{132}$ 0 $\frac{\sqrt{1155}i}{132}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{154}i}{264}$ 0 $-\frac{\sqrt{770}i}{264}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{264}$ 0 $\frac{\sqrt{22}i}{264}$
	$-\frac{\sqrt{22}i}{264}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{770}i}{264}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{462}i}{264}$	0 $-\frac{\sqrt{1155}i}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{5\sqrt{154}i}{264}$ 0 $\frac{5\sqrt{77}i}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{5\sqrt{77}i}{132}$ 0 $-\frac{5\sqrt{154}i}{264}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{1155}i}{132}$ 0 $\frac{\sqrt{462}i}{264}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{770}i}{264}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{22}i}{264}$ 0 0 0 0 0 0 0 0 0 0
943	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 3)$	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{44}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{132}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{165}i}{66}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{132}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{154}i}{44}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{165}i}{66}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{2310}i}{132}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{154}i}{44}$ 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
	$-\frac{\sqrt{154}i}{44}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{2310}i}{132}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0

944 symmetry

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

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{132}$	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{66}$	
	0	0	0	0	0	0	$\frac{\sqrt{165}}{66}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{132}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0	0	0
	0	0	0	$\frac{\sqrt{165}}{66}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{2310}}{132}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{154}}{44}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{2310}}{132}$	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
945	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$											

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 4)$	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{77}i}{66}$ 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{11}i}{66}$ 0 0 0 $-\frac{\sqrt{385}i}{66}$ 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{66}$ 0 0 0 $\frac{\sqrt{462}i}{66}$ 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{66}$ 0 0 0 $-\frac{\sqrt{154}i}{66}$ 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{385}i}{66}$ 0 0 0 $\frac{\sqrt{11}i}{66}$
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{77}i}{66}$ 0 0 0 0
	0	$\frac{\sqrt{11}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{154}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{462}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{77}i}{66}$	0 0 0 $-\frac{\sqrt{385}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{385}i}{66}$ 0 0 0 $\frac{\sqrt{77}i}{66}$ 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{462}i}{66}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{154}i}{66}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{11}i}{66}$ 0 0 0 0 0 0 0 0 0
$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$		

946 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													
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 4)$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{66}$	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{66}$	0	0	0	$\frac{\sqrt{385}}{66}$	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{154}}{66}$	0	0	0	$-\frac{\sqrt{462}}{66}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{462}}{66}$	0	0	0	$\frac{\sqrt{154}}{66}$	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{385}}{66}$	0	0	0	0	$-\frac{\sqrt{11}}{66}$
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{66}$	0	0	0	0
	0	$-\frac{\sqrt{11}}{66}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{154}}{66}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{462}}{66}$	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{77}}{66}$	0	0	0	$\frac{\sqrt{385}}{66}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{385}}{66}$	0	0	0	$-\frac{\sqrt{77}}{66}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{462}}{66}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{154}}{66}$	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{11}}{66}$	0	0	0	0	0	0	0	0	0	0

947 symmetry

z

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_1^{(a)}(A_{2g})$	$\frac{5\sqrt{14}}{49}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{14}}{49}$	0	0	0	0	0	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{14}}{49}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{14}}{49}$	0	0	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{14}}{49}$	0	0	0	0	0	$\frac{\sqrt{35}}{98}$	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{14}}{49}$	0	0	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{14}}{28}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{21}}{98}$	0	0	0	0	0	0	$\frac{15\sqrt{14}}{196}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	0	$\frac{9\sqrt{14}}{196}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	0	$\frac{3\sqrt{14}}{196}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{42}}{98}$	0	0	0	0	0	0	$-\frac{3\sqrt{14}}{196}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{35}}{98}$	0	0	0	0	0	0	$-\frac{9\sqrt{14}}{196}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	0	0	0	0	$-\frac{15\sqrt{14}}{196}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{3\sqrt{14}}{28}$	0
948	symmetry	$x$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(a)}(E_g)$	0	$\frac{\sqrt{70}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{28} \quad 0 \quad \frac{\sqrt{7}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{70}}{49}$	$0 \quad \frac{4\sqrt{7}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{196} \quad 0 \quad \frac{\sqrt{21}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{4\sqrt{7}}{49} \quad 0 \quad \frac{3\sqrt{14}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{196} \quad 0 \quad \frac{\sqrt{42}}{196} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad \frac{3\sqrt{14}}{49} \quad 0 \quad \frac{4\sqrt{7}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{196} \quad 0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{4\sqrt{7}}{49} \quad 0 \quad \frac{\sqrt{70}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{196} \quad 0 \quad \frac{\sqrt{105}}{196} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{49} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{196} \quad 0 \quad \frac{\sqrt{3}}{28} \quad 0 \quad 0$
	$-\frac{\sqrt{3}}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{105}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad \frac{3\sqrt{42}}{98} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{7}}{196}$	$0 \quad -\frac{\sqrt{70}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{98} \quad 0 \quad \frac{3\sqrt{210}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{21}}{196} \quad 0 \quad -\frac{\sqrt{42}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{196} \quad 0 \quad \frac{3\sqrt{14}}{49} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{196} \quad 0 \quad -\frac{\sqrt{21}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{49} \quad 0 \quad \frac{3\sqrt{210}}{196} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{196} \quad 0 \quad -\frac{\sqrt{7}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{196} \quad 0 \quad \frac{3\sqrt{42}}{98} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{196} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{98} \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{28} \quad 0 \quad 0$

949 symmetry

y

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,2}^{(a)}(E_g)$	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	0	$-\frac{\sqrt{3}i}{28}$	0	$-\frac{\sqrt{7}i}{196}$	0	0	0	0	0	0
	$\frac{\sqrt{70}i}{49}$	0	$-\frac{4\sqrt{7}i}{49}$	0	0	0	0	$-\frac{\sqrt{105}i}{196}$	0	$-\frac{\sqrt{21}i}{196}$	0	0	0	0	0
	0	$\frac{4\sqrt{7}i}{49}$	0	$-\frac{3\sqrt{14}i}{49}$	0	0	0	0	$-\frac{\sqrt{70}i}{196}$	0	$-\frac{\sqrt{42}i}{196}$	0	0	0	0
	0	0	$\frac{3\sqrt{14}i}{49}$	0	$-\frac{4\sqrt{7}i}{49}$	0	0	0	$-\frac{\sqrt{42}i}{196}$	0	$-\frac{\sqrt{70}i}{196}$	0	0	0	0
	0	0	0	$\frac{4\sqrt{7}i}{49}$	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	0	$-\frac{\sqrt{21}i}{196}$	0	$-\frac{\sqrt{105}i}{196}$	0	0
	0	0	0	0	$\frac{\sqrt{70}i}{49}$	0	0	0	0	0	$-\frac{\sqrt{7}i}{196}$	0	$-\frac{\sqrt{3}i}{28}$	0	0
	$\frac{\sqrt{3}i}{28}$	0	0	0	0	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{105}i}{196}$	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	$-\frac{3\sqrt{42}i}{98}$	0	0	0	0	0	0
	$\frac{\sqrt{7}i}{196}$	0	$\frac{\sqrt{70}i}{196}$	0	0	0	0	$\frac{3\sqrt{42}i}{98}$	0	$-\frac{3\sqrt{210}i}{196}$	0	0	0	0	0
	0	$\frac{\sqrt{21}i}{196}$	0	$\frac{\sqrt{42}i}{196}$	0	0	0	0	$\frac{3\sqrt{210}i}{196}$	0	$-\frac{3\sqrt{14}i}{49}$	0	0	0	0
	0	0	$\frac{\sqrt{42}i}{196}$	0	$\frac{\sqrt{21}i}{196}$	0	0	0	0	$\frac{3\sqrt{14}i}{49}$	0	$-\frac{3\sqrt{210}i}{196}$	0	0	0
	0	0	0	$\frac{\sqrt{70}i}{196}$	0	$\frac{\sqrt{7}i}{196}$	0	0	0	0	$\frac{3\sqrt{210}i}{196}$	0	$-\frac{3\sqrt{42}i}{98}$	0	0
	0	0	0	0	$\frac{\sqrt{105}i}{196}$	0	0	0	0	0	$\frac{3\sqrt{42}i}{98}$	0	$-\frac{3\sqrt{2}i}{28}$	0	0
	0	0	0	0	0	$\frac{\sqrt{3}i}{28}$	0	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	0
950	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(A_{1g})$	0	0 0 0 $-\frac{5\sqrt{3}}{42}$ 0 0 0 0 0 0 $-\frac{1}{14}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{30}}{21}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}}{14}$ 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{3}}{42}$ $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{3\sqrt{2}}{28}$ 0
	$-\frac{5\sqrt{3}}{42}$	0 0 0 0 0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$
	0	$-\frac{\sqrt{30}}{21}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{14}$ 0 0 0 0 0 0
	0	0 0 $-\frac{5\sqrt{3}}{42}$ 0 0 0 0 0 0 $\frac{1}{14}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 0 0 0
	0	0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{3}}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{21}$ 0 0 0
	0	0 0 0 0 0 $\frac{1}{14}$ $-\frac{\sqrt{42}}{42}$ 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0
	$-\frac{1}{14}$	0 0 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{42}$
	0	$-\frac{\sqrt{3}}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{21}$ 0 0 0 0 0 0
	0	0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0 0 0 0 $-\frac{2\sqrt{6}}{21}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 0 0
951	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_3^{(a)}(A_{2g}, 1)$	$-\frac{5\sqrt{3}}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{2}}{7}$	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	$\frac{2\sqrt{3}}{21}$	0	0	0	0	0	0	$\frac{1}{7}$	0	0	0	0	0	0
	0	0	0	$-\frac{2\sqrt{3}}{21}$	0	0	0	0	0	$\frac{1}{7}$	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	$\frac{5\sqrt{3}}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{2}}{7}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{3}}{6}$	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{2}}{7}$	0	0	0	0	0	0	$\frac{5\sqrt{3}}{42}$	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	$\frac{1}{7}$	0	0	0	0	0	0	$\frac{\sqrt{3}}{14}$	0	0	0	0	0	0
	0	0	0	$\frac{1}{7}$	0	0	0	0	0	0	$-\frac{\sqrt{3}}{14}$	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	$-\frac{\sqrt{2}}{7}$	0	0	0	0	0	0	$-\frac{5\sqrt{3}}{42}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{3}}{6}$	0	0
952	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(a)}(A_{2g}, 2)$	0	0	0	$\frac{5\sqrt{3}i}{42}$	0	0	0	0	0	$\frac{i}{14}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{30}i}{21}$	0	0	0	0	0	$\frac{\sqrt{3}i}{14}$	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{3}i}{42}$	$\frac{\sqrt{14}i}{28}$	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	0
	$-\frac{5\sqrt{3}i}{42}$	0	0	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	$\frac{\sqrt{14}i}{28}$	0
	0	$-\frac{\sqrt{30}i}{21}$	0	0	0	0	0	0	$\frac{\sqrt{3}i}{14}$	0	0	0	0	0	0
	0	0	$-\frac{5\sqrt{3}i}{42}$	0	0	0	0	0	0	$\frac{i}{14}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{14}i}{28}$	0	0	0	0	0	0	$\frac{\sqrt{42}i}{42}$	0	0	0	0	0
	0	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	0	$\frac{2\sqrt{6}i}{21}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{3}i}{14}$	0	0	0	0	0	0	$\frac{\sqrt{30}i}{21}$	0	0	0
	0	0	0	0	0	$-\frac{i}{14}$	$-\frac{\sqrt{42}i}{42}$	0	0	0	0	0	$\frac{2\sqrt{6}i}{21}$	0	0
	$-\frac{i}{14}$	0	0	0	0	0	0	$-\frac{2\sqrt{6}i}{21}$	0	0	0	0	0	$\frac{\sqrt{42}i}{42}$	0
	0	$-\frac{\sqrt{3}i}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{21}$	0	0	0	0	0	0
	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	0	$-\frac{2\sqrt{6}i}{21}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{14}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{42}$	0	0	0	0
953	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 1)$	0	$-\frac{\sqrt{10}}{14}$
	$-\frac{\sqrt{10}}{14}$	0
	0	$\frac{1}{14}$
	$\frac{1}{14}$	0
	0	$\frac{\sqrt{2}}{7}$
	$\frac{\sqrt{2}}{7}$	0
	0	$\frac{1}{14}$
	$\frac{1}{14}$	0
	0	$-\frac{\sqrt{10}}{14}$
	$-\frac{\sqrt{10}}{14}$	0
	0	$-\frac{\sqrt{10}}{14}$
	$-\frac{\sqrt{10}}{14}$	0
	0	$-\frac{\sqrt{10}}{42}$
	$-\frac{\sqrt{10}}{42}$	0
		$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
954	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(a)}(E_g, 1)$	0	$\frac{\sqrt{10}i}{14}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 $\frac{i}{7}$ 0 0 0 0 0
	$-\frac{\sqrt{10}i}{14}$	0 $-\frac{i}{14}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{42}$ 0 $\frac{\sqrt{3}i}{21}$ 0 0 0 0
	0	$\frac{i}{14}$ 0 $-\frac{\sqrt{2}i}{7}$ 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 $-\frac{\sqrt{6}i}{84}$ 0 0 0 0
	0	0 $\frac{\sqrt{2}i}{7}$ 0 $-\frac{i}{14}$ 0 0 0 0 $-\frac{\sqrt{6}i}{84}$ 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0
	0	0 0 $\frac{i}{14}$ 0 $\frac{\sqrt{10}i}{14}$ 0 0 0 0 $\frac{\sqrt{3}i}{21}$ 0 $-\frac{\sqrt{15}i}{42}$ 0
	0	0 0 0 $-\frac{\sqrt{10}i}{14}$ 0 0 0 0 0 0 $\frac{i}{7}$ 0 $\frac{\sqrt{21}i}{42}$
	$-\frac{\sqrt{21}i}{42}$	0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0
	0	$\frac{\sqrt{15}i}{42}$ 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 $\frac{\sqrt{6}i}{42}$ 0 0 0 0 0
	$-\frac{i}{7}$	0 $\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{42}$ 0 $-\frac{\sqrt{30}i}{42}$ 0 0 0 0
	0	$-\frac{\sqrt{3}i}{21}$ 0 $\frac{\sqrt{6}i}{84}$ 0 0 0 0 $\frac{\sqrt{30}i}{42}$ 0 $-\frac{\sqrt{2}i}{7}$ 0 0 0
	0	0 $\frac{\sqrt{6}i}{84}$ 0 $-\frac{\sqrt{3}i}{21}$ 0 0 0 0 $\frac{\sqrt{2}i}{7}$ 0 $-\frac{\sqrt{30}i}{42}$ 0 0
	0	0 0 0 $\frac{\sqrt{10}i}{28}$ 0 $-\frac{i}{7}$ 0 0 0 0 $\frac{\sqrt{30}i}{42}$ 0 $\frac{\sqrt{6}i}{42}$
	0	0 0 0 0 $\frac{\sqrt{15}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{42}$ 0 $\frac{\sqrt{14}i}{14}$
	0	0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0

955 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$	0	0	$\frac{5\sqrt{2}i}{28}$	0	0	0	0	0	0	$\frac{\sqrt{6}i}{21}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{10}i}{28}$	0	0	$\frac{\sqrt{42}i}{42}$	0	0	0	$\frac{\sqrt{30}i}{42}$	0	0	0	0
	$-\frac{5\sqrt{2}i}{28}$	0	0	0	$-\frac{\sqrt{10}i}{28}$	0	0	$\frac{\sqrt{3}i}{42}$	0	0	0	$\frac{i}{14}$	0	0	0
	0	$-\frac{\sqrt{10}i}{28}$	0	0	0	$-\frac{5\sqrt{2}i}{28}$	0	0	$-\frac{i}{14}$	0	0	0	$-\frac{\sqrt{3}i}{42}$	0	0
	0	0	$\frac{\sqrt{10}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{42}$	0	0	0	$-\frac{\sqrt{42}i}{42}$	0
	0	0	0	$\frac{5\sqrt{2}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{6}i}{21}$	0	0	0	0	0
	0	$-\frac{\sqrt{42}i}{42}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{3}i}{42}$	0	0	0	0	0	0	$\frac{3i}{14}$	0	0	0	0	0
	0	0	0	$\frac{i}{14}$	0	0	$-\frac{\sqrt{105}i}{42}$	0	0	0	$\frac{\sqrt{3}i}{21}$	0	0	0	0
	$-\frac{\sqrt{6}i}{21}$	0	0	0	$\frac{\sqrt{30}i}{42}$	0	0	$-\frac{3i}{14}$	0	0	0	$-\frac{\sqrt{3}i}{21}$	0	0	0
	0	$-\frac{\sqrt{30}i}{42}$	0	0	0	$\frac{\sqrt{6}i}{21}$	0	0	$-\frac{\sqrt{3}i}{21}$	0	0	0	$-\frac{3i}{14}$	0	0
	0	0	$-\frac{i}{14}$	0	0	0	0	0	0	$\frac{\sqrt{3}i}{21}$	0	0	0	$-\frac{\sqrt{105}i}{42}$	0
	0	0	0	$\frac{\sqrt{3}i}{42}$	0	0	0	0	0	$\frac{3i}{14}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{42}i}{42}$	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0	0	0

956 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(a)}(E_g, 2)$	0 0 $-\frac{5\sqrt{2}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{21}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{10}}{28}$ 0 0 $\frac{\sqrt{42}}{42}$ 0 0 0 $-\frac{\sqrt{30}}{42}$ 0 0 0 0	
	$-\frac{5\sqrt{2}}{28}$ 0 0 0 $\frac{\sqrt{10}}{28}$ 0 0 $\frac{\sqrt{3}}{42}$ 0 0 0 $-\frac{1}{14}$ 0 0 0 0	
	0 $-\frac{\sqrt{10}}{28}$ 0 0 0 $\frac{5\sqrt{2}}{28}$ 0 0 $-\frac{1}{14}$ 0 0 0 $\frac{\sqrt{3}}{42}$ 0	
	0 0 $\frac{\sqrt{10}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{30}}{42}$ 0 0 0 $\frac{\sqrt{42}}{42}$	
	0 0 0 $\frac{5\sqrt{2}}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{21}$ 0 0 0 0	
	0 $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{3}}{42}$ 0 0 0 0 0 0 $-\frac{3}{14}$ 0 0 0 0 0	
	0 0 0 $-\frac{1}{14}$ 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 $-\frac{\sqrt{3}}{21}$ 0 0 0 0	
	$-\frac{\sqrt{6}}{21}$ 0 0 0 $-\frac{\sqrt{30}}{42}$ 0 0 $-\frac{3}{14}$ 0 0 0 $\frac{\sqrt{3}}{21}$ 0 0	
	0 $-\frac{\sqrt{30}}{42}$ 0 0 0 $-\frac{\sqrt{6}}{21}$ 0 0 $-\frac{\sqrt{3}}{21}$ 0 0 0 $\frac{3}{14}$ 0	
	0 0 $-\frac{1}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{21}$ 0 0 0 $\frac{\sqrt{105}}{42}$	
	0 0 0 $\frac{\sqrt{3}}{42}$ 0 0 0 0 0 0 $\frac{3}{14}$ 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{42}$ 0 0	
957	symmetry	$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(a)}(A_{1g})$	0	0	0	$\frac{\sqrt{6}}{21}$	0	0	0	0	0	$\frac{5\sqrt{2}}{28}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{15}}{21}$	0	0	0	0	0	$-\frac{\sqrt{6}}{28}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{6}}{21}$	$-\frac{\sqrt{7}}{14}$	0	0	0	0	$-\frac{3}{14}$	0	0	
	$\frac{\sqrt{6}}{21}$	0	0	0	0	0	0	$\frac{3}{14}$	0	0	0	0	0	$\frac{\sqrt{7}}{14}$	
	0	$-\frac{\sqrt{15}}{21}$	0	0	0	0	0	0	$\frac{\sqrt{6}}{28}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{6}}{21}$	0	0	0	0	0	0	$-\frac{5\sqrt{2}}{28}$	0	0	0	0	
	0	0	$-\frac{\sqrt{7}}{14}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{21}$	0	0	0	0	
	0	0	0	$\frac{3}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{3}}{42}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{6}}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{15}}{21}$	0	0	
	0	0	0	0	0	$-\frac{5\sqrt{2}}{28}$	$\frac{\sqrt{21}}{21}$	0	0	0	0	0	$-\frac{\sqrt{3}}{42}$	0	
	$\frac{5\sqrt{2}}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{3}}{42}$	0	0	0	0	0	$\frac{\sqrt{21}}{21}$	
	0	$-\frac{\sqrt{6}}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{15}}{21}$	0	0	0	0	0	
	0	0	$-\frac{3}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{3}}{42}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{7}}{14}$	0	0	0	0	0	$\frac{\sqrt{21}}{21}$	0	0	0	0	
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													
$\mathbb{M}_5^{(a)}(A_{2g}, 1)$	$\frac{\sqrt{42}}{294}$	0	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	0
	0	$-\frac{5\sqrt{42}}{294}$	0	0	0	0	0	0	$-\frac{3\sqrt{105}}{98}$	0	0	0	0	0	0
	0	0	$\frac{5\sqrt{42}}{147}$	0	0	0	0	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0
	0	0	0	$-\frac{5\sqrt{42}}{147}$	0	0	0	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{42}}{294}$	0	0	0	0	0	$-\frac{3\sqrt{105}}{98}$	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{42}}{294}$	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{42}}{84}$	0	0	0	0	0	0	0	0
	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	$-\frac{23\sqrt{42}}{588}$	0	0	0	0	0	0	0
	0	$-\frac{3\sqrt{105}}{98}$	0	0	0	0	0	0	$\frac{17\sqrt{42}}{588}$	0	0	0	0	0	0
	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0	0	$\frac{5\sqrt{42}}{196}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{14}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{42}}{196}$	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{105}}{98}$	0	0	0	0	0	0	$-\frac{17\sqrt{42}}{588}$	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0	0	$\frac{23\sqrt{42}}{588}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{84}$	0
959	symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(a)}(A_{2g}, 2)$	0	0 0 0 $-\frac{\sqrt{6}i}{21}$ 0 0 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{15}i}{21}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{6}i}{21}$ $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $\frac{3i}{14}$ 0
	$\frac{\sqrt{6}i}{21}$	0 0 0 0 0 0 0 $\frac{3i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$
	0	$-\frac{\sqrt{15}i}{21}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0
	0	0 $\frac{\sqrt{6}i}{21}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0 0 0
	0	0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 0 0
	0	0 0 0 $-\frac{3i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{42}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{21}$ 0 0 0
	0	0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ $\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 $\frac{\sqrt{3}i}{42}$ 0
	$\frac{5\sqrt{2}i}{28}$	0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$
	0	$-\frac{\sqrt{6}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{21}$ 0 0 0 0 0
	0	0 0 $-\frac{3i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{42}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{21}$ 0 0 0

960 symmetry

$$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(a)}(E_g, 1)$	0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 0 0 0 0 0 0 $\frac{5\sqrt{2}}{28}$ 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 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	
	$\frac{\sqrt{3}}{7}$ 0 0 0 0 0 0 0 - $\frac{5\sqrt{2}}{28}$ 0 0 0 0 0 0	
	0 0 0 0 - $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0	
	0 0 0 0 0 - $\frac{5\sqrt{2}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 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 0 0 0 0 0 0 0 0 0 0	
	$\frac{5\sqrt{2}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0	
961	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(a)}(E_g, 1)$	0	0 0 0 0 0 $\frac{\sqrt{3}i}{7}$ 0 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 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 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{7}$	0 0 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{3}i}{7}$ 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{5\sqrt{2}i}{28}$	0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{7}$ 0 0 0 0 0 0
		$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

962 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(a)}(E_g, 2)$	0	$\frac{\sqrt{14}}{98}$	0	0	0	0	$-\frac{\sqrt{15}}{84}$	0	$\frac{5\sqrt{35}}{196}$	0	0	0	0	0	0
	$\frac{\sqrt{14}}{98}$	0	$-\frac{\sqrt{35}}{49}$	0	0	0	0	$\frac{23\sqrt{21}}{588}$	0	$-\frac{13\sqrt{105}}{588}$	0	0	0	0	0
	0	$-\frac{\sqrt{35}}{49}$	0	$\frac{\sqrt{70}}{49}$	0	0	0	0	$-\frac{11\sqrt{14}}{196}$	0	$\frac{\sqrt{210}}{588}$	0	0	0	0
	0	0	$\frac{\sqrt{70}}{49}$	0	$-\frac{\sqrt{35}}{49}$	0	0	0	0	$-\frac{\sqrt{210}}{588}$	0	$\frac{11\sqrt{14}}{196}$	0	0	0
	0	0	0	$-\frac{\sqrt{35}}{49}$	0	$\frac{\sqrt{14}}{98}$	0	0	0	0	$\frac{13\sqrt{105}}{588}$	0	$-\frac{23\sqrt{21}}{588}$	0	0
	0	0	0	0	$\frac{\sqrt{14}}{98}$	0	0	0	0	0	$-\frac{5\sqrt{35}}{196}$	0	$\frac{\sqrt{15}}{84}$	0	0
	$-\frac{\sqrt{15}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{10}}{28}$	0	0	0	0	0	0	0
	0	$\frac{23\sqrt{21}}{588}$	0	0	0	0	$\frac{\sqrt{10}}{28}$	0	$-\frac{2\sqrt{210}}{147}$	0	0	0	0	0	0
	$\frac{5\sqrt{35}}{196}$	0	$-\frac{11\sqrt{14}}{196}$	0	0	0	0	$-\frac{2\sqrt{210}}{147}$	0	$\frac{\sqrt{42}}{588}$	0	0	0	0	0
	0	$-\frac{13\sqrt{105}}{588}$	0	$-\frac{\sqrt{210}}{588}$	0	0	0	0	$\frac{\sqrt{42}}{588}$	0	$\frac{\sqrt{70}}{49}$	0	0	0	0
	0	0	$\frac{\sqrt{210}}{588}$	0	$\frac{13\sqrt{105}}{588}$	0	0	0	0	$\frac{\sqrt{70}}{49}$	0	$\frac{\sqrt{42}}{588}$	0	0	0
	0	0	0	$\frac{11\sqrt{14}}{196}$	0	$-\frac{5\sqrt{35}}{196}$	0	0	0	0	$\frac{\sqrt{42}}{588}$	0	$-\frac{2\sqrt{210}}{147}$	0	0
	0	0	0	0	$-\frac{23\sqrt{21}}{588}$	0	0	0	0	0	0	$-\frac{2\sqrt{210}}{147}$	0	$\frac{\sqrt{10}}{28}$	0
	0	0	0	0	0	$\frac{\sqrt{15}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{10}}{28}$	0	0
963	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(a)}(E_g, 2)$	0	$-\frac{\sqrt{14}i}{98}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{84}$ 0 $-\frac{5\sqrt{35}i}{196}$ 0 0 0 0 0
	$\frac{\sqrt{14}i}{98}$	0 $\frac{\sqrt{35}i}{49}$ 0 0 0 0 0 $\frac{23\sqrt{21}i}{588}$ 0 $\frac{13\sqrt{105}i}{588}$ 0 0 0 0 0
	0	$-\frac{\sqrt{35}i}{49}$ 0 $-\frac{\sqrt{70}i}{49}$ 0 0 0 0 $-\frac{11\sqrt{14}i}{196}$ 0 $-\frac{\sqrt{210}i}{588}$ 0 0 0 0 0
	0	0 $\frac{\sqrt{70}i}{49}$ 0 $\frac{\sqrt{35}i}{49}$ 0 0 0 0 $-\frac{\sqrt{210}i}{588}$ 0 $-\frac{11\sqrt{14}i}{196}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{35}i}{49}$ 0 $-\frac{\sqrt{14}i}{98}$ 0 0 0 0 $\frac{13\sqrt{105}i}{588}$ 0 $\frac{23\sqrt{21}i}{588}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}i}{98}$ 0 0 0 0 0 $-\frac{5\sqrt{35}i}{196}$ 0 $-\frac{\sqrt{15}i}{84}$ 0 0 0
	$\frac{\sqrt{15}i}{84}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 0 0 0
	0	$-\frac{23\sqrt{21}i}{588}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 $\frac{2\sqrt{210}i}{147}$ 0 0 0 0 0 0
	$\frac{5\sqrt{35}i}{196}$	0 $\frac{11\sqrt{14}i}{196}$ 0 0 0 0 0 $-\frac{2\sqrt{210}i}{147}$ 0 $-\frac{\sqrt{42}i}{588}$ 0 0 0 0 0
	0	$-\frac{13\sqrt{105}i}{588}$ 0 $\frac{\sqrt{210}i}{588}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{588}$ 0 $-\frac{\sqrt{70}i}{49}$ 0 0 0 0
	0	0 $\frac{\sqrt{210}i}{588}$ 0 $-\frac{13\sqrt{105}i}{588}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{49}$ 0 $-\frac{\sqrt{42}i}{588}$ 0 0 0
	0	0 0 0 $\frac{11\sqrt{14}i}{196}$ 0 $\frac{5\sqrt{35}i}{196}$ 0 0 0 0 $\frac{\sqrt{42}i}{588}$ 0 $\frac{2\sqrt{210}i}{147}$ 0 0 0
	0	0 0 0 0 $-\frac{23\sqrt{21}i}{588}$ 0 0 0 0 0 $-\frac{2\sqrt{210}i}{147}$ 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{15}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0
$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$		

964 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(a)}(E_g, 3)$	0	0 0 0 0 $\frac{\sqrt{6}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{14}$ 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{6}i}{14}$ 0 0 0 0 0 0 $\frac{i}{14}$ 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 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{6}i}{14}$	0 0 0 0 0 0 0 $-\frac{i}{14}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{6}i}{14}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{14}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0
	0	0 0 0 0 $\frac{i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{15}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 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 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{15}i}{14}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 0 0
	0	$-\frac{i}{14}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{28}$ 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0
965	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(a)}(E_g, 3)$	0	0	0	0	$\frac{\sqrt{6}}{14}$	0	0	0	0	0	$\frac{\sqrt{15}}{14}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{6}}{14}$	0	0	0	0	0	$\frac{1}{14}$	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	$-\frac{\sqrt{14}}{14}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{6}}{14}$	0	0	0	0	0	0	$\frac{1}{14}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{6}}{14}$	0	0	0	0	0	0	$\frac{\sqrt{15}}{14}$	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{14}}{14}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{28}$	0	0	0	
	0	0	0	0	$\frac{1}{14}$	0	0	0	0	0	$\frac{\sqrt{10}}{28}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{15}}{14}$	0	0	0	0	0	$-\frac{\sqrt{10}}{28}$	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	$\frac{\sqrt{42}}{28}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{15}}{14}$	0	0	0	0	0	0	$\frac{\sqrt{10}}{28}$	0	0	0	0	0	0	
966	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(a)}(E_g, 4)$	0	0	$-\frac{i}{14}$	0	0	0	0	0	0	$-\frac{5\sqrt{3}i}{42}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{5}i}{14}$	0	0	$-\frac{\sqrt{21}i}{42}$	0	0	0	$\frac{\sqrt{15}i}{21}$	0	0	0	0	
	$\frac{i}{14}$	0	0	0	$-\frac{\sqrt{5}i}{14}$	0	0	$\frac{2\sqrt{6}i}{21}$	0	0	0	$\frac{\sqrt{2}i}{14}$	0	0	0	
	0	$-\frac{\sqrt{5}i}{14}$	0	0	0	$\frac{i}{14}$	0	0	$-\frac{\sqrt{2}i}{14}$	0	0	0	$-\frac{2\sqrt{6}i}{21}$	0	0	
	0	0	$\frac{\sqrt{5}i}{14}$	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{21}$	0	0	0	$\frac{\sqrt{21}i}{42}$	0	
	0	0	0	$-\frac{i}{14}$	0	0	0	0	0	0	$\frac{5\sqrt{3}i}{42}$	0	0	0	0	
	0	$\frac{\sqrt{21}i}{42}$	0	0	0	0	0	0	$-\frac{\sqrt{210}i}{84}$	0	0	0	0	0	0	
	0	0	$-\frac{2\sqrt{6}i}{21}$	0	0	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{2}i}{14}$	0	0	$\frac{\sqrt{210}i}{84}$	0	0	0	$\frac{\sqrt{6}i}{21}$	0	0	0	0	
	$\frac{5\sqrt{3}i}{42}$	0	0	0	$\frac{\sqrt{15}i}{21}$	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	0	$-\frac{\sqrt{6}i}{21}$	0	0	0	
	0	$-\frac{\sqrt{15}i}{21}$	0	0	0	$-\frac{5\sqrt{3}i}{42}$	0	0	$-\frac{\sqrt{6}i}{21}$	0	0	0	$-\frac{3\sqrt{2}i}{28}$	0	0	
	0	0	$-\frac{\sqrt{2}i}{14}$	0	0	0	0	0	0	$\frac{\sqrt{6}i}{21}$	0	0	0	$\frac{\sqrt{210}i}{84}$	0	
	0	0	0	$\frac{2\sqrt{6}i}{21}$	0	0	0	0	0	0	$\frac{3\sqrt{2}i}{28}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{21}i}{42}$	0	0	0	0	0	$-\frac{\sqrt{210}i}{84}$	0	0	0	0	
967	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(a)}(E_g, 4)$	0	0 0 $\frac{1}{14}$ 0 0 0 0 0 0 $\frac{5\sqrt{3}}{42}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{5}}{14}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 $-\frac{\sqrt{15}}{21}$ 0 0 0
	$\frac{1}{14}$	0 0 0 0 $\frac{\sqrt{5}}{14}$ 0 0 $\frac{2\sqrt{6}}{21}$ 0 0 0 $-\frac{\sqrt{2}}{14}$ 0 0
	0	$-\frac{\sqrt{5}}{14}$ 0 0 0 $-\frac{1}{14}$ 0 0 $-\frac{\sqrt{2}}{14}$ 0 0 0 $\frac{2\sqrt{6}}{21}$ 0
	0	0 0 $\frac{\sqrt{5}}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{21}$ 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 $-\frac{1}{14}$ 0 0 0 0 0 0 $\frac{5\sqrt{3}}{42}$ 0 0 0
	0	$-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0
	0	0 0 $\frac{2\sqrt{6}}{21}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{2}}{14}$ 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 $-\frac{\sqrt{6}}{21}$ 0 0 0
	$\frac{5\sqrt{3}}{42}$	0 0 0 $-\frac{\sqrt{15}}{21}$ 0 0 $-\frac{3\sqrt{2}}{28}$ 0 0 0 $\frac{\sqrt{6}}{21}$ 0 0
	0	$-\frac{\sqrt{15}}{21}$ 0 0 0 0 $\frac{5\sqrt{3}}{42}$ 0 0 $-\frac{\sqrt{6}}{21}$ 0 0 0 $\frac{3\sqrt{2}}{28}$ 0
	0	0 0 $-\frac{\sqrt{2}}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{6}}{21}$ 0 0 0 $-\frac{\sqrt{210}}{84}$
	0	0 0 0 $\frac{2\sqrt{6}}{21}$ 0 0 0 0 0 0 $\frac{3\sqrt{2}}{28}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0

968 symmetry

z

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_1^{(1,-1;a)}(A_{2g})$	$-\frac{5\sqrt{14}}{98}$	0 0 0 0 0 0 0 $-\frac{2\sqrt{21}}{49}$ 0 0 0 0 0 0
	0	$-\frac{3\sqrt{14}}{98}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{35}}{49}$ 0 0 0 0 0
	0	0 $-\frac{\sqrt{14}}{98}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{42}}{49}$ 0 0 0 0
	0	0 0 0 $\frac{\sqrt{14}}{98}$ 0 0 0 0 0 0 $-\frac{2\sqrt{42}}{49}$ 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{14}}{98}$ 0 0 0 0 0 0 $-\frac{2\sqrt{35}}{49}$ 0 0
	0	0 0 0 0 0 $\frac{5\sqrt{14}}{98}$ 0 0 0 0 0 0 $-\frac{2\sqrt{21}}{49}$ 0
	0	0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0
	$-\frac{2\sqrt{21}}{49}$	0 0 0 0 0 0 0 $\frac{5\sqrt{14}}{98}$ 0 0 0 0 0 0
	0	$-\frac{2\sqrt{35}}{49}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{14}}{98}$ 0 0 0 0 0
	0	0 0 $-\frac{2\sqrt{42}}{49}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{98}$ 0 0 0 0
	0	0 0 0 0 $-\frac{2\sqrt{42}}{49}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{98}$ 0 0 0
	0	0 0 0 0 0 $-\frac{2\sqrt{35}}{49}$ 0 0 0 0 0 0 $-\frac{3\sqrt{14}}{98}$ 0 0
	0	0 0 0 0 0 $-\frac{2\sqrt{21}}{49}$ 0 0 0 0 0 0 $-\frac{5\sqrt{14}}{98}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$

969 symmetry

x

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)$	0	$-\frac{\sqrt{70}}{98}$ 0 0 0 0 0 $\frac{\sqrt{3}}{7}$ 0 $-\frac{\sqrt{7}}{49}$ 0 0 0 0 0
	$-\frac{\sqrt{70}}{98}$	0 $-\frac{2\sqrt{7}}{49}$ 0 0 0 0 0 $\frac{\sqrt{105}}{49}$ 0 $-\frac{\sqrt{21}}{49}$ 0 0 0 0 0
	0	$-\frac{2\sqrt{7}}{49}$ 0 $-\frac{3\sqrt{14}}{98}$ 0 0 0 0 0 $\frac{\sqrt{70}}{49}$ 0 $-\frac{\sqrt{42}}{49}$ 0 0 0 0
	0	0 $-\frac{3\sqrt{14}}{98}$ 0 $-\frac{2\sqrt{7}}{49}$ 0 0 0 0 0 $\frac{\sqrt{42}}{49}$ 0 $-\frac{\sqrt{70}}{49}$ 0 0 0
	0	0 0 $-\frac{2\sqrt{7}}{49}$ 0 $-\frac{\sqrt{70}}{98}$ 0 0 0 0 0 $\frac{\sqrt{21}}{49}$ 0 $-\frac{\sqrt{105}}{49}$ 0
	0	0 0 0 $-\frac{\sqrt{70}}{98}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{49}$ 0 $-\frac{\sqrt{3}}{7}$
	$\frac{\sqrt{3}}{7}$	0 0 0 0 0 0 0 $\frac{\sqrt{2}}{14}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{105}}{49}$ 0 0 0 0 0 $\frac{\sqrt{2}}{14}$ 0 $\frac{\sqrt{42}}{49}$ 0 0 0 0 0
	$-\frac{\sqrt{7}}{49}$	0 $\frac{\sqrt{70}}{49}$ 0 0 0 0 0 $\frac{\sqrt{42}}{49}$ 0 $\frac{\sqrt{210}}{98}$ 0 0 0 0 0
	0	$-\frac{\sqrt{21}}{49}$ 0 $\frac{\sqrt{42}}{49}$ 0 0 0 0 $\frac{\sqrt{210}}{98}$ 0 $\frac{2\sqrt{14}}{49}$ 0 0 0 0
	0	0 $-\frac{\sqrt{42}}{49}$ 0 $\frac{\sqrt{21}}{49}$ 0 0 0 0 0 $\frac{2\sqrt{14}}{49}$ 0 $\frac{\sqrt{210}}{98}$ 0 0
	0	0 0 0 $-\frac{\sqrt{70}}{49}$ 0 $\frac{\sqrt{7}}{49}$ 0 0 0 0 0 $\frac{\sqrt{210}}{98}$ 0 $\frac{\sqrt{42}}{49}$
	0	0 0 0 0 $-\frac{\sqrt{105}}{49}$ 0 0 0 0 0 0 $\frac{\sqrt{42}}{49}$ 0 $\frac{\sqrt{2}}{14}$
	0	0 0 0 0 0 $-\frac{\sqrt{3}}{7}$ 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{14}$ 0

970 symmetry

y

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)$	0	$\frac{\sqrt{70}i}{98}$	0	0	0	0	$\frac{\sqrt{3}i}{7}$	0	$\frac{\sqrt{7}i}{49}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{70}i}{98}$	0	$\frac{2\sqrt{7}i}{49}$	0	0	0	0	$\frac{\sqrt{105}i}{49}$	0	$\frac{\sqrt{21}i}{49}$	0	0	0	0	0	0
	0	$-\frac{2\sqrt{7}i}{49}$	0	$\frac{3\sqrt{14}i}{98}$	0	0	0	0	$\frac{\sqrt{70}i}{49}$	0	$\frac{\sqrt{42}i}{49}$	0	0	0	0	0
	0	0	$-\frac{3\sqrt{14}i}{98}$	0	$\frac{2\sqrt{7}i}{49}$	0	0	0	0	$\frac{\sqrt{42}i}{49}$	0	$\frac{\sqrt{70}i}{49}$	0	0	0	0
	0	0	0	$-\frac{2\sqrt{7}i}{49}$	0	$\frac{\sqrt{70}i}{98}$	0	0	0	0	$\frac{\sqrt{21}i}{49}$	0	$\frac{\sqrt{105}i}{49}$	0	0	0
	0	0	0	0	$-\frac{\sqrt{70}i}{98}$	0	0	0	0	0	$\frac{\sqrt{7}i}{49}$	0	$\frac{\sqrt{3}i}{7}$	0	0	0
	$-\frac{\sqrt{3}i}{7}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2}i}{14}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}i}{49}$	0	0	0	0	$\frac{\sqrt{2}i}{14}$	0	$-\frac{\sqrt{42}i}{49}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{7}i}{49}$	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	0	$\frac{\sqrt{42}i}{49}$	0	$-\frac{\sqrt{210}i}{98}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{21}i}{49}$	0	$-\frac{\sqrt{42}i}{49}$	0	0	0	0	$\frac{\sqrt{210}i}{98}$	0	$-\frac{2\sqrt{14}i}{49}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{42}i}{49}$	0	$-\frac{\sqrt{21}i}{49}$	0	0	0	0	$\frac{2\sqrt{14}i}{49}$	0	$-\frac{\sqrt{210}i}{98}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{70}i}{49}$	0	$-\frac{\sqrt{7}i}{49}$	0	0	0	0	$\frac{\sqrt{210}i}{98}$	0	$-\frac{\sqrt{42}i}{49}$	0	0	0
	0	0	0	0	$-\frac{\sqrt{105}i}{49}$	0	0	0	0	0	$\frac{\sqrt{42}i}{49}$	0	$-\frac{\sqrt{2}i}{14}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{3}i}{7}$	0	0	0	0	0	$\frac{\sqrt{2}i}{14}$	0	0	0	0
971	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,-1;a)}(A_{1g})$	0	0	0	$\frac{\sqrt{70}}{98}$	0	0	0	0	0	$\frac{\sqrt{210}}{147}$	0	0	0	0	
	0	0	0	0	$\frac{2\sqrt{7}}{49}$	0	0	0	0	0	$\frac{\sqrt{70}}{49}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{70}}{98}$	$-\frac{\sqrt{15}}{21}$	0	0	0	0	$\frac{\sqrt{105}}{49}$	0	$\frac{\sqrt{15}}{21}$	
	$\frac{\sqrt{70}}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{105}}{49}$	0	0	0	0	0	$\frac{\sqrt{15}}{21}$	
	0	$\frac{2\sqrt{7}}{49}$	0	0	0	0	0	0	$-\frac{\sqrt{70}}{49}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{70}}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{210}}{147}$	0	0	0	0	
	0	0	$-\frac{\sqrt{15}}{21}$	0	0	0	0	0	0	$-\frac{\sqrt{5}}{14}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{105}}{49}$	0	0	0	0	0	$-\frac{2\sqrt{35}}{49}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{70}}{49}$	0	0	0	0	0	$-\frac{5\sqrt{7}}{49}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{210}}{147}$	$-\frac{\sqrt{5}}{14}$	0	0	0	0	$-\frac{2\sqrt{35}}{49}$	0	$-\frac{\sqrt{5}}{14}$	
	$\frac{\sqrt{210}}{147}$	0	0	0	0	0	0	$-\frac{2\sqrt{35}}{49}$	0	0	0	0	0	$-\frac{\sqrt{5}}{14}$	
	0	$\frac{\sqrt{70}}{49}$	0	0	0	0	0	0	$-\frac{5\sqrt{7}}{49}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{105}}{49}$	0	0	0	0	0	0	$-\frac{2\sqrt{35}}{49}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{15}}{21}$	0	0	0	0	0	$-\frac{\sqrt{5}}{14}$	0	0	0	0	
972	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix
$M_3^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{70}}{98}$	0 0 0 0 0 0 0 $\frac{4\sqrt{105}}{147}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{70}}{70}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{2\sqrt{70}}{245}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{210}}{147}$ 0 0 0 0
	0	0 0 0 $\frac{2\sqrt{70}}{245}$ 0 0 0 0 0 0 $-\frac{2\sqrt{210}}{147}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{70}}{70}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{70}}{98}$ 0 0 0 0 0 0 $\frac{4\sqrt{105}}{147}$ 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0
	$\frac{4\sqrt{105}}{147}$	0 0 0 0 0 0 0 $\frac{5\sqrt{70}}{196}$ 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 $-\frac{2\sqrt{210}}{147}$ 0 0 0 0 0 0 $\frac{3\sqrt{70}}{196}$ 0 0 0 0
	0	0 0 0 $-\frac{2\sqrt{210}}{147}$ 0 0 0 0 0 0 $-\frac{3\sqrt{70}}{196}$ 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 $\frac{4\sqrt{105}}{147}$ 0 0 0 0 0 0 $-\frac{5\sqrt{70}}{196}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}}{28}$
973	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	0	0	0	$-\frac{\sqrt{70}i}{98}$	0	0	0	0	0	$-\frac{\sqrt{210}i}{147}$	0	0	0	0	
	0	0	0	0	$-\frac{2\sqrt{7}i}{49}$	0	0	0	0	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{70}i}{98}$	$-\frac{\sqrt{15}i}{21}$	0	0	0	0	$-\frac{\sqrt{105}i}{49}$	0	0	
	$\frac{\sqrt{70}i}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{49}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{21}$	
	0	$\frac{2\sqrt{7}i}{49}$	0	0	0	0	0	0	$-\frac{\sqrt{70}i}{49}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{70}i}{98}$	0	0	0	0	0	0	$-\frac{\sqrt{210}i}{147}$	0	0	0	0	
	0	0	$\frac{\sqrt{15}i}{21}$	0	0	0	0	0	0	$\frac{\sqrt{5}i}{14}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{105}i}{49}$	0	0	0	0	0	$\frac{2\sqrt{35}i}{49}$	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{70}i}{49}$	0	0	0	0	0	$\frac{5\sqrt{7}i}{49}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{210}i}{147}$	$-\frac{\sqrt{5}i}{14}$	0	0	0	0	$\frac{2\sqrt{35}i}{49}$	0	0	
	$\frac{\sqrt{210}i}{147}$	0	0	0	0	0	0	$-\frac{2\sqrt{35}i}{49}$	0	0	0	0	0	$\frac{\sqrt{5}i}{14}$	
	0	$\frac{\sqrt{70}i}{49}$	0	0	0	0	0	0	$-\frac{5\sqrt{7}i}{49}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{105}i}{49}$	0	0	0	0	0	0	$-\frac{2\sqrt{35}i}{49}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{15}i}{21}$	0	0	0	0	0	$-\frac{\sqrt{5}i}{14}$	0	0	0	0	
974	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{21}}{49}$	0	0	0	0	$-\frac{\sqrt{10}}{21}$	0	$\frac{2\sqrt{210}}{147}$	0	0	0	0	0	0
	$\frac{\sqrt{21}}{49}$	0	$-\frac{\sqrt{210}}{490}$	0	0	0	0	$\frac{5\sqrt{14}}{147}$	0	$\frac{2\sqrt{70}}{147}$	0	0	0	0	0
	0	$-\frac{\sqrt{210}}{490}$	0	$-\frac{2\sqrt{105}}{245}$	0	0	0	0	$\frac{5\sqrt{21}}{147}$	0	$-\frac{\sqrt{35}}{147}$	0	0	0	0
	0	0	$-\frac{2\sqrt{105}}{245}$	0	$-\frac{\sqrt{210}}{490}$	0	0	0	0	$\frac{\sqrt{35}}{147}$	0	$-\frac{5\sqrt{21}}{147}$	0	0	0
	0	0	0	$-\frac{\sqrt{210}}{490}$	0	$\frac{\sqrt{21}}{49}$	0	0	0	0	$-\frac{2\sqrt{70}}{147}$	0	$-\frac{5\sqrt{14}}{147}$	0	0
	0	0	0	0	$\frac{\sqrt{21}}{49}$	0	0	0	0	0	$-\frac{2\sqrt{210}}{147}$	0	$\frac{\sqrt{10}}{21}$	0	0
	$-\frac{\sqrt{10}}{21}$	0	0	0	0	0	0	$-\frac{\sqrt{15}}{14}$	0	0	0	0	0	0	0
	0	$\frac{5\sqrt{14}}{147}$	0	0	0	0	$-\frac{\sqrt{15}}{14}$	0	$-\frac{\sqrt{35}}{98}$	0	0	0	0	0	0
	$\frac{2\sqrt{210}}{147}$	0	$\frac{5\sqrt{21}}{147}$	0	0	0	0	$-\frac{\sqrt{35}}{98}$	0	$\frac{5\sqrt{7}}{98}$	0	0	0	0	0
	0	$\frac{2\sqrt{70}}{147}$	0	$\frac{\sqrt{35}}{147}$	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	$\frac{\sqrt{105}}{49}$	0	0	0	0
	0	0	$-\frac{\sqrt{35}}{147}$	0	$-\frac{2\sqrt{70}}{147}$	0	0	0	0	$\frac{\sqrt{105}}{49}$	0	$\frac{5\sqrt{7}}{98}$	0	0	0
	0	0	0	$-\frac{5\sqrt{21}}{147}$	0	$-\frac{2\sqrt{210}}{147}$	0	0	0	0	$\frac{5\sqrt{7}}{98}$	0	$-\frac{\sqrt{35}}{98}$	0	0
	0	0	0	0	$-\frac{5\sqrt{14}}{147}$	0	0	0	0	0	$-\frac{\sqrt{35}}{98}$	0	$-\frac{\sqrt{15}}{14}$	0	0
	0	0	0	0	0	$\frac{\sqrt{10}}{21}$	0	0	0	0	0	$-\frac{\sqrt{15}}{14}$	0	0	0

975 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{21}i}{49}$	0	0	0	0	$-\frac{\sqrt{10}i}{21}$	0	$-\frac{2\sqrt{210}i}{147}$	0	0	0	0	0	0	0
	$\frac{\sqrt{21}i}{49}$	0	$\frac{\sqrt{210}i}{490}$	0	0	0	0	$\frac{5\sqrt{14}i}{147}$	0	$-\frac{2\sqrt{70}i}{147}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{210}i}{490}$	0	$\frac{2\sqrt{105}i}{245}$	0	0	0	0	$\frac{5\sqrt{21}i}{147}$	0	$\frac{\sqrt{35}i}{147}$	0	0	0	0	0
	0	0	$-\frac{2\sqrt{105}i}{245}$	0	$\frac{\sqrt{210}i}{490}$	0	0	0	0	$\frac{\sqrt{35}i}{147}$	0	$\frac{5\sqrt{21}i}{147}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{210}i}{490}$	0	$-\frac{\sqrt{21}i}{49}$	0	0	0	0	$-\frac{2\sqrt{70}i}{147}$	0	$\frac{5\sqrt{14}i}{147}$	0	0	0
	0	0	0	0	$\frac{\sqrt{21}i}{49}$	0	0	0	0	0	0	$-\frac{2\sqrt{210}i}{147}$	0	$-\frac{\sqrt{10}i}{21}$	0	0
	$\frac{\sqrt{10}i}{21}$	0	0	0	0	0	0	$\frac{\sqrt{15}i}{14}$	0	0	0	0	0	0	0	0
	0	$-\frac{5\sqrt{14}i}{147}$	0	0	0	0	$-\frac{\sqrt{15}i}{14}$	0	$\frac{\sqrt{35}i}{98}$	0	0	0	0	0	0	0
	$\frac{2\sqrt{210}i}{147}$	0	$-\frac{5\sqrt{21}i}{147}$	0	0	0	0	$-\frac{\sqrt{35}i}{98}$	0	$-\frac{5\sqrt{7}i}{98}$	0	0	0	0	0	0
	0	$\frac{2\sqrt{70}i}{147}$	0	$-\frac{\sqrt{35}i}{147}$	0	0	0	0	$\frac{5\sqrt{7}i}{98}$	0	$-\frac{\sqrt{105}i}{49}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{35}i}{147}$	0	$\frac{2\sqrt{70}i}{147}$	0	0	0	0	$\frac{\sqrt{105}i}{49}$	0	$-\frac{5\sqrt{7}i}{98}$	0	0	0	0
	0	0	0	$-\frac{5\sqrt{21}i}{147}$	0	$\frac{2\sqrt{210}i}{147}$	0	0	0	0	$\frac{5\sqrt{7}i}{98}$	0	$\frac{\sqrt{35}i}{98}$	0	0	0
	0	0	0	0	$-\frac{5\sqrt{14}i}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{35}i}{98}$	0	$\frac{\sqrt{15}i}{14}$	0	0
	0	0	0	0	0	$\frac{\sqrt{10}i}{21}$	0	0	0	0	0	0	$-\frac{\sqrt{15}i}{14}$	0	0	0

976 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	0 0 $-\frac{\sqrt{105}i}{98}$ 0 0 0 0 0 0 $-\frac{4\sqrt{35}i}{147}$ 0 0 0 0														
	0 0 0 $-\frac{\sqrt{21}i}{98}$ 0 0 $-\frac{2\sqrt{5}i}{21}$ 0 0 0 $-\frac{10\sqrt{7}i}{147}$ 0 0 0 0														
	$\frac{\sqrt{105}i}{98}$ 0 0 0 $\frac{\sqrt{21}i}{98}$ 0 0 $-\frac{\sqrt{70}i}{147}$ 0 0 0 $-\frac{\sqrt{210}i}{147}$ 0 0 0														
	0 $\frac{\sqrt{21}i}{98}$ 0 0 0 $\frac{\sqrt{105}i}{98}$ 0 0 $\frac{\sqrt{210}i}{147}$ 0 0 0 $\frac{\sqrt{70}i}{147}$ 0 0 0														
	0 0 $-\frac{\sqrt{21}i}{98}$ 0 0 0 0 0 0 $\frac{10\sqrt{7}i}{147}$ 0 0 0 $\frac{2\sqrt{5}i}{21}$														
	0 0 0 $-\frac{\sqrt{105}i}{98}$ 0 0 0 0 0 0 $\frac{4\sqrt{35}i}{147}$ 0 0 0 0														
	0 $\frac{2\sqrt{5}i}{21}$ 0 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 0 0 0 0 0 0														
	0 0 $\frac{\sqrt{70}i}{147}$ 0 0 0 0 0 0 0 $\frac{3\sqrt{210}i}{196}$ 0 0 0 0														
	0 0 0 $-\frac{\sqrt{210}i}{147}$ 0 0 $-\frac{5\sqrt{2}i}{28}$ 0 0 0 $\frac{\sqrt{70}i}{98}$ 0 0 0 0														
	$\frac{4\sqrt{35}i}{147}$ 0 0 0 $-\frac{10\sqrt{7}i}{147}$ 0 0 $-\frac{3\sqrt{210}i}{196}$ 0 0 0 $-\frac{\sqrt{70}i}{98}$ 0 0														
	0 $\frac{10\sqrt{7}i}{147}$ 0 0 0 $-\frac{4\sqrt{35}i}{147}$ 0 0 $-\frac{\sqrt{70}i}{98}$ 0 0 0 $-\frac{3\sqrt{210}i}{196}$ 0 0														
	0 0 $\frac{\sqrt{210}i}{147}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{98}$ 0 0 0 $-\frac{5\sqrt{2}i}{28}$														
	0 0 0 $-\frac{\sqrt{70}i}{147}$ 0 0 0 0 0 0 $\frac{3\sqrt{210}i}{196}$ 0 0 0 0														
	0 0 0 0 $-\frac{2\sqrt{5}i}{21}$ 0 0 0 0 0 0 $\frac{5\sqrt{2}i}{28}$ 0 0 0														

977 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	0	0	$\frac{\sqrt{105}}{98}$	0	0	0	0	0	0	$\frac{4\sqrt{35}}{147}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{21}}{98}$	0	0	$-\frac{2\sqrt{5}}{21}$	0	0	0	$\frac{10\sqrt{7}}{147}$	0	0	0	0
	$\frac{\sqrt{105}}{98}$	0	0	0	$-\frac{\sqrt{21}}{98}$	0	0	$-\frac{\sqrt{70}}{147}$	0	0	0	$\frac{\sqrt{210}}{147}$	0	0	0
	0	$\frac{\sqrt{21}}{98}$	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	$\frac{\sqrt{210}}{147}$	0	0	0	$-\frac{\sqrt{70}}{147}$	0	0
	0	0	$-\frac{\sqrt{21}}{98}$	0	0	0	0	0	0	$\frac{10\sqrt{7}}{147}$	0	0	0	$-\frac{2\sqrt{5}}{21}$	0
	0	0	0	$-\frac{\sqrt{105}}{98}$	0	0	0	0	0	$\frac{4\sqrt{35}}{147}$	0	0	0	0	0
	0	$-\frac{2\sqrt{5}}{21}$	0	0	0	0	0	0	$-\frac{5\sqrt{2}}{28}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{70}}{147}$	0	0	0	0	0	0	$-\frac{3\sqrt{210}}{196}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{210}}{147}$	0	0	$-\frac{5\sqrt{2}}{28}$	0	0	0	$-\frac{\sqrt{70}}{98}$	0	0	0	0
	$\frac{4\sqrt{35}}{147}$	0	0	0	$\frac{10\sqrt{7}}{147}$	0	0	$-\frac{3\sqrt{210}}{196}$	0	0	0	$\frac{\sqrt{70}}{98}$	0	0	0
	0	$\frac{10\sqrt{7}}{147}$	0	0	0	$\frac{4\sqrt{35}}{147}$	0	0	$-\frac{\sqrt{70}}{98}$	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0
	0	0	$\frac{\sqrt{210}}{147}$	0	0	0	0	0	$\frac{\sqrt{70}}{98}$	0	0	0	$\frac{5\sqrt{2}}{28}$	0	0
	0	0	0	$-\frac{\sqrt{70}}{147}$	0	0	0	0	0	$\frac{3\sqrt{210}}{196}$	0	0	0	0	0
	0	0	0	0	$-\frac{2\sqrt{5}}{21}$	0	0	0	0	0	$\frac{5\sqrt{2}}{28}$	0	0	0	0
978	symmetry	$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	0	0	0	$-\frac{\sqrt{55}}{231}$	0	0	0	0	0	$-\frac{\sqrt{165}}{77}$	0	0	0	0	
	0	0	0	0	$\frac{5\sqrt{22}}{462}$	0	0	0	0	0	$\frac{3\sqrt{55}}{385}$	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{55}}{231}$	$\frac{\sqrt{2310}}{385}$	0	0	0	0	$\frac{3\sqrt{330}}{385}$	0	0	
	$-\frac{\sqrt{55}}{231}$	0	0	0	0	0	0	$-\frac{3\sqrt{330}}{385}$	0	0	0	0	0	$-\frac{\sqrt{2310}}{385}$	
	0	$\frac{5\sqrt{22}}{462}$	0	0	0	0	0	0	$-\frac{3\sqrt{55}}{385}$	0	0	0	0	0	
	0	0	$-\frac{\sqrt{55}}{231}$	0	0	0	0	0	$\frac{\sqrt{165}}{77}$	0	0	0	0	0	
	0	0	$\frac{\sqrt{2310}}{385}$	0	0	0	0	0	$\frac{\sqrt{770}}{77}$	0	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{330}}{385}$	0	0	0	0	0	$-\frac{\sqrt{110}}{154}$	0	0	0	0	
	0	0	0	0	$-\frac{3\sqrt{55}}{385}$	0	0	0	0	0	$-\frac{5\sqrt{22}}{77}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{165}}{77}$	$\frac{\sqrt{770}}{77}$	0	0	0	0	$-\frac{\sqrt{110}}{154}$	0	0	
	$-\frac{\sqrt{165}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{110}}{154}$	0	0	0	0	0	$\frac{\sqrt{770}}{77}$	
	0	$\frac{3\sqrt{55}}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}}{77}$	0	0	0	0	0	
	0	0	$\frac{3\sqrt{330}}{385}$	0	0	0	0	0	0	$-\frac{\sqrt{110}}{154}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{2310}}{385}$	0	0	0	0	0	$\frac{\sqrt{770}}{77}$	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												
$M_5^{(1,-1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{385}}{3234}$	0	0	0	0	0	0	$-\frac{\sqrt{2310}}{539}$	0	0	0	0	0	0
	0	$\frac{5\sqrt{385}}{3234}$	0	0	0	0	0	0	$\frac{9\sqrt{154}}{539}$	0	0	0	0	0
	0	0	$-\frac{5\sqrt{385}}{1617}$	0	0	0	0	0	0	$-\frac{2\sqrt{1155}}{539}$	0	0	0	0
	0	0	0	$\frac{5\sqrt{385}}{1617}$	0	0	0	0	0	$-\frac{2\sqrt{1155}}{539}$	0	0	0	0
	0	0	0	0	$-\frac{5\sqrt{385}}{3234}$	0	0	0	0	0	$\frac{9\sqrt{154}}{539}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{385}}{3234}$	0	0	0	0	0	$-\frac{\sqrt{2310}}{539}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{385}}{154}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{2310}}{539}$	0	0	0	0	0	0	$-\frac{23\sqrt{385}}{1078}$	0	0	0	0	0	0
	0	$\frac{9\sqrt{154}}{539}$	0	0	0	0	0	0	$\frac{17\sqrt{385}}{1078}$	0	0	0	0	0
	0	0	$-\frac{2\sqrt{1155}}{539}$	0	0	0	0	0	0	$\frac{15\sqrt{385}}{1078}$	0	0	0	0
	0	0	0	$-\frac{2\sqrt{1155}}{539}$	0	0	0	0	0	0	$-\frac{15\sqrt{385}}{1078}$	0	0	0
	0	0	0	0	$\frac{9\sqrt{154}}{539}$	0	0	0	0	0	0	$-\frac{17\sqrt{385}}{1078}$	0	0
	0	0	0	0	0	$-\frac{\sqrt{2310}}{539}$	0	0	0	0	0	$\frac{23\sqrt{385}}{1078}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{385}}{154}$	0
980	symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$												

continued ...

Table 10

No.	multipole	matrix												
$M_5^{(1,-1;a)}(A_{2g}, 2)$	0	0	0	$\frac{\sqrt{55}i}{231}$	0	0	0	0	0	$\frac{\sqrt{165}i}{77}$	0	0	0	
	0	0	0	0	$-\frac{5\sqrt{22}i}{462}$	0	0	0	0	0	$-\frac{3\sqrt{55}i}{385}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{55}i}{231}$	$\frac{\sqrt{2310}i}{385}$	0	0	0	0	$-\frac{3\sqrt{330}i}{385}$	0	
	$-\frac{\sqrt{55}i}{231}$	0	0	0	0	0	0	$-\frac{3\sqrt{330}i}{385}$	0	0	0	0	$\frac{\sqrt{2310}i}{385}$	
	0	$\frac{5\sqrt{22}i}{462}$	0	0	0	0	0	0	$-\frac{3\sqrt{55}i}{385}$	0	0	0	0	
	0	0	$-\frac{\sqrt{55}i}{231}$	0	0	0	0	0	$\frac{\sqrt{165}i}{77}$	0	0	0	0	
	0	0	$-\frac{\sqrt{2310}i}{385}$	0	0	0	0	0	$-\frac{\sqrt{770}i}{77}$	0	0	0	0	
	0	0	0	$\frac{3\sqrt{330}i}{385}$	0	0	0	0	0	$\frac{\sqrt{110}i}{154}$	0	0	0	
	0	0	0	0	$\frac{3\sqrt{55}i}{385}$	0	0	0	0	0	$\frac{5\sqrt{22}i}{77}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{165}i}{77}$	$\frac{\sqrt{770}i}{77}$	0	0	0	0	$\frac{\sqrt{110}i}{154}$	0	
	$-\frac{\sqrt{165}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{154}$	0	0	0	0	$-\frac{\sqrt{770}i}{77}$	
	0	$\frac{3\sqrt{55}i}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}i}{77}$	0	0	0	0	
	0	0	$\frac{3\sqrt{330}i}{385}$	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{154}$	0	0	0	
	0	0	0	$-\frac{\sqrt{2310}i}{385}$	0	0	0	0	0	$\frac{\sqrt{770}i}{77}$	0	0	0	

981 symmetry

$$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	0	0	0	0	0	$-\frac{\sqrt{110}}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{165}}{77}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}}{77}$	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{231}}{77}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{110}}{154}$	0	0	0	0	0	0	$\frac{\sqrt{165}}{77}$	0	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{231}}{77}$	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{165}}{77}$	0	0	0	0	0	$\frac{3\sqrt{110}}{77}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{165}}{77}$	0	0	0	0	0	0	$\frac{3\sqrt{110}}{77}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{231}}{77}$	0	0	0	0	0	0	$\frac{\sqrt{2310}}{154}$	0	0	0	0	0	

982 symmetry

$$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 1)$	0	0	0	0	0	$-\frac{\sqrt{110}i}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{165}i}{77}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{231}i}{77}$	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{231}i}{77}$	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{110}i}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{165}i}{77}$	0	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{231}i}{77}$	0	0	0	0	0	$\frac{\sqrt{2310}i}{154}$	0	0		
	0	0	0	0	0	$\frac{\sqrt{165}i}{77}$	0	0	0	0	0	$\frac{3\sqrt{110}i}{77}$	0		
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{2310}i}{154}$		
	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	
	$\frac{\sqrt{165}i}{77}$	0	0	0	0	0	0	$-\frac{3\sqrt{110}i}{77}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{231}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{2310}i}{154}$	0	0	0	0	0	
983	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{\sqrt{1155}}{3234}$	0	0	0	0	$\frac{\sqrt{22}}{154}$	0	$-\frac{5\sqrt{462}}{1078}$	0	0	0	0	0	0
	$-\frac{\sqrt{1155}}{3234}$	0	$\frac{5\sqrt{462}}{3234}$	0	0	0	0	$-\frac{23\sqrt{770}}{5390}$	0	$\frac{13\sqrt{154}}{1078}$	0	0	0	0	0
	0	$\frac{5\sqrt{462}}{3234}$	0	$-\frac{5\sqrt{231}}{1617}$	0	0	0	0	$\frac{\sqrt{1155}}{245}$	0	$-\frac{\sqrt{77}}{539}$	0	0	0	0
	0	0	$-\frac{5\sqrt{231}}{1617}$	0	$\frac{5\sqrt{462}}{3234}$	0	0	0	0	$\frac{\sqrt{77}}{539}$	0	$-\frac{\sqrt{1155}}{245}$	0	0	0
	0	0	0	$\frac{5\sqrt{462}}{3234}$	0	$-\frac{\sqrt{1155}}{3234}$	0	0	0	0	$-\frac{13\sqrt{154}}{1078}$	0	$\frac{23\sqrt{770}}{5390}$	0	0
	0	0	0	0	$-\frac{\sqrt{1155}}{3234}$	0	0	0	0	0	$\frac{5\sqrt{462}}{1078}$	0	$-\frac{\sqrt{22}}{154}$		
	$\frac{\sqrt{22}}{154}$	0	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	0	0	0	0	0	0
	0	$-\frac{23\sqrt{770}}{5390}$	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	$-\frac{20\sqrt{77}}{539}$	0	0	0	0	0	0
	$-\frac{5\sqrt{462}}{1078}$	0	$\frac{\sqrt{1155}}{245}$	0	0	0	0	$-\frac{20\sqrt{77}}{539}$	0	$\frac{\sqrt{385}}{1078}$	0	0	0	0	0
	0	$\frac{13\sqrt{154}}{1078}$	0	$\frac{\sqrt{77}}{539}$	0	0	0	0	$\frac{\sqrt{385}}{1078}$	0	$\frac{10\sqrt{231}}{539}$	0	0	0	0
	0	0	$-\frac{\sqrt{77}}{539}$	0	$-\frac{13\sqrt{154}}{1078}$	0	0	0	0	$\frac{10\sqrt{231}}{539}$	0	$\frac{\sqrt{385}}{1078}$	0	0	0
	0	0	0	$-\frac{\sqrt{1155}}{245}$	0	$\frac{5\sqrt{462}}{1078}$	0	0	0	0	$\frac{\sqrt{385}}{1078}$	0	$-\frac{20\sqrt{77}}{539}$	0	
	0	0	0	0	$\frac{23\sqrt{770}}{5390}$	0	0	0	0	0	$-\frac{20\sqrt{77}}{539}$	0	$\frac{5\sqrt{33}}{154}$		
	0	0	0	0	0	$-\frac{\sqrt{22}}{154}$	0	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	
984	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$													

continued ...

Table 10

No.	multipole	matrix																		
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{1155}i}{3234}$	0	0	0	0	$\frac{\sqrt{22}i}{154}$	0	$\frac{5\sqrt{462}i}{1078}$	0	0	0	0	0	0	0				
	$-\frac{\sqrt{1155}i}{3234}$	0	$-\frac{5\sqrt{462}i}{3234}$	0	0	0	0	$-\frac{23\sqrt{770}i}{5390}$	0	$-\frac{13\sqrt{154}i}{1078}$	0	0	0	0	0	0				
	0	$\frac{5\sqrt{462}i}{3234}$	0	$\frac{5\sqrt{231}i}{1617}$	0	0	0	0	$\frac{\sqrt{1155}i}{245}$	0	$\frac{\sqrt{77}i}{539}$	0	$\frac{\sqrt{77}i}{539}$	0	0	0	0			
	0	0	$-\frac{5\sqrt{231}i}{1617}$	0	$-\frac{5\sqrt{462}i}{3234}$	0	0	0	0	$\frac{\sqrt{77}i}{539}$	0	$\frac{\sqrt{1155}i}{245}$	0	0	0	0	0			
	0	0	0	$\frac{5\sqrt{462}i}{3234}$	0	$\frac{\sqrt{1155}i}{3234}$	0	0	0	0	$-\frac{13\sqrt{154}i}{1078}$	0	$-\frac{23\sqrt{770}i}{5390}$	0	0	0	0			
	0	0	0	0	$-\frac{\sqrt{1155}i}{3234}$	0	0	0	0	0	0	$\frac{5\sqrt{462}i}{1078}$	0	$\frac{\sqrt{22}i}{154}$	0	0	0	0		
	$-\frac{\sqrt{22}i}{154}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0	0	0	0	0		
	0	$\frac{23\sqrt{770}i}{5390}$	0	0	0	0	$\frac{5\sqrt{33}i}{154}$	0	$\frac{20\sqrt{77}i}{539}$	0	0	0	0	0	0	0	0	0		
	$-\frac{5\sqrt{462}i}{1078}$	0	$-\frac{\sqrt{1155}i}{245}$	0	0	0	0	$-\frac{20\sqrt{77}i}{539}$	0	$-\frac{\sqrt{385}i}{1078}$	0	0	0	0	0	0	0	0	0	
	0	$\frac{13\sqrt{154}i}{1078}$	0	$-\frac{\sqrt{77}i}{539}$	0	0	0	0	$\frac{\sqrt{385}i}{1078}$	0	$-\frac{10\sqrt{231}i}{539}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{77}i}{539}$	0	$\frac{13\sqrt{154}i}{1078}$	0	0	0	0	$\frac{10\sqrt{231}i}{539}$	0	$-\frac{\sqrt{385}i}{1078}$	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{1155}i}{245}$	0	$-\frac{5\sqrt{462}i}{1078}$	0	0	0	0	$\frac{\sqrt{385}i}{1078}$	0	$\frac{20\sqrt{77}i}{539}$	0	0	0	0	0	0	0
	0	0	0	0	$\frac{23\sqrt{770}i}{5390}$	0	0	0	0	0	0	$-\frac{20\sqrt{77}i}{539}$	0	$-\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{22}i}{154}$	0	0	0	0	0	0	0	$\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0

985 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	$-\frac{\sqrt{55}i}{154}$	0	0	0	0	0	$-\frac{3\sqrt{22}i}{77}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{55}i}{154}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{385}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{2\sqrt{1155}i}{385}$	0	0
	0	0	0	0	0	0	$-\frac{2\sqrt{1155}i}{385}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{55}i}{154}$	0	0	0	0	0	0	$\frac{\sqrt{330}i}{385}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{55}i}{154}$	0	0	0	0	0	0	$\frac{3\sqrt{22}i}{77}$	0	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{1155}i}{385}$	0	0	0	0	0	$\frac{3\sqrt{385}i}{154}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{330}i}{385}$	0	0	0	0	0	$\frac{5\sqrt{33}i}{154}$	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{22}i}{77}$	0	0	0	0	0	$-\frac{5\sqrt{33}i}{154}$	0	0	0
	0	0	0	0	0	0	$-\frac{3\sqrt{385}i}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{385}i}{154}$	0
	$\frac{3\sqrt{22}i}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{330}i}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{33}i}{154}$	0	0	0	0	0	0
	0	0	$-\frac{2\sqrt{1155}i}{385}$	0	0	0	0	0	0	$\frac{3\sqrt{385}i}{154}$	0	0	0	0	0
986	symmetry	$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	$-\frac{\sqrt{55}}{154}$	0	0	0	0	0	$-\frac{3\sqrt{22}}{77}$	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{55}}{154}$	0	0	0	0	0	$-\frac{\sqrt{330}}{385}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{2\sqrt{1155}}{385}$	0	0
	0	0	0	0	0	0	$\frac{2\sqrt{1155}}{385}$	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{55}}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{330}}{385}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{55}}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{22}}{77}$	0	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{1155}}{385}$	0	0	0	0	0	$\frac{3\sqrt{385}}{154}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{330}}{385}$	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{22}}{77}$	0	0	0	0	0	$-\frac{5\sqrt{33}}{154}$	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{385}}{154}$	0	0	0	0	0	0	$-\frac{3\sqrt{385}}{154}$	0
	$-\frac{3\sqrt{22}}{77}$	0	0	0	0	0	0	$\frac{5\sqrt{33}}{154}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{330}}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{33}}{154}$	0	0	0	0	0	0
	0	0	$\frac{2\sqrt{1155}}{385}$	0	0	0	0	0	0	$-\frac{3\sqrt{385}}{154}$	0	0	0	0	0
987	symmetry	$-\frac{\sqrt{105xyz(x^2+y^2-2z^2)}}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 4)$	0	0	$\frac{\sqrt{330}i}{924}$	0	0	0	0	0	0	$\frac{\sqrt{110}i}{77}$	0	0	0	0	0
	0	0	0	$-\frac{5\sqrt{66}i}{924}$	0	0	$\frac{\sqrt{770}i}{385}$	0	0	0	$-\frac{2\sqrt{22}i}{77}$	0	0	0	0
	$-\frac{\sqrt{330}i}{924}$	0	0	0	$\frac{5\sqrt{66}i}{924}$	0	0	$-\frac{8\sqrt{55}i}{385}$	0	0	0	$-\frac{2\sqrt{165}i}{385}$	0	0	0
	0	$\frac{5\sqrt{66}i}{924}$	0	0	0	$-\frac{\sqrt{330}i}{924}$	0	0	$\frac{2\sqrt{165}i}{385}$	0	0	0	$\frac{8\sqrt{55}i}{385}$	0	0
	0	0	$-\frac{5\sqrt{66}i}{924}$	0	0	0	0	0	0	$\frac{2\sqrt{22}i}{77}$	0	0	0	$-\frac{\sqrt{770}i}{385}$	0
	0	0	0	$\frac{\sqrt{330}i}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{77}$	0	0	0	0
	0	$-\frac{\sqrt{770}i}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{77}i}{154}$	0	0	0	0	0	0
	0	0	$\frac{8\sqrt{55}i}{385}$	0	0	0	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0	0	0	0
	0	0	0	$-\frac{2\sqrt{165}i}{385}$	0	0	$\frac{5\sqrt{77}i}{154}$	0	0	0	$\frac{2\sqrt{55}i}{77}$	0	0	0	0
	$-\frac{\sqrt{110}i}{77}$	0	0	0	$-\frac{2\sqrt{22}i}{77}$	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0	0	$-\frac{2\sqrt{55}i}{77}$	0	0	0
	0	$\frac{2\sqrt{22}i}{77}$	0	0	0	$\frac{\sqrt{110}i}{77}$	0	0	$-\frac{2\sqrt{55}i}{77}$	0	0	0	$-\frac{3\sqrt{165}i}{154}$	0	0
	0	0	$\frac{2\sqrt{165}i}{385}$	0	0	0	0	0	0	$\frac{2\sqrt{55}i}{77}$	0	0	0	$\frac{5\sqrt{77}i}{154}$	0
	0	0	0	$-\frac{8\sqrt{55}i}{385}$	0	0	0	0	0	0	$\frac{3\sqrt{165}i}{154}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{770}i}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{77}i}{154}$	0	0	0
988	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 4)$	0	0	$-\frac{\sqrt{330}}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{110}}{77}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{66}}{924}$	0	0	$\frac{\sqrt{770}}{385}$	0	0	0	$\frac{2\sqrt{22}}{77}$	0	0	0	0
	$-\frac{\sqrt{330}}{924}$	0	0	0	$-\frac{5\sqrt{66}}{924}$	0	0	$-\frac{8\sqrt{55}}{385}$	0	0	0	$\frac{2\sqrt{165}}{385}$	0	0	0
	0	$\frac{5\sqrt{66}}{924}$	0	0	0	$\frac{\sqrt{330}}{924}$	0	0	$\frac{2\sqrt{165}}{385}$	0	0	0	$-\frac{8\sqrt{55}}{385}$	0	0
	0	0	$-\frac{5\sqrt{66}}{924}$	0	0	0	0	0	0	$\frac{2\sqrt{22}}{77}$	0	0	0	0	$\frac{\sqrt{770}}{385}$
	0	0	0	$\frac{\sqrt{330}}{924}$	0	0	0	0	0	$-\frac{\sqrt{110}}{77}$	0	0	0	0	0
	0	$\frac{\sqrt{770}}{385}$	0	0	0	0	0	0	$\frac{5\sqrt{77}}{154}$	0	0	0	0	0	0
	0	0	$-\frac{8\sqrt{55}}{385}$	0	0	0	0	0	0	$-\frac{3\sqrt{165}}{154}$	0	0	0	0	0
	0	0	0	$\frac{2\sqrt{165}}{385}$	0	0	$\frac{5\sqrt{77}}{154}$	0	0	0	$-\frac{2\sqrt{55}}{77}$	0	0	0	0
	$-\frac{\sqrt{110}}{77}$	0	0	0	$\frac{2\sqrt{22}}{77}$	0	0	$-\frac{3\sqrt{165}}{154}$	0	0	0	$\frac{2\sqrt{55}}{77}$	0	0	0
	0	$\frac{2\sqrt{22}}{77}$	0	0	0	$-\frac{\sqrt{110}}{77}$	0	0	$-\frac{2\sqrt{55}}{77}$	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0
	0	0	$\frac{2\sqrt{165}}{385}$	0	0	0	0	0	$\frac{2\sqrt{55}}{77}$	0	0	0	0	$-\frac{5\sqrt{77}}{154}$	0
	0	0	0	$-\frac{8\sqrt{55}}{385}$	0	0	0	0	0	0	$\frac{3\sqrt{165}}{154}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{770}}{385}$	0	0	0	0	0	0	$-\frac{5\sqrt{77}}{154}$	0	0	0
989	symmetry	$\frac{\sqrt{6006xyz(x^2-3y^2)(3x^2-y^2)}}{16}$													

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
990	symmetry	$\frac{\sqrt{21}x(x^2-3y^2)(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix
$M_7^{(1,-1;a)}(A_{1g}, 2)$	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 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
991	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

*continued ..*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
993	symmetry	$\frac{\sqrt{21}y(3x^2-y^2)(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4)}{32}$

*continued ...*

Table 10

No.	multipole	matrix									
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 3)$	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	$\frac{\sqrt{1430}i}{286}$	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	$-\frac{\sqrt{10010}i}{286}$	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	$\frac{3\sqrt{2002}i}{286}$	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{1430}i}{286}$	0	0	0	0	0	0	$-\frac{\sqrt{10010}i}{286}$	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	$\frac{\sqrt{10010}i}{286}$	0	0	0	0	0	0	$\frac{\sqrt{1430}i}{286}$	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	$-\frac{3\sqrt{2002}i}{286}$	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	$\frac{\sqrt{10010}i}{286}$	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	$-\frac{\sqrt{1430}i}{286}$	0	0	0	0	0	0

*continued ..*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
995	symmetry	$\frac{\sqrt{429}y(7x^6 - 35x^4y^2 + 21x^2y^4 - y^6)}{32}$

*continued ...*

Table 10

No.	multipole	matrix
996	$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ <p style="text-align: center;"><math>-\frac{\sqrt{231}x(x^2+y^2-12z^2)(x^4-10x^2y^2+5y^4)}{32}</math></p>

*continued ...*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 2) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}}{26} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{182}}{26} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}}{26} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}}{26} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{182}}{26} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}}{26} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
997	symmetry	$\frac{\sqrt{231}y(x^2+y^2-12z^2)(5x^4-10x^2y^2+y^4)}{32}$

*continued ...*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 2) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}i}{26} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{182}i}{26} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{78}i}{26} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
998	symmetry	$-\frac{\sqrt{7}x(5x^6+15x^4y^2-120x^4z^2+15x^2y^4-240x^2y^2z^2+240x^2z^4+5y^6-120y^4z^2+240y^2z^4-64z^6)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{858}}{858}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{858}}{858}$ 0 $\frac{\sqrt{2002}}{286}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 $\frac{\sqrt{2002}}{286}$ 0 $-\frac{\sqrt{10010}}{286}$ 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{10010}}{286}$ 0 $\frac{5\sqrt{6006}}{858}$ 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 $\frac{5\sqrt{6006}}{858}$ 0 $-\frac{\sqrt{10010}}{286}$ 0 $\frac{\sqrt{2002}}{286}$ 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10010}}{286}$ 0 $\frac{\sqrt{2002}}{286}$ 0 $-\frac{\sqrt{858}}{858}$ 0

*continued ..*

Table 10

No.	multipole	matrix									
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	$\frac{\sqrt{858}i}{858}$	0	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{858}i}{858}$	0	$-\frac{\sqrt{2002}i}{286}$	0	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	$\frac{\sqrt{2002}i}{286}$	0	$\frac{\sqrt{10010}i}{286}$	0	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	$-\frac{\sqrt{10010}i}{286}$	0	$-\frac{5\sqrt{6006}i}{858}$	0	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	$\frac{5\sqrt{6006}i}{858}$	0	$\frac{\sqrt{10010}i}{286}$	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	$-\frac{\sqrt{10010}i}{286}$	0	$-\frac{\sqrt{2002}i}{286}$	0	0	0
1000	symmetry										
		$\frac{\sqrt{231}xyz(x-y)(x+y)(3x^2+3y^2-10z^2)}{4}$									

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}i}{52} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}i}{52} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}i}{52} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}i}{52} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}i}{52} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}i}{52} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}i}{52} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}i}{52} & 0 & 0 & 0 & 0 \end{bmatrix}$
1001	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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 4) & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}}{52} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}}{52} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}}{52} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}}{52} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{130}}{52} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{546}}{52} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{546}}{52} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{130}}{52} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
1002	symmetry	$\frac{\sqrt{42}xyz(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{16}$

continued ...

Table 10

*continued ..*

Table 10

*continued ..*

Table 10

No.	multipole	matrix
$\mathbb{M}_1^{(1,1;a)}(A_{2g})$	$\frac{2\sqrt{105}}{49}$	0 0 0 0 0 0 0 $-\frac{3\sqrt{70}}{196}$ 0 0 0 0 0 0
	0	$\frac{6\sqrt{105}}{245}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{196}$ 0 0 0 0 0
	0	0 $\frac{2\sqrt{105}}{245}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0 0
	0	0 0 0 $-\frac{2\sqrt{105}}{245}$ 0 0 0 0 0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0
	0	0 0 0 0 $-\frac{6\sqrt{105}}{245}$ 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{196}$ 0 0
	0	0 0 0 0 0 $-\frac{2\sqrt{105}}{49}$ 0 0 0 0 0 0 $-\frac{3\sqrt{70}}{196}$ 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0
	$-\frac{3\sqrt{70}}{196}$	0 0 0 0 0 0 0 $-\frac{5\sqrt{105}}{294}$ 0 0 0 0 0 0
	0	$-\frac{5\sqrt{42}}{196}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{98}$ 0 0 0 0 0
	0	0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{294}$ 0 0 0 0
	0	0 0 0 $-\frac{3\sqrt{35}}{98}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{294}$ 0 0 0
	0	0 0 0 0 $-\frac{5\sqrt{42}}{196}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{98}$ 0 0
	0	0 0 0 0 0 $-\frac{3\sqrt{70}}{196}$ 0 0 0 0 0 0 $\frac{5\sqrt{105}}{294}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}}{42}$
1005	symmetry	$x$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0	$\frac{2\sqrt{21}}{49}$ 0 0 0 0 0 $\frac{3\sqrt{10}}{56}$ 0 $-\frac{\sqrt{210}}{392}$ 0 0 0 0 0 0
	$\frac{2\sqrt{21}}{49}$	0 $\frac{4\sqrt{210}}{245}$ 0 0 0 0 0 $\frac{15\sqrt{14}}{392}$ 0 $-\frac{3\sqrt{70}}{392}$ 0 0 0 0 0
	0	$\frac{4\sqrt{210}}{245}$ 0 $\frac{6\sqrt{105}}{245}$ 0 0 0 0 $\frac{5\sqrt{21}}{196}$ 0 $-\frac{3\sqrt{35}}{196}$ 0 0 0 0
	0	0 $\frac{6\sqrt{105}}{245}$ 0 $\frac{4\sqrt{210}}{245}$ 0 0 0 0 $\frac{3\sqrt{35}}{196}$ 0 $-\frac{5\sqrt{21}}{196}$ 0 0 0
	0	0 0 $\frac{4\sqrt{210}}{245}$ 0 $\frac{2\sqrt{21}}{49}$ 0 0 0 0 0 $\frac{3\sqrt{70}}{392}$ 0 $-\frac{15\sqrt{14}}{392}$ 0
	0	0 0 0 0 $\frac{2\sqrt{21}}{49}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{392}$ 0 $-\frac{3\sqrt{10}}{56}$ 0
	$\frac{3\sqrt{10}}{56}$	0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{42}$ 0 0 0 0 0 0 0
	0	$\frac{15\sqrt{14}}{392}$ 0 0 0 0 $-\frac{\sqrt{15}}{42}$ 0 $-\frac{\sqrt{35}}{49}$ 0 0 0 0 0 0
	$-\frac{\sqrt{210}}{392}$	0 $\frac{5\sqrt{21}}{196}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{49}$ 0 $-\frac{5\sqrt{7}}{98}$ 0 0 0 0
	0	$-\frac{3\sqrt{70}}{392}$ 0 $\frac{3\sqrt{35}}{196}$ 0 0 0 0 $-\frac{5\sqrt{7}}{98}$ 0 $-\frac{2\sqrt{105}}{147}$ 0 0 0
	0	0 $-\frac{3\sqrt{35}}{196}$ 0 $\frac{3\sqrt{70}}{392}$ 0 0 0 0 $-\frac{2\sqrt{105}}{147}$ 0 $-\frac{5\sqrt{7}}{98}$ 0 0
	0	0 0 0 $-\frac{5\sqrt{21}}{196}$ 0 $\frac{\sqrt{210}}{392}$ 0 0 0 0 $-\frac{5\sqrt{7}}{98}$ 0 $-\frac{\sqrt{35}}{49}$ 0
	0	0 0 0 0 $-\frac{15\sqrt{14}}{392}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{49}$ 0 $-\frac{\sqrt{15}}{42}$ 0
	0	0 0 0 0 0 $-\frac{3\sqrt{10}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{42}$ 0
1006	symmetry	$y$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	0	$-\frac{2\sqrt{21}i}{49}$	0	0	0	0	$\frac{3\sqrt{10}i}{56}$	0	$\frac{\sqrt{210}i}{392}$	0	0	0	0	0	0
	$\frac{2\sqrt{21}i}{49}$	0	$-\frac{4\sqrt{210}i}{245}$	0	0	0	0	$\frac{15\sqrt{14}i}{392}$	0	$\frac{3\sqrt{70}i}{392}$	0	0	0	0	0
	0	$\frac{4\sqrt{210}i}{245}$	0	$-\frac{6\sqrt{105}i}{245}$	0	0	0	0	$\frac{5\sqrt{21}i}{196}$	0	$\frac{3\sqrt{35}i}{196}$	0	0	0	0
	0	0	$\frac{6\sqrt{105}i}{245}$	0	$-\frac{4\sqrt{210}i}{245}$	0	0	0	0	$\frac{3\sqrt{35}i}{196}$	0	$\frac{5\sqrt{21}i}{196}$	0	0	0
	0	0	0	$\frac{4\sqrt{210}i}{245}$	0	$-\frac{2\sqrt{21}i}{49}$	0	0	0	0	$\frac{3\sqrt{70}i}{392}$	0	$\frac{15\sqrt{14}i}{392}$	0	0
	0	0	0	0	$\frac{2\sqrt{21}i}{49}$	0	0	0	0	0	$\frac{\sqrt{210}i}{392}$	0	$\frac{3\sqrt{10}i}{56}$	0	0
	$-\frac{3\sqrt{10}i}{56}$	0	0	0	0	0	0	$\frac{\sqrt{15}i}{42}$	0	0	0	0	0	0	0
	0	$-\frac{15\sqrt{14}i}{392}$	0	0	0	0	$-\frac{\sqrt{15}i}{42}$	0	$\frac{\sqrt{35}i}{49}$	0	0	0	0	0	0
	$-\frac{\sqrt{210}i}{392}$	0	$-\frac{5\sqrt{21}i}{196}$	0	0	0	0	$-\frac{\sqrt{35}i}{49}$	0	$\frac{5\sqrt{7}i}{98}$	0	0	0	0	0
	0	$-\frac{3\sqrt{70}i}{392}$	0	$-\frac{3\sqrt{35}i}{196}$	0	0	0	0	$-\frac{5\sqrt{7}i}{98}$	0	$\frac{2\sqrt{105}i}{147}$	0	0	0	0
	0	0	$-\frac{3\sqrt{35}i}{196}$	0	$-\frac{3\sqrt{70}i}{392}$	0	0	0	0	$-\frac{2\sqrt{105}i}{147}$	0	$\frac{5\sqrt{7}i}{98}$	0	0	0
	0	0	0	$-\frac{5\sqrt{21}i}{196}$	0	$-\frac{\sqrt{210}i}{392}$	0	0	0	0	$-\frac{5\sqrt{7}i}{98}$	0	$\frac{\sqrt{35}i}{49}$	0	0
	0	0	0	0	$-\frac{15\sqrt{14}i}{392}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{49}$	0	$\frac{\sqrt{15}i}{42}$	0	0
	0	0	0	0	0	$-\frac{3\sqrt{10}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{42}$	0	0	0
1007	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,1;a)}(A_{1g})$	0	0	0	$-\frac{5\sqrt{77}}{147}$	0	0	0	0	0	$\frac{\sqrt{231}}{196}$	0	0	0	0	
	0	0	0	0	$-\frac{2\sqrt{770}}{147}$	0	0	0	0	0	$\frac{3\sqrt{77}}{196}$	0	0	0	
	0	0	0	0	0	$-\frac{5\sqrt{77}}{147}$	$-\frac{\sqrt{66}}{56}$	0	0	0	0	$\frac{3\sqrt{462}}{392}$	0	0	
	$-\frac{5\sqrt{77}}{147}$	0	0	0	0	0	0	$-\frac{3\sqrt{462}}{392}$	0	0	0	0	0	$\frac{\sqrt{66}}{56}$	
	0	$-\frac{2\sqrt{770}}{147}$	0	0	0	0	0	0	$-\frac{3\sqrt{77}}{196}$	0	0	0	0	0	
	0	0	$-\frac{5\sqrt{77}}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{231}}{196}$	0	0	0	0	
	0	0	$-\frac{\sqrt{66}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{22}}{77}$	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{462}}{392}$	0	0	0	0	0	0	$\frac{4\sqrt{154}}{539}$	0	0	0	
	0	0	0	0	$-\frac{3\sqrt{77}}{196}$	0	0	0	0	0	0	$\frac{2\sqrt{770}}{539}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{231}}{196}$	$\frac{\sqrt{22}}{77}$	0	0	0	0	0	$\frac{4\sqrt{154}}{539}$	0	
	$\frac{\sqrt{231}}{196}$	0	0	0	0	0	0	$\frac{4\sqrt{154}}{539}$	0	0	0	0	0	$\frac{\sqrt{22}}{77}$	
	0	$\frac{3\sqrt{77}}{196}$	0	0	0	0	0	0	$\frac{2\sqrt{770}}{539}$	0	0	0	0	0	
	0	0	$\frac{3\sqrt{462}}{392}$	0	0	0	0	0	0	$\frac{4\sqrt{154}}{539}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{66}}{56}$	0	0	0	0	0	$\frac{\sqrt{22}}{77}$	0	0	0	0	
1008	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 1)$	$-\frac{5\sqrt{77}}{147}$	0	0	0	0	0	0	$\frac{\sqrt{462}}{98}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{77}}{21}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{4\sqrt{77}}{147}$	0	0	0	0	0	0	$-\frac{\sqrt{231}}{98}$	0	0	0	0	0
	0	0	0	$-\frac{4\sqrt{77}}{147}$	0	0	0	0	0	$-\frac{\sqrt{231}}{98}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{77}}{21}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{77}}{147}$	0	0	0	0	0	0	$\frac{\sqrt{462}}{98}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{77}}{77}$	0	0	0	0	0	0	0	0
	$\frac{\sqrt{462}}{98}$	0	0	0	0	0	0	$-\frac{5\sqrt{77}}{539}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{77}$	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{231}}{98}$	0	0	0	0	0	0	$-\frac{3\sqrt{77}}{539}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{231}}{98}$	0	0	0	0	0	0	$\frac{3\sqrt{77}}{539}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{77}}{77}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{462}}{98}$	0	0	0	0	0	0	$\frac{5\sqrt{77}}{539}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{77}$	0
1009	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	0	0	0	$\frac{5\sqrt{77}i}{147}$	0	0	0	0	0	$-\frac{\sqrt{231}i}{196}$	0	0	0	
	0	0	0	0	$\frac{2\sqrt{770}i}{147}$	0	0	0	0	$-\frac{3\sqrt{77}i}{196}$	0	0	0	
	0	0	0	0	0	$\frac{5\sqrt{77}i}{147}$	$-\frac{\sqrt{66}i}{56}$	0	0	0	$-\frac{3\sqrt{462}i}{392}$	0	0	
	$-\frac{5\sqrt{77}i}{147}$	0	0	0	0	0	$-\frac{3\sqrt{462}i}{392}$	0	0	0	0	0	$-\frac{\sqrt{66}i}{56}$	
	0	$-\frac{2\sqrt{770}i}{147}$	0	0	0	0	0	$-\frac{3\sqrt{77}i}{196}$	0	0	0	0	0	
	0	0	$-\frac{5\sqrt{77}i}{147}$	0	0	0	0	0	$-\frac{\sqrt{231}i}{196}$	0	0	0	0	
	0	0	$\frac{\sqrt{66}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{22}i}{77}$	0	0	0	0	
	0	0	0	$\frac{3\sqrt{462}i}{392}$	0	0	0	0	0	$-\frac{4\sqrt{154}i}{539}$	0	0	0	
	0	0	0	0	$\frac{3\sqrt{77}i}{196}$	0	0	0	0	0	$-\frac{2\sqrt{770}i}{539}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{231}i}{196}$	$\frac{\sqrt{22}i}{77}$	0	0	0	0	$-\frac{4\sqrt{154}i}{539}$	0	
	$\frac{\sqrt{231}i}{196}$	0	0	0	0	0	0	$\frac{4\sqrt{154}i}{539}$	0	0	0	0	$-\frac{\sqrt{22}i}{77}$	
	0	$\frac{3\sqrt{77}i}{196}$	0	0	0	0	0	$\frac{2\sqrt{770}i}{539}$	0	0	0	0	0	
	0	0	$\frac{3\sqrt{462}i}{392}$	0	0	0	0	0	$\frac{4\sqrt{154}i}{539}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{66}i}{56}$	0	0	0	0	0	$\frac{\sqrt{22}i}{77}$	0	0	0	
1010	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{2310}}{147}$	0	0	0	0	$-\frac{\sqrt{11}}{28}$	0	$\frac{\sqrt{231}}{98}$	0	0	0	0	0	0
	$-\frac{\sqrt{2310}}{147}$	0	$\frac{\sqrt{231}}{147}$	0	0	0	0	$\frac{\sqrt{385}}{196}$	0	$\frac{\sqrt{77}}{98}$	0	0	0	0	0
	0	$\frac{\sqrt{231}}{147}$	0	$\frac{2\sqrt{462}}{147}$	0	0	0	0	$\frac{\sqrt{2310}}{392}$	0	$-\frac{\sqrt{154}}{392}$	0	0	0	0
	0	0	$\frac{2\sqrt{462}}{147}$	0	$\frac{\sqrt{231}}{147}$	0	0	0	0	$\frac{\sqrt{154}}{392}$	0	$-\frac{\sqrt{2310}}{392}$	0	0	0
	0	0	0	$\frac{\sqrt{231}}{147}$	0	$-\frac{\sqrt{2310}}{147}$	0	0	0	0	$-\frac{\sqrt{77}}{98}$	0	$-\frac{\sqrt{385}}{196}$	0	0
	0	0	0	0	$-\frac{\sqrt{2310}}{147}$	0	0	0	0	0	$-\frac{\sqrt{231}}{98}$	0	$\frac{\sqrt{11}}{28}$	0	0
	$-\frac{\sqrt{11}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{66}}{77}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{385}}{196}$	0	0	0	0	$\frac{\sqrt{66}}{77}$	0	$\frac{\sqrt{154}}{539}$	0	0	0	0	0	0
	$\frac{\sqrt{231}}{98}$	0	$\frac{\sqrt{2310}}{392}$	0	0	0	0	$\frac{\sqrt{154}}{539}$	0	$-\frac{\sqrt{770}}{539}$	0	0	0	0	0
	0	$\frac{\sqrt{77}}{98}$	0	$\frac{\sqrt{154}}{392}$	0	0	0	0	$-\frac{\sqrt{770}}{539}$	0	$-\frac{2\sqrt{462}}{539}$	0	0	0	0
	0	0	$-\frac{\sqrt{154}}{392}$	0	$-\frac{\sqrt{77}}{98}$	0	0	0	0	$-\frac{2\sqrt{462}}{539}$	0	$-\frac{\sqrt{770}}{539}$	0	0	0
	0	0	0	$-\frac{\sqrt{2310}}{392}$	0	$-\frac{\sqrt{231}}{98}$	0	0	0	0	$-\frac{\sqrt{770}}{539}$	0	$\frac{\sqrt{154}}{539}$	0	0
	0	0	0	0	$-\frac{\sqrt{385}}{196}$	0	0	0	0	0	0	$\frac{\sqrt{154}}{539}$	0	$\frac{\sqrt{66}}{77}$	0
	0	0	0	0	0	$\frac{\sqrt{11}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{66}}{77}$	0	0
1011	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{2310}i}{147}$	0	0	0	0	$-\frac{\sqrt{11}i}{28}$	0	$-\frac{\sqrt{231}i}{98}$	0	0	0	0	0	0
	$-\frac{\sqrt{2310}i}{147}$	0	$-\frac{\sqrt{231}i}{147}$	0	0	0	0	$\frac{\sqrt{385}i}{196}$	0	$-\frac{\sqrt{77}i}{98}$	0	0	0	0	0
	0	$\frac{\sqrt{231}i}{147}$	0	$-\frac{2\sqrt{462}i}{147}$	0	0	0	0	$\frac{\sqrt{2310}i}{392}$	0	$\frac{\sqrt{154}i}{392}$	0	0	0	0
	0	0	$\frac{2\sqrt{462}i}{147}$	0	$-\frac{\sqrt{231}i}{147}$	0	0	0	0	$\frac{\sqrt{154}i}{392}$	0	$\frac{\sqrt{2310}i}{392}$	0	0	0
	0	0	0	$\frac{\sqrt{231}i}{147}$	0	$\frac{\sqrt{2310}i}{147}$	0	0	0	0	$-\frac{\sqrt{77}i}{98}$	0	$\frac{\sqrt{385}i}{196}$	0	0
	0	0	0	0	$-\frac{\sqrt{2310}i}{147}$	0	0	0	0	0	$-\frac{\sqrt{231}i}{98}$	0	$-\frac{\sqrt{11}i}{28}$	0	0
	$\frac{\sqrt{11}i}{28}$	0	0	0	0	0	0	$-\frac{\sqrt{66}i}{77}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{385}i}{196}$	0	0	0	0	$\frac{\sqrt{66}i}{77}$	0	$-\frac{\sqrt{154}i}{539}$	0	0	0	0	0	0
	$\frac{\sqrt{231}i}{98}$	0	$-\frac{\sqrt{2310}i}{392}$	0	0	0	0	$\frac{\sqrt{154}i}{539}$	0	$\frac{\sqrt{770}i}{539}$	0	0	0	0	0
	0	$\frac{\sqrt{77}i}{98}$	0	$-\frac{\sqrt{154}i}{392}$	0	0	0	0	$-\frac{\sqrt{770}i}{539}$	0	$\frac{2\sqrt{462}i}{539}$	0	0	0	0
	0	0	$-\frac{\sqrt{154}i}{392}$	0	$\frac{\sqrt{77}i}{98}$	0	0	0	0	$-\frac{2\sqrt{462}i}{539}$	0	$\frac{\sqrt{770}i}{539}$	0	0	0
	0	0	0	$-\frac{\sqrt{2310}i}{392}$	0	$\frac{\sqrt{231}i}{98}$	0	0	0	0	$-\frac{\sqrt{770}i}{539}$	0	$-\frac{\sqrt{154}i}{539}$	0	0
	0	0	0	0	$-\frac{\sqrt{385}i}{196}$	0	0	0	0	0	$\frac{\sqrt{154}i}{539}$	0	$-\frac{\sqrt{66}i}{77}$	0	0
	0	0	0	0	0	$\frac{\sqrt{11}i}{28}$	0	0	0	0	0	$\frac{\sqrt{66}i}{77}$	0	0	0
$\sqrt{15}xyz$															

1012 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	0	0	$\frac{5\sqrt{462}i}{294}$	0	0	0	0	0	0	$-\frac{\sqrt{154}i}{98}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{2310}i}{294}$	0	0	$-\frac{\sqrt{22}i}{28}$	0	0	0	$-\frac{\sqrt{770}i}{196}$	0	0	0	0
	$-\frac{5\sqrt{462}i}{294}$	0	0	0	$-\frac{\sqrt{2310}i}{294}$	0	0	$-\frac{\sqrt{77}i}{196}$	0	0	0	$-\frac{\sqrt{231}i}{196}$	0	0	0
	0	$-\frac{\sqrt{2310}i}{294}$	0	0	0	$-\frac{5\sqrt{462}i}{294}$	0	0	$\frac{\sqrt{231}i}{196}$	0	0	0	$\frac{\sqrt{77}i}{196}$	0	0
	0	0	$\frac{\sqrt{2310}i}{294}$	0	0	0	0	0	0	$\frac{\sqrt{770}i}{196}$	0	0	0	$\frac{\sqrt{22}i}{28}$	0
	0	0	0	$\frac{5\sqrt{462}i}{294}$	0	0	0	0	0	0	$\frac{\sqrt{154}i}{98}$	0	0	0	0
	0	$\frac{\sqrt{22}i}{28}$	0	0	0	0	0	0	0	$-\frac{\sqrt{55}i}{77}$	0	0	0	0	0
	0	0	$\frac{\sqrt{77}i}{196}$	0	0	0	0	0	0	$-\frac{3\sqrt{231}i}{539}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{231}i}{196}$	0	0	$\frac{\sqrt{55}i}{77}$	0	0	0	$-\frac{2\sqrt{77}i}{539}$	0	0	0	0
	$\frac{\sqrt{154}i}{98}$	0	0	0	$-\frac{\sqrt{770}i}{196}$	0	0	$\frac{3\sqrt{231}i}{539}$	0	0	0	$\frac{2\sqrt{77}i}{539}$	0	0	0
	0	$\frac{\sqrt{770}i}{196}$	0	0	0	$-\frac{\sqrt{154}i}{98}$	0	0	$\frac{2\sqrt{77}i}{539}$	0	0	0	$\frac{3\sqrt{231}i}{539}$	0	0
	0	0	$\frac{\sqrt{231}i}{196}$	0	0	0	0	0	$-\frac{2\sqrt{77}i}{539}$	0	0	0	$\frac{\sqrt{55}i}{77}$	0	0
	0	0	0	$-\frac{\sqrt{77}i}{196}$	0	0	0	0	0	$-\frac{3\sqrt{231}i}{539}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{22}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{55}i}{77}$	0	0	0	0
1013	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	0	0	$-\frac{5\sqrt{462}}{294}$	0	0	0	0	0	$\frac{\sqrt{154}}{98}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{2310}}{294}$	0	0	$-\frac{\sqrt{22}}{28}$	0	0	$\frac{\sqrt{770}}{196}$	0	0	0	0	0
	$-\frac{5\sqrt{462}}{294}$	0	0	0	$\frac{\sqrt{2310}}{294}$	0	0	$-\frac{\sqrt{77}}{196}$	0	0	$\frac{\sqrt{231}}{196}$	0	0	0	0
	0	$-\frac{\sqrt{2310}}{294}$	0	0	0	$\frac{5\sqrt{462}}{294}$	0	0	$\frac{\sqrt{231}}{196}$	0	0	$-\frac{\sqrt{77}}{196}$	0	0	0
	0	0	$\frac{\sqrt{2310}}{294}$	0	0	0	0	0	$\frac{\sqrt{770}}{196}$	0	0	0	$-\frac{\sqrt{22}}{28}$	0	0
	0	0	0	$\frac{5\sqrt{462}}{294}$	0	0	0	0	0	$\frac{\sqrt{154}}{98}$	0	0	0	0	0
	0	$-\frac{\sqrt{22}}{28}$	0	0	0	0	0	0	$\frac{\sqrt{55}}{77}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{77}}{196}$	0	0	0	0	0	$\frac{3\sqrt{231}}{539}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{231}}{196}$	0	0	$\frac{\sqrt{55}}{77}$	0	0	0	$\frac{2\sqrt{77}}{539}$	0	0	0	0
	$\frac{\sqrt{154}}{98}$	0	0	0	$\frac{\sqrt{770}}{196}$	0	0	$\frac{3\sqrt{231}}{539}$	0	0	0	$-\frac{2\sqrt{77}}{539}$	0	0	0
	0	$\frac{\sqrt{770}}{196}$	0	0	0	$\frac{\sqrt{154}}{98}$	0	0	$\frac{2\sqrt{77}}{539}$	0	0	0	$-\frac{3\sqrt{231}}{539}$	0	0
	0	0	$\frac{\sqrt{231}}{196}$	0	0	0	0	0	$-\frac{2\sqrt{77}}{539}$	0	0	0	$-\frac{\sqrt{55}}{77}$	0	0
	0	0	0	$-\frac{\sqrt{77}}{196}$	0	0	0	0	0	$-\frac{3\sqrt{231}}{539}$	0	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{22}}{28}$	0	0	0	0	0	$-\frac{\sqrt{55}}{77}$	0	0	0	0
1014	symmetry	$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_5^{(1,1;a)}(A_{1g})$	0	0	0	$\frac{2\sqrt{143}}{77}$	0	0	0	0	0	$-\frac{5\sqrt{429}}{924}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{1430}}{77}$	0	0	0	0	0	$\frac{\sqrt{143}}{308}$	0	0	
	0	0	0	0	0	$\frac{2\sqrt{143}}{77}$	$\frac{\sqrt{6006}}{924}$	0	0	0	0	$\frac{\sqrt{858}}{308}$	0	
	$\frac{2\sqrt{143}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{858}}{308}$	0	0	0	0	$-\frac{\sqrt{6006}}{924}$	
	0	$-\frac{\sqrt{1430}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{143}}{308}$	0	0	0	0	
	0	0	$\frac{2\sqrt{143}}{77}$	0	0	0	0	0	0	$\frac{5\sqrt{429}}{924}$	0	0	0	
	0	0	$\frac{\sqrt{6006}}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{2002}}{1001}$	0	0	0	
	0	0	0	$-\frac{\sqrt{858}}{308}$	0	0	0	0	0	$\frac{\sqrt{286}}{2002}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{143}}{308}$	0	0	0	0	0	$\frac{\sqrt{1430}}{1001}$	0	0	
	0	0	0	0	0	$\frac{5\sqrt{429}}{924}$	$-\frac{\sqrt{2002}}{1001}$	0	0	0	0	$\frac{\sqrt{286}}{2002}$	0	
	$-\frac{5\sqrt{429}}{924}$	0	0	0	0	0	0	$\frac{\sqrt{286}}{2002}$	0	0	0	0	$-\frac{\sqrt{2002}}{1001}$	
	0	$\frac{\sqrt{143}}{308}$	0	0	0	0	0	0	$\frac{\sqrt{1430}}{1001}$	0	0	0	0	
	0	0	$\frac{\sqrt{858}}{308}$	0	0	0	0	0	$\frac{\sqrt{286}}{2002}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{6006}}{924}$	0	0	0	0	0	$-\frac{\sqrt{2002}}{1001}$	0	0	0	
1015	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													
$\mathbb{M}_5^{(1,1;a)}(A_{2g}, 1)$	$\frac{\sqrt{1001}}{539}$	0	0	0	0	0	0	$-\frac{5\sqrt{6006}}{6468}$	0	0	0	0	0	0	0
	0	$-\frac{5\sqrt{1001}}{539}$	0	0	0	0	0	0	$\frac{3\sqrt{10010}}{2156}$	0	0	0	0	0	0
	0	0	$\frac{10\sqrt{1001}}{539}$	0	0	0	0	0	0	$-\frac{5\sqrt{3003}}{3234}$	0	0	0	0	0
	0	0	0	$-\frac{10\sqrt{1001}}{539}$	0	0	0	0	0	$-\frac{5\sqrt{3003}}{3234}$	0	0	0	0	0
	0	0	0	0	$\frac{5\sqrt{1001}}{539}$	0	0	0	0	0	0	$\frac{3\sqrt{10010}}{2156}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{1001}}{539}$	0	0	0	0	0	$-\frac{5\sqrt{6006}}{6468}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{1001}}{2002}$	0	0	0	0	0	0	0	0
	$-\frac{5\sqrt{6006}}{6468}$	0	0	0	0	0	0	$\frac{23\sqrt{1001}}{14014}$	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{10010}}{2156}$	0	0	0	0	0	0	$-\frac{17\sqrt{1001}}{14014}$	0	0	0	0	0	0
	0	0	$-\frac{5\sqrt{3003}}{3234}$	0	0	0	0	0	$-\frac{15\sqrt{1001}}{14014}$	0	0	0	0	0	0
	0	0	0	$-\frac{5\sqrt{3003}}{3234}$	0	0	0	0	0	$\frac{15\sqrt{1001}}{14014}$	0	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{10010}}{2156}$	0	0	0	0	0	$\frac{17\sqrt{1001}}{14014}$	0	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{6006}}{6468}$	0	0	0	0	0	0	$-\frac{23\sqrt{1001}}{14014}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{1001}}{2002}$	0
1016	symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_5^{(1,1;a)}(A_{2g}, 2)$	0	0	0	$-\frac{2\sqrt{143}i}{77}$	0	0	0	0	0	$\frac{5\sqrt{429}i}{924}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{1430}i}{77}$	0	0	0	0	0	$-\frac{\sqrt{143}i}{308}$	0	0	
	0	0	0	0	0	$-\frac{2\sqrt{143}i}{77}$	$\frac{\sqrt{6006}i}{924}$	0	0	0	0	$-\frac{\sqrt{858}i}{308}$	0	
	$\frac{2\sqrt{143}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{858}i}{308}$	0	0	0	0	$\frac{\sqrt{6006}i}{924}$	
	0	$-\frac{\sqrt{1430}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{143}i}{308}$	0	0	0	0	
	0	0	$\frac{2\sqrt{143}i}{77}$	0	0	0	0	0	$\frac{5\sqrt{429}i}{924}$	0	0	0	0	
	0	0	$-\frac{\sqrt{6006}i}{924}$	0	0	0	0	0	$\frac{\sqrt{2002}i}{1001}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{858}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{286}i}{2002}$	0	0	0	
	0	0	0	0	$\frac{\sqrt{143}i}{308}$	0	0	0	0	0	$-\frac{\sqrt{1430}i}{1001}$	0	0	
	0	0	0	0	0	$-\frac{5\sqrt{429}i}{924}$	$-\frac{\sqrt{2002}i}{1001}$	0	0	0	0	$-\frac{\sqrt{286}i}{2002}$	0	
	$-\frac{5\sqrt{429}i}{924}$	0	0	0	0	0	0	$\frac{\sqrt{286}i}{2002}$	0	0	0	0	$\frac{\sqrt{2002}i}{1001}$	
	0	$\frac{\sqrt{143}i}{308}$	0	0	0	0	0	0	$\frac{\sqrt{1430}i}{1001}$	0	0	0	0	
	0	0	$\frac{\sqrt{858}i}{308}$	0	0	0	0	0	$\frac{\sqrt{286}i}{2002}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{6006}i}{924}$	0	0	0	0	0	$-\frac{\sqrt{2002}i}{1001}$	0	0	0	
1017	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 1)$	0	0	0	0	0	$\frac{3\sqrt{286}}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{429}}{924}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{15015}}{924}$	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{15015}}{924}$	0	0	0	0	0	0	0	0	
	$\frac{3\sqrt{286}}{77}$	0	0	0	0	0	0	$\frac{5\sqrt{429}}{924}$	0	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{15015}}{924}$	0	0	0	0	0	$-\frac{\sqrt{6006}}{2002}$	0	0		
	0	0	0	0	0	$\frac{5\sqrt{429}}{924}$	0	0	0	0	$-\frac{3\sqrt{286}}{1001}$	0	0		
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6006}}{2002}$	0	0		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{6006}}{2002}$	0	0	0	0	0	0	0	0	
	$-\frac{5\sqrt{429}}{924}$	0	0	0	0	0	0	$-\frac{3\sqrt{286}}{1001}$	0	0	0	0	0	0	
1018 symmetry		$-\frac{3\sqrt{14y}(5x^4 - 10x^2y^2 + y^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 1)$	0	0	0	0	0	$\frac{3\sqrt{286}i}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{429}i}{924}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{15015}i}{924}$	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{15015}i}{924}$	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{286}i}{77}$	0	0	0	0	0	0	$-\frac{5\sqrt{429}i}{924}$	0	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{15015}i}{924}$	0	0	0	0	0	$-\frac{\sqrt{6006}i}{2002}$	0	0		
	0	0	0	0	0	$\frac{5\sqrt{429}i}{924}$	0	0	0	0	0	$-\frac{3\sqrt{286}i}{1001}$	0		
	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6006}i}{2002}$	0		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{6006}i}{2002}$	0	0	0	0	0	0	0	
	$\frac{5\sqrt{429}i}{924}$	0	0	0	0	0	0	$\frac{3\sqrt{286}i}{1001}$	0	0	0	0	0	0	
1019	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$													
		$\frac{\sqrt{15015}i}{924}$	0	0	0	0	0	0	$\frac{\sqrt{6006}i}{2002}$	0	0	0	0	0	0

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 2)$	0	$\frac{\sqrt{3003}}{539}$	0	0	0	0	$\frac{\sqrt{1430}}{1848}$	0	$-\frac{5\sqrt{30030}}{12936}$	0	0	0	0	0	0	0
	$\frac{\sqrt{3003}}{539}$	0	$-\frac{\sqrt{30030}}{539}$	0	0	0	0	$-\frac{23\sqrt{2002}}{12936}$	0	$\frac{13\sqrt{10010}}{12936}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{30030}}{539}$	0	$\frac{2\sqrt{15015}}{539}$	0	0	0	0	$\frac{\sqrt{3003}}{588}$	0	$-\frac{\sqrt{5005}}{6468}$	0	0	0	0	0
	0	0	$\frac{2\sqrt{15015}}{539}$	0	$-\frac{\sqrt{30030}}{539}$	0	0	0	0	$\frac{\sqrt{5005}}{6468}$	0	$-\frac{\sqrt{3003}}{588}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{30030}}{539}$	0	$\frac{\sqrt{3003}}{539}$	0	0	0	0	$-\frac{13\sqrt{10010}}{12936}$	0	$\frac{23\sqrt{2002}}{12936}$	0	0	0
	0	0	0	0	$\frac{\sqrt{3003}}{539}$	0	0	0	0	0	$\frac{5\sqrt{30030}}{12936}$	0	$-\frac{\sqrt{1430}}{1848}$	0	0	0
	$\frac{\sqrt{1430}}{1848}$	0	0	0	0	0	0	$-\frac{\sqrt{2145}}{2002}$	0	0	0	0	0	0	0	0
	0	$-\frac{23\sqrt{2002}}{12936}$	0	0	0	0	$-\frac{\sqrt{2145}}{2002}$	0	$\frac{4\sqrt{5005}}{7007}$	0	0	0	0	0	0	0
	$-\frac{5\sqrt{30030}}{12936}$	0	$\frac{\sqrt{3003}}{588}$	0	0	0	0	$\frac{4\sqrt{5005}}{7007}$	0	$-\frac{\sqrt{1001}}{14014}$	0	0	0	0	0	0
	0	$\frac{13\sqrt{10010}}{12936}$	0	$\frac{\sqrt{5005}}{6468}$	0	0	0	0	$-\frac{\sqrt{1001}}{14014}$	0	$-\frac{2\sqrt{15015}}{7007}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{5005}}{6468}$	0	$-\frac{13\sqrt{10010}}{12936}$	0	0	0	0	$-\frac{2\sqrt{15015}}{7007}$	0	$-\frac{\sqrt{1001}}{14014}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{3003}}{588}$	0	$\frac{5\sqrt{30030}}{12936}$	0	0	0	0	$-\frac{\sqrt{1001}}{14014}$	0	$\frac{4\sqrt{5005}}{7007}$	0	0	0
	0	0	0	0	$\frac{23\sqrt{2002}}{12936}$	0	0	0	0	0	$\frac{4\sqrt{5005}}{7007}$	0	$-\frac{\sqrt{2145}}{2002}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{1430}}{1848}$	0	0	0	0	0	0	0	$-\frac{\sqrt{2145}}{2002}$	0	0
1020	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 2)$	0	$-\frac{\sqrt{3003}i}{539}$	0	0	0	0	$\frac{\sqrt{1430}i}{1848}$	0	$\frac{5\sqrt{30030}i}{12936}$	0	0	0	0	0	0	0
	$\frac{\sqrt{3003}i}{539}$	0	$\frac{\sqrt{30030}i}{539}$	0	0	0	0	$-\frac{23\sqrt{2002}i}{12936}$	0	$-\frac{13\sqrt{10010}i}{12936}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{30030}i}{539}$	0	$-\frac{2\sqrt{15015}i}{539}$	0	0	0	0	$\frac{\sqrt{3003}i}{588}$	0	$\frac{\sqrt{5005}i}{6468}$	0	0	0	0	0
	0	0	$\frac{2\sqrt{15015}i}{539}$	0	$\frac{\sqrt{30030}i}{539}$	0	0	0	0	$\frac{\sqrt{5005}i}{6468}$	0	$\frac{\sqrt{3003}i}{588}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{30030}i}{539}$	0	$-\frac{\sqrt{3003}i}{539}$	0	0	0	0	$-\frac{13\sqrt{10010}i}{12936}$	0	$-\frac{23\sqrt{2002}i}{12936}$	0	0	0
	0	0	0	0	$\frac{\sqrt{3003}i}{539}$	0	0	0	0	0	$\frac{5\sqrt{30030}i}{12936}$	0	$\frac{\sqrt{1430}i}{1848}$	0	0	0
	$-\frac{\sqrt{1430}i}{1848}$	0	0	0	0	0	0	$\frac{\sqrt{2145}i}{2002}$	0	0	0	0	0	0	0	0
	0	$\frac{23\sqrt{2002}i}{12936}$	0	0	0	0	$-\frac{\sqrt{2145}i}{2002}$	0	$-\frac{4\sqrt{5005}i}{7007}$	0	0	0	0	0	0	0
	$-\frac{5\sqrt{30030}i}{12936}$	0	$-\frac{\sqrt{3003}i}{588}$	0	0	0	0	$\frac{4\sqrt{5005}i}{7007}$	0	$\frac{\sqrt{1001}i}{14014}$	0	0	0	0	0	0
	0	$\frac{13\sqrt{10010}i}{12936}$	0	$-\frac{\sqrt{5005}i}{6468}$	0	0	0	0	$-\frac{\sqrt{1001}i}{14014}$	0	$\frac{2\sqrt{15015}i}{7007}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{5005}i}{6468}$	0	$\frac{13\sqrt{10010}i}{12936}$	0	0	0	0	$-\frac{2\sqrt{15015}i}{7007}$	0	$\frac{\sqrt{1001}i}{14014}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{3003}i}{588}$	0	$-\frac{5\sqrt{30030}i}{12936}$	0	0	0	0	$-\frac{\sqrt{1001}i}{14014}$	0	$-\frac{4\sqrt{5005}i}{7007}$	0	0	0
	0	0	0	0	$\frac{23\sqrt{2002}i}{12936}$	0	0	0	0	0	$\frac{4\sqrt{5005}i}{7007}$	0	$\frac{\sqrt{2145}i}{2002}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{1430}i}{1848}$	0	0	0	0	0	0	$-\frac{\sqrt{2145}i}{2002}$	0	0	0

1021 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 3)$	0	0	0	0	$\frac{3\sqrt{143}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{1430}i}{308}$	0	0	
	0	0	0	0	0	$-\frac{3\sqrt{143}i}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{858}i}{924}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{3003}i}{462}$	
	0	0	0	0	0	0	$-\frac{\sqrt{3003}i}{462}$	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{143}i}{77}$	0	0	0	0	0	0	$\frac{\sqrt{858}i}{924}$	0	0	0	0	0	0	
	0	$\frac{3\sqrt{143}i}{77}$	0	0	0	0	0	0	$\frac{\sqrt{1430}i}{308}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{3003}i}{462}$	0	0	0	0	0	0	$-\frac{3\sqrt{1001}i}{2002}$	0	0	0	
	0	0	0	0	$-\frac{\sqrt{858}i}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{2145}i}{2002}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{1430}i}{308}$	0	0	0	0	0	0	$\frac{\sqrt{2145}i}{2002}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{1001}i}{2002}$	
	$\frac{\sqrt{1430}i}{308}$	0	0	0	0	0	0	$\frac{\sqrt{2145}i}{2002}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{858}i}{924}$	0	0	0	0	0	0	$-\frac{\sqrt{2145}i}{2002}$	0	0	0	0	0	
1022 symmetry		$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 3)$	0	0	0	0	$\frac{3\sqrt{143}}{77}$	0	0	0	0	0	$-\frac{\sqrt{1430}}{308}$	0	0	
	0	0	0	0	0	$-\frac{3\sqrt{143}}{77}$	0	0	0	0	0	$-\frac{\sqrt{858}}{924}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{3003}}{462}$	0
	0	0	0	0	0	0	$\frac{\sqrt{3003}}{462}$	0	0	0	0	0	0	0
	$\frac{3\sqrt{143}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{858}}{924}$	0	0	0	0	0	0
	0	$-\frac{3\sqrt{143}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{1430}}{308}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{3003}}{462}$	0	0	0	0	0	$-\frac{3\sqrt{1001}}{2002}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{858}}{924}$	0	0	0	0	0	$-\frac{\sqrt{2145}}{2002}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{1430}}{308}$	0	0	0	0	0	$\frac{\sqrt{2145}}{2002}$	0	0
	0	0	0	0	0	0	$-\frac{3\sqrt{1001}}{2002}$	0	0	0	0	0	0	$\frac{3\sqrt{1001}}{2002}$
	$-\frac{\sqrt{1430}}{308}$	0	0	0	0	0	0	$-\frac{\sqrt{2145}}{2002}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{858}}{924}$	0	0	0	0	0	0	$\frac{\sqrt{2145}}{2002}$	0	0	0	0	0
	0	0	$\frac{\sqrt{3003}}{462}$	0	0	0	0	0	0	$\frac{3\sqrt{1001}}{2002}$	0	0	0	0
1023	symmetry	$-\frac{\sqrt{105xyz(x^2+y^2-2z^2)}}{2}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 4)$	0	0	$-\frac{\sqrt{858}i}{154}$	0	0	0	0	0	$\frac{5\sqrt{286}i}{924}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{4290}i}{154}$	0	0	$\frac{\sqrt{2002}i}{924}$	0	0	$-\frac{\sqrt{1430}i}{462}$	0	0	0	0	0
	$\frac{\sqrt{858}i}{154}$	0	0	0	$-\frac{\sqrt{4290}i}{154}$	0	0	$-\frac{2\sqrt{143}i}{231}$	0	0	$-\frac{\sqrt{429}i}{462}$	0	$-\frac{\sqrt{429}i}{462}$	0	0
	0	$-\frac{\sqrt{4290}i}{154}$	0	0	0	$\frac{\sqrt{858}i}{154}$	0	0	$\frac{\sqrt{429}i}{462}$	0	0	0	$\frac{2\sqrt{143}i}{231}$	0	0
	0	0	$\frac{\sqrt{4290}i}{154}$	0	0	0	0	0	$\frac{\sqrt{1430}i}{462}$	0	0	0	$-\frac{\sqrt{2002}i}{924}$	0	0
	0	0	0	$-\frac{\sqrt{858}i}{154}$	0	0	0	0	0	$-\frac{5\sqrt{286}i}{924}$	0	0	0	0	0
	0	$-\frac{\sqrt{2002}i}{924}$	0	0	0	0	0	0	$\frac{\sqrt{5005}i}{2002}$	0	0	0	0	0	0
	0	0	$\frac{2\sqrt{143}i}{231}$	0	0	0	0	0	0	$-\frac{3\sqrt{429}i}{2002}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{429}i}{462}$	0	0	$-\frac{\sqrt{5005}i}{2002}$	0	0	0	$-\frac{2\sqrt{143}i}{1001}$	0	0	0	0
	$-\frac{5\sqrt{286}i}{924}$	0	0	0	$-\frac{\sqrt{1430}i}{462}$	0	0	$\frac{3\sqrt{429}i}{2002}$	0	0	0	$\frac{2\sqrt{143}i}{1001}$	0	0	0
	0	$\frac{\sqrt{1430}i}{462}$	0	0	0	$\frac{5\sqrt{286}i}{924}$	0	0	$\frac{2\sqrt{143}i}{1001}$	0	0	0	$\frac{3\sqrt{429}i}{2002}$	0	0
	0	0	$\frac{\sqrt{429}i}{462}$	0	0	0	0	0	$-\frac{2\sqrt{143}i}{1001}$	0	0	0	$-\frac{\sqrt{5005}i}{2002}$	0	0
	0	0	0	$-\frac{2\sqrt{143}i}{231}$	0	0	0	0	0	$-\frac{3\sqrt{429}i}{2002}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{2002}i}{924}$	0	0	0	0	0	$\frac{\sqrt{5005}i}{2002}$	0	0	0	0
1024	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 4)$	0	0 $\frac{\sqrt{858}}{154}$ 0 0 0 0 0 0 0 $-\frac{5\sqrt{286}}{924}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{4290}}{154}$ 0 0 $\frac{\sqrt{2002}}{924}$ 0 0 0 $\frac{\sqrt{1430}}{462}$ 0 0 0 0
	$\frac{\sqrt{858}}{154}$	0 0 0 0 $\frac{\sqrt{4290}}{154}$ 0 0 $-\frac{2\sqrt{143}}{231}$ 0 0 0 $\frac{\sqrt{429}}{462}$ 0 0 0
	0	$-\frac{\sqrt{4290}}{154}$ 0 0 0 0 $-\frac{\sqrt{858}}{154}$ 0 0 $\frac{\sqrt{429}}{462}$ 0 0 0 $-\frac{2\sqrt{143}}{231}$ 0
	0	0 $\frac{\sqrt{4290}}{154}$ 0 0 0 0 0 0 $\frac{\sqrt{1430}}{462}$ 0 0 0 0 $\frac{\sqrt{2002}}{924}$
	0	0 0 0 $-\frac{\sqrt{858}}{154}$ 0 0 0 0 0 0 $-\frac{5\sqrt{286}}{924}$ 0 0 0 0
	0	$\frac{\sqrt{2002}}{924}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{5005}}{2002}$ 0 0 0 0 0
	0	0 $-\frac{2\sqrt{143}}{231}$ 0 0 0 0 0 0 $\frac{3\sqrt{429}}{2002}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{429}}{462}$ 0 0 $-\frac{\sqrt{5005}}{2002}$ 0 0 0 $\frac{2\sqrt{143}}{1001}$ 0 0 0
	$-\frac{5\sqrt{286}}{924}$	0 0 0 $\frac{\sqrt{1430}}{462}$ 0 0 $\frac{3\sqrt{429}}{2002}$ 0 0 0 $-\frac{2\sqrt{143}}{1001}$ 0 0
	0	$\frac{\sqrt{1430}}{462}$ 0 0 0 $-\frac{5\sqrt{286}}{924}$ 0 0 $\frac{2\sqrt{143}}{1001}$ 0 0 0 $-\frac{3\sqrt{429}}{2002}$ 0
	0	0 0 0 $\frac{\sqrt{429}}{462}$ 0 0 0 0 $-\frac{2\sqrt{143}}{1001}$ 0 0 0 $\frac{\sqrt{5005}}{2002}$
	0	0 0 0 $-\frac{2\sqrt{143}}{231}$ 0 0 0 0 0 0 $-\frac{3\sqrt{429}}{2002}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{2002}}{924}$ 0 0 0 0 0 0 $\frac{\sqrt{5005}}{2002}$ 0 0 0