

PG No. 36  $D_{3d}(1)$   $\bar{3}m$  (-31m setting) [ trigonal ] (lgs basis)

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

Table 1: (s,s) block.

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

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

Table 2: (s,p) block.

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

*continued ...*

Table 2

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

continued ...

Table 2

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

*continued ...*

Table 2

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

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

Table 3: (s,d) block.

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

continued ...

Table 3

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

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
42	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,0}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{60} \\ \frac{\sqrt{10}i}{10} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{60} & 0 \end{bmatrix}$
43	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{10} & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ -\frac{\sqrt{10}}{10} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 \end{bmatrix}$
44	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,0}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
45	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
46	symmetry	$z$
	$\mathbb{G}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
47	symmetry	$x$
	$\mathbb{G}_{1,0}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & -\frac{\sqrt{30}}{20} & 0 \end{bmatrix}$
48	symmetry	$y$
	$\mathbb{G}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \end{bmatrix}$
49	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(a)}(A_{1g})$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
50	symmetry	$\sqrt{3}yz$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{T}_{2,0}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
51	symmetry	$-\sqrt{3}xz$ $\mathbb{T}_{2,1}^{(a)}(E_g, 1)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \end{bmatrix}$
52	symmetry	$\sqrt{3}xy$ $\mathbb{T}_{2,0}^{(a)}(E_g, 2)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
53	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{T}_{2,1}^{(a)}(E_g, 2)$ $\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
54	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{T}_2^{(1,0;a)}(A_{1g})$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
55	symmetry	$\sqrt{3}yz$ $\mathbb{T}_{2,0}^{(1,0;a)}(E_g, 1)$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}i}{12} & 0 \end{bmatrix}$
56	symmetry	$-\sqrt{3}xz$ $\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \end{bmatrix}$
57	symmetry	$\sqrt{3}xy$ $\mathbb{T}_{2,0}^{(1,0;a)}(E_g, 2)$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
58	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$
59	symmetry	$\frac{\sqrt{10}y(3x^2 - y^2)}{4}$

continued ...

Table 3

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

continued ...

Table 3

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

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

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 \end{bmatrix}$
70	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
71	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{Q}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
72	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
73	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 \end{bmatrix}$
74	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,0}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}$
75	symmetry	$\sqrt{15}xyz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
76	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{8} & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ -\frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{2}i}{8} \end{bmatrix}$
77	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 \end{bmatrix}$
78	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{2}}{8} \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & -\frac{\sqrt{2}}{8} & 0 \end{bmatrix}$
79	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,0}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{30}}{24} \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & \frac{\sqrt{30}}{24} & 0 \end{bmatrix}$
80	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{24} & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 \end{bmatrix}$
81	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,0}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 \end{bmatrix}$
82	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
83	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{7}i}{7} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{7} & \frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 \end{bmatrix}$
84	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{8} & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ \frac{\sqrt{6}}{8} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \end{bmatrix}$
85	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{6}}{8} \\ \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & -\frac{\sqrt{6}}{8} & 0 \end{bmatrix}$
86	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{70}i}{112} & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & \frac{\sqrt{42}}{56} \\ -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{112} & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{112} & -\frac{\sqrt{42}}{56} & 0 \end{bmatrix}$
87	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{56} & \frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} \\ -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{70}i}{112} & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & -\frac{5\sqrt{42}i}{112} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \end{bmatrix}$
88	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \end{bmatrix}$
89	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & \frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \end{bmatrix}$
90	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & \frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 \end{bmatrix}$
91	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{14} \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \end{bmatrix}$
93	symmetry	$\sqrt{3}yz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_{2,0}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{105}}{42} \\ \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{105}}{42} & 0 \end{bmatrix}$
94	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{42} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ \frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 \end{bmatrix}$
95	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_{2,0}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \end{bmatrix}$
96	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
97	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{T}_3^{(a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 \end{bmatrix}$
98	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
99	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
100	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
101	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 \end{bmatrix}$
102	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{T}_{3,0}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \end{bmatrix}$
103	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
104	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{8} & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \end{bmatrix}$
105	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \end{bmatrix}$
106	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & \frac{\sqrt{2}i}{8} & 0 \end{bmatrix}$
107	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,0}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{24} & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{30}i}{24} \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & -\frac{\sqrt{30}i}{24} & 0 \end{bmatrix}$
108	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{24} & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 \end{bmatrix}$
109	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,0}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 \end{bmatrix}$
110	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
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
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{3\sqrt{7}i}{56} & \frac{\sqrt{7}}{7} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{7} & \frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 \end{bmatrix}$
112	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{8} & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ -\frac{\sqrt{6}i}{8} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \end{bmatrix}$
113	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{8} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{6}i}{8} \\ \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & \frac{\sqrt{6}i}{8} & 0 \end{bmatrix}$
114	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{42}i}{56} \\ -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & -\frac{5\sqrt{42}}{112} & \frac{\sqrt{42}i}{56} & 0 \end{bmatrix}$
115	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{56} & \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \\ \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{5\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \end{bmatrix}$
116	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & \frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 \end{bmatrix}$
117	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \end{bmatrix}$
118	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} \frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 \end{bmatrix}$
119	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{14} \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \end{bmatrix}$
121	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_{2,0}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{105}i}{42} \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{105}i}{42} & 0 \end{bmatrix}$
122	symmetry	$-\sqrt{3}xz$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{42} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \\ -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 \end{bmatrix}$
123	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_{2,0}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \end{bmatrix}$
124	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{105}}{42} \end{bmatrix}$

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

Table 5: (p,p) block.

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
135	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
136	symmetry	$1$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
137	symmetry	$z$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
138	symmetry	$x$

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

*continued ...*

Table 5

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

continued ...

Table 5

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} \\ 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & \frac{\sqrt{30}}{15} & 0 \end{bmatrix}$
155	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{15} & \frac{\sqrt{30}i}{15} & 0 \end{bmatrix}$
156	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
157	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
158	symmetry	$z$

continued ...

Table 5

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

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

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	$\begin{bmatrix} z \\ \dots \end{bmatrix}$

*continued ...*

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
162	symmetry	$\begin{bmatrix} x \\ -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \end{bmatrix}$
163	symmetry	$\begin{bmatrix} y \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
164	symmetry	$\begin{bmatrix} \frac{\sqrt{10}y(3x^2-y^2)}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
165	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
174	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{5}}{60} & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 & \frac{\sqrt{5}}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} \\ -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{5}}{60} & 0 & \frac{7\sqrt{5}i}{60} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{5}i}{15} & -\frac{\sqrt{5}}{60} & 0 & \frac{7\sqrt{5}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{30} & \frac{\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} \\ 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 \end{bmatrix}$
175	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & -\frac{7\sqrt{5}}{60} & 0 & -\frac{\sqrt{5}i}{60} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{5}i}{15} & \frac{7\sqrt{5}}{60} & 0 & -\frac{\sqrt{5}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{60} & 0 & \frac{\sqrt{5}}{12} & \frac{\sqrt{5}i}{15} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{60} & 0 & -\frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{5}i}{15} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} & -\frac{\sqrt{5}}{30} & 0 \end{bmatrix}$
176	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} \\ \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{6} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{6} \end{bmatrix}$
177	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} \\ \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{bmatrix}$
178	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
179	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
180	symmetry	$\begin{bmatrix} -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \end{bmatrix}$
181	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 \end{bmatrix}$
182	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \end{bmatrix}$
183	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 \end{bmatrix}$
184	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & -\frac{11\sqrt{10}}{120} & \frac{\sqrt{10}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & \frac{11\sqrt{10}}{120} & 0 & 0 & -\frac{\sqrt{10}i}{120} \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{10}i}{120} & 0 & 0 & -\frac{\sqrt{10}}{120} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{10}i}{120} & \frac{\sqrt{10}}{120} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{10}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} \\ -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 \end{bmatrix}$
185	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{10}i}{120} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{120} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{10}i}{120} & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{10}i}{120} & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{10}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{10}i}{120} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{10}i}{30} & 0 & 0 & -\frac{\sqrt{10}}{24} \\ -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{30} & \frac{\sqrt{10}}{24} & 0 \end{bmatrix}$
186	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,0}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{1}{6} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{12} \\ \frac{\sqrt{3}}{12} & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{i}{12} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{6} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{12} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & \frac{i}{6} & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} \end{bmatrix}$
187	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} \\ -\frac{\sqrt{3}}{12} & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{i}{6} & 0 \\ 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$
188	symmetry	$z$
	$\mathbb{Q}_1^{(1,1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \end{bmatrix}$
189	symmetry	$x$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
190	symmetry	$\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
191	symmetry	$\begin{bmatrix} & & & -\frac{x^2}{2} - \frac{y^2}{2} + z^2 & & & & & \\ & & & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
192	symmetry	$\begin{bmatrix} & & & \sqrt{3}yz & & & & & \\ & & & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ & & & 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
193	symmetry	$\begin{bmatrix} & & & -\sqrt{3}xz & & & & & \\ & & & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ & & & 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ & & & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
194	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_{2,0}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
195	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
196	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \end{bmatrix}$
197	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{2,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
198	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
199	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_{2,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
200	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
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
		$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{35}}{140} \\ -\frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & -\frac{\sqrt{35}}{140} & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{35}}{140} & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} \\ \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 \\ \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 \end{bmatrix}$
202	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \end{bmatrix}$
203	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \end{bmatrix}$
204	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & -\frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{14}i}{56} \\ \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{14}i}{56} & \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \end{bmatrix}$
205	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{14}}{56} \\ -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & -\frac{\sqrt{14}}{56} & 0 \end{bmatrix}$
206	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
207	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
208	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} \end{bmatrix}$
209	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
234	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{12} & 0 & -\frac{\sqrt{5}i}{60} & \frac{\sqrt{5}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{12} & 0 & \frac{\sqrt{5}i}{60} & 0 & 0 & -\frac{\sqrt{5}}{15} \\ \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & 0 & \frac{\sqrt{5}i}{60} & 0 & -\frac{7\sqrt{5}}{60} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{5}}{15} & -\frac{\sqrt{5}i}{60} & 0 & -\frac{7\sqrt{5}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & -\frac{\sqrt{5}}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & 0 & 0 & \frac{\sqrt{5}}{30} & 0 \end{bmatrix}$
235	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & -\frac{7\sqrt{5}i}{60} & 0 & \frac{\sqrt{5}}{60} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{5}}{15} & \frac{7\sqrt{5}i}{60} & 0 & \frac{\sqrt{5}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{60} & 0 & \frac{\sqrt{5}i}{12} & -\frac{\sqrt{5}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{60} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & \frac{\sqrt{5}}{15} & 0 & 0 & \frac{\sqrt{5}i}{30} \\ 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{15} & -\frac{\sqrt{5}i}{30} & 0 \end{bmatrix}$
236	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} \\ -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{6} \end{bmatrix}$
237	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} \\ \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{6} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{6} & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{bmatrix}$
238	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
239	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
240	symmetry	$\begin{bmatrix} -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
241	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 \end{bmatrix}$
242	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 \end{bmatrix}$
243	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{8} & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \end{bmatrix}$
244	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{11\sqrt{10}i}{120} & \frac{\sqrt{10}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{11\sqrt{10}i}{120} & 0 & 0 & -\frac{\sqrt{10}}{120} \\ -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{10}}{120} & 0 & 0 & \frac{\sqrt{10}i}{120} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{10}}{120} & -\frac{\sqrt{10}i}{120} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{10}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 \end{bmatrix}$
245	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{10}}{120} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{120} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{10}}{120} & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{10}}{120} & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{10}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{10}}{120} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{10}}{30} & 0 & 0 & \frac{\sqrt{10}i}{24} \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{30} & -\frac{\sqrt{10}i}{24} & 0 \end{bmatrix}$
246	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,0}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{i}{6} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{12} \\ -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{1}{12} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{6} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{12} \\ -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{6} & -\frac{i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{6} & \frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{6} \end{bmatrix}$
247	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{6} \\ -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{6} & -\frac{i}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{12} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{6} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{1}{6} & 0 \\ 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$
248	symmetry	$z$
	$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \end{bmatrix}$
249	symmetry	$x$

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
254	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
255	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \end{bmatrix}$
256	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}i}{60} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \end{bmatrix}$
257	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{2,0}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
258	symmetry	$\begin{bmatrix} \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \end{bmatrix}$
259	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
260	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
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
		$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{35}i}{140} \\ -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{35}i}{140} & 0 \\ 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{35}i}{140} & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} \\ -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{35}}{140} & 0 \\ \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 \end{bmatrix}$
262	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \end{bmatrix}$
263	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \end{bmatrix}$
264	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{14}}{56} \\ \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{14}}{56} & -\frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{14}i}{56} & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \\ \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \end{bmatrix}$
265	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{14}}{56} & \frac{\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & \frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{14}i}{56} & 0 \end{bmatrix}$
266	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
267	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
268	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} \end{bmatrix}$
269	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{7}i}{28} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
270	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & -\frac{1}{4} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{1}{4} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{i}{4} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \end{bmatrix}$
271	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & -\frac{i}{12} & \frac{1}{12} & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{3} & 0 & \frac{i}{12} & 0 & 0 & -\frac{1}{12} \\ \frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{1}{12} & -\frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{6} & -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} \\ 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 \end{bmatrix}$
272	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & \frac{1}{12} & -\frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{12} & 0 & -\frac{i}{3} & -\frac{1}{12} & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{12} & 0 & \frac{i}{3} & 0 & 0 & \frac{1}{12} \\ 0 & 0 & 0 & -\frac{1}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} \\ 0 & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 \end{bmatrix}$
273	symmetry	$\sqrt{3}xy$

continued ...

Table 6

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

continued ...

Table 6

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

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

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

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry $\mathbb{Q}_2^{(a)}(A_{1g})$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
282	symmetry $\mathbb{Q}_{2,0}^{(a)}(E_g, 1)$	$\begin{pmatrix} \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 \end{pmatrix}$
283	symmetry $\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \\ -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \end{pmatrix}$
284	symmetry	$\begin{pmatrix} & & & & & & & \sqrt{3}xy & & & & & & \end{pmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
285	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$
286	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
287	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
288	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_{2g})$	$\begin{bmatrix} \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \end{bmatrix}$
289	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{Q}_{4,0}^{(a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 \end{bmatrix}$
290	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} \\ \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
291	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{Q}_{4,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
293	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
294	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \end{bmatrix}$
295	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & \frac{\sqrt{35}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{56} & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 \\ \frac{\sqrt{35}}{56} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & 0 & 0 & 0 & \frac{\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
296	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{2}i}{16} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & \frac{\sqrt{2}i}{16} \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & -\frac{\sqrt{2}}{8} & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{32} & \frac{\sqrt{2}i}{16} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & -\frac{\sqrt{2}i}{16} \\ -\frac{\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{16} & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \end{bmatrix}$
298	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{224} & \frac{\sqrt{210}i}{56} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{11\sqrt{14}}{224} & \frac{5\sqrt{14}i}{112} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{224} & 0 & 0 & -\frac{\sqrt{210}i}{56} & \frac{\sqrt{14}i}{56} & 0 & \frac{11\sqrt{14}}{224} & 0 & 0 & -\frac{5\sqrt{14}i}{112} \\ \frac{5\sqrt{14}i}{112} & 0 & 0 & -\frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{224} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}i}{112} & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}}{224} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \end{bmatrix}$
299	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{9\sqrt{14}i}{224} & 0 & 0 \\ 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{9\sqrt{14}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}i}{224} & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & \frac{11\sqrt{14}i}{224} & 0 & -\frac{\sqrt{14}}{56} & -\frac{5\sqrt{14}i}{112} & 0 \\ 0 & 0 & \frac{3\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & \frac{11\sqrt{14}i}{224} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & \frac{5\sqrt{14}i}{112} \\ 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{224} & \frac{\sqrt{14}}{56} & 0 \end{bmatrix}$
300	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,0}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & -\frac{3i}{16} & 0 & \frac{3}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & -\frac{3i}{16} & 0 & -\frac{3}{16} & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$ $\begin{bmatrix} 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & -\frac{3}{16} & 0 & -\frac{3i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & \frac{3}{16} & 0 & -\frac{3i}{16} & 0 & 0 & 0 \end{bmatrix}$
302	symmetry	$-\frac{\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{28} \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & \frac{\sqrt{7}}{112} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & \frac{\sqrt{105}}{112} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} \end{bmatrix}$
303	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & \frac{3\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} \\ \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & -\frac{\sqrt{70}}{84} & 0 \\ 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} \\ -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 \\ -\frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{42} & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 \end{bmatrix}$
309	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} \\ 0 & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} \\ -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & -\frac{3\sqrt{35}i}{112} & 0 & 0 & 0 & \frac{5\sqrt{21}}{112} & 0 & \frac{5\sqrt{21}i}{112} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{35}}{112} & 0 & -\frac{3\sqrt{35}i}{112} & 0 & 0 & 0 & -\frac{5\sqrt{21}}{112} & 0 & \frac{5\sqrt{21}i}{112} & 0 & 0 & 0 \end{bmatrix}$
310	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} -\frac{3\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 \\ 0 & \frac{3\sqrt{30}i}{80} & \frac{\sqrt{2}}{8} & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & -\frac{\sqrt{30}}{40} & -\frac{3\sqrt{30}i}{80} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{3\sqrt{30}i}{80} \\ 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{160} & 0 & 0 & \frac{\sqrt{30}}{40} \\ \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{160} & -\frac{\sqrt{30}}{40} & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{32} & \frac{3\sqrt{30}i}{80} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & -\frac{3\sqrt{30}i}{80} \\ -\frac{3\sqrt{30}i}{80} & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{30}i}{80} & \frac{3\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{40} & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} \\ -\frac{\sqrt{30}}{40} & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{160} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 \end{bmatrix}$
312	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,0}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & -\frac{9\sqrt{210}}{1120} & -\frac{\sqrt{210}i}{560} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{210}i}{280} & 0 & \frac{9\sqrt{210}}{1120} & 0 & 0 & \frac{\sqrt{210}i}{560} \\ -\frac{\sqrt{210}i}{560} & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{9\sqrt{210}}{1120} & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{560} & -\frac{3\sqrt{14}}{224} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{9\sqrt{210}}{1120} & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}}{280} & -\frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} \\ \frac{3\sqrt{210}}{280} & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{210}i}{224} & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 \end{bmatrix}$
313	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & -\frac{9\sqrt{210}i}{1120} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{560} & \frac{3\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & -\frac{9\sqrt{210}i}{1120} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{9\sqrt{210}i}{1120} & 0 & \frac{\sqrt{210}}{280} & \frac{\sqrt{210}i}{560} & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & \frac{9\sqrt{210}i}{1120} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{210}i}{560} \\ 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & -\frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{210}i}{224} & 0 & 0 & \frac{3\sqrt{210}}{280} \\ -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{224} & -\frac{3\sqrt{210}}{280} & 0 \end{bmatrix}$
314	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{15}}{40} & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} \\ \frac{\sqrt{15}}{40} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 \\ 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} \\ -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{15}}{40} & 0 \\ 0 & 0 & 0 & \frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & \frac{\sqrt{15}}{80} & 0 & 0 \\ 0 & 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 & 0 \end{bmatrix}$
315	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{40} & 0 \\ 0 & -\frac{\sqrt{15}}{40} & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} \\ \frac{\sqrt{15}}{40} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 \\ 0 & 0 & 0 & \frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{80} & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 \\ 0 & 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & -\frac{\sqrt{15}i}{80} & 0 & 0 & 0 \end{bmatrix}$
316	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,0}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{56} & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} \\ \frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 \\ 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{105}}{140} & \\ \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & \frac{\sqrt{105}}{140} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & \frac{11\sqrt{105}i}{560} & 0 & \frac{11\sqrt{105}}{560} & \frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & 0 & \frac{11\sqrt{105}i}{560} & 0 & -\frac{11\sqrt{105}}{560} & 0 & 0 & -\frac{\sqrt{105}i}{70} \end{bmatrix}$
317	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{105}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} \\ \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}i}{280} & \frac{\sqrt{105}}{56} & 0 \\ 0 & \frac{\sqrt{105}}{140} & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & \frac{3\sqrt{105}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & \\ -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{105}i}{280} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 \\ -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{Q}_2^{(1,1;a)}(A_{1g})$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{105}}{84} \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & -\frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{\sqrt{105}}{84} & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & \\ -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 \end{bmatrix}$
319	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_{2,0}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \\ 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \end{bmatrix}$
320	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & -\frac{\sqrt{35}}{42} & 0 & 0 \end{bmatrix}$
321	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_{2,0}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} \\ -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}}{84} \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{35}}{84} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 \end{bmatrix}$
322	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{168} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{168} & -\frac{\sqrt{35}}{42} & 0 \\ 0 & -\frac{\sqrt{35}}{84} & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{35}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & \frac{5\sqrt{35}}{168} & 0 & -\frac{5\sqrt{35}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{21}}{24} & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & -\frac{5\sqrt{35}i}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
323	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{G}_3^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
325	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 \end{bmatrix}$
326	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 \end{bmatrix}$
327	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} \\ -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
328	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
329	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix}$
330	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} \\ \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 \end{bmatrix}$
331	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}}{42} & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ \frac{\sqrt{21}}{42} & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}}{42} \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & \frac{3\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{3\sqrt{35}i}{70} & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
332	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \\ \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 \end{bmatrix}$
333	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,0}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{84} & \frac{\sqrt{14}i}{21} & 0 \\ 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & \frac{\sqrt{210}i}{105} & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{21} \\ \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{21} & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{84} & -\frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} \\ \frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 \end{bmatrix}$
334	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{21} & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & -\frac{3\sqrt{210}}{280} & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{5\sqrt{14}}{168} & -\frac{\sqrt{14}i}{21} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & \frac{\sqrt{210}i}{105} & -\frac{\sqrt{14}i}{84} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{14}i}{21} \\ 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{14}}{84} \\ -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{105} & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & -\frac{\sqrt{14}}{84} & 0 \end{bmatrix}$
335	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,0}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & \frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{35}i}{42} \end{bmatrix}$
336	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{35}}{42} & 0 \\ 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 \end{bmatrix}$
337	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} \frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & \frac{7\sqrt{30}i}{240} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{30} & \frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{48} & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & \frac{7\sqrt{30}i}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{5\sqrt{2}}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{80} & \frac{\sqrt{30}i}{30} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & -\frac{5\sqrt{2}}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & \frac{\sqrt{30}}{80} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & \frac{\sqrt{30}}{30} \\ \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{30}}{30} & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}}{84} & \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} & \frac{\sqrt{21}}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & \frac{\sqrt{35}}{56} & \frac{\sqrt{35}i}{21} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{\sqrt{35}i}{21} & \frac{5\sqrt{21}i}{168} & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
339	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{2}i}{48} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & -\frac{\sqrt{30}}{48} & \frac{\sqrt{30}i}{30} & 0 \\ 0 & 0 & -\frac{5\sqrt{2}i}{48} & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ -\frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{2}}{48} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{7\sqrt{30}}{240} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & -\frac{\sqrt{2}}{48} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{7\sqrt{30}}{240} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{30} & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 \\ \frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 \end{bmatrix}$
340	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,0}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
341	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
342	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{35}i}{40} & 0 & -\frac{3\sqrt{35}}{280} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} & \frac{\sqrt{35}i}{40} & 0 & \frac{3\sqrt{35}}{280} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{3\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{70} & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ \frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} \end{bmatrix}$
343	symmetry	$\frac{\sqrt{15}y(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & 0 & -\frac{3\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & \frac{5\sqrt{21}}{168} & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & -\frac{\sqrt{35}}{40} & \frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} & \frac{3\sqrt{35}i}{280} & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{\sqrt{35}}{70} \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & -\frac{\sqrt{35}}{70} & 0 \end{bmatrix}$
344	symmetry	$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,0}^{(1,-1;a)}(E_g, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
345	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{20} & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 \\ 0 & 0 & \frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 \end{bmatrix}$
346	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \end{bmatrix}$
347	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
348	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & -\frac{\sqrt{6}}{24} & -\frac{\sqrt{6}i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{6}i}{16} \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{32} & 0 & 0 & -\frac{\sqrt{6}}{24} \\ -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{32} & \frac{\sqrt{6}}{24} & 0 \end{bmatrix}$
349	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 \\ 0 & 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 \end{bmatrix}$
350	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & -\frac{\sqrt{6}i}{16} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & \frac{\sqrt{6}i}{16} \\ \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}i}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 \end{bmatrix}$
351	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,0}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{5\sqrt{10}}{96} & -\frac{\sqrt{10}i}{48} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{\sqrt{10}i}{24} & 0 & \frac{5\sqrt{10}}{96} & 0 & 0 & \frac{\sqrt{10}i}{48} \\ -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{48} & \frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} \\ \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 \end{bmatrix}$
352	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{5\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & \frac{\sqrt{10}i}{48} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & \frac{5\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{10}i}{48} \\ 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \\ -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{96} & -\frac{\sqrt{10}}{24} & 0 & 0 \end{bmatrix}$
353	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_{3,0}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{1}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{6} \\ -\frac{1}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 \\ 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ -\frac{i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & \frac{1}{6} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & -\frac{7i}{48} & 0 & -\frac{7}{48} & -\frac{i}{6} & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & -\frac{7i}{48} & 0 & \frac{7}{48} & 0 & 0 & \frac{i}{6} \end{bmatrix}$
354	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{i}{24} & 0 & 0 & \frac{1}{24} \\ \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{i}{24} & -\frac{1}{24} & 0 \\ 0 & \frac{1}{6} & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} \\ -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & 0 & -\frac{i}{24} & 0 \\ \frac{i}{6} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & -\frac{1}{24} & 0 & \frac{i}{24} & 0 & 0 \\ 0 & -\frac{i}{6} & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{24} & 0 & 0 & 0 \end{bmatrix}$
355	symmetry	$z$
	$\mathbb{G}_1^{(1,1;a)}(A_{2g})$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{28} & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} \\ \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & \frac{\sqrt{210}i}{70} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{210}i}{70} & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
356	symmetry	$x$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{1,0}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & -\frac{\sqrt{210}}{140} & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{28} & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \end{bmatrix}$
357	symmetry	$\begin{bmatrix} \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & \frac{\sqrt{210}}{70} & -\frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{210}i}{140} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} \\ \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{14}}{28} & 0 \end{bmatrix}$
358	symmetry	$\begin{bmatrix} \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{13\sqrt{70}i}{672} & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{70}}{56} & 0 & -\frac{13\sqrt{70}i}{672} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & -\frac{11\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{56} & \frac{\sqrt{42}i}{48} & 0 \\ 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & -\frac{11\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{42}i}{48} \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{96} & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} \\ -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{96} & \frac{\sqrt{42}}{168} & 0 \end{bmatrix}$
359	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{168} & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{105}}{168} \\ -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & -\frac{\sqrt{105}}{168} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 & -\frac{5\sqrt{7}}{112} & \frac{2\sqrt{7}i}{21} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 & \frac{5\sqrt{7}}{112} & 0 & 0 & -\frac{2\sqrt{7}i}{21} & -\frac{5\sqrt{105}i}{336} & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 \end{bmatrix}$
360	symmetry	$\begin{bmatrix} \frac{\sqrt{10}x(x^2-3y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{11\sqrt{42}}{672} & \frac{\sqrt{42}i}{48} & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{11\sqrt{42}}{672} & 0 & 0 & -\frac{\sqrt{42}i}{48} \\ -\frac{\sqrt{42}i}{48} & 0 & 0 & \frac{13\sqrt{70}}{672} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{48} & -\frac{13\sqrt{70}}{672} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & \frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{168} & \frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} \\ -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{96} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 \end{bmatrix}$
361	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{5\sqrt{42}}{672} & \frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & -\frac{\sqrt{70}i}{112} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{5\sqrt{42}}{672} & 0 & 0 & -\frac{5\sqrt{42}i}{168} & -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{70}i}{112} \\ -\frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{112} & \frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{56} & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{5\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} \\ -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 \end{bmatrix}$
362	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} -\frac{\sqrt{70}i}{112} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{112} & -\frac{\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{42} & \frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{70}i}{112} & 0 \\ 0 & 0 & -\frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{5\sqrt{42}i}{168} & -\frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{112} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{70}}{56} \\ \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{224} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}i}{224} & \frac{\sqrt{70}}{56} & 0 \end{bmatrix}$
363	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & -\frac{3\sqrt{7}}{56} & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & \frac{\sqrt{7}}{112} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} \end{bmatrix}$
364	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & \frac{3\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(a)}(A_{1g})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
366	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,0}^{(a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 \end{bmatrix}$
367	symmetry	$-\sqrt{3}xz$
	$\mathbb{T}_{2,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
368	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
369	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \end{bmatrix}$
370	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
371	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
372	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_{2g})$	$\begin{bmatrix} \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \end{bmatrix}$
373	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{T}_{4,0}^{(a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 \end{bmatrix}$
374	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{T}_{4,1}^{(a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
375	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{T}_{4,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
377	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
378	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \end{bmatrix}$
379	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & \frac{\sqrt{35}i}{56} & 0 \\ 0 & -\frac{\sqrt{35}i}{56} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} \\ \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{112} & 0 & \frac{\sqrt{35}}{112} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & 0 & \frac{\sqrt{35}i}{112} & 0 & \frac{\sqrt{35}}{112} & 0 & 0 & 0 \end{bmatrix}$
380	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{32} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{32} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{2}}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & -\frac{\sqrt{2}i}{8} & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{32} & -\frac{\sqrt{2}}{16} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & \frac{\sqrt{2}}{16} \\ \frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{16} & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \end{bmatrix}$
382	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{224} & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{11\sqrt{14}i}{224} & -\frac{5\sqrt{14}}{112} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{224} & 0 & 0 & \frac{\sqrt{210}}{56} & -\frac{\sqrt{14}}{56} & 0 & \frac{11\sqrt{14}i}{224} & 0 & 0 & \frac{5\sqrt{14}}{112} \\ -\frac{5\sqrt{14}}{112} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}i}{224} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{14}}{112} & \frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}i}{224} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & -\frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} \\ -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{224} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \end{bmatrix}$
383	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{9\sqrt{14}}{224} & 0 & 0 \\ 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{9\sqrt{14}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{210}}{224} & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{11\sqrt{14}}{224} & 0 & -\frac{\sqrt{14}i}{56} & \frac{5\sqrt{14}}{112} & 0 \\ 0 & 0 & -\frac{3\sqrt{210}}{224} & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & -\frac{11\sqrt{14}}{224} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 \\ 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 \\ -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{224} & \frac{\sqrt{14}i}{56} & 0 & 0 \end{bmatrix}$
384	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,0}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & 0 & \frac{3}{16} & 0 & \frac{3i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & \frac{3i}{16} & 0 & -\frac{3i}{16} & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$ $\begin{bmatrix} 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & -\frac{3i}{16} & 0 & \frac{3}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & \frac{3i}{16} & 0 & \frac{3}{16} & 0 & 0 & 0 \end{bmatrix}$
386	symmetry	$-\frac{\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & -\frac{\sqrt{105}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & \frac{\sqrt{7}i}{112} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & \frac{\sqrt{105}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} \end{bmatrix}$
387	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} \\ \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & \frac{\sqrt{70}i}{84} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} \\ \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 \\ -\frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{42} & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 \end{bmatrix}$
393	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & 0 & 0 & -\frac{3\sqrt{35}i}{112} & 0 & -\frac{3\sqrt{35}}{112} & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{112} & 0 & \frac{5\sqrt{21}}{112} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & -\frac{3\sqrt{35}}{112} & 0 & 0 & 0 & \frac{5\sqrt{21}i}{112} & 0 & \frac{5\sqrt{21}}{112} & 0 & 0 & 0 \end{bmatrix}$
394	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} -\frac{3\sqrt{30}}{80} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 \\ 0 & \frac{3\sqrt{30}}{80} & -\frac{\sqrt{2}i}{8} & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & \frac{\sqrt{30}i}{40} & -\frac{3\sqrt{30}}{80} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{3\sqrt{30}}{80} \\ 0 & \frac{\sqrt{30}}{40} & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{160} & 0 & 0 & -\frac{\sqrt{30}i}{40} \\ \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{160} & \frac{\sqrt{30}i}{40} & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{32} & \frac{3\sqrt{30}}{80} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & -\frac{3\sqrt{30}}{80} \\ -\frac{3\sqrt{30}}{80} & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{30}}{80} & -\frac{3\sqrt{2}i}{32} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{40} & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} \\ \frac{\sqrt{30}i}{40} & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{160} & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 \end{bmatrix}$
396	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{224} & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & \frac{9\sqrt{210}i}{1120} & -\frac{\sqrt{210}}{560} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}}{56} & -\frac{\sqrt{210}}{280} & 0 & -\frac{9\sqrt{210}i}{1120} & 0 & 0 & \frac{\sqrt{210}}{560} \\ -\frac{\sqrt{210}}{560} & 0 & 0 & -\frac{3\sqrt{14}i}{224} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{9\sqrt{210}i}{1120} & 0 & \frac{\sqrt{210}}{70} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{560} & \frac{3\sqrt{14}i}{224} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{9\sqrt{210}i}{1120} & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}i}{280} & -\frac{3\sqrt{14}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & -\frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} \\ -\frac{3\sqrt{210}i}{280} & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 \end{bmatrix}$
397	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{210}}{560} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & -\frac{9\sqrt{210}}{1120} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{560} & -\frac{3\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & -\frac{9\sqrt{210}}{1120} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & \frac{9\sqrt{210}}{1120} & 0 & -\frac{\sqrt{210}i}{280} & \frac{\sqrt{210}}{560} & 0 \\ 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & \frac{9\sqrt{210}}{1120} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{210}}{560} \\ 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & -\frac{3\sqrt{210}i}{280} \\ -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{224} & \frac{3\sqrt{210}i}{280} & 0 \end{bmatrix}$
398	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{15}i}{40} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ -\frac{\sqrt{15}i}{40} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} \\ -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{15}i}{40} & 0 \\ 0 & 0 & 0 & \frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{80} & 0 & -\frac{\sqrt{15}i}{80} & 0 & 0 \\ 0 & 0 & \frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{80} & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{40} & 0 \\ 0 & \frac{\sqrt{15}i}{40} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ -\frac{\sqrt{15}i}{40} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & 0 & 0 & -\frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 \\ 0 & 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 & 0 \end{bmatrix}$
400	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{56} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} \\ -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 \\ 0 & \frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} \\ \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & -\frac{\sqrt{105}i}{140} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & 0 & \frac{11\sqrt{105}}{560} & 0 & -\frac{11\sqrt{105}i}{560} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 & \frac{11\sqrt{105}i}{560} & 0 & \frac{11\sqrt{105}i}{560} & 0 & 0 & -\frac{\sqrt{105}}{70} \end{bmatrix}$
401	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{105}}{280} & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} \\ \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}}{280} & -\frac{\sqrt{105}i}{56} & 0 \\ 0 & -\frac{\sqrt{105}i}{140} & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & \frac{3\sqrt{105}}{280} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} \\ \frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{105}}{280} & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 \\ -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{70} & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{T}_2^{(1,1;a)}(A_{1g})$	$\begin{bmatrix} 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & \frac{\sqrt{105}i}{84} & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
403	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_{2,0}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{35}}{42} \\ -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 \end{bmatrix}$
404	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 \end{bmatrix}$
405	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 \\ 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \end{bmatrix}$
406	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{35}}{168} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{168} & -\frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & -\frac{\sqrt{35}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{35}}{168} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 \\ -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & \frac{\sqrt{21}}{24} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}i}{168} & 0 & \frac{5\sqrt{35}}{168} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{21}i}{24} & 0 & \frac{\sqrt{21}}{24} & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{5\sqrt{35}}{168} & 0 & 0 & 0 & 0 \end{bmatrix}$
407	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
409	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 \end{bmatrix}$
411	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
412	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,0}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
413	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
414	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} \\ \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 \end{bmatrix}$
415	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}i}{42} & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & \frac{3\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{3\sqrt{35}}{70} & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
416	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 \end{bmatrix}$
417	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,0}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{420} & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{84} & \frac{\sqrt{14}}{21} & 0 \\ 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & \frac{\sqrt{210}}{105} & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{21} \\ \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{21} & \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{84} & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} \\ -\frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 \end{bmatrix}$
418	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} \frac{\sqrt{14}}{21} & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & 0 & \frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{21} & -\frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{3\sqrt{210}i}{280} & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{5\sqrt{14}i}{168} & -\frac{\sqrt{14}}{21} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & \frac{\sqrt{210}}{105} & -\frac{\sqrt{14}}{84} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{14}}{21} \\ 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{14}}{84} \\ -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{21} & \frac{\sqrt{14}i}{84} & 0 \end{bmatrix}$
419	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_{3,0}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & \\ -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & -\frac{\sqrt{35}i}{42} & 0 & \\ 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{35}}{42} \end{bmatrix}$
420	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{35}i}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \end{bmatrix}$
421	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{48} & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & \frac{7\sqrt{30}}{240} & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{30} & -\frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & \frac{7\sqrt{30}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & -\frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & \frac{\sqrt{30}i}{80} & \frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & \frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{30} & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & \frac{\sqrt{35}}{21} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{56} & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{21} & \frac{5\sqrt{21}}{168} & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 \end{bmatrix}$
423	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{2}}{48} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & \frac{\sqrt{30}i}{48} & \frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & -\frac{5\sqrt{2}}{48} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{30}}{30} \\ -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{2}i}{48} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & -\frac{7\sqrt{30}i}{240} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{2}i}{48} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & \frac{7\sqrt{30}i}{240} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} \\ -\frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 \end{bmatrix}$
424	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
425	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
426	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{168} & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & \frac{3\sqrt{35}i}{280} & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & \frac{\sqrt{35}}{40} & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 & \frac{\sqrt{35}}{70} \\ -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \end{bmatrix}$
427	symmetry	$\frac{\sqrt{15}y(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & -\frac{5\sqrt{21}i}{168} & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{3\sqrt{35}}{280} & 0 & \frac{\sqrt{35}i}{40} & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{168} & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & \frac{3\sqrt{35}}{280} & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & \frac{\sqrt{35}i}{70} & 0 \end{bmatrix}$
428	symmetry	$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 \\ 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 \end{bmatrix}$
429	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 \end{bmatrix}$
430	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
431	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
432	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & \frac{\sqrt{6}}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{16} \\ 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{32} & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{32} & \frac{\sqrt{6}i}{24} & 0 \end{bmatrix}$
433	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & -\frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 \end{bmatrix}$
434	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{96} & \frac{\sqrt{6}}{16} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{\sqrt{6}}{16} \\ -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{6}}{32} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 \end{bmatrix}$
435	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{5\sqrt{10}i}{96} & \frac{\sqrt{10}}{48} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{\sqrt{6}}{24} & \frac{\sqrt{10}}{24} & 0 & \frac{5\sqrt{10}i}{96} & 0 & 0 & -\frac{\sqrt{10}}{48} \\ \frac{\sqrt{10}}{48} & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{48} & \frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{24} & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \\ \frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \end{bmatrix}$
436	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{1,0}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & \frac{\sqrt{210}i}{140} & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{70} & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} \\ \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \end{bmatrix}$
441	symmetry	$\begin{bmatrix} \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{70} & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{210}}{140} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{14}i}{28} & 0 \end{bmatrix}$
442	symmetry	$\begin{bmatrix} \frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{48} & -\frac{\sqrt{70}i}{56} & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & -\frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{42}}{48} & 0 \\ 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & -\frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{42}}{48} \\ 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 & \frac{\sqrt{42}i}{168} \\ -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{96} & -\frac{\sqrt{42}i}{168} & 0 \end{bmatrix}$
443	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{168} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{105}i}{168} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & \frac{2\sqrt{7}}{21} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{7}}{112} & 0 & -\frac{5\sqrt{7}i}{112} & 0 & 0 & -\frac{2\sqrt{7}}{21} & -\frac{5\sqrt{105}}{336} & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 \end{bmatrix}$
444	symmetry	$\begin{bmatrix} \frac{\sqrt{10}x(x^2-3y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{11\sqrt{42}i}{672} & \frac{\sqrt{42}}{48} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{42} & 0 & -\frac{5\sqrt{70}i}{224} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{11\sqrt{42}i}{672} & 0 & 0 & -\frac{\sqrt{42}}{48} \\ -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{13\sqrt{70}i}{672} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & \frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 \\ 0 & \frac{\sqrt{42}}{48} & \frac{13\sqrt{70}i}{672} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{168} & \frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} \\ \frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{96} & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 \end{bmatrix}$
445	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{5\sqrt{42}i}{672} & \frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & -\frac{\sqrt{70}}{112} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & -\frac{5\sqrt{42}}{168} & -\frac{\sqrt{70}}{56} & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{70}}{112} \\ -\frac{\sqrt{70}}{112} & 0 & 0 & \frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{112} & -\frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} \\ \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} \end{bmatrix}$
446	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} -\frac{\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{672} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{112} & \frac{\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{672} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & \frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & \frac{\sqrt{70}}{112} & 0 \\ 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{5\sqrt{42}}{168} & -\frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{112} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{70}i}{56} \\ \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{224} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}}{224} & -\frac{\sqrt{70}i}{56} & 0 \end{bmatrix}$
447	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & \frac{3\sqrt{7}i}{56} & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{7}}{14} \end{bmatrix}$
448	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 \end{bmatrix}$

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

Table 8: (d,d) block.

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
453	symmetry	$\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
454	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
455	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	$\begin{bmatrix} \frac{3\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \end{bmatrix}$
456	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
457	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
458	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
461	$\mathbb{Q}_{4,0}^{(a)}(E_g, 2)$	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{bmatrix}$
462	$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	$\frac{-\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$

*continued ...*

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
463	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
464	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

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

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
469	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & \frac{3\sqrt{35}}{140} & \frac{\sqrt{35}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{35} \\ 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & \frac{2\sqrt{35}i}{35} & 0 & 0 & -\frac{3\sqrt{35}}{140} \\ \frac{\sqrt{105}i}{70} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}i}{35} & \frac{3\sqrt{35}}{140} & 0 & \\ 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{3\sqrt{35}}{140} & -\frac{2\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} & \\ \frac{\sqrt{105}}{70} & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & \frac{2\sqrt{35}i}{35} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & -\frac{3\sqrt{35}}{140} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & \end{bmatrix}$
470	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	0 0 0 $\frac{\sqrt{6}}{8}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{8}$	
	0 0 $-\frac{\sqrt{6}}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{6}i}{8}$ 0	
	0 $-\frac{\sqrt{6}}{8}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0	
	$\frac{\sqrt{6}}{8}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$	
	0 $-\frac{\sqrt{6}i}{8}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0	
	$-\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0	
471	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{Q}_4^{(1,-1;a)}(A_{2g})$	0 0 0 $-\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 $\frac{\sqrt{6}}{8}$	
	0 0 $-\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{8}$ 0	
	0 $\frac{\sqrt{6}i}{8}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0	
	$\frac{\sqrt{6}i}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$	
	0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{8}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0	
	$\frac{\sqrt{6}}{8}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0	
472	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{4,0}^{(1,-1;a)}(E_g, 1)$	0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 $\frac{\sqrt{42}}{56}$	
	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{\sqrt{42}i}{28}$ $-\frac{\sqrt{42}}{56}$ 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ $\frac{3\sqrt{14}i}{56}$ 0	
	0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 $-\frac{3\sqrt{14}i}{56}$	
	$\frac{\sqrt{42}i}{28}$ 0 $\frac{3\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0	
	0 $-\frac{\sqrt{42}i}{28}$ 0 $-\frac{3\sqrt{14}i}{56}$ $\frac{\sqrt{14}}{14}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{14}}{28}$ $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0	
473	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0 0 0 $-\frac{\sqrt{42}}{56}$ $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{56}$	
	0 0 $\frac{\sqrt{42}}{56}$ 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0	
	0 $\frac{\sqrt{42}}{56}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$-\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	$\frac{\sqrt{42}i}{28}$ 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0	
	0 $-\frac{\sqrt{42}i}{28}$ 0 $\frac{3\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0	
	0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0	
	474 symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
475	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 \\ 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
476	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,0}^{(1,1;a)}(E_g, 2)$	$0 \quad 0 \quad -\frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{210} \quad 0 \quad \frac{\sqrt{105}i}{210} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{42} \quad \frac{\sqrt{105}}{210} \quad 0 \quad \frac{\sqrt{105}i}{210} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad \frac{3\sqrt{35}i}{70} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{70} \quad 0 \quad \frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{105}}{210} \quad 0 \quad -\frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35}$	
	$-\frac{\sqrt{105}}{210} \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0$	
	$0 \quad -\frac{\sqrt{105}i}{210} \quad 0 \quad -\frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35}$	
	$-\frac{\sqrt{105}i}{210} \quad 0 \quad -\frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{35} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad \frac{\sqrt{35}}{35} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0$	
483	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 2)$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{210} \quad 0 \quad -\frac{\sqrt{105}}{210} \quad \frac{\sqrt{105}i}{42} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{210} \quad 0 \quad \frac{\sqrt{105}}{210} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{42}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad \frac{\sqrt{35}}{35} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{105}i}{210} \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{70}$	
	$\frac{\sqrt{105}i}{210} \quad 0 \quad \frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{70} \quad 0$	
	$0 \quad \frac{\sqrt{105}}{210} \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{70}$	
	$-\frac{\sqrt{105}}{210} \quad 0 \quad \frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}i}{70} \quad 0$	
	$-\frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{70} \quad 0 \quad -\frac{3\sqrt{35}i}{70} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{70} \quad 0 \quad -\frac{3\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0$	
484	symmetry	$z$

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
489	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} \\ 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
490	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_{3,0}^{(1,0;a)}(E_g, 1)$	0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 $\frac{\sqrt{30}i}{60}$ 0 0 $-\frac{\sqrt{30}}{24}$	
	0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 $-\frac{\sqrt{30}i}{60}$ $\frac{\sqrt{30}}{24}$ 0	
	0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 0 $\frac{\sqrt{10}}{20}$	
	$\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{40}$ $-\frac{\sqrt{10}}{20}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}i}{40}$ 0	
	0 0 0 0 0 0 $-\frac{\sqrt{10}}{10}$ 0 0 $\frac{\sqrt{10}i}{40}$	
	$-\frac{\sqrt{30}i}{60}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 $-\frac{\sqrt{10}}{10}$ 0 0 0 0	
	0 $\frac{\sqrt{30}i}{60}$ 0 $\frac{\sqrt{10}i}{40}$ $\frac{\sqrt{10}}{10}$ 0 0 0 0 0	
	0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0	
	$-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0 0	
491	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0 0 0 $\frac{\sqrt{30}}{24}$ $\frac{\sqrt{30}i}{60}$ 0 0 0 0 $-\frac{\sqrt{30}i}{24}$	
	0 0 $-\frac{\sqrt{30}}{24}$ 0 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0	
	0 $-\frac{\sqrt{30}}{24}$ 0 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0 0 $-\frac{\sqrt{10}i}{20}$	
	$\frac{\sqrt{30}}{24}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0	
	$-\frac{\sqrt{30}i}{60}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 $-\frac{\sqrt{10}i}{10}$ 0 0	
	0 $\frac{\sqrt{30}i}{60}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 $-\frac{\sqrt{10}i}{10}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}i}{10}$ 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0	
	0 0 0 0 0 $\frac{\sqrt{10}i}{10}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$	
	0 $\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 0 0	
	$\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0	
492	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{G}_{3,0}^{(1,0;a)}(E_g, 2)$	0	0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 $-\frac{\sqrt{3}}{12}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0
	0	0 0 0 $\frac{\sqrt{3}i}{6}$ $\frac{\sqrt{3}}{12}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0 0
	$\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 $-\frac{i}{4}$
	$-\frac{\sqrt{3}}{12}$	0 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0
	0	$-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 $\frac{1}{4}$
	$-\frac{\sqrt{3}i}{12}$	0 0 0 0 0 0 0 0 $-\frac{1}{4}$ 0
	0	0 0 0 0 0 $\frac{i}{4}$ 0 $-\frac{1}{4}$ 0 0
	0	0 0 0 0 0 $\frac{i}{4}$ 0 $\frac{1}{4}$ 0 0
493	symmetry	$\sqrt{15}xyz$
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 2)$	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 $-\frac{\sqrt{3}}{12}$ $\frac{\sqrt{3}i}{6}$ 0
	0	0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{3}}{12}$ 0 0 $-\frac{\sqrt{3}i}{6}$
	0	0 0 0 0 0 $\frac{i}{4}$ 0 $-\frac{1}{4}$ 0 0
	0	0 0 0 0 $\frac{i}{4}$ 0 $\frac{1}{4}$ 0 0 0
	0	$\frac{\sqrt{3}i}{12}$ 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0
	$\frac{\sqrt{3}i}{12}$	0 $-\frac{i}{4}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}}{12}$ 0 $\frac{1}{4}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}}{12}$	0 $-\frac{1}{4}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
494	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_2^{(1,0;a)}(A_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \end{bmatrix}$
495	symmetry	$\sqrt{3}yz$
$\mathbb{T}_{2,0}^{(1,0;a)}(E_g, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ -\frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & \frac{\sqrt{42}i}{42} & 0 \\ 0 & \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & \frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} \\ \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \\ \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \end{bmatrix}$
496	symmetry	$-\sqrt{3}xz$

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & \frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{14}i}{28} & 0 \\ 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
499	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}i}{14} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \end{bmatrix}$
500	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} \\ 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 \\ 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{10}i}{20} & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & -\frac{3\sqrt{10}}{40} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{3\sqrt{10}}{40} \\ 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & \frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
		$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} \\ 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 \\ 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & -\frac{3\sqrt{10}}{40} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{3\sqrt{10}}{40} \\ 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{10}i}{20} & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
		$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 1)$	0	$-\frac{3\sqrt{70}}{70}$
	$-\frac{3\sqrt{70}}{70}$	0
	0	$-\frac{3\sqrt{210}}{280}$
	$-\frac{3\sqrt{210}}{280}$	0
	0	$-\frac{\sqrt{70}}{140}$
	$\frac{\sqrt{210}}{140}$	0
	0	$-\frac{\sqrt{70}}{280}$
	$-\frac{3\sqrt{210}}{280}$	0
	0	$-\frac{\sqrt{70}}{140}$
	$-\frac{3\sqrt{210}}{280}$	0
503	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$\frac{3\sqrt{70}i}{70}$
	$-\frac{3\sqrt{70}i}{70}$	0
	0	$\frac{3\sqrt{210}i}{280}$
	$-\frac{3\sqrt{210}i}{280}$	0
	0	$\frac{\sqrt{70}i}{140}$
	$\frac{3\sqrt{210}i}{280}$	0
	0	$-\frac{\sqrt{70}i}{140}$
	$\frac{\sqrt{210}}{140}$	0
	0	$-\frac{\sqrt{70}}{280}$
	$-\frac{3\sqrt{210}}{280}$	0
504	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{5} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$
505	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{5} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{5} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \end{bmatrix}$
506	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 3)$	0	0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{3\sqrt{105}i}{140}$ 0 $-\frac{3\sqrt{105}}{140}$ 0 0 0
	0	0 0 $-\frac{\sqrt{105}}{70}$ $\frac{3\sqrt{105}i}{140}$ 0 $-\frac{3\sqrt{105}}{140}$ 0 0 0 0
	$\frac{\sqrt{105}}{70}$	0 0 0 0 0 $\frac{\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 0
	0	$-\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 0
	0	$-\frac{3\sqrt{105}i}{140}$ 0 $\frac{\sqrt{35}i}{70}$ $-\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $\frac{\sqrt{35}}{28}$
	$\frac{3\sqrt{105}i}{140}$	0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 $\frac{\sqrt{35}}{28}$ 0
	0	$-\frac{3\sqrt{105}}{140}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 $\frac{\sqrt{35}i}{28}$
	$-\frac{3\sqrt{105}}{140}$	0 $-\frac{\sqrt{35}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ $-\frac{\sqrt{35}i}{28}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 $\frac{\sqrt{35}i}{28}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0
507 symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$	
	0	0 0 0 0 0 $\frac{3\sqrt{105}}{140}$ 0 $-\frac{3\sqrt{105}i}{140}$ $-\frac{\sqrt{105}}{70}$ 0
	0	0 0 0 0 $\frac{3\sqrt{105}}{140}$ 0 $\frac{3\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{105}}{70}$
	0	0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{35}}{28}$ 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0
	0	$\frac{3\sqrt{105}}{140}$ 0 $\frac{\sqrt{35}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 $-\frac{\sqrt{35}i}{70}$
	$\frac{3\sqrt{105}}{140}$	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 $\frac{\sqrt{35}}{35}$ $\frac{\sqrt{35}i}{70}$ 0
	0	$-\frac{3\sqrt{105}i}{140}$ 0 $\frac{\sqrt{35}i}{28}$ $-\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $\frac{\sqrt{35}}{70}$
	$\frac{3\sqrt{105}i}{140}$	0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 $\frac{\sqrt{35}}{35}$ 0 0 0 $\frac{\sqrt{35}}{70}$ 0
	$-\frac{\sqrt{105}}{70}$	0 0 0 0 0 $-\frac{\sqrt{35}i}{70}$ 0 $\frac{\sqrt{35}}{70}$ 0 0 0
508 symmetry	$z$	
	<i>continued ...</i>	

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
511	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
512	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
515	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ \frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
516	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
517	$\mathbb{M}_{3,0}^{(a)}(E_g, 2)$	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
518	$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$	$z$

*continued ...*

Table 8

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

*continued ..*

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)$	0	$-\frac{\sqrt{10}i}{10}$
	$\frac{\sqrt{10}i}{10}$	0
	0	0
	0	$-\frac{\sqrt{10}i}{10}$
	0	$\frac{\sqrt{10}i}{10}$
	0	0
	0	$-\frac{\sqrt{10}i}{10}$
	0	$\frac{\sqrt{10}i}{10}$
	0	0
	0	$-\frac{\sqrt{10}i}{10}$
521	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$\mathbb{M}_3^{(1,-1;a)}(A_{1g})$	0	$0$
	0	$\frac{\sqrt{14}i}{14}$
	0	$-\frac{\sqrt{14}i}{14}$
	0	$\frac{\sqrt{14}i}{14}$
	$-\frac{\sqrt{14}i}{14}$	0
	0	0
	0	$\frac{\sqrt{42}i}{28}$
	0	$-\frac{\sqrt{42}i}{28}$
	0	$\frac{\sqrt{42}}{28}$
	0	$-\frac{\sqrt{42}i}{28}$
522	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{105}}{35}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0$
	$0$	$-\frac{\sqrt{105}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad -\frac{\sqrt{105}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{35} \quad \frac{\sqrt{105}i}{70} \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0$
	$0$	$\frac{\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70}$
	$-\frac{\sqrt{35}i}{70}$	$0 \quad \frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0$
	$0$	$-\frac{\sqrt{35}}{70} \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{70}$
	$-\frac{\sqrt{35}}{70}$	$0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad -\frac{\sqrt{105}i}{70} \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad \frac{\sqrt{105}i}{70} \quad -\frac{\sqrt{105}}{35} \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{35}$
523	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{14}$	
	$0 \quad 0 \quad -\frac{\sqrt{14}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{14} \quad 0$	
	$0 \quad -\frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$-\frac{\sqrt{14}}{14} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{28} \quad 0 \quad \frac{\sqrt{42}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{28} \quad 0 \quad -\frac{\sqrt{42}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{28} \quad 0 \quad \frac{\sqrt{42}}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{28} \quad 0 \quad \frac{\sqrt{42}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{14}i}{14} \quad 0 \quad 0$	
	$\frac{\sqrt{14}i}{14} \quad 0 \quad 0$	
524	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,0}^{(1,-1;a)}(E_g, 1)$	0	$\frac{\sqrt{70}}{35}, 0, \frac{\sqrt{210}}{210}, 0, 0, 0, \frac{\sqrt{210}}{105}, 0, 0, -\frac{\sqrt{210}i}{210}$
	$\frac{\sqrt{70}}{35}$	$0, \frac{\sqrt{210}}{210}, 0, 0, 0, 0, 0, -\frac{\sqrt{210}}{105}, \frac{\sqrt{210}i}{210}, 0$
	0	$\frac{\sqrt{210}}{210}, 0, -\frac{\sqrt{70}}{35}, 0, 0, 0, \frac{\sqrt{70}}{35}, 0, 0, 0$
	$\frac{\sqrt{210}}{210}$	$0, -\frac{\sqrt{70}}{35}, 0, 0, 0, 0, 0, -\frac{\sqrt{70}}{35}, 0, 0$
	0	$0, 0, 0, 0, 0, \frac{3\sqrt{70}}{140}, 0, \frac{\sqrt{70}i}{140}, \frac{\sqrt{70}}{35}, 0$
	0	$0, 0, 0, 0, \frac{3\sqrt{70}}{140}, 0, -\frac{\sqrt{70}i}{140}, 0, 0, -\frac{\sqrt{70}}{35}$
	$\frac{\sqrt{210}}{105}$	$0, \frac{\sqrt{70}}{35}, 0, 0, 0, \frac{\sqrt{70}i}{140}, 0, \frac{\sqrt{70}}{140}, 0, 0$
	0	$-\frac{\sqrt{210}}{105}, 0, -\frac{\sqrt{70}}{35}, -\frac{\sqrt{70}i}{140}, 0, \frac{\sqrt{70}}{140}, 0, 0, 0, 0$
	0	$-\frac{\sqrt{210}i}{210}, 0, 0, \frac{\sqrt{70}}{35}, 0, 0, 0, 0, 0, -\frac{\sqrt{70}}{35}$
	$\frac{\sqrt{210}i}{210}$	$0, 0, 0, 0, 0, -\frac{\sqrt{70}}{35}, 0, 0, -\frac{\sqrt{70}}{35}, 0$
525	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{70}i}{35}, 0, \frac{\sqrt{210}i}{210}, \frac{\sqrt{210}}{105}, 0, 0, 0, 0, 0, \frac{\sqrt{210}}{210}$
	$\frac{\sqrt{70}i}{35}$	$0, -\frac{\sqrt{210}i}{210}, 0, 0, 0, -\frac{\sqrt{210}}{105}, 0, 0, 0, \frac{\sqrt{210}}{210}$
	0	$\frac{\sqrt{210}i}{210}, 0, \frac{\sqrt{70}i}{35}, -\frac{\sqrt{70}}{35}, 0, 0, 0, 0, 0, 0$
	$-\frac{\sqrt{210}i}{210}$	$0, -\frac{\sqrt{70}i}{35}, 0, 0, 0, \frac{\sqrt{70}}{35}, 0, 0, 0, 0$
	$\frac{\sqrt{210}}{105}$	$0, -\frac{\sqrt{70}}{35}, 0, 0, 0, -\frac{\sqrt{70}i}{140}, 0, -\frac{\sqrt{70}}{140}, 0, 0$
	0	$-\frac{\sqrt{210}}{105}, 0, \frac{\sqrt{70}}{35}, \frac{\sqrt{70}i}{140}, 0, -\frac{\sqrt{70}}{140}, 0, 0, 0, 0$
	0	$0, 0, 0, 0, 0, -\frac{\sqrt{70}}{140}, 0, -\frac{3\sqrt{70}i}{140}, \frac{\sqrt{70}}{35}, 0$
	0	$0, 0, 0, 0, -\frac{\sqrt{70}}{140}, 0, \frac{3\sqrt{70}i}{140}, 0, 0, -\frac{\sqrt{70}}{35}$
	$\frac{\sqrt{210}}{210}$	$0, 0, 0, 0, 0, 0, \frac{\sqrt{70}}{35}, 0, 0, \frac{\sqrt{70}i}{35}$
	$\frac{\sqrt{210}}{210}$	$0, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{70}}{35}, -\frac{\sqrt{70}i}{35}, 0$
526	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,0}^{(1,-1;a)}(E_g, 2)$	0 0 $\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0	
	0 0 0 $-\frac{\sqrt{21}}{21}$ $\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 0	
	$\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0	
	0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$	
	$\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0	
	0 $-\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}i}{14}$	
	$-\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ $\frac{\sqrt{7}i}{14}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)$	527 symmetry $\sqrt{15}xyz$	0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{21}}{21}$ 0
	0 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{21}}{21}$	
	0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{14}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 $\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}i}{14}$	
	$\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$ $\frac{\sqrt{7}i}{14}$ 0	
	0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$	
	$\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}}{14}$ 0	
	$-\frac{\sqrt{21}}{21}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0	
	0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0	
528 symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$	

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	0 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 0 0 0 $\frac{\sqrt{30}}{30}$	
	0 0 $\frac{\sqrt{30}i}{30}$ 0 0 0 0 0 $\frac{\sqrt{30}}{30}$ 0	
	0 $-\frac{\sqrt{30}i}{30}$ 0 $-\frac{\sqrt{10}i}{60}$ $\frac{\sqrt{10}}{15}$ 0 0 0 0 $-\frac{\sqrt{10}}{60}$	
	$\frac{\sqrt{30}i}{30}$ 0 $\frac{\sqrt{10}i}{60}$ 0 0 $-\frac{\sqrt{10}}{15}$ 0 0 $-\frac{\sqrt{10}}{60}$ 0	
	0 0 $\frac{\sqrt{10}}{15}$ 0 0 $\frac{\sqrt{10}i}{15}$ 0 $\frac{\sqrt{10}}{15}$ 0 0	
	0 0 0 $-\frac{\sqrt{10}}{15}$ $-\frac{\sqrt{10}i}{15}$ 0 $\frac{\sqrt{10}}{15}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{15}$ 0 $-\frac{\sqrt{10}i}{15}$ $\frac{\sqrt{10}}{15}$ 0	
	0 0 0 0 $\frac{\sqrt{10}}{15}$ 0 $\frac{\sqrt{10}i}{15}$ 0 0 $-\frac{\sqrt{10}}{15}$	
	0 $\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{10}}{60}$ 0 0 0 $\frac{\sqrt{10}}{15}$ 0 $\frac{\sqrt{10}i}{60}$	
	$\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{10}}{60}$ 0 0 0 0 $-\frac{\sqrt{10}}{15}$ $-\frac{\sqrt{10}i}{60}$ 0	
529	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{7}}{7}$ 0 0 0 0 $\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0	
	0 $-\frac{\sqrt{7}}{7}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0 0	
	0 0 $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{7}i}{42}$ 0 $\frac{\sqrt{7}}{42}$ 0 0	
	0 0 0 $-\frac{\sqrt{7}}{42}$ $-\frac{\sqrt{7}i}{42}$ 0 $\frac{\sqrt{7}}{42}$ 0 0 0	
	0 $\frac{\sqrt{21}i}{21}$ 0 $\frac{\sqrt{7}i}{42}$ $-\frac{2\sqrt{7}}{21}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$	
	$-\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{7}i}{42}$ 0 0 $\frac{2\sqrt{7}}{21}$ 0 0 $\frac{\sqrt{7}}{42}$ 0	
	0 $-\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{7}}{42}$ 0 0 $-\frac{2\sqrt{7}}{21}$ 0 0 $-\frac{\sqrt{7}i}{42}$	
	$-\frac{\sqrt{21}}{21}$ 0 $\frac{\sqrt{7}}{42}$ 0 0 0 0 $\frac{2\sqrt{7}}{21}$ $\frac{\sqrt{7}i}{42}$ 0	
	0 0 0 0 0 $\frac{\sqrt{7}}{42}$ 0 $-\frac{\sqrt{7}i}{42}$ $\frac{\sqrt{7}}{42}$ 0	
	0 0 0 0 $\frac{\sqrt{7}}{42}$ 0 $\frac{\sqrt{7}i}{42}$ 0 0 $-\frac{\sqrt{7}}{42}$	
530	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 $\frac{\sqrt{30}}{30}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{30}$	
	0 0 $\frac{\sqrt{30}}{30}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0	
	0 $\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{10}}{60}$ 0 0 0 $\frac{\sqrt{10}}{15}$ 0 0 $\frac{\sqrt{10}i}{60}$	
	$\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{10}}{60}$ 0 0 0 0 $-\frac{\sqrt{10}}{15}$ $-\frac{\sqrt{10}i}{60}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{10}}{15}$ 0 $\frac{\sqrt{10}i}{15}$ $-\frac{\sqrt{10}}{15}$ 0	
	0 0 0 0 $-\frac{\sqrt{10}}{15}$ 0 $-\frac{\sqrt{10}i}{15}$ 0 0 $\frac{\sqrt{10}}{15}$	
	0 0 $\frac{\sqrt{10}}{15}$ 0 0 $\frac{\sqrt{10}i}{15}$ 0 $\frac{\sqrt{10}}{15}$ 0 0	
	0 0 0 $-\frac{\sqrt{10}}{15}$ $-\frac{\sqrt{10}i}{15}$ 0 $\frac{\sqrt{10}}{15}$ 0 0 0	
	0 $\frac{\sqrt{30}i}{30}$ 0 $\frac{\sqrt{10}i}{60}$ $-\frac{\sqrt{10}}{15}$ 0 0 0 0 $\frac{\sqrt{10}}{60}$	
	$-\frac{\sqrt{30}i}{30}$ 0 $-\frac{\sqrt{10}i}{60}$ 0 0 $\frac{\sqrt{10}}{15}$ 0 0 $\frac{\sqrt{10}}{60}$ 0	
531	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 1)$	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 $\frac{\sqrt{2}i}{4}$	
	0 0 $\frac{\sqrt{2}}{4}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{4}$ 0	
	0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{4}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{4}$	
	0 0 $-\frac{\sqrt{2}i}{4}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{4}$ 0	
532	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
533	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{\sqrt{105}}{35} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{2\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ \frac{\sqrt{105}}{35} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{105} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & \frac{\sqrt{105}i}{105} & -\frac{\sqrt{105}}{105} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & -\frac{\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{105}}{105} \\ \frac{2\sqrt{35}}{35} & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & \frac{\sqrt{105}i}{105} & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 \\ 0 & -\frac{2\sqrt{35}}{35} & 0 & \frac{\sqrt{105}}{105} & -\frac{\sqrt{105}i}{105} & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{105} & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \end{bmatrix}$
534	$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 2)$	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{\sqrt{105}i}{35}$
	$\frac{\sqrt{105}i}{35}$	0
	0	$-\frac{\sqrt{35}i}{70}$
	$\frac{\sqrt{35}i}{70}$	0
	$\frac{2\sqrt{35}}{35}$	0
	0	$-\frac{2\sqrt{35}}{35}$
	0	0
	0	$-\frac{\sqrt{35}}{70}$
	$-\frac{\sqrt{35}}{70}$	0
	0	$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 3)$	0	0
	0	$-\frac{\sqrt{5}}{10}$
	0	$\frac{\sqrt{5}}{10}$
	0	$-\frac{\sqrt{5}i}{10}$
	0	$\frac{\sqrt{5}i}{10}$
	0	0
	0	$-\frac{\sqrt{5}}{10}$
	0	$\frac{\sqrt{5}}{10}$
	0	$-\frac{\sqrt{5}i}{10}$
	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$	0
535	symmetry	
536	symmetry	

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{1,0}^{(1,1;a)}(E_g)$	0	$-\frac{\sqrt{70}}{70}$
	$-\frac{\sqrt{70}}{70}$	0
	0	$-\frac{\sqrt{210}}{70}$
	$-\frac{\sqrt{210}}{70}$	0
	0	$\frac{\sqrt{70}}{70}$
	$\frac{\sqrt{210}}{140}$	0
	0	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
541	symmetry	$y$
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0	$\frac{\sqrt{70}i}{70}$
	$-\frac{\sqrt{70}i}{70}$	0
	0	$\frac{\sqrt{210}i}{70}$
	$0$	$-\frac{\sqrt{70}i}{70}$
	$\frac{\sqrt{210}i}{70}$	0
	$\frac{\sqrt{210}}{140}$	0
	0	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
542	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{1g})$		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} \\ 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{14}i}{12} & \frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{12} \\ -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{14}i}{12} & 0 & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 & \frac{\sqrt{14}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{14}}{24} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{24} \\ 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{14}}{12} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{14}i}{12} \\ -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{14}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & \frac{\sqrt{14}i}{12} & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 1)$		$\begin{bmatrix} \frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{35}i}{84} & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} \\ \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{84} \\ \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}}{105} & -\frac{\sqrt{35}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & \frac{\sqrt{35}}{105} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{105} \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
544	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} \\ 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 \\ 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{14}}{12} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{14}i}{12} \\ -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{14}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & \frac{\sqrt{14}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & -\frac{\sqrt{14}}{24} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{14}}{24} \\ 0 & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{14}i}{12} & -\frac{\sqrt{14}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{12} \\ \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{14}i}{12} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{14}}{12} & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
545	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{M}_{3,0}^{(1,1;a)}(E_g, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{70} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{56} \\ -\frac{\sqrt{210}}{70} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & \frac{\sqrt{70}i}{56} & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{210}}{168} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{210}}{168} \\ \frac{\sqrt{70}}{28} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{3\sqrt{210}}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{210}i}{84} & 0 & \frac{3\sqrt{210}}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} \\ \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{210}i}{70}$ 0 $\frac{\sqrt{70}i}{56}$ $\frac{\sqrt{70}}{28}$ 0 0 0 0 $\frac{\sqrt{70}}{56}$
	$-\frac{\sqrt{210}i}{70}$	0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 $\frac{\sqrt{70}}{56}$ 0
	0	$\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{210}i}{420}$ $\frac{\sqrt{210}}{168}$ 0 0 0 0 0
	$-\frac{\sqrt{70}i}{56}$	0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0
	$\frac{\sqrt{70}}{28}$	0 $\frac{\sqrt{210}}{168}$ 0 0 0 $-\frac{3\sqrt{210}i}{140}$ 0 $\frac{\sqrt{210}}{84}$ 0 0
	0	$-\frac{\sqrt{70}}{28}$ 0 $-\frac{\sqrt{210}}{168}$ $\frac{3\sqrt{210}i}{140}$ 0 $\frac{\sqrt{210}}{84}$ 0 $\frac{\sqrt{210}i}{420}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{420}$ 0 0 $\frac{\sqrt{210}}{168}$
	0	$\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{210}i}{420}$
	$\frac{\sqrt{70}}{56}$	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ $-\frac{\sqrt{210}i}{420}$ 0
	547	symmetry $-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{M}_{3,0}^{(1,1;a)}(E_g, 2)$	0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0	
	0 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 0	
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0	
	0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0 0	
	0 $\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$	
	$-\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{21}}{28}$ 0	
	0 $\frac{\sqrt{7}}{28}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{21}i}{28}$	
	$\frac{\sqrt{7}}{28}$ 0 $-\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$ $-\frac{\sqrt{21}i}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0	
548	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

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

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

Table 9: (d,f) block.

No.	multipole	matrix
549	symmetry	$z$
$0 0 0 0 0 0 \frac{3\sqrt{35}}{70} 0 0 0 0 0 0 0 0$		
$0 0 0 0 0 0 0 \frac{3\sqrt{35}}{70} 0 0 0 0 0 0 0$		
$0 0 0 0 0 0 0 0 0 0 0 0 0 0 \frac{\sqrt{7}}{14} 0$		
$0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \frac{\sqrt{7}}{14}$		
$0 0 0 0 -\frac{\sqrt{105}}{70} 0 0 0 0 0 0 \frac{\sqrt{7}}{14} 0 0 0 0$		
$0 0 0 0 0 -\frac{\sqrt{105}}{70} 0 0 0 0 0 0 \frac{\sqrt{7}}{14} 0 0 0$		
$0 0 -\frac{\sqrt{105}}{70} 0 0 0 0 0 0 -\frac{\sqrt{7}}{14} 0 0 0 0 0 0$		
$0 0 0 -\frac{\sqrt{105}}{70} 0 0 0 0 0 0 -\frac{\sqrt{7}}{14} 0 0 0 0 0 0$		
$\frac{\sqrt{7}}{14} 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$		
$0 \frac{\sqrt{7}}{14} 0 0 0 0 0 0 0 0 0 0 0 0 0 0$		

continued ...

Table 9

No.	multipole	matrix
550	symmetry $\mathbb{Q}_{1,0}^{(a)}(E_u)$	$x$ $\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
551	symmetry $\mathbb{Q}_{1,1}^{(a)}(E_u)$	$y$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
552	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
553	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
554	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 \end{bmatrix}$
555	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 \end{bmatrix}$
556	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(a)}(E_u, 1)$	0 0 0 0 $-\frac{3\sqrt{10}}{80}$ 0 0 0 0 0 $\frac{\sqrt{6}}{16}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{10}}{80}$ 0 0 0 0 0 $\frac{\sqrt{6}}{16}$ 0 0 0	
	0 0 0 0 $\frac{11\sqrt{30}}{240}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{11\sqrt{30}}{240}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{30}}{60}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{8}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{30}}{60}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{8}$	
	$\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{30}}{240}$ 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}}{240}$ 0 0 0 0 0 $-\frac{3\sqrt{2}}{16}$ 0 0 0 0 0	
557	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_{3,0}^{(a)}(E_u, 2)$	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 $\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}}{6}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{3}}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{3}}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0	
	0 0 $-\frac{\sqrt{3}}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{3}}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}}{8}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
558	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
559	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
560	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(a)}(A_{2u}, 1)$	0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{84}$	
	0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{5\sqrt{42}}{168}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{5\sqrt{42}}{168}$ 0 0	
	0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}}{168}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}}{168}$ 0 0 0 0	
	$\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
561	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(a)}(A_{2u}, 2)$	0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 0 0 0	
	0 0 $-\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{1}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0	
	$-\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{15}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{15}$	
	0 0 0 0 $\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0	
562	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
563	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
	$\mathbb{Q}_{5,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
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
	$\mathbb{Q}_{5,0}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 \end{bmatrix}$
565	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
	$\mathbb{Q}_{5,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} \\ -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 \end{bmatrix}$
566	symmetry	$-\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

*continued ...*

Table 9

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

*continued ..*

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,0}^{(a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
569	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
	$\mathbb{Q}_{5,1}^{(a)}(E_u, 4)$	$\begin{bmatrix} \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
570	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} \\ -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
571	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & \frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
572	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} \\ \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
573	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,0}^{(1,-1;a)}(E_u, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{21}}{84} \\ -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{210} & -\frac{2\sqrt{105}i}{105} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & \frac{2\sqrt{105}i}{105} & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \end{bmatrix}$
		$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
574	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	0	$\frac{\sqrt{21}}{84}, \frac{\sqrt{35}i}{70}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, \frac{\sqrt{21}i}{84}$
	$-\frac{\sqrt{21}}{84}$	$0, 0, -\frac{\sqrt{35}i}{70}, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{21}i}{42}, 0, 0, 0, \frac{\sqrt{21}i}{84}, 0$
	0	$-\frac{\sqrt{7}}{14}, \frac{\sqrt{105}i}{210}, 0, 0, 0, 0, \frac{\sqrt{105}i}{420}, -\frac{\sqrt{7}i}{14}, 0, 0, 0, 0, 0, 0, 0, 0$
	$\frac{\sqrt{7}}{14}$	$0, 0, -\frac{\sqrt{105}i}{210}, 0, 0, \frac{\sqrt{105}i}{420}, 0, 0, 0, \frac{\sqrt{7}i}{14}, 0, 0, 0, 0, 0$
	0	$0, 0, -\frac{\sqrt{105}}{120}, 0, -\frac{\sqrt{105}i}{210}, 0, 0, 0, -\frac{\sqrt{7}}{56}, 0, 0, 0, 0, 0, 0$
	0	$0, 0, \frac{\sqrt{105}}{120}, 0, -\frac{\sqrt{105}i}{210}, 0, 0, 0, \frac{\sqrt{7}}{56}, 0, 0, 0, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{105}i}{210}, 0, \frac{\sqrt{105}}{168}, \frac{2\sqrt{105}i}{105}, 0, 0, 0, 0, 0, -\frac{3\sqrt{7}}{56}, 0, 0$
	0	$0, 0, \frac{\sqrt{105}i}{210}, 0, -\frac{\sqrt{105}}{168}, 0, 0, -\frac{2\sqrt{105}i}{105}, 0, 0, \frac{3\sqrt{7}}{56}, 0, 0, 0$
	0	$0, 0, 0, 0, -\frac{2\sqrt{105}i}{105}, 0, 0, \frac{\sqrt{105}}{420}, 0, 0, 0, 0, 0, \frac{\sqrt{7}}{14}, 0$
	0	$0, 0, 0, 0, 0, \frac{2\sqrt{105}i}{105}, -\frac{\sqrt{105}}{420}, 0, 0, 0, 0, 0, -\frac{\sqrt{7}}{14}, 0$
575	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_{3,0}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{210}i}{84}, 0, 0, \frac{\sqrt{14}}{56}, 0, \frac{\sqrt{14}i}{56}, 0, 0, 0, \frac{\sqrt{210}}{168}, 0, -\frac{\sqrt{210}i}{168}, 0, 0$	
	0	$\frac{\sqrt{210}i}{84}, -\frac{\sqrt{14}}{56}, 0, \frac{\sqrt{14}i}{56}, 0, 0, 0, -\frac{\sqrt{210}}{168}, 0, -\frac{\sqrt{210}i}{168}, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{42}}{168}, 0, -\frac{\sqrt{42}i}{168}, 0, 0, 0, -\frac{\sqrt{70}}{56}, 0, -\frac{\sqrt{70}i}{56}, 0, 0$
	0	$0, 0, -\frac{\sqrt{42}}{168}, 0, -\frac{\sqrt{42}i}{168}, 0, 0, 0, \frac{\sqrt{70}}{56}, 0, -\frac{\sqrt{70}i}{56}, 0, 0, 0$
	0	$0, 0, \frac{\sqrt{42}i}{168}, 0, 0, 0, 0, \frac{\sqrt{42}i}{42}, -\frac{\sqrt{70}i}{56}, 0, 0, 0, 0, 0, 0$
	0	$0, 0, 0, -\frac{\sqrt{42}i}{168}, 0, 0, \frac{\sqrt{42}i}{42}, 0, 0, \frac{\sqrt{70}i}{56}, 0, 0, 0, 0, 0$
	0	$0, 0, 0, 0, \frac{\sqrt{42}i}{168}, 0, 0, \frac{\sqrt{42}}{42}, 0, 0, 0, \frac{\sqrt{70}i}{56}, 0, 0, 0$
	0	$0, 0, 0, 0, 0, -\frac{\sqrt{42}i}{168}, -\frac{\sqrt{42}}{42}, 0, 0, 0, 0, 0, -\frac{\sqrt{70}i}{56}, 0, 0$
	0	$0, 0, 0, -\frac{\sqrt{42}i}{42}, 0, \frac{\sqrt{42}}{42}, 0, 0, \frac{\sqrt{42}i}{84}, 0, 0, 0, 0, 0, 0$
	0	$0, 0, -\frac{\sqrt{42}i}{42}, 0, \frac{\sqrt{42}}{42}, 0, 0, 0, \frac{\sqrt{42}i}{84}, 0, 0, 0, 0, 0, 0$
576	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & -\frac{\sqrt{210}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{42}i}{84} & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{15} & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{15} \\ -\frac{\sqrt{6}}{15} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 \\ 0 & -\frac{\sqrt{2}}{60} & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} \\ \frac{\sqrt{2}}{60} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} & 0 \\ \frac{\sqrt{2}i}{30} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & -\frac{7\sqrt{2}}{240} & 0 & -\frac{11\sqrt{2}i}{240} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{30} & -\frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & \frac{7\sqrt{2}}{240} & 0 & -\frac{11\sqrt{2}i}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & \frac{\sqrt{30}}{80} & 0 & 0 & 0 & -\frac{17\sqrt{2}i}{240} & 0 & \frac{\sqrt{2}}{240} & -\frac{\sqrt{2}i}{30} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & -\frac{17\sqrt{2}i}{240} & 0 & -\frac{\sqrt{2}}{240} & 0 & 0 & \frac{\sqrt{2}i}{30} & 0 \\ 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{2}}{60} \\ \frac{\sqrt{2}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{60} & 0 & 0 \end{bmatrix}$	
		$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 1)$	0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0	
	0 0 $\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0	
	$\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{21}}{168}$ 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{13\sqrt{35}}{840}$ 0 $\frac{13\sqrt{35}i}{840}$ 0 0 0	
	0 $-\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}}{168}$ 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 $\frac{13\sqrt{35}}{840}$ 0 $\frac{13\sqrt{35}i}{840}$ 0 0 0 0	
	0 $-\frac{\sqrt{35}}{60}$ $-\frac{5\sqrt{21}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ $-\frac{5\sqrt{35}i}{168}$ 0 0 0 0 $-\frac{\sqrt{35}i}{60}$	
	$\frac{\sqrt{35}}{60}$ 0 0 $\frac{5\sqrt{21}i}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $\frac{5\sqrt{35}i}{168}$ 0 0 $-\frac{\sqrt{35}i}{60}$ 0	
	0 $\frac{\sqrt{35}i}{60}$ 0 0 $\frac{5\sqrt{21}i}{168}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{5\sqrt{35}i}{168}$ 0 0 $-\frac{\sqrt{35}i}{60}$	
	$\frac{\sqrt{35}i}{60}$ 0 0 0 0 $-\frac{5\sqrt{21}i}{168}$ $\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{5\sqrt{35}i}{168}$ $\frac{\sqrt{35}}{60}$ 0	
	0 0 0 $\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0 0 $\frac{\sqrt{35}i}{120}$ 0 $\frac{\sqrt{35}}{120}$ $-\frac{\sqrt{35}i}{42}$ 0	
	0 0 $\frac{\sqrt{21}i}{56}$ 0 $\frac{\sqrt{21}}{56}$ 0 0 0 $\frac{\sqrt{35}i}{120}$ 0 $-\frac{\sqrt{35}}{120}$ 0 0 $\frac{\sqrt{35}i}{42}$	
579	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 2)$	0 $\frac{\sqrt{6}i}{15}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{20}$ 0 0 $\frac{\sqrt{6}}{15}$	
	$\frac{\sqrt{6}i}{15}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{20}$ $-\frac{\sqrt{6}}{15}$ 0	
	0 $\frac{\sqrt{2}i}{60}$ 0 0 $\frac{\sqrt{30}i}{60}$ 0 0 $-\frac{\sqrt{30}}{30}$ 0 0 $-\frac{\sqrt{2}i}{12}$ 0 0 $-\frac{\sqrt{2}}{60}$	
	$\frac{\sqrt{2}i}{60}$ 0 0 0 0 $-\frac{\sqrt{30}i}{60}$ $\frac{\sqrt{30}}{30}$ 0 0 0 0 $\frac{\sqrt{2}i}{12}$ $\frac{\sqrt{2}}{60}$ 0	
	0 0 0 $\frac{\sqrt{30}i}{80}$ 0 $\frac{\sqrt{30}}{80}$ 0 0 0 0 $-\frac{\sqrt{2}i}{240}$ 0 $\frac{17\sqrt{2}}{240}$ $\frac{\sqrt{2}i}{30}$ 0	
	0 0 $\frac{\sqrt{30}i}{80}$ 0 $-\frac{\sqrt{30}}{80}$ 0 0 0 $-\frac{\sqrt{2}i}{240}$ 0 $-\frac{17\sqrt{2}}{240}$ 0 0 $-\frac{\sqrt{2}i}{30}$	
	$\frac{\sqrt{2}i}{30}$ 0 0 $-\frac{\sqrt{30}}{240}$ 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 $\frac{11\sqrt{2}}{240}$ 0 $\frac{7\sqrt{2}i}{240}$ 0 0	
	0 $-\frac{\sqrt{2}i}{30}$ $\frac{\sqrt{30}}{240}$ 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 $-\frac{11\sqrt{2}}{240}$ 0 $\frac{7\sqrt{2}i}{240}$ 0 0 0	
	0 $\frac{\sqrt{2}}{60}$ $\frac{\sqrt{30}i}{60}$ 0 0 0 0 $-\frac{\sqrt{30}i}{30}$ $\frac{\sqrt{2}i}{12}$ 0 0 0 0 $\frac{\sqrt{2}i}{60}$	
	$-\frac{\sqrt{2}}{60}$ 0 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{2}i}{12}$ 0 0 0 $\frac{\sqrt{2}i}{60}$	
580	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
	581 symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
	$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
		$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$
582	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,0}^{(1,-1;a)}(E_u, 2)$	0	$-\frac{\sqrt{7}i}{35}$
	$-\frac{\sqrt{7}i}{35}$	0
	0	$\frac{\sqrt{21}i}{42}$
	$\frac{\sqrt{21}i}{42}$	0
	0	$-\frac{\sqrt{35}i}{40}$
	$-\frac{\sqrt{35}i}{40}$	0
	$-\frac{\sqrt{21}i}{30}$	$-\frac{\sqrt{35}i}{280}$
	$-\frac{\sqrt{21}i}{30}$	0
	$\frac{\sqrt{21}i}{30}$	$\frac{\sqrt{35}}{280}$
	0	$\frac{3\sqrt{35}i}{140}$
583	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 2)$	0	$\frac{\sqrt{7}}{35}$
	$-\frac{\sqrt{7}}{35}$	0
	0	$\frac{\sqrt{21}}{42}$
	$-\frac{\sqrt{21}}{42}$	0
	$\frac{\sqrt{21}i}{30}$	$-\frac{3\sqrt{35}}{280}$
	0	$-\frac{\sqrt{21}i}{30}$
	$-\frac{\sqrt{21}i}{30}$	$\frac{3\sqrt{35}}{280}$
	0	$-\frac{\sqrt{35}i}{280}$
	$-\frac{\sqrt{35}i}{280}$	0
	0	$\frac{3\sqrt{35}i}{140}$
584	symmetry	$-\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix	
$\mathbb{Q}_{5,0}^{(1,-1;a)}(E_u, 4)$	$\begin{bmatrix} -\frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 \\ 0 & \frac{i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{15} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} \\ -\frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 & 0 & -\frac{\sqrt{3}i}{20} \\ 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 & 0 & \frac{\sqrt{3}}{20} \\ \frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & -\frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \end{bmatrix}$		
		$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$	
		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & \frac{i}{40} & 0 & \frac{1}{40} & -\frac{i}{5} & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & \frac{i}{40} & 0 & -\frac{1}{40} & 0 & 0 & \frac{i}{5} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{40} & 0 & \frac{\sqrt{5}}{40} & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{3\sqrt{3}i}{40} & 0 & -\frac{3\sqrt{3}}{40} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{40} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & -\frac{\sqrt{5}i}{10} & \frac{3\sqrt{3}i}{40} & 0 & \frac{3\sqrt{3}}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{7\sqrt{3}i}{120} & 0 & 0 & \frac{\sqrt{3}}{15} \\ \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{40} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{7\sqrt{3}i}{120} & -\frac{\sqrt{3}}{15} & 0 \\ 0 & -\frac{\sqrt{3}}{20} & \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & -\frac{7\sqrt{3}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{15} \\ \frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{7\sqrt{3}i}{120} & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{3}}{120} & 0 & -\frac{\sqrt{3}i}{120} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{40} & 0 & \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & \frac{\sqrt{3}}{120} & 0 & -\frac{\sqrt{3}i}{120} & 0 & 0 & 0 \end{bmatrix}$	
		$z$	
588	symmetry		

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{Q}_1^{(1,0;a)}(A_{2u})$	0 0 0 $\frac{3\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 0 $\frac{3\sqrt{210}}{280}$ 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 $\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0	
	0 0 $-\frac{\sqrt{210}i}{140}$ 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
589	symmetry	$x$
$\mathbb{Q}_{1,0}^{(1,0;a)}(E_u)$	0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ $-\frac{3\sqrt{70}}{140}$ 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}}{28}$	
	0 0 0 0 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0	
	0 $\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0	
	$-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0	
590	symmetry	$y$

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)$	$0 \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}i}{140} \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{70}i}{140} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28}$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0$	
	$\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0$	
	$0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0$	
591	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$0 \quad 0 \quad -\frac{5\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad \frac{\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}i}{16} \quad \frac{\sqrt{6}}{24} \quad 0 \quad \frac{\sqrt{6}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{96} \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{6}i}{96} \quad 0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{32} \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{32} \quad 0 \quad 0 \quad 0$	
592	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & -\frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{80} & 0 & -\frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{15}}{240} & 0 & \frac{11\sqrt{15}i}{240} & 0 & 0 & 0 & \frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 \\ 0 & 0 & -\frac{11\sqrt{15}}{240} & 0 & \frac{11\sqrt{15}i}{240} & 0 & 0 & 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{240} & 0 & \frac{\sqrt{15}}{240} & 0 & 0 & 0 & -\frac{3i}{16} & 0 & -\frac{3}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{240} & 0 & -\frac{\sqrt{15}}{240} & 0 & 0 & 0 & -\frac{3i}{16} & 0 & \frac{3}{16} & 0 & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
593	symmetry	$\frac{\sqrt{6}x(x^2 + y^2 - 4z^2)}{4}$
$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & -\frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{10}i}{16} \\ -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{16} & -\frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 - 3y^2)}{4}$	
	$\frac{\sqrt{10}x(x^2 + 3y^2)}{4}$	
594	symmetry	$-\frac{\sqrt{6}x(x^2 + y^2 - 4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,0}^{(1,0;a)}(E_u, 1)$	0 0 0 0 $\frac{\sqrt{30}i}{160}$ 0 0 $\frac{\sqrt{30}}{30}$ 0 0 $-\frac{\sqrt{2}i}{32}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{30}i}{160}$ $-\frac{\sqrt{30}}{30}$ 0 0 0 0 $\frac{\sqrt{2}i}{32}$ 0 0 0	
	0 0 0 0 $-\frac{11\sqrt{10}i}{480}$ 0 0 $\frac{\sqrt{10}}{24}$ 0 0 0 $\frac{\sqrt{6}i}{96}$ 0 0 $-\frac{\sqrt{6}}{12}$	
	0 0 0 0 0 $\frac{11\sqrt{10}i}{480}$ $-\frac{\sqrt{10}}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{96}$ $\frac{\sqrt{6}}{12}$ 0	
	0 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{480}$ $-\frac{\sqrt{10}i}{120}$ 0 0 0 0 $\frac{7\sqrt{6}}{96}$ $\frac{\sqrt{6}i}{48}$ 0	
	0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{480}$ 0 0 $\frac{\sqrt{10}i}{120}$ 0 0 $-\frac{7\sqrt{6}}{96}$ 0 0 $-\frac{\sqrt{6}i}{48}$	
	$-\frac{\sqrt{6}i}{48}$ 0 0 $-\frac{11\sqrt{10}}{480}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 $\frac{\sqrt{6}}{32}$ 0 0 0 0	
	0 $\frac{\sqrt{6}i}{48}$ $\frac{11\sqrt{10}}{480}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{10}i}{480}$ 0 0 0 0 $-\frac{\sqrt{10}i}{24}$ $\frac{\sqrt{6}i}{32}$ 0 0 0 0 0	
	$\frac{\sqrt{6}}{12}$ 0 0 $-\frac{\sqrt{10}i}{480}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0 0 $-\frac{\sqrt{6}i}{32}$ 0 0 0 0	
595	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{30}i}{160}$ 0 0 0 0 $-\frac{\sqrt{30}i}{30}$ $-\frac{\sqrt{2}i}{32}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{160}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $\frac{\sqrt{2}i}{32}$ 0 0 0 0	
	0 0 $-\frac{11\sqrt{10}i}{480}$ 0 0 0 0 $\frac{\sqrt{10}i}{24}$ $-\frac{\sqrt{6}i}{96}$ 0 0 0 0 $\frac{\sqrt{6}i}{12}$	
	0 0 0 $\frac{11\sqrt{10}i}{480}$ 0 0 $\frac{\sqrt{10}i}{24}$ 0 0 $\frac{\sqrt{6}i}{96}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0	
	$\frac{\sqrt{6}i}{48}$ 0 0 $\frac{\sqrt{10}}{24}$ 0 $\frac{11\sqrt{10}i}{480}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{32}$ 0 0 0	
	0 $-\frac{\sqrt{6}i}{48}$ $-\frac{\sqrt{10}}{24}$ 0 $\frac{11\sqrt{10}i}{480}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{10}i}{480}$ 0 $\frac{\sqrt{10}}{24}$ $\frac{\sqrt{10}i}{120}$ 0 0 $\frac{7\sqrt{6}i}{96}$ 0 0 $\frac{\sqrt{6}i}{48}$ 0	
	0 0 $\frac{\sqrt{10}i}{480}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 $-\frac{\sqrt{10}i}{120}$ $\frac{7\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{\sqrt{6}i}{48}$	
	0 $\frac{\sqrt{6}i}{12}$ 0 0 $-\frac{\sqrt{10}i}{480}$ 0 0 $\frac{\sqrt{10}}{24}$ 0 0 0 $\frac{\sqrt{6}i}{32}$ 0 0 0	
	$\frac{\sqrt{6}i}{12}$ 0 0 0 0 $\frac{\sqrt{10}i}{480}$ $-\frac{\sqrt{10}}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{32}$ 0 0 0	
596	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,0}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{3}}{48}$ 0 $-\frac{\sqrt{3}i}{48}$ 0 0 0 $\frac{\sqrt{5}}{16}$ 0 $-\frac{\sqrt{5}i}{16}$ 0 0	
	0 0 $\frac{\sqrt{3}}{48}$ 0 $-\frac{\sqrt{3}i}{48}$ 0 0 0 $-\frac{\sqrt{5}}{16}$ 0 $-\frac{\sqrt{5}i}{16}$ 0 0 0	
	0 0 0 $\frac{7}{48}$ 0 $-\frac{7i}{48}$ 0 0 0 $\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 0 $-\frac{7}{48}$ 0 $-\frac{7i}{48}$ 0 0 0 $-\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 $-\frac{\sqrt{15}}{24}$ $-\frac{i}{6}$ 0 0 0 0 $-\frac{i}{24}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{15}}{24}$ 0 0 $\frac{i}{6}$ 0 0 $-\frac{i}{24}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{i}{6}$ 0 0 $-\frac{1}{24}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $\frac{i}{6}$ $\frac{1}{24}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{i}{48}$ 0 $-\frac{1}{48}$ $-\frac{i}{6}$ 0 0 $\frac{\sqrt{15}i}{48}$ 0 $-\frac{\sqrt{15}}{48}$ 0 0	
	0 0 $-\frac{i}{48}$ 0 $\frac{1}{48}$ 0 0 0 $\frac{i}{6}$ $\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
597	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{3}i}{12}$ 0 $-\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{3}i}{12}$ 0 $\frac{\sqrt{3}}{12}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{i}{12}$ 0 $\frac{1}{12}$ $-\frac{i}{6}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{i}{12}$ 0 $-\frac{1}{12}$ 0 0 $\frac{i}{6}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{i}{24}$ 0 0 $\frac{1}{24}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{\sqrt{15}}{24}$	
	0 0 0 0 0 $\frac{i}{24}$ $-\frac{1}{24}$ 0 0 0 0 $\frac{\sqrt{15}i}{24}$ $\frac{\sqrt{15}}{24}$ 0	
	0 0 $\frac{i}{24}$ 0 0 0 0 $-\frac{i}{24}$ $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 $-\frac{\sqrt{15}i}{24}$	
	0 0 0 $-\frac{i}{24}$ 0 0 $-\frac{i}{24}$ 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 0 0 $-\frac{1}{24}$ 0 $\frac{i}{24}$ 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0	
	0 0 $\frac{1}{24}$ 0 $\frac{i}{24}$ 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0	
598	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{1u})$	0	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{20} & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} \\ -\frac{\sqrt{6}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 \\ 0 & -\frac{3\sqrt{2}}{40} & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{40} \\ \frac{3\sqrt{2}}{40} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 \\ -\frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & -\frac{7\sqrt{30}i}{240} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{80} & 0 & \frac{\sqrt{2}i}{80} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{10} & \frac{\sqrt{30}}{48} & 0 & -\frac{7\sqrt{30}i}{240} & 0 & 0 & 0 & \frac{3\sqrt{2}}{80} & 0 & \frac{\sqrt{2}i}{80} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{240} & 0 & \frac{\sqrt{30}}{240} & 0 & 0 & 0 & \frac{7\sqrt{2}i}{80} & 0 & 0 & \frac{9\sqrt{2}}{80} & \frac{\sqrt{2}i}{10} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{240} & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 & \frac{7\sqrt{2}i}{80} & 0 & -\frac{9\sqrt{2}}{80} & 0 & 0 & -\frac{\sqrt{2}i}{10} \\ 0 & \frac{3\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{3\sqrt{2}}{40} \\ \frac{3\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{3\sqrt{2}}{40} & 0 & 0 \end{bmatrix}$
	599	$\text{symmetry}$
		$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
	$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 \\ 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \\ -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & \frac{3\sqrt{35}}{280} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
600	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 2)$	0	$\frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{20}$
	$\frac{\sqrt{6}i}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{40} \quad -\frac{\sqrt{6}}{20} \quad 0$
	0	$\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{40}$
	$\frac{3\sqrt{2}i}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{80} \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{16} \quad \frac{3\sqrt{2}}{40} \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{240} \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{2}i}{80} \quad 0 \quad -\frac{7\sqrt{2}}{80} \quad -\frac{\sqrt{2}i}{10} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{30}i}{240} \quad 0 \quad -\frac{\sqrt{30}}{240} \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{2}i}{80} \quad 0 \quad \frac{7\sqrt{2}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{10}$
	$-\frac{\sqrt{2}i}{10}$	$0 \quad 0 \quad 0 \quad -\frac{7\sqrt{30}}{240} \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{80} \quad 0 \quad \frac{3\sqrt{2}i}{80} \quad 0 \quad 0$
	0	$\frac{\sqrt{2}i}{10} \quad \frac{7\sqrt{30}}{240} \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{80} \quad 0 \quad \frac{3\sqrt{2}i}{80} \quad 0 \quad 0 \quad 0$
	0	$\frac{3\sqrt{2}}{40} \quad \frac{\sqrt{30}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad \frac{\sqrt{2}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40}$
	$-\frac{3\sqrt{2}}{40}$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40} \quad 0$
601	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{Q}_{5,0}^{(1,0;a)}(E_u, 1)$	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40}$
	$\frac{\sqrt{10}i}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad -\frac{\sqrt{10}}{40} \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad \frac{\sqrt{10}}{80} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{10}}{40} \quad -\frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40}$
	$\frac{\sqrt{10}}{40}$	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0$
602	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 1)$	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{10}}{40} \quad -\frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40}$	
	$\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{80} \quad 0 \quad \frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad \frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad -\frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40}$	
	$-\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0$	
		$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
603	symmetry	
$\mathbb{Q}_{5,0}^{(1,0;a)}(E_u, 2)$	$0 \quad \frac{\sqrt{7}i}{20} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{20}$	
	$\frac{\sqrt{7}i}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{280} \quad -\frac{\sqrt{105}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56} \quad \frac{\sqrt{7}}{20} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{420} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{420} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{84}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420} \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{420} \quad -\frac{\sqrt{21}}{84} \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{120} \quad 0 \quad \frac{\sqrt{35}}{840} \quad -\frac{\sqrt{35}i}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{40} \quad 0 \quad -\frac{11\sqrt{21}}{840} \quad -\frac{\sqrt{21}i}{210} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{35}i}{120} \quad 0 \quad -\frac{\sqrt{35}}{840} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{105} \quad -\frac{\sqrt{21}i}{40} \quad 0 \quad \frac{11\sqrt{21}}{840} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{210}$	
	$\frac{\sqrt{21}i}{210} \quad 0 \quad 0 \quad \frac{29\sqrt{35}}{840} \quad 0 \quad -\frac{\sqrt{35}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{21}}{280} \quad 0 \quad \frac{\sqrt{21}i}{40} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}i}{210} \quad -\frac{29\sqrt{35}}{840} \quad 0 \quad -\frac{\sqrt{35}i}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{21}}{280} \quad 0 \quad \frac{\sqrt{21}i}{40} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{21}}{84} \quad -\frac{\sqrt{35}i}{840} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{60} \quad -\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{840} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0$	
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
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 2)$	$0 \quad -\frac{\sqrt{7}}{20} \quad -\frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{42} \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{20}$	
	$\frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{35}i}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad \frac{\sqrt{21}i}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{420} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0$	
	$-\frac{\sqrt{21}i}{210} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{120} \quad 0 \quad -\frac{29\sqrt{35}i}{840} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{40} \quad 0 \quad \frac{13\sqrt{21}i}{280} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{21}i}{210} \quad -\frac{\sqrt{35}}{120} \quad 0 \quad -\frac{29\sqrt{35}i}{840} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{40} \quad 0 \quad \frac{13\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{840} \quad 0 \quad \frac{\sqrt{35}}{120} \quad \frac{\sqrt{35}i}{105} \quad 0 \quad 0 \quad -\frac{11\sqrt{21}i}{840} \quad 0 \quad -\frac{\sqrt{21}}{40} \quad -\frac{\sqrt{21}i}{210} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{35}i}{840} \quad 0 \quad -\frac{\sqrt{35}}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{105} \quad -\frac{11\sqrt{21}i}{840} \quad 0 \quad \frac{\sqrt{21}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{210}$	
	$0 \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{840} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{21}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{840} \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad 0$	
605	symmetry	$-\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{Q}_{5,0}^{(1,0;a)}(E_u, 3)$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{40} \quad 0 \quad \frac{\sqrt{5}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{40} \quad 0 \quad \frac{\sqrt{3}i}{40} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{5}}{40} \quad 0 \quad \frac{\sqrt{5}i}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{40} \quad 0 \quad \frac{\sqrt{3}i}{40} \quad 0 \quad 0 \quad 0$	
	$\frac{i}{5} \quad 0 \quad 0 \quad \frac{\sqrt{15}}{30} \quad 0 \quad \frac{\sqrt{15}i}{30} \quad 0 \quad 0$	
	$0 \quad -\frac{i}{5} \quad -\frac{\sqrt{15}}{30} \quad 0 \quad \frac{\sqrt{15}i}{30} \quad 0 \quad 0$	
	$0 \quad \frac{1}{10} \quad \frac{\sqrt{15}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10}$	
	$-\frac{1}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0$	
	$0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{1}{10}$	
	$-\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{10} \quad \frac{1}{10} \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{120} \quad 0 \quad \frac{\sqrt{15}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad \frac{1}{8} \quad \frac{i}{5} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{15}i}{120} \quad 0 \quad -\frac{\sqrt{15}}{120} \quad 0 \quad 0 \quad 0 \quad \frac{i}{8} \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad -\frac{i}{5}$	
606	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{5}i}{40}$ 0 $\frac{\sqrt{5}}{40}$ 0 0 0 $-\frac{\sqrt{3}i}{40}$ 0 $\frac{\sqrt{3}}{40}$ 0 0	
	0 0 $\frac{\sqrt{5}i}{40}$ 0 $-\frac{\sqrt{5}}{40}$ 0 0 0 $-\frac{\sqrt{3}i}{40}$ 0 $-\frac{\sqrt{3}}{40}$ 0 0 0	
	0 0 0 $\frac{\sqrt{15}i}{120}$ 0 $-\frac{\sqrt{15}}{120}$ 0 0 0 $-\frac{i}{8}$ 0 $-\frac{1}{8}$ $-\frac{i}{5}$ 0	
	0 0 $\frac{\sqrt{15}i}{120}$ 0 $\frac{\sqrt{15}}{120}$ 0 0 0 $-\frac{i}{8}$ 0 $\frac{1}{8}$ 0 0 $\frac{i}{5}$	
	0 $-\frac{i}{10}$ 0 0 $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 $-\frac{i}{10}$ 0 0 $-\frac{1}{10}$	
	$-\frac{i}{10}$ 0 0 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 $\frac{i}{10}$ $\frac{1}{10}$ 0	
	0 $-\frac{1}{10}$ $-\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 $\frac{i}{10}$ 0 0 0 $\frac{i}{10}$	
	$\frac{1}{10}$ 0 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 $-\frac{i}{10}$ 0 0 $\frac{i}{10}$ 0	
	$\frac{i}{5}$ 0 0 $\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{i}{5}$ $-\frac{\sqrt{15}}{30}$ 0 $\frac{\sqrt{15}i}{30}$ 0 0 0 0 0 0 0 0 0	
607	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$\mathbb{Q}_{5,0}^{(1,0;a)}(E_u, 4)$	$\frac{i}{10}$ 0 0 $\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 $\frac{3}{40}$ 0 $-\frac{3i}{40}$ 0 0	
	0 $-\frac{i}{10}$ $-\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 $-\frac{3}{40}$ 0 $-\frac{3i}{40}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{5}}{24}$ 0 $\frac{\sqrt{5}i}{24}$ 0 0 0 $-\frac{7\sqrt{3}}{120}$ 0 $-\frac{7\sqrt{3}i}{120}$ 0 0	
	0 0 $\frac{\sqrt{5}}{24}$ 0 $\frac{\sqrt{5}i}{24}$ 0 0 0 $\frac{7\sqrt{3}}{120}$ 0 $-\frac{7\sqrt{3}i}{120}$ 0 0 0	
	0 $-\frac{\sqrt{3}}{30}$ $-\frac{\sqrt{5}i}{60}$ 0 0 0 0 $-\frac{\sqrt{5}i}{15}$ $-\frac{\sqrt{3}i}{20}$ 0 0 0 $-\frac{\sqrt{3}i}{10}$	
	$\frac{\sqrt{3}}{30}$ 0 0 $\frac{\sqrt{5}i}{60}$ 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 $\frac{\sqrt{3}i}{20}$ 0 0 $-\frac{\sqrt{3}i}{10}$ 0	
	0 $-\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{5}i}{60}$ 0 0 $-\frac{\sqrt{5}}{15}$ 0 0 $\frac{\sqrt{3}i}{20}$ 0 0 $\frac{\sqrt{3}}{10}$	
	$-\frac{\sqrt{3}i}{30}$ 0 0 0 0 $\frac{\sqrt{5}i}{60}$ $\frac{\sqrt{5}}{15}$ 0 0 0 0 $-\frac{\sqrt{3}i}{20}$ $-\frac{\sqrt{3}}{10}$ 0	
	0 0 0 $\frac{\sqrt{5}i}{60}$ 0 $\frac{\sqrt{5}}{60}$ $\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{3}i}{60}$ 0 $-\frac{\sqrt{3}}{60}$ 0 0	
	0 0 $\frac{\sqrt{5}i}{60}$ 0 $-\frac{\sqrt{5}}{60}$ 0 0 $-\frac{\sqrt{5}i}{30}$ $\frac{\sqrt{3}i}{60}$ 0 $\frac{\sqrt{3}}{60}$ 0 0 0	
608	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 4)$	0 0 0 $\frac{\sqrt{15}i}{120}$ 0 $-\frac{\sqrt{15}}{120}$ 0 0 0 $\frac{7i}{40}$ 0 $\frac{7}{40}$ $\frac{i}{10}$ 0	
	0 0 $\frac{\sqrt{15}i}{120}$ 0 $\frac{\sqrt{15}}{120}$ 0 0 0 $\frac{7i}{40}$ 0 $-\frac{7}{40}$ 0 0 $-\frac{i}{10}$	
	0 0 0 $\frac{\sqrt{5}i}{120}$ 0 $\frac{\sqrt{5}}{120}$ $\frac{\sqrt{5}i}{30}$ 0 0 0 $\frac{\sqrt{3}i}{40}$ 0 $-\frac{\sqrt{3}}{40}$ 0 0 0	
	0 0 $\frac{\sqrt{5}i}{120}$ 0 $-\frac{\sqrt{5}}{120}$ 0 0 0 $-\frac{\sqrt{5}i}{30}$ $\frac{\sqrt{3}i}{40}$ 0 $\frac{\sqrt{3}}{40}$ 0 0 0	
	0 $\frac{\sqrt{3}i}{10}$ 0 0 $\frac{\sqrt{5}i}{30}$ 0 0 0 $\frac{\sqrt{5}}{15}$ 0 0 $-\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{3}}{30}$	
	$\frac{\sqrt{3}i}{10}$ 0 0 0 0 $-\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{5}}{15}$ 0 0 0 0 $\frac{\sqrt{3}i}{30}$ $\frac{\sqrt{3}}{30}$ 0	
	0 $-\frac{\sqrt{3}}{10}$ $-\frac{\sqrt{5}i}{30}$ 0 0 0 0 $-\frac{\sqrt{5}i}{15}$ $-\frac{\sqrt{3}i}{30}$ 0 0 0 0 $-\frac{\sqrt{3}i}{30}$	
	$\frac{\sqrt{3}}{10}$ 0 0 $\frac{\sqrt{5}i}{30}$ 0 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 $\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{3}i}{30}$ 0	
	0 0 0 $\frac{\sqrt{5}}{30}$ 0 $-\frac{\sqrt{5}i}{30}$ 0 0 0 $\frac{\sqrt{3}}{15}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 0	
	0 0 $-\frac{\sqrt{5}}{30}$ 0 $-\frac{\sqrt{5}i}{30}$ 0 0 0 $-\frac{\sqrt{3}}{15}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 0	
609	symmetry	$z$
$\mathbb{Q}_1^{(1,1;a)}(A_{2u})$	0 0 0 $\frac{3\sqrt{35}}{280}$ 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 0 $\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{35}}{280}$ 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0	
	$-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{280}$ 0 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0	
	0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{280}$ 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0	
	0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0	
	0 0 $\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0	
	0 0 $\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{70}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$	
610	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,0}^{(1,1;a)}(E_u)$	0	$\frac{\sqrt{21}i}{28}$ 0 0 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 0 $-\frac{\sqrt{21}}{28}$
	$\frac{\sqrt{21}i}{28}$	0 0 0 0 0 $\frac{3\sqrt{35}i}{280}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{56}$ $\frac{\sqrt{21}}{28}$ 0
	0	$\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{105}i}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0
	$\frac{\sqrt{7}i}{28}$	0 0 0 0 0 $-\frac{\sqrt{105}i}{280}$ $\frac{\sqrt{105}}{140}$ 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{105}}{70}$ $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 $\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0
	0	0 0 $\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0
	0	0 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0
	0	0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0
611	symmetry	$y$
$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	0	$-\frac{\sqrt{21}}{28}$ $\frac{3\sqrt{35}i}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 0 $-\frac{\sqrt{21}i}{28}$
	$\frac{\sqrt{21}}{28}$	0 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0
	0	$\frac{\sqrt{7}}{28}$ $\frac{\sqrt{105}i}{280}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$ $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{7}}{28}$	0 0 $-\frac{\sqrt{105}i}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}}{140}$ 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{105}}{140}$ 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0
	0	0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$
	0	0 0 0 0 0 $\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{105}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0
612	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{1u})$	0	$-\frac{\sqrt{210}}{420} \quad -\frac{\sqrt{14}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{420}$
	$\frac{\sqrt{210}}{420}$	$0 \quad 0 \quad \frac{\sqrt{14}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{420} \quad 0$
	$0 \quad \frac{\sqrt{70}}{60} \quad -\frac{\sqrt{42}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad -\frac{\sqrt{70}i}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{60}$	
	$-\frac{\sqrt{70}}{60}$	$0 \quad 0 \quad \frac{\sqrt{42}i}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{96} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{60} \quad 0$
	$\frac{\sqrt{70}i}{240}$	$0 \quad 0 \quad -\frac{\sqrt{42}}{42} \quad 0 \quad -\frac{13\sqrt{42}i}{672} \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{70}}{840} \quad 0 \quad -\frac{\sqrt{70}i}{96} \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{70}i}{240} \quad \frac{\sqrt{42}}{42} \quad 0 \quad -\frac{13\sqrt{42}i}{672} \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{70}}{840} \quad 0 \quad -\frac{\sqrt{70}i}{96} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{224} \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{70}i}{480} \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad -\frac{\sqrt{70}i}{240} \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{42}i}{224} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{70}i}{480} \quad 0 \quad -\frac{\sqrt{70}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{240}$	
	$0 \quad -\frac{\sqrt{70}i}{60} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{96} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{96} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{60}$	
	$-\frac{\sqrt{70}i}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{96} \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{96} \quad -\frac{\sqrt{70}}{60} \quad 0$
613	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(1,1;a)}(A_{2u}, 1)$	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{112} \quad 0 \quad -\frac{\sqrt{35}i}{112} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{21}}{336} \quad 0 \quad \frac{5\sqrt{21}i}{336} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{35}}{112} \quad 0 \quad -\frac{\sqrt{35}i}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{21}}{336} \quad 0 \quad \frac{5\sqrt{21}i}{336} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{7}i}{21}$	$0 \quad 0 \quad \frac{\sqrt{105}}{336} \quad 0 \quad \frac{\sqrt{105}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{7}}{336} \quad 0 \quad -\frac{13\sqrt{7}i}{336} \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{7}i}{21} \quad -\frac{\sqrt{105}}{336} \quad 0 \quad \frac{\sqrt{105}i}{336} \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{7}}{336} \quad 0 \quad -\frac{13\sqrt{7}i}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{7}}{24} \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad -\frac{5\sqrt{7}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24}$	
	$-\frac{\sqrt{7}}{24}$	$0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad \frac{5\sqrt{7}i}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0$
	$0 \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad -\frac{5\sqrt{7}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{24}$	
	$-\frac{\sqrt{7}i}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{84} \quad -\frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{7}i}{84} \quad -\frac{\sqrt{7}}{24} \quad 0$
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{112} \quad 0 \quad \frac{\sqrt{105}}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{48} \quad 0 \quad -\frac{\sqrt{7}}{48} \quad -\frac{\sqrt{7}i}{21} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{105}i}{112} \quad 0 \quad -\frac{\sqrt{105}}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{48} \quad 0 \quad \frac{\sqrt{7}}{48} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{21}$	
614	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{2u}, 2)$	$0 - \frac{\sqrt{210}i}{420} 0 0 -\frac{\sqrt{14}i}{32} 0 0 0 0 0 -\frac{\sqrt{210}i}{160} 0 0 -\frac{\sqrt{210}}{420}$	
	$-\frac{\sqrt{210}i}{420} 0 0 0 0 \frac{\sqrt{14}i}{32} 0 0 0 0 0 \frac{\sqrt{210}i}{160} \frac{\sqrt{210}}{420} 0$	
	$0 -\frac{\sqrt{70}i}{60} 0 0 \frac{\sqrt{42}i}{96} 0 0 \frac{\sqrt{42}}{168} 0 0 -\frac{\sqrt{70}i}{96} 0 0 \frac{\sqrt{70}}{60}$	
	$-\frac{\sqrt{70}i}{60} 0 0 0 0 -\frac{\sqrt{42}i}{96} -\frac{\sqrt{42}}{168} 0 0 0 0 \frac{\sqrt{70}i}{96} -\frac{\sqrt{70}}{60} 0$	
	$0 0 0 \frac{\sqrt{42}i}{56} 0 -\frac{5\sqrt{42}}{224} 0 0 0 -\frac{\sqrt{70}i}{84} 0 -\frac{7\sqrt{70}}{480} \frac{\sqrt{70}i}{240} 0$	
	$0 0 \frac{\sqrt{42}i}{56} 0 \frac{5\sqrt{42}}{224} 0 0 0 -\frac{\sqrt{70}i}{84} 0 \frac{7\sqrt{70}}{480} 0 0 -\frac{\sqrt{70}i}{240}$	
	$\frac{\sqrt{70}i}{240} 0 0 -\frac{13\sqrt{42}}{672} 0 -\frac{\sqrt{42}i}{42} 0 0 0 \frac{\sqrt{70}}{96} 0 -\frac{11\sqrt{70}i}{840} 0 0 0$	
	$0 -\frac{\sqrt{70}i}{240} \frac{13\sqrt{42}}{672} 0 -\frac{\sqrt{42}i}{42} 0 0 0 -\frac{\sqrt{70}}{96} 0 -\frac{11\sqrt{70}i}{840} 0 0 0$	
	$0 -\frac{\sqrt{70}}{60} \frac{\sqrt{42}i}{96} 0 0 0 0 \frac{\sqrt{42}i}{168} \frac{\sqrt{70}i}{96} 0 0 0 0 -\frac{\sqrt{70}i}{60}$	
	$\frac{\sqrt{70}}{60} 0 0 -\frac{\sqrt{42}i}{96} 0 0 \frac{\sqrt{42}i}{168} 0 0 -\frac{\sqrt{70}i}{96} 0 0 0 -\frac{\sqrt{70}i}{60}$	
615	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,0}^{(1,1;a)}(E_u, 1)$	$0 \frac{\sqrt{14}i}{28} 0 0 -\frac{\sqrt{210}i}{224} 0 0 0 0 0 \frac{5\sqrt{14}i}{224} 0 0 -\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28} 0 0 0 0 \frac{\sqrt{210}i}{224} 0 0 0 0 0 -\frac{5\sqrt{14}i}{224} \frac{\sqrt{14}}{28} 0$	
	$0 -\frac{\sqrt{42}i}{84} 0 0 \frac{\sqrt{70}i}{224} 0 0 \frac{\sqrt{70}}{56} 0 0 -\frac{13\sqrt{42}i}{672} 0 0 0$	
	$-\frac{\sqrt{42}i}{84} 0 0 0 0 -\frac{\sqrt{70}i}{224} -\frac{\sqrt{70}}{56} 0 0 0 0 \frac{13\sqrt{42}i}{672} 0 0$	
	$0 0 0 \frac{\sqrt{70}i}{56} 0 -\frac{\sqrt{70}}{224} -\frac{\sqrt{70}i}{56} 0 0 \frac{\sqrt{42}i}{84} 0 -\frac{\sqrt{42}}{96} \frac{\sqrt{42}i}{48} 0$	
	$0 0 \frac{\sqrt{70}i}{56} 0 \frac{\sqrt{70}}{224} 0 0 \frac{\sqrt{70}i}{56} \frac{\sqrt{42}i}{84} 0 \frac{\sqrt{42}}{96} 0 0 -\frac{\sqrt{42}i}{48}$	
	$-\frac{\sqrt{42}i}{48} 0 0 \frac{\sqrt{70}}{224} 0 0 0 0 -\frac{\sqrt{42}}{96} 0 \frac{\sqrt{42}i}{56} 0 0 0$	
	$0 \frac{\sqrt{42}i}{48} -\frac{\sqrt{70}}{224} 0 0 0 0 0 \frac{\sqrt{42}}{96} 0 \frac{\sqrt{42}i}{56} 0 0 0$	
	$0 0 -\frac{3\sqrt{70}i}{224} 0 0 0 0 -\frac{\sqrt{70}i}{56} -\frac{\sqrt{42}i}{96} 0 0 0 0 \frac{\sqrt{42}i}{84}$	
	$0 0 0 \frac{3\sqrt{70}i}{224} 0 0 -\frac{\sqrt{70}i}{56} 0 0 \frac{\sqrt{42}i}{96} 0 0 0 \frac{\sqrt{42}i}{84}$	
616	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 1)$	0	$-\frac{\sqrt{14}}{28}, \frac{\sqrt{210}i}{224}, 0, 0, 0, 0, 0, 0, \frac{5\sqrt{14}i}{224}, 0, 0, 0, 0, -\frac{\sqrt{14}i}{28}$
	$\frac{\sqrt{14}}{28}$	$0, 0, -\frac{\sqrt{210}i}{224}, 0, 0, 0, 0, 0, 0, -\frac{5\sqrt{14}i}{224}, 0, 0, 0, -\frac{\sqrt{14}i}{28}, 0$
	0	$-\frac{\sqrt{42}}{84}, \frac{\sqrt{70}i}{224}, 0, 0, 0, 0, \frac{\sqrt{70}i}{56}, \frac{13\sqrt{42}i}{672}, 0, 0, 0, 0, 0, 0, 0$
	$\frac{\sqrt{42}}{84}$	$0, 0, -\frac{\sqrt{70}i}{224}, 0, 0, \frac{\sqrt{70}i}{56}, 0, 0, -\frac{13\sqrt{42}i}{672}, 0, 0, 0, 0, 0$
	$\frac{\sqrt{42}i}{48}$	$0, 0, 0, 0, -\frac{\sqrt{70}i}{224}, 0, 0, 0, \frac{\sqrt{42}}{56}, 0, -\frac{\sqrt{42}i}{96}, 0, 0, 0$
	0	$-\frac{\sqrt{42}i}{48}, 0, 0, -\frac{\sqrt{70}i}{224}, 0, 0, -\frac{\sqrt{42}}{56}, 0, -\frac{\sqrt{42}i}{96}, 0, 0, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{70}i}{224}, 0, -\frac{\sqrt{70}}{56}, \frac{\sqrt{70}i}{56}, 0, 0, -\frac{\sqrt{42}i}{96}, 0, \frac{\sqrt{42}}{84}, \frac{\sqrt{42}i}{48}, 0$
	0	$0, 0, \frac{\sqrt{70}i}{224}, 0, \frac{\sqrt{70}}{56}, 0, 0, -\frac{\sqrt{70}i}{56}, -\frac{\sqrt{42}i}{96}, 0, -\frac{\sqrt{42}}{84}, 0, 0, -\frac{\sqrt{42}i}{48}$
	0	$0, 0, 0, 0, \frac{3\sqrt{70}i}{224}, 0, 0, \frac{\sqrt{70}}{56}, 0, 0, -\frac{\sqrt{42}i}{96}, 0, 0, 0, \frac{\sqrt{42}}{84}$
	0	$0, 0, 0, 0, 0, -\frac{3\sqrt{70}i}{224}, -\frac{\sqrt{70}}{56}, 0, 0, 0, 0, \frac{\sqrt{42}i}{96}, -\frac{\sqrt{42}}{84}, 0$
617	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_{3,0}^{(1,1;a)}(E_u, 2)$	$-\frac{\sqrt{35}i}{35}$	$0, 0, 0, \frac{3\sqrt{21}}{112}, 0, \frac{3\sqrt{21}i}{112}, 0, 0, 0, -\frac{13\sqrt{35}}{560}, 0, \frac{13\sqrt{35}i}{560}, 0, 0$
	0	$\frac{\sqrt{35}i}{35}, -\frac{3\sqrt{21}}{112}, 0, \frac{3\sqrt{21}i}{112}, 0, 0, 0, \frac{13\sqrt{35}}{560}, 0, \frac{13\sqrt{35}i}{560}, 0, 0, 0$
	0	$0, 0, 0, \frac{3\sqrt{7}}{112}, 0, -\frac{3\sqrt{7}i}{112}, 0, 0, 0, \frac{11\sqrt{105}}{1680}, 0, \frac{11\sqrt{105}i}{1680}, 0, 0$
	0	$0, 0, -\frac{3\sqrt{7}}{112}, 0, -\frac{3\sqrt{7}i}{112}, 0, 0, 0, -\frac{11\sqrt{105}}{1680}, 0, \frac{11\sqrt{105}i}{1680}, 0, 0$
	0	$0, -\frac{\sqrt{105}}{120}, -\frac{\sqrt{7}i}{28}, 0, 0, 0, 0, -\frac{\sqrt{7}i}{56}, \frac{\sqrt{105}i}{420}, 0, 0, 0, 0, 0$
	$\frac{\sqrt{105}}{120}$	$0, 0, \frac{\sqrt{7}i}{28}, 0, 0, -\frac{\sqrt{7}i}{56}, 0, 0, -\frac{\sqrt{105}i}{420}, 0, 0, 0, 0$
	0	$0, -\frac{\sqrt{105}i}{120}, 0, 0, -\frac{\sqrt{7}i}{28}, 0, 0, -\frac{\sqrt{7}}{56}, 0, 0, 0, -\frac{\sqrt{105}i}{420}, 0, 0$
	$-\frac{\sqrt{105}i}{120}$	$0, 0, 0, 0, \frac{\sqrt{7}i}{28}, \frac{\sqrt{7}}{56}, 0, 0, 0, 0, 0, \frac{\sqrt{105}i}{420}, 0, 0$
	0	$0, 0, 0, -\frac{5\sqrt{7}i}{112}, 0, -\frac{5\sqrt{7}}{112}, \frac{\sqrt{7}i}{14}, 0, 0, -\frac{\sqrt{105}i}{80}, 0, \frac{\sqrt{105}}{80}, 0, 0$
	0	$0, 0, -\frac{5\sqrt{7}i}{112}, 0, \frac{5\sqrt{7}}{112}, 0, 0, -\frac{\sqrt{7}i}{14}, -\frac{\sqrt{105}i}{80}, 0, -\frac{\sqrt{105}}{80}, 0, 0$
618	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 2)$	$-\frac{\sqrt{21}i}{28}$	$0 \ 0 \ 0 \ -\frac{\sqrt{21}i}{28} \ 0 \ \frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{70} \ 0 \ \frac{\sqrt{35}}{70} \ -\frac{\sqrt{35}i}{35} \ 0$
	$-\frac{\sqrt{21}i}{28}$	$0 \ 0 \ -\frac{\sqrt{21}i}{28} \ 0 \ -\frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{70} \ 0 \ -\frac{\sqrt{35}}{70} \ 0 \ 0 \ \frac{\sqrt{35}i}{35}$
	$-\frac{\sqrt{7}i}{28}$	$0 \ 0 \ 0 \ -\frac{\sqrt{7}i}{28} \ 0 \ -\frac{\sqrt{7}}{28} \ \frac{\sqrt{7}i}{14} \ 0 \ 0 \ -\frac{\sqrt{105}i}{70} \ 0 \ \frac{\sqrt{105}}{70} \ 0 \ 0 \ 0$
	$-\frac{\sqrt{7}i}{28}$	$0 \ 0 \ -\frac{\sqrt{7}i}{28} \ 0 \ \frac{\sqrt{7}}{28} \ 0 \ 0 \ -\frac{\sqrt{7}i}{14} \ -\frac{\sqrt{105}i}{70} \ 0 \ -\frac{\sqrt{105}}{70} \ 0 \ 0 \ 0$
	$0$	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}i}{56} \ 0 \ 0 \ \frac{\sqrt{7}}{56} \ 0 \ 0 \ -\frac{\sqrt{105}i}{120} \ 0 \ 0 \ 0 \ -\frac{\sqrt{105}}{120}$
	$0$	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{7}i}{56} \ -\frac{\sqrt{7}}{56} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{105}i}{120} \ \frac{\sqrt{105}}{120} \ 0$
	$\frac{\sqrt{7}i}{56}$	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{7}i}{56} \ -\frac{\sqrt{105}i}{120} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{105}i}{120}$
	$-\frac{\sqrt{7}i}{56}$	$0 \ 0 \ 0 \ -\frac{\sqrt{7}i}{56} \ 0 \ 0 \ -\frac{\sqrt{7}i}{56} \ 0 \ 0 \ \frac{\sqrt{105}i}{120} \ 0 \ 0 \ -\frac{\sqrt{105}i}{120} \ 0$
	$-\frac{\sqrt{7}}{56}$	$0 \ 0 \ 0 \ -\frac{\sqrt{7}}{56} \ 0 \ \frac{\sqrt{7}i}{56} \ 0 \ 0 \ 0 \ -\frac{\sqrt{105}}{120} \ 0 \ -\frac{\sqrt{105}i}{120} \ 0 \ 0$
	$\frac{\sqrt{7}}{56}$	$0 \ 0 \ \frac{\sqrt{7}}{56} \ 0 \ \frac{\sqrt{7}i}{56} \ 0 \ 0 \ 0 \ \frac{\sqrt{105}}{120} \ 0 \ -\frac{\sqrt{105}i}{120} \ 0 \ 0 \ 0$
619	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{G}_2^{(a)}(A_{1u})$	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$\frac{\sqrt{70}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{70}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ \frac{\sqrt{42}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{70}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{42}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{70}}{56} \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{70}}{56} \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{56} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{70}}{56} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{70}}{28} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{70}}{28}$	
620	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,0}^{(a)}(E_u, 1)$		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\sqrt{3}xz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\mathbb{G}_{2,1}^{(a)}(E_u, 1)$
		$\sqrt{3}xy$
621	symmetry	
622	symmetry	

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{2,0}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
623	symmetry	$\begin{bmatrix} -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
625	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{80} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} \\ -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
626	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \end{bmatrix}$
627	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & 0 \end{bmatrix}$
628	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(a)}(E_u, 1)$	0 0 0 0 $-\frac{3\sqrt{14}}{112}$ 0 0 0 0 0 $\frac{\sqrt{210}}{112}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{14}}{112}$ 0 0 0 0 0 $\frac{\sqrt{210}}{112}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{13\sqrt{70}}{560}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{13\sqrt{70}}{560}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{40}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{70}}{40}$	
	$-\frac{\sqrt{70}}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{70}}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{80}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{42}}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}}{80}$ 0 0 0 0	
629	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{G}_{4,0}^{(a)}(E_u, 2)$	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 $\frac{\sqrt{5}}{10}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}}{10}$	
	0 0 0 0 $-\frac{\sqrt{3}}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{5}}{40}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{3}}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{5}}{40}$ 0 0 0	
	0 0 $-\frac{\sqrt{3}}{8}$ 0 0 0 0 0 $\frac{3\sqrt{5}}{40}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{3}}{8}$ 0 0 0 0 0 $\frac{3\sqrt{5}}{40}$ 0 0 0 0 0	
	$-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
630	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \end{bmatrix}$
631	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,0}^{(a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
632	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(a)}(E_u, 3)$	$\begin{bmatrix} -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
633	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{280} & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{210}i}{70} & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & \frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{42}}{84} \\ -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{42}}{84} & 0 \\ 0 & -\frac{\sqrt{42}}{84} & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
634	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 $\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ $-\frac{3\sqrt{70}}{140}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0	
	0 0 0 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}}{28}$	
	0 0 0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 $\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	$-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0	
635	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)$	0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{140}$ $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0	
	0 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{14}i}{28}$	
	0 $-\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
	$-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0	
636	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,0}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0	
	0 0 $\frac{3\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{210}}{280}$ 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 0 $-\frac{3\sqrt{210}}{280}$ 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0	
	0 0 $-\frac{\sqrt{210}i}{140}$ 0 $\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0	
637	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 0	
	0 0 $\frac{3\sqrt{210}i}{280}$ 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 $\frac{\sqrt{210}}{140}$ 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 $-\frac{\sqrt{210}}{140}$ 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 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 0 0 $\frac{3\sqrt{105}i}{560}$ 0 $\frac{3\sqrt{105}}{560}$ $\frac{2\sqrt{105}i}{105}$ 0 0 $\frac{3\sqrt{7}i}{112}$ 0 $-\frac{3\sqrt{7}}{112}$ 0 0	
	0 0 $\frac{3\sqrt{105}i}{560}$ 0 $-\frac{3\sqrt{105}}{560}$ 0 0 $-\frac{2\sqrt{105}i}{105}$ $\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{112}$ 0 0 0	
	0 0 0 $\frac{11\sqrt{35}i}{560}$ 0 $-\frac{11\sqrt{35}}{560}$ 0 0 0 $\frac{\sqrt{21}i}{112}$ 0 $\frac{\sqrt{21}}{112}$ $-\frac{\sqrt{21}i}{21}$ 0	
	0 0 $\frac{11\sqrt{35}i}{560}$ 0 $\frac{11\sqrt{35}}{560}$ 0 0 0 $\frac{\sqrt{21}i}{112}$ 0 $-\frac{\sqrt{21}}{112}$ 0 0 $\frac{\sqrt{21}i}{21}$	
	0 $-\frac{\sqrt{21}i}{56}$ 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 0 $\frac{\sqrt{21}}{56}$	
	$-\frac{\sqrt{21}i}{56}$ 0 0 0 $\frac{\sqrt{35}i}{140}$ $\frac{\sqrt{35}}{140}$ 0 0 0 0 $-\frac{\sqrt{21}i}{84}$ $-\frac{\sqrt{21}}{56}$ 0	
	0 $-\frac{\sqrt{21}}{56}$ $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 $-\frac{\sqrt{35}i}{140}$ $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 $-\frac{\sqrt{21}i}{56}$	
	$\frac{\sqrt{21}}{56}$ 0 0 $\frac{\sqrt{35}i}{140}$ 0 0 $-\frac{\sqrt{35}i}{140}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0	
	$-\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{35}}{560}$ 0 $\frac{\sqrt{35}i}{560}$ 0 0 0 $\frac{3\sqrt{21}}{112}$ 0 $-\frac{3\sqrt{21}i}{112}$ 0 0	
	0 $\frac{\sqrt{21}i}{21}$ $-\frac{\sqrt{35}}{560}$ 0 $\frac{\sqrt{35}i}{560}$ 0 0 0 $-\frac{3\sqrt{21}}{112}$ 0 $-\frac{3\sqrt{21}i}{112}$ 0 0 0	
639	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	0 0 $-\frac{5\sqrt{6}i}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{32}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}i}{96}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{2}i}{32}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ $\frac{\sqrt{30}i}{96}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2}i}{32}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 $-\frac{\sqrt{30}i}{96}$ 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{48}$ 0 0 $\frac{\sqrt{2}}{8}$ 0 $-\frac{\sqrt{2}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{32}$ 0 0	
	0 $\frac{\sqrt{30}i}{48}$ $-\frac{\sqrt{2}}{8}$ 0 $-\frac{\sqrt{2}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{32}$ 0 $\frac{\sqrt{2}}{8}$ 0 0 0 $-\frac{\sqrt{30}i}{32}$ 0 0 $\frac{\sqrt{30}i}{48}$ 0	
	0 0 $\frac{\sqrt{2}i}{32}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 0 $-\frac{\sqrt{30}i}{32}$ 0 0 0 0 $-\frac{\sqrt{30}i}{48}$	
	0 0 0 0 $-\frac{\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{30}i}{96}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{2}i}{32}$ $-\frac{\sqrt{2}}{8}$ 0 0 0 0 $-\frac{\sqrt{30}i}{96}$ 0 0	
640	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{30}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{96} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & \frac{\sqrt{30}i}{48} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & -\frac{\sqrt{30}i}{48} \\ \frac{\sqrt{30}i}{48} & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{48} & -\frac{\sqrt{2}}{32} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & \frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
641	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{224} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{11\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & -\frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}i}{224} & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{224} & \frac{\sqrt{210}}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{224} & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{672} & -\frac{\sqrt{210}i}{112} & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{210}}{672} & 0 & 0 & \frac{\sqrt{210}i}{112} \\ \frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{14}}{224} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{210}}{672} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{112} & \frac{\sqrt{14}}{224} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & \frac{5\sqrt{210}}{672} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{84} & -\frac{\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & -\frac{3\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{14}i}{224} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{3\sqrt{210}i}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
642	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	0 0 $\frac{3\sqrt{42}i}{224}$ 0 0 0 0 $-\frac{\sqrt{42}i}{42}$ $\frac{3\sqrt{70}i}{224}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{42}i}{224}$ 0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 $-\frac{3\sqrt{70}i}{224}$ 0 0 0 0	
	0 0 $\frac{11\sqrt{14}i}{224}$ 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ $\frac{\sqrt{210}i}{224}$ 0 0 0 0 $\frac{\sqrt{210}i}{84}$	
	0 0 0 $-\frac{11\sqrt{14}i}{224}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{210}i}{224}$ 0 0 $\frac{\sqrt{210}i}{84}$ 0	
	$-\frac{\sqrt{210}i}{112}$ 0 0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{224}$ 0 0 0 0 0 $-\frac{5\sqrt{210}i}{672}$ 0 0	
	0 $\frac{\sqrt{210}i}{112}$ $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{224}$ 0 0 0 0 $-\frac{5\sqrt{210}i}{672}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{14}i}{224}$ 0 $-\frac{\sqrt{14}}{56}$ $-\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{210}i}{672}$ 0 0 $-\frac{\sqrt{210}i}{112}$ 0	
	0 0 $\frac{3\sqrt{14}i}{224}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 $\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{210}i}{672}$ 0 0 0 0 $\frac{\sqrt{210}i}{112}$	
	0 $\frac{\sqrt{210}i}{84}$ 0 0 $\frac{\sqrt{14}i}{224}$ 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{3\sqrt{210}i}{224}$ 0 0 0	
	$\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{14}i}{224}$ $\frac{\sqrt{14}}{56}$ 0 0 0 0 $\frac{3\sqrt{210}i}{224}$ 0 0	
643	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 2)$	0 0 0 $\frac{5\sqrt{3}}{48}$ 0 $-\frac{5\sqrt{3}i}{48}$ 0 0 0 $-\frac{\sqrt{5}}{16}$ 0 $-\frac{\sqrt{5}i}{16}$ 0 0	
	0 0 $-\frac{5\sqrt{3}}{48}$ 0 $-\frac{5\sqrt{3}i}{48}$ 0 0 0 $\frac{\sqrt{5}}{16}$ 0 $-\frac{\sqrt{5}i}{16}$ 0 0 0	
	0 0 0 $-\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0 $-\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0	
	0 0 $\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0 $\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$	
	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$	
	$-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0	
	0 0 0 $-\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0 0 $-\frac{\sqrt{15}i}{48}$ 0 $-\frac{\sqrt{15}}{48}$ 0 0	
644	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{5\sqrt{3}i}{48} & 0 & -\frac{5\sqrt{3}}{48} & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & -\frac{\sqrt{5}}{16} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{3}i}{48} & 0 & \frac{5\sqrt{3}}{48} & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 \\ 0 & 0 & \frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 \\ 0 & 0 & \frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 \end{bmatrix}$
645	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,0}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}}{48} & 0 & -\frac{\sqrt{21}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{48} & 0 & -\frac{\sqrt{21}i}{48} & 0 & 0 & 0 & \frac{\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 & 0 & \frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{168} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} \\ -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} \\ \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{5\sqrt{105}i}{336} & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 \end{bmatrix}$
646	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{21}i}{168}$ 0 $\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{\sqrt{35}i}{56}$ 0 $-\frac{\sqrt{35}}{56}$ 0 0	
	0 0 $-\frac{\sqrt{21}i}{168}$ 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{\sqrt{35}i}{56}$ 0 $\frac{\sqrt{35}}{56}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0	
	0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{105}i}{168}$ 0 $-\frac{\sqrt{105}}{168}$ 0 0 0	
	0 $\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 $\frac{\sqrt{105}}{168}$	
	$\frac{\sqrt{105}i}{84}$ 0 0 0 $\frac{\sqrt{7}i}{56}$ $\frac{\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{105}}{168}$ 0	
	0 $-\frac{\sqrt{105}}{84}$ $\frac{\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{56}$ $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{168}$	
	$\frac{\sqrt{105}}{84}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0	
647	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$
$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 1)$	0 0 0 $\frac{3\sqrt{385}i}{616}$ 0 $\frac{3\sqrt{385}}{616}$ $\frac{\sqrt{385}i}{77}$ 0 0 $\frac{5\sqrt{231}i}{616}$ 0 $-\frac{5\sqrt{231}}{616}$ 0 0	
	0 0 $\frac{3\sqrt{385}i}{616}$ 0 $-\frac{3\sqrt{385}}{616}$ 0 0 $-\frac{\sqrt{385}i}{77}$ $\frac{5\sqrt{231}i}{616}$ 0 $\frac{5\sqrt{231}}{616}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{1155}i}{924}$ 0 $\frac{\sqrt{1155}}{924}$ 0 0 0 $-\frac{\sqrt{77}i}{308}$ 0 $-\frac{\sqrt{77}}{308}$ 0 $-\frac{\sqrt{77}i}{308}$ 0	
	0 0 $-\frac{\sqrt{1155}i}{924}$ 0 $-\frac{\sqrt{1155}}{924}$ 0 0 0 $-\frac{\sqrt{77}i}{308}$ 0 $\frac{\sqrt{77}}{308}$ 0 0 $-\frac{\sqrt{77}i}{154}$	
	0 $\frac{\sqrt{77}i}{154}$ 0 0 $\frac{\sqrt{1155}i}{308}$ 0 0 $-\frac{\sqrt{1155}}{231}$ $\frac{\sqrt{1155}}{231}$ 0 0 $-\frac{5\sqrt{77}i}{308}$ 0 0 $-\frac{\sqrt{77}}{154}$	
	$\frac{\sqrt{77}i}{154}$ 0 0 0 $-\frac{\sqrt{1155}i}{308}$ $\frac{\sqrt{1155}}{231}$ 0 0 0 0 $\frac{5\sqrt{77}i}{308}$ $\frac{\sqrt{77}}{154}$ 0	
	0 $\frac{\sqrt{77}}{154}$ $\frac{\sqrt{1155}i}{308}$ 0 0 0 0 $-\frac{\sqrt{1155}i}{231}$ $\frac{5\sqrt{77}i}{308}$ 0 0 0 0 $\frac{\sqrt{77}i}{154}$	
	$-\frac{\sqrt{77}}{154}$ 0 0 $-\frac{\sqrt{1155}i}{308}$ 0 0 $-\frac{\sqrt{1155}i}{231}$ 0 0 $-\frac{5\sqrt{77}i}{308}$ 0 0 0 $\frac{\sqrt{77}i}{154}$	
	$\frac{\sqrt{77}i}{154}$ 0 0 $-\frac{\sqrt{1155}}{1848}$ 0 $-\frac{\sqrt{1155}i}{1848}$ 0 0 0 $-\frac{3\sqrt{77}}{616}$ 0 $\frac{3\sqrt{77}i}{616}$ 0 0 0	
	0 $-\frac{\sqrt{77}i}{154}$ $\frac{\sqrt{1155}}{1848}$ 0 $-\frac{\sqrt{1155}i}{1848}$ 0 0 0 $\frac{3\sqrt{77}}{616}$ 0 $\frac{3\sqrt{77}i}{616}$ 0 0 0	
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
	$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \end{bmatrix}$
649	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 3)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{110}}{220} & \frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{220} \\ \frac{3\sqrt{110}}{220} & 0 & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 \\ 0 & -\frac{\sqrt{330}}{440} & -\frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & -\frac{\sqrt{330}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & \\ \frac{\sqrt{330}}{440} & 0 & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 \\ -\frac{\sqrt{330}i}{110} & 0 & 0 & \frac{\sqrt{22}}{176} & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & \frac{7\sqrt{330}}{880} & 0 & -\frac{\sqrt{330}i}{176} & 0 & 0 & \\ 0 & \frac{\sqrt{330}i}{110} & -\frac{\sqrt{22}}{176} & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{7\sqrt{330}}{880} & 0 & -\frac{\sqrt{330}i}{176} & 0 & 0 & 0 & \\ 0 & 0 & 0 & -\frac{5\sqrt{22}i}{176} & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{3\sqrt{330}i}{880} & 0 & -\frac{\sqrt{330}}{176} & \frac{\sqrt{330}i}{110} & 0 & \\ 0 & 0 & -\frac{5\sqrt{22}i}{176} & 0 & -\frac{3\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{3\sqrt{330}i}{880} & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & -\frac{\sqrt{330}i}{110} & \\ 0 & \frac{\sqrt{330}i}{440} & 0 & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & -\frac{\sqrt{330}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} \\ \frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}i}{176} & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{176} & \frac{\sqrt{330}}{440} & 0 & \end{bmatrix}$
650	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \end{bmatrix}$
651	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{440} & 0 & 0 & \frac{3\sqrt{110}}{220} \\ \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{440} & -\frac{3\sqrt{110}}{220} & 0 \\ 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & -\frac{3\sqrt{22}i}{176} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & 0 & \frac{\sqrt{330}}{440} \\ -\frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{176} & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{176} & -\frac{\sqrt{330}}{440} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{22}i}{176} & 0 & \frac{5\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{176} & 0 & -\frac{3\sqrt{330}}{880} & \frac{\sqrt{330}i}{110} & 0 \\ 0 & 0 & -\frac{3\sqrt{22}i}{176} & 0 & -\frac{5\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{176} & 0 & \frac{3\sqrt{330}}{880} & 0 & 0 & -\frac{\sqrt{330}i}{110} \\ \frac{\sqrt{330}i}{110} & 0 & 0 & -\frac{3\sqrt{22}}{176} & 0 & -\frac{\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{176} & 0 & \frac{7\sqrt{330}i}{880} & 0 & 0 \\ 0 & -\frac{\sqrt{330}i}{110} & \frac{3\sqrt{22}}{176} & 0 & -\frac{\sqrt{22}i}{176} & 0 & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & \frac{7\sqrt{330}i}{880} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{330}}{440} & -\frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & -\frac{\sqrt{330}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} \\ \frac{\sqrt{330}}{440} & 0 & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} \end{bmatrix}$
652	symmetry	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \end{bmatrix}$
	653 symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$
	$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{48} & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & \frac{\sqrt{2}}{8} & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{21}yz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$
654	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,0}^{(1,-1;a)}(E_u, 2)$	$0 - \frac{\sqrt{11}i}{44} 0 0 -\frac{\sqrt{165}i}{88} 0 0 \frac{\sqrt{165}}{66} 0 0 \frac{5\sqrt{11}i}{88} 0 0 \frac{\sqrt{11}}{44}$	
	$-\frac{\sqrt{11}i}{44} 0 0 0 0 \frac{\sqrt{165}i}{88} -\frac{\sqrt{165}}{66} 0 0 0 0 0 -\frac{5\sqrt{11}i}{88} -\frac{\sqrt{11}}{44} 0$	
	$0 0 0 0 -\frac{\sqrt{55}i}{132} 0 0 \frac{\sqrt{55}}{132} 0 0 0 \frac{\sqrt{33}i}{132} 0 0 \frac{\sqrt{33}}{132}$	
	$0 0 0 0 0 \frac{\sqrt{55}i}{132} -\frac{\sqrt{55}}{132} 0 0 0 0 0 -\frac{\sqrt{33}i}{132} -\frac{\sqrt{33}}{132} 0$	
	$0 0 0 \frac{\sqrt{55}i}{264} 0 \frac{5\sqrt{55}}{264} \frac{\sqrt{55}i}{33} 0 0 0 \frac{\sqrt{33}i}{88} 0 -\frac{7\sqrt{33}}{264} \frac{\sqrt{33}i}{66} 0$	
	$0 0 \frac{\sqrt{55}i}{264} 0 -\frac{5\sqrt{55}}{264} 0 0 0 -\frac{\sqrt{55}i}{33} \frac{\sqrt{33}i}{88} 0 \frac{7\sqrt{33}}{264} 0 0 -\frac{\sqrt{33}i}{66}$	
	$-\frac{\sqrt{33}i}{66} 0 0 \frac{\sqrt{55}}{264} 0 \frac{\sqrt{55}i}{264} 0 0 0 0 \frac{\sqrt{33}}{88} 0 -\frac{\sqrt{33}i}{88} 0 0 0$	
	$0 \frac{\sqrt{33}i}{66} -\frac{\sqrt{55}}{264} 0 \frac{\sqrt{55}i}{264} 0 0 0 0 -\frac{\sqrt{33}}{88} 0 -\frac{\sqrt{33}i}{88} 0 0 0 0$	
	$0 \frac{\sqrt{33}}{132} \frac{\sqrt{55}i}{264} 0 0 0 0 -\frac{\sqrt{55}i}{132} \frac{\sqrt{33}i}{88} 0 0 0 0 0 0$	
	$-\frac{\sqrt{33}}{132} 0 0 -\frac{\sqrt{55}i}{264} 0 0 0 -\frac{\sqrt{55}i}{132} 0 0 0 -\frac{\sqrt{33}i}{88} 0 0 0 0$	
655	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 2)$	$0 \frac{\sqrt{11}}{44} \frac{\sqrt{165}i}{88} 0 0 0 0 -\frac{\sqrt{165}i}{66} \frac{5\sqrt{11}i}{88} 0 0 0 0 0 \frac{\sqrt{11}i}{44}$	
	$-\frac{\sqrt{11}}{44} 0 0 -\frac{\sqrt{165}i}{88} 0 0 -\frac{\sqrt{165}i}{66} 0 0 -\frac{5\sqrt{11}i}{88} 0 0 0 \frac{\sqrt{11}i}{44} 0$	
	$0 0 -\frac{\sqrt{55}i}{132} 0 0 0 0 \frac{\sqrt{55}i}{132} -\frac{\sqrt{33}i}{132} 0 0 0 0 0 -\frac{\sqrt{33}i}{132}$	
	$0 0 0 \frac{\sqrt{55}i}{132} 0 0 \frac{\sqrt{55}i}{132} 0 0 0 \frac{\sqrt{33}i}{132} 0 0 0 -\frac{\sqrt{33}i}{132} 0$	
	$\frac{\sqrt{33}i}{66} 0 0 -\frac{\sqrt{55}}{264} 0 -\frac{\sqrt{55}i}{264} 0 0 0 0 -\frac{\sqrt{33}}{88} 0 \frac{\sqrt{33}i}{88} 0 0 0$	
	$0 -\frac{\sqrt{33}i}{66} \frac{\sqrt{55}}{264} 0 -\frac{\sqrt{55}i}{264} 0 0 0 \frac{\sqrt{33}}{88} 0 \frac{\sqrt{33}i}{88} 0 0 0 0$	
	$0 0 0 -\frac{5\sqrt{55}i}{264} 0 -\frac{\sqrt{55}}{264} -\frac{\sqrt{55}i}{33} 0 0 0 -\frac{7\sqrt{33}i}{264} 0 \frac{\sqrt{33}}{88} \frac{\sqrt{33}i}{66} 0$	
	$0 0 -\frac{5\sqrt{55}i}{264} 0 \frac{\sqrt{55}}{264} 0 0 \frac{\sqrt{55}i}{33} -\frac{7\sqrt{33}i}{264} 0 -\frac{\sqrt{33}}{88} 0 0 0 -\frac{\sqrt{33}i}{66}$	
	$0 -\frac{\sqrt{33}i}{132} 0 0 -\frac{\sqrt{55}i}{264} 0 0 \frac{\sqrt{55}}{132} 0 0 0 \frac{\sqrt{33}i}{88} 0 0 0 0$	
	$-\frac{\sqrt{33}i}{132} 0 0 0 0 \frac{\sqrt{55}i}{264} -\frac{\sqrt{55}}{132} 0 0 0 0 0 -\frac{\sqrt{33}i}{88} 0 0 0 0$	
656	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,0}^{(1,-1;a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{88}$ 0 0 0 $\frac{\sqrt{33}}{88}$ 0 $\frac{\sqrt{33}i}{88}$ 0 0	
	0 0 $\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{88}$ 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 $\frac{\sqrt{33}i}{88}$ 0 0 0	
	$-\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{165}}{264}$ 0 $\frac{\sqrt{165}i}{264}$ 0 0 0 $\frac{3\sqrt{11}}{88}$ 0 $-\frac{3\sqrt{11}i}{88}$ 0 0	
	0 $\frac{\sqrt{11}i}{22}$ $-\frac{\sqrt{165}}{264}$ 0 $\frac{\sqrt{165}i}{264}$ 0 0 0 $-\frac{3\sqrt{11}}{88}$ 0 $-\frac{3\sqrt{11}i}{88}$ 0 0 0	
	0 $\frac{\sqrt{11}}{22}$ $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{\sqrt{11}i}{22}$	
	$-\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 $-\frac{\sqrt{11}i}{22}$ 0	
	0 $-\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 $-\frac{\sqrt{11}}{22}$	
	$-\frac{\sqrt{11}i}{22}$ 0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ $\frac{\sqrt{11}}{22}$ 0	
	0 0 0 $\frac{\sqrt{165}i}{132}$ 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 $\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{22}$ 0	
	0 0 $\frac{\sqrt{165}i}{132}$ 0 $\frac{\sqrt{165}}{132}$ 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{11}i}{22}$	
657	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{55}i}{88}$ 0 $\frac{\sqrt{55}}{88}$ 0 0 0 $-\frac{\sqrt{33}i}{88}$ 0 $\frac{\sqrt{33}}{88}$ 0 0	
	0 0 $\frac{\sqrt{55}i}{88}$ 0 $-\frac{\sqrt{55}}{88}$ 0 0 0 $-\frac{\sqrt{33}i}{88}$ 0 $-\frac{\sqrt{33}}{88}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{165}i}{132}$ 0 $\frac{\sqrt{165}}{132}$ 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 $-\frac{\sqrt{11}}{44}$ $\frac{\sqrt{11}i}{22}$ 0	
	0 0 $-\frac{\sqrt{165}i}{132}$ 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 $\frac{\sqrt{11}}{44}$ 0 0 $-\frac{\sqrt{11}i}{22}$	
	$0 -\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 $-\frac{\sqrt{11}}{22}$	
	$-\frac{\sqrt{11}i}{22}$ 0 0 0 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ $\frac{\sqrt{11}}{22}$ 0	
	0 $-\frac{\sqrt{11}i}{22}$ $\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 $\frac{\sqrt{11}i}{22}$	
	$\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 0 0 $\frac{\sqrt{11}i}{22}$	
	$-\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{165}}{264}$ 0 $\frac{\sqrt{165}i}{264}$ 0 0 0 $\frac{3\sqrt{11}}{88}$ 0 $-\frac{3\sqrt{11}i}{88}$ 0 0 0	
	0 $\frac{\sqrt{11}i}{22}$ $-\frac{\sqrt{165}}{264}$ 0 $\frac{\sqrt{165}i}{264}$ 0 0 0 $-\frac{3\sqrt{11}}{88}$ 0 $-\frac{3\sqrt{11}i}{88}$ 0 0 0	
658	symmetry	$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,0}^{(1,-1;a)}(E_u, 4)$	$\frac{\sqrt{110}i}{55}$	0 0 0 $-\frac{\sqrt{66}}{132}$ 0 $-\frac{\sqrt{66}i}{132}$ 0 0 0 $-\frac{3\sqrt{110}}{220}$ 0 $\frac{3\sqrt{110}i}{220}$ 0 0
	0	$-\frac{\sqrt{110}i}{55}$ $\frac{\sqrt{66}}{132}$ 0 $-\frac{\sqrt{66}i}{132}$ 0 0 0 $\frac{3\sqrt{110}}{220}$ 0 $\frac{3\sqrt{110}i}{220}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{22}}{528}$ 0 $-\frac{\sqrt{22}i}{528}$ 0 0 0 $-\frac{\sqrt{330}}{2640}$ 0 $-\frac{\sqrt{330}i}{2640}$ 0 0
	0	0 0 $-\frac{\sqrt{22}}{528}$ 0 $-\frac{\sqrt{22}i}{528}$ 0 0 0 $\frac{\sqrt{330}}{2640}$ 0 $-\frac{\sqrt{330}i}{2640}$ 0 0 0
	0	$-\frac{\sqrt{330}}{165}$ $-\frac{\sqrt{22}i}{66}$ 0 0 0 0 $\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{330}i}{110}$ 0 0 0 0 0
	$\frac{\sqrt{330}}{165}$	0 0 0 $\frac{\sqrt{22}i}{66}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{330}i}{110}$ 0 0 0 0
	0	$-\frac{\sqrt{330}i}{165}$ 0 0 $-\frac{\sqrt{22}i}{66}$ 0 0 $\frac{\sqrt{22}}{33}$ 0 0 $\frac{\sqrt{330}i}{110}$ 0 0 0
	$-\frac{\sqrt{330}i}{165}$	0 0 0 0 $\frac{\sqrt{22}i}{66}$ $-\frac{\sqrt{22}}{33}$ 0 0 0 0 0 $-\frac{\sqrt{330}i}{110}$ 0 0
	0	0 0 0 $\frac{5\sqrt{22}i}{528}$ 0 $\frac{5\sqrt{22}}{528}$ $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{330}i}{240}$ 0 $-\frac{\sqrt{330}}{240}$ 0 0
	0	0 0 $\frac{5\sqrt{22}i}{528}$ 0 $-\frac{5\sqrt{22}}{528}$ 0 0 $-\frac{\sqrt{22}i}{33}$ $\frac{\sqrt{330}i}{240}$ 0 $\frac{\sqrt{330}}{240}$ 0 0 0
659	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 4)$	0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 $\frac{\sqrt{66}}{66}$ 0 0 0 $-\frac{\sqrt{110}i}{110}$ 0 $-\frac{\sqrt{110}}{110}$ $\frac{\sqrt{110}i}{55}$ 0	
	0 0 $-\frac{\sqrt{66}i}{66}$ 0 $-\frac{\sqrt{66}}{66}$ 0 0 0 $-\frac{\sqrt{110}i}{110}$ 0 $\frac{\sqrt{110}}{110}$ 0 0 $-\frac{\sqrt{110}i}{55}$	
	0 0 0 $\frac{7\sqrt{22}i}{528}$ 0 $\frac{7\sqrt{22}}{528}$ $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{3\sqrt{330}i}{880}$ 0 $-\frac{3\sqrt{330}}{880}$ 0 0 0	
	0 0 $\frac{7\sqrt{22}i}{528}$ 0 $-\frac{7\sqrt{22}}{528}$ 0 0 $-\frac{\sqrt{22}i}{33}$ $\frac{3\sqrt{330}i}{880}$ 0 $\frac{3\sqrt{330}}{880}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{22}}{33}$ 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 0 $-\frac{\sqrt{330}}{165}$	
	0 0 0 0 0 $-\frac{\sqrt{22}i}{33}$ $\frac{\sqrt{22}}{33}$ 0 0 0 0 $\frac{\sqrt{330}i}{165}$ $\frac{\sqrt{330}}{165}$ 0	
	0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 0 0 $\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{330}i}{165}$ 0 0 0 0 $-\frac{\sqrt{330}i}{165}$	
	0 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{330}i}{165}$ 0 0 0 $-\frac{\sqrt{330}i}{165}$	
	0 0 0 $\frac{\sqrt{22}}{528}$ 0 $-\frac{\sqrt{22}i}{528}$ 0 0 0 $-\frac{\sqrt{330}}{2640}$ 0 $-\frac{\sqrt{330}i}{2640}$ 0 0	
	0 0 $-\frac{\sqrt{22}}{528}$ 0 $-\frac{\sqrt{22}i}{528}$ 0 0 0 $\frac{\sqrt{330}}{2640}$ 0 $-\frac{\sqrt{330}i}{2640}$ 0 0 0	
660	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{G}_2^{(1,0;a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & \frac{\sqrt{35}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
661	symmetry	$\sqrt{3}yz$
$\mathbb{G}_{2,0}^{(1,0;a)}(E_u, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{105}}{84} \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & -\frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 \end{bmatrix}$
662	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 1)$	0	$\frac{\sqrt{105}}{84}, \frac{\sqrt{7}i}{56}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{105}i}{168}, 0, 0, 0, 0, \frac{\sqrt{105}i}{84}$
	$-\frac{\sqrt{105}}{84}$	$0, 0, -\frac{\sqrt{7}i}{56}, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{105}i}{168}, 0, 0, \frac{\sqrt{105}i}{84}, 0$
	0	$\frac{\sqrt{35}}{28}, \frac{\sqrt{21}i}{168}, 0, 0, 0, 0, \frac{\sqrt{21}i}{84}, -\frac{\sqrt{35}i}{56}, 0, 0, 0, 0, 0, 0$
	$-\frac{\sqrt{35}}{28}$	$0, 0, -\frac{\sqrt{21}i}{168}, 0, 0, \frac{\sqrt{21}i}{84}, 0, 0, 0, \frac{\sqrt{35}i}{56}, 0, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{21}}{84}, 0, -\frac{\sqrt{21}i}{42}, 0, 0, 0, \frac{\sqrt{35}}{28}, 0, 0, 0, 0$
	0	$0, 0, -\frac{\sqrt{21}}{84}, 0, -\frac{\sqrt{21}i}{42}, 0, 0, 0, -\frac{\sqrt{35}}{28}, 0, 0, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{21}i}{42}, 0, -\frac{\sqrt{21}}{42}, \frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, 0, 0, 0$
	0	$0, 0, \frac{\sqrt{21}i}{42}, 0, \frac{\sqrt{21}}{42}, 0, 0, -\frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, 0, 0$
	0	$0, 0, 0, 0, -\frac{\sqrt{21}i}{42}, 0, 0, \frac{\sqrt{21}}{84}, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{35}}{28}$
	0	$0, 0, 0, 0, 0, \frac{\sqrt{21}i}{42}, -\frac{\sqrt{21}}{84}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{35}}{28}, 0$
663	symmetry	$\sqrt{3}xy$
$\mathbb{G}_{2,0}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{105}i}{42}$	$0, 0, 0, \frac{\sqrt{7}}{56}, 0, \frac{\sqrt{7}i}{56}, 0, 0, 0, \frac{\sqrt{105}}{168}, 0, -\frac{\sqrt{105}i}{168}, 0, 0$
	0	$-\frac{\sqrt{105}i}{42}, -\frac{\sqrt{7}}{56}, 0, \frac{\sqrt{7}i}{56}, 0, 0, 0, -\frac{\sqrt{105}}{168}, 0, -\frac{\sqrt{105}i}{168}, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{21}}{168}, 0, -\frac{\sqrt{21}i}{168}, 0, 0, 0, -\frac{\sqrt{35}}{56}, 0, -\frac{\sqrt{35}i}{56}, 0, 0$
	0	$0, 0, -\frac{\sqrt{21}}{168}, 0, -\frac{\sqrt{21}i}{168}, 0, 0, 0, \frac{\sqrt{35}}{56}, 0, -\frac{\sqrt{35}i}{56}, 0, 0, 0$
	0	$0, 0, -\frac{\sqrt{21}i}{84}, 0, 0, 0, 0, \frac{\sqrt{21}i}{42}, \frac{\sqrt{35}i}{28}, 0, 0, 0, 0, 0, 0$
	0	$0, 0, 0, \frac{\sqrt{21}i}{84}, 0, 0, \frac{\sqrt{21}i}{42}, 0, 0, -\frac{\sqrt{35}i}{28}, 0, 0, 0, 0, 0$
	0	$0, 0, 0, 0, -\frac{\sqrt{21}i}{84}, 0, 0, \frac{\sqrt{21}}{42}, 0, 0, 0, -\frac{\sqrt{35}i}{28}, 0, 0, 0$
	0	$0, 0, 0, 0, -\frac{\sqrt{21}i}{42}, 0, -\frac{\sqrt{21}}{42}, \frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, 0, 0$
	0	$0, 0, 0, -\frac{\sqrt{21}i}{42}, 0, -\frac{\sqrt{21}}{42}, \frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, 0, 0, 0$
	0	$0, 0, -\frac{\sqrt{21}i}{42}, 0, \frac{\sqrt{21}}{42}, 0, 0, -\frac{\sqrt{21}i}{42}, 0, 0, 0, 0, 0, 0, 0$
664	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{168} & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{168} & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & \frac{\sqrt{35}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	
		$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}i}{112} & 0 & \frac{3\sqrt{7}}{112} & 0 & 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}i}{112} & 0 & -\frac{3\sqrt{7}}{112} & 0 & 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & \frac{\sqrt{105}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & 0 & \frac{13\sqrt{35}i}{560} & 0 & \frac{13\sqrt{35}}{560} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & 0 & \frac{13\sqrt{35}i}{560} & 0 & -\frac{13\sqrt{35}}{560} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} \\ \frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 \\ 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{40} \\ -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{40} \\ 0 & 0 & 0 & \frac{3\sqrt{21}}{112} & 0 & \frac{3\sqrt{21}i}{112} & 0 & 0 & 0 & \frac{\sqrt{35}}{80} & 0 & -\frac{\sqrt{35}i}{80} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{21}}{112} & 0 & \frac{3\sqrt{21}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{35}}{80} & 0 & -\frac{\sqrt{35}i}{80} & 0 & 0 & 0 \end{bmatrix}$	
		$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 2)$	0	$\frac{\sqrt{6}}{20} \quad \frac{9\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{6}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{20}$
	$-\frac{\sqrt{6}}{20}$	$0 \quad 0 \quad 0 \quad -\frac{9\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{6}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{20} \quad 0$
	$0$	$\frac{\sqrt{2}}{20} \quad \frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad \frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20}$
	$-\frac{\sqrt{2}}{20}$	$0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20} \quad 0$
	$-\frac{3\sqrt{2}i}{80}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{40} \quad 0 \quad -\frac{13\sqrt{2}i}{160} \quad 0 \quad 0 \quad 0$
	$0$	$\frac{3\sqrt{2}i}{80} \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad -\frac{13\sqrt{2}i}{160} \quad 0 \quad 0 \quad 0 \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{160} \quad 0 \quad \frac{\sqrt{2}}{20} \quad \frac{3\sqrt{2}i}{80} \quad 0$
	$0$	$0 \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{160} \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{80}$
	$0$	$-\frac{\sqrt{2}i}{20} \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{20}$
	$-\frac{\sqrt{2}i}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}i}{160} \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{32} \quad -\frac{\sqrt{2}}{20} \quad 0$
667	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{G}_4^{(1,0;a)}(A_{2u})$	0	$-\frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad -\frac{9\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{6}i}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{20}$
	$-\frac{\sqrt{6}i}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{10}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{6}i}{160} \quad \frac{\sqrt{6}}{20} \quad 0$
	$0$	$\frac{\sqrt{2}i}{20} \quad 0 \quad 0 \quad \frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20}$
	$\frac{\sqrt{2}i}{20}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{32} \quad \frac{\sqrt{2}}{20} \quad 0$
	$0$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20} \quad 0 \quad -\frac{\sqrt{2}}{160} \quad \frac{3\sqrt{2}i}{80} \quad 0$
	$0$	$0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad -\frac{\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20} \quad 0 \quad \frac{\sqrt{2}}{160} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{80}$
	$\frac{3\sqrt{2}i}{80}$	$0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{2}}{160} \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0$
	$0$	$-\frac{3\sqrt{2}i}{80} \quad -\frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{2}}{160} \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad 0 \quad 0$
	$0$	$\frac{\sqrt{2}}{20} \quad \frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad \frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20}$
	$-\frac{\sqrt{2}}{20}$	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{32} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20} \quad 0$
668	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,0}^{(1,0;a)}(E_u, 1)$	0	$-\frac{3\sqrt{42}i}{140}$
	$-\frac{3\sqrt{42}i}{140}$	0
	0	$-\frac{\sqrt{14}i}{28}$
	$-\frac{\sqrt{14}i}{28}$	0
	0	$\frac{\sqrt{210}i}{280}$
	$-\frac{\sqrt{14}i}{80}$	$\frac{\sqrt{210}i}{280}$
	0	$\frac{\sqrt{14}i}{80}$
	0	$-\frac{3\sqrt{210}i}{1120}$
	0	$\frac{3\sqrt{210}i}{1120}$
	0	$\frac{3\sqrt{210}i}{1120}$
669	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 1)$	0	$\frac{3\sqrt{42}}{140}$
	$-\frac{3\sqrt{42}}{140}$	0
	0	$-\frac{\sqrt{14}}{28}$
	$\frac{\sqrt{14}}{28}$	0
	$\frac{\sqrt{14}i}{80}$	0
	0	$-\frac{\sqrt{14}i}{80}$
	0	$-\frac{3\sqrt{210}i}{1120}$
	0	$\frac{3\sqrt{210}i}{1120}$
	0	$-\frac{3\sqrt{210}i}{1120}$
	0	$\frac{3\sqrt{210}i}{1120}$
670	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,0}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{3\sqrt{5}}{80}$ 0 $-\frac{3\sqrt{5}i}{80}$ 0 0 0 $-\frac{3\sqrt{3}}{80}$ 0 $-\frac{3\sqrt{3}i}{80}$ 0 0	
	0 0 $-\frac{3\sqrt{5}}{80}$ 0 $-\frac{3\sqrt{5}i}{80}$ 0 0 0 $\frac{3\sqrt{3}}{80}$ 0 $-\frac{3\sqrt{3}i}{80}$ 0 0 0	
	$\frac{i}{5}$ 0 0 $\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0	
	0 $-\frac{i}{5}$ $-\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $-\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0	
	0 $-\frac{1}{40}$ $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{3i}{20}$ 0 0 0 0 $\frac{i}{40}$	
	$\frac{1}{40}$ 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $-\frac{3i}{20}$ 0 0 $\frac{i}{40}$ 0	
	0 $\frac{i}{40}$ 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{3i}{20}$ 0 0 $\frac{1}{40}$	
	$\frac{i}{40}$ 0 0 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $-\frac{3i}{20}$ $-\frac{1}{40}$ 0	
	0 0 0 $\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $\frac{i}{16}$ 0 $\frac{1}{16}$ $\frac{i}{5}$ 0	
	0 0 $\frac{\sqrt{15}i}{80}$ 0 $\frac{\sqrt{15}}{80}$ 0 0 0 $-\frac{1}{16}$ 0 $-\frac{1}{16}$ 0 0 $-\frac{i}{5}$	
671	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{5}i}{80}$ 0 $-\frac{3\sqrt{5}}{80}$ 0 0 0 $\frac{3\sqrt{3}i}{80}$ 0 $-\frac{3\sqrt{3}}{80}$ 0 0	
	0 0 $-\frac{3\sqrt{5}i}{80}$ 0 $\frac{3\sqrt{5}}{80}$ 0 0 0 $\frac{3\sqrt{3}i}{80}$ 0 $\frac{3\sqrt{3}}{80}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{15}i}{80}$ 0 $\frac{\sqrt{15}}{80}$ 0 0 0 $-\frac{i}{16}$ 0 $-\frac{1}{16}$ $-\frac{i}{5}$ 0	
	0 0 $-\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $-\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0 $\frac{i}{5}$	
	0 $\frac{i}{40}$ 0 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{3i}{20}$ 0 0 $\frac{1}{40}$	
	$\frac{i}{40}$ 0 0 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $-\frac{3i}{20}$ $-\frac{1}{40}$ 0	
	0 $\frac{1}{40}$ $\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $-\frac{3i}{20}$ 0 0 0 0 $-\frac{i}{40}$	
	$-\frac{1}{40}$ 0 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 $\frac{3i}{20}$ 0 0 0 $-\frac{i}{40}$ 0	
	$\frac{i}{5}$ 0 0 $\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0	
	0 $-\frac{i}{5}$ $-\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $-\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0	
672	symmetry	$-\frac{\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,0}^{(1,0;a)}(E_u, 3)$	$\frac{\sqrt{21}i}{35} 0 0 \frac{3\sqrt{35}}{112} 0 \frac{3\sqrt{35}i}{112} 0 0 0 -\frac{3\sqrt{21}}{560} 0 \frac{3\sqrt{21}i}{560} 0 0$	
	$0 -\frac{\sqrt{21}i}{35} -\frac{3\sqrt{35}}{112} 0 \frac{3\sqrt{35}i}{112} 0 0 0 \frac{3\sqrt{21}}{560} 0 \frac{3\sqrt{21}i}{560} 0 0 0$	
	$0 0 0 \frac{\sqrt{105}}{112} 0 -\frac{\sqrt{105}i}{112} 0 0 0 \frac{37\sqrt{7}}{560} 0 \frac{37\sqrt{7}i}{560} 0 0 0$	
	$0 0 -\frac{\sqrt{105}}{112} 0 -\frac{\sqrt{105}i}{112} 0 0 0 -\frac{37\sqrt{7}}{560} 0 \frac{37\sqrt{7}i}{560} 0 0 0$	
	$0 \frac{\sqrt{7}}{40} \frac{\sqrt{105}i}{140} 0 0 0 0 \frac{3\sqrt{105}i}{280} -\frac{\sqrt{7}i}{140} 0 0 0 0 -\frac{\sqrt{7}i}{20}$	
	$-\frac{\sqrt{7}}{40} 0 0 -\frac{\sqrt{105}i}{140} 0 0 \frac{3\sqrt{105}i}{280} 0 0 \frac{\sqrt{7}i}{140} 0 0 -\frac{\sqrt{7}i}{20} 0$	
	$0 \frac{\sqrt{7}i}{40} 0 0 \frac{\sqrt{105}i}{140} 0 0 \frac{3\sqrt{105}}{280} 0 0 \frac{\sqrt{7}i}{140} 0 0 \frac{\sqrt{7}}{20}$	
	$\frac{\sqrt{7}i}{40} 0 0 0 -\frac{\sqrt{105}i}{140} -\frac{3\sqrt{105}}{280} 0 0 0 0 -\frac{\sqrt{7}i}{140} -\frac{\sqrt{7}}{20} 0$	
	$0 0 0 \frac{\sqrt{105}i}{560} 0 \frac{\sqrt{105}}{560} -\frac{\sqrt{105}i}{70} 0 0 -\frac{\sqrt{7}i}{80} 0 \frac{\sqrt{7}}{80} 0 0$	
	$0 0 \frac{\sqrt{105}i}{560} 0 -\frac{\sqrt{105}}{560} 0 0 \frac{\sqrt{105}i}{70} -\frac{\sqrt{7}i}{80} 0 -\frac{\sqrt{7}}{80} 0 0 0$	
673	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 3)$	$0 0 0 -\frac{3\sqrt{35}i}{280} 0 \frac{3\sqrt{35}}{280} 0 0 0 \frac{9\sqrt{21}i}{280} 0 \frac{9\sqrt{21}}{280} \frac{\sqrt{21}i}{35} 0$	
	$0 0 -\frac{3\sqrt{35}i}{280} 0 -\frac{3\sqrt{35}}{280} 0 0 0 \frac{9\sqrt{21}i}{280} 0 -\frac{9\sqrt{21}}{280} 0 0 -\frac{\sqrt{21}i}{35}$	
	$0 0 0 -\frac{\sqrt{105}i}{280} 0 -\frac{\sqrt{105}}{280} -\frac{\sqrt{105}i}{70} 0 0 \frac{\sqrt{7}i}{280} 0 -\frac{\sqrt{7}}{280} 0 0 0$	
	$0 0 -\frac{\sqrt{105}i}{280} 0 \frac{\sqrt{105}}{280} 0 0 \frac{\sqrt{105}i}{70} \frac{\sqrt{7}i}{280} 0 \frac{\sqrt{7}}{280} 0 0 0$	
	$0 \frac{\sqrt{7}i}{20} 0 0 \frac{\sqrt{105}i}{280} 0 0 -\frac{3\sqrt{105}}{280} 0 0 \frac{\sqrt{7}i}{40} 0 0 \frac{\sqrt{7}}{40}$	
	$\frac{\sqrt{7}i}{20} 0 0 0 -\frac{\sqrt{105}i}{280} \frac{3\sqrt{105}}{280} 0 0 0 0 -\frac{\sqrt{7}i}{40} -\frac{\sqrt{7}}{40} 0$	
	$0 -\frac{\sqrt{7}}{20} -\frac{\sqrt{105}i}{280} 0 0 0 0 \frac{3\sqrt{105}i}{280} \frac{\sqrt{7}i}{40} 0 0 0 0 \frac{\sqrt{7}i}{40}$	
	$\frac{\sqrt{7}}{20} 0 0 \frac{\sqrt{105}i}{280} 0 0 \frac{3\sqrt{105}i}{280} 0 0 -\frac{\sqrt{7}i}{40} 0 0 \frac{\sqrt{7}i}{40} 0$	
	$0 0 0 -\frac{\sqrt{105}}{70} 0 \frac{\sqrt{105}i}{70} 0 0 0 -\frac{\sqrt{7}}{20} 0 -\frac{\sqrt{7}i}{20} 0 0 0$	
	$0 0 \frac{\sqrt{105}}{70} 0 0 \frac{\sqrt{105}i}{70} 0 0 0 \frac{\sqrt{7}}{20} 0 -\frac{\sqrt{7}i}{20} 0 0 0$	
674	symmetry	1

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_0^{(1,1;a)}(A_{1u})$	0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 $-\frac{\sqrt{105}}{140}$ $\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0	
	0 0 $-\frac{\sqrt{105}i}{140}$ 0 $\frac{\sqrt{105}}{140}$ 0 0 $-\frac{\sqrt{105}i}{70}$ $-\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{35}i}{140}$ 0 $-\frac{3\sqrt{35}}{140}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{84}$ $\frac{\sqrt{21}i}{42}$ 0	
	0 0 $\frac{3\sqrt{35}i}{140}$ 0 $\frac{3\sqrt{35}}{140}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 $\frac{\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{21}i}{42}$	
	0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{70}$ 0 0 $-\frac{\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{21}}{42}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 0 $\frac{\sqrt{35}i}{70}$ $\frac{\sqrt{35}}{70}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{21}}{42}$ 0	
	0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{70}$ 0 0 0 $-\frac{\sqrt{35}i}{70}$ $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$	
	$-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{70}$ 0 0 $-\frac{\sqrt{35}i}{70}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0	
	$\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{35}}{70}$ 0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0	
	0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{35}}{70}$ 0 $-\frac{\sqrt{35}i}{70}$ 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0	
675	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	0 0 0 $-\frac{3\sqrt{35}i}{280}$ 0 $-\frac{3\sqrt{35}}{280}$ $\frac{\sqrt{35}i}{35}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0 $\frac{\sqrt{21}}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{35}i}{280}$ 0 $\frac{3\sqrt{35}}{280}$ 0 0 $-\frac{\sqrt{35}i}{35}$ $-\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0 0	
	0 0 0 $-\frac{11\sqrt{105}i}{840}$ 0 $\frac{11\sqrt{105}}{840}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{7}i}{14}$ 0	
	0 0 $-\frac{11\sqrt{105}i}{840}$ 0 $-\frac{11\sqrt{105}}{840}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$	
	0 $\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{105}i}{280}$ 0 0 $\frac{\sqrt{105}}{210}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$	
	$\frac{\sqrt{7}i}{28}$ 0 0 0 $\frac{\sqrt{105}i}{280}$ $-\frac{\sqrt{105}}{210}$ 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ $\frac{\sqrt{7}}{28}$ 0	
	0 $\frac{\sqrt{7}}{28}$ $-\frac{\sqrt{105}i}{280}$ 0 0 0 $\frac{\sqrt{105}i}{210}$ $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$	
	$-\frac{\sqrt{7}}{28}$ 0 0 $\frac{\sqrt{105}i}{280}$ 0 0 $\frac{\sqrt{105}i}{210}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0	
	$-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{105}}{840}$ 0 $-\frac{\sqrt{105}i}{840}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0	
	0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{105}}{840}$ 0 $-\frac{\sqrt{105}i}{840}$ 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0	
676	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,0}^{(1,1;a)}(E_u, 1)$	0 0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{105}i}{140}$ $\frac{\sqrt{105}}{105}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0	
	0 0 0 0 $\frac{11\sqrt{35}i}{420}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 $\frac{\sqrt{21}}{42}$	
	0 0 0 0 0 $-\frac{11\sqrt{35}i}{420}$ $-\frac{\sqrt{35}}{42}$ 0 0 0 0 $\frac{\sqrt{21}i}{84}$ $-\frac{\sqrt{21}}{42}$ 0	
	0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{105}$ $\frac{\sqrt{35}i}{105}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{21}i}{42}$ 0	
	0 0 $-\frac{\sqrt{35}i}{42}$ 0 $-\frac{\sqrt{35}}{105}$ 0 0 $-\frac{\sqrt{35}i}{105}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{21}i}{42}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{35}}{420}$ 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{35}}{420}$ 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0	
	0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{420}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	$-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{420}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0	
677	symmetry	$-\sqrt{3}xz$
$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	0 0 $\frac{\sqrt{105}i}{140}$ 0 0 0 $-\frac{\sqrt{105}i}{105}$ $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $\frac{\sqrt{105}i}{105}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0	
	0 0 $\frac{11\sqrt{35}i}{420}$ 0 0 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}i}{84}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$	
	0 0 0 $-\frac{11\sqrt{35}i}{420}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0	
	$-\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0	
	0 $\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{105}$ 0 $\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{35}i}{105}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0	
	0 0 $-\frac{\sqrt{35}i}{105}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{35}i}{105}$ $\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$	
	0 $-\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{35}i}{420}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0	
	$-\frac{\sqrt{21}i}{42}$ 0 0 0 0 $-\frac{\sqrt{35}i}{420}$ $-\frac{\sqrt{35}}{42}$ 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0	
678	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,0}^{(1,1;a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{105}}{60}$ 0 $\frac{\sqrt{105}i}{60}$ 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0	
	0 0 $-\frac{\sqrt{105}}{60}$ 0 $\frac{\sqrt{105}i}{60}$ 0 0 0 $\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{35}}{420}$ 0 $\frac{\sqrt{35}i}{420}$ 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0	
	0 0 $\frac{\sqrt{35}}{420}$ 0 $\frac{\sqrt{35}i}{420}$ 0 0 0 $\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0	
	0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 $-\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$	
	$-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0	
	0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0	
	0 0 0 $\frac{\sqrt{35}i}{105}$ 0 $\frac{\sqrt{35}}{105}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0	
	0 0 $\frac{\sqrt{35}i}{105}$ 0 $-\frac{\sqrt{35}}{105}$ 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{42}$ 0 0 0	
679	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	0 0 0 $-\frac{11\sqrt{105}i}{840}$ 0 $\frac{11\sqrt{105}}{840}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0	
	0 0 $-\frac{11\sqrt{105}i}{840}$ 0 $-\frac{11\sqrt{105}}{840}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0	
	0 0 0 $\frac{13\sqrt{35}i}{840}$ 0 $\frac{13\sqrt{35}}{840}$ $-\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0	
	0 0 $\frac{13\sqrt{35}i}{840}$ 0 $-\frac{13\sqrt{35}}{840}$ 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}i}{56}$ 0 $\frac{\sqrt{21}}{56}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{35}i}{168}$ 0 0 $\frac{\sqrt{35}}{420}$ 0 0 $-\frac{5\sqrt{21}i}{168}$ 0 0 $\frac{\sqrt{21}}{42}$	
	$-\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{35}i}{168}$ $-\frac{\sqrt{35}}{420}$ 0 0 0 0 $\frac{5\sqrt{21}i}{168}$ $-\frac{\sqrt{21}}{42}$ 0	
	0 $\frac{\sqrt{21}}{28}$ $\frac{\sqrt{35}i}{168}$ 0 0 0 0 $-\frac{\sqrt{35}i}{420}$ $-\frac{5\sqrt{21}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$	
	$-\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{35}i}{168}$ 0 0 $-\frac{\sqrt{35}i}{420}$ 0 0 $\frac{5\sqrt{21}i}{168}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0	
	0 0 0 $\frac{\sqrt{35}}{120}$ 0 $-\frac{\sqrt{35}i}{120}$ 0 0 0 $\frac{\sqrt{21}}{168}$ 0 $\frac{\sqrt{21}i}{168}$ 0 0 0	
	0 0 $-\frac{\sqrt{35}}{120}$ 0 $-\frac{\sqrt{35}i}{120}$ 0 0 0 $-\frac{\sqrt{21}}{168}$ 0 $\frac{\sqrt{21}i}{168}$ 0 0 0	
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 0 0 $-\frac{3\sqrt{462}i}{616}$ 0 $-\frac{3\sqrt{462}}{616}$ $\frac{5\sqrt{462}i}{462}$ 0 0 $-\frac{3\sqrt{770}i}{616}$ 0 $\frac{3\sqrt{770}}{616}$ 0 0	
	0 0 $-\frac{3\sqrt{462}i}{616}$ 0 $\frac{3\sqrt{462}}{616}$ 0 0 $-\frac{5\sqrt{462}i}{462}$ $-\frac{3\sqrt{770}i}{616}$ 0 $-\frac{3\sqrt{770}}{616}$ 0 0 0	
	0 0 0 $\frac{\sqrt{154}i}{308}$ 0 $-\frac{\sqrt{154}}{308}$ 0 0 0 $\frac{\sqrt{2310}i}{1540}$ 0 $\frac{\sqrt{2310}}{1540}$ 0 $\frac{\sqrt{2310}}{924}$ $\frac{\sqrt{2310}i}{924}$ 0	
	0 0 $\frac{\sqrt{154}i}{308}$ 0 $\frac{\sqrt{154}}{308}$ 0 0 0 $\frac{\sqrt{2310}i}{1540}$ 0 $-\frac{\sqrt{2310}}{1540}$ 0 0 $-\frac{\sqrt{2310}i}{924}$	
	0 $-\frac{\sqrt{2310}i}{770}$ 0 0 $\frac{5\sqrt{154}i}{616}$ 0 0 $\frac{\sqrt{154}}{77}$ 0 0 $-\frac{5\sqrt{2310}i}{1848}$ 0 0 $\frac{\sqrt{2310}}{770}$	
	$-\frac{\sqrt{2310}i}{770}$ 0 0 0 $-\frac{5\sqrt{154}i}{616}$ $-\frac{\sqrt{154}}{77}$ 0 0 0 0 $\frac{5\sqrt{2310}i}{1848}$ $-\frac{\sqrt{2310}}{770}$ 0	
	0 $-\frac{\sqrt{2310}}{770}$ $\frac{5\sqrt{154}i}{616}$ 0 0 0 0 $\frac{\sqrt{154}i}{77}$ $\frac{5\sqrt{2310}i}{1848}$ 0 0 0 0 $-\frac{\sqrt{2310}i}{770}$	
	$\frac{\sqrt{2310}}{770}$ 0 0 $-\frac{5\sqrt{154}i}{616}$ 0 0 $\frac{\sqrt{154}i}{77}$ 0 0 $-\frac{5\sqrt{2310}i}{1848}$ 0 0 $-\frac{\sqrt{2310}i}{770}$ 0	
	$\frac{\sqrt{2310}i}{924}$ 0 0 $\frac{\sqrt{154}}{616}$ 0 $\frac{\sqrt{154}i}{616}$ 0 0 0 $\frac{3\sqrt{2310}}{3080}$ 0 $-\frac{3\sqrt{2310}i}{3080}$ 0 0	
	0 $-\frac{\sqrt{2310}i}{924}$ $-\frac{\sqrt{154}}{616}$ 0 $\frac{\sqrt{154}i}{616}$ 0 0 0 $-\frac{3\sqrt{2310}}{3080}$ 0 $-\frac{3\sqrt{2310}i}{3080}$ 0 0 0	
681	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 2)$	0 $\frac{3\sqrt{11}}{220}$ $\frac{\sqrt{165}i}{165}$ 0 0 0 0 0 $-\frac{\sqrt{11}i}{55}$ 0 0 0 0 $-\frac{3\sqrt{11}i}{220}$	
	$-\frac{3\sqrt{11}}{220}$ 0 0 $-\frac{\sqrt{165}i}{165}$ 0 0 0 0 0 $\frac{\sqrt{11}i}{55}$ 0 0 0 $-\frac{3\sqrt{11}i}{220}$ 0	
	0 $\frac{3\sqrt{33}}{110}$ $-\frac{\sqrt{55}i}{110}$ 0 0 0 0 $-\frac{\sqrt{55}i}{220}$ $-\frac{\sqrt{33}i}{66}$ 0 0 0 0 $\frac{3\sqrt{33}i}{110}$	
	$-\frac{3\sqrt{33}}{110}$ 0 0 $\frac{\sqrt{55}i}{110}$ 0 0 $-\frac{\sqrt{55}i}{220}$ 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 $\frac{3\sqrt{33}i}{110}$ 0	
	$-\frac{4\sqrt{33}i}{165}$ 0 0 $\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{110}$ 0 0 0 $-\frac{9\sqrt{33}}{440}$ 0 $\frac{\sqrt{33}i}{55}$ 0 0 0	
	0 $\frac{4\sqrt{33}i}{165}$ $-\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{110}$ 0 0 0 $\frac{9\sqrt{33}}{440}$ 0 $\frac{\sqrt{33}i}{55}$ 0 0 0	
	0 0 0 $\frac{\sqrt{55}i}{55}$ 0 $-\frac{7\sqrt{55}}{440}$ 0 0 0 $-\frac{\sqrt{33}i}{110}$ 0 $-\frac{3\sqrt{33}}{440}$ $\frac{4\sqrt{33}i}{165}$ 0	
	0 0 $\frac{\sqrt{55}i}{55}$ 0 $\frac{7\sqrt{55}}{440}$ 0 0 0 $-\frac{\sqrt{33}i}{110}$ 0 $\frac{3\sqrt{33}}{440}$ 0 0 $-\frac{4\sqrt{33}i}{165}$	
	0 $-\frac{3\sqrt{33}i}{110}$ 0 0 $\frac{\sqrt{55}i}{110}$ 0 0 $\frac{\sqrt{55}}{220}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 $\frac{3\sqrt{33}}{110}$	
	$-\frac{3\sqrt{33}i}{110}$ 0 0 0 0 $-\frac{\sqrt{55}i}{110}$ $-\frac{\sqrt{55}}{220}$ 0 0 0 0 $\frac{\sqrt{33}i}{66}$ $-\frac{3\sqrt{33}}{110}$ 0	
682	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{2u})$	0	$-\frac{3\sqrt{11}i}{220}$
	$-\frac{3\sqrt{11}i}{220}$	0
	0	$\frac{3\sqrt{33}i}{110}$
	$\frac{3\sqrt{33}i}{110}$	0
	0	$\frac{7\sqrt{55}i}{440}$
	$\frac{7\sqrt{55}i}{440}$	0
	$\frac{4\sqrt{33}i}{165}$	0
	0	$-\frac{4\sqrt{33}i}{165}$
	$-\frac{4\sqrt{33}i}{165}$	0
	$-\frac{3\sqrt{33}}{110}$	0
683	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,0}^{(1,1;a)}(E_u, 1)$	0	$\frac{3\sqrt{77}i}{220}$
	$\frac{3\sqrt{77}i}{220}$	0
	0	$-\frac{\sqrt{385}i}{385}$
	$-\frac{\sqrt{385}i}{385}$	0
	0	$-\frac{\sqrt{385}i}{440}$
	$-\frac{\sqrt{385}i}{440}$	0
	$-\frac{2\sqrt{231}i}{385}$	0
	0	$-\frac{2\sqrt{231}i}{385}$
	$-\frac{2\sqrt{231}i}{385}$	0
	$\frac{\sqrt{231}}{462}$	0
684	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 1)$	0	$\begin{bmatrix} 0 & -\frac{3\sqrt{77}}{220} & \frac{3\sqrt{1155}i}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{231} & \frac{3\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}i}{220} \\ \frac{3\sqrt{77}}{220} & 0 & 0 & -\frac{3\sqrt{1155}i}{770} & 0 & 0 & \frac{\sqrt{1155}i}{231} & 0 & 0 & -\frac{3\sqrt{77}i}{154} & 0 & 0 & -\frac{3\sqrt{77}i}{220} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{385}i}{385} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{220} & -\frac{\sqrt{231}i}{385} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{462} \\ 0 & 0 & 0 & \frac{\sqrt{385}i}{385} & 0 & 0 & -\frac{\sqrt{385}i}{220} & 0 & 0 & \frac{\sqrt{231}i}{385} & 0 & 0 & \frac{\sqrt{231}i}{462} & 0 & 0 \\ \frac{2\sqrt{231}i}{385} & 0 & 0 & \frac{\sqrt{385}}{440} & 0 & -\frac{\sqrt{385}i}{770} & 0 & 0 & 0 & \frac{3\sqrt{231}}{440} & 0 & -\frac{\sqrt{231}i}{1155} & 0 & 0 \\ 0 & -\frac{2\sqrt{231}i}{385} & -\frac{\sqrt{385}}{440} & 0 & -\frac{\sqrt{385}i}{770} & 0 & 0 & 0 & -\frac{3\sqrt{231}}{440} & 0 & -\frac{\sqrt{231}i}{1155} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{385}i}{385} & 0 & \frac{\sqrt{385}}{440} & -\frac{4\sqrt{385}i}{385} & 0 & 0 & \frac{23\sqrt{231}i}{2310} & 0 & -\frac{3\sqrt{231}}{440} & \frac{2\sqrt{231}i}{385} & 0 \\ 0 & 0 & \frac{3\sqrt{385}i}{385} & 0 & -\frac{\sqrt{385}}{440} & 0 & 0 & \frac{4\sqrt{385}i}{385} & \frac{23\sqrt{231}i}{2310} & 0 & \frac{3\sqrt{231}}{440} & 0 & 0 & -\frac{2\sqrt{231}i}{385} \\ 0 & \frac{\sqrt{231}i}{462} & 0 & 0 & -\frac{\sqrt{385}i}{770} & 0 & 0 & -\frac{\sqrt{385}}{220} & 0 & 0 & \frac{3\sqrt{231}i}{770} & 0 & 0 & 0 \\ \frac{\sqrt{231}i}{462} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{770} & \frac{\sqrt{385}}{220} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}i}{770} & 0 & 0 \end{bmatrix}$
	685	symmetry
	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$	
	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{330}}{1320} & 0 & -\frac{\sqrt{330}i}{1320} & 0 & 0 & 0 & -\frac{\sqrt{22}}{440} & 0 & -\frac{\sqrt{22}i}{440} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}}{1320} & 0 & -\frac{\sqrt{330}i}{1320} & 0 & 0 & 0 & \frac{\sqrt{22}}{440} & 0 & -\frac{\sqrt{22}i}{440} & 0 & 0 & 0 \\ -\frac{3\sqrt{66}i}{220} & 0 & 0 & \frac{7\sqrt{110}}{440} & 0 & \frac{7\sqrt{110}i}{440} & 0 & 0 & 0 & -\frac{5\sqrt{66}}{264} & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 \\ 0 & \frac{3\sqrt{66}i}{220} & -\frac{7\sqrt{110}}{440} & 0 & \frac{7\sqrt{110}i}{440} & 0 & 0 & 0 & \frac{5\sqrt{66}}{264} & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{330} & -\frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{66}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{330} \\ \frac{\sqrt{66}}{330} & 0 & 0 & \frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{330} \\ 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & \frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{66}i}{440} & 0 & 0 & 0 & \frac{\sqrt{66}}{330} \\ \frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}i}{440} & -\frac{\sqrt{66}}{330} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{110}i}{55} & 0 & \frac{\sqrt{110}}{55} & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & \frac{\sqrt{66}}{66} & -\frac{3\sqrt{66}i}{220} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{110}i}{55} & 0 & -\frac{\sqrt{110}}{55} & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & \frac{3\sqrt{66}i}{220} \end{bmatrix}$	
	686	symmetry
	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{330}i}{1320}$ 0 $-\frac{\sqrt{330}}{1320}$ 0 0 0 $\frac{\sqrt{22}i}{440}$ 0 $-\frac{\sqrt{22}}{440}$ 0 0	
	0 0 $-\frac{\sqrt{330}i}{1320}$ 0 $\frac{\sqrt{330}}{1320}$ 0 0 0 $\frac{\sqrt{22}i}{440}$ 0 $\frac{\sqrt{22}}{440}$ 0 0 0	
	0 0 0 $\frac{\sqrt{110}i}{55}$ 0 $-\frac{\sqrt{110}}{55}$ 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 $-\frac{\sqrt{66}}{66}$ $\frac{3\sqrt{66}i}{220}$ 0	
	0 0 $\frac{\sqrt{110}i}{55}$ 0 $\frac{\sqrt{110}}{55}$ 0 0 0 $-\frac{\sqrt{66}i}{66}$ 0 $\frac{\sqrt{66}}{66}$ 0 0 $-\frac{3\sqrt{66}i}{220}$	
	0 $\frac{\sqrt{66}i}{330}$ 0 0 $\frac{3\sqrt{110}i}{440}$ 0 0 0 0 $\frac{3\sqrt{66}i}{440}$ 0 0 $\frac{\sqrt{66}}{330}$	
	$\frac{\sqrt{66}i}{330}$ 0 0 0 $-\frac{3\sqrt{110}i}{440}$ 0 0 0 0 0 $-\frac{3\sqrt{66}i}{440}$ $-\frac{\sqrt{66}}{330}$ 0	
	0 $\frac{\sqrt{66}}{330}$ $\frac{3\sqrt{110}i}{440}$ 0 0 0 0 $-\frac{3\sqrt{66}i}{440}$ 0 0 0 0 $-\frac{\sqrt{66}i}{330}$	
	$-\frac{\sqrt{66}}{330}$ 0 0 $-\frac{3\sqrt{110}i}{440}$ 0 0 0 0 $\frac{3\sqrt{66}i}{440}$ 0 0 $-\frac{\sqrt{66}i}{330}$ 0	
	$-\frac{3\sqrt{66}i}{220}$ 0 0 $\frac{7\sqrt{110}}{440}$ 0 $\frac{7\sqrt{110}i}{440}$ 0 0 0 $-\frac{5\sqrt{66}}{264}$ 0 $\frac{5\sqrt{66}i}{264}$ 0 0	
	0 $\frac{3\sqrt{66}i}{220}$ $-\frac{7\sqrt{110}}{440}$ 0 $\frac{7\sqrt{110}i}{440}$ 0 0 0 $\frac{5\sqrt{66}}{264}$ 0 $\frac{5\sqrt{66}i}{264}$ 0 0 0	
687	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{G}_{4,0}^{(1,1;a)}(E_u, 3)$	$\frac{3\sqrt{154}i}{220}$ 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 $-\frac{\sqrt{2310}i}{1848}$ 0 0 0 $\frac{29\sqrt{154}}{3080}$ 0 $-\frac{29\sqrt{154}i}{3080}$ 0 0	
	0 $-\frac{3\sqrt{154}i}{220}$ $\frac{\sqrt{2310}}{1848}$ 0 $-\frac{\sqrt{2310}i}{1848}$ 0 0 0 $-\frac{29\sqrt{154}}{3080}$ 0 $-\frac{29\sqrt{154}i}{3080}$ 0 0 0	
	0 0 0 $\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ 0 0 0 $\frac{29\sqrt{462}}{9240}$ 0 $\frac{29\sqrt{462}i}{9240}$ 0 0	
	0 0 $-\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ 0 0 0 $-\frac{29\sqrt{462}}{9240}$ 0 $\frac{29\sqrt{462}i}{9240}$ 0 0 0	
	0 $\frac{17\sqrt{462}}{2310}$ $-\frac{\sqrt{770}i}{440}$ 0 0 0 0 $-\frac{\sqrt{770}i}{385}$ $-\frac{3\sqrt{462}i}{440}$ 0 0 0 0 $\frac{\sqrt{462}i}{210}$	
	$-\frac{17\sqrt{462}}{2310}$ 0 0 $\frac{\sqrt{770}i}{440}$ 0 0 $-\frac{\sqrt{770}i}{385}$ 0 0 $\frac{3\sqrt{462}i}{440}$ 0 0 $\frac{\sqrt{462}i}{210}$ 0	
	0 $\frac{17\sqrt{462}i}{2310}$ 0 0 $-\frac{\sqrt{770}i}{440}$ 0 0 $-\frac{\sqrt{770}}{385}$ 0 0 $\frac{3\sqrt{462}i}{440}$ 0 0 $-\frac{\sqrt{462}}{210}$	
	$\frac{17\sqrt{462}i}{2310}$ 0 0 0 0 $\frac{\sqrt{770}i}{440}$ $\frac{\sqrt{770}}{385}$ 0 0 0 0 $-\frac{3\sqrt{462}i}{440}$ $\frac{\sqrt{462}}{210}$ 0	
	0 0 0 $-\frac{\sqrt{770}i}{385}$ 0 $-\frac{\sqrt{770}}{385}$ $\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{\sqrt{462}i}{210}$ 0 $\frac{\sqrt{462}}{210}$ 0 0	
	0 0 $-\frac{\sqrt{770}i}{385}$ 0 $\frac{\sqrt{770}}{385}$ 0 0 $-\frac{\sqrt{770}i}{220}$ $-\frac{\sqrt{462}i}{210}$ 0 $-\frac{\sqrt{462}}{210}$ 0 0 0	
688	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 3)$	0 0 0 $\frac{23\sqrt{2310}i}{9240}$ 0 $-\frac{23\sqrt{2310}}{9240}$ 0 0 0 $\frac{\sqrt{154}i}{3080}$ 0 $\frac{\sqrt{154}}{3080}$ $\frac{3\sqrt{154}i}{220}$ 0	
	0 0 $\frac{23\sqrt{2310}i}{9240}$ 0 $\frac{23\sqrt{2310}}{9240}$ 0 0 0 $\frac{\sqrt{154}i}{3080}$ 0 $-\frac{\sqrt{154}}{3080}$ 0 0 $-\frac{3\sqrt{154}i}{220}$	
	0 0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 $-\frac{9\sqrt{770}}{3080}$ $\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{41\sqrt{462}i}{9240}$ 0 $\frac{41\sqrt{462}}{9240}$ 0 0	
	0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 $\frac{9\sqrt{770}}{3080}$ 0 0 $-\frac{\sqrt{770}i}{220}$ $-\frac{41\sqrt{462}i}{9240}$ 0 $-\frac{41\sqrt{462}}{9240}$ 0 0	
	0 $-\frac{\sqrt{462}i}{210}$ 0 0 $\frac{\sqrt{770}i}{220}$ 0 0 $\frac{\sqrt{770}}{385}$ 0 0 $-\frac{\sqrt{462}i}{220}$ 0 0 $\frac{17\sqrt{462}}{2310}$	
	$-\frac{\sqrt{462}i}{210}$ 0 0 0 $-\frac{\sqrt{770}i}{220}$ $-\frac{\sqrt{770}}{385}$ 0 0 0 0 $\frac{\sqrt{462}i}{220}$ $-\frac{17\sqrt{462}}{2310}$ 0	
	0 $\frac{\sqrt{462}}{210}$ $-\frac{\sqrt{770}i}{220}$ 0 0 0 0 $-\frac{\sqrt{770}i}{385}$ $-\frac{\sqrt{462}i}{220}$ 0 0 0 0 $\frac{17\sqrt{462}i}{2310}$	
	$-\frac{\sqrt{462}}{210}$ 0 0 $\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{\sqrt{770}i}{385}$ 0 0 $\frac{\sqrt{462}i}{220}$ 0 0 $\frac{17\sqrt{462}i}{2310}$ 0	
	0 0 0 $-\frac{3\sqrt{770}}{1540}$ 0 $\frac{3\sqrt{770}i}{1540}$ 0 0 0 $-\frac{13\sqrt{462}}{4620}$ 0 $-\frac{13\sqrt{462}i}{4620}$ 0 0	
	0 0 $\frac{3\sqrt{770}}{1540}$ 0 $\frac{3\sqrt{770}i}{1540}$ 0 0 0 $\frac{13\sqrt{462}}{4620}$ 0 $-\frac{13\sqrt{462}i}{4620}$ 0 0	
689	symmetry	$z$
$\mathbb{T}_1^{(a)}(A_{2u})$	0 0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	
	0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0	
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
690	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,0}^{(a)}(E_u)$	0 0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 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 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0	
	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$	
	0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0	
691	symmetry	$y$
$\mathbb{T}_{1,1}^{(a)}(E_u)$	0 0 0 0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{105}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$	
	$\frac{\sqrt{7}i}{14}$ 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 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0	
692	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(a)}(A_{1u})$	0 0 0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$	
	$\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0	
693	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(a)}(A_{2u}, 1)$	0 0 0 0 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$	
	0 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 $\frac{\sqrt{3}i}{24}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 $\frac{\sqrt{3}i}{24}$ 0 0 0	
	0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0	
	$-\frac{\sqrt{3}i}{6}$ 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	
694	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 \end{bmatrix}$
695	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,0}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 \end{bmatrix}$
696	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	0 0 0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{10}i}{80}$ 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0	
	0 0 0 0 $\frac{11\sqrt{30}i}{240}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{11\sqrt{30}i}{240}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{30}i}{60}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{60}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0	
	$\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{30}i}{240}$ 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}i}{240}$ 0 0 0 0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0	
697	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{T}_{3,0}^{(a)}(E_u, 2)$	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 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{3}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{5}i}{8}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
698	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
699	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
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
$\mathbb{T}_5^{(a)}(A_{2u}, 1)$	0 0 0 0 0 0 $\frac{\sqrt{210}i}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$	
	0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0	
	0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0	
	$\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
701	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(a)}(A_{2u}, 2)$	0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0	
	0 0 $-\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{15}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{15}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{15}$	
	0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0	
	0 0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0	
702	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,0}^{(a)}(E_u, 2)$	0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0 0 0	
	$-\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$	
	0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0	
705	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{T}_{5,1}^{(a)}(E_u, 2)$	0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{70}$	
	$-\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 0	
706	symmetry	$-\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,0}^{(a)}(E_u, 4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
709	symmetry	$-\frac{\sqrt{10}5xyz(x^2+y^2-2z^2)}{2}$
	$\mathbb{T}_{5,1}^{(a)}(E_u, 4)$	$\begin{bmatrix} \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
710	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

*continued ...*

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(A_{1u})$	0	$\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$
	$-\frac{\sqrt{35}i}{28}$	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0
	0	0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 0
711	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 1)$	0	0 0 0 $-\frac{\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{280}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0
	0	0 0 $\frac{\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{280}$ 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 0
	$\frac{\sqrt{42}}{28}$	0 0 0 $-\frac{\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0
	0	$-\frac{\sqrt{42}}{28}$ $\frac{\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0
	0	0 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{70}}{70}$ $\frac{\sqrt{42}}{56}$ 0 0 0 0 0
	0	0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{70}}{70}$ 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0
	0	0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{70}i}{70}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 0
	0	0 0 0 $\frac{\sqrt{70}}{70}$ 0 $\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0
	0	0 0 $\frac{\sqrt{70}}{70}$ 0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 0 0 0 0 $\frac{\sqrt{42}}{28}$
712	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} \\ -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
713	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{210} & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & -\frac{2\sqrt{105}}{105} & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{105}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$		
714	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 1)$	0	$\frac{\sqrt{21}i}{84} - \frac{\sqrt{35}}{70} 0 0 0 0 0 0 -\frac{\sqrt{21}}{42} 0 0 0 0 -\frac{\sqrt{21}}{84}$
	$-\frac{\sqrt{21}i}{84}$	$0 0 \frac{\sqrt{35}}{70} 0 0 0 0 0 \frac{\sqrt{21}}{42} 0 0 0 -\frac{\sqrt{21}}{84} 0$
	0	$-\frac{\sqrt{7}i}{14} -\frac{\sqrt{105}}{210} 0 0 0 0 -\frac{\sqrt{105}}{420} \frac{\sqrt{7}}{14} 0 0 0 0 0 0$
	$\frac{\sqrt{7}i}{14}$	$0 0 \frac{\sqrt{105}}{210} 0 0 -\frac{\sqrt{105}}{420} 0 0 -\frac{\sqrt{7}}{14} 0 0 0 0 0$
	0	$0 0 0 -\frac{\sqrt{105}i}{120} 0 \frac{\sqrt{105}}{210} 0 0 0 -\frac{\sqrt{7}i}{56} 0 0 0 0 0$
	0	$0 0 \frac{\sqrt{105}i}{120} 0 \frac{\sqrt{105}}{210} 0 0 0 \frac{\sqrt{7}i}{56} 0 0 0 0 0$
	0	$0 0 0 -\frac{\sqrt{105}}{210} 0 \frac{\sqrt{105}i}{168} -\frac{2\sqrt{105}}{105} 0 0 0 0 0 -\frac{3\sqrt{7}i}{56} 0 0$
	0	$0 0 -\frac{\sqrt{105}}{210} 0 -\frac{\sqrt{105}i}{168} 0 0 \frac{2\sqrt{105}}{105} 0 0 \frac{3\sqrt{7}i}{56} 0 0 0$
	0	$0 0 0 0 \frac{2\sqrt{105}}{105} 0 0 \frac{\sqrt{105}i}{420} 0 0 0 0 0 \frac{\sqrt{7}i}{14}$
	0	$0 0 0 0 0 -\frac{2\sqrt{105}}{105} -\frac{\sqrt{105}i}{420} 0 0 0 0 0 -\frac{\sqrt{7}i}{14} 0$
715	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{T}_{3,0}^{(1,-1;a)}(E_u, 2)$	$\frac{\sqrt{210}}{84} 0 0 \frac{\sqrt{14}i}{56} 0 -\frac{\sqrt{14}}{56} 0 0 0 \frac{\sqrt{210}i}{168} 0 \frac{\sqrt{210}}{168} 0 0$	
	0	$-\frac{\sqrt{210}}{84} -\frac{\sqrt{14}i}{56} 0 -\frac{\sqrt{14}}{56} 0 0 0 -\frac{\sqrt{210}i}{168} 0 \frac{\sqrt{210}}{168} 0 0 0 0$
	0	$0 0 0 \frac{\sqrt{42}i}{168} 0 \frac{\sqrt{42}}{168} 0 0 0 -\frac{\sqrt{70}i}{56} 0 \frac{\sqrt{70}}{56} 0 0$
	0	$0 0 -\frac{\sqrt{42}i}{168} 0 \frac{\sqrt{42}}{168} 0 0 0 \frac{\sqrt{70}i}{56} 0 \frac{\sqrt{70}}{56} 0 0 0$
	0	$0 0 -\frac{\sqrt{42}}{168} 0 0 0 0 -\frac{\sqrt{42}}{42} \frac{\sqrt{70}}{56} 0 0 0 0 0 0$
	0	$0 0 0 \frac{\sqrt{42}}{168} 0 0 -\frac{\sqrt{42}}{42} 0 0 -\frac{\sqrt{70}}{56} 0 0 0 0$
	0	$0 0 0 0 -\frac{\sqrt{42}}{168} 0 0 \frac{\sqrt{42}i}{42} 0 0 0 -\frac{\sqrt{70}}{56} 0 0$
	0	$0 0 0 0 0 \frac{\sqrt{42}}{168} -\frac{\sqrt{42}i}{42} 0 0 0 0 \frac{\sqrt{70}}{56} 0 0$
	0	$0 0 0 \frac{\sqrt{42}}{42} 0 \frac{\sqrt{42}i}{42} 0 0 -\frac{\sqrt{42}}{84} 0 0 0 0 0$
	0	$0 0 \frac{\sqrt{42}}{42} 0 \frac{\sqrt{42}i}{42} 0 0 -\frac{\sqrt{42}}{84} 0 0 0 0 0 0$
716	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & \frac{\sqrt{210}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{42}}{84} & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{15} & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{15} \\ -\frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & \frac{\sqrt{6}}{15} & 0 \\ 0 & -\frac{\sqrt{2}i}{60} & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{60} \\ \frac{\sqrt{2}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{60} & 0 & 0 \\ -\frac{\sqrt{2}}{30} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & \frac{\sqrt{30}}{240} & 0 & 0 & 0 & -\frac{7\sqrt{2}i}{240} & 0 & \frac{11\sqrt{2}}{240} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{30} & -\frac{\sqrt{30}i}{48} & 0 & \frac{\sqrt{30}}{240} & 0 & 0 & 0 & \frac{7\sqrt{2}i}{240} & 0 & \frac{11\sqrt{2}}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & \frac{17\sqrt{2}}{240} & 0 & \frac{\sqrt{2}i}{240} & \frac{\sqrt{2}}{30} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & \frac{17\sqrt{2}}{240} & 0 & -\frac{\sqrt{2}i}{240} & 0 & 0 & -\frac{\sqrt{2}}{30} & 0 \\ 0 & -\frac{\sqrt{2}}{60} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{60} & 0 \\ -\frac{\sqrt{2}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{60} & 0 & 0 \end{bmatrix}$	
		$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 1)$	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0	
	0 0 $\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0 0	
	$-\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{21}i}{168}$ 0 $\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{13\sqrt{35}i}{840}$ 0 $-\frac{13\sqrt{35}}{840}$ 0 0 0	
	0 $\frac{\sqrt{35}}{42}$ $\frac{\sqrt{21}i}{168}$ 0 $\frac{\sqrt{21}}{168}$ 0 0 0 $\frac{13\sqrt{35}i}{840}$ 0 $-\frac{13\sqrt{35}}{840}$ 0 0 0 0	
	0 $-\frac{\sqrt{35}i}{60}$ $\frac{5\sqrt{21}}{168}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ $\frac{5\sqrt{35}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{60}$ 0	
	$\frac{\sqrt{35}i}{60}$ 0 0 $-\frac{5\sqrt{21}}{168}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{5\sqrt{35}}{168}$ 0 0 $\frac{\sqrt{35}}{60}$ 0 0	
	0 $-\frac{\sqrt{35}}{60}$ 0 0 $-\frac{5\sqrt{21}}{168}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 $\frac{5\sqrt{35}}{168}$ 0 0 $-\frac{\sqrt{35}i}{60}$ 0	
	$-\frac{\sqrt{35}}{60}$ 0 0 0 0 $\frac{5\sqrt{21}}{168}$ $\frac{\sqrt{21}i}{42}$ 0 0 0 0 $-\frac{5\sqrt{35}}{168}$ $\frac{\sqrt{35}i}{60}$ 0	
	0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{120}$ 0 $\frac{\sqrt{35}i}{120}$ $\frac{\sqrt{35}}{42}$ 0	
	0 0 $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{120}$ 0 $-\frac{\sqrt{35}i}{120}$ 0 0 $-\frac{\sqrt{35}}{42}$	
719	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 2)$	0 $-\frac{\sqrt{6}}{15}$ 0 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 $\frac{\sqrt{6}}{20}$ 0 0 $\frac{\sqrt{6}i}{15}$	
	$-\frac{\sqrt{6}}{15}$ 0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 $-\frac{\sqrt{6}}{20}$ $-\frac{\sqrt{6}i}{15}$ 0	
	0 $-\frac{\sqrt{2}}{60}$ 0 0 $-\frac{\sqrt{30}}{60}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $\frac{\sqrt{2}}{12}$ 0 0 $-\frac{\sqrt{2}i}{60}$	
	$-\frac{\sqrt{2}}{60}$ 0 0 0 0 $\frac{\sqrt{30}}{60}$ $\frac{\sqrt{30}i}{30}$ 0 0 0 0 $-\frac{\sqrt{2}}{12}$ $\frac{\sqrt{2}i}{60}$ 0	
	0 0 0 $-\frac{\sqrt{30}}{80}$ 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 $\frac{\sqrt{2}}{240}$ 0 $\frac{17\sqrt{2}i}{240}$ $-\frac{\sqrt{2}}{30}$ 0	
	0 0 $-\frac{\sqrt{30}}{80}$ 0 $-\frac{\sqrt{30}i}{80}$ 0 0 0 $\frac{\sqrt{2}}{240}$ 0 $-\frac{17\sqrt{2}i}{240}$ 0 0 $\frac{\sqrt{2}}{30}$	
	$-\frac{\sqrt{2}}{30}$ 0 0 $-\frac{\sqrt{30}i}{240}$ 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 $\frac{11\sqrt{2}i}{240}$ 0 $-\frac{7\sqrt{2}}{240}$ 0 0	
	0 $\frac{\sqrt{2}}{30}$ $\frac{\sqrt{30}i}{240}$ 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 $-\frac{11\sqrt{2}i}{240}$ 0 $-\frac{7\sqrt{2}}{240}$ 0 0 0	
	0 $\frac{\sqrt{2}i}{60}$ $-\frac{\sqrt{30}}{60}$ 0 0 0 0 $\frac{\sqrt{30}}{30}$ $-\frac{\sqrt{2}}{12}$ 0 0 0 0 $-\frac{\sqrt{2}}{60}$	
	$-\frac{\sqrt{2}i}{60}$ 0 0 $\frac{\sqrt{30}}{60}$ 0 0 $\frac{\sqrt{30}}{30}$ 0 0 $\frac{\sqrt{2}}{12}$ 0 0 0 $-\frac{\sqrt{2}}{60}$ 0	
720	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
	721 symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
	$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 1)$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
	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
$\mathbb{T}_{5,0}^{(1,-1;a)}(E_u, 2)$	0	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{35} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{7}i}{35} \\ \frac{\sqrt{7}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{7}i}{35} & 0 \\ 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{13\sqrt{21}}{420} & 0 & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & -\frac{13\sqrt{21}}{420} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & \frac{\sqrt{35}i}{280} & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{23\sqrt{21}}{840} & 0 & \frac{\sqrt{21}i}{120} & -\frac{\sqrt{21}}{30} \\ 0 & 0 & \frac{\sqrt{35}}{40} & 0 & -\frac{\sqrt{35}i}{280} & 0 & 0 & -\frac{\sqrt{35}}{35} & \frac{23\sqrt{21}}{840} & 0 & -\frac{\sqrt{21}i}{120} & 0 & 0 \\ \frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 & \frac{\sqrt{21}i}{120} & 0 & \frac{9\sqrt{21}}{280} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{30} & \frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{120} & 0 & \frac{9\sqrt{21}}{280} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{21}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{21}}{60} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \end{bmatrix}$
	723	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 2)$	0	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{35} & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{35} \\ -\frac{\sqrt{7}i}{35} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{7}}{35} \\ 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & -\frac{13\sqrt{21}}{420} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{13\sqrt{21}}{420} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{30} & 0 & 0 & -\frac{3\sqrt{35}i}{280} & 0 & -\frac{\sqrt{35}}{280} & 0 & 0 & 0 & -\frac{9\sqrt{21}i}{280} & 0 & -\frac{\sqrt{21}}{120} & 0 & 0 \\ 0 & \frac{\sqrt{21}}{30} & \frac{3\sqrt{35}i}{280} & 0 & -\frac{\sqrt{35}}{280} & 0 & 0 & 0 & \frac{9\sqrt{21}i}{280} & 0 & -\frac{\sqrt{21}}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{280} & 0 & \frac{\sqrt{35}i}{40} & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{21}}{120} & 0 & -\frac{23\sqrt{21}i}{840} & -\frac{\sqrt{21}}{30} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{280} & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & \frac{\sqrt{35}}{35} & -\frac{\sqrt{21}}{120} & 0 & \frac{23\sqrt{21}i}{840} & 0 & 0 & \frac{\sqrt{21}}{30} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{60} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{60} & \frac{\sqrt{21}i}{42} & 0 \end{bmatrix}$
	724	$\frac{-3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,0}^{(1,-1;a)}(E_u, 4)$	$\frac{1}{5} 0 0 0 0 0 0 0 0 \frac{i}{10} 0 \frac{1}{10} 0 0 0$	
	$0 -\frac{1}{5} 0 0 0 0 0 0 -\frac{i}{10} 0 \frac{1}{10} 0 0 0 0$	
	$0 0 0 0 0 0 0 0 0 \frac{\sqrt{3}i}{30} 0 -\frac{\sqrt{3}}{30} 0 0 0$	
	$0 0 0 0 0 0 0 0 0 -\frac{\sqrt{3}i}{30} 0 -\frac{\sqrt{3}}{30} 0 0 0 0$	
	$0 \frac{\sqrt{3}i}{15} \frac{\sqrt{5}}{20} 0 0 0 0 -\frac{\sqrt{5}}{20} -\frac{\sqrt{3}}{60} 0 0 0 0 0 \frac{\sqrt{3}}{20}$	
	$-\frac{\sqrt{3}i}{15} 0 0 -\frac{\sqrt{5}}{20} 0 0 -\frac{\sqrt{5}}{20} 0 0 \frac{\sqrt{3}}{60} 0 0 0 \frac{\sqrt{3}}{20} 0$	
	$0 -\frac{\sqrt{3}}{15} 0 0 \frac{\sqrt{5}}{20} 0 0 \frac{\sqrt{5}i}{20} 0 0 \frac{\sqrt{3}}{60} 0 0 0 \frac{\sqrt{3}i}{20}$	
	$-\frac{\sqrt{3}}{15} 0 0 0 0 -\frac{\sqrt{5}}{20} -\frac{\sqrt{5}i}{20} 0 0 0 0 -\frac{\sqrt{3}}{60} -\frac{\sqrt{3}i}{20} 0$	
	$0 0 0 -\frac{\sqrt{5}}{20} 0 \frac{\sqrt{5}i}{20} -\frac{\sqrt{5}}{10} 0 0 -\frac{\sqrt{3}}{20} 0 -\frac{\sqrt{3}i}{20} 0 0 0$	
	$0 0 -\frac{\sqrt{5}}{20} 0 -\frac{\sqrt{5}i}{20} 0 0 \frac{\sqrt{5}}{10} -\frac{\sqrt{3}}{20} 0 \frac{\sqrt{3}i}{20} 0 0 0 0$	
727	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 4)$	$0 0 0 -\frac{\sqrt{15}}{40} 0 -\frac{\sqrt{15}i}{40} 0 0 0 -\frac{1}{40} 0 \frac{i}{40} \frac{1}{5} 0$	
	$0 0 -\frac{\sqrt{15}}{40} 0 \frac{\sqrt{15}i}{40} 0 0 0 -\frac{1}{40} 0 -\frac{i}{40} 0 0 -\frac{1}{5}$	
	$0 0 0 -\frac{\sqrt{5}}{40} 0 \frac{\sqrt{5}i}{40} -\frac{\sqrt{5}}{10} 0 0 -\frac{3\sqrt{3}}{40} 0 -\frac{3\sqrt{3}i}{40} 0 0 0$	
	$0 0 -\frac{\sqrt{5}}{40} 0 -\frac{\sqrt{5}i}{40} 0 0 \frac{\sqrt{5}}{10} -\frac{3\sqrt{3}}{40} 0 \frac{3\sqrt{3}i}{40} 0 0 0$	
	$0 -\frac{\sqrt{3}}{20} 0 0 \frac{\sqrt{5}}{40} 0 0 -\frac{\sqrt{5}i}{20} 0 0 \frac{7\sqrt{3}}{120} 0 0 \frac{\sqrt{3}i}{15}$	
	$-\frac{\sqrt{3}}{20} 0 0 0 0 -\frac{\sqrt{5}}{40} \frac{\sqrt{5}i}{20} 0 0 0 0 -\frac{7\sqrt{3}}{120} -\frac{\sqrt{3}i}{15} 0$	
	$0 -\frac{\sqrt{3}i}{20} -\frac{\sqrt{5}}{40} 0 0 0 0 -\frac{\sqrt{5}}{20} \frac{7\sqrt{3}}{120} 0 0 0 0 -\frac{\sqrt{3}}{15}$	
	$\frac{\sqrt{3}i}{20} 0 0 \frac{\sqrt{5}}{40} 0 0 -\frac{\sqrt{5}}{20} 0 0 -\frac{7\sqrt{3}}{120} 0 0 -\frac{\sqrt{3}}{15} 0$	
	$0 0 0 -\frac{\sqrt{5}i}{40} 0 -\frac{\sqrt{5}}{40} 0 0 0 -\frac{\sqrt{3}i}{120} 0 \frac{\sqrt{3}}{120} 0 0 0$	
	$0 0 \frac{\sqrt{5}i}{40} 0 -\frac{\sqrt{5}}{40} 0 0 0 \frac{\sqrt{3}i}{120} 0 \frac{\sqrt{3}}{120} 0 0 0 0$	
728	symmetry	$z$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_1^{(1,0;a)}(A_{2u})$	0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0	
	0 0 $\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{210}i}{280}$ 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 0 $-\frac{3\sqrt{210}i}{280}$ 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 $-\frac{\sqrt{210}}{140}$ 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0	
	0 0 $-\frac{\sqrt{210}}{140}$ 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0	
729	symmetry	$x$
$\mathbb{T}_{1,0}^{(1,0;a)}(E_u)$	0 0 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ $\frac{3\sqrt{70}i}{140}$ 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{14}i}{28}$	
	0 0 0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{210}i}{140}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0	
	$\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0	
730	symmetry	$y$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(1,0;a)}(E_u)$	0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{3\sqrt{70}}{140}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0	
	0 0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{210}}{140}$ $\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{\sqrt{14}}{28}$	
	0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	$-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0	
731	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 0 0 0 $\frac{\sqrt{30}}{32}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{2}}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}}{32}$ 0 0 0 0 $\frac{\sqrt{6}}{24}$ $\frac{\sqrt{10}}{32}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 $\frac{\sqrt{6}}{24}$ 0 0 $-\frac{\sqrt{10}}{32}$ 0 0 0 0 0	
	$-\frac{\sqrt{10}}{16}$ 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0	
	0 $\frac{\sqrt{10}}{16}$ $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{96}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 $\frac{\sqrt{10}}{32}$ 0 0 $\frac{\sqrt{10}}{16}$ 0	
	0 0 $-\frac{\sqrt{6}}{96}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0 0 $-\frac{\sqrt{10}}{16}$	
	0 0 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 $\frac{\sqrt{6}i}{24}$ 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}}{32}$ $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $-\frac{\sqrt{10}}{32}$ 0 0 0	
732	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	0 0 0 $-\frac{3\sqrt{5}i}{80}$ 0 $-\frac{3\sqrt{5}}{80}$ 0 0 0 $-\frac{\sqrt{3}i}{16}$ 0 $\frac{\sqrt{3}}{16}$ 0 0 0	
	0 0 $\frac{3\sqrt{5}i}{80}$ 0 $-\frac{3\sqrt{5}}{80}$ 0 0 0 $\frac{\sqrt{3}i}{16}$ 0 $\frac{\sqrt{3}}{16}$ 0 0 0	
	0 0 0 $-\frac{11\sqrt{15}i}{240}$ 0 $\frac{11\sqrt{15}}{240}$ 0 0 0 $-\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0	
	0 0 $\frac{11\sqrt{15}i}{240}$ 0 $\frac{11\sqrt{15}}{240}$ 0 0 0 $\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0	
	0 $\frac{i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 $-\frac{1}{8}$	
	$-\frac{i}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 0 $-\frac{1}{8}$ 0	
	0 $\frac{1}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 $\frac{i}{8}$	
	$\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 $-\frac{i}{8}$ 0	
	0 0 0 $-\frac{\sqrt{15}}{240}$ 0 $-\frac{\sqrt{15}i}{240}$ 0 0 0 $-\frac{3}{16}$ 0 $\frac{3i}{16}$ 0 0	
	0 0 $-\frac{\sqrt{15}}{240}$ 0 $\frac{\sqrt{15}i}{240}$ 0 0 0 $-\frac{3}{16}$ 0 $-\frac{3i}{16}$ 0 0 0	
733	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	0 0 0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{2}}{32}$ 0 0 0 0 0 $\frac{\sqrt{30}}{32}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 $\frac{\sqrt{6}i}{24}$ 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}}{32}$ $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $-\frac{\sqrt{10}}{32}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{96}$ 0 0 0 0 $\frac{\sqrt{10}i}{32}$ $-\frac{\sqrt{10}}{16}$ 0	
	0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{96}$ 0 0 0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 $\frac{\sqrt{10}}{16}$	
	$-\frac{\sqrt{10}}{16}$ 0 0 $-\frac{\sqrt{6}i}{96}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $\frac{\sqrt{10}i}{32}$ 0 0 0	
	0 $\frac{\sqrt{10}}{16}$ $\frac{\sqrt{6}i}{96}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{6}}{32}$ 0 0 0 0 $-\frac{\sqrt{6}}{24}$ $-\frac{\sqrt{10}}{32}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}}{32}$ 0 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0	
734	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

*continued ..*

Table 9

No.	multipole	matrix
$T_{3,0}^{(1,0;a)}(E_u, 1)$	0 0 0 0 $\frac{\sqrt{30}}{160}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{2}}{32}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{30}}{160}$ $\frac{\sqrt{30}i}{30}$ 0 0 0 0 $\frac{\sqrt{2}}{32}$ 0 0 0	
	0 0 0 0 $-\frac{11\sqrt{10}}{480}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0 0 $\frac{\sqrt{6}}{96}$ 0 0 $\frac{\sqrt{6}i}{12}$	
	0 0 0 0 0 $\frac{11\sqrt{10}}{480}$ $\frac{\sqrt{10}i}{24}$ 0 0 0 0 $-\frac{\sqrt{6}}{96}$ $-\frac{\sqrt{6}i}{12}$ 0	
	0 0 0 $-\frac{\sqrt{10}}{24}$ 0 $\frac{\sqrt{10}i}{480}$ $-\frac{\sqrt{10}}{120}$ 0 0 0 0 $-\frac{7\sqrt{6}i}{96}$ $\frac{\sqrt{6}}{48}$ 0	
	0 0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{480}$ 0 0 $\frac{\sqrt{10}}{120}$ 0 0 $\frac{7\sqrt{6}i}{96}$ 0 0 $-\frac{\sqrt{6}}{48}$	
	$-\frac{\sqrt{6}}{48}$ 0 0 $\frac{11\sqrt{10}i}{480}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0 $-\frac{\sqrt{6}i}{32}$ 0 0 0 0	
	0 $\frac{\sqrt{6}}{48}$ $-\frac{11\sqrt{10}i}{480}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0 $\frac{\sqrt{6}i}{32}$ 0 0 0 0 0	
	0 $\frac{\sqrt{6}i}{12}$ $\frac{\sqrt{10}}{480}$ 0 0 0 0 $-\frac{\sqrt{10}}{24}$ $\frac{\sqrt{6}}{32}$ 0 0 0 0 0	
	$-\frac{\sqrt{6}i}{12}$ 0 0 $-\frac{\sqrt{10}}{480}$ 0 0 0 $-\frac{\sqrt{10}}{24}$ 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 0 0	
735	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$T_{3,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{30}}{160}$ 0 0 0 0 $-\frac{\sqrt{30}}{30}$ $-\frac{\sqrt{2}}{32}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}}{160}$ 0 0 $-\frac{\sqrt{30}}{30}$ 0 0 $\frac{\sqrt{2}}{32}$ 0 0 0 0 0	
	0 0 $-\frac{11\sqrt{10}}{480}$ 0 0 0 0 $\frac{\sqrt{10}}{24}$ $-\frac{\sqrt{6}}{96}$ 0 0 0 0 $\frac{\sqrt{6}}{12}$	
	0 0 0 $\frac{11\sqrt{10}}{480}$ 0 0 $\frac{\sqrt{10}}{24}$ 0 0 $\frac{\sqrt{6}}{96}$ 0 0 $\frac{\sqrt{6}}{12}$ 0	
	$\frac{\sqrt{6}}{48}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0 $\frac{11\sqrt{10}}{480}$ 0 0 0 0 0 $\frac{\sqrt{6}}{32}$ 0 0 0	
	0 $-\frac{\sqrt{6}}{48}$ $\frac{\sqrt{10}i}{24}$ 0 $\frac{11\sqrt{10}}{480}$ 0 0 0 0 0 $\frac{\sqrt{6}}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{10}}{480}$ 0 $-\frac{\sqrt{10}i}{24}$ $\frac{\sqrt{10}}{120}$ 0 0 $\frac{7\sqrt{6}i}{96}$ 0 0 $\frac{\sqrt{6}}{48}$ 0	
	0 0 $\frac{\sqrt{10}}{480}$ 0 $\frac{\sqrt{10}i}{24}$ 0 0 $-\frac{\sqrt{10}}{120}$ $\frac{7\sqrt{6}}{96}$ 0 0 0 0 $-\frac{\sqrt{6}}{48}$	
	0 $\frac{\sqrt{6}}{12}$ 0 0 $-\frac{\sqrt{10}}{480}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0 0 $\frac{\sqrt{6}}{32}$ 0 0 0 0	
	$\frac{\sqrt{6}}{12}$ 0 0 0 0 $\frac{\sqrt{10}}{480}$ $\frac{\sqrt{10}i}{24}$ 0 0 0 0 $-\frac{\sqrt{6}}{32}$ 0 0 0	
736	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$T_{3,0}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{3}i}{48}$ 0 $-\frac{\sqrt{3}}{48}$ 0 0 0 $-\frac{\sqrt{5}i}{16}$ 0 $-\frac{\sqrt{5}}{16}$ 0 0	
	0 0 $-\frac{\sqrt{3}i}{48}$ 0 $-\frac{\sqrt{3}}{48}$ 0 0 0 $\frac{\sqrt{5}i}{16}$ 0 $-\frac{\sqrt{5}}{16}$ 0 0 0	
	0 0 0 $-\frac{7i}{48}$ 0 $-\frac{7}{48}$ 0 0 0 $-\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	0 0 $\frac{7i}{48}$ 0 $-\frac{7}{48}$ 0 0 0 $\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	0 $\frac{\sqrt{15}i}{24}$ $-\frac{1}{6}$ 0 0 0 0 $-\frac{1}{24}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{24}$ 0 0 $\frac{1}{6}$ 0 0 $-\frac{1}{24}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{24}$ 0 0 $-\frac{1}{6}$ 0 0 $\frac{i}{24}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 $\frac{1}{6}$ $-\frac{i}{24}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{1}{48}$ 0 $\frac{i}{48}$ $-\frac{1}{6}$ 0 0 $\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0	
	0 0 $-\frac{1}{48}$ 0 $-\frac{i}{48}$ 0 0 0 $\frac{1}{6}$ $\frac{\sqrt{15}}{48}$ 0 $-\frac{\sqrt{15}i}{48}$ 0 0 0	
737	symmetry	$\sqrt{15}xyz$
$T_{3,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{\sqrt{3}}{12}$ 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{3}}{12}$ 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{1}{12}$ 0 $-\frac{i}{12}$ $-\frac{1}{6}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{1}{12}$ 0 $\frac{i}{12}$ 0 0 $\frac{1}{6}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{1}{24}$ 0 0 $-\frac{i}{24}$ 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 $\frac{\sqrt{15}i}{24}$	
	0 0 0 0 0 $\frac{1}{24}$ $\frac{i}{24}$ 0 0 0 0 $\frac{\sqrt{15}}{24}$ $-\frac{\sqrt{15}i}{24}$ 0	
	0 0 $\frac{1}{24}$ 0 0 0 0 $-\frac{1}{24}$ $-\frac{\sqrt{15}}{24}$ 0 0 0 0 $-\frac{\sqrt{15}}{24}$	
	0 0 0 $-\frac{1}{24}$ 0 0 $-\frac{1}{24}$ 0 0 $\frac{\sqrt{15}}{24}$ 0 0 $-\frac{\sqrt{15}}{24}$ 0	
	0 0 0 $\frac{i}{24}$ 0 $\frac{1}{24}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0	
	0 0 $-\frac{i}{24}$ 0 $\frac{1}{24}$ 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0	
738	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(A_{1u})$	0	$-\frac{\sqrt{6}i}{20} \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{20}$
	$\frac{\sqrt{6}i}{20}$	$0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{20} \quad 0$
	0	$\frac{3\sqrt{2}i}{40} \quad -\frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{60} \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{40}$
	$-\frac{3\sqrt{2}i}{40}$	$0 \quad 0 \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{40} \quad 0$
	$-\frac{\sqrt{2}}{10}$	$0 \quad 0 \quad \frac{\sqrt{30}i}{48} \quad 0 \quad -\frac{7\sqrt{30}}{240} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{80} \quad 0 \quad \frac{\sqrt{2}}{80} \quad 0 \quad 0$
	0	$\frac{\sqrt{2}}{10} \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad -\frac{7\sqrt{30}}{240} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}i}{80} \quad 0 \quad \frac{\sqrt{2}}{80} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad -\frac{\sqrt{30}i}{240} \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{2}}{80} \quad 0 \quad -\frac{9\sqrt{2}i}{80} \quad \frac{\sqrt{2}}{10} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad \frac{\sqrt{30}i}{240} \quad 0 \quad 0 \quad 0 \quad \frac{7\sqrt{2}}{80} \quad 0 \quad \frac{9\sqrt{2}i}{80} \quad 0 \quad -\frac{\sqrt{2}}{10}$
	$\frac{3\sqrt{2}}{40}$	$0 \quad 0 \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40}$
	$\frac{3\sqrt{2}}{40}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{80} \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{16} \quad -\frac{3\sqrt{2}i}{40} \quad 0$
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	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{7}i}{56} \quad 0 \quad -\frac{3\sqrt{7}}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{56} \quad 0 \quad \frac{\sqrt{105}}{56} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{7}i}{56} \quad 0 \quad -\frac{3\sqrt{7}}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{56} \quad 0 \quad \frac{\sqrt{105}}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{84} \quad 0 \quad -\frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{21}i}{84} \quad 0 \quad -\frac{\sqrt{21}}{84} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{35}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70}$
	$\frac{\sqrt{35}i}{70}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{70} \quad 0$
	0	$0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70}$
	$-\frac{\sqrt{35}}{70}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{168} \quad 0 \quad \frac{\sqrt{21}i}{168} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{280} \quad 0 \quad -\frac{3\sqrt{35}i}{280} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{21}}{168} \quad 0 \quad -\frac{\sqrt{21}i}{168} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{35}}{280} \quad 0 \quad \frac{3\sqrt{35}i}{280} \quad 0 \quad 0 \quad 0$
740	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(A_{2u}, 2)$	$0 \quad \frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{20}$	
	$\frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{40} \quad \frac{\sqrt{6}i}{20} \quad 0$	
	$0 \quad \frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad \frac{3\sqrt{2}i}{40}$	
	$\frac{3\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{80} \quad \frac{\sqrt{30}i}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{16} \quad -\frac{3\sqrt{2}i}{40} \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad -\frac{\sqrt{30}i}{240} \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{2}}{80} \quad 0 \quad \frac{7\sqrt{2}i}{80} \quad -\frac{\sqrt{2}}{10} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{30}}{240} \quad 0 \quad \frac{\sqrt{30}i}{240} \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{2}}{80} \quad 0 \quad -\frac{7\sqrt{2}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{2}}{10}$	
	$-\frac{\sqrt{2}}{10} \quad 0 \quad 0 \quad \frac{7\sqrt{30}i}{240} \quad 0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{80} \quad 0 \quad \frac{3\sqrt{2}}{80} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{2}}{10} \quad -\frac{7\sqrt{30}i}{240} \quad 0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{80} \quad 0 \quad \frac{3\sqrt{2}}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{2}i}{40} \quad \frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{40}$	
	$\frac{3\sqrt{2}i}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{40} \quad 0$	
741	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{T}_{5,0}^{(1,0;a)}(E_u, 1)$	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{40}$	
	$\frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{16} \quad \frac{\sqrt{10}i}{40} \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad \frac{\sqrt{10}i}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{80} \quad 0 \quad -\frac{\sqrt{10}}{80} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{10}i}{40} \quad -\frac{5\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40}$	
	$-\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad \frac{5\sqrt{6}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0$	
742	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$T_{5,1}^{(1,0;a)}(E_u, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{40} & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{10}}{40} \\ -\frac{\sqrt{10}i}{40} & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{80} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & \frac{\sqrt{10}i}{40} \\ -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & -\frac{\sqrt{10}i}{40} & 0 \end{bmatrix}$
		$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
743	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$T_{5,0}^{(1,0;a)}(E_u, 2)$		$\begin{bmatrix} 0 & \frac{\sqrt{7}}{20} & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}i}{20} \\ \frac{\sqrt{7}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & -\frac{\sqrt{7}i}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{420} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & -\frac{\sqrt{21}}{420} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{420} & -\frac{\sqrt{35}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{420} & \frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{120} & 0 & -\frac{\sqrt{35}i}{840} & -\frac{\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{21}}{40} & 0 & \frac{11\sqrt{21}i}{840} & -\frac{\sqrt{21}}{210} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{120} & 0 & \frac{\sqrt{35}i}{840} & 0 & 0 & \frac{\sqrt{35}}{105} & -\frac{\sqrt{21}}{40} & 0 & -\frac{11\sqrt{21}i}{840} & 0 & 0 & \frac{\sqrt{21}}{210} \\ \frac{\sqrt{21}}{210} & 0 & 0 & -\frac{29\sqrt{35}i}{840} & 0 & -\frac{\sqrt{35}}{120} & 0 & 0 & 0 & -\frac{13\sqrt{21}i}{280} & 0 & \frac{\sqrt{21}}{40} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{210} & \frac{29\sqrt{35}i}{840} & 0 & -\frac{\sqrt{35}}{120} & 0 & 0 & 0 & \frac{13\sqrt{21}i}{280} & 0 & \frac{\sqrt{21}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{35}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} & -\frac{\sqrt{21}}{280} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{35}}{840} & 0 & 0 & \frac{\sqrt{35}}{60} & 0 & 0 & \frac{\sqrt{21}}{280} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
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
$T_{5,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{20} & -\frac{\sqrt{105}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} \\ -\frac{\sqrt{7}i}{20} & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{420} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{60} & \frac{\sqrt{21}}{420} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{420} & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & -\frac{\sqrt{21}}{420} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ -\frac{\sqrt{21}}{210} & 0 & 0 & -\frac{\sqrt{35}i}{120} & 0 & -\frac{29\sqrt{35}}{840} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{40} & 0 & \frac{13\sqrt{21}}{280} & 0 & 0 \\ 0 & \frac{\sqrt{21}}{210} & \frac{\sqrt{35}i}{120} & 0 & -\frac{29\sqrt{35}}{840} & 0 & 0 & 0 & \frac{\sqrt{21}i}{40} & 0 & \frac{13\sqrt{21}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{840} & 0 & -\frac{\sqrt{35}i}{120} & \frac{\sqrt{35}}{105} & 0 & 0 & -\frac{11\sqrt{21}}{840} & 0 & \frac{\sqrt{21}i}{40} & -\frac{\sqrt{21}}{210} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{840} & 0 & \frac{\sqrt{35}i}{120} & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{11\sqrt{21}}{840} & 0 & -\frac{\sqrt{21}i}{40} & 0 & 0 & \frac{\sqrt{21}}{210} \\ 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{35}}{840} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & -\frac{\sqrt{21}}{280} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{840} & -\frac{\sqrt{35}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{280} & 0 & 0 \end{bmatrix}$	
		$-\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
745	symmetry	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}i}{40} & 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{40} & 0 & \frac{\sqrt{3}}{40} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & \frac{\sqrt{3}i}{40} & 0 & \frac{\sqrt{3}}{40} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{5} & \frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{10} & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{1}{10} \\ \frac{i}{10} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & -\frac{1}{10} & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & \frac{i}{10} & 0 \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & -\frac{i}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{120} & 0 & -\frac{\sqrt{15}i}{120} & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & \frac{1}{5} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{120} & 0 & \frac{\sqrt{15}i}{120} & 0 & 0 & 0 & \frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & -\frac{1}{5} \end{bmatrix}$
746	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$T_{5,1}^{(1,0;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{5}}{40}$ 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 $-\frac{\sqrt{3}}{40}$ 0 $-\frac{\sqrt{3}i}{40}$ 0 0	
	0 0 $\frac{\sqrt{5}}{40}$ 0 $\frac{\sqrt{5}i}{40}$ 0 0 0 $-\frac{\sqrt{3}}{40}$ 0 $\frac{\sqrt{3}i}{40}$ 0 0 0	
	0 0 0 $\frac{\sqrt{15}}{120}$ 0 $\frac{\sqrt{15}i}{120}$ 0 0 0 $-\frac{1}{8}$ 0 $\frac{i}{8}$ $-\frac{1}{5}$ 0	
	0 0 $\frac{\sqrt{15}}{120}$ 0 $-\frac{\sqrt{15}i}{120}$ 0 0 0 $-\frac{1}{8}$ 0 $-\frac{i}{8}$ 0 0 $\frac{1}{5}$	
	0 $-\frac{1}{10}$ 0 0 $-\frac{\sqrt{15}}{30}$ 0 0 0 0 0 $-\frac{1}{10}$ 0 0 $\frac{i}{10}$	
	$-\frac{1}{10}$ 0 0 0 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0 $\frac{1}{10}$ $-\frac{i}{10}$ 0	
	0 $\frac{i}{10}$ $-\frac{\sqrt{15}}{30}$ 0 0 0 0 0 $\frac{1}{10}$ 0 0 0 0 $\frac{1}{10}$	
	$-\frac{i}{10}$ 0 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 $-\frac{1}{10}$ 0 0 0 $\frac{1}{10}$ 0	
	$\frac{1}{5}$ 0 0 $-\frac{\sqrt{15}i}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{1}{5}$ $\frac{\sqrt{15}i}{30}$ 0 $\frac{\sqrt{15}}{30}$ 0 0 0 0 0 0 0 0 0	
747	symmetry	$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
$T_{5,0}^{(1,0;a)}(E_u, 4)$	$\frac{1}{10}$ 0 0 $-\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 $-\frac{3i}{40}$ 0 $-\frac{3}{40}$ 0 0	
	0 $-\frac{1}{10}$ $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 $\frac{3i}{40}$ 0 $-\frac{3}{40}$ 0 0 0	
	0 0 0 $\frac{\sqrt{5}i}{24}$ 0 $\frac{\sqrt{5}}{24}$ 0 0 0 $\frac{7\sqrt{3}i}{120}$ 0 $-\frac{7\sqrt{3}}{120}$ 0 0	
	0 0 $-\frac{\sqrt{5}i}{24}$ 0 $\frac{\sqrt{5}}{24}$ 0 0 0 $-\frac{7\sqrt{3}i}{120}$ 0 $-\frac{7\sqrt{3}}{120}$ 0 0 0	
	0 $\frac{\sqrt{3}i}{30}$ $-\frac{\sqrt{5}}{60}$ 0 0 0 0 $-\frac{\sqrt{5}}{15}$ $-\frac{\sqrt{3}}{20}$ 0 0 0 0 $-\frac{\sqrt{3}}{10}$	
	$-\frac{\sqrt{3}i}{30}$ 0 0 $\frac{\sqrt{5}}{60}$ 0 0 $-\frac{\sqrt{5}}{15}$ 0 0 $\frac{\sqrt{3}}{20}$ 0 0 $-\frac{\sqrt{3}}{10}$ 0	
	0 $-\frac{\sqrt{3}}{30}$ 0 0 $-\frac{\sqrt{5}}{60}$ 0 0 $\frac{\sqrt{5}i}{15}$ 0 0 $\frac{\sqrt{3}}{20}$ 0 0 $-\frac{\sqrt{3}i}{10}$	
	$-\frac{\sqrt{3}}{30}$ 0 0 0 0 $\frac{\sqrt{5}}{60}$ $-\frac{\sqrt{5}i}{15}$ 0 0 0 0 $-\frac{\sqrt{3}}{20}$ $\frac{\sqrt{3}i}{10}$ 0	
	0 0 0 $\frac{\sqrt{5}}{60}$ 0 $-\frac{\sqrt{5}i}{60}$ $\frac{\sqrt{5}}{30}$ 0 0 $\frac{\sqrt{3}}{60}$ 0 $\frac{\sqrt{3}i}{60}$ 0 0	
	0 0 $\frac{\sqrt{5}}{60}$ 0 $\frac{\sqrt{5}i}{60}$ 0 0 $-\frac{\sqrt{5}}{30}$ $\frac{\sqrt{3}}{60}$ 0 $-\frac{\sqrt{3}i}{60}$ 0 0 0	
748	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 4)$	0 0 0 $\frac{\sqrt{15}}{120}$ 0 $\frac{\sqrt{15}i}{120}$ 0 0 0 0 $\frac{7}{40}$ 0 $-\frac{7i}{40}$ $\frac{1}{10}$ 0	
	0 0 $\frac{\sqrt{15}}{120}$ 0 $-\frac{\sqrt{15}i}{120}$ 0 0 0 $\frac{7}{40}$ 0 $\frac{7i}{40}$ 0 0 $-\frac{1}{10}$	
	0 0 0 $\frac{\sqrt{5}}{120}$ 0 $-\frac{\sqrt{5}i}{120}$ $\frac{\sqrt{5}}{30}$ 0 0 $\frac{\sqrt{3}}{40}$ 0 $\frac{\sqrt{3}i}{40}$ 0 0 0	
	0 0 $\frac{\sqrt{5}}{120}$ 0 $\frac{\sqrt{5}i}{120}$ 0 0 $-\frac{\sqrt{5}}{30}$ $\frac{\sqrt{3}}{40}$ 0 $-\frac{\sqrt{3}i}{40}$ 0 0 0	
	0 $\frac{\sqrt{3}}{10}$ 0 0 $\frac{\sqrt{5}}{30}$ 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 $-\frac{\sqrt{3}}{30}$ 0 0 $\frac{\sqrt{3}i}{30}$	
	$\frac{\sqrt{3}}{10}$ 0 0 0 0 $-\frac{\sqrt{5}}{30}$ $\frac{\sqrt{5}i}{15}$ 0 0 0 0 $\frac{\sqrt{3}}{30}$ $-\frac{\sqrt{3}i}{30}$ 0	
	0 $\frac{\sqrt{3}i}{10}$ $-\frac{\sqrt{5}}{30}$ 0 0 0 $-\frac{\sqrt{5}}{15}$ $-\frac{\sqrt{3}}{30}$ 0 0 0 0 $-\frac{\sqrt{3}}{30}$	
	$-\frac{\sqrt{3}i}{10}$ 0 0 $\frac{\sqrt{5}}{30}$ 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 $\frac{\sqrt{3}}{30}$ 0 0 $-\frac{\sqrt{3}}{30}$ 0	
	0 0 0 $-\frac{\sqrt{5}i}{30}$ 0 $-\frac{\sqrt{5}}{30}$ 0 0 0 $-\frac{\sqrt{3}i}{15}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 0	
	0 0 $\frac{\sqrt{5}i}{30}$ 0 $-\frac{\sqrt{5}}{30}$ 0 0 0 $\frac{\sqrt{3}i}{15}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 0	
749	symmetry	$z$
$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	0 0 0 $\frac{3\sqrt{35}i}{280}$ 0 $\frac{3\sqrt{35}}{280}$ 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0 0	
	0 0 $-\frac{3\sqrt{35}i}{280}$ 0 $\frac{3\sqrt{35}}{280}$ 0 0 0 $-\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0 0 0	
	$\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{105}i}{280}$ 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0	
	0 $-\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}i}{280}$ 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0	
	0 0 $\frac{\sqrt{105}}{140}$ 0 0 0 0 $\frac{\sqrt{105}}{70}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 $\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{105}}{140}$ $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0	
	0 0 0 $-\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0	
	0 0 $-\frac{\sqrt{105}}{70}$ 0 $\frac{\sqrt{105}i}{70}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$	
750	symmetry	$x$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,0}^{(1,1;a)}(E_u)$	0	$-\frac{\sqrt{21}}{28}$ 0 0 0 $\frac{3\sqrt{35}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{56}$ 0 0 $-\frac{\sqrt{21}i}{28}$
	$-\frac{\sqrt{21}}{28}$	0 0 0 0 0 $-\frac{3\sqrt{35}}{280}$ 0 0 0 0 0 $\frac{\sqrt{21}}{56}$ $\frac{\sqrt{21}i}{28}$ 0
	0	$-\frac{\sqrt{7}}{28}$ 0 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0
	$-\frac{\sqrt{7}}{28}$	0 0 0 0 0 $\frac{\sqrt{105}}{280}$ $\frac{\sqrt{105}i}{140}$ 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{105}i}{70}$ $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{140}$ 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0
	0	0 0 $\frac{\sqrt{105}i}{70}$ 0 $\frac{\sqrt{105}}{140}$ 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0
	0	0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0
751	symmetry	$y$
$\mathbb{T}_{1,1}^{(1,1;a)}(E_u)$	0	$-\frac{\sqrt{21}i}{28}$ $-\frac{3\sqrt{35}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{56}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$
	$\frac{\sqrt{21}i}{28}$	0 0 $\frac{3\sqrt{35}}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{56}$ 0 0 0 $\frac{\sqrt{21}}{28}$ 0
	0	$\frac{\sqrt{7}i}{28}$ $-\frac{\sqrt{105}}{280}$ 0 0 0 0 $\frac{\sqrt{105}}{140}$ $\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{7}i}{28}$	0 0 $\frac{\sqrt{105}}{280}$ 0 0 0 $\frac{\sqrt{105}}{140}$ 0 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{140}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{105}i}{140}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0
	0	0 0 $\frac{\sqrt{105}}{70}$ 0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{105}}{70}$ $\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0
752	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{1u})$	$0 \quad -\frac{\sqrt{210}i}{420} \quad \frac{\sqrt{14}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{420}$	
	$\frac{\sqrt{210}i}{420} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{420} \quad 0$	
	$0 \quad \frac{\sqrt{70}i}{60} \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{60} \quad 0$	
	$-\frac{\sqrt{70}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{60} \quad 0$	
	$-\frac{\sqrt{70}}{240} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{42} \quad 0 \quad \frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{70}i}{840} \quad 0 \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{70}}{240} \quad \frac{\sqrt{42}i}{42} \quad 0 \quad \frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{70}i}{840} \quad 0 \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{224} \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{70}}{480} \quad 0 \quad \frac{\sqrt{70}i}{84} \quad \frac{\sqrt{70}}{240} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{5\sqrt{42}}{224} \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{7\sqrt{70}}{480} \quad 0 \quad -\frac{\sqrt{70}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{240} \quad 0$	
	$0 \quad \frac{\sqrt{70}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{60} \quad 0$	
	$\frac{\sqrt{70}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{96} \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{96} \quad -\frac{\sqrt{70}i}{60} \quad 0 \quad 0$	
753	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 1)$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{112} \quad 0 \quad \frac{\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{21}i}{336} \quad 0 \quad -\frac{5\sqrt{21}}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{35}i}{112} \quad 0 \quad \frac{\sqrt{35}}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{21}i}{336} \quad 0 \quad -\frac{5\sqrt{21}}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{7}}{21} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{336} \quad 0 \quad -\frac{\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{7}i}{336} \quad 0 \quad \frac{13\sqrt{7}}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{7}}{21} \quad -\frac{\sqrt{105}i}{336} \quad 0 \quad -\frac{\sqrt{105}}{336} \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{7}i}{336} \quad 0 \quad \frac{13\sqrt{7}}{336} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{7}i}{24} \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad \frac{5\sqrt{7}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0$	
	$-\frac{\sqrt{7}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad -\frac{5\sqrt{7}}{84} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{24} \quad 0$	
	$0 \quad \frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{84} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{24} \quad 0$	
	$\frac{\sqrt{7}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{7}}{84} \quad -\frac{\sqrt{7}i}{24} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{112} \quad 0 \quad \frac{\sqrt{105}i}{112} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{48} \quad 0 \quad -\frac{\sqrt{7}i}{48} \quad \frac{\sqrt{7}}{21} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{105}}{112} \quad 0 \quad -\frac{\sqrt{105}i}{112} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{48} \quad 0 \quad \frac{\sqrt{7}i}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{21} \quad 0$	
754	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 2)$	0	$\frac{\sqrt{210}}{420} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{420}$
	$\frac{\sqrt{210}}{420}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{160} \quad \frac{\sqrt{210}i}{420} \quad 0 \quad 0$
	0	$\frac{\sqrt{70}}{60} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{60}$
	$\frac{\sqrt{70}}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{96} \quad -\frac{\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{96} \quad -\frac{\sqrt{70}i}{60} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad -\frac{5\sqrt{42}i}{224} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{84} \quad 0 \quad -\frac{7\sqrt{70}i}{480} \quad -\frac{\sqrt{70}}{240} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad \frac{5\sqrt{42}i}{224} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{84} \quad 0 \quad \frac{7\sqrt{70}i}{480} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{240}$
	$-\frac{\sqrt{70}}{240}$	$0 \quad 0 \quad -\frac{13\sqrt{42}i}{672} \quad 0 \quad \frac{\sqrt{42}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{96} \quad 0 \quad \frac{11\sqrt{70}}{840} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{70}}{240} \quad \frac{13\sqrt{42}i}{672} \quad 0 \quad \frac{\sqrt{42}}{42} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{96} \quad 0 \quad \frac{11\sqrt{70}}{840} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{70}i}{60} \quad -\frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad -\frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{60} \quad 0$
	$\frac{\sqrt{70}i}{60}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{96} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{60} \quad 0$
755	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{T}_{3,0}^{(1,1;a)}(E_u, 1)$	0	$0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28}$
	$-\frac{\sqrt{14}}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}}{224} \quad \frac{\sqrt{14}i}{28} \quad 0$
	0	$0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{42}}{84}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{224} \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{42}}{672} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad -\frac{\sqrt{70}i}{224} \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{96} \quad -\frac{\sqrt{42}}{48} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad \frac{\sqrt{70}i}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad -\frac{\sqrt{42}}{84} \quad 0 \quad \frac{\sqrt{42}i}{96} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{48}$
	$\frac{\sqrt{42}}{48}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{96} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{42}}{48} \quad -\frac{\sqrt{70}i}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{96} \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{56} \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{84}$
	0	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{224} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{84}$
756	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$T_{3,1}^{(1,1;a)}(E_u, 1)$	0	$-\frac{\sqrt{14}i}{28} \quad -\frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28}$
	$\frac{\sqrt{14}i}{28}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}}{224} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0$
	0	$-\frac{\sqrt{42}i}{84} \quad -\frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad -\frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{42}i}{84}$	$0 \quad 0 \quad \frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad \frac{13\sqrt{42}}{672} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{42}}{48}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{42}}{48} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{224} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{224} \quad 0 \quad -\frac{\sqrt{70}i}{56} \quad -\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{96} \quad 0 \quad \frac{\sqrt{42}i}{84} \quad -\frac{\sqrt{42}}{48} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{70}}{224} \quad 0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{56} \quad \frac{\sqrt{42}}{96} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{48}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{224} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{96} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{84}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{224} \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{96} \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0$
757	symmetry	$-\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$T_{3,0}^{(1,1;a)}(E_u, 2)$	$\frac{\sqrt{35}}{35}$	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{21}i}{112} \quad 0 \quad -\frac{3\sqrt{21}}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{35}i}{560} \quad 0 \quad -\frac{13\sqrt{35}}{560} \quad 0 \quad 0$
	0	$-\frac{\sqrt{35}}{35} \quad -\frac{3\sqrt{21}i}{112} \quad 0 \quad -\frac{3\sqrt{21}}{112} \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{35}i}{560} \quad 0 \quad -\frac{13\sqrt{35}}{560} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{7}i}{112} \quad 0 \quad \frac{3\sqrt{7}}{112} \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{105}i}{1680} \quad 0 \quad -\frac{11\sqrt{105}}{1680} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{7}i}{112} \quad 0 \quad \frac{3\sqrt{7}}{112} \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{105}i}{1680} \quad 0 \quad -\frac{11\sqrt{105}}{1680} \quad 0 \quad 0$
	0	$-\frac{\sqrt{105}i}{120} \quad \frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56} \quad -\frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{105}i}{120}$	$0 \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{105}}{120}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{28} \quad \frac{\sqrt{7}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{7}}{112} \quad 0 \quad -\frac{5\sqrt{7}i}{112} \quad -\frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{80} \quad 0 \quad \frac{\sqrt{105}i}{80} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{5\sqrt{7}}{112} \quad 0 \quad \frac{5\sqrt{7}i}{112} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad \frac{\sqrt{105}}{80} \quad 0 \quad -\frac{\sqrt{105}i}{80} \quad 0 \quad 0 \quad 0$
758	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{35}}{35} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{105}}{120} & 0 & 0 & -\frac{\sqrt{105}i}{120} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{120} & \frac{\sqrt{105}i}{120} & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & \frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & \frac{\sqrt{105}}{120} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & \frac{\sqrt{105}}{120} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{105}i}{120} & 0 & \frac{\sqrt{105}}{120} & 0 & 0 & 0 \end{bmatrix}$	
		$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} \end{bmatrix}$
		$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(a)}(E_u, 1)$	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{14}i}{56}$ 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 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 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 0 0	
761	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,1}^{(a)}(E_u, 1)$	0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
762	symmetry	$\sqrt{3}xy$

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(a)}(E_u, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
763	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{M}_{2,1}^{(a)}(E_u, 2)$		$\begin{bmatrix} \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
$\mathbb{M}_4^{(a)}(A_{1u}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \end{bmatrix}$
		$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{30}i}{80} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} \\ \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
765	symmetry	
766	symmetry	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(a)}(A_{2u})$	0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0 $\frac{3\sqrt{30}i}{80}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{2}i}{16}$ 0 0 0 0 0 0 $\frac{3\sqrt{30}i}{80}$ 0 0 0 0 0	
	0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 0	
	$\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{40}$	
	0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}i}{16}$ 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0	
767	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,0}^{(a)}(E_u, 1)$	0 0 $\frac{3\sqrt{14}i}{112}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{112}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{14}i}{112}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{112}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 0 $\frac{13\sqrt{70}i}{560}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 0 $\frac{13\sqrt{70}i}{560}$ 0 0 0 0 0	
	$\frac{\sqrt{70}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{70}i}{40}$ 0 0 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 $\frac{\sqrt{70}i}{40}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 $\frac{\sqrt{70}i}{40}$	
	0 0 0 0 0 $\frac{3\sqrt{42}i}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{80}$ 0 0 0	
	0 0 0 0 0 0 $\frac{3\sqrt{42}i}{112}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{80}$ 0 0 0	
768	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(a)}(E_u, 1)$	0 0 0 0 $\frac{3\sqrt{14}i}{112}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{112}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{13\sqrt{70}i}{560}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{13\sqrt{70}i}{560}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{40}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{40}$ 0 0 0	
	$\frac{\sqrt{70}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{70}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{3\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{80}$ 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{42}i}{112}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{80}$ 0 0 0 0 0 0 0	
769	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{M}_{4,0}^{(a)}(E_u, 2)$	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 $-\frac{\sqrt{5}i}{10}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{10}$	
	0 0 0 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 0	
	0 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 0 0 $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 0	
	$\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{5}i}{10}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
770	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$	
	771 symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$	
	772 symmetry	

*continued ..*

Table 9

No.	multipole	matrix
	$\mathbb{M}_{4,1}^{(a)}(E_u, 3)$	$\begin{bmatrix} \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
773	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{280} & \frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{210}}{70} & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & \frac{\sqrt{42}}{42} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{84} & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{42} & \frac{\sqrt{70}i}{140} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
774	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{3\sqrt{70}i}{140}$ 0 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{3\sqrt{70}i}{140}$ 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{14}i}{28}$	
	0 0 0 0 0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 $\frac{\sqrt{210}i}{140}$ $-\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{28}$ $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0	
	$\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0	
775	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)$	0 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{3\sqrt{70}}{140}$ $\frac{\sqrt{42}}{56}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{3\sqrt{70}}{140}$ 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	0 0 0 $\frac{3\sqrt{210}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	$-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
	0 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 $-\frac{\sqrt{210}}{140}$ $\frac{\sqrt{14}}{28}$ 0 0 0 $\frac{\sqrt{14}}{28}$	
	0 $-\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0	
	$-\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0	
776	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(1,-1;a)}(E_u, 2)$	0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{3\sqrt{70}}{280}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{210}i}{280}$ 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 0 $\frac{3\sqrt{210}i}{280}$ 0 $-\frac{3\sqrt{210}}{280}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 $-\frac{\sqrt{210}}{140}$ 0 $\frac{\sqrt{210}i}{140}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0	
	0 0 $-\frac{\sqrt{210}}{140}$ 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
777	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0	
	0 0 $-\frac{3\sqrt{70}}{280}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{210}}{280}$ 0 $-\frac{3\sqrt{210}i}{280}$ 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 0 $\frac{3\sqrt{210}}{280}$ 0 $\frac{3\sqrt{210}i}{280}$ 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0	
	0 0 0 $-\frac{\sqrt{210}i}{140}$ 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0	
	0 0 $\frac{\sqrt{210}i}{140}$ 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 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
$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	0 0 0 $\frac{3\sqrt{105}}{560}$ 0 $-\frac{3\sqrt{105}i}{560}$ $\frac{2\sqrt{105}}{105}$ 0 0 $\frac{3\sqrt{7}}{112}$ 0 $\frac{3\sqrt{7}i}{112}$ 0 0	
	0 0 $\frac{3\sqrt{105}}{560}$ 0 $\frac{3\sqrt{105}i}{560}$ 0 0 $-\frac{2\sqrt{105}}{105}$ $\frac{3\sqrt{7}}{112}$ 0 $-\frac{3\sqrt{7}i}{112}$ 0 0 0	
	0 0 0 $\frac{11\sqrt{35}}{560}$ 0 $\frac{11\sqrt{35}i}{560}$ 0 0 0 $\frac{\sqrt{21}}{112}$ 0 $-\frac{\sqrt{21}i}{112}$ $-\frac{\sqrt{21}}{21}$ 0	
	0 0 $\frac{11\sqrt{35}}{560}$ 0 $-\frac{11\sqrt{35}i}{560}$ 0 0 0 $\frac{\sqrt{21}}{112}$ 0 $\frac{\sqrt{21}i}{112}$ 0 0 $\frac{\sqrt{21}}{21}$	
	0 $-\frac{\sqrt{21}}{56}$ 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 $\frac{\sqrt{35}i}{140}$ 0 0 $\frac{\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{21}i}{56}$	
	$-\frac{\sqrt{21}}{56}$ 0 0 0 $\frac{\sqrt{35}}{140}$ $-\frac{\sqrt{35}i}{140}$ 0 0 0 0 $-\frac{\sqrt{21}}{84}$ $\frac{\sqrt{21}i}{56}$ 0	
	0 $\frac{\sqrt{21}i}{56}$ $-\frac{\sqrt{35}}{140}$ 0 0 0 0 $-\frac{\sqrt{35}}{140}$ $-\frac{\sqrt{21}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{56}$	
	$-\frac{\sqrt{21}i}{56}$ 0 0 $\frac{\sqrt{35}}{140}$ 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 $\frac{\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{21}}{56}$ 0	
	$-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{35}i}{560}$ 0 $\frac{\sqrt{35}}{560}$ 0 0 0 $-\frac{3\sqrt{21}i}{112}$ 0 $-\frac{3\sqrt{21}}{112}$ 0 0	
	0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{35}i}{560}$ 0 $\frac{\sqrt{35}}{560}$ 0 0 0 $\frac{3\sqrt{21}i}{112}$ 0 $-\frac{3\sqrt{21}}{112}$ 0 0 0	
779	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	0 0 $-\frac{5\sqrt{6}}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}}{32}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}}{96}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{32}$ 0 0 0 0 0	
	0 0 $\frac{\sqrt{2}}{32}$ 0 0 0 0 $-\frac{\sqrt{2}}{8}$ $\frac{\sqrt{30}}{96}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2}}{32}$ 0 0 $-\frac{\sqrt{2}}{8}$ 0 0 $-\frac{\sqrt{30}}{96}$ 0 0 0 0	
	$-\frac{\sqrt{30}}{48}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0	
	0 $\frac{\sqrt{30}}{48}$ $\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{2}}{32}$ 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0 $\frac{\sqrt{30}}{48}$ 0	
	0 0 $\frac{\sqrt{2}}{32}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 $-\frac{\sqrt{30}}{32}$ 0 0 0 $-\frac{\sqrt{30}}{48}$	
	0 0 0 0 $-\frac{\sqrt{2}}{32}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 $\frac{\sqrt{30}}{96}$ 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{2}}{32}$ $\frac{\sqrt{2}i}{8}$ 0 0 0 $-\frac{\sqrt{30}}{96}$ 0 0	
780	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{30}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{96} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & \frac{\sqrt{30}}{48} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & -\frac{\sqrt{30}}{48} \\ \frac{\sqrt{30}}{48} & 0 & 0 & -\frac{\sqrt{2}i}{32} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{48} & \frac{\sqrt{2}i}{32} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
781	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{224} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{11\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{210}}{224} & 0 & 0 & \frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}}{224} & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{224} & -\frac{\sqrt{210}i}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{224} & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{672} & -\frac{\sqrt{210}}{112} & 0 \\ 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{210}i}{672} & 0 & 0 & \frac{\sqrt{210}}{112} \\ \frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{14}i}{224} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{672} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{112} & -\frac{\sqrt{14}i}{224} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{84} & -\frac{\sqrt{14}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & -\frac{3\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & \frac{3\sqrt{210}}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
782	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	0 0 $\frac{3\sqrt{42}}{224}$ 0 0 0 0 $-\frac{\sqrt{42}}{42}$ $\frac{3\sqrt{70}}{224}$ 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{42}}{224}$ 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 $-\frac{3\sqrt{70}}{224}$ 0 0 0 0	
	0 0 $\frac{11\sqrt{14}}{224}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$ $\frac{\sqrt{210}}{224}$ 0 0 0 0 $\frac{\sqrt{210}}{84}$	
	0 0 0 $-\frac{11\sqrt{14}}{224}$ 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{210}}{224}$ 0 0 $\frac{\sqrt{210}}{84}$ 0	
	$-\frac{\sqrt{210}}{112}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{224}$ 0 0 0 0 0 $-\frac{5\sqrt{210}}{672}$ 0 0	
	0 $\frac{\sqrt{210}}{112}$ $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{224}$ 0 0 0 0 $-\frac{5\sqrt{210}}{672}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{14}}{224}$ 0 $\frac{\sqrt{14}i}{56}$ $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{210}}{672}$ 0 0 $-\frac{\sqrt{210}}{112}$ 0	
	0 0 $\frac{3\sqrt{14}}{224}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}}{56}$ $-\frac{\sqrt{210}}{672}$ 0 0 0 $\frac{\sqrt{210}}{112}$	
	0 $\frac{\sqrt{210}}{84}$ 0 0 $\frac{\sqrt{14}}{224}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{3\sqrt{210}}{224}$ 0 0 0	
	$\frac{\sqrt{210}}{84}$ 0 0 0 0 $-\frac{\sqrt{14}}{224}$ $-\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{3\sqrt{210}}{224}$ 0 0	
783	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{5\sqrt{3}i}{48}$ 0 $-\frac{5\sqrt{3}}{48}$ 0 0 0 $\frac{\sqrt{5}i}{16}$ 0 $-\frac{\sqrt{5}}{16}$ 0 0	
	0 0 $\frac{5\sqrt{3}i}{48}$ 0 $-\frac{5\sqrt{3}}{48}$ 0 0 0 $-\frac{\sqrt{5}i}{16}$ 0 $-\frac{\sqrt{5}}{16}$ 0 0 0	
	0 0 0 $\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0 $\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0	
	0 0 $-\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0 $-\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$	
	$\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0	
	0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$	
	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 0 0 $-\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0 $-\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0	
784	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	0 0 0 $-\frac{5\sqrt{3}}{48}$ 0 $\frac{5\sqrt{3}i}{48}$ 0 0 0 $\frac{\sqrt{5}}{16}$ 0 $\frac{\sqrt{5}i}{16}$ 0 0 0	
	0 0 $-\frac{5\sqrt{3}}{48}$ 0 $-\frac{5\sqrt{3}i}{48}$ 0 0 0 $\frac{\sqrt{5}}{16}$ 0 $-\frac{\sqrt{5}i}{16}$ 0 0 0	
	0 0 0 $\frac{1}{16}$ 0 $\frac{i}{16}$ 0 0 0 $\frac{\sqrt{15}}{48}$ 0 $-\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 0 $\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 0 $\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$	
	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$	
	$-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0	
	0 0 0 $\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0 $\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	0 0 $-\frac{i}{16}$ 0 $-\frac{1}{16}$ 0 0 0 $-\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
785	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{M}_{4,0}^{(1,-1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{21}i}{48}$ 0 $-\frac{\sqrt{21}}{48}$ 0 0 0 $\frac{\sqrt{35}i}{112}$ 0 $\frac{\sqrt{35}}{112}$ 0 0 0	
	0 0 $-\frac{\sqrt{21}i}{48}$ 0 $-\frac{\sqrt{21}}{48}$ 0 0 0 $-\frac{\sqrt{35}i}{112}$ 0 $\frac{\sqrt{35}}{112}$ 0 0 0	
	0 0 0 $\frac{5\sqrt{7}i}{112}$ 0 $\frac{5\sqrt{7}}{112}$ 0 0 0 $\frac{\sqrt{105}i}{336}$ 0 $-\frac{\sqrt{105}}{336}$ 0 0 0	
	0 0 $-\frac{5\sqrt{7}i}{112}$ 0 $\frac{5\sqrt{7}}{112}$ 0 0 0 $-\frac{\sqrt{105}i}{336}$ 0 $-\frac{\sqrt{105}}{336}$ 0 0 0	
	0 $-\frac{\sqrt{105}i}{168}$ $-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$	
	$\frac{\sqrt{105}i}{168}$ 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ 0	
	0 $\frac{\sqrt{105}}{168}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$	
	$\frac{\sqrt{105}}{168}$ 0 0 0 $\frac{\sqrt{7}}{14}$ $\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0	
	0 0 0 $-\frac{\sqrt{7}}{112}$ 0 $\frac{\sqrt{7}i}{112}$ $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{5\sqrt{105}}{336}$ 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 0	
	0 0 $-\frac{\sqrt{7}}{112}$ 0 $-\frac{\sqrt{7}i}{112}$ 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{5\sqrt{105}}{336}$ 0 $\frac{5\sqrt{105}i}{336}$ 0 0 0	
786	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 3)$	0 0 0 $-\frac{\sqrt{21}}{168}$ 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $\frac{\sqrt{35}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{21}}{168}$ 0 $\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0	
	0 0 $-\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}}{168}$ 0 $\frac{\sqrt{105}i}{168}$ 0 0 0	
	0 $\frac{\sqrt{105}}{84}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 $-\frac{\sqrt{105}}{168}$	
	$\frac{\sqrt{105}}{84}$ 0 0 0 $\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{105}}{56}$ $\frac{\sqrt{105}i}{168}$ 0	
	0 $\frac{\sqrt{105}i}{84}$ $\frac{\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{105}}{56}$ 0 0 0 0 $\frac{\sqrt{105}}{168}$	
	$-\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{105}}{56}$ 0 0 $\frac{\sqrt{105}}{168}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0	
787	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$
$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 1)$	0 0 0 $\frac{3\sqrt{385}}{616}$ 0 $-\frac{3\sqrt{385}i}{616}$ $\frac{\sqrt{385}}{77}$ 0 0 $\frac{5\sqrt{231}}{616}$ 0 $\frac{5\sqrt{231}i}{616}$ 0 0	
	0 0 $\frac{3\sqrt{385}}{616}$ 0 $\frac{3\sqrt{385}i}{616}$ 0 0 $-\frac{\sqrt{385}}{77}$ $\frac{5\sqrt{231}}{616}$ 0 $-\frac{5\sqrt{231}i}{616}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{924}$ 0 0 0 $-\frac{\sqrt{77}}{308}$ 0 $\frac{\sqrt{77}i}{308}$ $\frac{\sqrt{77}}{154}$ 0	
	0 0 $-\frac{\sqrt{1155}}{924}$ 0 $\frac{\sqrt{1155}i}{924}$ 0 0 0 $-\frac{\sqrt{77}}{308}$ 0 $-\frac{\sqrt{77}i}{308}$ 0 0 $-\frac{\sqrt{77}}{154}$	
	0 $\frac{\sqrt{77}}{154}$ 0 0 $\frac{\sqrt{1155}}{308}$ 0 0 $\frac{\sqrt{1155}i}{231}$ 0 0 $-\frac{5\sqrt{77}}{308}$ 0 0 $\frac{\sqrt{77}i}{154}$	
	$\frac{\sqrt{77}}{154}$ 0 0 0 0 $-\frac{\sqrt{1155}}{308}$ $-\frac{\sqrt{1155}i}{231}$ 0 0 0 0 $\frac{5\sqrt{77}}{308}$ $-\frac{\sqrt{77}i}{154}$ 0	
	0 $-\frac{\sqrt{77}i}{154}$ $\frac{\sqrt{1155}}{308}$ 0 0 0 0 $-\frac{\sqrt{1155}}{231}$ $\frac{5\sqrt{77}}{308}$ 0 0 0 0 $\frac{\sqrt{77}}{154}$	
	$\frac{\sqrt{77}i}{154}$ 0 0 $-\frac{\sqrt{1155}}{308}$ 0 0 $-\frac{\sqrt{1155}}{231}$ 0 0 $-\frac{5\sqrt{77}}{308}$ 0 0 $\frac{\sqrt{77}}{154}$ 0	
	$\frac{\sqrt{77}}{154}$ 0 0 $\frac{\sqrt{1155}i}{1848}$ 0 $-\frac{\sqrt{1155}}{1848}$ 0 0 0 $\frac{3\sqrt{77}i}{616}$ 0 $\frac{3\sqrt{77}}{616}$ 0 0 0	
	0 $-\frac{\sqrt{77}}{154}$ $-\frac{\sqrt{1155}i}{1848}$ 0 $-\frac{\sqrt{1155}}{1848}$ 0 0 0 $-\frac{3\sqrt{77}i}{616}$ 0 $\frac{3\sqrt{77}}{616}$ 0 0 0	
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
	$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \end{bmatrix}$
789	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
	$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 3)$	$\begin{bmatrix} 0 & \frac{3\sqrt{110}i}{220} & \frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{220} \\ -\frac{3\sqrt{110}i}{220} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{440} & 0 & 0 & 0 & \frac{3\sqrt{110}}{220} & 0 \\ 0 & \frac{\sqrt{330}i}{440} & -\frac{3\sqrt{22}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & -\frac{\sqrt{330}}{176} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} \\ -\frac{\sqrt{330}i}{440} & 0 & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 \\ -\frac{\sqrt{330}}{110} & 0 & 0 & -\frac{\sqrt{22}i}{176} & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{7\sqrt{330}i}{880} & 0 & -\frac{\sqrt{330}}{176} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{110} & \frac{\sqrt{22}i}{176} & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & 0 & \frac{7\sqrt{330}i}{880} & 0 & -\frac{\sqrt{330}}{176} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{22}}{176} & 0 & -\frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{3\sqrt{330}}{880} & 0 & \frac{\sqrt{330}i}{176} & \frac{\sqrt{330}}{110} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{22}}{176} & 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{3\sqrt{330}}{880} & 0 & -\frac{\sqrt{330}i}{176} & 0 & 0 & -\frac{\sqrt{330}}{110} & 0 \\ 0 & \frac{\sqrt{330}}{440} & 0 & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & -\frac{\sqrt{330}}{176} & 0 & 0 & \frac{\sqrt{330}i}{440} & 0 \\ \frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{22}}{176} & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{176} & -\frac{\sqrt{330}i}{440} & 0 & 0 \end{bmatrix}$
790	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \end{bmatrix}$
791	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & \frac{3\sqrt{110}}{220} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{440} & 0 & 0 & -\frac{3\sqrt{110}i}{220} \\ \frac{3\sqrt{110}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{440} & \frac{3\sqrt{110}i}{220} & 0 \\ 0 & -\frac{\sqrt{330}}{440} & 0 & 0 & -\frac{3\sqrt{22}}{176} & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & -\frac{\sqrt{330}i}{440} \\ -\frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{176} & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{176} & \frac{\sqrt{330}i}{440} & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{22}}{176} & 0 & -\frac{5\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{176} & 0 & \frac{3\sqrt{330}i}{880} & \frac{\sqrt{330}}{110} & 0 \\ 0 & 0 & -\frac{3\sqrt{22}}{176} & 0 & \frac{5\sqrt{22}i}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{176} & 0 & -\frac{3\sqrt{330}i}{880} & 0 & 0 & -\frac{\sqrt{330}}{110} \\ \frac{\sqrt{330}}{110} & 0 & 0 & \frac{3\sqrt{22}i}{176} & 0 & -\frac{\sqrt{22}}{176} & 0 & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & \frac{7\sqrt{330}}{880} & 0 & 0 \\ 0 & -\frac{\sqrt{330}}{110} & -\frac{3\sqrt{22}i}{176} & 0 & -\frac{\sqrt{22}}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}i}{176} & 0 & \frac{7\sqrt{330}}{880} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{440} & -\frac{3\sqrt{22}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & -\frac{\sqrt{330}}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} \\ -\frac{\sqrt{330}i}{440} & 0 & 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} \end{bmatrix}$
792	symmetry	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,0}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{2}}{8}$ 0 0 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 $-\frac{\sqrt{2}i}{8}$	
	$\frac{\sqrt{2}}{8}$ 0 0 0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ $\frac{\sqrt{2}i}{8}$ 0	
	0 0 0 $\frac{\sqrt{30}}{48}$ 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 $-\frac{\sqrt{2}i}{16}$ 0 0	
	0 0 $\frac{\sqrt{30}}{48}$ 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 $\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 $-\frac{\sqrt{2}}{16}$ 0 0	
	0 0 $\frac{\sqrt{30}i}{48}$ 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 $-\frac{\sqrt{2}}{16}$ 0 0 0	
	0 $\frac{\sqrt{2}i}{8}$ $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 $\frac{\sqrt{2}}{8}$	
	$-\frac{\sqrt{2}i}{8}$ 0 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 $\frac{\sqrt{2}}{8}$ 0	
793	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{2}i}{8}$ $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 0 0 0 $\frac{\sqrt{2}}{8}$	
	$-\frac{\sqrt{2}i}{8}$ 0 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 $\frac{\sqrt{2}}{8}$ 0	
	0 0 0 $\frac{\sqrt{30}i}{48}$ 0 $\frac{\sqrt{30}}{48}$ 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 $\frac{\sqrt{2}}{16}$ 0 0 0	
	0 0 $-\frac{\sqrt{30}i}{48}$ 0 $\frac{\sqrt{30}}{48}$ 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 $\frac{\sqrt{2}}{16}$ 0 0 0	
	0 0 0 $\frac{\sqrt{30}}{48}$ 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 $\frac{\sqrt{30}}{48}$ 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 $-\frac{\sqrt{2}}{16}$ 0 $\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 $-\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}}{16}$ 0 0 $\frac{\sqrt{2}i}{8}$	
	$-\frac{\sqrt{2}}{8}$ 0 0 0 0 $-\frac{\sqrt{30}}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{16}$ $-\frac{\sqrt{2}i}{8}$ 0	
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
$\mathbb{M}_{6,0}^{(1,-1;a)}(E_u, 2)$	0	$-\frac{\sqrt{11}}{44}$ 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $\frac{5\sqrt{11}}{88}$ 0 0 $-\frac{\sqrt{11}i}{44}$
	$-\frac{\sqrt{11}}{44}$	0 0 0 0 0 $\frac{\sqrt{165}}{88}$ $\frac{\sqrt{165}i}{66}$ 0 0 0 0 $-\frac{5\sqrt{11}}{88}$ $\frac{\sqrt{11}i}{44}$ 0
	0	0 0 0 0 $-\frac{\sqrt{55}}{132}$ 0 0 $-\frac{\sqrt{55}i}{132}$ 0 0 $\frac{\sqrt{33}}{132}$ 0 0 $-\frac{\sqrt{33}i}{132}$
	0	0 0 0 0 0 $\frac{\sqrt{55}}{132}$ $\frac{\sqrt{55}i}{132}$ 0 0 0 0 $-\frac{\sqrt{33}}{132}$ $\frac{\sqrt{33}i}{132}$ 0
	0	0 0 0 $\frac{\sqrt{55}}{264}$ 0 $-\frac{5\sqrt{55}i}{264}$ $\frac{\sqrt{55}}{33}$ 0 0 $\frac{\sqrt{33}}{88}$ 0 $\frac{7\sqrt{33}i}{264}$ $\frac{\sqrt{33}}{66}$ 0
	0	0 0 $\frac{\sqrt{55}}{264}$ 0 $\frac{5\sqrt{55}i}{264}$ 0 0 $-\frac{\sqrt{55}}{33}$ $\frac{\sqrt{33}}{88}$ 0 $-\frac{7\sqrt{33}i}{264}$ 0 0 $-\frac{\sqrt{33}}{66}$
	$-\frac{\sqrt{33}}{66}$	0 0 $-\frac{\sqrt{55}i}{264}$ 0 $\frac{\sqrt{55}}{264}$ 0 0 0 $-\frac{\sqrt{33}i}{88}$ 0 $-\frac{\sqrt{33}}{88}$ 0 0 0
	0	$\frac{\sqrt{33}}{66}$ $\frac{\sqrt{55}i}{264}$ 0 $\frac{\sqrt{55}}{264}$ 0 0 0 $\frac{\sqrt{33}i}{88}$ 0 $-\frac{\sqrt{33}}{88}$ 0 0 0
	0	$-\frac{\sqrt{33}i}{132}$ $\frac{\sqrt{55}}{264}$ 0 0 0 0 $-\frac{\sqrt{55}}{132}$ $\frac{\sqrt{33}}{88}$ 0 0 0 0 0
	$\frac{\sqrt{33}i}{132}$	0 0 $-\frac{\sqrt{55}}{264}$ 0 0 $-\frac{\sqrt{55}}{132}$ 0 0 $-\frac{\sqrt{33}}{88}$ 0 0 0 0
795	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 2)$	0	$-\frac{\sqrt{11}i}{44}$ $\frac{\sqrt{165}}{88}$ 0 0 0 0 $-\frac{\sqrt{165}}{66}$ $\frac{5\sqrt{11}}{88}$ 0 0 0 0 $\frac{\sqrt{11}}{44}$
	$\frac{\sqrt{11}i}{44}$	0 0 $-\frac{\sqrt{165}}{88}$ 0 0 $-\frac{\sqrt{165}}{66}$ 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 $\frac{\sqrt{11}}{44}$ 0
	0	0 0 $-\frac{\sqrt{55}}{132}$ 0 0 0 0 $\frac{\sqrt{55}}{132}$ $-\frac{\sqrt{33}}{132}$ 0 0 0 0 $-\frac{\sqrt{33}}{132}$
	0	0 0 0 $\frac{\sqrt{55}}{132}$ 0 0 $\frac{\sqrt{55}}{132}$ 0 0 $\frac{\sqrt{33}}{132}$ 0 0 $-\frac{\sqrt{33}}{132}$ 0
	$\frac{\sqrt{33}}{66}$	0 0 $\frac{\sqrt{55}i}{264}$ 0 $-\frac{\sqrt{55}}{264}$ 0 0 0 $\frac{\sqrt{33}i}{88}$ 0 $\frac{\sqrt{33}}{88}$ 0 0 0
	0	$-\frac{\sqrt{33}}{66}$ $-\frac{\sqrt{55}i}{264}$ 0 $-\frac{\sqrt{55}}{264}$ 0 0 0 $-\frac{\sqrt{33}i}{88}$ 0 $\frac{\sqrt{33}}{88}$ 0 0 0
	0	0 0 $-\frac{5\sqrt{55}}{264}$ 0 $\frac{\sqrt{55}i}{264}$ $-\frac{\sqrt{55}}{33}$ 0 0 $-\frac{7\sqrt{33}}{264}$ 0 $-\frac{\sqrt{33}i}{88}$ $\frac{\sqrt{33}}{66}$ 0
	0	0 0 $-\frac{5\sqrt{55}}{264}$ 0 $-\frac{\sqrt{55}i}{264}$ 0 0 $\frac{\sqrt{55}}{33}$ $-\frac{7\sqrt{33}}{264}$ 0 $\frac{\sqrt{33}i}{88}$ 0 0 $-\frac{\sqrt{33}}{66}$
	0	$-\frac{\sqrt{33}}{132}$ 0 0 $-\frac{\sqrt{55}}{264}$ 0 0 $-\frac{\sqrt{55}i}{132}$ 0 0 $\frac{\sqrt{33}}{88}$ 0 0 0
	$-\frac{\sqrt{33}}{132}$	0 0 0 0 0 $\frac{\sqrt{55}}{264}$ $\frac{\sqrt{55}i}{132}$ 0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 0
796	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,0}^{(1,-1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{55}i}{88}$ 0 $\frac{\sqrt{55}}{88}$ 0 0 0 $-\frac{\sqrt{33}i}{88}$ 0 $\frac{\sqrt{33}}{88}$ 0 0	
	0 0 $-\frac{\sqrt{55}i}{88}$ 0 $\frac{\sqrt{55}}{88}$ 0 0 0 $\frac{\sqrt{33}i}{88}$ 0 $\frac{\sqrt{33}}{88}$ 0 0 0	
	$-\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $-\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0	
	0 $\frac{\sqrt{11}}{22}$ $\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0	
	0 $-\frac{\sqrt{11}i}{22}$ $-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}}{44}$ 0 0 0 0 $-\frac{\sqrt{11}}{22}$	
	$\frac{\sqrt{11}i}{22}$ 0 0 $\frac{\sqrt{165}}{132}$ 0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 0 0 $-\frac{\sqrt{11}}{22}$ 0	
	0 $-\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}}{44}$ 0 0 0 $\frac{\sqrt{11}i}{22}$	
	$-\frac{\sqrt{11}}{22}$ 0 0 0 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}}{44}$ $-\frac{\sqrt{11}i}{22}$ 0	
	0 0 0 $\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 $\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ $-\frac{\sqrt{11}}{22}$ 0	
	0 0 $\frac{\sqrt{165}}{132}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 $\frac{\sqrt{11}}{44}$ 0 $\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{11}}{22}$	
797	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 3)$	0 0 0 $\frac{\sqrt{55}}{88}$ 0 $-\frac{\sqrt{55}i}{88}$ 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 $-\frac{\sqrt{33}i}{88}$ 0 0	
	0 0 $\frac{\sqrt{55}}{88}$ 0 $\frac{\sqrt{55}i}{88}$ 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 $\frac{\sqrt{33}i}{88}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{165}}{132}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $\frac{\sqrt{11}i}{44}$ $\frac{\sqrt{11}}{22}$ 0	
	0 0 $-\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $-\frac{\sqrt{11}}{22}$	
	$0 -\frac{\sqrt{11}}{22}$ 0 0 $\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}}{44}$ 0 0 0 $\frac{\sqrt{11}i}{22}$	
	$-\frac{\sqrt{11}}{22}$ 0 0 0 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 0 $-\frac{\sqrt{11}}{44}$ $-\frac{\sqrt{11}i}{22}$ 0	
	0 $\frac{\sqrt{11}i}{22}$ $\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 0 0 0 $\frac{\sqrt{11}}{22}$	
	$-\frac{\sqrt{11}i}{22}$ 0 0 $-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $\frac{\sqrt{11}}{44}$ 0 0 0 $\frac{\sqrt{11}}{22}$	
	$-\frac{\sqrt{11}}{22}$ 0 0 $-\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $-\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0	
	0 $\frac{\sqrt{11}}{22}$ $\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0	
798	symmetry	$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,0}^{(1,-1;a)}(E_u, 4)$	$\frac{\sqrt{110}}{55} 0 0 \frac{\sqrt{66}i}{132} 0 -\frac{\sqrt{66}}{132} 0 0 0 \frac{3\sqrt{110}i}{220} 0 \frac{3\sqrt{110}}{220} 0 0$	
	$0 -\frac{\sqrt{110}}{55} -\frac{\sqrt{66}i}{132} 0 -\frac{\sqrt{66}}{132} 0 0 0 -\frac{3\sqrt{110}i}{220} 0 \frac{3\sqrt{110}}{220} 0 0 0$	
	$0 0 0 -\frac{\sqrt{22}i}{528} 0 -\frac{\sqrt{22}}{528} 0 0 0 0 \frac{\sqrt{330}i}{2640} 0 -\frac{\sqrt{330}}{2640} 0 0$	
	$0 0 \frac{\sqrt{22}i}{528} 0 -\frac{\sqrt{22}}{528} 0 0 0 -\frac{\sqrt{330}i}{2640} 0 -\frac{\sqrt{330}}{2640} 0 0 0$	
	$0 \frac{\sqrt{330}i}{165} -\frac{\sqrt{22}}{66} 0 0 0 0 \frac{\sqrt{22}}{33} -\frac{\sqrt{330}}{110} 0 0 0 0 0$	
	$-\frac{\sqrt{330}i}{165} 0 0 \frac{\sqrt{22}}{66} 0 0 \frac{\sqrt{22}}{33} 0 0 \frac{\sqrt{330}}{110} 0 0 0 0$	
	$0 -\frac{\sqrt{330}}{165} 0 0 -\frac{\sqrt{22}}{66} 0 0 -\frac{\sqrt{22}i}{33} 0 0 0 \frac{\sqrt{330}}{110} 0 0 0$	
	$-\frac{\sqrt{330}}{165} 0 0 0 0 \frac{\sqrt{22}}{66} \frac{\sqrt{22}i}{33} 0 0 0 0 0 -\frac{\sqrt{330}}{110} 0 0$	
	$0 0 0 \frac{5\sqrt{22}}{528} 0 -\frac{5\sqrt{22}i}{528} \frac{\sqrt{22}}{33} 0 0 \frac{\sqrt{330}}{240} 0 \frac{\sqrt{330}i}{240} 0 0$	
	$0 0 \frac{5\sqrt{22}}{528} 0 \frac{5\sqrt{22}i}{528} 0 0 -\frac{\sqrt{22}}{33} \frac{\sqrt{330}}{240} 0 -\frac{\sqrt{330}i}{240} 0 0 0$	
799	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 4)$	$0 0 0 -\frac{\sqrt{66}}{66} 0 -\frac{\sqrt{66}i}{66} 0 0 0 -\frac{\sqrt{110}}{110} 0 \frac{\sqrt{110}i}{110} \frac{\sqrt{110}}{55} 0$	
	$0 0 -\frac{\sqrt{66}}{66} 0 \frac{\sqrt{66}i}{66} 0 0 0 -\frac{\sqrt{110}}{110} 0 -\frac{\sqrt{110}i}{110} 0 0 -\frac{\sqrt{110}}{55}$	
	$0 0 0 \frac{7\sqrt{22}}{528} 0 -\frac{7\sqrt{22}i}{528} \frac{\sqrt{22}}{33} 0 0 \frac{3\sqrt{330}}{880} 0 \frac{3\sqrt{330}i}{880} 0 0$	
	$0 0 \frac{7\sqrt{22}}{528} 0 \frac{7\sqrt{22}i}{528} 0 0 -\frac{\sqrt{22}}{33} \frac{3\sqrt{330}}{880} 0 -\frac{3\sqrt{330}i}{880} 0 0 0$	
	$0 0 0 0 \frac{\sqrt{22}}{33} 0 0 \frac{\sqrt{22}i}{33} 0 0 -\frac{\sqrt{330}}{165} 0 0 \frac{\sqrt{330}i}{165}$	
	$0 0 0 0 0 -\frac{\sqrt{22}}{33} -\frac{\sqrt{22}i}{33} 0 0 0 0 \frac{\sqrt{330}}{165} -\frac{\sqrt{330}i}{165} 0$	
	$0 0 -\frac{\sqrt{22}}{33} 0 0 0 \frac{\sqrt{22}}{33} -\frac{\sqrt{330}}{165} 0 0 0 0 0 -\frac{\sqrt{330}}{165}$	
	$0 0 0 \frac{\sqrt{22}}{33} 0 0 \frac{\sqrt{22}}{33} 0 0 \frac{\sqrt{330}}{165} 0 0 -\frac{\sqrt{330}}{165} 0$	
	$0 0 0 -\frac{\sqrt{22}i}{528} 0 -\frac{\sqrt{22}}{528} 0 0 0 \frac{\sqrt{330}i}{2640} 0 -\frac{\sqrt{330}}{2640} 0 0$	
	$0 0 \frac{\sqrt{22}i}{528} 0 -\frac{\sqrt{22}}{528} 0 0 0 -\frac{\sqrt{330}i}{2640} 0 -\frac{\sqrt{330}}{2640} 0 0 0$	
800	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,0;a)}(A_{1u})$	0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $\frac{\sqrt{35}i}{56}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 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 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0 0	
801	symmetry	$\sqrt{3}yz$
$\mathbb{M}_{2,0}^{(1,0;a)}(E_u, 1)$	0 $\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{168}$ 0 0 $\frac{\sqrt{105}i}{84}$	
	$\frac{\sqrt{105}}{84}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}}{168}$ $-\frac{\sqrt{105}i}{84}$ 0	
	0 $-\frac{\sqrt{35}}{28}$ 0 0 $-\frac{\sqrt{21}}{168}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 0 $-\frac{\sqrt{35}}{56}$ 0 0 0	
	$-\frac{\sqrt{35}}{28}$ 0 0 0 0 $\frac{\sqrt{21}}{168}$ $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 $\frac{\sqrt{35}}{56}$ 0 0	
	0 0 0 $-\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0	
	0 0 $-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0	
	0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{21}}{84}$ 0 0 0 0 0 $\frac{\sqrt{35}}{28}$	
	0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{21}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ 0	
802	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 1)$	0	$\frac{\sqrt{105}i}{84} - \frac{\sqrt{7}}{56}$
	$-\frac{\sqrt{105}i}{84}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{35}i}{28} - \frac{\sqrt{21}}{168}$
	$-\frac{\sqrt{35}i}{28}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$0 0 0 \frac{\sqrt{21}i}{84} 0 \frac{\sqrt{21}}{42} 0 0 0 \frac{\sqrt{35}i}{28} 0 0 0 0 0 0$
	0	$0 0 -\frac{\sqrt{21}i}{84} 0 \frac{\sqrt{21}}{42} 0 0 0 -\frac{\sqrt{35}i}{28} 0 0 0 0 0 0 0$
	0	$0 0 0 -\frac{\sqrt{21}}{42} 0 -\frac{\sqrt{21}i}{42} -\frac{\sqrt{21}}{42} 0 0 0 0 0 0 0 0 0$
	0	$0 0 -\frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 \frac{\sqrt{21}}{42} 0 0 0 0 0 0 0 0$
	0	$0 0 0 0 \frac{\sqrt{21}}{42} 0 0 0 \frac{\sqrt{21}i}{84} 0 0 0 0 0 -\frac{\sqrt{35}i}{28}$
	0	$0 0 0 0 0 -\frac{\sqrt{21}}{42} -\frac{\sqrt{21}i}{84} 0 0 0 0 0 0 \frac{\sqrt{35}i}{28} 0$
803	symmetry	$\sqrt{3}xy$
$\mathbb{M}_{2,0}^{(1,0;a)}(E_u, 2)$	$-\frac{\sqrt{105}}{42} 0 0 \frac{\sqrt{7}i}{56} 0 -\frac{\sqrt{7}}{56} 0 0 0 \frac{\sqrt{105}i}{168} 0 \frac{\sqrt{105}}{168} 0 0 0$	
	0	$\frac{\sqrt{105}}{42} -\frac{\sqrt{7}i}{56} 0 -\frac{\sqrt{7}}{56} 0 0 0 -\frac{\sqrt{105}i}{168} 0 \frac{\sqrt{105}}{168} 0 0 0 0$
	0	$0 0 0 \frac{\sqrt{21}i}{168} 0 \frac{\sqrt{21}}{168} 0 0 0 -\frac{\sqrt{35}i}{56} 0 \frac{\sqrt{35}}{56} 0 0$
	0	$0 0 -\frac{\sqrt{21}i}{168} 0 \frac{\sqrt{21}}{168} 0 0 0 \frac{\sqrt{35}i}{56} 0 \frac{\sqrt{35}}{56} 0 0 0$
	0	$0 0 \frac{\sqrt{21}}{84} 0 0 0 0 0 -\frac{\sqrt{21}}{42} -\frac{\sqrt{35}}{28} 0 0 0 0 0$
	0	$0 0 0 -\frac{\sqrt{21}}{84} 0 0 -\frac{\sqrt{21}}{42} 0 0 \frac{\sqrt{35}}{28} 0 0 0 0 0$
	0	$0 0 0 0 \frac{\sqrt{21}}{84} 0 0 \frac{\sqrt{21}i}{42} 0 0 0 \frac{\sqrt{35}}{28} 0 0 0 0$
	0	$0 0 0 0 0 -\frac{\sqrt{21}}{84} -\frac{\sqrt{21}i}{42} 0 0 0 0 0 0 -\frac{\sqrt{35}}{28} 0 0$
	0	$0 0 0 \frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 \frac{\sqrt{21}}{42} 0 0 0 0 0 0 0$
	0	$0 0 \frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 0 \frac{\sqrt{21}}{42} 0 0 0 0 0 0 0$
804	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{168} & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	
805	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{7}}{112} & 0 & \frac{3\sqrt{7}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & -\frac{\sqrt{105}i}{112} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}}{112} & 0 & -\frac{3\sqrt{7}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & \frac{\sqrt{105}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & 0 & -\frac{13\sqrt{35}}{560} & 0 & \frac{13\sqrt{35}i}{560} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & 0 & 0 & 0 & -\frac{13\sqrt{35}}{560} & 0 & -\frac{13\sqrt{35}i}{560} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} \\ -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{40} & 0 \\ 0 & \frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} \\ -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{21}i}{112} & 0 & -\frac{3\sqrt{21}}{112} & 0 & 0 & 0 & \frac{\sqrt{35}i}{80} & 0 & \frac{\sqrt{35}}{80} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{21}i}{112} & 0 & -\frac{3\sqrt{21}}{112} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{80} & 0 & \frac{\sqrt{35}}{80} & 0 & 0 & 0 \end{bmatrix}$	
806	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 2)$	$0 \quad \frac{\sqrt{6}i}{20} \quad -\frac{9\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{6}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{20}$	
	$-\frac{\sqrt{6}i}{20} \quad 0 \quad 0 \quad \frac{9\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{6}}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{20} \quad 0$	
	$0 \quad \frac{\sqrt{2}i}{20} \quad -\frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad -\frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0$	
	$-\frac{\sqrt{2}i}{20} \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0$	
	$\frac{3\sqrt{2}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{40} \quad 0 \quad \frac{13\sqrt{2}}{160} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{2}}{80} \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{40} \quad 0 \quad \frac{13\sqrt{2}}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{160} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{160} \quad 0 \quad \frac{\sqrt{2}i}{20} \quad -\frac{3\sqrt{2}}{80} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{30}}{160} \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{160} \quad 0 \quad -\frac{\sqrt{2}i}{20} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{80} \quad 0$	
	$0 \quad \frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{20} \quad 0$	
	$\frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{30}}{160} \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{32} \quad -\frac{\sqrt{2}i}{20} \quad 0 \quad 0$	
807	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{M}_4^{(1,0;a)}(A_{2u})$	$0 \quad \frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad \frac{9\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{9\sqrt{6}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{20}$	
	$\frac{\sqrt{6}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{10}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{9\sqrt{6}}{160} \quad \frac{\sqrt{6}i}{20} \quad 0$	
	$0 \quad -\frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad -\frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{20}$	
	$-\frac{\sqrt{2}}{20} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2}}{32} \quad \frac{\sqrt{2}i}{20} \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0 \quad -\frac{\sqrt{2}i}{160} \quad -\frac{3\sqrt{2}}{80} \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad -\frac{\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0 \quad \frac{\sqrt{2}i}{160} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{80} \quad 0$	
	$-\frac{3\sqrt{2}}{80} \quad 0 \quad 0 \quad \frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{2}i}{160} \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{2}}{80} \quad -\frac{3\sqrt{30}i}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{2}i}{160} \quad 0 \quad -\frac{\sqrt{2}}{40} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{2}i}{20} \quad -\frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad -\frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20}$	
	$-\frac{\sqrt{2}i}{20} \quad 0 \quad 0 \quad \frac{3\sqrt{30}}{160} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad \frac{3\sqrt{2}}{32} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{20} \quad 0$	
808	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,0}^{(1,0;a)}(E_u, 1)$	$0 \quad \frac{3\sqrt{42}}{140} \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad \frac{3\sqrt{42}i}{140}$	
	$\frac{3\sqrt{42}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{224} \quad -\frac{3\sqrt{42}i}{140} \quad 0$	
	$0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{1120} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad \frac{13\sqrt{14}}{1120} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{1120} \quad \frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{14}}{1120} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad \frac{3\sqrt{210}i}{1120} \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{20} \quad 0 \quad \frac{3\sqrt{14}i}{160} \quad -\frac{\sqrt{14}}{80} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad -\frac{3\sqrt{210}i}{1120} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad -\frac{\sqrt{14}}{20} \quad 0 \quad -\frac{3\sqrt{14}i}{160} \quad 0 \quad 0 \quad \frac{\sqrt{14}}{80}$	
	$\frac{\sqrt{14}}{80} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{1120} \quad 0 \quad \frac{\sqrt{210}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{160} \quad 0 \quad -\frac{11\sqrt{14}}{280} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{14}}{80} \quad \frac{3\sqrt{210}i}{1120} \quad 0 \quad \frac{\sqrt{210}}{70} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{160} \quad 0 \quad -\frac{11\sqrt{14}}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{3\sqrt{210}}{1120} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{280} \quad \frac{\sqrt{14}}{160} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{1120} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{160} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0$	
809	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 1)$	$0 \quad \frac{3\sqrt{42}i}{140} \quad -\frac{3\sqrt{70}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{140}$	
	$-\frac{3\sqrt{42}i}{140} \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{224} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{140} \quad 0$	
	$0 \quad -\frac{\sqrt{14}i}{28} \quad -\frac{\sqrt{210}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{280} \quad -\frac{13\sqrt{14}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{1120} \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{280} \quad 0 \quad 0 \quad \frac{13\sqrt{14}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{14}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{70} \quad 0 \quad -\frac{3\sqrt{210}}{1120} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{14}i}{280} \quad 0 \quad -\frac{3\sqrt{14}}{160} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{14}}{80} \quad -\frac{\sqrt{210}i}{70} \quad 0 \quad -\frac{3\sqrt{210}}{1120} \quad 0 \quad 0 \quad 0 \quad -\frac{11\sqrt{14}i}{280} \quad 0 \quad -\frac{3\sqrt{14}}{160} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{1120} \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad -\frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{160} \quad 0 \quad \frac{\sqrt{14}i}{20} \quad -\frac{\sqrt{14}}{80} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{1120} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{160} \quad 0 \quad -\frac{\sqrt{14}i}{20} \quad 0 \quad \frac{\sqrt{14}}{80}$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{1120} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{160} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{1120} \quad \frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{160} \quad -\frac{\sqrt{14}i}{28} \quad 0$	
810	symmetry	$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,0}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{3\sqrt{5}i}{80}$ 0 $\frac{3\sqrt{5}}{80}$ 0 0 0 $-\frac{3\sqrt{3}i}{80}$ 0 $\frac{3\sqrt{3}}{80}$ 0 0	
	0 0 $-\frac{3\sqrt{5}i}{80}$ 0 $\frac{3\sqrt{5}}{80}$ 0 0 0 $\frac{3\sqrt{3}i}{80}$ 0 $\frac{3\sqrt{3}}{80}$ 0 0 0	
	$-\frac{1}{5}$ 0 0 $\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0 0	
	0 $\frac{1}{5}$ $-\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $-\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0 0	
	0 $-\frac{i}{40}$ $\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $-\frac{3}{20}$ 0 0 0 0 $-\frac{1}{40}$	
	$\frac{i}{40}$ 0 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $\frac{3}{20}$ 0 0 $-\frac{1}{40}$ 0	
	0 $-\frac{1}{40}$ 0 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $-\frac{3}{20}$ 0 0 $\frac{i}{40}$	
	$-\frac{1}{40}$ 0 0 0 0 $\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $\frac{3}{20}$ $-\frac{i}{40}$ 0	
	0 0 0 $-\frac{\sqrt{15}}{80}$ 0 $-\frac{\sqrt{15}i}{80}$ 0 0 0 $-\frac{1}{16}$ 0 $\frac{i}{16}$ $-\frac{1}{5}$ 0	
	0 0 $-\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $-\frac{1}{16}$ 0 $-\frac{i}{16}$ 0 0 $\frac{1}{5}$	
811	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 0 $\frac{3\sqrt{5}}{80}$ 0 $-\frac{3\sqrt{5}i}{80}$ 0 0 0 $-\frac{3\sqrt{3}}{80}$ 0 $-\frac{3\sqrt{3}i}{80}$ 0 0	
	0 0 $\frac{3\sqrt{5}}{80}$ 0 $\frac{3\sqrt{5}i}{80}$ 0 0 0 $-\frac{3\sqrt{3}}{80}$ 0 $\frac{3\sqrt{3}i}{80}$ 0 0 0	
	0 0 0 $\frac{\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{80}$ 0 0 0 $\frac{1}{16}$ 0 $-\frac{i}{16}$ $\frac{1}{5}$ 0	
	0 0 $\frac{\sqrt{15}}{80}$ 0 $-\frac{\sqrt{15}i}{80}$ 0 0 0 $\frac{1}{16}$ 0 $\frac{i}{16}$ 0 0 $-\frac{1}{5}$	
	0 $-\frac{1}{40}$ 0 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $-\frac{3}{20}$ 0 0 $\frac{i}{40}$	
	$-\frac{1}{40}$ 0 0 0 0 $\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $\frac{3}{20}$ $-\frac{i}{40}$ 0	
	0 $\frac{i}{40}$ $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $\frac{3}{20}$ 0 0 0 0 $\frac{1}{40}$	
	$-\frac{i}{40}$ 0 0 $\frac{\sqrt{15}}{20}$ 0 0 0 0 0 $-\frac{3}{20}$ 0 0 $\frac{1}{40}$ 0	
	$-\frac{1}{5}$ 0 0 $\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0	
	0 $\frac{1}{5}$ $-\frac{\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{80}$ 0 0 0 $-\frac{i}{16}$ 0 $\frac{1}{16}$ 0 0 0	
812	symmetry	$-\frac{\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,0}^{(1,0;a)}(E_u, 3)$	$-\frac{\sqrt{21}}{35}$	0 0 $\frac{3\sqrt{35}i}{112}$ 0 $-\frac{3\sqrt{35}}{112}$ 0 0 0 0 $-\frac{3\sqrt{21}i}{560}$ 0 $-\frac{3\sqrt{21}}{560}$ 0 0
	0	$\frac{\sqrt{21}}{35}$ 0 $-\frac{3\sqrt{35}i}{112}$ 0 $-\frac{3\sqrt{35}}{112}$ 0 0 0 0 $\frac{3\sqrt{21}i}{560}$ 0 $-\frac{3\sqrt{21}}{560}$ 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{112}$ 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 $\frac{37\sqrt{7}i}{560}$ 0 $-\frac{37\sqrt{7}}{560}$ 0 0
	0	0 0 $-\frac{\sqrt{105}i}{112}$ 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 $-\frac{37\sqrt{7}i}{560}$ 0 $-\frac{37\sqrt{7}}{560}$ 0 0
	0	$\frac{\sqrt{7}i}{40}$ $-\frac{\sqrt{105}}{140}$ 0 0 0 0 0 $-\frac{3\sqrt{105}}{280}$ $\frac{\sqrt{7}}{140}$ 0 0 0 0 $\frac{\sqrt{7}}{20}$
	$-\frac{\sqrt{7}i}{40}$	0 0 $\frac{\sqrt{105}}{140}$ 0 0 0 $-\frac{3\sqrt{105}}{280}$ 0 0 0 $-\frac{\sqrt{7}}{140}$ 0 0 $\frac{\sqrt{7}}{20}$ 0
	0	$-\frac{\sqrt{7}}{40}$ 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 0 $\frac{3\sqrt{105}i}{280}$ 0 0 0 $-\frac{\sqrt{7}}{140}$ 0 0 $\frac{\sqrt{7}i}{20}$
	$-\frac{\sqrt{7}}{40}$	0 0 0 0 0 $\frac{\sqrt{105}}{140}$ $-\frac{3\sqrt{105}i}{280}$ 0 0 0 0 $\frac{\sqrt{7}}{140}$ $-\frac{\sqrt{7}i}{20}$ 0
	0	0 0 0 $-\frac{\sqrt{105}}{560}$ 0 $\frac{\sqrt{105}i}{560}$ $\frac{\sqrt{105}}{70}$ 0 0 0 $\frac{\sqrt{7}}{80}$ 0 $\frac{\sqrt{7}i}{80}$ 0 0
	0	0 0 $-\frac{\sqrt{105}}{560}$ 0 $-\frac{\sqrt{105}i}{560}$ 0 0 0 $-\frac{\sqrt{105}}{70}$ $\frac{\sqrt{7}}{80}$ 0 $-\frac{\sqrt{7}i}{80}$ 0 0 0
813	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
		0 0 0 $\frac{3\sqrt{35}}{280}$ 0 $\frac{3\sqrt{35}i}{280}$ 0 0 0 0 $-\frac{9\sqrt{21}}{280}$ 0 $\frac{9\sqrt{21}i}{280}$ $-\frac{\sqrt{21}}{35}$ 0
		0 0 $\frac{3\sqrt{35}}{280}$ 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 0 $-\frac{9\sqrt{21}}{280}$ 0 $-\frac{9\sqrt{21}i}{280}$ 0 0 $\frac{\sqrt{21}}{35}$
		0 0 0 $\frac{\sqrt{105}}{280}$ 0 $-\frac{\sqrt{105}i}{280}$ $\frac{\sqrt{105}}{70}$ 0 0 0 $-\frac{\sqrt{7}}{280}$ 0 0 $-\frac{\sqrt{7}i}{280}$ 0 0
		0 0 $\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{280}$ 0 0 0 $-\frac{\sqrt{105}}{70}$ $-\frac{\sqrt{7}}{280}$ 0 $\frac{\sqrt{7}i}{280}$ 0 0 0
		0 $-\frac{\sqrt{7}}{20}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 $-\frac{3\sqrt{105}i}{280}$ 0 0 0 $-\frac{\sqrt{7}}{40}$ 0 0 $\frac{\sqrt{7}i}{40}$
		$-\frac{\sqrt{7}}{20}$ 0 0 0 0 $\frac{\sqrt{105}}{280}$ $\frac{3\sqrt{105}i}{280}$ 0 0 0 0 0 $\frac{\sqrt{7}}{40}$ $-\frac{\sqrt{7}i}{40}$ 0
		0 $-\frac{\sqrt{7}i}{20}$ $\frac{\sqrt{105}}{280}$ 0 0 0 0 $-\frac{3\sqrt{105}}{280}$ $-\frac{\sqrt{7}}{40}$ 0 0 0 0 $-\frac{\sqrt{7}}{40}$
		$\frac{\sqrt{7}i}{20}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 $-\frac{3\sqrt{105}}{280}$ 0 0 0 $\frac{\sqrt{7}}{40}$ 0 0 0 $-\frac{\sqrt{7}}{40}$
		0 0 0 $-\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}}{70}$ 0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 $\frac{\sqrt{7}}{20}$ 0 0
814	symmetry	1

*continued ..*

Table 9

No.	multipole	matrix
$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	0 0 0 $-\frac{\sqrt{105}}{140}$ 0 $\frac{\sqrt{105}i}{140}$ $\frac{\sqrt{105}}{70}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 $-\frac{\sqrt{105}}{140}$ 0 $-\frac{\sqrt{105}i}{140}$ 0 0 $-\frac{\sqrt{105}}{70}$ $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{35}}{140}$ 0 $\frac{3\sqrt{35}i}{140}$ 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 $\frac{\sqrt{21}i}{84}$ $\frac{\sqrt{21}}{42}$ 0 0	
	0 0 $\frac{3\sqrt{35}}{140}$ 0 $-\frac{3\sqrt{35}i}{140}$ 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{84}$ 0 0 $-\frac{\sqrt{21}}{42}$	
	0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{35}i}{70}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{21}i}{42}$	
	$\frac{\sqrt{21}}{42}$ 0 0 0 $\frac{\sqrt{35}}{70}$ $-\frac{\sqrt{35}i}{70}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{21}i}{42}$ 0	
	0 $-\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{35}}{70}$ 0 0 0 0 $-\frac{\sqrt{35}}{70}$ $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{35}}{70}$ 0 0 $-\frac{\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{21}}{42}$ 0	
	$\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0	
	0 $-\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{70}$ 0 0 0 $\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 0	
815	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(1,1;a)}(A_{1u})$	0 0 0 $-\frac{3\sqrt{35}}{280}$ 0 $\frac{3\sqrt{35}i}{280}$ $\frac{\sqrt{35}}{35}$ 0 0 $-\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0	
	0 0 $-\frac{3\sqrt{35}}{280}$ 0 $-\frac{3\sqrt{35}i}{280}$ 0 0 0 $-\frac{\sqrt{35}}{35}$ $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0	
	0 0 0 $-\frac{11\sqrt{105}}{840}$ 0 $-\frac{11\sqrt{105}i}{840}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ $\frac{\sqrt{7}}{14}$ 0	
	0 0 $-\frac{11\sqrt{105}}{840}$ 0 $\frac{11\sqrt{105}i}{840}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}}{14}$	
	0 $\frac{\sqrt{7}}{28}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 $-\frac{\sqrt{105}i}{210}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{7}i}{28}$	
	$\frac{\sqrt{7}}{28}$ 0 0 0 $\frac{\sqrt{105}}{280}$ $\frac{\sqrt{105}i}{210}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{7}i}{28}$ 0	
	0 $-\frac{\sqrt{7}i}{28}$ $-\frac{\sqrt{105}}{280}$ 0 0 0 0 $\frac{\sqrt{105}}{210}$ $-\frac{\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{7}}{28}$	
	$\frac{\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{105}}{280}$ 0 0 $\frac{\sqrt{105}}{210}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{7}}{28}$	
	$-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{105}i}{840}$ 0 $-\frac{\sqrt{105}}{840}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 0	
	0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}i}{840}$ 0 $-\frac{\sqrt{105}}{840}$ 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 0	
816	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(1,1;a)}(E_u, 1)$	0 0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 $\frac{\sqrt{105}i}{105}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{105}}{140}$ $-\frac{\sqrt{105}i}{105}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0	
	0 0 0 0 $\frac{11\sqrt{35}}{420}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{21}i}{42}$	
	0 0 0 0 0 $-\frac{11\sqrt{35}}{420}$ $\frac{\sqrt{35}i}{42}$ 0 0 0 0 $\frac{\sqrt{21}}{84}$ $\frac{\sqrt{21}i}{42}$ 0	
	0 0 0 $-\frac{\sqrt{35}}{42}$ 0 $-\frac{\sqrt{35}i}{105}$ $\frac{\sqrt{35}}{105}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{21}}{42}$ 0	
	0 0 $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{105}$ 0 0 $-\frac{\sqrt{35}}{105}$ 0 0 $\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{21}}{42}$	
	$\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{420}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0	
	0 $-\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{420}$ 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{35}}{420}$ 0 0 0 0 $-\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{21}}{28}$ 0 0 0 0 0	
	$\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{35}}{420}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0	
817	symmetry	$-\sqrt{3}xz$
$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 1)$	0 0 $\frac{\sqrt{105}}{140}$ 0 0 0 0 $\frac{\sqrt{105}}{105}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{105}}{140}$ 0 0 $\frac{\sqrt{105}}{105}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 0	
	0 0 $\frac{11\sqrt{35}}{420}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ $\frac{\sqrt{21}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$	
	0 0 0 $-\frac{11\sqrt{35}}{420}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{21}}{84}$ 0 0 0 $-\frac{\sqrt{21}}{42}$ 0	
	$-\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	0 $\frac{\sqrt{21}}{42}$ $\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}}{105}$ 0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{35}}{105}$ 0 0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0	
	0 0 $-\frac{\sqrt{35}}{105}$ 0 $\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{35}}{105}$ $\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$	
	0 $-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}}{420}$ 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0	
	$-\frac{\sqrt{21}}{42}$ 0 0 0 0 $-\frac{\sqrt{35}}{420}$ $\frac{\sqrt{35}i}{42}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
818	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,0}^{(1,1;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{105}i}{60}$ 0 $\frac{\sqrt{105}}{60}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0	
	0 0 $\frac{\sqrt{105}i}{60}$ 0 $\frac{\sqrt{105}}{60}$ 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ 0 0 0	
	0 0 0 $\frac{\sqrt{35}i}{420}$ 0 $\frac{\sqrt{35}}{420}$ 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{84}$ 0 0 0	
	0 0 $-\frac{\sqrt{35}i}{420}$ 0 $\frac{\sqrt{35}}{420}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{84}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{42}$ $-\frac{\sqrt{35}}{42}$ 0 0 0 0 $-\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}}{28}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{35}}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0	
	0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$	
	$\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{35}i}{420}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0	
	0 0 0 $\frac{\sqrt{35}}{105}$ 0 $-\frac{\sqrt{35}i}{105}$ 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 $\frac{\sqrt{21}}{42}$ 0 $\frac{\sqrt{21}i}{42}$ 0 0	
	0 0 $\frac{\sqrt{35}}{105}$ 0 $\frac{\sqrt{35}i}{105}$ 0 0 0 $\frac{\sqrt{35}}{42}$ $\frac{\sqrt{21}}{42}$ 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0	
819	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 2)$	0 0 0 $-\frac{11\sqrt{105}}{840}$ 0 $-\frac{11\sqrt{105}i}{840}$ 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0	
	0 0 $-\frac{11\sqrt{105}}{840}$ 0 $\frac{11\sqrt{105}i}{840}$ 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0	
	0 0 0 $\frac{13\sqrt{35}}{840}$ 0 $-\frac{13\sqrt{35}i}{840}$ $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0	
	0 0 $\frac{13\sqrt{35}}{840}$ 0 $\frac{13\sqrt{35}i}{840}$ 0 0 $\frac{\sqrt{35}}{42}$ $\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0	
	0 $-\frac{\sqrt{21}}{28}$ 0 0 $-\frac{\sqrt{35}}{168}$ 0 0 $-\frac{\sqrt{35}i}{420}$ 0 0 $-\frac{5\sqrt{21}}{168}$ 0 0 $-\frac{\sqrt{21}i}{42}$	
	$-\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{35}}{168}$ $\frac{\sqrt{35}i}{420}$ 0 0 0 0 $\frac{5\sqrt{21}}{168}$ $\frac{\sqrt{21}i}{42}$ 0	
	0 $-\frac{\sqrt{21}i}{28}$ $\frac{\sqrt{35}}{168}$ 0 0 0 0 $-\frac{\sqrt{35}}{420}$ $-\frac{5\sqrt{21}}{168}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$	
	$\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{35}}{168}$ 0 0 $-\frac{\sqrt{35}}{420}$ 0 0 $\frac{5\sqrt{21}}{168}$ 0 0 $\frac{\sqrt{21}}{42}$ 0	
	0 0 0 $-\frac{\sqrt{35}i}{120}$ 0 $-\frac{\sqrt{35}}{120}$ 0 0 0 $-\frac{\sqrt{21}i}{168}$ 0 $\frac{\sqrt{21}}{168}$ 0 0 0	
	0 0 $\frac{\sqrt{35}i}{120}$ 0 $-\frac{\sqrt{35}}{120}$ 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 $\frac{\sqrt{21}}{168}$ 0 0 0	
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
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 1)$	0	$0 \ 0 \ 0 \ -\frac{3\sqrt{462}}{616} \ 0 \ \frac{3\sqrt{462}i}{616} \ \frac{5\sqrt{462}}{462} \ 0 \ 0 \ -\frac{3\sqrt{770}}{616} \ 0 \ -\frac{3\sqrt{770}i}{616} \ 0 \ 0$
	0	$0 \ 0 \ -\frac{3\sqrt{462}}{616} \ 0 \ -\frac{3\sqrt{462}i}{616} \ 0 \ 0 \ -\frac{5\sqrt{462}}{462} \ -\frac{3\sqrt{770}}{616} \ 0 \ \frac{3\sqrt{770}i}{616} \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ \frac{\sqrt{154}}{308} \ 0 \ \frac{\sqrt{154}i}{308} \ 0 \ 0 \ 0 \ \frac{\sqrt{2310}}{1540} \ 0 \ -\frac{\sqrt{2310}i}{1540} \ \frac{\sqrt{2310}}{924} \ 0$
	0	$0 \ 0 \ \frac{\sqrt{154}}{308} \ 0 \ -\frac{\sqrt{154}i}{308} \ 0 \ 0 \ 0 \ \frac{\sqrt{2310}}{1540} \ 0 \ \frac{\sqrt{2310}i}{1540} \ 0 \ 0 \ -\frac{\sqrt{2310}}{924}$
	0	$-\frac{\sqrt{2310}}{770} \ 0 \ 0 \ \frac{5\sqrt{154}}{616} \ 0 \ 0 \ 0 \ -\frac{\sqrt{154}i}{77} \ 0 \ 0 \ -\frac{5\sqrt{2310}}{1848} \ 0 \ 0 \ -\frac{\sqrt{2310}i}{770}$
	$-\frac{\sqrt{2310}}{770}$	$0 \ 0 \ 0 \ 0 \ -\frac{5\sqrt{154}}{616} \ \frac{\sqrt{154}i}{77} \ 0 \ 0 \ 0 \ 0 \ \frac{5\sqrt{2310}}{1848} \ \frac{\sqrt{2310}i}{770} \ 0$
	0	$\frac{\sqrt{2310}i}{770} \ \frac{5\sqrt{154}}{616} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{154}}{77} \ \frac{5\sqrt{2310}}{1848} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{2310}}{770}$
	$-\frac{\sqrt{2310}i}{770}$	$0 \ 0 \ -\frac{5\sqrt{154}}{616} \ 0 \ 0 \ \frac{\sqrt{154}}{77} \ 0 \ 0 \ -\frac{5\sqrt{2310}}{1848} \ 0 \ 0 \ 0 \ -\frac{\sqrt{2310}}{770}$
	$\frac{\sqrt{2310}}{924}$	$0 \ 0 \ -\frac{\sqrt{154}i}{616} \ 0 \ \frac{\sqrt{154}}{616} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2310}i}{3080} \ 0 \ -\frac{3\sqrt{2310}}{3080} \ 0 \ 0$
	0	$-\frac{\sqrt{2310}}{924} \ \frac{\sqrt{154}i}{616} \ 0 \ \frac{\sqrt{154}}{616} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2310}i}{3080} \ 0 \ -\frac{3\sqrt{2310}}{3080} \ 0 \ 0$
821	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 2)$	0	$0 \ -\frac{3\sqrt{11}i}{220} \ \frac{\sqrt{165}}{165} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{11}}{55} \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{11}}{220}$
	$\frac{3\sqrt{11}i}{220}$	$0 \ 0 \ -\frac{\sqrt{165}}{165} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{11}}{55} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{11}}{220} \ 0$
	0	$-\frac{3\sqrt{33}i}{110} \ -\frac{\sqrt{55}}{110} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{55}}{220} \ -\frac{\sqrt{33}}{66} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{33}}{110}$
	$\frac{3\sqrt{33}i}{110}$	$0 \ 0 \ \frac{\sqrt{55}}{110} \ 0 \ 0 \ -\frac{\sqrt{55}}{220} \ 0 \ 0 \ \frac{\sqrt{33}}{66} \ 0 \ 0 \ 0 \ \frac{3\sqrt{33}}{110} \ 0$
	$-\frac{4\sqrt{33}}{165}$	$0 \ 0 \ -\frac{\sqrt{55}i}{88} \ 0 \ \frac{\sqrt{55}}{110} \ 0 \ 0 \ 0 \ 0 \ \frac{9\sqrt{33}i}{440} \ 0 \ \frac{\sqrt{33}}{55} \ 0 \ 0$
	0	$\frac{4\sqrt{33}}{165} \ \frac{\sqrt{55}i}{88} \ 0 \ \frac{\sqrt{55}}{110} \ 0 \ 0 \ 0 \ -\frac{9\sqrt{33}i}{440} \ 0 \ \frac{\sqrt{33}}{55} \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ \frac{\sqrt{55}}{55} \ 0 \ \frac{7\sqrt{55}i}{440} \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}}{110} \ 0 \ \frac{3\sqrt{33}i}{440} \ \frac{4\sqrt{33}}{165} \ 0$
	0	$0 \ 0 \ \frac{\sqrt{55}}{55} \ 0 \ -\frac{7\sqrt{55}i}{440} \ 0 \ 0 \ 0 \ -\frac{\sqrt{33}}{110} \ 0 \ -\frac{3\sqrt{33}i}{440} \ 0 \ 0 \ -\frac{4\sqrt{33}}{165}$
	0	$-\frac{3\sqrt{33}}{110} \ 0 \ 0 \ \frac{\sqrt{55}}{110} \ 0 \ 0 \ -\frac{\sqrt{55}i}{220} \ 0 \ 0 \ -\frac{\sqrt{33}}{66} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{33}i}{110}$
	$-\frac{3\sqrt{33}}{110}$	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{55}}{110} \ \frac{\sqrt{55}i}{220} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{33}}{66} \ \frac{3\sqrt{33}i}{110} \ 0$
822	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(A_{2u})$	0	$-\frac{3\sqrt{11}}{220} \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{11}}{55} \quad 0 \quad 0 \quad \frac{3\sqrt{11}i}{220}$
	$-\frac{3\sqrt{11}}{220}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{165}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{55} \quad -\frac{3\sqrt{11}i}{220} \quad 0$
	$0 \quad \frac{3\sqrt{33}}{110}$	$0 \quad 0 \quad -\frac{\sqrt{55}}{110} \quad 0 \quad 0 \quad \frac{\sqrt{55}i}{220} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad \frac{3\sqrt{33}i}{110}$
	$\frac{3\sqrt{33}}{110}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{110} \quad -\frac{\sqrt{55}i}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad -\frac{3\sqrt{33}i}{110} \quad 0$
	$0 \quad 0 \quad 0 \quad \frac{7\sqrt{55}}{440}$	$0 \quad \frac{\sqrt{55}i}{55} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{33}}{440} \quad 0 \quad \frac{\sqrt{33}i}{110} \quad \frac{4\sqrt{33}}{165} \quad 0$
	$0 \quad 0 \quad \frac{7\sqrt{55}}{440}$	$0 \quad -\frac{\sqrt{55}i}{55} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{33}}{440} \quad 0 \quad -\frac{\sqrt{33}i}{110} \quad 0 \quad 0 \quad -\frac{4\sqrt{33}}{165}$
	$\frac{4\sqrt{33}}{165}$	$0 \quad 0 \quad \frac{\sqrt{55}i}{110} \quad 0 \quad -\frac{\sqrt{55}}{88} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{55} \quad 0 \quad -\frac{9\sqrt{33}}{440} \quad 0 \quad 0$
	$0 \quad -\frac{4\sqrt{33}}{165}$	$-\frac{\sqrt{55}i}{110} \quad 0 \quad -\frac{\sqrt{55}}{88} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{55} \quad 0 \quad -\frac{9\sqrt{33}}{440} \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{3\sqrt{33}i}{110}$	$-\frac{\sqrt{55}}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{220} \quad -\frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}}{110}$
	$\frac{3\sqrt{33}i}{110}$	$0 \quad 0 \quad \frac{\sqrt{55}}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{220} \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0$
823	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,0}^{(1,1;a)}(E_u, 1)$	0	$\frac{3\sqrt{77}}{220} \quad 0 \quad 0 \quad -\frac{3\sqrt{1155}}{770} \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{231} \quad 0 \quad 0 \quad \frac{3\sqrt{77}}{154} \quad 0 \quad 0 \quad \frac{3\sqrt{77}i}{220}$
	$\frac{3\sqrt{77}}{220}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{1155}}{770} \quad -\frac{\sqrt{1155}i}{231} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{77}}{154} \quad -\frac{3\sqrt{77}i}{220} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{385}}{385} \quad 0 \quad 0 \quad \frac{\sqrt{385}i}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{462}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{385}}{385} \quad -\frac{\sqrt{385}i}{220} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{231}}{385} \quad -\frac{\sqrt{231}i}{462} \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{385}}{440} \quad 0 \quad \frac{3\sqrt{385}i}{385} \quad \frac{4\sqrt{385}}{385} \quad 0 \quad 0 \quad -\frac{3\sqrt{231}}{440} \quad 0 \quad -\frac{23\sqrt{231}i}{2310} \quad \frac{2\sqrt{231}}{385} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{385}}{440} \quad 0 \quad -\frac{3\sqrt{385}i}{385} \quad 0 \quad 0 \quad -\frac{4\sqrt{385}}{385} \quad -\frac{3\sqrt{231}}{440} \quad 0 \quad \frac{23\sqrt{231}i}{2310} \quad 0 \quad 0 \quad -\frac{2\sqrt{231}}{385}$
	$-\frac{2\sqrt{231}}{385}$	$0 \quad 0 \quad -\frac{\sqrt{385}i}{770} \quad 0 \quad -\frac{\sqrt{385}}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{1155} \quad 0 \quad \frac{3\sqrt{231}}{440} \quad 0 \quad 0$
	$0 \quad \frac{2\sqrt{231}}{385}$	$\frac{\sqrt{385}i}{770} \quad 0 \quad -\frac{\sqrt{385}}{440} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{231}i}{1155} \quad 0 \quad \frac{3\sqrt{231}}{440} \quad 0 \quad 0 \quad 0$
	$0 \quad \frac{\sqrt{231}i}{462}$	$\frac{\sqrt{385}}{770} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{385}}{220} \quad \frac{3\sqrt{231}}{770} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{231}i}{462}$	$0 \quad 0 \quad -\frac{\sqrt{385}}{770} \quad 0 \quad 0 \quad \frac{\sqrt{385}}{220} \quad 0 \quad 0 \quad -\frac{3\sqrt{231}}{770} \quad 0 \quad 0 \quad 0 \quad 0$
824	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 1)$	0	$\begin{bmatrix} 0 & \frac{3\sqrt{77}i}{220} & \frac{3\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{231} & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{220} \\ -\frac{3\sqrt{77}i}{220} & 0 & 0 & -\frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{3\sqrt{77}}{154} & 0 & 0 & -\frac{3\sqrt{77}}{220} & 0 \\ 0 & 0 & -\frac{\sqrt{385}}{385} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{220} & -\frac{\sqrt{231}}{385} & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{462} \\ 0 & 0 & 0 & \frac{\sqrt{385}}{385} & 0 & 0 & -\frac{\sqrt{385}}{220} & 0 & 0 & \frac{\sqrt{231}}{385} & 0 & 0 & \frac{\sqrt{231}}{462} & 0 \\ \frac{2\sqrt{231}}{385} & 0 & 0 & -\frac{\sqrt{385}i}{440} & 0 & -\frac{\sqrt{385}}{770} & 0 & 0 & 0 & -\frac{3\sqrt{231}i}{440} & 0 & -\frac{\sqrt{231}}{1155} & 0 & 0 \\ 0 & -\frac{2\sqrt{231}}{385} & \frac{\sqrt{385}i}{440} & 0 & -\frac{\sqrt{385}}{770} & 0 & 0 & 0 & \frac{3\sqrt{231}i}{440} & 0 & -\frac{\sqrt{231}}{1155} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{385}}{385} & 0 & -\frac{\sqrt{385}i}{440} & -\frac{4\sqrt{385}}{385} & 0 & 0 & \frac{23\sqrt{231}}{2310} & 0 & \frac{3\sqrt{231}i}{440} & \frac{2\sqrt{231}}{385} & 0 \\ 0 & 0 & \frac{3\sqrt{385}}{385} & 0 & \frac{\sqrt{385}i}{440} & 0 & 0 & \frac{4\sqrt{385}}{385} & \frac{23\sqrt{231}}{2310} & 0 & -\frac{3\sqrt{231}i}{440} & 0 & 0 & -\frac{2\sqrt{231}}{385} \\ 0 & \frac{\sqrt{231}}{462} & 0 & 0 & -\frac{\sqrt{385}}{770} & 0 & 0 & \frac{\sqrt{385}i}{220} & 0 & 0 & \frac{3\sqrt{231}}{770} & 0 & 0 & 0 \\ \frac{\sqrt{231}}{462} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{770} & -\frac{\sqrt{385}i}{220} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{770} & 0 & 0 \end{bmatrix}$
	825	symmetry
		$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,0}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{330}i}{1320} & 0 & -\frac{\sqrt{330}}{1320} & 0 & 0 & 0 & \frac{\sqrt{22}i}{440} & 0 & -\frac{\sqrt{22}}{440} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}i}{1320} & 0 & -\frac{\sqrt{330}}{1320} & 0 & 0 & 0 & -\frac{\sqrt{22}i}{440} & 0 & -\frac{\sqrt{22}}{440} & 0 & 0 & 0 \\ -\frac{3\sqrt{66}}{220} & 0 & 0 & -\frac{7\sqrt{110}i}{440} & 0 & \frac{7\sqrt{110}}{440} & 0 & 0 & 0 & \frac{5\sqrt{66}i}{264} & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 \\ 0 & \frac{3\sqrt{66}}{220} & \frac{7\sqrt{110}i}{440} & 0 & \frac{7\sqrt{110}}{440} & 0 & 0 & 0 & -\frac{5\sqrt{66}i}{264} & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{66}i}{330} & -\frac{3\sqrt{110}}{440} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{66}}{440} & 0 & 0 & 0 & \frac{\sqrt{66}}{330} \\ -\frac{\sqrt{66}i}{330} & 0 & 0 & \frac{3\sqrt{110}}{440} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}}{440} & 0 & 0 & \frac{\sqrt{66}}{330} & 0 \\ 0 & \frac{\sqrt{66}}{330} & 0 & 0 & \frac{3\sqrt{110}}{440} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{66}}{440} & 0 & 0 & -\frac{\sqrt{66}i}{330} \\ \frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{440} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}}{440} & \frac{\sqrt{66}i}{330} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{110}}{55} & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & -\frac{\sqrt{66}i}{66} & -\frac{3\sqrt{66}}{220} & 0 \\ 0 & 0 & -\frac{\sqrt{110}}{55} & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{3\sqrt{66}}{220} \end{bmatrix}$
	826	symmetry
		$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 2)$	0 0 0 $-\frac{\sqrt{330}}{1320}$ 0 $\frac{\sqrt{330}i}{1320}$ 0 0 0 $\frac{\sqrt{22}}{440}$ 0 $\frac{\sqrt{22}i}{440}$ 0 0	
	0 0 $-\frac{\sqrt{330}}{1320}$ 0 $-\frac{\sqrt{330}i}{1320}$ 0 0 0 $\frac{\sqrt{22}}{440}$ 0 $-\frac{\sqrt{22}i}{440}$ 0 0 0	
	0 0 0 $\frac{\sqrt{110}}{55}$ 0 $\frac{\sqrt{110}i}{55}$ 0 0 0 $-\frac{\sqrt{66}}{66}$ 0 $\frac{\sqrt{66}i}{66}$ $\frac{3\sqrt{66}}{220}$ 0	
	0 0 $\frac{\sqrt{110}}{55}$ 0 $-\frac{\sqrt{110}i}{55}$ 0 0 0 $-\frac{\sqrt{66}}{66}$ 0 $-\frac{\sqrt{66}i}{66}$ 0 0 $-\frac{3\sqrt{66}}{220}$	
	0 $\frac{\sqrt{66}}{330}$ 0 0 $\frac{3\sqrt{110}}{440}$ 0 0 0 0 $\frac{3\sqrt{66}}{440}$ 0 0 $-\frac{\sqrt{66}i}{330}$	
	$\frac{\sqrt{66}}{330}$ 0 0 0 0 $-\frac{3\sqrt{110}}{440}$ 0 0 0 0 0 $-\frac{3\sqrt{66}}{440}$ $\frac{\sqrt{66}i}{330}$ 0	
	0 $-\frac{\sqrt{66}i}{330}$ $\frac{3\sqrt{110}}{440}$ 0 0 0 0 0 $-\frac{3\sqrt{66}}{440}$ 0 0 0 0 $-\frac{\sqrt{66}}{330}$	
	$\frac{\sqrt{66}i}{330}$ 0 0 $-\frac{3\sqrt{110}}{440}$ 0 0 0 0 $\frac{3\sqrt{66}}{440}$ 0 0 0 $-\frac{\sqrt{66}}{330}$ 0	
	$-\frac{3\sqrt{66}}{220}$ 0 0 $-\frac{7\sqrt{110}i}{440}$ 0 $\frac{7\sqrt{110}}{440}$ 0 0 0 $\frac{5\sqrt{66}i}{264}$ 0 $\frac{5\sqrt{66}}{264}$ 0 0	
	0 $\frac{3\sqrt{66}}{220}$ $\frac{7\sqrt{110}i}{440}$ 0 $\frac{7\sqrt{110}}{440}$ 0 0 0 $-\frac{5\sqrt{66}i}{264}$ 0 $\frac{5\sqrt{66}}{264}$ 0 0 0	
827	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{M}_{4,0}^{(1,1;a)}(E_u, 3)$	$\frac{3\sqrt{154}}{220}$ 0 0 $\frac{\sqrt{2310}i}{1848}$ 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 0 $-\frac{29\sqrt{154}i}{3080}$ 0 $-\frac{29\sqrt{154}}{3080}$ 0 0	
	0 $-\frac{3\sqrt{154}}{220}$ $-\frac{\sqrt{2310}i}{1848}$ 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 0 $\frac{29\sqrt{154}i}{3080}$ 0 $-\frac{29\sqrt{154}}{3080}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{770}i}{616}$ 0 $-\frac{\sqrt{770}}{616}$ 0 0 0 $-\frac{29\sqrt{462}i}{9240}$ 0 $\frac{29\sqrt{462}}{9240}$ 0 0	
	0 0 $\frac{\sqrt{770}i}{616}$ 0 $-\frac{\sqrt{770}}{616}$ 0 0 0 $\frac{29\sqrt{462}i}{9240}$ 0 $\frac{29\sqrt{462}}{9240}$ 0 0 0	
	0 $-\frac{17\sqrt{462}i}{2310}$ $-\frac{\sqrt{770}}{440}$ 0 0 0 0 $-\frac{\sqrt{770}}{385}$ $-\frac{3\sqrt{462}}{440}$ 0 0 0 0 $\frac{\sqrt{462}}{210}$	
	$\frac{17\sqrt{462}i}{2310}$ 0 0 $\frac{\sqrt{770}}{440}$ 0 0 $-\frac{\sqrt{770}}{385}$ 0 0 $\frac{3\sqrt{462}}{440}$ 0 0 $\frac{\sqrt{462}}{210}$ 0	
	0 $\frac{17\sqrt{462}}{2310}$ 0 0 $-\frac{\sqrt{770}}{440}$ 0 0 $\frac{\sqrt{770}i}{385}$ 0 0 $\frac{3\sqrt{462}}{440}$ 0 0 $\frac{\sqrt{462}i}{210}$	
	$\frac{17\sqrt{462}}{2310}$ 0 0 0 $\frac{\sqrt{770}}{440}$ $-\frac{\sqrt{770}i}{385}$ 0 0 0 0 $-\frac{3\sqrt{462}}{440}$ $-\frac{\sqrt{462}i}{210}$ 0	
	0 0 0 $-\frac{\sqrt{770}}{385}$ 0 $\frac{\sqrt{770}i}{385}$ $\frac{\sqrt{770}}{220}$ 0 0 $-\frac{\sqrt{462}}{210}$ 0 $-\frac{\sqrt{462}i}{210}$ 0 0	
	0 0 $-\frac{\sqrt{770}}{385}$ 0 $-\frac{\sqrt{770}i}{385}$ 0 0 $-\frac{\sqrt{770}}{220}$ $-\frac{\sqrt{462}}{210}$ 0 $\frac{\sqrt{462}i}{210}$ 0 0 0	
828	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 3)$	0 0 0 $\frac{23\sqrt{2310}}{9240}$ 0 $\frac{23\sqrt{2310}i}{9240}$ 0 0 0 $\frac{\sqrt{154}}{3080}$ 0 $-\frac{\sqrt{154}i}{3080}$ $\frac{3\sqrt{154}}{220}$ 0	
	0 0 $\frac{23\sqrt{2310}}{9240}$ 0 $-\frac{23\sqrt{2310}i}{9240}$ 0 0 0 $\frac{\sqrt{154}}{3080}$ 0 $\frac{\sqrt{154}i}{3080}$ 0 0 $-\frac{3\sqrt{154}}{220}$	
	0 0 0 $-\frac{9\sqrt{770}}{3080}$ 0 $\frac{9\sqrt{770}i}{3080}$ $\frac{\sqrt{770}}{220}$ 0 0 $-\frac{41\sqrt{462}}{9240}$ 0 $-\frac{41\sqrt{462}i}{9240}$ 0 0 0	
	0 0 $-\frac{9\sqrt{770}}{3080}$ 0 $-\frac{9\sqrt{770}i}{3080}$ 0 0 $-\frac{\sqrt{770}}{220}$ $-\frac{41\sqrt{462}}{9240}$ 0 $\frac{41\sqrt{462}i}{9240}$ 0 0 0	
	0 $-\frac{\sqrt{462}}{210}$ 0 0 $\frac{\sqrt{770}}{220}$ 0 0 $-\frac{\sqrt{770}i}{385}$ 0 0 $-\frac{\sqrt{462}}{220}$ 0 0 $-\frac{17\sqrt{462}i}{2310}$	
	$-\frac{\sqrt{462}}{210}$ 0 0 0 0 $-\frac{\sqrt{770}}{220}$ $\frac{\sqrt{770}i}{385}$ 0 0 0 0 $\frac{\sqrt{462}}{220}$ $\frac{17\sqrt{462}i}{2310}$ 0	
	0 $-\frac{\sqrt{462}i}{210}$ $-\frac{\sqrt{770}}{220}$ 0 0 0 0 $-\frac{\sqrt{770}}{385}$ $-\frac{\sqrt{462}}{220}$ 0 0 0 0 $\frac{17\sqrt{462}}{2310}$	
	$\frac{\sqrt{462}i}{210}$ 0 0 $\frac{\sqrt{770}}{220}$ 0 0 $-\frac{\sqrt{770}}{385}$ 0 0 0 0 0 $\frac{17\sqrt{462}}{2310}$ 0	
	0 0 0 $\frac{3\sqrt{770}i}{1540}$ 0 $\frac{3\sqrt{770}}{1540}$ 0 0 0 $\frac{13\sqrt{462}i}{4620}$ 0 $-\frac{13\sqrt{462}}{4620}$ 0 0 0	
	0 0 $-\frac{3\sqrt{770}i}{1540}$ 0 $\frac{3\sqrt{770}}{1540}$ 0 0 0 $-\frac{13\sqrt{462}i}{4620}$ 0 $-\frac{13\sqrt{462}}{4620}$ 0 0 0	

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

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	831 symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,0}^{(a)}(E_g, 1)$	0	0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{210}}{42}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$
	0	0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$
	0	0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0 0

832 symmetry

 $-\sqrt{3}xz$ 

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	0 0 0 0 $\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0	
	$\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{5\sqrt{14}}{56}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{5\sqrt{14}}{56}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{5\sqrt{14}}{56}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{5\sqrt{14}}{56}$ 0 0 0 0 0	
833 symmetry		$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,0}^{(a)}(E_g, 2)$	0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0	
	0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0	
	$-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0	
	0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{56}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
$\frac{\sqrt{3}(x-y)(x+y)}{2}$		

834 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
	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														
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	$-\frac{\sqrt{77}}{22}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{77}}{22}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{9\sqrt{77}}{616}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	0	0
	0	0	0	$\frac{9\sqrt{77}}{616}$	0	0	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	0
	0	0	0	0	$\frac{9\sqrt{77}}{616}$	0	0	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0	0
	0	0	0	0	0	$\frac{9\sqrt{77}}{616}$	0	0	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{77}}{77}$	0	0	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0
	0	0	0	0	0	0	0	$\frac{3\sqrt{77}}{77}$	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{88}$	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{88}$	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{88}$	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{88}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{22}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{77}}{22}$	0	0

836 symmetry

$$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	0	0	0	0	$\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0
	0	0	0	0	0	0	$-\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0
	0	0	0	0	0	0	0	$-\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0
	$\frac{\sqrt{66}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{66}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0	0
	0	0	0	$-\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0
	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0
	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0
837	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(a)}(A_{2g})$	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0
	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0
	0	0	0	0	0	0	0	$\frac{3\sqrt{110}}{88}$	0	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0
	0	0	0	0	$\frac{3\sqrt{110}}{88}$	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0
	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0
	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0	$\frac{\sqrt{110}}{88}$	0	0
	0	0	0	0	0	0	0	$\frac{3\sqrt{66}}{88}$	0	0	0	0	0	$\frac{\sqrt{110}}{88}$	0
	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	$\frac{\sqrt{110}}{88}$	0	0	0	$\frac{\sqrt{110}}{88}$	0
	0	0	0	0	0	$-\frac{\sqrt{66}}{88}$	0	0	0	0	$\frac{\sqrt{110}}{88}$	0	0	0	$\frac{\sqrt{110}}{88}$

838 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,0}^{(a)}(E_g, 1)$	0	0	$\frac{\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}}{88}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{462}}{616}$	0	0	0	0	$-\frac{\sqrt{770}}{88}$	0	0	0	0	0	0
	$\frac{\sqrt{462}}{616}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{462}}{616}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	0	0	0	0	$\frac{9\sqrt{462}}{616}$	0	0
	0	0	0	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	0	0	0	0	$\frac{9\sqrt{462}}{616}$	0
	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	0	0	0	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0
	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	0	0	0	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0
	$-\frac{\sqrt{770}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{770}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	0
	0	0	0	0	0	0	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0
	0	0	0	0	$\frac{9\sqrt{462}}{616}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0	0
	0	0	0	0	0	$\frac{9\sqrt{462}}{616}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0
839	symmetry	$\frac{\sqrt{10xz}(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	0 0 0 0 $-\frac{\sqrt{462}}{616}$ 0 0 0 0 0 $-\frac{\sqrt{770}}{88}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{462}}{616}$ 0 0 0 0 0 $-\frac{\sqrt{770}}{88}$ 0 0 0	
	0 0 0 0 0 0 $\frac{3\sqrt{770}}{616}$ 0 0 0 0 0 $\frac{9\sqrt{462}}{616}$ 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{770}}{616}$ 0 0 0 0 0 $\frac{9\sqrt{462}}{616}$	
	$-\frac{\sqrt{462}}{616}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{462}}{616}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{3\sqrt{770}}{616}$ 0 0 0 0 0 $\frac{5\sqrt{462}}{616}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{770}}{616}$ 0 0 0 0 0 $\frac{5\sqrt{462}}{616}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{5\sqrt{462}}{616}$ 0 0 0 0 0 $\frac{\sqrt{770}}{616}$ 0	
	0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{616}$ 0 0 0 0 0 $\frac{\sqrt{770}}{616}$	
	$-\frac{\sqrt{770}}{88}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{770}}{88}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{9\sqrt{462}}{616}$ 0 0 0 0 0 $\frac{\sqrt{770}}{616}$ 0 0 0 0 0	
	0 0 0 $\frac{9\sqrt{462}}{616}$ 0 0 0 0 0 $\frac{\sqrt{770}}{616}$ 0 0 0 0	
$-\frac{\sqrt{35}xy(x-y)(x+y)}{2}$		

840 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,0}^{(a)}(E_g, 2)$	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 $-\frac{\sqrt{55}}{22}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{33}}{22}$ 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 0 0
	0	$-\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
841	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	$-\frac{\sqrt{55}}{22}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0 $\frac{\sqrt{33}}{88}$ 0 0 0 0 0
	0	0 0 0 $\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 $\frac{\sqrt{33}}{88}$ 0 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{33}}{88}$ 0 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{22}$ 0
842	symmetry	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,0}^{(a)}(E_g, 3)$	0	0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{385}}{154}$ 0 0 0 0 0 $-\frac{\sqrt{231}}{77}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{385}}{154}$ 0 0 0 0 0 $-\frac{\sqrt{231}}{77}$ 0 0 0 0
	0	0 0 $\frac{3\sqrt{385}}{154}$ 0 0 0 0 0 $\frac{\sqrt{231}}{77}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{3\sqrt{385}}{154}$ 0 0 0 0 0 $\frac{\sqrt{231}}{77}$ 0 0 0 0 0
	$-\frac{\sqrt{231}}{154}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{231}}{77}$ 0 0 0 0 0 $\frac{\sqrt{385}}{154}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{231}}{77}$ 0 0 0 0 0 $\frac{\sqrt{385}}{154}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{231}}{77}$ 0 0 0 0 0 $\frac{\sqrt{385}}{154}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{231}}{77}$ 0 0 0 0 0 $\frac{\sqrt{385}}{154}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$		
843	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 \\ 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{44} & 0 & 0 & 0 \end{bmatrix}$
	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													
$\mathbb{Q}_6^{(a)}(A_{1g}, 1)$	$\frac{\sqrt{462}}{154}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{462}}{154}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{25\sqrt{462}}{3696}$	0	0	0	0	0	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0	0
	0	0	0	$-\frac{25\sqrt{462}}{3696}$	0	0	0	0	0	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0
	0	0	0	0	$-\frac{25\sqrt{462}}{3696}$	0	0	0	0	0	$\frac{\sqrt{770}}{176}$	0	0	0	0
	0	0	0	0	0	$-\frac{25\sqrt{462}}{3696}$	0	0	0	0	0	$\frac{\sqrt{770}}{176}$	0	0	0
	0	0	0	0	0	0	$\frac{5\sqrt{462}}{231}$	0	0	0	0	0	$\frac{\sqrt{770}}{176}$	0	0
	0	0	0	0	0	0	0	$\frac{5\sqrt{462}}{231}$	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{13\sqrt{462}}{1232}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{13\sqrt{462}}{1232}$	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{13\sqrt{462}}{1232}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{13\sqrt{462}}{1232}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}}{154}$	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}}{154}$	0
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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
846	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$

*continued ...*

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{1g}, 3)$	0	0 0 0 0 $\frac{3\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{3\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 $-\frac{3\sqrt{33}}{88}$ 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 $-\frac{3\sqrt{33}}{88}$
	$\frac{3\sqrt{33}}{88}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{33}}{88}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0
	$-\frac{3\sqrt{55}}{88}$	0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$
	0	$-\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $-\frac{3\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{3\sqrt{33}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{55}}{88}$ 0 0 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{5}{16}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{16}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{5}{16}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{16}$ 0 0 0	
	0 0 $-\frac{5}{16}$ 0 0 0 0 0 $\frac{\sqrt{15}}{16}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{5}{16}$ 0 0 0 0 0 $\frac{\sqrt{15}}{16}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{15}}{16}$ 0 0 0 0 0 $\frac{3}{16}$ 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{15}}{16}$ 0 0 0 0 0 $\frac{3}{16}$ 0 0 0	
	0 0 $-\frac{\sqrt{15}}{16}$ 0 0 0 0 $\frac{3}{16}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{15}}{16}$ 0 0 0 0 0 $\frac{3}{16}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$		

848 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(a)}(A_{2g}, 2)$	0	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	$-\frac{3\sqrt{55}}{88}$	0	0	0	0	0	0
	0	0	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	$-\frac{3\sqrt{55}}{88}$	0	0	0	0	0
	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{55}}{44}$	0	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{55}}{44}$	0	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	0
	0	0	0	0	$-\frac{\sqrt{55}}{44}$	0	0	0	0	0	$-\frac{\sqrt{33}}{44}$	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{55}}{44}$	0	0	0	0	0	$-\frac{\sqrt{33}}{44}$	0	0	0
	$-\frac{3\sqrt{55}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{3\sqrt{55}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{33}}{44}$	0	0	0	0	0	$\frac{3\sqrt{55}}{88}$	0	0
	0	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	$\frac{3\sqrt{55}}{88}$	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	$\frac{3\sqrt{55}}{88}$	0	0	0	0
849	symmetry	$\frac{3\sqrt{154}yz(5x^4 - 10x^2y^2 + y^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \end{bmatrix}$
850	symmetry	$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$

*continued ...*

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
$\mathbb{Q}_{6,0}^{(a)}(E_g, 2)$	0	0 $\frac{\sqrt{330}}{264}$ 0 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{330}}{264}$ 0 0 0 0 0 $\frac{3\sqrt{22}}{88}$ 0 0 0 0 0
	$\frac{\sqrt{330}}{264}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{330}}{264}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{132}$ 0
	0	0 0 0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{132}$
	0	0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 $\frac{5\sqrt{330}}{264}$ 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{22}}{88}$ 0 0 0 0 0 $\frac{5\sqrt{330}}{264}$ 0 0 0
	$\frac{3\sqrt{22}}{88}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{3\sqrt{22}}{88}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{5\sqrt{330}}{264}$ 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0
	0	0 0 0 0 0 0 0 $\frac{5\sqrt{330}}{264}$ 0 0 0 0 0 $\frac{\sqrt{22}}{44}$
	0	0 0 0 0 $-\frac{\sqrt{330}}{132}$ 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{330}}{132}$ 0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 0 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													
$\mathbb{Q}_{6,1}^{(a)}(E_g, 2)$	0	0	0	0	$-\frac{\sqrt{330}}{264}$	0	0	0	0	$\frac{3\sqrt{22}}{88}$	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{330}}{264}$	0	0	0	0	$\frac{3\sqrt{22}}{88}$	0	0	0	
	0	0	0	0	0	0	$\frac{5\sqrt{22}}{88}$	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	
	0	0	0	0	0	0	$\frac{5\sqrt{22}}{88}$	0	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	
	$-\frac{\sqrt{330}}{264}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{330}}{264}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{5\sqrt{22}}{88}$	0	0	0	0	0	$\frac{5\sqrt{330}}{264}$	0	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{22}}{88}$	0	0	0	0	0	$\frac{5\sqrt{330}}{264}$	0	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{330}}{264}$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	
	0	0	0	0	0	0	$\frac{5\sqrt{330}}{264}$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	
	$\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{22}}{88}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0
853	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,0}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{66}}{22} 0$
	0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{66}}{22} 0$
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0	0 0 0 0
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0	0 0 0 0
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0	0 0 0 0
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0	0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0
	0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0	0 0 0 0
	0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0	0 0 0 0
	0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0
	0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0	0 0 0 0
	$-\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0
	0 $-\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0
854	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
$\mathbb{Q}_{6,1}^{(a)}(E_g, 3)$	$-\frac{\sqrt{66}}{22}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 0 $-\frac{\sqrt{110}}{176}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{176}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 $\frac{\sqrt{110}}{176}$ 0 0 0 0
	0	0 0 0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 $\frac{\sqrt{110}}{176}$ 0 0 0
	0	0 0 0 0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 $\frac{\sqrt{110}}{176}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{110}}{176}$ 0 0 0 0 $\frac{5\sqrt{66}}{176}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{110}}{176}$ 0 0 0 0 0 $\frac{5\sqrt{66}}{176}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{110}}{176}$ 0 0 0 0 0 0 $\frac{5\sqrt{66}}{176}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{110}}{176}$ 0 0 0 0 0 0 $\frac{5\sqrt{66}}{176}$ 0 0
	0	0 0 0 0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0
	0	0 0 0 0 0 0 0 $-\frac{5\sqrt{66}}{176}$ 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$
		$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$
855	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,0}^{(a)}(E_g, 4)$	0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{55}}{176}$ 0 0 0 0 0 $-\frac{13\sqrt{33}}{528}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{55}}{176}$ 0 0 0 0 0 $-\frac{13\sqrt{33}}{528}$ 0 0	
	0 0 $\frac{\sqrt{55}}{176}$ 0 0 0 0 0 $\frac{13\sqrt{33}}{528}$ 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{55}}{176}$ 0 0 0 0 0 $\frac{13\sqrt{33}}{528}$ 0 0 0 0	
	$\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{2\sqrt{33}}{33}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $\frac{13\sqrt{33}}{528}$ 0 0 0 0 0 $-\frac{7\sqrt{55}}{176}$ 0 0 0	
	0 0 0 0 0 $\frac{13\sqrt{33}}{528}$ 0 0 0 0 0 $-\frac{7\sqrt{55}}{176}$ 0 0 0	
	0 0 0 $-\frac{13\sqrt{33}}{528}$ 0 0 0 0 $-\frac{7\sqrt{55}}{176}$ 0 0 0 0 0	
	0 0 0 $-\frac{13\sqrt{33}}{528}$ 0 0 0 0 0 $-\frac{7\sqrt{55}}{176}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$		
856	symmetry	

*continued ...*

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 4)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{55}}{176} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{55}}{176} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{55}}{176} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{55}}{176} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} \\ 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}}{176} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}}{176} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{176} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{33}}{528} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{176} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	857 symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ $\frac{\sqrt{21}i}{21}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{42}$ 0 0 $-\frac{\sqrt{21}i}{21}$	
	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{21}}{56}$ 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $-\frac{\sqrt{35}}{56}$	
	0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ $-\frac{\sqrt{21}}{56}$ 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ $\frac{\sqrt{35}}{56}$ 0	
	0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{21}i}{56}$ $\frac{\sqrt{35}i}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{56}$	
	0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 $-\frac{\sqrt{35}i}{56}$ 0	
	0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0	
	0 0 $\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0	
	$\frac{\sqrt{21}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 $\frac{\sqrt{35}}{56}$ 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 $-\frac{\sqrt{21}}{168}$	
	$\frac{\sqrt{21}i}{42}$ 0 0 0 0 $\frac{\sqrt{35}i}{28}$ $-\frac{\sqrt{35}}{56}$ 0 0 0 0 $\frac{\sqrt{21}i}{84}$ $\frac{\sqrt{21}}{168}$ 0	
	0 $\frac{\sqrt{21}}{42}$ $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 $\frac{\sqrt{35}i}{56}$ $\frac{\sqrt{21}i}{84}$ 0 0 0 0 $\frac{\sqrt{21}i}{168}$	
	$-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 $\frac{\sqrt{21}i}{168}$	
	$-\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{35}}{56}$ 0 $\frac{\sqrt{35}i}{56}$ 0 0 0 $\frac{\sqrt{21}}{168}$ 0 $-\frac{\sqrt{21}i}{168}$ 0 0	
	0 $\frac{\sqrt{21}i}{21}$ $-\frac{\sqrt{35}}{56}$ 0 $\frac{\sqrt{35}i}{56}$ 0 0 0 $-\frac{\sqrt{21}}{168}$ 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0	

858 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

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

859 symmetry

 $-\sqrt{3}xz$ 

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0	0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0	0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0	0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0	0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$	0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0	0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0	0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0	0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0	0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{56}$	0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0	
	symmetry	$\sqrt{3}xy$													

continued ...

Table 10

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

861 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 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}}{56}$ 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$	
	0 0 0 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0	
	0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 0 0	
	0 0 $\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 0 0 0	
	$-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $\frac{\sqrt{105}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{56}$	
	$-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}}{56}$ 0	
	0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$	
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0	
	0 0 0 $\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 $\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 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
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$	0 0 0 $-\frac{\sqrt{35}i}{56}$ 0 $\frac{\sqrt{35}}{56}$ 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 $\frac{\sqrt{21}}{56}$ $\frac{\sqrt{21}i}{21}$ 0	
	0 0 $-\frac{\sqrt{35}i}{56}$ 0 $-\frac{\sqrt{35}}{56}$ 0 0 0 $\frac{\sqrt{21}i}{56}$ 0 $-\frac{\sqrt{21}}{56}$ 0 0 $-\frac{\sqrt{21}i}{21}$	
	0 $\frac{\sqrt{35}i}{56}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 $\frac{\sqrt{21}}{56}$ 0 0 0 0 $\frac{\sqrt{35}}{56}$	
	$\frac{\sqrt{35}i}{56}$ 0 0 0 $\frac{\sqrt{21}i}{21}$ $-\frac{\sqrt{21}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{35}}{56}$ 0	
	0 $-\frac{\sqrt{35}}{56}$ $\frac{\sqrt{21}i}{21}$ 0 0 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{56}$	
	$\frac{\sqrt{35}}{56}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{56}$ 0	
	0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0	
	0 0 $\frac{\sqrt{21}}{56}$ 0 $\frac{\sqrt{21}i}{56}$ 0 0 0 $\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0	
	0 $-\frac{\sqrt{21}i}{56}$ 0 0 0 0 $\frac{\sqrt{35}}{56}$ 0 0 $\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{21}}{56}$	
	$-\frac{\sqrt{21}i}{56}$ 0 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{21}}{56}$ 0	
	0 $-\frac{\sqrt{21}}{56}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{56}$ $-\frac{\sqrt{21}i}{21}$ 0 0 0 0 $\frac{\sqrt{21}i}{56}$	
	$\frac{\sqrt{21}}{56}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 $\frac{\sqrt{21}i}{21}$ 0 0 0 $\frac{\sqrt{21}i}{56}$	
	$-\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0 $\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0	
	0 $\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{35}}{56}$ 0 $-\frac{\sqrt{35}i}{56}$ 0 0 0 $-\frac{\sqrt{21}}{56}$ 0 $-\frac{\sqrt{21}i}{56}$ 0 0 0	
863	symmetry	$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{2}i}{8}$ 0 0	
	0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0 $-\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ $-\frac{\sqrt{2}i}{16}$ 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ $-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{2}i}{16}$	
	0 $\frac{\sqrt{2}i}{8}$ 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 $\frac{\sqrt{2}}{8}$	
	$\frac{\sqrt{2}i}{8}$ 0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ $-\frac{\sqrt{2}}{8}$ 0	
	$-\frac{\sqrt{30}i}{48}$ 0 0 $-\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{48}$ $\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0	
	0 0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{48}$	
	0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0	
	0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0	

864 symmetry

$$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_4^{(1,-1;a)}(A_{2g})$	0	0	0	0	$\frac{\sqrt{2}i}{16}$	0	0	$-\frac{\sqrt{2}}{8}$	0	0	$-\frac{\sqrt{30}i}{48}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{2}i}{16}$	$\frac{\sqrt{2}}{8}$	0	0	0	$\frac{\sqrt{30}i}{48}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{48}$	0	0	$-\frac{\sqrt{2}i}{8}$	0	$\frac{\sqrt{2}}{8}$	$\frac{\sqrt{2}i}{16}$	0
	0	0	0	0	0	0	0	$\frac{\sqrt{30}i}{48}$	$-\frac{\sqrt{2}i}{8}$	0	$-\frac{\sqrt{2}}{8}$	0	0	$-\frac{\sqrt{2}i}{16}$
	$-\frac{\sqrt{2}i}{16}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{2}}{8}$	0	$-\frac{\sqrt{2}i}{8}$	0	0
	0	$\frac{\sqrt{2}i}{16}$	0	0	0	0	0	0	$\frac{\sqrt{2}}{8}$	0	$-\frac{\sqrt{2}i}{8}$	0	0	0
	0	$\frac{\sqrt{2}}{8}$	$\frac{\sqrt{30}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{2}i}{16}$	0	0	0	0	$-\frac{\sqrt{2}i}{8}$
	$-\frac{\sqrt{2}}{8}$	0	0	$-\frac{\sqrt{30}i}{48}$	0	0	0	0	0	$\frac{\sqrt{2}i}{16}$	0	0	$-\frac{\sqrt{2}i}{8}$	0
	0	0	0	$\frac{\sqrt{2}i}{8}$	0	$\frac{\sqrt{2}}{8}$	$\frac{\sqrt{2}i}{16}$	0	0	0	0	0	$\frac{\sqrt{30}i}{48}$	0
	0	0	$\frac{\sqrt{2}i}{8}$	0	$-\frac{\sqrt{2}}{8}$	0	0	$-\frac{\sqrt{2}i}{16}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{48}$
	$\frac{\sqrt{30}i}{48}$	0	0	$-\frac{\sqrt{2}}{8}$	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{30}i}{48}$	$\frac{\sqrt{2}}{8}$	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{2}i}{16}$	0	0	0	0	$\frac{\sqrt{2}i}{8}$	$-\frac{\sqrt{30}i}{48}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{2}i}{16}$	0	0	$\frac{\sqrt{2}i}{8}$	0	0	$\frac{\sqrt{30}i}{48}$	0	0	0	0

865 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{4,0}^{(1,-1;a)}(E_g, 1)$	0	0	0	0	$-\frac{5\sqrt{14}i}{112}$	0	0	$-\frac{\sqrt{14}}{56}$	0	0	$-\frac{\sqrt{210}i}{112}$	0	0	$\frac{\sqrt{210}}{84}$		
	0	0	0	0	0	$\frac{5\sqrt{14}i}{112}$	$\frac{\sqrt{14}}{56}$	0	0	0	0	$\frac{\sqrt{210}i}{112}$	$-\frac{\sqrt{210}}{84}$	0		
	0	0	0	0	0	$-\frac{\sqrt{210}}{84}$	$-\frac{\sqrt{210}i}{112}$	0	0	$\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	$-\frac{5\sqrt{14}i}{112}$	0		
	0	0	0	0	$\frac{\sqrt{210}}{84}$	0	0	$\frac{\sqrt{210}i}{112}$	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	$\frac{5\sqrt{14}i}{112}$		
	$\frac{5\sqrt{14}i}{112}$	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	$-\frac{\sqrt{14}}{56}$	0	$\frac{\sqrt{14}i}{56}$	0	0		
	0	$-\frac{5\sqrt{14}i}{112}$	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	$\frac{\sqrt{14}}{56}$	0	$\frac{\sqrt{14}i}{56}$	0	0	0		
	0	$\frac{\sqrt{14}}{56}$	$\frac{\sqrt{210}i}{112}$	0	0	0	0	0	$\frac{5\sqrt{14}i}{112}$	0	0	0	0	$\frac{\sqrt{14}i}{56}$		
	$-\frac{\sqrt{14}}{56}$	0	0	$-\frac{\sqrt{210}i}{112}$	0	0	0	0	0	$-\frac{5\sqrt{14}i}{112}$	0	0	$\frac{\sqrt{14}i}{56}$	0		
	0	0	0	$-\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	$-\frac{5\sqrt{14}i}{112}$	0	0	0	0	$\frac{\sqrt{210}}{84}$	$\frac{\sqrt{210}i}{112}$	0		
	0	0	$-\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	$\frac{5\sqrt{14}i}{112}$	0	0	$-\frac{\sqrt{210}}{84}$	0	0	0	$-\frac{\sqrt{210}i}{112}$	
	$\frac{\sqrt{210}i}{112}$	0	0	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	
	0	$-\frac{\sqrt{210}i}{112}$	$\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{210}}{84}$	$\frac{5\sqrt{14}i}{112}$	0	0	0	0	$-\frac{\sqrt{14}i}{56}$	$-\frac{\sqrt{210}i}{112}$	0	0	0	0	0	0	
	$\frac{\sqrt{210}}{84}$	0	0	$-\frac{5\sqrt{14}i}{112}$	0	0	$-\frac{\sqrt{14}i}{56}$	0	0	$\frac{\sqrt{210}i}{112}$	0	0	0	0	0	

866 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0	0 $-\frac{5\sqrt{14}i}{112}$ 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ $\frac{\sqrt{210}i}{112}$ 0 0 0 0 $-\frac{\sqrt{210}i}{84}$
	0	0 0 0 $\frac{5\sqrt{14}i}{112}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 $-\frac{\sqrt{210}i}{84}$ 0
	$\frac{5\sqrt{14}i}{112}$	0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	0	$-\frac{5\sqrt{14}i}{112}$ 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ $\frac{5\sqrt{14}i}{112}$ 0
	0	0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 $\frac{\sqrt{210}i}{112}$ $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{5\sqrt{14}i}{112}$
	0	$\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{210}i}{112}$ 0 0 0 0 0 $-\frac{5\sqrt{14}i}{112}$ 0 0 $-\frac{\sqrt{14}i}{56}$
	$\frac{\sqrt{14}i}{56}$	0 0 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 0 0 0 0 $\frac{5\sqrt{14}i}{112}$ $\frac{\sqrt{14}i}{56}$ 0
	$-\frac{\sqrt{210}i}{112}$	0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0
	0	$\frac{\sqrt{210}i}{112}$ $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ $\frac{5\sqrt{14}i}{112}$ 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 $\frac{\sqrt{210}i}{112}$ 0
	0	0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{5\sqrt{14}i}{112}$ $\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{210}i}{112}$
	0	$\frac{\sqrt{210}i}{84}$ 0 0 0 $-\frac{5\sqrt{14}i}{112}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{210}i}{112}$ 0 0 0
	$\frac{\sqrt{210}i}{84}$	0 0 0 0 0 $\frac{5\sqrt{14}i}{112}$ $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 $\frac{\sqrt{210}i}{112}$ 0 0 0

867 symmetry

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

continued ...

Table 10

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

868 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 $\frac{i}{8}$ 0 $-\frac{1}{8}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0
	0	0 0 $\frac{i}{8}$ 0 $\frac{1}{8}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0
	0	$-\frac{i}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $-\frac{1}{8}$
	$-\frac{i}{8}$	0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $\frac{1}{8}$ 0
	0	$\frac{1}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 $-\frac{i}{8}$
	$-\frac{1}{8}$	0 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 $-\frac{i}{8}$ 0
	0	0 0 0 $-\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 $\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0
	0	0 0 $\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 $-\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0 0
	0	$-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $-\frac{1}{8}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$
	$-\frac{\sqrt{15}i}{24}$	0 0 0 0 0 0 $\frac{1}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0
	0	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$
	$\frac{\sqrt{15}}{24}$	0 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0
	0	0 0 0 $\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0
	0	0 0 $-\frac{1}{8}$ 0 $\frac{i}{8}$ 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0

869 symmetry

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

continued ...

Table 10

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

870 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	0	$\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{105}i}{84}$	0	$\frac{\sqrt{105}}{84}$	0	0	0
	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0
	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	0	$\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{7}}{28}$	0	0
	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	
	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{7}i}{28}$	0	
	$\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	
	0	$-\frac{\sqrt{7}i}{14}$	$\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	$\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	
	0	$\frac{\sqrt{105}i}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	
	$\frac{\sqrt{105}i}{84}$	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{7}}{28}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	
	0	$-\frac{\sqrt{105}}{84}$	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	
	$\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	0	
	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	$\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	
	0	0	$\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	
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 $\frac{\sqrt{1155}i}{264}$ 0 $-\frac{\sqrt{1155}}{264}$ 0 0 0 $\frac{5\sqrt{77}i}{616}$ 0 $\frac{5\sqrt{77}}{616}$ $-\frac{2\sqrt{77}i}{77}$ 0														
	0 0 $\frac{\sqrt{1155}i}{264}$ 0 $\frac{\sqrt{1155}}{264}$ 0 0 0 $\frac{5\sqrt{77}i}{616}$ 0 $-\frac{5\sqrt{77}}{616}$ 0 0 $\frac{2\sqrt{77}i}{77}$														
	0 $-\frac{\sqrt{1155}i}{264}$ 0 0 $-\frac{5\sqrt{77}i}{616}$ 0 0 $\frac{5\sqrt{77}}{616}$ 0 0 $\frac{3\sqrt{1155}i}{616}$ 0 0 $\frac{\sqrt{1155}}{924}$														
	$-\frac{\sqrt{1155}i}{264}$ 0 0 0 $\frac{5\sqrt{77}i}{616}$ $-\frac{5\sqrt{77}}{616}$ 0 0 0 0 $-\frac{3\sqrt{1155}i}{616}$ $-\frac{\sqrt{1155}}{924}$ 0														
	0 $\frac{\sqrt{1155}}{264}$ $\frac{5\sqrt{77}i}{616}$ 0 0 0 $-\frac{5\sqrt{77}i}{616}$ $\frac{3\sqrt{1155}i}{616}$ 0 0 0 0 $\frac{\sqrt{1155}i}{924}$														
	$-\frac{\sqrt{1155}}{264}$ 0 0 $-\frac{5\sqrt{77}i}{616}$ 0 0 $-\frac{5\sqrt{77}i}{616}$ 0 0 $-\frac{3\sqrt{1155}i}{616}$ 0 0 $\frac{\sqrt{1155}i}{924}$ 0														
	0 0 0 $-\frac{5\sqrt{77}}{616}$ 0 $\frac{5\sqrt{77}i}{616}$ 0 0 0 $-\frac{5\sqrt{1155}}{1848}$ 0 $-\frac{5\sqrt{1155}i}{1848}$ 0 0														
	0 0 $\frac{5\sqrt{77}}{616}$ 0 $\frac{5\sqrt{77}i}{616}$ 0 0 0 $\frac{5\sqrt{1155}}{1848}$ 0 $-\frac{5\sqrt{1155}i}{1848}$ 0 0 0														
	0 $-\frac{5\sqrt{77}i}{616}$ 0 0 $-\frac{3\sqrt{1155}i}{616}$ 0 0 $\frac{5\sqrt{1155}}{1848}$ 0 0 $\frac{\sqrt{77}i}{56}$ 0 0 $\frac{5\sqrt{77}}{308}$														
	$-\frac{5\sqrt{77}i}{616}$ 0 0 0 $\frac{3\sqrt{1155}i}{616}$ $-\frac{5\sqrt{1155}}{1848}$ 0 0 0 0 $-\frac{\sqrt{77}i}{56}$ $-\frac{5\sqrt{77}}{308}$ 0														
	0 $-\frac{5\sqrt{77}}{616}$ $-\frac{3\sqrt{1155}i}{616}$ 0 0 0 0 $\frac{5\sqrt{1155}i}{1848}$ $-\frac{\sqrt{77}i}{56}$ 0 0 0 0 $-\frac{5\sqrt{77}i}{308}$														
	$\frac{5\sqrt{77}}{616}$ 0 0 $\frac{3\sqrt{1155}i}{616}$ 0 0 $\frac{5\sqrt{1155}i}{1848}$ 0 0 $\frac{\sqrt{77}i}{56}$ 0 0 $-\frac{5\sqrt{77}i}{308}$ 0														
	$\frac{2\sqrt{77}i}{77}$ 0 0 $-\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{924}$ 0 0 0 $-\frac{5\sqrt{77}}{308}$ 0 $\frac{5\sqrt{77}i}{308}$ 0 0														
	0 $-\frac{2\sqrt{77}i}{77}$ $\frac{\sqrt{1155}}{924}$ 0 $-\frac{\sqrt{1155}i}{924}$ 0 0 0 $\frac{5\sqrt{77}}{308}$ 0 $\frac{5\sqrt{77}i}{308}$ 0 0 0														

$$\frac{\sqrt{462(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}}{32}$$

872 symmetry

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} \\ -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} \\ \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 \\ \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} \\ \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} \\ \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 2)$		$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
873	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 3)$	0 0 $\frac{3\sqrt{22}i}{176}$ 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ $\frac{\sqrt{330}i}{176}$ 0 0 0 0 0														
	0 0 0 $-\frac{3\sqrt{22}i}{176}$ 0 0 $-\frac{\sqrt{22}i}{22}$ 0 0 $-\frac{\sqrt{330}i}{176}$ 0 0 0 0 0														
	$-\frac{3\sqrt{22}i}{176}$ 0 0 0 0 $-\frac{\sqrt{330}i}{352}$ 0 0 0 $-\frac{\sqrt{22}}{88}$ 0 0 $-\frac{7\sqrt{22}i}{352}$ 0 0														
	0 $\frac{3\sqrt{22}i}{176}$ 0 0 $-\frac{\sqrt{330}i}{352}$ 0 0 0 $\frac{\sqrt{22}}{88}$ 0 $-\frac{7\sqrt{22}i}{352}$ 0 0 0														
	0 0 0 $\frac{\sqrt{330}i}{352}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 $\frac{9\sqrt{22}i}{352}$ 0 $-\frac{3\sqrt{22}}{88}$ $-\frac{3\sqrt{22}i}{176}$ 0														
	0 0 $\frac{\sqrt{330}i}{352}$ 0 0 0 0 $-\frac{\sqrt{330}i}{88}$ $\frac{9\sqrt{22}i}{352}$ 0 $\frac{3\sqrt{22}}{88}$ 0 0 $\frac{3\sqrt{22}i}{176}$														
	0 $\frac{\sqrt{22}i}{22}$ 0 0 $-\frac{\sqrt{330}i}{88}$ 0 0 0 0 $-\frac{3\sqrt{22}i}{88}$ 0 0 $\frac{\sqrt{22}}{22}$														
	$\frac{\sqrt{22}i}{22}$ 0 0 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 0 0 0 $\frac{3\sqrt{22}i}{88}$ $-\frac{\sqrt{22}}{22}$ 0														
	$-\frac{\sqrt{330}i}{176}$ 0 0 $\frac{\sqrt{22}}{88}$ 0 $-\frac{9\sqrt{22}i}{352}$ 0 0 0 0 0 $-\frac{\sqrt{330}i}{352}$ 0 0														
	0 $\frac{\sqrt{330}i}{176}$ $-\frac{\sqrt{22}}{88}$ 0 $-\frac{9\sqrt{22}i}{352}$ 0 0 0 0 0 $-\frac{\sqrt{330}i}{352}$ 0 0 0														
	0 0 0 $\frac{7\sqrt{22}i}{352}$ 0 $\frac{3\sqrt{22}}{88}$ $\frac{3\sqrt{22}i}{88}$ 0 0 $\frac{\sqrt{330}i}{352}$ 0 0 $\frac{\sqrt{330}i}{176}$ 0 0														
	0 0 $\frac{7\sqrt{22}i}{352}$ 0 $-\frac{3\sqrt{22}}{88}$ 0 0 $-\frac{3\sqrt{22}i}{88}$ $\frac{\sqrt{330}i}{352}$ 0 0 0 0 $-\frac{\sqrt{330}i}{176}$														
	0 0 0 0 $\frac{3\sqrt{22}i}{176}$ 0 0 $-\frac{\sqrt{22}}{22}$ 0 0 $-\frac{\sqrt{330}i}{176}$ 0 0 0														
	0 0 0 0 0 $-\frac{3\sqrt{22}i}{176}$ $\frac{\sqrt{22}}{22}$ 0 0 0 0 $\frac{\sqrt{330}i}{176}$ 0 0														

874 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
		0	0	0	$\frac{\sqrt{10}}{16}$	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	$-\frac{\sqrt{6}}{16}$	0	$-\frac{\sqrt{6}i}{16}$	0	0
		0	0	$-\frac{\sqrt{10}}{16}$	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	$\frac{\sqrt{6}}{16}$	0	$-\frac{\sqrt{6}i}{16}$	0	0	0
		0	$-\frac{\sqrt{10}}{16}$	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	
		$\frac{\sqrt{10}}{16}$	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	
		0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{10}}{16}$		
		$\frac{\sqrt{10}i}{16}$	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{10}}{16}$	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	$\frac{\sqrt{6}}{16}$	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6}i}{16}$		
		$-\frac{\sqrt{6}}{16}$	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	
		0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{6}}{16}$		
		$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6}}{16}$	0	
		0	0	0	$-\frac{\sqrt{10}i}{16}$	0	$-\frac{\sqrt{10}}{16}$	0	0	0	$\frac{\sqrt{6}i}{16}$	0	$-\frac{\sqrt{6}}{16}$	0	0
		0	0	$-\frac{\sqrt{10}i}{16}$	0	$\frac{\sqrt{10}}{16}$	0	0	0	$\frac{\sqrt{6}i}{16}$	0	$\frac{\sqrt{6}}{16}$	0	0	0
875	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 0 $\frac{3\sqrt{22}i}{176}$ 0 0 $-\frac{\sqrt{22}}{22}$ 0 0 $-\frac{\sqrt{330}i}{176}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{22}i}{176}$ $\frac{\sqrt{22}}{22}$ 0 0 0 0 $\frac{\sqrt{330}i}{176}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{330}}{352}$ $\frac{\sqrt{330}i}{88}$ 0 0 $\frac{3\sqrt{22}i}{88}$ 0 0 $-\frac{9\sqrt{22}}{352}$ $\frac{3\sqrt{22}i}{176}$ 0	
	0 0 0 0 $-\frac{\sqrt{330}}{352}$ 0 0 $-\frac{\sqrt{330}i}{88}$ $\frac{3\sqrt{22}i}{88}$ 0 0 $\frac{9\sqrt{22}}{352}$ 0 0 $-\frac{3\sqrt{22}i}{176}$	
	$-\frac{3\sqrt{22}i}{176}$ 0 0 $-\frac{\sqrt{330}}{352}$ 0 0 0 0 0 $\frac{7\sqrt{22}}{352}$ 0 $\frac{\sqrt{22}i}{88}$ 0 0 0	
	0 $\frac{3\sqrt{22}i}{176}$ $\frac{\sqrt{330}}{352}$ 0 0 0 0 0 $-\frac{7\sqrt{22}}{352}$ 0 $\frac{\sqrt{22}i}{88}$ 0 0 0	
	0 $\frac{\sqrt{22}}{22}$ $-\frac{\sqrt{330}i}{88}$ 0 0 0 0 0 $\frac{3\sqrt{22}i}{88}$ 0 0 0 0 $-\frac{\sqrt{22}i}{22}$	
	$-\frac{\sqrt{22}}{22}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{22}i}{88}$ 0 0 $-\frac{\sqrt{22}i}{22}$ 0	
	0 0 0 $-\frac{3\sqrt{22}i}{88}$ 0 $-\frac{7\sqrt{22}}{352}$ $-\frac{3\sqrt{22}i}{88}$ 0 0 0 0 $\frac{\sqrt{330}}{352}$ $\frac{\sqrt{330}i}{176}$ 0	
	0 0 $-\frac{3\sqrt{22}i}{88}$ 0 $\frac{7\sqrt{22}}{352}$ 0 0 $\frac{3\sqrt{22}i}{88}$ 0 0 $-\frac{\sqrt{330}}{352}$ 0 0 0 $-\frac{\sqrt{330}i}{176}$	
	$\frac{\sqrt{330}i}{176}$ 0 0 $\frac{9\sqrt{22}}{352}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0 0 $-\frac{\sqrt{330}}{352}$ 0 0 0 0	
	0 $-\frac{\sqrt{330}i}{176}$ $-\frac{9\sqrt{22}}{352}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0 0 $\frac{\sqrt{330}}{352}$ 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{22}i}{176}$ 0 0 0 0 $\frac{\sqrt{22}i}{22}$ $-\frac{\sqrt{330}i}{176}$ 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{22}i}{176}$ 0 0 $\frac{\sqrt{22}i}{22}$ 0 0 $\frac{\sqrt{330}i}{176}$ 0 0 0 0	
$\frac{3\sqrt{154}yz(5x^4 - 10x^2y^2 + y^4)}{16}$		
876	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,0}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{2}}{32}$ 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{96}$ $\frac{\sqrt{30}i}{48}$ 0	
	0 0 0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{96}$ 0 0 $-\frac{\sqrt{30}i}{48}$	
	$\frac{\sqrt{30}i}{48}$ 0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 0 0 $-\frac{\sqrt{30}}{96}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0	
	0 $-\frac{\sqrt{30}i}{48}$ $\frac{5\sqrt{2}}{32}$ 0 0 0 0 0 $\frac{\sqrt{30}}{96}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{96}$ 0 0 0 0 0 $\frac{5\sqrt{2}}{32}$ $-\frac{\sqrt{2}i}{16}$ 0	
	0 0 $\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{96}$ 0 0 0 0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 $\frac{\sqrt{2}i}{16}$	
	$\frac{\sqrt{2}i}{16}$ 0 0 $\frac{\sqrt{30}}{96}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 $-\frac{5\sqrt{2}}{32}$ 0 0 0	
	0 $-\frac{\sqrt{2}i}{16}$ $-\frac{\sqrt{30}}{96}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 $\frac{5\sqrt{2}}{32}$ 0 0 0 0	
	0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 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
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 1)$	0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{48}$ 0 0 0 0 $\frac{5\sqrt{2}i}{32}$ 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{96}$ 0 0 0	
	0 $\frac{\sqrt{30}i}{48}$ 0 0 $\frac{5\sqrt{2}i}{32}$ 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{96}$ 0 0 0	
	0 0 0 $-\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{96}$ 0 $-\frac{\sqrt{30}}{24}$ $\frac{\sqrt{30}i}{48}$ 0	
	0 0 $-\frac{5\sqrt{2}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{96}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 $-\frac{\sqrt{30}i}{48}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{2}i}{16}$ 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{96}$ 0 0 0 0 0 $\frac{5\sqrt{2}i}{32}$ 0 0	
	0 $-\frac{\sqrt{2}i}{16}$ $\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{96}$ 0 0 0 0 0 $\frac{5\sqrt{2}i}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{96}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 0 $-\frac{5\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{2}i}{16}$ 0	
	0 0 0 0 $-\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{30}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{16}$ 0 0	
	$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$	

878 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{6,0}^{(1,-1;a)}(E_g, 2)$	0	0	0	0	$\frac{7\sqrt{55}i}{264}$	0	0	$-\frac{\sqrt{55}}{66}$	0	0	$-\frac{5\sqrt{33}i}{264}$	0	0	$-\frac{\sqrt{33}}{33}$		
	0	0	0	0	0	$-\frac{7\sqrt{55}i}{264}$	$\frac{\sqrt{55}}{66}$	0	0	0	0	$\frac{5\sqrt{33}i}{264}$	$\frac{\sqrt{33}}{33}$	0		
	0	0	0	0	0	$-\frac{5\sqrt{33}}{528}$	$-\frac{5\sqrt{33}i}{264}$	0	0	$-\frac{\sqrt{55}i}{132}$	0	$\frac{5\sqrt{55}}{528}$	$-\frac{\sqrt{55}i}{132}$	0		
	0	0	0	0	$\frac{5\sqrt{33}}{528}$	0	0	$\frac{5\sqrt{33}i}{264}$	$-\frac{\sqrt{55}i}{132}$	0	$-\frac{5\sqrt{55}}{528}$	0	0	$\frac{\sqrt{55}i}{132}$		
	$-\frac{7\sqrt{55}i}{264}$	0	0	$\frac{5\sqrt{33}}{528}$	0	0	0	0	0	$\frac{13\sqrt{55}}{528}$	0	$-\frac{\sqrt{55}i}{132}$	0	0		
	0	$\frac{7\sqrt{55}i}{264}$	$-\frac{5\sqrt{33}}{528}$	0	0	0	0	0	$-\frac{13\sqrt{55}}{528}$	0	$-\frac{\sqrt{55}i}{132}$	0	0	0		
	0	$\frac{\sqrt{55}}{66}$	$\frac{5\sqrt{33}i}{264}$	0	0	0	0	0	$\frac{5\sqrt{55}i}{264}$	0	0	0	0	$\frac{\sqrt{55}i}{66}$		
	$-\frac{\sqrt{55}}{66}$	0	0	$-\frac{5\sqrt{33}i}{264}$	0	0	0	0	0	$-\frac{5\sqrt{55}i}{264}$	0	0	$\frac{\sqrt{55}i}{66}$	0		
	0	0	0	$\frac{\sqrt{55}i}{132}$	0	$-\frac{13\sqrt{55}}{528}$	$-\frac{5\sqrt{55}i}{264}$	0	0	0	0	$\frac{\sqrt{33}}{48}$	$-\frac{5\sqrt{33}i}{132}$	0		
	0	0	$\frac{\sqrt{55}i}{132}$	0	$\frac{13\sqrt{55}}{528}$	0	0	$\frac{5\sqrt{55}i}{264}$	0	0	$-\frac{\sqrt{33}}{48}$	0	0	$\frac{5\sqrt{33}i}{132}$		
	$\frac{5\sqrt{33}i}{264}$	0	0	$-\frac{5\sqrt{55}}{528}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	$-\frac{\sqrt{33}}{48}$	0	0	0	0		
	0	$-\frac{5\sqrt{33}i}{264}$	$\frac{5\sqrt{55}}{528}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	$\frac{\sqrt{33}}{48}$	0	0	0	0	0		
	0	$\frac{\sqrt{33}}{33}$	$\frac{\sqrt{55}i}{132}$	0	0	0	0	$-\frac{\sqrt{55}i}{66}$	$\frac{5\sqrt{33}i}{132}$	0	0	0	0	0		
	$-\frac{\sqrt{33}}{33}$	0	0	$-\frac{\sqrt{55}i}{132}$	0	0	$-\frac{\sqrt{55}i}{66}$	0	0	$-\frac{5\sqrt{33}i}{132}$	0	0	0	0		

$$-\frac{\sqrt{21}xz(5x^4 + 10x^2y^2 - 20x^2z^2 + 5y^4 - 20y^2z^2 + 8z^4)}{8}$$

879 symmetry

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 2)$	0	0	$\frac{7\sqrt{55}i}{264}$	0	0	0	0	$-\frac{\sqrt{55}i}{66}$	$\frac{5\sqrt{33}i}{264}$	0	0	0	0	$\frac{\sqrt{33}i}{33}$
	0	0	0	$-\frac{7\sqrt{55}i}{264}$	0	0	$-\frac{\sqrt{55}i}{66}$	0	0	$-\frac{5\sqrt{33}i}{264}$	0	0	$\frac{\sqrt{33}i}{33}$	0
	$-\frac{7\sqrt{55}i}{264}$	0	0	0	0	$\frac{5\sqrt{33}i}{528}$	0	0	0	$\frac{\sqrt{55}}{132}$	0	$-\frac{13\sqrt{55}i}{528}$	0	0
	0	$\frac{7\sqrt{55}i}{264}$	0	0	$\frac{5\sqrt{33}i}{528}$	0	0	0	$-\frac{\sqrt{55}}{132}$	0	$-\frac{13\sqrt{55}i}{528}$	0	0	0
	0	0	0	$-\frac{5\sqrt{33}i}{528}$	0	0	$-\frac{5\sqrt{33}i}{264}$	0	0	$-\frac{5\sqrt{55}i}{528}$	0	$\frac{\sqrt{55}}{132}$	$\frac{\sqrt{55}i}{132}$	0
	0	0	$-\frac{5\sqrt{33}i}{528}$	0	0	0	0	$\frac{5\sqrt{33}i}{264}$	$-\frac{5\sqrt{55}i}{528}$	0	$-\frac{\sqrt{55}}{132}$	0	0	$-\frac{\sqrt{55}i}{132}$
	0	$\frac{\sqrt{55}i}{66}$	0	0	$\frac{5\sqrt{33}i}{264}$	0	0	0	0	$-\frac{5\sqrt{55}i}{264}$	0	0	$-\frac{\sqrt{55}}{66}$	
	$\frac{\sqrt{55}i}{66}$	0	0	0	0	$-\frac{5\sqrt{33}i}{264}$	0	0	0	0	0	$\frac{5\sqrt{55}i}{264}$	$\frac{\sqrt{55}}{66}$	0
	$-\frac{5\sqrt{33}i}{264}$	0	0	$-\frac{\sqrt{55}}{132}$	0	$\frac{5\sqrt{55}i}{528}$	0	0	0	0	0	$-\frac{\sqrt{33}i}{48}$	0	0
	0	$\frac{5\sqrt{33}i}{264}$	$\frac{\sqrt{55}}{132}$	0	$\frac{5\sqrt{55}i}{528}$	0	0	0	0	$-\frac{\sqrt{33}i}{48}$	0	0	0	
	0	0	0	$\frac{13\sqrt{55}i}{528}$	0	$-\frac{\sqrt{55}}{132}$	$\frac{5\sqrt{55}i}{264}$	0	0	$\frac{\sqrt{33}i}{48}$	0	0	$-\frac{5\sqrt{33}i}{132}$	0
	0	0	$\frac{13\sqrt{55}i}{528}$	0	$\frac{\sqrt{55}}{132}$	0	0	$-\frac{5\sqrt{55}i}{264}$	$\frac{\sqrt{33}i}{48}$	0	0	0	0	$\frac{5\sqrt{33}i}{132}$
	0	$-\frac{\sqrt{33}i}{33}$	0	0	$-\frac{\sqrt{55}i}{132}$	0	0	$\frac{\sqrt{55}}{66}$	0	0	$\frac{5\sqrt{33}i}{132}$	0	0	0
	$-\frac{\sqrt{33}i}{33}$	0	0	0	0	$\frac{\sqrt{55}i}{132}$	$-\frac{\sqrt{55}}{66}$	0	0	0	0	$-\frac{5\sqrt{33}i}{132}$	0	0

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

880 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,0}^{(1,-1;a)}(E_g, 3)$	0 0 0 $-\frac{\sqrt{165}}{132}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $\frac{\sqrt{11}i}{44}$ 0 0														
	0 0 $\frac{\sqrt{165}}{132}$ 0 $-\frac{\sqrt{165}i}{132}$ 0 0 0 $\frac{\sqrt{11}}{44}$ 0 $\frac{\sqrt{11}i}{44}$ 0 0 0														
	0 $\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}i}{88}$ $\frac{\sqrt{165}i}{66}$ 0 0 0 0 $-\frac{\sqrt{165}i}{264}$														
	$-\frac{\sqrt{165}}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}i}{88}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{165}i}{264}$ 0														
	0 $\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{165}}{264}$														
	$\frac{\sqrt{165}i}{132}$ 0 0 0 0 0 $\frac{5\sqrt{11}}{88}$ 0 0 0 0 $\frac{\sqrt{165}i}{66}$ $-\frac{\sqrt{165}}{264}$ 0														
	0 0 0 $\frac{5\sqrt{11}i}{88}$ 0 $\frac{5\sqrt{11}}{88}$ 0 0 0 $-\frac{\sqrt{165}i}{88}$ 0 $\frac{\sqrt{165}}{88}$ 0 0														
	0 0 $\frac{5\sqrt{11}i}{88}$ 0 $-\frac{5\sqrt{11}}{88}$ 0 0 0 $-\frac{\sqrt{165}i}{88}$ 0 $-\frac{\sqrt{165}}{88}$ 0 0 0														
	0 $\frac{\sqrt{11}}{44}$ $-\frac{\sqrt{165}i}{66}$ 0 0 0 0 $\frac{\sqrt{165}i}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{11}i}{88}$														
	$-\frac{\sqrt{11}}{44}$ 0 0 $\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{165}i}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{11}i}{88}$ 0														
	0 $-\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{165}}{88}$ 0 0 0 0 0 $-\frac{3\sqrt{11}}{88}$														
	$-\frac{\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{\sqrt{165}i}{66}$ $\frac{\sqrt{165}}{88}$ 0 0 0 0 0 $\frac{3\sqrt{11}}{88}$ 0														
	0 0 0 $\frac{\sqrt{165}i}{264}$ 0 $-\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $\frac{3\sqrt{11}}{88}$ 0 0														
	0 0 $\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0														
881	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 $\frac{\sqrt{165}i}{264}$ 0 $-\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $\frac{3\sqrt{11}}{88}$ 0 0	
	0 0 $\frac{\sqrt{165}i}{264}$ 0 $\frac{\sqrt{165}}{264}$ 0 0 0 $\frac{3\sqrt{11}i}{88}$ 0 $-\frac{3\sqrt{11}}{88}$ 0 0 0	
	0 $-\frac{\sqrt{165}i}{264}$ 0 0 $\frac{5\sqrt{11}i}{88}$ 0 0 $-\frac{5\sqrt{11}}{88}$ 0 0 $-\frac{\sqrt{165}i}{264}$ 0 0 $-\frac{\sqrt{165}}{132}$	
	$-\frac{\sqrt{165}i}{264}$ 0 0 0 0 $-\frac{5\sqrt{11}i}{88}$ $\frac{5\sqrt{11}}{88}$ 0 0 0 $\frac{\sqrt{165}i}{264}$ $\frac{\sqrt{165}}{132}$ 0	
	0 $\frac{\sqrt{165}}{264}$ $-\frac{5\sqrt{11}i}{88}$ 0 0 0 0 $\frac{5\sqrt{11}i}{88}$ $-\frac{\sqrt{165}i}{264}$ 0 0 0 $-\frac{\sqrt{165}i}{132}$	
	$-\frac{\sqrt{165}}{264}$ 0 0 $\frac{5\sqrt{11}i}{88}$ 0 0 $\frac{5\sqrt{11}i}{88}$ 0 0 $\frac{\sqrt{165}i}{264}$ 0 0 $-\frac{\sqrt{165}i}{132}$ 0	
	0 0 0 $\frac{5\sqrt{11}}{88}$ 0 $-\frac{5\sqrt{11}i}{88}$ 0 0 0 $-\frac{\sqrt{165}}{88}$ 0 $-\frac{\sqrt{165}i}{88}$ 0 0	
	0 0 $-\frac{5\sqrt{11}}{88}$ 0 $-\frac{5\sqrt{11}i}{88}$ 0 0 0 $\frac{\sqrt{165}}{88}$ 0 $-\frac{\sqrt{165}i}{88}$ 0 0 0	
	0 $-\frac{3\sqrt{11}i}{88}$ 0 0 $\frac{\sqrt{165}i}{264}$ 0 0 $\frac{\sqrt{165}}{88}$ 0 0 $\frac{5\sqrt{11}i}{88}$ 0 0 $-\frac{\sqrt{11}}{44}$	
	$-\frac{3\sqrt{11}i}{88}$ 0 0 0 0 $-\frac{\sqrt{165}i}{264}$ $-\frac{\sqrt{165}}{88}$ 0 0 0 0 $-\frac{5\sqrt{11}i}{88}$ $\frac{\sqrt{11}}{44}$ 0	
	0 $-\frac{3\sqrt{11}}{88}$ $\frac{\sqrt{165}i}{264}$ 0 0 0 0 $\frac{\sqrt{165}i}{88}$ $-\frac{5\sqrt{11}i}{88}$ 0 0 0 0 $\frac{\sqrt{11}i}{44}$	
	$\frac{3\sqrt{11}}{88}$ 0 0 $-\frac{\sqrt{165}i}{264}$ 0 0 $\frac{\sqrt{165}i}{88}$ 0 0 $\frac{5\sqrt{11}i}{88}$ 0 0 0 $\frac{\sqrt{11}i}{44}$ 0	
	0 0 0 $\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 $\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0	
	0 0 $-\frac{\sqrt{165}}{132}$ 0 $\frac{\sqrt{165}i}{132}$ 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0	
$\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$		
882	symmetry	

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{Q}_{6,0}^{(1,-1;a)}(E_g, 4)$	0	0	0	$-\frac{\sqrt{22}}{48}$	0	$\frac{\sqrt{22}i}{48}$	0	0	0	$-\frac{\sqrt{330}}{528}$	0	$-\frac{\sqrt{330}i}{528}$	0	0	0	
	0	0	$\frac{\sqrt{22}}{48}$	0	$\frac{\sqrt{22}i}{48}$	0	0	0	$\frac{\sqrt{330}}{528}$	0	$-\frac{\sqrt{330}i}{528}$	0	0	0	0	
	0	$\frac{\sqrt{22}}{48}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	$\frac{\sqrt{22}i}{33}$	0	0	0	0	0	$-\frac{7\sqrt{22}i}{528}$	
	$-\frac{\sqrt{22}}{48}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	0	0	$-\frac{\sqrt{22}i}{33}$	0	0	$-\frac{7\sqrt{22}i}{528}$	0	0	
	0	$-\frac{\sqrt{22}i}{48}$	0	0	0	0	0	$\frac{\sqrt{330}}{132}$	0	0	$\frac{\sqrt{22}i}{33}$	0	0	0	$-\frac{7\sqrt{22}}{528}$	
	$-\frac{\sqrt{22}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{330}}{132}$	0	0	0	0	$-\frac{\sqrt{22}i}{33}$	$\frac{7\sqrt{22}}{528}$	0	0	
	0	0	0	$\frac{\sqrt{330}i}{132}$	0	$-\frac{\sqrt{330}}{132}$	0	0	0	$\frac{\sqrt{22}i}{132}$	0	$\frac{\sqrt{22}}{132}$	$-\frac{2\sqrt{22}i}{33}$	0	0	
	0	0	$\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	$\frac{\sqrt{22}i}{132}$	0	$-\frac{\sqrt{22}}{132}$	0	0	$\frac{2\sqrt{22}i}{33}$		
	0	$\frac{\sqrt{330}}{528}$	$-\frac{\sqrt{22}i}{33}$	0	0	0	0	$-\frac{\sqrt{22}i}{132}$	0	0	0	0	0	$-\frac{5\sqrt{330}i}{528}$		
	$-\frac{\sqrt{330}}{528}$	0	0	$\frac{\sqrt{22}i}{33}$	0	0	$-\frac{\sqrt{22}i}{132}$	0	0	0	0	0	$-\frac{5\sqrt{330}i}{528}$	0		
	0	$\frac{\sqrt{330}i}{528}$	0	0	$-\frac{\sqrt{22}i}{33}$	0	0	$-\frac{\sqrt{22}}{132}$	0	0	0	0	0	0	$\frac{5\sqrt{330}}{528}$	
	$\frac{\sqrt{330}i}{528}$	0	0	0	0	$\frac{\sqrt{22}i}{33}$	$\frac{\sqrt{22}}{132}$	0	0	0	0	0	$-\frac{5\sqrt{330}}{528}$	0		
	0	0	0	$\frac{7\sqrt{22}i}{528}$	0	$\frac{7\sqrt{22}}{528}$	$\frac{2\sqrt{22}i}{33}$	0	0	$\frac{5\sqrt{330}i}{528}$	0	$-\frac{5\sqrt{330}}{528}$	0	0	0	
	0	0	$\frac{7\sqrt{22}i}{528}$	0	$-\frac{7\sqrt{22}}{528}$	0	0	$-\frac{2\sqrt{22}i}{33}$	$\frac{5\sqrt{330}i}{528}$	0	$\frac{5\sqrt{330}}{528}$	0	0	0	0	

$$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$$

883 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 4)$	0 0 0 $-\frac{17\sqrt{22}i}{528}$ 0 $-\frac{17\sqrt{22}}{528}$ $-\frac{2\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{330}i}{176}$ 0 $\frac{\sqrt{330}}{176}$ 0 0	
	0 0 $-\frac{17\sqrt{22}i}{528}$ 0 $\frac{17\sqrt{22}}{528}$ 0 0 $\frac{2\sqrt{22}i}{33}$ $-\frac{\sqrt{330}i}{176}$ 0 $-\frac{\sqrt{330}}{176}$ 0 0 0	
	0 $\frac{17\sqrt{22}i}{528}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{22}}{528}$	
	$\frac{17\sqrt{22}i}{528}$ 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{22}}{528}$ 0	
	0 $\frac{17\sqrt{22}}{528}$ 0 0 0 0 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 0 0 $-\frac{\sqrt{22}i}{528}$	
	$-\frac{17\sqrt{22}}{528}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{22}i}{528}$ 0	
	$\frac{2\sqrt{22}i}{33}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}}{33}$ 0 $\frac{\sqrt{22}i}{33}$ 0 0	
	0 $-\frac{2\sqrt{22}i}{33}$ 0 0 0 0 0 0 $\frac{\sqrt{22}}{33}$ 0 $\frac{\sqrt{22}i}{33}$ 0 0 0	
	0 $\frac{\sqrt{330}i}{176}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{22}}{33}$ 0 0 0 0 0 $\frac{\sqrt{330}}{176}$	
	$\frac{\sqrt{330}i}{176}$ 0 0 0 0 $\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{22}}{33}$ 0 0 0 0 0 $-\frac{\sqrt{330}}{176}$ 0	
	0 $-\frac{\sqrt{330}}{176}$ $\frac{\sqrt{22}i}{33}$ 0 0 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{176}$	
	$\frac{\sqrt{330}}{176}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{176}$ 0	
	0 0 0 $-\frac{\sqrt{22}}{528}$ 0 $\frac{\sqrt{22}i}{528}$ 0 0 0 $-\frac{\sqrt{330}}{176}$ 0 $-\frac{\sqrt{330}i}{176}$ 0 0 0	
	0 0 $\frac{\sqrt{22}}{528}$ 0 $\frac{\sqrt{22}i}{528}$ 0 0 0 $\frac{\sqrt{330}}{176}$ 0 $-\frac{\sqrt{330}i}{176}$ 0 0 0	

884 symmetry

1

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_0^{(1,1;a)}(A_{1g})$	0	0	0	0	0	0	0	0	$\frac{\sqrt{42}i}{42}$	0	$\frac{\sqrt{42}}{42}$	$\frac{\sqrt{42}i}{42}$	0	0	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{42}i}{42}$	0	$-\frac{\sqrt{42}}{42}$	0	0	$-\frac{\sqrt{42}i}{42}$	
	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	0	$-\frac{\sqrt{42}}{56}$	0	0	$\frac{\sqrt{70}i}{56}$	0	0	$\frac{\sqrt{70}}{56}$	
	0	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	$\frac{\sqrt{42}}{56}$	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	$-\frac{\sqrt{70}}{56}$	0	
	0	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	0	$\frac{\sqrt{42}i}{56}$	$\frac{\sqrt{70}i}{56}$	0	0	0	0	$\frac{\sqrt{70}i}{56}$	
	0	0	0	$\frac{\sqrt{42}i}{56}$	0	0	$\frac{\sqrt{42}i}{56}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	$\frac{\sqrt{70}i}{56}$	0	
	0	0	0	$\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	
	0	0	$-\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	0	0	0	$-\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	
	0	$-\frac{\sqrt{42}i}{42}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	$-\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{42}i}{168}$	0	0	$\frac{\sqrt{42}}{168}$	
	$-\frac{\sqrt{42}i}{42}$	0	0	0	0	$\frac{\sqrt{70}i}{56}$	$\frac{\sqrt{70}}{56}$	0	0	0	0	$\frac{\sqrt{42}i}{168}$	$-\frac{\sqrt{42}}{168}$	0	
	0	$-\frac{\sqrt{42}}{42}$	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	$\frac{\sqrt{42}i}{168}$	0	0	0	0	$-\frac{\sqrt{42}i}{168}$	
	$\frac{\sqrt{42}}{42}$	0	0	$\frac{\sqrt{70}i}{56}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	0	$-\frac{\sqrt{42}i}{168}$	0	0	$-\frac{\sqrt{42}i}{168}$	0	
	$-\frac{\sqrt{42}i}{42}$	0	0	$-\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	$-\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0	
	0	$\frac{\sqrt{42}i}{42}$	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	$\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0	0	

885 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_2^{(1,1;a)}(A_{1g})$	0	0	0	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}i}{14}$	0	
	0	0	$\frac{\sqrt{105}i}{84}$	0	$\frac{\sqrt{105}}{84}$	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	0	0	$-\frac{\sqrt{7}i}{14}$	
	0	$-\frac{\sqrt{105}i}{84}$	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	
	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	$\frac{\sqrt{7}i}{14}$	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	
	0	$\frac{\sqrt{105}}{84}$	$\frac{\sqrt{7}i}{14}$	0	0	0	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	
	$-\frac{\sqrt{105}}{84}$	0	0	$-\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	0	
	0	0	0	$\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	$\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	
	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	
	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{7}}{28}$	
	$\frac{\sqrt{7}i}{28}$	0	0	0	0	0	$\frac{\sqrt{105}}{84}$	0	0	0	0	$-\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{7}}{28}$	0	
	0	$\frac{\sqrt{7}}{28}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	$-\frac{\sqrt{7}i}{14}$	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	
	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{105}i}{84}$	0	0	$\frac{\sqrt{7}i}{14}$	0	0	$-\frac{\sqrt{7}i}{28}$	0	0	
	$-\frac{\sqrt{7}i}{14}$	0	0	$\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	
	0	$\frac{\sqrt{7}i}{14}$	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	$\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	

886 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

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

887 symmetry

 $-\sqrt{3}xz$ 

continued ...

Table 10

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

888 symmetry

 $\sqrt{3}xy$ 

continued ...

Table 10

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

889 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 0 $\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{84}$ $-\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0	
	0 0 $\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0 0 0	
	0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{35}}{84}$	
	$-\frac{\sqrt{35}i}{84}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{35}}{84}$ 0	
	0 $-\frac{\sqrt{35}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 $-\frac{\sqrt{35}i}{84}$	
	$\frac{\sqrt{35}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{84}$ 0	
	$\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $-\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0	
	0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0 0	
	0 $-\frac{\sqrt{21}i}{28}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{35}}{84}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$	
	$-\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{35}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0	
	0 $\frac{\sqrt{21}}{28}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 0 $\frac{\sqrt{21}i}{28}$	
	$-\frac{\sqrt{21}}{28}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0	
	0 0 0 $-\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0	
	0 0 $\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{28}$ 0 0 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														
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 1)$	0	0	0	$-\frac{\sqrt{154}i}{88}$	0	$\frac{\sqrt{154}}{88}$	0	0	0	$-\frac{\sqrt{2310}i}{616}$	0	$-\frac{\sqrt{2310}}{616}$	$-\frac{\sqrt{2310}i}{231}$	0	0	
	0	0	$-\frac{\sqrt{154}i}{88}$	0	$-\frac{\sqrt{154}}{88}$	0	0	0	$-\frac{\sqrt{2310}i}{616}$	0	$\frac{\sqrt{2310}}{616}$	0	0	$\frac{\sqrt{2310}i}{231}$		
	0	$\frac{\sqrt{154}i}{88}$	0	0	$-\frac{5\sqrt{2310}i}{3696}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{15\sqrt{154}i}{1232}$	0	0	0	$-\frac{\sqrt{154}}{308}$	
	$\frac{\sqrt{154}i}{88}$	0	0	0	0	$\frac{5\sqrt{2310}i}{3696}$	$\frac{\sqrt{2310}}{616}$	0	0	0	0	$-\frac{15\sqrt{154}i}{1232}$	$\frac{\sqrt{154}}{308}$	0		
	0	$-\frac{\sqrt{154}}{88}$	$\frac{5\sqrt{2310}i}{3696}$	0	0	0	0	$\frac{\sqrt{2310}i}{616}$	$\frac{15\sqrt{154}i}{1232}$	0	0	0	0	$-\frac{\sqrt{154}i}{308}$		
	$\frac{\sqrt{154}}{88}$	0	0	$-\frac{5\sqrt{2310}i}{3696}$	0	0	$\frac{\sqrt{2310}i}{616}$	0	0	$-\frac{15\sqrt{154}i}{1232}$	0	0	0	$-\frac{\sqrt{154}i}{308}$	0	
	0	0	0	$\frac{\sqrt{2310}}{616}$	0	$-\frac{\sqrt{2310}i}{616}$	0	0	0	$\frac{5\sqrt{154}}{616}$	0	$\frac{5\sqrt{154}i}{616}$	0	0	0	
	0	0	$-\frac{\sqrt{2310}}{616}$	0	$-\frac{\sqrt{2310}i}{616}$	0	0	0	$-\frac{5\sqrt{154}}{616}$	0	$\frac{5\sqrt{154}i}{616}$	0	0	0		
	0	$\frac{\sqrt{2310}i}{616}$	0	0	$-\frac{15\sqrt{154}i}{1232}$	0	0	$-\frac{5\sqrt{154}}{616}$	0	0	$\frac{\sqrt{2310}i}{336}$	0	0	0	$-\frac{\sqrt{2310}}{308}$	
	$\frac{\sqrt{2310}i}{616}$	0	0	0	0	$\frac{15\sqrt{154}i}{1232}$	$\frac{5\sqrt{154}}{616}$	0	0	0	0	$-\frac{\sqrt{2310}i}{336}$	$\frac{\sqrt{2310}}{308}$	0		
	0	$\frac{\sqrt{2310}}{616}$	$-\frac{15\sqrt{154}i}{1232}$	0	0	0	0	$-\frac{5\sqrt{154}i}{616}$	$-\frac{\sqrt{2310}i}{336}$	0	0	0	0	$\frac{\sqrt{2310}i}{308}$		
	$-\frac{\sqrt{2310}}{616}$	0	0	$\frac{15\sqrt{154}i}{1232}$	0	0	$-\frac{5\sqrt{154}i}{616}$	0	0	$\frac{\sqrt{2310}i}{336}$	0	0	0	$\frac{\sqrt{2310}i}{308}$	0	
	$\frac{\sqrt{2310}i}{231}$	0	0	$\frac{\sqrt{154}}{308}$	0	$\frac{\sqrt{154}i}{308}$	0	0	0	$\frac{\sqrt{2310}}{308}$	0	$-\frac{\sqrt{2310}i}{308}$	0	0	0	
	0	$-\frac{\sqrt{2310}i}{231}$	$-\frac{\sqrt{154}}{308}$	0	$\frac{\sqrt{154}i}{308}$	0	0	0	$-\frac{\sqrt{2310}}{308}$	0	$-\frac{\sqrt{2310}i}{308}$	0	0	0	0	

891 symmetry

$$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 2)$	0 0 $\frac{\sqrt{55}i}{110}$ 0 0 0 0 $\frac{\sqrt{55}i}{110}$ $\frac{\sqrt{33}i}{66}$ 0 0 0 0 0 0														
	0 0 0 $-\frac{\sqrt{55}i}{110}$ 0 0 $\frac{\sqrt{55}i}{110}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 0 0 0														
	$-\frac{\sqrt{55}i}{110}$ 0 0 0 0 $\frac{3\sqrt{33}i}{88}$ 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 $-\frac{\sqrt{55}i}{440}$ 0 0 0 0														
	0 $\frac{\sqrt{55}i}{110}$ 0 0 $\frac{3\sqrt{33}i}{88}$ 0 0 $\frac{\sqrt{55}}{44}$ 0 $-\frac{\sqrt{55}i}{440}$ 0 0 0 0 0 0														
	0 0 0 $-\frac{3\sqrt{33}i}{88}$ 0 0 $\frac{\sqrt{33}i}{33}$ 0 0 $-\frac{\sqrt{55}i}{88}$ 0 $\frac{7\sqrt{55}}{220}$ $-\frac{\sqrt{55}i}{110}$ 0 0 0														
	0 0 $-\frac{3\sqrt{33}i}{88}$ 0 0 0 0 $-\frac{\sqrt{33}i}{33}$ $-\frac{\sqrt{55}i}{88}$ 0 $-\frac{7\sqrt{55}}{220}$ 0 0 $\frac{\sqrt{55}i}{110}$ 0 0 0														
	0 $-\frac{\sqrt{55}i}{110}$ 0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 0 0 0 $-\frac{\sqrt{55}i}{55}$ 0 0 $-\frac{\sqrt{55}}{110}$ 0 0 0														
	$-\frac{\sqrt{55}i}{110}$ 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 0 0 0 0 $\frac{\sqrt{55}i}{55}$ $\frac{\sqrt{55}}{110}$ 0 0 0														
	$-\frac{\sqrt{33}i}{66}$ 0 0 $\frac{\sqrt{55}}{44}$ 0 $\frac{\sqrt{55}i}{88}$ 0 0 0 0 0 $\frac{3\sqrt{33}i}{88}$ 0 0 0 0														
	0 $\frac{\sqrt{33}i}{66}$ $-\frac{\sqrt{55}}{44}$ 0 $\frac{\sqrt{55}i}{88}$ 0 0 0 0 0 $\frac{3\sqrt{33}i}{88}$ 0 0 0 0 0														
	0 0 0 $\frac{\sqrt{55}i}{440}$ 0 $-\frac{7\sqrt{55}}{220}$ $\frac{\sqrt{55}i}{55}$ 0 0 $-\frac{3\sqrt{33}i}{88}$ 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 0														
	0 0 $\frac{\sqrt{55}i}{440}$ 0 $\frac{7\sqrt{55}}{220}$ 0 0 $-\frac{\sqrt{55}i}{55}$ $-\frac{3\sqrt{33}i}{88}$ 0 0 0 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0														
	0 0 0 0 $\frac{\sqrt{55}i}{110}$ 0 0 $\frac{\sqrt{55}}{110}$ 0 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 0 0														
	0 0 0 0 0 $-\frac{\sqrt{55}i}{110}$ $-\frac{\sqrt{55}}{110}$ 0 0 0 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 0 0														
892	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_4^{(1,1;a)}(A_{2g})$	0	0	0	0	$\frac{\sqrt{55}i}{110}$	0	0	$\frac{\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{33}i}{66}$	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{55}i}{110}$	$-\frac{\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{33}i}{66}$	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	$\frac{\sqrt{33}i}{33}$	0	0	$-\frac{7\sqrt{55}i}{220}$	0	$\frac{\sqrt{55}}{88}$	$\frac{\sqrt{55}i}{110}$	0	0
	0	0	0	0	$\frac{3\sqrt{33}}{88}$	0	0	$-\frac{\sqrt{33}i}{33}$	$-\frac{7\sqrt{55}i}{220}$	0	$-\frac{\sqrt{55}}{88}$	0	0	$-\frac{\sqrt{55}i}{110}$	0
	$-\frac{\sqrt{55}i}{110}$	0	0	$\frac{3\sqrt{33}}{88}$	0	0	0	0	0	$\frac{\sqrt{55}}{440}$	0	$\frac{\sqrt{55}i}{44}$	0	0	0
	0	$\frac{\sqrt{55}i}{110}$	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	$-\frac{\sqrt{55}}{440}$	0	$\frac{\sqrt{55}i}{44}$	0	0	0	0
	0	$-\frac{\sqrt{55}}{110}$	$-\frac{\sqrt{33}i}{33}$	0	0	0	0	0	$\frac{\sqrt{55}i}{55}$	0	0	0	0	$\frac{\sqrt{55}i}{110}$	0
	$\frac{\sqrt{55}}{110}$	0	0	$\frac{\sqrt{33}i}{33}$	0	0	0	0	0	$-\frac{\sqrt{55}i}{55}$	0	0	$\frac{\sqrt{55}i}{110}$	0	0
	0	0	0	$\frac{7\sqrt{55}i}{220}$	0	$-\frac{\sqrt{55}}{440}$	$-\frac{\sqrt{55}i}{55}$	0	0	0	0	$-\frac{3\sqrt{33}}{88}$	$\frac{\sqrt{33}i}{66}$	0	0
	0	0	$\frac{7\sqrt{55}i}{220}$	0	$\frac{\sqrt{55}}{440}$	0	0	$\frac{\sqrt{55}i}{55}$	0	0	$\frac{3\sqrt{33}}{88}$	0	0	$-\frac{\sqrt{33}i}{66}$	0
	$\frac{\sqrt{33}i}{66}$	0	0	$-\frac{\sqrt{55}}{88}$	0	$-\frac{\sqrt{55}i}{44}$	0	0	0	$\frac{3\sqrt{33}}{88}$	0	0	0	0	0
	0	$-\frac{\sqrt{33}i}{66}$	$\frac{\sqrt{55}}{88}$	0	$-\frac{\sqrt{55}i}{44}$	0	0	0	$-\frac{3\sqrt{33}}{88}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{55}i}{110}$	0	0	0	0	$-\frac{\sqrt{55}i}{110}$	$-\frac{\sqrt{33}i}{66}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{55}i}{110}$	0	0	$-\frac{\sqrt{55}i}{110}$	0	0	$\frac{\sqrt{33}i}{66}$	0	0	0	0	0
893	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,0}^{(1,1;a)}(E_g, 1)$	0	0	0	0	$\frac{\sqrt{385}i}{110}$	0	0	$\frac{\sqrt{385}}{110}$	0	0	$-\frac{\sqrt{231}i}{154}$	0	0	$\frac{2\sqrt{231}}{231}$	
	0	0	0	0	0	$-\frac{\sqrt{385}i}{110}$	$-\frac{\sqrt{385}}{110}$	0	0	0	0	$\frac{\sqrt{231}i}{154}$	$-\frac{2\sqrt{231}}{231}$	0	
	0	0	0	0	0	$\frac{5\sqrt{231}}{1848}$	$-\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{385}i}{220}$	0	$-\frac{\sqrt{385}}{3080}$	$-\frac{\sqrt{385}i}{385}$	0	
	0	0	0	0	$-\frac{5\sqrt{231}}{1848}$	0	0	$\frac{\sqrt{231}i}{154}$	$\frac{\sqrt{385}i}{220}$	0	$\frac{\sqrt{385}}{3080}$	0	0	$\frac{\sqrt{385}i}{385}$	
	$-\frac{\sqrt{385}i}{110}$	0	0	$-\frac{5\sqrt{231}}{1848}$	0	0	0	0	0	$-\frac{29\sqrt{385}}{3080}$	0	$\frac{\sqrt{385}i}{220}$	0	0	
	0	$\frac{\sqrt{385}i}{110}$	$\frac{5\sqrt{231}}{1848}$	0	0	0	0	0	$\frac{29\sqrt{385}}{3080}$	0	$\frac{\sqrt{385}i}{220}$	0	0	0	
	0	$-\frac{\sqrt{385}}{110}$	$\frac{\sqrt{231}i}{154}$	0	0	0	0	0	$\frac{\sqrt{385}i}{154}$	0	0	0	0	$-\frac{\sqrt{385}i}{110}$	
	$\frac{\sqrt{385}}{110}$	0	0	$-\frac{\sqrt{231}i}{154}$	0	0	0	0	0	$-\frac{\sqrt{385}i}{154}$	0	0	$-\frac{\sqrt{385}i}{110}$	0	
	0	0	0	$-\frac{\sqrt{385}i}{220}$	0	$\frac{29\sqrt{385}}{3080}$	$-\frac{\sqrt{385}i}{154}$	0	0	0	0	$-\frac{\sqrt{231}}{168}$	$-\frac{\sqrt{231}i}{77}$	0	
	0	0	$-\frac{\sqrt{385}i}{220}$	0	$-\frac{29\sqrt{385}}{3080}$	0	0	$\frac{\sqrt{385}i}{154}$	0	0	$\frac{\sqrt{231}}{168}$	0	0	$\frac{\sqrt{231}i}{77}$	
	$\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{385}}{3080}$	0	$-\frac{\sqrt{385}i}{220}$	0	0	0	$\frac{\sqrt{231}}{168}$	0	0	0	0	
	0	$-\frac{\sqrt{231}i}{154}$	$-\frac{\sqrt{385}}{3080}$	0	$-\frac{\sqrt{385}i}{220}$	0	0	0	$-\frac{\sqrt{231}}{168}$	0	0	0	0	0	
	0	$-\frac{2\sqrt{231}}{231}$	$\frac{\sqrt{385}i}{385}$	0	0	0	0	$\frac{\sqrt{385}i}{110}$	$\frac{\sqrt{231}i}{77}$	0	0	0	0	0	
	$\frac{2\sqrt{231}}{231}$	0	0	$-\frac{\sqrt{385}i}{385}$	0	0	$\frac{\sqrt{385}i}{110}$	0	0	$-\frac{\sqrt{231}i}{77}$	0	0	0	0	
$\frac{\sqrt{10xz}(3x^2+3y^2-4z^2)}{4}$															

894 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 1)$	0	0	$\frac{\sqrt{385}i}{110}$	0	0	0	0	$\frac{\sqrt{385}i}{110}$	$\frac{\sqrt{231}i}{154}$	0	0	0	0	$-\frac{2\sqrt{231}i}{231}$	
	0	0	0	$-\frac{\sqrt{385}i}{110}$	0	0	$\frac{\sqrt{385}i}{110}$	0	0	$-\frac{\sqrt{231}i}{154}$	0	0	$-\frac{2\sqrt{231}i}{231}$	0	
	$-\frac{\sqrt{385}i}{110}$	0	0	0	0	$-\frac{5\sqrt{231}i}{1848}$	0	0	0	$-\frac{\sqrt{385}}{220}$	0	$\frac{29\sqrt{385}i}{3080}$	0	0	
	0	$\frac{\sqrt{385}i}{110}$	0	0	$-\frac{5\sqrt{231}i}{1848}$	0	0	0	$\frac{\sqrt{385}}{220}$	0	$\frac{29\sqrt{385}i}{3080}$	0	0	0	
	0	0	0	$\frac{5\sqrt{231}i}{1848}$	0	0	$-\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{385}i}{3080}$	0	$-\frac{\sqrt{385}}{220}$	$\frac{\sqrt{385}i}{385}$	0	
	0	0	$\frac{5\sqrt{231}i}{1848}$	0	0	0	0	$\frac{\sqrt{231}i}{154}$	$\frac{\sqrt{385}i}{3080}$	0	$\frac{\sqrt{385}}{220}$	0	0	$-\frac{\sqrt{385}i}{385}$	
	0	$-\frac{\sqrt{385}i}{110}$	0	0	$\frac{\sqrt{231}i}{154}$	0	0	0	0	0	$-\frac{\sqrt{385}i}{154}$	0	0	$\frac{\sqrt{385}}{110}$	
	$-\frac{\sqrt{385}i}{110}$	0	0	0	0	$-\frac{\sqrt{231}i}{154}$	0	0	0	0	0	$\frac{\sqrt{385}i}{154}$	$-\frac{\sqrt{385}}{110}$	0	
	$-\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{385}}{220}$	0	$-\frac{\sqrt{385}i}{3080}$	0	0	0	0	0	$\frac{\sqrt{231}i}{168}$	0	0	
	0	$\frac{\sqrt{231}i}{154}$	$-\frac{\sqrt{385}}{220}$	0	$-\frac{\sqrt{385}i}{3080}$	0	0	0	0	0	$\frac{\sqrt{231}i}{168}$	0	0	0	
	0	0	0	$-\frac{29\sqrt{385}i}{3080}$	0	$\frac{\sqrt{385}}{220}$	$\frac{\sqrt{385}i}{154}$	0	0	$-\frac{\sqrt{231}i}{168}$	0	0	$-\frac{\sqrt{231}i}{77}$	0	
	0	0	$-\frac{29\sqrt{385}i}{3080}$	0	$-\frac{\sqrt{385}}{220}$	0	0	$-\frac{\sqrt{385}i}{154}$	$-\frac{\sqrt{231}i}{168}$	0	0	0	0	$\frac{\sqrt{231}i}{77}$	
	0	$\frac{2\sqrt{231}i}{231}$	0	0	$-\frac{\sqrt{385}i}{385}$	0	0	$-\frac{\sqrt{385}}{110}$	0	0	$\frac{\sqrt{231}i}{77}$	0	0	0	
	$\frac{2\sqrt{231}i}{231}$	0	0	0	0	$\frac{\sqrt{385}i}{385}$	$\frac{\sqrt{385}}{110}$	0	0	0	0	$-\frac{\sqrt{231}i}{77}$	0	0	

895 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,0}^{(1,1;a)}(E_g, 2)$	0	0	0	$\frac{\sqrt{110}}{55}$	0	$\frac{\sqrt{110}i}{55}$	0	0	0	$-\frac{\sqrt{66}}{66}$	0	$\frac{\sqrt{66}i}{66}$	0	0	0
	0	0	$-\frac{\sqrt{110}}{55}$	0	$\frac{\sqrt{110}i}{55}$	0	0	0	$\frac{\sqrt{66}}{66}$	0	$\frac{\sqrt{66}i}{66}$	0	0	0	0
	0	$-\frac{\sqrt{110}}{55}$	0	0	0	0	0	$\frac{\sqrt{66}i}{264}$	$\frac{3\sqrt{110}i}{220}$	0	0	0	0	0	$-\frac{7\sqrt{110}i}{440}$
	$\frac{\sqrt{110}}{55}$	0	0	0	0	0	$\frac{\sqrt{66}i}{264}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{7\sqrt{110}i}{440}$	0	0
	0	$-\frac{\sqrt{110}i}{55}$	0	0	0	0	0	$\frac{\sqrt{66}}{264}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$\frac{7\sqrt{110}}{440}$	0
	$-\frac{\sqrt{110}i}{55}$	0	0	0	0	0	$-\frac{\sqrt{66}}{264}$	0	0	0	0	$\frac{3\sqrt{110}i}{220}$	$-\frac{7\sqrt{110}}{440}$	0	0
	0	0	0	$-\frac{\sqrt{66}i}{264}$	0	$-\frac{\sqrt{66}}{264}$	0	0	0	$\frac{\sqrt{110}i}{440}$	0	$-\frac{\sqrt{110}}{440}$	0	0	0
	0	0	$-\frac{\sqrt{66}i}{264}$	0	$\frac{\sqrt{66}}{264}$	0	0	0	$\frac{\sqrt{110}i}{440}$	0	$\frac{\sqrt{110}}{440}$	0	0	0	0
	0	$\frac{\sqrt{66}}{66}$	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	$-\frac{\sqrt{110}i}{440}$	0	0	0	0	0	$\frac{5\sqrt{66}i}{264}$	0
	$-\frac{\sqrt{66}}{66}$	0	0	$\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{110}i}{440}$	0	0	0	0	0	$\frac{5\sqrt{66}i}{264}$	0	0
	0	$-\frac{\sqrt{66}i}{66}$	0	0	$\frac{3\sqrt{110}i}{220}$	0	0	$\frac{\sqrt{110}}{440}$	0	0	0	0	0	$\frac{5\sqrt{66}}{264}$	0
	$-\frac{\sqrt{66}i}{66}$	0	0	0	0	$-\frac{3\sqrt{110}i}{220}$	$-\frac{\sqrt{110}}{440}$	0	0	0	0	0	$-\frac{5\sqrt{66}}{264}$	0	0
	0	0	0	$\frac{7\sqrt{110}i}{440}$	0	$-\frac{7\sqrt{110}}{440}$	0	0	0	$-\frac{5\sqrt{66}i}{264}$	0	$-\frac{5\sqrt{66}}{264}$	0	0	0
	0	0	$\frac{7\sqrt{110}i}{440}$	0	$\frac{7\sqrt{110}}{440}$	0	0	0	$-\frac{5\sqrt{66}i}{264}$	0	$\frac{5\sqrt{66}}{264}$	0	0	0	0

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

896 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 2)$	0	0	0	$\frac{7\sqrt{110}i}{440}$	0	$-\frac{7\sqrt{110}}{440}$	0	0	0	$-\frac{5\sqrt{66}i}{264}$	0	$-\frac{5\sqrt{66}}{264}$	0	0	
	0	0	$\frac{7\sqrt{110}i}{440}$	0	$\frac{7\sqrt{110}}{440}$	0	0	0	$-\frac{5\sqrt{66}i}{264}$	0	$\frac{5\sqrt{66}}{264}$	0	0	0	
	0	$-\frac{7\sqrt{110}i}{440}$	0	0	$\frac{3\sqrt{66}i}{176}$	0	0	$\frac{\sqrt{66}}{264}$	0	0	$-\frac{3\sqrt{110}i}{880}$	0	0	$\frac{\sqrt{110}}{55}$	
	$-\frac{7\sqrt{110}i}{440}$	0	0	0	0	$-\frac{3\sqrt{66}i}{176}$	$-\frac{\sqrt{66}}{264}$	0	0	0	$\frac{3\sqrt{110}i}{880}$	$-\frac{\sqrt{110}}{55}$	0		
	0	$\frac{7\sqrt{110}}{440}$	$-\frac{3\sqrt{66}i}{176}$	0	0	0	0	$-\frac{\sqrt{66}i}{264}$	$-\frac{3\sqrt{110}i}{880}$	0	0	0	0	$\frac{\sqrt{110}i}{55}$	
	$-\frac{7\sqrt{110}}{440}$	0	0	$\frac{3\sqrt{66}i}{176}$	0	0	$-\frac{\sqrt{66}i}{264}$	0	0	$\frac{3\sqrt{110}i}{880}$	0	0	$\frac{\sqrt{110}i}{55}$	0	
	0	0	0	$-\frac{\sqrt{66}}{264}$	0	$\frac{\sqrt{66}i}{264}$	0	0	0	$\frac{\sqrt{110}}{440}$	0	$\frac{\sqrt{110}i}{440}$	0	0	
	0	0	$\frac{\sqrt{66}}{264}$	0	$\frac{\sqrt{66}i}{264}$	0	0	0	$-\frac{\sqrt{110}}{440}$	0	$\frac{\sqrt{110}i}{440}$	0	0	0	
	0	$\frac{5\sqrt{66}i}{264}$	0	0	$\frac{3\sqrt{110}i}{880}$	0	0	$-\frac{\sqrt{110}}{440}$	0	0	$\frac{3\sqrt{66}i}{176}$	0	0	$-\frac{\sqrt{66}}{66}$	
	$\frac{5\sqrt{66}i}{264}$	0	0	0	0	$-\frac{3\sqrt{110}i}{880}$	$\frac{\sqrt{110}}{440}$	0	0	0	0	$-\frac{3\sqrt{66}i}{176}$	$\frac{\sqrt{66}}{66}$	0	
	0	$\frac{5\sqrt{66}}{264}$	$\frac{3\sqrt{110}i}{880}$	0	0	0	0	$-\frac{\sqrt{110}i}{440}$	$-\frac{3\sqrt{66}i}{176}$	0	0	0	0	$\frac{\sqrt{66}i}{66}$	
	$-\frac{5\sqrt{66}}{264}$	0	0	$-\frac{3\sqrt{110}i}{880}$	0	0	$-\frac{\sqrt{110}i}{440}$	0	0	$\frac{3\sqrt{66}i}{176}$	0	0	$\frac{\sqrt{66}i}{66}$	0	
	0	0	0	$-\frac{\sqrt{110}}{55}$	0	$-\frac{\sqrt{110}i}{55}$	0	0	0	$\frac{\sqrt{66}}{66}$	0	$-\frac{\sqrt{66}i}{66}$	0	0	
	0	0	$\frac{\sqrt{110}}{55}$	0	$-\frac{\sqrt{110}i}{55}$	0	0	0	$-\frac{\sqrt{66}}{66}$	0	$-\frac{\sqrt{66}i}{66}$	0	0	0	

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

897 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,0}^{(1,1;a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{462}}{462}$ 0 $-\frac{\sqrt{462}i}{462}$ 0 0														
	0 0 0 0 0 0 0 0 $\frac{\sqrt{462}}{462}$ 0 $-\frac{\sqrt{462}i}{462}$ 0 0 0 0														
	0 0 0 0 0 0 0 $\frac{17\sqrt{462}i}{1848}$ $\frac{\sqrt{770}i}{220}$ 0 0 0 0 $\frac{9\sqrt{770}i}{3080}$														
	0 0 0 0 0 0 $\frac{17\sqrt{462}i}{1848}$ 0 0 $-\frac{\sqrt{770}i}{220}$ 0 0 $\frac{9\sqrt{770}i}{3080}$ 0														
	0 0 0 0 0 0 0 $-\frac{17\sqrt{462}}{1848}$ 0 0 $\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{\sqrt{770}i}{220}$ $-\frac{9\sqrt{770}}{3080}$ 0														
	0 0 0 0 $-\frac{17\sqrt{462}i}{1848}$ 0 $\frac{17\sqrt{462}}{1848}$ 0 0 0 $\frac{9\sqrt{770}i}{3080}$ 0 $\frac{9\sqrt{770}}{3080}$ $-\frac{\sqrt{770}i}{110}$ 0														
	0 $-\frac{17\sqrt{462}i}{1848}$ 0 $-\frac{17\sqrt{462}}{1848}$ 0 0 0 $\frac{9\sqrt{770}i}{3080}$ 0 $-\frac{9\sqrt{770}}{3080}$ 0 0 $\frac{\sqrt{770}i}{110}$														
	0 $\frac{\sqrt{462}}{462}$ $-\frac{\sqrt{770}i}{220}$ 0 0 0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 0 0 0 0 $\frac{13\sqrt{462}i}{1848}$														
	$-\frac{\sqrt{462}}{462}$ 0 0 $\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 0 0 0 0 $\frac{13\sqrt{462}i}{1848}$ 0														
	0 $\frac{\sqrt{462}i}{462}$ 0 0 $-\frac{\sqrt{770}i}{220}$ 0 0 $-\frac{9\sqrt{770}}{3080}$ 0 0 0 0 0 $-\frac{13\sqrt{462}}{1848}$														
	$\frac{\sqrt{462}i}{462}$ 0 0 0 0 $\frac{\sqrt{770}i}{220}$ $\frac{9\sqrt{770}}{3080}$ 0 0 0 0 0 $\frac{13\sqrt{462}}{1848}$ 0														
	0 0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 $-\frac{9\sqrt{770}}{3080}$ $\frac{\sqrt{770}i}{110}$ 0 0 $-\frac{13\sqrt{462}i}{1848}$ 0 $\frac{13\sqrt{462}}{1848}$ 0 0														
	0 0 $-\frac{9\sqrt{770}i}{3080}$ 0 $\frac{9\sqrt{770}}{3080}$ 0 0 $-\frac{\sqrt{770}i}{110}$ $-\frac{13\sqrt{462}i}{1848}$ 0 $-\frac{13\sqrt{462}}{1848}$ 0 0 0														
898	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	0	$\frac{\sqrt{770}i}{220}$	0	$\frac{\sqrt{770}}{220}$	$-\frac{\sqrt{770}i}{110}$	0	0	$\frac{5\sqrt{462}i}{924}$	0	$-\frac{5\sqrt{462}}{924}$	0	0	0	
	0	0	$\frac{\sqrt{770}i}{220}$	0	$-\frac{\sqrt{770}}{220}$	0	0	$\frac{\sqrt{770}i}{110}$	$\frac{5\sqrt{462}i}{924}$	0	$\frac{5\sqrt{462}}{924}$	0	0	0	0	
	0	$-\frac{\sqrt{770}i}{220}$	0	0	0	0	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{770}i}{220}$	0	0	$\frac{\sqrt{770}}{616}$		
	$-\frac{\sqrt{770}i}{220}$	0	0	0	0	0	$-\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{770}i}{220}$	$-\frac{\sqrt{770}}{616}$	0		
	0	$-\frac{\sqrt{770}}{220}$	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	$\frac{\sqrt{770}i}{220}$	0	0	0	0	$-\frac{\sqrt{770}i}{616}$		
	$\frac{\sqrt{770}}{220}$	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	0	$-\frac{\sqrt{770}i}{220}$	0	0	$-\frac{\sqrt{770}i}{616}$	0		
	$\frac{\sqrt{770}i}{110}$	0	0	$-\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	0	0	0	
	0	$-\frac{\sqrt{770}i}{110}$	$\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	0	$-\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	0	0	0		
	0	$-\frac{5\sqrt{462}i}{924}$	0	0	$-\frac{\sqrt{770}i}{220}$	0	0	$-\frac{19\sqrt{770}}{3080}$	0	0	0	0	0	$\frac{\sqrt{462}}{1848}$		
	$-\frac{5\sqrt{462}i}{924}$	0	0	0	0	$\frac{\sqrt{770}i}{220}$	$\frac{19\sqrt{770}}{3080}$	0	0	0	0	0	$-\frac{\sqrt{462}}{1848}$	0		
	0	$\frac{5\sqrt{462}}{924}$	$\frac{\sqrt{770}i}{220}$	0	0	0	0	$\frac{19\sqrt{770}i}{3080}$	0	0	0	0	0	$\frac{\sqrt{462}i}{1848}$		
	$-\frac{5\sqrt{462}}{924}$	0	0	$-\frac{\sqrt{770}i}{220}$	0	0	$\frac{19\sqrt{770}i}{3080}$	0	0	0	0	0	$\frac{\sqrt{462}i}{1848}$	0		
	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	0	$-\frac{\sqrt{462}}{1848}$	0	$-\frac{\sqrt{462}i}{1848}$	0	0	0	
	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{616}$	0	0	0	$\frac{\sqrt{462}}{1848}$	0	$-\frac{\sqrt{462}i}{1848}$	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 0 0 $-\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$	
	0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$	
	0 0 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}}{56}$ 0	
	0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0	
	0 0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 $\frac{\sqrt{105}}{56}$ 0 0 0	
	0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$	
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0	
	0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}}{56}$	
	$-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0	
	0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 $\frac{\sqrt{105}}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0	
	0 0 $-\frac{\sqrt{105}i}{56}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{56}$ 0 0 0	

900 symmetry

x

continued ...

Table 10

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

901 symmetry

y

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{1,1}^{(1,0;a)}(E_g)$	0 0 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 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0													
	0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0	0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0													
	0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0	0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 $-\frac{3\sqrt{7}i}{56}$ $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$													
	0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0	0 0 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0													
	0 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0	0 0 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0													
	$-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0	0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0													
	0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{56}$	0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 $-\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{56}$													
	0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{56}$	0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0													
	$\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0	$\frac{\sqrt{10y(3x^2-y^2)}}{4}$													

902 symmetry

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	$\frac{\sqrt{6}i}{24}$	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	$\frac{\sqrt{6}i}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0
	$-\frac{\sqrt{6}i}{16}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0
	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	$\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}i}{16}$	0
	0	0	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	$\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{6}i}{16}$
	0	$-\frac{\sqrt{6}i}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	$\frac{\sqrt{6}i}{16}$	0	0	$-\frac{\sqrt{6}}{24}$	
	$-\frac{\sqrt{6}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	$0$	$-\frac{\sqrt{6}i}{16}$	$\frac{\sqrt{6}}{24}$	0
	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{10}i}{16}$	$-\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}i}{16}$	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0
	0	0	$\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$
	0	0	0	0	$\frac{\sqrt{6}i}{16}$	0	0	$\frac{\sqrt{6}}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{6}i}{16}$	$-\frac{\sqrt{6}}{24}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0

903 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 1)$	0 0 0 $-\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 $\frac{1}{8}$ 0 $-\frac{i}{8}$ 0 0	
	0 0 $\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 $-\frac{1}{8}$ 0 $-\frac{i}{8}$ 0 0 0	
	0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$	
	$-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0	
	0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $-\frac{1}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}}{24}$	
	$\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0	
	0 0 0 $\frac{i}{8}$ 0 $\frac{1}{8}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0	
	0 0 $\frac{i}{8}$ 0 $-\frac{1}{8}$ 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0	
	0 $-\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $\frac{i}{8}$	
	$\frac{1}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 $\frac{i}{8}$ 0	
	0 $\frac{i}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 $\frac{1}{8}$	
	$\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 $-\frac{1}{8}$ 0	
	0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 $-\frac{i}{8}$ 0 $-\frac{1}{8}$ 0 0	
	0 0 $\frac{\sqrt{15}i}{24}$ 0 $\frac{\sqrt{15}}{24}$ 0 0 0 $-\frac{i}{8}$ 0 $\frac{1}{8}$ 0 0 0	
$\frac{\sqrt{10x(x^2-3y^2)}}{4}$		

904 symmetry

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 2)$	0	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	$-\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{6}i}{16}$	$\frac{\sqrt{6}}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0
	0	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	$-\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}i}{16}$	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	$-\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{6}i}{16}$
	$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0
	0	$-\frac{\sqrt{6}i}{16}$	0	0	0	0	0	0	$\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0
	0	$\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	$-\frac{\sqrt{6}i}{24}$
	$-\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	$-\frac{\sqrt{6}i}{24}$	0
	0	0	0	$\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}i}{16}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0
	0	0	$\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$
	$-\frac{\sqrt{10}i}{16}$	0	0	$-\frac{\sqrt{6}}{24}$	0	$\frac{\sqrt{6}i}{24}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{10}i}{16}$	$\frac{\sqrt{6}}{24}$	0	$\frac{\sqrt{6}i}{24}$	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{6}i}{16}$	0	0	0	0	$\frac{\sqrt{6}i}{24}$	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{6}i}{16}$	0	0	$\frac{\sqrt{6}i}{24}$	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0

905 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{3,0}^{(1,0;a)}(E_g, 1)$	0	0	0	0	$\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{10}}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$\frac{\sqrt{6}}{12}$		
	0	0	0	0	0	$-\frac{\sqrt{10}i}{48}$	$-\frac{\sqrt{10}}{24}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	$-\frac{\sqrt{6}}{12}$	0		
	0	0	0	0	0	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{10}i}{24}$	0	$-\frac{\sqrt{10}}{24}$	$\frac{\sqrt{10}i}{48}$	0		
	0	0	0	0	$\frac{\sqrt{6}}{12}$	0	0	$-\frac{\sqrt{6}i}{48}$	$-\frac{\sqrt{10}i}{24}$	0	$\frac{\sqrt{10}}{24}$	0	0	$-\frac{\sqrt{10}i}{48}$		
	$-\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{6}}{12}$	0	0	0	0	0	$\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0		
	0	$\frac{\sqrt{10}i}{48}$	$-\frac{\sqrt{6}}{12}$	0	0	0	0	0	$-\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0	0		
	0	$-\frac{\sqrt{10}}{24}$	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{48}$	0	0	0	0	$-\frac{\sqrt{10}i}{24}$		
	$\frac{\sqrt{10}}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0	0	$\frac{\sqrt{10}i}{48}$	0	0	0	$-\frac{\sqrt{10}i}{24}$		
	0	0	0	$\frac{\sqrt{10}i}{24}$	0	$-\frac{\sqrt{10}}{24}$	$\frac{\sqrt{10}i}{48}$	0	0	0	0	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}i}{48}$	0		
	0	0	$\frac{\sqrt{10}i}{24}$	0	$\frac{\sqrt{10}}{24}$	0	0	$-\frac{\sqrt{10}i}{48}$	0	0	$-\frac{\sqrt{6}}{12}$	0	0	$\frac{\sqrt{6}i}{48}$		
	$-\frac{\sqrt{6}i}{48}$	0	0	$\frac{\sqrt{10}}{24}$	0	$\frac{\sqrt{10}i}{24}$	0	0	0	$-\frac{\sqrt{6}}{12}$	0	0	0	0		
	0	$\frac{\sqrt{6}i}{48}$	$-\frac{\sqrt{10}}{24}$	0	$\frac{\sqrt{10}i}{24}$	0	0	0	$\frac{\sqrt{6}}{12}$	0	0	0	0	0		
	0	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{10}i}{48}$	0	0	0	0	$\frac{\sqrt{10}i}{24}$	$\frac{\sqrt{6}i}{48}$	0	0	0	0	0		
	$\frac{\sqrt{6}}{12}$	0	0	$\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{10}i}{24}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0		

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

906 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	0	0	$\frac{\sqrt{10}i}{48}$	0	0	0	0	$\frac{\sqrt{10}i}{24}$	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$-\frac{\sqrt{6}i}{12}$	
	0	0	0	$-\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{10}i}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{6}i}{12}$	0	
	$-\frac{\sqrt{10}i}{48}$	0	0	0	0	$\frac{\sqrt{6}i}{12}$	0	0	0	$\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0	
	0	$\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{6}i}{12}$	0	0	0	$-\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0	0	
	0	0	0	$-\frac{\sqrt{6}i}{12}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	$\frac{\sqrt{10}i}{24}$	0	$\frac{\sqrt{10}}{24}$	$-\frac{\sqrt{10}i}{48}$	0	
	0	0	$-\frac{\sqrt{6}i}{12}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	$\frac{\sqrt{10}i}{24}$	0	$-\frac{\sqrt{10}}{24}$	0	0	$\frac{\sqrt{10}i}{48}$	
	0	$-\frac{\sqrt{10}i}{24}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	0	0	$\frac{\sqrt{10}i}{48}$	0	0	$\frac{\sqrt{10}}{24}$		
	$-\frac{\sqrt{10}i}{24}$	0	0	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{48}$	$-\frac{\sqrt{10}}{24}$	0	
	$\frac{\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{6}i}{12}$	0	0	
	0	$-\frac{\sqrt{6}i}{48}$	$\frac{\sqrt{10}}{24}$	0	$-\frac{\sqrt{10}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{6}i}{12}$	0	0	0	
	0	0	$\frac{\sqrt{10}i}{24}$	0	$-\frac{\sqrt{10}}{24}$	$-\frac{\sqrt{10}i}{48}$	0	0	0	$\frac{\sqrt{6}i}{12}$	0	0	$-\frac{\sqrt{6}i}{48}$	0	
	0	0	$\frac{\sqrt{10}i}{24}$	0	$\frac{\sqrt{10}}{24}$	0	0	$\frac{\sqrt{10}i}{48}$	$\frac{\sqrt{6}i}{12}$	0	0	0	0	$\frac{\sqrt{6}i}{48}$	
	0	$\frac{\sqrt{6}i}{12}$	0	0	$\frac{\sqrt{10}i}{48}$	0	0	$-\frac{\sqrt{10}}{24}$	0	0	$\frac{\sqrt{6}i}{48}$	0	0	0	
	$\frac{\sqrt{6}i}{12}$	0	0	0	0	$-\frac{\sqrt{10}i}{48}$	$\frac{\sqrt{10}}{24}$	0	0	0	0	$-\frac{\sqrt{6}i}{48}$	0	0	

907 symmetry

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

continued ...

Table 10

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

908 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{6} & 0 \\ 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & \frac{i}{6} \\ -\frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & 0 & \frac{i}{6} & 0 \\ \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
909	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

*continued ...*

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{1g})$	0 0 $\frac{\sqrt{30}i}{80}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$ $\frac{\sqrt{2}i}{16}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{30}i}{80}$ 0 0 $\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{80}$ 0 0 0 0 $-\frac{3\sqrt{2}i}{32}$ 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $\frac{11\sqrt{30}i}{480}$ 0 0 0	
	0 $\frac{\sqrt{30}i}{80}$ 0 0 $-\frac{3\sqrt{2}i}{32}$ 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{11\sqrt{30}i}{480}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 $-\frac{\sqrt{30}i}{96}$ 0 $-\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{30}i}{80}$ 0 0	
	0 0 $\frac{3\sqrt{2}i}{32}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ $-\frac{\sqrt{30}i}{96}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{30}i}{80}$	
	0 $-\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 $0$ $-\frac{\sqrt{30}i}{40}$ 0 0 $-\frac{\sqrt{30}}{30}$	
	$-\frac{\sqrt{30}i}{30}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{40}$ $\frac{\sqrt{30}}{30}$ 0	
	$-\frac{\sqrt{2}i}{16}$ 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{96}$ 0 0 0 0 0 $-\frac{3\sqrt{2}i}{32}$ 0 0	
	0 $\frac{\sqrt{2}i}{16}$ $\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{96}$ 0 0 0 0 $-\frac{3\sqrt{2}i}{32}$ 0 0 0	
	0 0 0 $-\frac{11\sqrt{30}i}{480}$ 0 $\frac{\sqrt{30}}{120}$ $\frac{\sqrt{30}i}{40}$ 0 0 $\frac{3\sqrt{2}i}{32}$ 0 0 $\frac{\sqrt{2}i}{16}$ 0	
	0 0 $-\frac{11\sqrt{30}i}{480}$ 0 $-\frac{\sqrt{30}}{120}$ 0 0 $-\frac{\sqrt{30}i}{40}$ $\frac{3\sqrt{2}i}{32}$ 0 0 0 $-\frac{\sqrt{2}i}{16}$	
	0 0 0 0 $\frac{\sqrt{30}i}{80}$ 0 0 $\frac{\sqrt{30}}{30}$ 0 0 $-\frac{\sqrt{2}i}{16}$ 0 0 0	
$\frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8}$		

910 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 1)$	0	0	0	$\frac{\sqrt{21}}{24}$	0	$\frac{\sqrt{21}i}{24}$	0	0	0	$\frac{\sqrt{35}}{56}$	0	$-\frac{\sqrt{35}i}{56}$	0	0	0
	0	0	$-\frac{\sqrt{21}}{24}$	0	$\frac{\sqrt{21}i}{24}$	0	0	0	$-\frac{\sqrt{35}}{56}$	0	$-\frac{\sqrt{35}i}{56}$	0	0	0	0
	0	$-\frac{\sqrt{21}}{24}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{56}$	0	0	0	0	0	0	$-\frac{\sqrt{21}i}{84}$
	$\frac{\sqrt{21}}{24}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{21}i}{84}$	0	0
	0	$-\frac{\sqrt{21}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{35}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{21}}{84}$
	$-\frac{\sqrt{21}i}{24}$	0	0	0	0	0	$\frac{\sqrt{35}}{56}$	0	0	0	0	0	$-\frac{\sqrt{21}}{84}$	0	0
	0	0	0	$\frac{\sqrt{35}i}{56}$	0	$\frac{\sqrt{35}}{56}$	0	0	0	$\frac{5\sqrt{21}i}{168}$	0	$-\frac{5\sqrt{21}}{168}$	0	0	0
	0	0	$\frac{\sqrt{35}i}{56}$	0	$-\frac{\sqrt{35}}{56}$	0	0	0	$\frac{5\sqrt{21}i}{168}$	0	$\frac{5\sqrt{21}}{168}$	0	0	0	0
	0	$-\frac{\sqrt{35}}{56}$	0	0	0	0	0	$-\frac{5\sqrt{21}i}{168}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0
	$\frac{\sqrt{35}}{56}$	0	0	0	0	0	$-\frac{5\sqrt{21}i}{168}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0	0
	0	$\frac{\sqrt{35}i}{56}$	0	0	0	0	0	$\frac{5\sqrt{21}}{168}$	0	0	0	0	0	$-\frac{\sqrt{35}}{28}$	0
	$\frac{\sqrt{35}i}{56}$	0	0	0	0	0	$-\frac{5\sqrt{21}}{168}$	0	0	0	0	0	$\frac{\sqrt{35}}{28}$	0	0
	0	0	0	$\frac{\sqrt{21}i}{84}$	0	$-\frac{\sqrt{21}}{84}$	0	0	0	$\frac{\sqrt{35}i}{28}$	0	$\frac{\sqrt{35}}{28}$	0	0	0
	0	0	$\frac{\sqrt{21}i}{84}$	0	$\frac{\sqrt{21}}{84}$	0	0	0	$\frac{\sqrt{35}i}{28}$	0	$-\frac{\sqrt{35}}{28}$	0	0	0	0

911 symmetry

$$-\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 2)$	0	0	0	0	$-\frac{\sqrt{30}i}{80}$	0	0	$-\frac{\sqrt{30}}{30}$	0	0	$\frac{\sqrt{2}i}{16}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{30}i}{80}$	$\frac{\sqrt{30}}{30}$	0	0	0	$-\frac{\sqrt{2}i}{16}$	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{2}}{32}$	$-\frac{\sqrt{2}i}{8}$	0	0	$-\frac{\sqrt{30}i}{120}$	0	$-\frac{\sqrt{30}}{96}$	$-\frac{\sqrt{30}i}{80}$	0	0
	0	0	0	0	$\frac{3\sqrt{2}}{32}$	0	0	$\frac{\sqrt{2}i}{8}$	$-\frac{\sqrt{30}i}{120}$	0	$\frac{\sqrt{30}}{96}$	0	0	$\frac{\sqrt{30}i}{80}$	0
	$\frac{\sqrt{30}i}{80}$	0	0	$\frac{3\sqrt{2}}{32}$	0	0	0	0	0	$\frac{11\sqrt{30}}{480}$	0	$\frac{\sqrt{30}i}{24}$	0	0	0
	0	$-\frac{\sqrt{30}i}{80}$	$-\frac{3\sqrt{2}}{32}$	0	0	0	0	0	$-\frac{11\sqrt{30}}{480}$	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0
	0	$\frac{\sqrt{30}}{30}$	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{40}$	0	0	0	0	$-\frac{\sqrt{30}i}{30}$	0
	$-\frac{\sqrt{30}}{30}$	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$\frac{\sqrt{30}i}{40}$	0	0	$-\frac{\sqrt{30}i}{30}$	0	0
	0	0	0	$\frac{\sqrt{30}i}{120}$	0	$-\frac{11\sqrt{30}}{480}$	$\frac{\sqrt{30}i}{40}$	0	0	0	0	$-\frac{3\sqrt{2}}{32}$	$-\frac{\sqrt{2}i}{16}$	0	0
	0	0	$\frac{\sqrt{30}i}{120}$	0	$\frac{11\sqrt{30}}{480}$	0	0	$-\frac{\sqrt{30}i}{40}$	0	0	$\frac{3\sqrt{2}}{32}$	0	0	$\frac{\sqrt{2}i}{16}$	0
	$-\frac{\sqrt{2}i}{16}$	0	0	$\frac{\sqrt{30}}{96}$	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	$\frac{3\sqrt{2}}{32}$	0	0	0	0	0
	0	$\frac{\sqrt{2}i}{16}$	$-\frac{\sqrt{30}}{96}$	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	$-\frac{3\sqrt{2}}{32}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{30}i}{80}$	0	0	0	0	$\frac{\sqrt{30}i}{30}$	$\frac{\sqrt{2}i}{16}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{30}i}{80}$	0	0	$\frac{\sqrt{30}i}{30}$	0	0	$-\frac{\sqrt{2}i}{16}$	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												
$\mathbb{G}_{5,0}^{(1,0;a)}(E_g, 1)$	0	0	0	0	$\frac{5\sqrt{6}i}{48}$	0	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0
	0	0	0	0	0	$-\frac{5\sqrt{6}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0
	0	0	0	0	0	$\frac{\sqrt{10}}{32}$	0	0	0	$-\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{96}$	$-\frac{5\sqrt{6}i}{48}$	0
	0	0	0	0	$-\frac{\sqrt{10}}{32}$	0	0	0	$-\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{96}$	0	0	$\frac{5\sqrt{6}i}{48}$
	$-\frac{5\sqrt{6}i}{48}$	0	0	$-\frac{\sqrt{10}}{32}$	0	0	0	0	0	$-\frac{\sqrt{6}}{96}$	0	$\frac{\sqrt{6}i}{24}$	0	0
	0	$\frac{5\sqrt{6}i}{48}$	$\frac{\sqrt{10}}{32}$	0	0	0	0	0	$\frac{\sqrt{6}}{96}$	0	$\frac{\sqrt{6}i}{24}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{96}$	0	0	0	0	0	$\frac{\sqrt{10}}{32}$	$\frac{\sqrt{10}i}{16}$	0
	0	0	$\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{96}$	0	0	0	0	0	$-\frac{\sqrt{10}}{32}$	0	0	$-\frac{\sqrt{10}i}{16}$
	$-\frac{\sqrt{10}i}{16}$	0	0	$\frac{\sqrt{6}}{96}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	$-\frac{\sqrt{10}}{32}$	0	0	0	0
	0	$\frac{\sqrt{10}i}{16}$	$-\frac{\sqrt{6}}{96}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	$\frac{\sqrt{10}}{32}$	0	0	0	0	0
	0	0	$\frac{5\sqrt{6}i}{48}$	0	0	0	0	0	$-\frac{\sqrt{10}i}{16}$	0	0	0	0	0
	0	0	0	$-\frac{5\sqrt{6}i}{48}$	0	0	0	0	$\frac{\sqrt{10}i}{16}$	0	0	0	0	0
913	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$												

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 1)$	0 0 $-\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0 0 0	
	0 0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0 0 0	
	$\frac{5\sqrt{6}i}{48}$ 0 0 0 0 $\frac{\sqrt{10}i}{32}$ 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{96}$ 0 0 0	
	0 $-\frac{5\sqrt{6}i}{48}$ 0 0 $\frac{\sqrt{10}i}{32}$ 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{96}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{96}$ 0 $-\frac{\sqrt{6}}{24}$ $-\frac{5\sqrt{6}i}{48}$ 0	
	0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 0 0 0 $-\frac{\sqrt{6}i}{96}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 $\frac{5\sqrt{6}i}{48}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{10}i}{16}$ 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{32}$ 0 0	
	0 $\frac{\sqrt{10}i}{16}$ $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{96}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{32}$ 0 0 0	
	0 0 0 $\frac{\sqrt{6}i}{96}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $-\frac{\sqrt{10}i}{32}$ 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0	
	0 0 0 0 $\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{16}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{5\sqrt{6}i}{48}$ 0 0 0 0 0 $-\frac{\sqrt{10}i}{16}$ 0 0 0	
	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$	

914 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,0}^{(1,0;a)}(E_g, 2)$	0	0	0	0	$-\frac{\sqrt{35}i}{120}$	0	0	$\frac{\sqrt{35}}{30}$	0	0	$\frac{\sqrt{21}i}{168}$	0	0	$-\frac{\sqrt{21}}{21}$	
	0	0	0	0	0	$\frac{\sqrt{35}i}{120}$	$-\frac{\sqrt{35}}{30}$	0	0	0	0	$-\frac{\sqrt{21}i}{168}$	$\frac{\sqrt{21}}{21}$	0	
	0	0	0	0	0	$-\frac{5\sqrt{21}}{336}$	$\frac{\sqrt{21}i}{168}$	0	0	$\frac{\sqrt{35}i}{60}$	0	$\frac{73\sqrt{35}}{1680}$	$\frac{\sqrt{35}i}{420}$	0	
	0	0	0	0	$\frac{5\sqrt{21}}{336}$	0	0	$-\frac{\sqrt{21}i}{168}$	$\frac{\sqrt{35}i}{60}$	0	$-\frac{73\sqrt{35}}{1680}$	0	0	$-\frac{\sqrt{35}i}{420}$	
	$\frac{\sqrt{35}i}{120}$	0	0	$\frac{5\sqrt{21}}{336}$	0	0	0	0	0	$\frac{17\sqrt{35}}{1680}$	0	$\frac{\sqrt{35}i}{60}$	0	0	
	0	$-\frac{\sqrt{35}i}{120}$	$-\frac{5\sqrt{21}}{336}$	0	0	0	0	0	$-\frac{17\sqrt{35}}{1680}$	0	$\frac{\sqrt{35}i}{60}$	0	0	0	
	0	$-\frac{\sqrt{35}}{30}$	$-\frac{\sqrt{21}i}{168}$	0	0	0	0	0	$-\frac{\sqrt{35}i}{168}$	0	0	0	0	$-\frac{\sqrt{35}i}{30}$	
	$\frac{\sqrt{35}}{30}$	0	0	$\frac{\sqrt{21}i}{168}$	0	0	0	0	0	$\frac{\sqrt{35}i}{168}$	0	0	0	$-\frac{\sqrt{35}i}{30}$	
	0	0	0	$-\frac{\sqrt{35}i}{60}$	0	$-\frac{17\sqrt{35}}{1680}$	$\frac{\sqrt{35}i}{168}$	0	0	0	0	$\frac{11\sqrt{21}}{336}$	$\frac{\sqrt{21}i}{84}$	0	
	0	0	$-\frac{\sqrt{35}i}{60}$	0	$\frac{17\sqrt{35}}{1680}$	0	0	$-\frac{\sqrt{35}i}{168}$	0	0	$-\frac{11\sqrt{21}}{336}$	0	0	$-\frac{\sqrt{21}i}{84}$	
$\mathbb{G}_{5,0}^{(1,0;a)}(E_g, 2)$	$-\frac{\sqrt{21}i}{168}$	0	0	$-\frac{73\sqrt{35}}{1680}$	0	$-\frac{\sqrt{35}i}{60}$	0	0	0	$-\frac{11\sqrt{21}}{336}$	0	0	0	0	
	0	$\frac{\sqrt{21}i}{168}$	$\frac{73\sqrt{35}}{1680}$	0	$-\frac{\sqrt{35}i}{60}$	0	0	0	$\frac{11\sqrt{21}}{336}$	0	0	0	0	0	
	0	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{35}i}{420}$	0	0	0	0	$\frac{\sqrt{35}i}{30}$	$-\frac{\sqrt{21}i}{84}$	0	0	0	0	0	
	$-\frac{\sqrt{21}}{21}$	0	0	$\frac{\sqrt{35}i}{420}$	0	0	$\frac{\sqrt{35}i}{30}$	0	0	$\frac{\sqrt{21}i}{84}$	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
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 2)$	0 0 $-\frac{\sqrt{35}i}{120}$ 0 0 0 0 $\frac{\sqrt{35}i}{30}$ $-\frac{\sqrt{21}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{21}$	
	0 0 0 $\frac{\sqrt{35}i}{120}$ 0 0 $\frac{\sqrt{35}i}{30}$ 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0 $\frac{\sqrt{21}i}{21}$	
	$\frac{\sqrt{35}i}{120}$ 0 0 0 0 $\frac{5\sqrt{21}i}{336}$ 0 0 0 $-\frac{\sqrt{35}}{60}$ 0 0 $-\frac{17\sqrt{35}i}{1680}$ 0 0	
	0 $-\frac{\sqrt{35}i}{120}$ 0 0 $\frac{5\sqrt{21}i}{336}$ 0 0 0 $\frac{\sqrt{35}}{60}$ 0 $-\frac{17\sqrt{35}i}{1680}$ 0 0 0	
	0 0 0 $-\frac{5\sqrt{21}i}{336}$ 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0 $-\frac{73\sqrt{35}i}{1680}$ 0 $-\frac{\sqrt{35}}{60}$ $-\frac{\sqrt{35}i}{420}$ 0	
	0 0 $-\frac{5\sqrt{21}i}{336}$ 0 0 0 0 $-\frac{\sqrt{21}i}{168}$ $-\frac{73\sqrt{35}i}{1680}$ 0 $\frac{\sqrt{35}}{60}$ 0 0 $\frac{\sqrt{35}i}{420}$	
	0 $-\frac{\sqrt{35}i}{30}$ 0 0 $-\frac{\sqrt{21}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{35}i}{168}$ 0 0 $\frac{\sqrt{35}}{30}$	
	$-\frac{\sqrt{35}i}{30}$ 0 0 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{35}i}{168}$ $-\frac{\sqrt{35}}{30}$ 0	
	$\frac{\sqrt{21}i}{168}$ 0 0 $\frac{\sqrt{35}}{60}$ 0 $\frac{73\sqrt{35}i}{1680}$ 0 0 0 0 0 $-\frac{11\sqrt{21}i}{336}$ 0 0	
	0 $-\frac{\sqrt{21}i}{168}$ $-\frac{\sqrt{35}}{60}$ 0 $\frac{73\sqrt{35}i}{1680}$ 0 0 0 0 0 $-\frac{11\sqrt{21}i}{336}$ 0 0 0	
	0 0 0 $\frac{17\sqrt{35}i}{1680}$ 0 $\frac{\sqrt{35}}{60}$ $-\frac{\sqrt{35}i}{168}$ 0 0 0 $\frac{11\sqrt{21}i}{336}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0	
	0 0 $\frac{17\sqrt{35}i}{1680}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 $\frac{\sqrt{35}i}{168}$ $\frac{11\sqrt{21}i}{336}$ 0 0 0 0 $-\frac{\sqrt{21}i}{84}$	
	0 $-\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{35}i}{420}$ 0 0 $-\frac{\sqrt{35}}{30}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0	
	$-\frac{\sqrt{21}i}{21}$ 0 0 0 0 $-\frac{\sqrt{35}i}{420}$ $\frac{\sqrt{35}}{30}$ 0 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 0	
$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$		
916	symmetry	

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{5,0}^{(1,0;a)}(E_g, 3)$	0	0	0	$\frac{\sqrt{15}}{120}$	0	$\frac{\sqrt{15}i}{120}$	0	0	0	$-\frac{1}{8}$	0	$\frac{i}{8}$	0	0	0	0
	0	0	$-\frac{\sqrt{15}}{120}$	0	$\frac{\sqrt{15}i}{120}$	0	0	0	$\frac{1}{8}$	0	$\frac{i}{8}$	0	0	0	0	0
	0	$-\frac{\sqrt{15}}{120}$	0	0	0	0	0	$-\frac{i}{8}$	$-\frac{\sqrt{15}i}{15}$	0	0	0	0	$-\frac{\sqrt{15}i}{30}$	0	0
	$\frac{\sqrt{15}}{120}$	0	0	0	0	0	$-\frac{i}{8}$	0	0	$\frac{\sqrt{15}i}{15}$	0	0	$-\frac{\sqrt{15}i}{30}$	0	0	0
	0	$-\frac{\sqrt{15}i}{120}$	0	0	0	0	0	$-\frac{1}{8}$	0	0	$\frac{\sqrt{15}i}{15}$	0	0	$\frac{\sqrt{15}}{30}$	0	0
	$-\frac{\sqrt{15}i}{120}$	0	0	0	0	0	$\frac{1}{8}$	0	0	0	0	$-\frac{\sqrt{15}i}{15}$	$-\frac{\sqrt{15}}{30}$	0	0	0
	0	0	0	$\frac{i}{8}$	0	$\frac{1}{8}$	0	0	0	$-\frac{\sqrt{15}i}{40}$	0	$\frac{\sqrt{15}}{40}$	0	0	0	0
	0	0	$\frac{i}{8}$	0	$-\frac{1}{8}$	0	0	0	$-\frac{\sqrt{15}i}{40}$	0	$-\frac{\sqrt{15}}{40}$	0	0	0	0	0
	0	$\frac{1}{8}$	$\frac{\sqrt{15}i}{15}$	0	0	0	0	$\frac{\sqrt{15}i}{40}$	0	0	0	0	0	0	0	0
	$-\frac{1}{8}$	0	0	$-\frac{\sqrt{15}i}{15}$	0	0	$\frac{\sqrt{15}i}{40}$	0	0	0	0	0	0	0	0	0
	0	$-\frac{i}{8}$	0	0	$-\frac{\sqrt{15}i}{15}$	0	0	$-\frac{\sqrt{15}}{40}$	0	0	0	0	0	0	0	0
	$-\frac{i}{8}$	0	0	0	0	$\frac{\sqrt{15}i}{15}$	$\frac{\sqrt{15}}{40}$	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{15}i}{30}$	0	$-\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{15}i}{30}$	0	$\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0	0

917 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	$\frac{\sqrt{15}i}{30}$	0	$-\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{15}i}{30}$	0	$\frac{\sqrt{15}}{30}$	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{15}i}{30}$	0	0	$-\frac{i}{4}$	0	0	$-\frac{1}{8}$	0	0	$\frac{\sqrt{15}i}{60}$	0	0	$\frac{\sqrt{15}}{120}$	0	
	$-\frac{\sqrt{15}i}{30}$	0	0	0	0	$\frac{i}{4}$	$\frac{1}{8}$	0	0	0	0	$-\frac{\sqrt{15}i}{60}$	$-\frac{\sqrt{15}}{120}$	0		
	0	$\frac{\sqrt{15}}{30}$	$\frac{i}{4}$	0	0	0	0	$\frac{i}{8}$	$\frac{\sqrt{15}i}{60}$	0	0	0	0	$\frac{\sqrt{15}i}{120}$		
	$-\frac{\sqrt{15}}{30}$	0	0	$-\frac{i}{4}$	0	0	$\frac{i}{8}$	0	0	$-\frac{\sqrt{15}i}{60}$	0	0	$\frac{\sqrt{15}i}{120}$	0		
	0	0	0	$\frac{1}{8}$	0	$-\frac{i}{8}$	0	0	0	$-\frac{\sqrt{15}}{40}$	0	$-\frac{\sqrt{15}i}{40}$	0	0	0	
	0	0	$-\frac{1}{8}$	0	$-\frac{i}{8}$	0	0	0	$\frac{\sqrt{15}}{40}$	0	$-\frac{\sqrt{15}i}{40}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{15}i}{60}$	0	0	$\frac{\sqrt{15}}{40}$	0	0	$-\frac{i}{4}$	0	0	$-\frac{1}{8}$	0	
	0	0	0	0	0	$\frac{\sqrt{15}i}{60}$	$-\frac{\sqrt{15}}{40}$	0	0	0	$0$	$\frac{i}{4}$	$\frac{1}{8}$	0		
	0	0	$-\frac{\sqrt{15}i}{60}$	0	0	0	0	$\frac{\sqrt{15}i}{40}$	$\frac{i}{4}$	0	0	0	0	$\frac{i}{8}$		
	0	0	0	$\frac{\sqrt{15}i}{60}$	0	0	$\frac{\sqrt{15}i}{40}$	0	0	$-\frac{i}{4}$	0	0	$\frac{i}{8}$	0		
	0	0	0	$-\frac{\sqrt{15}}{120}$	0	$-\frac{\sqrt{15}i}{120}$	0	0	0	$\frac{1}{8}$	0	$-\frac{i}{8}$	0	0	0	
	0	0	$\frac{\sqrt{15}}{120}$	0	$-\frac{\sqrt{15}i}{120}$	0	0	0	$-\frac{1}{8}$	0	$-\frac{i}{8}$	0	0	0	0	

918 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{G}_{5,0}^{(1,0;a)}(E_g, 4)$	0	0	0	$\frac{\sqrt{5}}{12}$	0	$-\frac{\sqrt{5}i}{12}$	0	0	0	$\frac{\sqrt{3}}{12}$	0	$\frac{\sqrt{3}i}{12}$	0	0	0	0
	0	0	$-\frac{\sqrt{5}}{12}$	0	$-\frac{\sqrt{5}i}{12}$	0	0	0	$-\frac{\sqrt{3}}{12}$	0	$\frac{\sqrt{3}i}{12}$	0	0	0	0	0
	0	$-\frac{\sqrt{5}}{12}$	0	0	0	0	0	$-\frac{\sqrt{3}i}{24}$	$\frac{\sqrt{5}i}{30}$	0	0	0	0	0	$-\frac{\sqrt{5}i}{120}$	
	$\frac{\sqrt{5}}{12}$	0	0	0	0	0	$-\frac{\sqrt{3}i}{24}$	0	0	$-\frac{\sqrt{5}i}{30}$	0	0	$-\frac{\sqrt{5}i}{120}$	0		
	0	$\frac{\sqrt{5}i}{12}$	0	0	0	0	0	$\frac{\sqrt{3}}{24}$	0	0	$\frac{\sqrt{5}i}{30}$	0	0	$-\frac{\sqrt{5}i}{120}$		
	$\frac{\sqrt{5}i}{12}$	0	0	0	0	0	$-\frac{\sqrt{3}}{24}$	0	0	0	0	$-\frac{\sqrt{5}i}{30}$	$\frac{\sqrt{5}}{120}$	0		
	0	0	0	$\frac{\sqrt{3}i}{24}$	0	$-\frac{\sqrt{3}}{24}$	0	0	0	$-\frac{11\sqrt{5}i}{120}$	0	$-\frac{11\sqrt{5}}{120}$	$-\frac{\sqrt{5}i}{15}$	0		
	0	0	$\frac{\sqrt{3}i}{24}$	0	$\frac{\sqrt{3}}{24}$	0	0	0	$-\frac{11\sqrt{5}i}{120}$	0	$\frac{11\sqrt{5}}{120}$	0	0	$\frac{\sqrt{5}i}{15}$		
	0	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{5}i}{30}$	0	0	0	0	$\frac{11\sqrt{5}i}{120}$	0	0	0	0	0	$\frac{\sqrt{3}i}{24}$		
	$\frac{\sqrt{3}}{12}$	0	0	$\frac{\sqrt{5}i}{30}$	0	0	$\frac{11\sqrt{5}i}{120}$	0	0	0	0	0	$\frac{\sqrt{3}i}{24}$	0		
	0	$-\frac{\sqrt{3}i}{12}$	0	0	$-\frac{\sqrt{5}i}{30}$	0	0	$\frac{11\sqrt{5}}{120}$	0	0	0	0	0	$-\frac{\sqrt{3}}{24}$		
	$-\frac{\sqrt{3}i}{12}$	0	0	0	0	$\frac{\sqrt{5}i}{30}$	$-\frac{11\sqrt{5}}{120}$	0	0	0	0	0	$\frac{\sqrt{3}}{24}$	0		
	0	0	0	$\frac{\sqrt{5}i}{120}$	0	$\frac{\sqrt{5}}{120}$	$\frac{\sqrt{5}i}{15}$	0	0	$-\frac{\sqrt{3}i}{24}$	0	$\frac{\sqrt{3}}{24}$	0	0	0	0
	0	0	$\frac{\sqrt{5}i}{120}$	0	$-\frac{\sqrt{5}}{120}$	0	0	$-\frac{\sqrt{5}i}{15}$	$-\frac{\sqrt{3}i}{24}$	0	$-\frac{\sqrt{3}}{24}$	0	0	0	0	0

919 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 $\frac{\sqrt{5}i}{30}$ 0 $\frac{\sqrt{5}}{30}$ $-\frac{\sqrt{5}i}{15}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{5}i}{30}$ 0 $-\frac{\sqrt{5}}{30}$ 0 0 $\frac{\sqrt{5}i}{15}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}i}{30}$ 0 0 0 0 0 $-\frac{\sqrt{3}}{8}$ 0 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $-\frac{\sqrt{5}}{24}$	
	$-\frac{\sqrt{5}i}{30}$ 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0 0 0 0 $\frac{\sqrt{5}i}{30}$ $\frac{\sqrt{5}}{24}$ 0 0	
	0 $-\frac{\sqrt{5}}{30}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ $\frac{\sqrt{5}i}{30}$ 0 0 0 0 $\frac{\sqrt{5}i}{24}$ 0	
	$\frac{\sqrt{5}}{30}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{5}i}{24}$ 0 0	
	$\frac{\sqrt{5}i}{15}$ 0 0 $\frac{\sqrt{3}}{8}$ 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 $-\frac{\sqrt{5}}{120}$ 0 $\frac{\sqrt{5}i}{120}$ 0 0	
	0 $-\frac{\sqrt{5}i}{15}$ $-\frac{\sqrt{3}}{8}$ 0 $\frac{\sqrt{3}i}{8}$ 0 0 0 $\frac{\sqrt{5}}{120}$ 0 $\frac{\sqrt{5}i}{120}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{5}}{120}$ 0 0 0 0 0 $-\frac{\sqrt{3}}{8}$	
	0 0 0 0 0 $\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{5}}{120}$ 0 0 0 0 0 $\frac{\sqrt{3}}{8}$ 0	
	0 0 $\frac{\sqrt{5}i}{30}$ 0 0 0 0 $-\frac{\sqrt{5}i}{120}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$	
	0 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $-\frac{\sqrt{5}i}{120}$ 0 0 0 0 0 $-\frac{\sqrt{3}i}{8}$ 0	
	0 0 0 $\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{24}$ 0 0 0 $\frac{\sqrt{3}}{8}$ 0 $\frac{\sqrt{3}i}{8}$ 0 0 0	
	0 0 $-\frac{\sqrt{5}}{24}$ 0 $-\frac{\sqrt{5}i}{24}$ 0 0 0 $-\frac{\sqrt{3}}{8}$ 0 $\frac{\sqrt{3}i}{8}$ 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	$-\frac{\sqrt{105}}{42}$	0	$-\frac{\sqrt{105}i}{42}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{105}}{42}$	0	$\frac{\sqrt{105}i}{42}$	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}}{42}$	0	0	0	0	0	$-\frac{\sqrt{7}i}{56}$	0	0	0	0	0	$\frac{\sqrt{105}i}{168}$	
	$-\frac{\sqrt{105}}{42}$	0	0	0	0	0	$\frac{\sqrt{7}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{105}i}{168}$	0	
	0	$-\frac{\sqrt{105}i}{42}$	0	0	0	0	0	$-\frac{\sqrt{7}}{56}$	0	0	0	0	0	$-\frac{\sqrt{105}}{168}$	
	$\frac{\sqrt{105}i}{42}$	0	0	0	0	0	$-\frac{\sqrt{7}}{56}$	0	0	0	0	0	$-\frac{\sqrt{105}}{168}$	0	
	0	0	0	$-\frac{\sqrt{7}i}{56}$	0	$-\frac{\sqrt{7}}{56}$	0	0	0	$-\frac{\sqrt{105}i}{168}$	0	$\frac{\sqrt{105}}{168}$	0	0	0
	0	0	$\frac{\sqrt{7}i}{56}$	0	$-\frac{\sqrt{7}}{56}$	0	0	0	$\frac{\sqrt{105}i}{168}$	0	$\frac{\sqrt{105}}{168}$	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{105}i}{168}$	0	0	0	0	0	$-\frac{5\sqrt{7}i}{56}$		
	0	0	0	0	0	0	$\frac{\sqrt{105}i}{168}$	0	0	0	0	0	$\frac{5\sqrt{7}i}{56}$	0	
	0	0	0	0	0	0	$\frac{\sqrt{105}}{168}$	0	0	0	0	0	$-\frac{5\sqrt{7}}{56}$	0	
	0	0	0	$\frac{\sqrt{105}i}{168}$	0	$-\frac{\sqrt{105}}{168}$	0	0	0	$-\frac{5\sqrt{7}i}{56}$	0	$-\frac{5\sqrt{7}}{56}$	0	0	0
	0	0	$-\frac{\sqrt{105}i}{168}$	0	$-\frac{\sqrt{105}}{168}$	0	0	0	$\frac{5\sqrt{7}i}{56}$	0	$-\frac{5\sqrt{7}}{56}$	0	0	0	

921 symmetry

 $\sqrt{3}yz$ 

continued ...

Table 10

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

922 symmetry

 $-\sqrt{3}xz$ 

continued ...

Table 10

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

923 symmetry

 $\sqrt{3}xy$ 

continued ...

Table 10

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

924 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{35}}{42}$ 0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{35}}{21}$ 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{35}}{42}$ 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{35}}{21}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{21}i}{168}$ 0 0 $\frac{\sqrt{35}}{84}$ 0 0 $-\frac{\sqrt{35}i}{168}$	
	$-\frac{\sqrt{35}}{42}$ 0 0 0 0 $-\frac{\sqrt{21}}{84}$ $-\frac{\sqrt{21}i}{168}$ 0 0 0 0 $-\frac{\sqrt{35}}{84}$ $\frac{\sqrt{35}i}{168}$ 0	
	0 $\frac{\sqrt{35}i}{42}$ $\frac{\sqrt{21}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{168}$ $-\frac{\sqrt{35}}{84}$ 0 0 0 0 $-\frac{\sqrt{35}}{168}$	
	$-\frac{\sqrt{35}i}{42}$ 0 0 $-\frac{\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{21}}{168}$ 0 0 $\frac{\sqrt{35}}{84}$ 0 0 $-\frac{\sqrt{35}}{168}$ 0	
	$\frac{\sqrt{35}}{21}$ 0 0 $\frac{\sqrt{21}i}{168}$ 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 $\frac{\sqrt{35}i}{168}$ 0 $\frac{\sqrt{35}}{168}$ 0 0	
	0 $-\frac{\sqrt{35}}{21}$ $-\frac{\sqrt{21}i}{168}$ 0 $-\frac{\sqrt{21}}{168}$ 0 0 0 $-\frac{\sqrt{35}i}{168}$ 0 $\frac{\sqrt{35}}{168}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{35}i}{168}$ 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 $\frac{5\sqrt{21}i}{168}$	
	0 0 0 0 0 $\frac{\sqrt{35}}{84}$ $-\frac{\sqrt{35}i}{168}$ 0 0 0 0 $-\frac{5\sqrt{21}}{84}$ $-\frac{5\sqrt{21}i}{168}$ 0	
	0 0 $\frac{\sqrt{35}}{84}$ 0 0 0 0 $\frac{\sqrt{35}}{168}$ $\frac{5\sqrt{21}}{84}$ 0 0 0 0 $-\frac{5\sqrt{21}}{168}$	
	0 0 0 $-\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{35}}{168}$ 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{5\sqrt{21}}{168}$ 0	
	0 0 0 $-\frac{\sqrt{35}i}{168}$ 0 $-\frac{\sqrt{35}}{168}$ 0 0 0 $\frac{5\sqrt{21}i}{168}$ 0 $-\frac{5\sqrt{21}}{168}$ 0 0	
	0 0 $\frac{\sqrt{35}i}{168}$ 0 $-\frac{\sqrt{35}}{168}$ 0 0 0 $-\frac{5\sqrt{21}i}{168}$ 0 $-\frac{5\sqrt{21}}{168}$ 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	$\frac{\sqrt{231}}{616}$	0	$\frac{\sqrt{231}i}{616}$	0	0	0	$-\frac{\sqrt{385}}{88}$	0	$\frac{\sqrt{385}i}{88}$	0	0	0
	0	0	$\frac{\sqrt{231}}{616}$	0	$-\frac{\sqrt{231}i}{616}$	0	0	0	$-\frac{\sqrt{385}}{88}$	0	$-\frac{\sqrt{385}i}{88}$	0	0	0	0
	0	$\frac{\sqrt{231}}{616}$	0	0	0	0	0	$-\frac{3\sqrt{385}i}{616}$	0	0	0	0	0	0	$-\frac{9\sqrt{231}i}{616}$
	$\frac{\sqrt{231}}{616}$	0	0	0	0	0	$\frac{3\sqrt{385}i}{616}$	0	0	0	0	0	$\frac{9\sqrt{231}i}{616}$	0	0
	0	$\frac{\sqrt{231}i}{616}$	0	0	0	0	0	$-\frac{3\sqrt{385}}{616}$	0	0	0	0	0	$\frac{9\sqrt{231}}{616}$	0
	$-\frac{\sqrt{231}i}{616}$	0	0	0	0	0	$-\frac{3\sqrt{385}}{616}$	0	0	0	0	0	$\frac{9\sqrt{231}}{616}$	0	0
	0	0	0	$-\frac{3\sqrt{385}i}{616}$	0	$-\frac{3\sqrt{385}}{616}$	0	0	0	$-\frac{5\sqrt{231}i}{616}$	0	$\frac{5\sqrt{231}}{616}$	0	0	0
	0	0	$\frac{3\sqrt{385}i}{616}$	0	$-\frac{3\sqrt{385}}{616}$	0	0	0	$\frac{5\sqrt{231}i}{616}$	0	$\frac{5\sqrt{231}}{616}$	0	0	0	0
	0	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0	$-\frac{5\sqrt{231}i}{616}$	0	0	0	0	0	$-\frac{\sqrt{385}i}{616}$	0
	$-\frac{\sqrt{385}}{88}$	0	0	0	0	0	$\frac{5\sqrt{231}i}{616}$	0	0	0	0	0	$\frac{\sqrt{385}i}{616}$	0	0
	0	$\frac{\sqrt{385}i}{88}$	0	0	0	0	0	$\frac{5\sqrt{231}}{616}$	0	0	0	0	0	$-\frac{\sqrt{385}}{616}$	0
	$-\frac{\sqrt{385}i}{88}$	0	0	0	0	0	$\frac{5\sqrt{231}}{616}$	0	0	0	0	0	$-\frac{\sqrt{385}}{616}$	0	0
	0	0	0	$-\frac{9\sqrt{231}i}{616}$	0	$\frac{9\sqrt{231}}{616}$	0	0	0	$-\frac{\sqrt{385}i}{616}$	0	$-\frac{\sqrt{385}}{616}$	0	0	0
	0	0	$\frac{9\sqrt{231}i}{616}$	0	$\frac{9\sqrt{231}}{616}$	0	0	0	$\frac{\sqrt{385}i}{616}$	0	$-\frac{\sqrt{385}}{616}$	0	0	0	0

926 symmetry

$$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$	0	$-\frac{\sqrt{22}i}{44}$	$\frac{3\sqrt{330}}{880}$	0	0	0	0	$-\frac{\sqrt{330}}{440}$	$\frac{3\sqrt{22}}{176}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	
	$\frac{\sqrt{22}i}{44}$	0	0	$-\frac{3\sqrt{330}}{880}$	0	0	$-\frac{\sqrt{330}}{440}$	0	0	$-\frac{3\sqrt{22}}{176}$	0	0	$\frac{\sqrt{22}}{44}$	0	
	$\frac{3\sqrt{330}}{880}$	0	0	$\frac{3\sqrt{22}i}{88}$	0	$\frac{3\sqrt{22}}{88}$	0	0	0	0	0	$-\frac{\sqrt{330}}{110}$	0	0	
	0	$-\frac{3\sqrt{330}}{880}$	$-\frac{3\sqrt{22}i}{88}$	0	$\frac{3\sqrt{22}}{88}$	0	0	0	0	$-\frac{\sqrt{330}}{110}$	0	0	0	0	
	0	0	0	$\frac{3\sqrt{22}}{88}$	0	0	$-\frac{9\sqrt{22}}{176}$	0	0	0	0	$-\frac{\sqrt{330}i}{440}$	$\frac{3\sqrt{330}}{880}$	0	
	0	0	$\frac{3\sqrt{22}}{88}$	0	0	0	0	$\frac{9\sqrt{22}}{176}$	0	0	$\frac{\sqrt{330}i}{440}$	0	0	$-\frac{3\sqrt{330}}{880}$	
	0	$-\frac{\sqrt{330}}{440}$	0	0	$-\frac{9\sqrt{22}}{176}$	0	0	0	0	0	$-\frac{9\sqrt{330}}{880}$	0	0	$\frac{\sqrt{330}i}{440}$	
	$-\frac{\sqrt{330}}{440}$	0	0	0	0	$\frac{9\sqrt{22}}{176}$	0	0	0	0	0	$\frac{9\sqrt{330}}{880}$	$-\frac{\sqrt{330}i}{440}$	0	
	$\frac{3\sqrt{22}}{176}$	0	0	0	0	0	0	0	$-\frac{5\sqrt{22}i}{88}$	0	$\frac{\sqrt{22}}{88}$	0	0	0	
	0	$-\frac{3\sqrt{22}}{176}$	0	0	0	0	0	0	$\frac{5\sqrt{22}i}{88}$	0	$\frac{\sqrt{22}}{88}$	0	0	0	
	0	0	0	$-\frac{\sqrt{330}}{110}$	0	$-\frac{\sqrt{330}i}{440}$	$-\frac{9\sqrt{330}}{880}$	0	0	$\frac{\sqrt{22}}{88}$	0	$\frac{\sqrt{22}i}{44}$	$-\frac{3\sqrt{22}}{176}$	0	
	0	0	$-\frac{\sqrt{330}}{110}$	0	$\frac{\sqrt{330}i}{440}$	0	0	$\frac{9\sqrt{330}}{880}$	$\frac{\sqrt{22}}{88}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	$\frac{3\sqrt{22}}{176}$	
	0	$\frac{\sqrt{22}}{44}$	0	0	$\frac{3\sqrt{330}}{880}$	0	0	$\frac{\sqrt{330}i}{440}$	0	0	$-\frac{3\sqrt{22}}{176}$	0	0	$\frac{\sqrt{22}i}{44}$	
	$\frac{\sqrt{22}}{44}$	0	0	0	0	$-\frac{3\sqrt{330}}{880}$	$-\frac{\sqrt{330}i}{440}$	0	0	0	$\frac{3\sqrt{22}}{176}$	$-\frac{\sqrt{22}i}{44}$	0	0	

927 symmetry

$$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	0	$\frac{\sqrt{22}}{44}$	0	0	$\frac{3\sqrt{330}}{880}$	0	0	$\frac{\sqrt{330}i}{440}$	0	0	$-\frac{3\sqrt{22}}{176}$	0	0	$\frac{\sqrt{22}i}{44}$	
	$\frac{\sqrt{22}}{44}$	0	0	0	0	$-\frac{3\sqrt{330}}{880}$	$-\frac{\sqrt{330}i}{440}$	0	0	0	0	$\frac{3\sqrt{22}}{176}$	$-\frac{\sqrt{22}i}{44}$	0	
	0	0	0	0	0	$-\frac{3\sqrt{22}i}{88}$	$-\frac{9\sqrt{22}}{176}$	0	0	$-\frac{\sqrt{330}}{440}$	0	0	$-\frac{3\sqrt{330}}{880}$	0	
	0	0	0	0	$\frac{3\sqrt{22}i}{88}$	0	0	$\frac{9\sqrt{22}}{176}$	$-\frac{\sqrt{330}}{440}$	0	0	0	0	$\frac{3\sqrt{330}}{880}$	
	$\frac{3\sqrt{330}}{880}$	0	0	$-\frac{3\sqrt{22}i}{88}$	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	$-\frac{\sqrt{330}i}{110}$	0	0	0	0	
	0	$-\frac{3\sqrt{330}}{880}$	$\frac{3\sqrt{22}i}{88}$	0	$-\frac{3\sqrt{22}}{88}$	0	0	0	$\frac{\sqrt{330}i}{110}$	0	0	0	0	0	
	0	$\frac{\sqrt{330}i}{440}$	$-\frac{9\sqrt{22}}{176}$	0	0	0	0	0	$\frac{9\sqrt{330}}{880}$	0	0	0	0	$\frac{\sqrt{330}}{440}$	
	$-\frac{\sqrt{330}i}{440}$	0	0	$\frac{9\sqrt{22}}{176}$	0	0	0	0	0	$-\frac{9\sqrt{330}}{880}$	0	0	$\frac{\sqrt{330}}{440}$	0	
	0	0	0	$-\frac{\sqrt{330}}{440}$	0	$-\frac{\sqrt{330}i}{110}$	$\frac{9\sqrt{330}}{880}$	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{88}$	$-\frac{3\sqrt{22}}{176}$	0	
	0	0	$-\frac{\sqrt{330}}{440}$	0	$\frac{\sqrt{330}i}{110}$	0	0	$-\frac{9\sqrt{330}}{880}$	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{88}$	0	0	$\frac{3\sqrt{22}}{176}$	
	$-\frac{3\sqrt{22}}{176}$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{22}i}{88}$	0	$\frac{5\sqrt{22}}{88}$	0	0	
	0	$\frac{3\sqrt{22}}{176}$	0	0	0	0	0	0	$\frac{\sqrt{22}i}{88}$	0	$\frac{5\sqrt{22}}{88}$	0	0	0	
	0	$\frac{\sqrt{22}i}{44}$	$-\frac{3\sqrt{330}}{880}$	0	0	0	0	$\frac{\sqrt{330}}{440}$	$-\frac{3\sqrt{22}}{176}$	0	0	0	0	$-\frac{\sqrt{22}}{44}$	
	$-\frac{\sqrt{22}i}{44}$	0	0	$\frac{3\sqrt{330}}{880}$	0	0	$\frac{\sqrt{330}}{440}$	0	0	$\frac{3\sqrt{22}}{176}$	0	0	$-\frac{\sqrt{22}}{44}$	0	
$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$															

928 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{154}}{44}$	0	0	$\frac{\sqrt{2310}}{6160}$	0	0	$-\frac{3\sqrt{2310}i}{3080}$	0	0	$\frac{\sqrt{154}}{176}$	0	0	0	0
	$\frac{\sqrt{154}}{44}$	0	0	0	0	$-\frac{\sqrt{2310}}{6160}$	$\frac{3\sqrt{2310}i}{3080}$	0	0	0	$-\frac{\sqrt{154}}{176}$	0	0	0	0
	0	0	0	0	0	$\frac{9\sqrt{154}i}{616}$	$-\frac{3\sqrt{154}}{1232}$	0	0	$\frac{\sqrt{2310}}{3080}$	0	$-\frac{3\sqrt{2310}i}{1540}$	$-\frac{9\sqrt{2310}}{6160}$	0	0
	0	0	0	0	$-\frac{9\sqrt{154}i}{616}$	0	0	$\frac{3\sqrt{154}}{1232}$	$\frac{\sqrt{2310}}{3080}$	0	$\frac{3\sqrt{2310}i}{1540}$	0	0	$\frac{9\sqrt{2310}}{6160}$	0
	$\frac{\sqrt{2310}}{6160}$	0	0	$\frac{9\sqrt{154}i}{616}$	0	$-\frac{9\sqrt{154}}{616}$	0	0	0	$\frac{3\sqrt{2310}i}{1540}$	0	$-\frac{\sqrt{2310}}{770}$	0	0	0
	0	$-\frac{\sqrt{2310}}{6160}$	$-\frac{9\sqrt{154}i}{616}$	0	$-\frac{9\sqrt{154}}{616}$	0	0	0	$-\frac{3\sqrt{2310}i}{1540}$	0	$-\frac{\sqrt{2310}}{770}$	0	0	0	0
	0	$-\frac{3\sqrt{2310}i}{3080}$	$-\frac{3\sqrt{154}}{1232}$	0	0	0	0	$-\frac{3\sqrt{154}}{154}$	$-\frac{\sqrt{2310}}{1232}$	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	0
	$\frac{3\sqrt{2310}i}{3080}$	0	0	$\frac{3\sqrt{154}}{1232}$	0	0	$-\frac{3\sqrt{154}}{154}$	0	0	$\frac{\sqrt{2310}}{1232}$	0	0	$\frac{3\sqrt{2310}}{3080}$	0	0
	0	0	0	$\frac{\sqrt{2310}}{3080}$	0	$\frac{3\sqrt{2310}i}{1540}$	$-\frac{\sqrt{2310}}{1232}$	0	0	$-\frac{\sqrt{154}}{44}$	0	$\frac{3\sqrt{154}i}{616}$	$-\frac{\sqrt{154}}{1232}$	0	0
	0	0	$\frac{\sqrt{2310}}{3080}$	0	$-\frac{3\sqrt{2310}i}{1540}$	0	0	$\frac{\sqrt{2310}}{1232}$	$-\frac{\sqrt{154}}{44}$	0	$-\frac{3\sqrt{154}i}{616}$	0	0	$\frac{\sqrt{154}}{1232}$	0
	$\frac{\sqrt{154}}{176}$	0	0	$-\frac{3\sqrt{2310}i}{1540}$	0	$-\frac{\sqrt{2310}}{770}$	0	0	0	$\frac{3\sqrt{154}i}{616}$	0	$\frac{\sqrt{154}}{88}$	0	0	0
	0	$-\frac{\sqrt{154}}{176}$	$\frac{3\sqrt{2310}i}{1540}$	0	$-\frac{\sqrt{2310}}{770}$	0	0	0	$-\frac{3\sqrt{154}i}{616}$	0	$\frac{\sqrt{154}}{88}$	0	0	0	0
	0	0	$-\frac{9\sqrt{2310}}{6160}$	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	$-\frac{\sqrt{154}}{1232}$	0	0	0	0	$\frac{\sqrt{154}}{44}$	0
	0	0	0	$\frac{9\sqrt{2310}}{6160}$	0	0	$\frac{3\sqrt{2310}}{3080}$	0	0	$\frac{\sqrt{154}}{1232}$	0	0	$\frac{\sqrt{154}}{44}$	0	0
929	symmetry	$\frac{\sqrt{10xz}(3x^2+3y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$-\frac{\sqrt{154}i}{44}$	$\frac{\sqrt{2310}}{6160}$	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	$-\frac{\sqrt{154}}{176}$	0	0	0	0	0	0	0
	$\frac{\sqrt{154}i}{44}$	0	0	$-\frac{\sqrt{2310}}{6160}$	0	0	$\frac{3\sqrt{2310}}{3080}$	0	0	$\frac{\sqrt{154}}{176}$	0	0	0	0	0	0
	$\frac{\sqrt{2310}}{6160}$	0	0	$\frac{9\sqrt{154}i}{616}$	0	$-\frac{9\sqrt{154}}{616}$	0	0	0	$-\frac{\sqrt{2310}i}{770}$	0	$\frac{3\sqrt{2310}}{1540}$	0	0	0	0
	0	$-\frac{\sqrt{2310}}{6160}$	$-\frac{9\sqrt{154}i}{616}$	0	$-\frac{9\sqrt{154}}{616}$	0	0	0	$\frac{\sqrt{2310}i}{770}$	0	$\frac{3\sqrt{2310}}{1540}$	0	0	0	0	0
	0	0	0	$-\frac{9\sqrt{154}}{616}$	0	0	$-\frac{3\sqrt{154}}{1232}$	0	0	0	$-\frac{3\sqrt{2310}}{1540}$	0	$\frac{\sqrt{2310}i}{3080}$	$\frac{9\sqrt{2310}}{6160}$	0	0
	0	0	$-\frac{9\sqrt{154}}{616}$	0	0	0	0	$\frac{3\sqrt{154}}{1232}$	$-\frac{3\sqrt{2310}}{1540}$	0	$-\frac{\sqrt{2310}i}{3080}$	0	0	$-\frac{9\sqrt{2310}}{6160}$	0	0
	0	$\frac{3\sqrt{2310}}{3080}$	0	0	$-\frac{3\sqrt{154}}{1232}$	0	0	$\frac{3\sqrt{154}i}{154}$	0	0	$\frac{\sqrt{2310}}{1232}$	0	0	0	$\frac{3\sqrt{2310}i}{3080}$	0
	$\frac{3\sqrt{2310}}{3080}$	0	0	0	0	$\frac{3\sqrt{154}}{1232}$	$-\frac{3\sqrt{154}i}{154}$	0	0	0	0	$-\frac{\sqrt{2310}}{1232}$	$-\frac{3\sqrt{2310}i}{3080}$	0	0	
	$-\frac{\sqrt{154}}{176}$	0	0	$-\frac{\sqrt{2310}i}{770}$	0	$-\frac{3\sqrt{2310}}{1540}$	0	0	0	$-\frac{\sqrt{154}i}{88}$	0	$-\frac{3\sqrt{154}}{616}$	0	0	0	0
	0	$\frac{\sqrt{154}}{176}$	$\frac{\sqrt{2310}i}{770}$	0	$-\frac{3\sqrt{2310}}{1540}$	0	0	0	$\frac{\sqrt{154}i}{88}$	0	$-\frac{3\sqrt{154}}{616}$	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{2310}}{1540}$	0	$\frac{\sqrt{2310}i}{3080}$	$\frac{\sqrt{2310}}{1232}$	0	0	$-\frac{3\sqrt{154}}{616}$	0	$\frac{\sqrt{154}i}{44}$	$-\frac{\sqrt{154}}{1232}$	0	0	0
	0	0	$\frac{3\sqrt{2310}}{1540}$	0	$-\frac{\sqrt{2310}i}{3080}$	0	0	$-\frac{\sqrt{2310}}{1232}$	$-\frac{3\sqrt{154}}{616}$	0	$-\frac{\sqrt{154}i}{44}$	0	0	$\frac{\sqrt{154}}{1232}$	0	
	0	0	0	0	$\frac{9\sqrt{2310}}{6160}$	0	0	$\frac{3\sqrt{2310}i}{3080}$	0	0	$-\frac{\sqrt{154}}{1232}$	0	0	$-\frac{\sqrt{154}i}{44}$	0	0
	0	0	0	0	0	$-\frac{9\sqrt{2310}}{6160}$	$-\frac{3\sqrt{2310}i}{3080}$	0	0	0	0	$\frac{\sqrt{154}}{1232}$	$\frac{\sqrt{154}i}{44}$	0	0	

930 symmetry

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

continued ...

Table 10

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

931 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	$-\frac{\sqrt{165}}{440}$	0	$-\frac{\sqrt{165}i}{440}$	0	0	0	$-\frac{\sqrt{11}}{88}$	0	$\frac{\sqrt{11}i}{88}$	$-\frac{\sqrt{11}}{11}$	0		
	0	0	$-\frac{\sqrt{165}}{440}$	0	$\frac{\sqrt{165}i}{440}$	0	0	0	$-\frac{\sqrt{11}}{88}$	0	$-\frac{\sqrt{11}i}{88}$	0	0	$\frac{\sqrt{11}}{11}$		
	0	$-\frac{\sqrt{165}}{440}$	0	0	0	0	0	$\frac{3\sqrt{11}i}{88}$	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{\sqrt{165}i}{440}$		
	$-\frac{\sqrt{165}}{440}$	0	0	0	0	0	$-\frac{3\sqrt{11}i}{88}$	0	0	0	0	$-\frac{\sqrt{165}}{55}$	$-\frac{\sqrt{165}i}{440}$	$-\frac{\sqrt{165}i}{440}$	0	
	0	$-\frac{\sqrt{165}i}{440}$	0	0	0	0	0	$\frac{3\sqrt{11}}{88}$	$\frac{\sqrt{165}}{55}$	0	0	0	0	$-\frac{\sqrt{165}}{440}$		
	$\frac{\sqrt{165}i}{440}$	0	0	0	0	0	$\frac{3\sqrt{11}}{88}$	0	0	$-\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{165}}{440}$	0		
	0	0	0	$\frac{3\sqrt{11}i}{88}$	0	$\frac{3\sqrt{11}}{88}$	0	0	0	$-\frac{3\sqrt{165}i}{440}$	0	$\frac{3\sqrt{165}}{440}$	0	0	0	
	0	0	$-\frac{3\sqrt{11}i}{88}$	0	$\frac{3\sqrt{11}}{88}$	0	0	0	$\frac{3\sqrt{165}i}{440}$	0	$\frac{3\sqrt{165}}{440}$	0	0	0		
	0	$-\frac{\sqrt{11}}{88}$	0	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{3\sqrt{165}i}{440}$	0	0	0	0	0	$\frac{\sqrt{11}i}{88}$		
	$-\frac{\sqrt{11}}{88}$	0	0	0	0	$-\frac{\sqrt{165}}{55}$	$\frac{3\sqrt{165}i}{440}$	0	0	0	0	0	0	$-\frac{\sqrt{11}i}{88}$	0	
	0	$\frac{\sqrt{11}i}{88}$	$\frac{\sqrt{165}}{55}$	0	0	0	0	$\frac{3\sqrt{165}}{440}$	0	0	0	0	0	$\frac{\sqrt{11}}{88}$		
	$-\frac{\sqrt{11}i}{88}$	0	0	$-\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{165}}{440}$	0	0	0	0	0	0	$\frac{\sqrt{11}}{88}$	0	
	$-\frac{\sqrt{11}}{11}$	0	0	$\frac{\sqrt{165}i}{440}$	0	$-\frac{\sqrt{165}}{440}$	0	0	0	$\frac{\sqrt{11}i}{88}$	0	$\frac{\sqrt{11}}{88}$	0	0	0	
	0	$\frac{\sqrt{11}}{11}$	$-\frac{\sqrt{165}i}{440}$	0	$-\frac{\sqrt{165}}{440}$	0	0	0	$-\frac{\sqrt{11}i}{88}$	0	$\frac{\sqrt{11}}{88}$	0	0	0	0	

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

932 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{4,0}^{(1,0;a)}(E_g, 3)$	0	0	0	$-\frac{\sqrt{1155}i}{616}$	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	$\frac{\sqrt{77}i}{88}$	0	$-\frac{\sqrt{77}}{88}$	0	0	0	
	0	0	$\frac{\sqrt{1155}i}{616}$	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	$-\frac{\sqrt{77}i}{88}$	0	$-\frac{\sqrt{77}}{88}$	0	0	0	0	
	0	$-\frac{\sqrt{1155}i}{616}$	$-\frac{3\sqrt{77}}{308}$	0	0	0	0	$\frac{15\sqrt{77}}{616}$	$\frac{\sqrt{1155}}{1540}$	0	0	0	0	$\frac{17\sqrt{1155}}{3080}$		
	$\frac{\sqrt{1155}i}{616}$	0	0	$\frac{3\sqrt{77}}{308}$	0	0	$\frac{15\sqrt{77}}{616}$	0	0	$-\frac{\sqrt{1155}}{1540}$	0	0	$\frac{17\sqrt{1155}}{3080}$	0		
	0	$-\frac{\sqrt{1155}}{616}$	0	0	$\frac{3\sqrt{77}}{308}$	0	0	$\frac{15\sqrt{77}i}{616}$	0	0	$\frac{\sqrt{1155}}{1540}$	0	0	$-\frac{17\sqrt{1155}i}{3080}$		
	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	$-\frac{3\sqrt{77}}{308}$	$-\frac{15\sqrt{77}i}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{1540}$	$\frac{17\sqrt{1155}i}{3080}$	0		
	0	0	0	$\frac{15\sqrt{77}}{616}$	0	$\frac{15\sqrt{77}i}{616}$	0	0	0	$-\frac{3\sqrt{1155}}{3080}$	0	$\frac{3\sqrt{1155}i}{3080}$	$-\frac{\sqrt{1155}}{770}$	0		
	0	0	$\frac{15\sqrt{77}}{616}$	0	$-\frac{15\sqrt{77}i}{616}$	0	0	0	$-\frac{3\sqrt{1155}}{3080}$	0	$-\frac{3\sqrt{1155}i}{3080}$	0	0	$\frac{\sqrt{1155}}{770}$		
	0	$\frac{\sqrt{77}i}{88}$	$\frac{\sqrt{1155}}{1540}$	0	0	0	0	$-\frac{3\sqrt{1155}}{3080}$	$\frac{\sqrt{77}}{44}$	0	0	0	0	$\frac{5\sqrt{77}}{616}$		
	$-\frac{\sqrt{77}i}{88}$	0	0	$-\frac{\sqrt{1155}}{1540}$	0	0	$-\frac{3\sqrt{1155}}{3080}$	0	0	$-\frac{\sqrt{77}}{44}$	0	0	$\frac{5\sqrt{77}}{616}$	0		
	0	$-\frac{\sqrt{77}}{88}$	0	0	$\frac{\sqrt{1155}}{1540}$	0	0	$\frac{3\sqrt{1155}i}{3080}$	0	0	$-\frac{\sqrt{77}}{44}$	0	0	$\frac{5\sqrt{77}i}{616}$		
	$-\frac{\sqrt{77}}{88}$	0	0	0	0	$-\frac{\sqrt{1155}}{1540}$	$-\frac{3\sqrt{1155}i}{3080}$	0	0	0	0	$\frac{\sqrt{77}}{44}$	$-\frac{5\sqrt{77}i}{616}$	0		
	0	0	0	$\frac{17\sqrt{1155}}{3080}$	0	$-\frac{17\sqrt{1155}i}{3080}$	$-\frac{\sqrt{1155}}{770}$	0	0	$\frac{5\sqrt{77}}{616}$	0	$\frac{5\sqrt{77}i}{616}$	0	0		
	0	0	$\frac{17\sqrt{1155}}{3080}$	0	$\frac{17\sqrt{1155}i}{3080}$	0	0	$\frac{\sqrt{1155}}{770}$	$\frac{5\sqrt{77}}{616}$	0	$-\frac{5\sqrt{77}i}{616}$	0	0	0		

933 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 $-\frac{\sqrt{1155}}{1540}$ 0 $\frac{\sqrt{1155}i}{1540}$ $\frac{\sqrt{1155}}{770}$ 0 0 $-\frac{\sqrt{77}}{44}$ 0 $-\frac{\sqrt{77}i}{44}$ 0 0	
	0 0 $-\frac{\sqrt{1155}}{1540}$ 0 $-\frac{\sqrt{1155}i}{1540}$ 0 0 $-\frac{\sqrt{1155}}{770}$ $-\frac{\sqrt{77}}{44}$ 0 $\frac{\sqrt{77}i}{44}$ 0 0 0	
	0 $-\frac{\sqrt{1155}}{1540}$ 0 0 $-\frac{3\sqrt{77}}{154}$ 0 0 $-\frac{3\sqrt{77}i}{308}$ 0 0 $\frac{\sqrt{1155}}{385}$ 0 0 $\frac{\sqrt{1155}i}{308}$	
	$-\frac{\sqrt{1155}}{1540}$ 0 0 0 0 $\frac{3\sqrt{77}}{154}$ $\frac{3\sqrt{77}i}{308}$ 0 0 0 $-\frac{\sqrt{1155}}{385}$ $-\frac{\sqrt{1155}i}{308}$ 0 0	
	0 $\frac{\sqrt{1155}i}{1540}$ $-\frac{3\sqrt{77}}{154}$ 0 0 0 0 $\frac{3\sqrt{77}}{308}$ $-\frac{\sqrt{1155}}{385}$ 0 0 0 0 $\frac{\sqrt{1155}}{308}$	
	$-\frac{\sqrt{1155}i}{1540}$ 0 0 $\frac{3\sqrt{77}}{154}$ 0 0 $\frac{3\sqrt{77}}{308}$ 0 0 $\frac{\sqrt{1155}}{385}$ 0 0 0 $\frac{\sqrt{1155}}{308}$ 0	
	$\frac{\sqrt{1155}}{770}$ 0 0 $-\frac{3\sqrt{77}i}{308}$ 0 $\frac{3\sqrt{77}}{308}$ 0 0 0 $\frac{9\sqrt{1155}i}{1540}$ 0 $\frac{9\sqrt{1155}}{1540}$ 0 0	
	0 $-\frac{\sqrt{1155}}{770}$ $\frac{3\sqrt{77}i}{308}$ 0 $\frac{3\sqrt{77}}{308}$ 0 0 0 $-\frac{9\sqrt{1155}i}{1540}$ 0 $\frac{9\sqrt{1155}}{1540}$ 0 0 0	
	0 $-\frac{\sqrt{77}}{44}$ 0 0 $-\frac{\sqrt{1155}}{385}$ 0 0 $\frac{9\sqrt{1155}i}{1540}$ 0 0 $-\frac{\sqrt{77}}{154}$ 0 0 $-\frac{\sqrt{77}i}{308}$	
	$-\frac{\sqrt{77}}{44}$ 0 0 0 0 $\frac{\sqrt{1155}}{385}$ $-\frac{9\sqrt{1155}i}{1540}$ 0 0 0 0 $\frac{\sqrt{77}}{154}$ $\frac{\sqrt{77}i}{308}$ 0	
	0 $-\frac{\sqrt{77}i}{44}$ $\frac{\sqrt{1155}}{385}$ 0 0 0 0 $\frac{9\sqrt{1155}}{1540}$ $-\frac{\sqrt{77}}{154}$ 0 0 0 0 $\frac{\sqrt{77}}{308}$	
	$\frac{\sqrt{77}i}{44}$ 0 0 $-\frac{\sqrt{1155}}{385}$ 0 0 $\frac{9\sqrt{1155}}{1540}$ 0 0 $\frac{\sqrt{77}}{154}$ 0 0 $\frac{\sqrt{77}}{308}$ 0	
	0 0 0 $\frac{\sqrt{1155}i}{308}$ 0 $\frac{\sqrt{1155}}{308}$ 0 0 0 $-\frac{\sqrt{77}i}{308}$ 0 $\frac{\sqrt{77}}{308}$ 0 0 0	
	0 0 $-\frac{\sqrt{1155}i}{308}$ 0 $\frac{\sqrt{1155}}{308}$ 0 0 0 $\frac{\sqrt{77}i}{308}$ 0 $\frac{\sqrt{77}}{308}$ 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													
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 1)$	0	0	0	$\frac{\sqrt{165}}{264}$	0	$\frac{\sqrt{165}i}{264}$	0	0	0	$\frac{3\sqrt{11}}{88}$	0	$-\frac{3\sqrt{11}i}{88}$	0	0	
	0	0	$\frac{\sqrt{165}}{264}$	0	$-\frac{\sqrt{165}i}{264}$	0	0	0	$\frac{3\sqrt{11}}{88}$	0	$\frac{3\sqrt{11}i}{88}$	0	0	0	
	0	$\frac{\sqrt{165}}{264}$	0	0	0	0	0	$-\frac{5\sqrt{11}i}{88}$	0	0	0	0	0	$\frac{\sqrt{165}i}{132}$	
	$\frac{\sqrt{165}}{264}$	0	0	0	0	0	$\frac{5\sqrt{11}i}{88}$	0	0	0	0	0	$-\frac{\sqrt{165}i}{132}$	0	
	0	$\frac{\sqrt{165}i}{264}$	0	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	$-\frac{\sqrt{165}}{132}$	
	$-\frac{\sqrt{165}i}{264}$	0	0	0	0	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	0	0	$-\frac{\sqrt{165}}{132}$	0	
	0	0	0	$-\frac{5\sqrt{11}i}{88}$	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	$-\frac{5\sqrt{165}i}{264}$	0	$\frac{5\sqrt{165}}{264}$	0	0	
	0	0	$\frac{5\sqrt{11}i}{88}$	0	$-\frac{5\sqrt{11}}{88}$	0	0	0	$\frac{5\sqrt{165}i}{264}$	0	$\frac{5\sqrt{165}}{264}$	0	0	0	
	0	$\frac{3\sqrt{11}}{88}$	0	0	0	0	0	$-\frac{5\sqrt{165}i}{264}$	0	0	0	0	0	$\frac{\sqrt{11}i}{44}$	
	$\frac{3\sqrt{11}}{88}$	0	0	0	0	0	$\frac{5\sqrt{165}i}{264}$	0	0	0	0	0	$-\frac{\sqrt{11}i}{44}$	0	
	0	$-\frac{3\sqrt{11}i}{88}$	0	0	0	0	0	$\frac{5\sqrt{165}}{264}$	0	0	0	0	0	$\frac{\sqrt{11}}{44}$	
	$\frac{3\sqrt{11}i}{88}$	0	0	0	0	0	$\frac{5\sqrt{165}}{264}$	0	0	0	0	0	$\frac{\sqrt{11}}{44}$	0	
	0	0	0	$\frac{\sqrt{165}i}{132}$	0	$-\frac{\sqrt{165}}{132}$	0	0	0	$\frac{\sqrt{11}i}{44}$	0	$\frac{\sqrt{11}}{44}$	0	0	
	0	0	$-\frac{\sqrt{165}i}{132}$	0	$-\frac{\sqrt{165}}{132}$	0	0	0	$-\frac{\sqrt{11}i}{44}$	0	$\frac{\sqrt{11}}{44}$	0	0	0	

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
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 2)$	0	$0 \ 0 \ 0 \ \frac{\sqrt{70}}{112} \ 0 \ -\frac{\sqrt{70}i}{112} \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ -\frac{\sqrt{42}i}{112} \ 0 \ 0$
	0	$0 \ 0 \ \frac{\sqrt{70}}{112} \ 0 \ \frac{\sqrt{70}i}{112} \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ \frac{\sqrt{42}i}{112} \ 0 \ 0 \ 0$
	0	$\frac{\sqrt{70}}{112} \ 0 \ 0 \ 0 \ \frac{5\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{70}}{112} \ 0 \ 0 \ -\frac{\sqrt{70}i}{112}$
	$\frac{\sqrt{70}}{112}$	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{5\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{70}}{112} \ \frac{\sqrt{70}i}{112} \ 0$
	0	$0 \ -\frac{\sqrt{70}i}{112} \ \frac{5\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{70}}{112} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{70}}{112}$
	$\frac{\sqrt{70}i}{112}$	$0 \ 0 \ 0 \ -\frac{5\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{70}}{112} \ 0 \ 0 \ -\frac{\sqrt{70}}{112} \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$
	0	$0 \ -\frac{\sqrt{42}}{112} \ 0 \ 0 \ -\frac{3\sqrt{70}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{42}}{112} \ 0 \ 0 \ \frac{\sqrt{42}i}{112}$
	$-\frac{\sqrt{42}}{112}$	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{70}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{42}}{112} \ -\frac{\sqrt{42}i}{112} \ 0$
	0	$0 \ -\frac{\sqrt{42}i}{112} \ \frac{3\sqrt{70}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{42}}{112} \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{112}$
	$\frac{\sqrt{42}i}{112}$	$0 \ 0 \ 0 \ -\frac{3\sqrt{70}}{112} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{42}}{112} \ 0 \ 0 \ -\frac{\sqrt{42}}{112} \ 0$
	0	$0 \ 0 \ 0 \ -\frac{\sqrt{70}i}{112} \ 0 \ -\frac{\sqrt{70}}{112} \ 0 \ 0 \ 0 \ \frac{\sqrt{42}i}{112} \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ 0$
	0	$0 \ 0 \ \frac{\sqrt{70}i}{112} \ 0 \ -\frac{\sqrt{70}}{112} \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}i}{112} \ 0 \ -\frac{\sqrt{42}}{112} \ 0 \ 0 \ 0$

936 symmetry

$$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$T_6^{(1,0;a)}(A_{1g}, 3)$	0	$-\frac{\sqrt{2310}i}{308}$	$\frac{9\sqrt{154}}{1232}$	0	0	0	0	$\frac{\sqrt{154}}{77}$	$\frac{3\sqrt{2310}}{1232}$	0	0	0	0	$\frac{\sqrt{2310}}{308}$		
	$\frac{\sqrt{2310}i}{308}$	0	0	$-\frac{9\sqrt{154}}{1232}$	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{3\sqrt{2310}}{1232}$	0	0	$\frac{\sqrt{2310}}{308}$	0		
	$\frac{9\sqrt{154}}{1232}$	0	0	$-\frac{5\sqrt{2310}i}{1232}$	0	$\frac{\sqrt{2310}}{2464}$	0	0	0	$-\frac{\sqrt{154}i}{112}$	0	$\frac{\sqrt{154}}{352}$	0	0		
	0	$-\frac{9\sqrt{154}}{1232}$	$\frac{5\sqrt{2310}i}{1232}$	0	$\frac{\sqrt{2310}}{2464}$	0	0	0	$\frac{\sqrt{154}i}{112}$	0	$\frac{\sqrt{154}}{352}$	0	0	0		
	0	0	0	$\frac{\sqrt{2310}}{2464}$	0	0	$\frac{\sqrt{2310}}{616}$	0	0	$\frac{3\sqrt{154}}{224}$	0	$-\frac{3\sqrt{154}i}{616}$	$\frac{9\sqrt{154}}{1232}$	0		
	0	0	$\frac{\sqrt{2310}}{2464}$	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	$\frac{3\sqrt{154}}{224}$	0	$\frac{3\sqrt{154}i}{616}$	0	0	$-\frac{9\sqrt{154}}{1232}$		
	0	$\frac{\sqrt{154}}{77}$	0	0	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	$\frac{3\sqrt{154}}{616}$	0	0	$-\frac{\sqrt{154}i}{77}$		
	$\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	0	$-\frac{3\sqrt{154}}{616}$	$\frac{\sqrt{154}i}{77}$	0		
	$\frac{3\sqrt{2310}}{1232}$	0	0	$-\frac{\sqrt{154}i}{112}$	0	$\frac{3\sqrt{154}}{224}$	0	0	0	$\frac{\sqrt{2310}i}{1232}$	0	$-\frac{\sqrt{2310}}{352}$	0	0		
	0	$-\frac{3\sqrt{2310}}{1232}$	$\frac{\sqrt{154}i}{112}$	0	$\frac{3\sqrt{154}}{224}$	0	0	0	$-\frac{\sqrt{2310}i}{1232}$	0	$-\frac{\sqrt{2310}}{352}$	0	0	0		
	0	0	0	$\frac{\sqrt{154}}{352}$	0	$-\frac{3\sqrt{154}i}{616}$	$\frac{3\sqrt{154}}{616}$	0	0	$-\frac{\sqrt{2310}}{352}$	0	$\frac{\sqrt{2310}i}{308}$	$-\frac{3\sqrt{2310}}{1232}$	0		
	0	0	$\frac{\sqrt{154}}{352}$	0	$\frac{3\sqrt{154}i}{616}$	0	0	$-\frac{3\sqrt{154}}{616}$	$-\frac{\sqrt{2310}}{352}$	0	$-\frac{\sqrt{2310}i}{308}$	0	0	$\frac{3\sqrt{2310}}{1232}$		
	0	$\frac{\sqrt{2310}}{308}$	0	0	$\frac{9\sqrt{154}}{1232}$	0	0	$-\frac{\sqrt{154}i}{77}$	0	0	$-\frac{3\sqrt{2310}}{1232}$	0	0	$\frac{\sqrt{2310}i}{308}$		
	$\frac{\sqrt{2310}}{308}$	0	0	0	0	$-\frac{9\sqrt{154}}{1232}$	$\frac{\sqrt{154}i}{77}$	0	0	0	0	$\frac{3\sqrt{2310}}{1232}$	$-\frac{\sqrt{2310}i}{308}$	0		

937 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_6^{(1,0;a)}(A_{2g}, 1)$	0 0 0 $-\frac{\sqrt{70}i}{112}$ 0 $-\frac{\sqrt{70}}{112}$ 0 0 0 $\frac{\sqrt{42}i}{112}$ 0 $-\frac{\sqrt{42}}{112}$ 0 0	
	0 0 $\frac{\sqrt{70}i}{112}$ 0 $-\frac{\sqrt{70}}{112}$ 0 0 0 $-\frac{\sqrt{42}i}{112}$ 0 $-\frac{\sqrt{42}}{112}$ 0 0 0	
	0 $-\frac{\sqrt{70}i}{112}$ $\frac{5\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{112}$ 0 0 0 0 $-\frac{\sqrt{70}}{112}$	
	$\frac{\sqrt{70}i}{112}$ 0 0 $-\frac{5\sqrt{42}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{70}}{112}$ 0 0 $-\frac{\sqrt{70}}{112}$ 0	
	0 $-\frac{\sqrt{70}}{112}$ 0 0 $-\frac{5\sqrt{42}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{112}$ 0 0 $\frac{\sqrt{70}i}{112}$	
	$-\frac{\sqrt{70}}{112}$ 0 0 0 0 $\frac{5\sqrt{42}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{70}}{112}$ $-\frac{\sqrt{70}i}{112}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}i}{112}$ $-\frac{3\sqrt{70}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{42}}{112}$ 0 0 0 0 $\frac{\sqrt{42}}{112}$	
	$-\frac{\sqrt{42}i}{112}$ 0 0 $\frac{3\sqrt{70}}{112}$ 0 0 0 0 $-\frac{3\sqrt{42}}{112}$ 0 0 $\frac{\sqrt{42}}{112}$ 0	
	0 $-\frac{\sqrt{42}}{112}$ 0 0 $-\frac{3\sqrt{70}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{42}}{112}$ 0 0 $\frac{\sqrt{42}i}{112}$	
	$-\frac{\sqrt{42}}{112}$ 0 0 0 0 $\frac{3\sqrt{70}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{42}}{112}$ $-\frac{\sqrt{42}i}{112}$ 0	
	0 0 0 $-\frac{\sqrt{70}}{112}$ 0 $\frac{\sqrt{70}i}{112}$ 0 0 0 $\frac{\sqrt{42}}{112}$ 0 $\frac{\sqrt{42}i}{112}$ 0 0	
	0 0 $-\frac{\sqrt{70}}{112}$ 0 $-\frac{\sqrt{70}i}{112}$ 0 0 0 $\frac{\sqrt{42}}{112}$ 0 $-\frac{\sqrt{42}i}{112}$ 0 0 0	

938 symmetry

$$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_6^{(1,0;a)}(A_{2g}, 2)$	0	$\frac{\sqrt{2310}}{308}$	0	0	$\frac{9\sqrt{154}}{1232}$	0	0	$-\frac{\sqrt{154}i}{77}$	0	0	$-\frac{3\sqrt{2310}}{1232}$	0	0	$\frac{\sqrt{2310}i}{308}$		
	$\frac{\sqrt{2310}}{308}$	0	0	0	0	$-\frac{9\sqrt{154}}{1232}$	$\frac{\sqrt{154}i}{77}$	0	0	0	0	$\frac{3\sqrt{2310}}{1232}$	$-\frac{\sqrt{2310}i}{308}$	0		
	0	0	0	0	0	$-\frac{\sqrt{2310}i}{2464}$	$\frac{\sqrt{2310}}{616}$	0	0	$-\frac{3\sqrt{154}}{616}$	0	$\frac{3\sqrt{154}i}{224}$	$-\frac{9\sqrt{154}}{1232}$	0		
	0	0	0	0	$\frac{\sqrt{2310}i}{2464}$	0	0	$-\frac{\sqrt{2310}}{616}$	$-\frac{3\sqrt{154}}{616}$	0	$-\frac{3\sqrt{154}i}{224}$	0	0	$\frac{9\sqrt{154}}{1232}$		
	$\frac{9\sqrt{154}}{1232}$	0	0	$-\frac{\sqrt{2310}i}{2464}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	$\frac{\sqrt{154}i}{352}$	0	$-\frac{\sqrt{154}}{112}$	0	0	0	
	0	$-\frac{9\sqrt{154}}{1232}$	$\frac{\sqrt{2310}i}{2464}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	$-\frac{\sqrt{154}i}{352}$	0	$-\frac{\sqrt{154}}{112}$	0	0	0	0	
	0	$-\frac{\sqrt{154}i}{77}$	$\frac{\sqrt{2310}}{616}$	0	0	0	0	0	$-\frac{3\sqrt{154}}{616}$	0	0	0	0	$-\frac{\sqrt{154}}{77}$		
	$\frac{\sqrt{154}i}{77}$	0	0	$-\frac{\sqrt{2310}}{616}$	0	0	0	0	0	$\frac{3\sqrt{154}}{616}$	0	0	0	$-\frac{\sqrt{154}}{77}$	0	
	0	0	0	$-\frac{3\sqrt{154}}{616}$	0	$\frac{\sqrt{154}i}{352}$	$-\frac{3\sqrt{154}}{616}$	0	0	$-\frac{\sqrt{2310}}{308}$	0	$\frac{\sqrt{2310}i}{352}$	$-\frac{3\sqrt{2310}}{1232}$	0		
	0	0	$-\frac{3\sqrt{154}}{616}$	0	$-\frac{\sqrt{154}i}{352}$	0	0	$\frac{3\sqrt{154}}{616}$	$-\frac{\sqrt{2310}}{308}$	0	$-\frac{\sqrt{2310}i}{352}$	0	0	$\frac{3\sqrt{2310}}{1232}$		
	$-\frac{3\sqrt{2310}}{1232}$	0	0	$\frac{3\sqrt{154}i}{224}$	0	$-\frac{\sqrt{154}}{112}$	0	0	0	$\frac{\sqrt{2310}i}{352}$	0	$-\frac{\sqrt{2310}}{1232}$	0	0	0	
	0	$\frac{3\sqrt{2310}}{1232}$	$-\frac{3\sqrt{154}i}{224}$	0	$-\frac{\sqrt{154}}{112}$	0	0	0	$-\frac{\sqrt{2310}i}{352}$	0	$-\frac{\sqrt{2310}}{1232}$	0	0	0	0	
	0	$\frac{\sqrt{2310}i}{308}$	$-\frac{9\sqrt{154}}{1232}$	0	0	0	0	$-\frac{\sqrt{154}}{77}$	$-\frac{3\sqrt{2310}}{1232}$	0	0	0	0	$-\frac{\sqrt{2310}}{308}$		
	$-\frac{\sqrt{2310}i}{308}$	0	0	$\frac{9\sqrt{154}}{1232}$	0	0	$-\frac{\sqrt{154}}{77}$	0	0	$\frac{3\sqrt{2310}}{1232}$	0	0	0	$-\frac{\sqrt{2310}}{308}$	0	

$$\frac{3\sqrt{154}yz(5x^4 - 10x^2y^2 + y^4)}{16}$$

939 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,0}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{14}}{28}$	0	0	$\frac{5\sqrt{210}}{336}$	0	0	0	0	0	$\frac{5\sqrt{14}}{112}$	0	0	- $\frac{\sqrt{14}i}{28}$	
	$\frac{\sqrt{14}}{28}$	0	0	0	0	$-\frac{5\sqrt{210}}{336}$	0	0	0	0	0	$-\frac{5\sqrt{14}}{112}$	$\frac{\sqrt{14}i}{28}$	0	
	0	0	0	0	0	$-\frac{5\sqrt{14}i}{224}$	0	0	0	$\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{96}$	$\frac{5\sqrt{210}}{336}$	0	
	0	0	0	0	$\frac{5\sqrt{14}i}{224}$	0	0	0	$\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{96}$	0	0	$-\frac{5\sqrt{210}}{336}$	
	$\frac{5\sqrt{210}}{336}$	0	0	$-\frac{5\sqrt{14}i}{224}$	0	$\frac{5\sqrt{14}}{112}$	0	0	0	$-\frac{\sqrt{210}i}{672}$	0	$\frac{\sqrt{210}}{336}$	0	0	
	0	$-\frac{5\sqrt{210}}{336}$	$\frac{5\sqrt{14}i}{224}$	0	$\frac{5\sqrt{14}}{112}$	0	0	0	$\frac{\sqrt{210}i}{672}$	0	$\frac{\sqrt{210}}{336}$	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{210}}{168}$	0	$-\frac{\sqrt{210}i}{672}$	0	0	0	$-\frac{\sqrt{14}}{28}$	0	$\frac{3\sqrt{14}i}{224}$	$-\frac{5\sqrt{14}}{112}$	0	
	0	0	$\frac{\sqrt{210}}{168}$	0	$\frac{\sqrt{210}i}{672}$	0	0	0	$-\frac{\sqrt{14}}{28}$	0	$-\frac{3\sqrt{14}i}{224}$	0	0	$\frac{5\sqrt{14}}{112}$	
	$\frac{5\sqrt{14}}{112}$	0	0	$-\frac{\sqrt{210}i}{96}$	0	$\frac{\sqrt{210}}{336}$	0	0	0	$\frac{3\sqrt{14}i}{224}$	0	$-\frac{\sqrt{14}}{112}$	0	0	
	0	$-\frac{5\sqrt{14}}{112}$	$\frac{\sqrt{210}i}{96}$	0	$\frac{\sqrt{210}}{336}$	0	0	0	$-\frac{3\sqrt{14}i}{224}$	0	$-\frac{\sqrt{14}}{112}$	0	0	0	
	0	$-\frac{\sqrt{14}i}{28}$	$\frac{5\sqrt{210}}{336}$	0	0	0	0	$-\frac{5\sqrt{14}}{112}$	0	0	0	0	0	$-\frac{\sqrt{14}}{28}$	
	$\frac{\sqrt{14}i}{28}$	0	0	$-\frac{5\sqrt{210}}{336}$	0	0	0	0	$\frac{5\sqrt{14}}{112}$	0	0	$-\frac{\sqrt{14}}{28}$	0	0	

940 symmetry

$$\frac{3\sqrt{154xz(x^4 - 10x^2y^2 + 5y^4)}}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{14}i}{28}$	$-\frac{5\sqrt{210}}{336}$	0	0	0	0	0	$\frac{5\sqrt{14}}{112}$	0	0	0	0	$\frac{\sqrt{14}}{28}$	
	$-\frac{\sqrt{14}i}{28}$	0	0	$\frac{5\sqrt{210}}{336}$	0	0	0	0	$-\frac{5\sqrt{14}}{112}$	0	0	$\frac{\sqrt{14}}{28}$	0	0	
	$-\frac{5\sqrt{210}}{336}$	0	0	$\frac{5\sqrt{14}i}{112}$	0	$-\frac{5\sqrt{14}}{224}$	0	0	$-\frac{\sqrt{210}i}{336}$	0	$\frac{\sqrt{210}}{672}$	0	0	0	
	0	$\frac{5\sqrt{210}}{336}$	$-\frac{5\sqrt{14}i}{112}$	0	$-\frac{5\sqrt{14}}{224}$	0	0	0	$\frac{\sqrt{210}i}{336}$	0	$\frac{\sqrt{210}}{672}$	0	0	0	
	0	0	0	$-\frac{5\sqrt{14}}{224}$	0	0	0	0	$\frac{\sqrt{210}}{96}$	0	$-\frac{\sqrt{210}i}{168}$	$\frac{5\sqrt{210}}{336}$	0	0	
	0	0	$-\frac{5\sqrt{14}}{224}$	0	0	0	0	$\frac{\sqrt{210}}{96}$	0	$\frac{\sqrt{210}i}{168}$	0	0	$-\frac{5\sqrt{210}}{336}$	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	$\frac{5\sqrt{14}}{112}$	0	0	$-\frac{\sqrt{210}i}{336}$	0	$\frac{\sqrt{210}}{96}$	0	0	0	$-\frac{\sqrt{14}i}{112}$	0	$\frac{3\sqrt{14}}{224}$	0	0	
	0	$-\frac{5\sqrt{14}}{112}$	$\frac{\sqrt{210}i}{336}$	0	$\frac{\sqrt{210}}{96}$	0	0	0	$\frac{\sqrt{14}i}{112}$	0	$\frac{3\sqrt{14}}{224}$	0	0	0	
	0	0	0	$\frac{\sqrt{210}}{672}$	0	$-\frac{\sqrt{210}i}{168}$	0	0	0	$\frac{3\sqrt{14}}{224}$	0	$-\frac{\sqrt{14}i}{28}$	$\frac{5\sqrt{14}}{112}$	0	
	0	0	$\frac{\sqrt{210}}{672}$	0	$\frac{\sqrt{210}i}{168}$	0	0	0	$\frac{3\sqrt{14}}{224}$	0	$\frac{\sqrt{14}i}{28}$	0	0	$-\frac{5\sqrt{14}}{112}$	
	0	$\frac{\sqrt{14}}{28}$	0	0	$\frac{5\sqrt{210}}{336}$	0	0	0	0	$\frac{5\sqrt{14}}{112}$	0	0	$-\frac{\sqrt{14}i}{28}$	0	
	$\frac{\sqrt{14}}{28}$	0	0	0	0	$-\frac{5\sqrt{210}}{336}$	0	0	0	0	$-\frac{5\sqrt{14}}{112}$	$\frac{\sqrt{14}i}{28}$	0	0	

$$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$$

941 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,0}^{(1,0;a)}(E_g, 2)$	0	$-\frac{\sqrt{231}}{154}$	0	0	$\frac{\sqrt{385}}{1848}$	0	0	$\frac{2\sqrt{385}i}{231}$	0	0	$-\frac{\sqrt{231}}{616}$	0	0	0	0	0
	$-\frac{\sqrt{231}}{154}$	0	0	0	0	$-\frac{\sqrt{385}}{1848}$	$-\frac{2\sqrt{385}i}{231}$	0	0	0	$\frac{\sqrt{231}}{616}$	0	0	0	0	0
	0	0	0	0	0	$\frac{5\sqrt{231}i}{3696}$	$-\frac{5\sqrt{231}}{1848}$	0	0	$\frac{\sqrt{385}}{924}$	0	$-\frac{13\sqrt{385}i}{3696}$	$\frac{\sqrt{385}}{924}$	0	0	0
	0	0	0	0	$-\frac{5\sqrt{231}i}{3696}$	0	0	$\frac{5\sqrt{231}}{1848}$	$\frac{\sqrt{385}}{924}$	0	$\frac{13\sqrt{385}i}{3696}$	0	0	0	$-\frac{\sqrt{385}}{924}$	0
	$\frac{\sqrt{385}}{1848}$	0	0	$\frac{5\sqrt{231}i}{3696}$	0	$\frac{25\sqrt{231}}{1848}$	0	0	0	$\frac{13\sqrt{385}i}{3696}$	0	$-\frac{19\sqrt{385}}{1848}$	0	0	0	0
	0	$-\frac{\sqrt{385}}{1848}$	$-\frac{5\sqrt{231}i}{3696}$	0	$\frac{25\sqrt{231}}{1848}$	0	0	0	$-\frac{13\sqrt{385}i}{3696}$	0	$-\frac{19\sqrt{385}}{1848}$	0	0	0	0	0
	0	$\frac{2\sqrt{385}i}{231}$	$-\frac{5\sqrt{231}}{1848}$	0	0	0	0	$-\frac{5\sqrt{231}}{231}$	$-\frac{5\sqrt{385}}{1848}$	0	0	0	0	0	$-\frac{2\sqrt{385}}{231}$	0
	$-\frac{2\sqrt{385}i}{231}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	0	$-\frac{5\sqrt{231}}{231}$	0	0	$\frac{5\sqrt{385}}{1848}$	0	0	0	$-\frac{2\sqrt{385}}{231}$	0	0
	0	0	0	$\frac{\sqrt{385}}{924}$	0	$-\frac{13\sqrt{385}i}{3696}$	0	0	$\frac{5\sqrt{385}}{1848}$	$\frac{\sqrt{231}}{154}$	0	$\frac{5\sqrt{231}i}{528}$	0	$-\frac{5\sqrt{231}i}{528}$	$\frac{\sqrt{231}}{924}$	0
	0	0	$\frac{\sqrt{385}}{924}$	0	$-\frac{13\sqrt{385}i}{3696}$	0	0	$\frac{5\sqrt{385}}{1848}$	$\frac{\sqrt{231}}{154}$	0	$\frac{5\sqrt{231}i}{528}$	0	0	0	$-\frac{\sqrt{231}}{924}$	0
	$-\frac{\sqrt{231}}{616}$	0	0	$-\frac{13\sqrt{385}i}{3696}$	0	$-\frac{19\sqrt{385}}{1848}$	0	0	0	$-\frac{5\sqrt{231}i}{528}$	0	$\frac{9\sqrt{231}}{616}$	0	0	0	0
	0	$\frac{\sqrt{231}}{616}$	$\frac{13\sqrt{385}i}{3696}$	0	$-\frac{19\sqrt{385}}{1848}$	0	0	0	$\frac{5\sqrt{231}i}{528}$	0	$\frac{9\sqrt{231}}{616}$	0	0	0	0	0
	0	0	$\frac{\sqrt{385}}{924}$	0	0	0	0	$-\frac{2\sqrt{385}}{231}$	$\frac{\sqrt{231}}{924}$	0	0	0	0	0	$-\frac{\sqrt{231}}{154}$	0
	0	0	0	$-\frac{\sqrt{385}}{924}$	0	0	$-\frac{2\sqrt{385}}{231}$	0	0	$-\frac{\sqrt{231}}{924}$	0	0	0	$-\frac{\sqrt{231}}{154}$	0	0
942	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														
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 2)$	0	$\frac{\sqrt{231}i}{154}$	$\frac{\sqrt{385}}{1848}$	0	0	0	0	$-\frac{2\sqrt{385}}{231}$	$\frac{\sqrt{231}}{616}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{231}i}{154}$	0	0	$-\frac{\sqrt{385}}{1848}$	0	0	$-\frac{2\sqrt{385}}{231}$	0	0	$-\frac{\sqrt{231}}{616}$	0	0	0	0	0	0
	$\frac{\sqrt{385}}{1848}$	0	0	$-\frac{25\sqrt{231}i}{1848}$	0	$-\frac{5\sqrt{231}}{3696}$	0	0	0	$-\frac{19\sqrt{385}i}{1848}$	0	$\frac{13\sqrt{385}}{3696}$	0	0	0	0
	0	$-\frac{\sqrt{385}}{1848}$	$\frac{25\sqrt{231}i}{1848}$	0	$-\frac{5\sqrt{231}}{3696}$	0	0	0	$\frac{19\sqrt{385}i}{1848}$	0	$\frac{13\sqrt{385}}{3696}$	0	0	0	0	0
	0	0	0	$-\frac{5\sqrt{231}}{3696}$	0	0	$-\frac{5\sqrt{231}}{1848}$	0	0	$-\frac{13\sqrt{385}}{3696}$	0	$\frac{\sqrt{385}i}{924}$	$-\frac{\sqrt{385}}{924}$	0	0	0
	0	0	$-\frac{5\sqrt{231}}{3696}$	0	0	0	0	$\frac{5\sqrt{231}}{1848}$	$-\frac{13\sqrt{385}}{3696}$	0	$-\frac{\sqrt{385}i}{924}$	0	0	$\frac{\sqrt{385}}{924}$	0	0
	0	$-\frac{2\sqrt{385}}{231}$	0	0	$-\frac{5\sqrt{231}}{1848}$	0	0	$\frac{5\sqrt{231}i}{231}$	0	0	0	$\frac{5\sqrt{385}}{1848}$	0	0	$-\frac{2\sqrt{385}i}{231}$	0
	$-\frac{2\sqrt{385}}{231}$	0	0	0	0	$\frac{5\sqrt{231}}{1848}$	$-\frac{5\sqrt{231}i}{231}$	0	0	0	0	$-\frac{5\sqrt{385}}{1848}$	$\frac{2\sqrt{385}i}{231}$	0	0	0
	$\frac{\sqrt{231}}{616}$	0	0	$-\frac{19\sqrt{385}i}{1848}$	0	$-\frac{13\sqrt{385}}{3696}$	0	0	0	$-\frac{9\sqrt{231}i}{616}$	0	$\frac{5\sqrt{231}}{528}$	0	0	0	0
	0	$-\frac{\sqrt{231}}{616}$	$\frac{19\sqrt{385}i}{1848}$	0	$-\frac{13\sqrt{385}}{3696}$	0	0	0	$\frac{9\sqrt{231}i}{616}$	0	$\frac{5\sqrt{231}}{528}$	0	0	0	0	0
	0	0	0	$\frac{13\sqrt{385}}{3696}$	0	$\frac{\sqrt{385}i}{924}$	$\frac{5\sqrt{385}}{1848}$	0	0	$\frac{5\sqrt{231}}{528}$	0	$-\frac{\sqrt{231}i}{154}$	$\frac{\sqrt{231}}{924}$	0	0	0
	0	0	$\frac{13\sqrt{385}}{3696}$	0	$-\frac{\sqrt{385}i}{924}$	0	0	$-\frac{5\sqrt{385}}{1848}$	$\frac{5\sqrt{231}}{528}$	0	$\frac{\sqrt{231}i}{154}$	0	0	$-\frac{\sqrt{231}}{924}$	0	
	0	0	0	0	$-\frac{\sqrt{385}}{924}$	0	0	$-\frac{2\sqrt{385}i}{231}$	0	0	$\frac{\sqrt{231}}{924}$	0	0	$\frac{\sqrt{231}i}{154}$	0	0
	0	0	0	0	0	$\frac{\sqrt{385}}{924}$	$\frac{2\sqrt{385}i}{231}$	0	0	0	0	$-\frac{\sqrt{231}}{924}$	$-\frac{\sqrt{231}i}{154}$	0	0	0
943	symmetry	$\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,0}^{(1,0;a)}(E_g, 3)$	$\frac{2\sqrt{77}}{77}$	0	0	$-\frac{5\sqrt{1155}i}{924}$	0	$\frac{5\sqrt{1155}}{924}$	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	0	0	0
	0	$-\frac{2\sqrt{77}}{77}$	$\frac{5\sqrt{1155}i}{924}$	0	$\frac{5\sqrt{1155}}{924}$	0	0	0	$\frac{\sqrt{77}i}{308}$	0	$-\frac{\sqrt{77}}{308}$	0	0	0	0
	0	$-\frac{5\sqrt{1155}i}{924}$	$\frac{5\sqrt{77}}{308}$	0	0	0	0	$\frac{5\sqrt{77}}{616}$	$\frac{\sqrt{1155}}{924}$	0	0	0	0	$\frac{\sqrt{1155}}{1848}$	
	$\frac{5\sqrt{1155}i}{924}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	$\frac{5\sqrt{77}}{616}$	0	0	$-\frac{\sqrt{1155}}{924}$	0	0	$\frac{\sqrt{1155}}{1848}$	0	
	0	$\frac{5\sqrt{1155}}{924}$	0	0	$\frac{5\sqrt{77}}{308}$	0	0	$-\frac{5\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{1155}}{924}$	0	0	$\frac{\sqrt{1155}i}{1848}$	
	$\frac{5\sqrt{1155}}{924}$	0	0	0	0	$-\frac{5\sqrt{77}}{308}$	$\frac{5\sqrt{77}i}{616}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$	$-\frac{\sqrt{1155}i}{1848}$	0	
	0	0	0	$\frac{5\sqrt{77}}{616}$	0	$-\frac{5\sqrt{77}i}{616}$	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	$-\frac{\sqrt{1155}i}{616}$	0	0	0
	0	0	$\frac{5\sqrt{77}}{616}$	0	$\frac{5\sqrt{77}i}{616}$	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	$\frac{\sqrt{1155}i}{616}$	0	0	0	
	0	$-\frac{\sqrt{77}i}{308}$	$\frac{\sqrt{1155}}{924}$	0	0	0	0	$-\frac{\sqrt{1155}}{616}$	$-\frac{5\sqrt{77}}{308}$	0	0	0	0	$-\frac{13\sqrt{77}}{616}$	
	$\frac{\sqrt{77}i}{308}$	0	0	$-\frac{\sqrt{1155}}{924}$	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	$\frac{5\sqrt{77}}{308}$	0	0	$-\frac{13\sqrt{77}}{616}$	0	
	0	$-\frac{\sqrt{77}}{308}$	0	0	$-\frac{\sqrt{1155}}{924}$	0	0	$-\frac{\sqrt{1155}i}{616}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	$\frac{13\sqrt{77}i}{616}$	
	$-\frac{\sqrt{77}}{308}$	0	0	0	0	$\frac{\sqrt{1155}}{924}$	$\frac{\sqrt{1155}i}{616}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	$-\frac{13\sqrt{77}i}{616}$	0	
	0	0	0	$\frac{\sqrt{1155}}{1848}$	0	$\frac{\sqrt{1155}i}{1848}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$\frac{13\sqrt{77}i}{616}$	$-\frac{2\sqrt{77}}{77}$	0	
	0	0	$\frac{\sqrt{1155}}{1848}$	0	$-\frac{\sqrt{1155}i}{1848}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$-\frac{13\sqrt{77}i}{616}$	0	0	$\frac{2\sqrt{77}}{77}$	

$$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$$

944 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 3)$	0	0	0	$\frac{\sqrt{1155}}{1848}$	0	$\frac{\sqrt{1155}i}{1848}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$\frac{13\sqrt{77}i}{616}$	$-\frac{2\sqrt{77}}{77}$	0	
	0	0	$\frac{\sqrt{1155}}{1848}$	0	$-\frac{\sqrt{1155}i}{1848}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$-\frac{13\sqrt{77}i}{616}$	0	0	$\frac{2\sqrt{77}}{77}$	
	0	$\frac{\sqrt{1155}}{1848}$	0	0	0	0	0	$-\frac{5\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$\frac{5\sqrt{1155}i}{924}$	
	$\frac{\sqrt{1155}}{1848}$	0	0	0	0	0	$\frac{5\sqrt{77}i}{616}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$-\frac{5\sqrt{1155}i}{924}$	0	
	0	$\frac{\sqrt{1155}i}{1848}$	0	0	0	0	0	$-\frac{5\sqrt{77}}{616}$	$-\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{5\sqrt{1155}}{924}$	
	$-\frac{\sqrt{1155}i}{1848}$	0	0	0	0	0	$-\frac{5\sqrt{77}}{616}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$-\frac{5\sqrt{1155}}{924}$	0	
	0	0	0	$-\frac{5\sqrt{77}i}{616}$	0	$-\frac{5\sqrt{77}}{616}$	0	0	0	$\frac{\sqrt{1155}i}{616}$	0	$-\frac{\sqrt{1155}}{616}$	0	0	
	0	0	$\frac{5\sqrt{77}i}{616}$	0	$-\frac{5\sqrt{77}}{616}$	0	0	0	$-\frac{\sqrt{1155}i}{616}$	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	
	0	$-\frac{13\sqrt{77}}{616}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$\frac{\sqrt{1155}i}{616}$	0	0	0	0	0	$\frac{\sqrt{77}i}{308}$	
	$-\frac{13\sqrt{77}}{616}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$-\frac{\sqrt{1155}i}{616}$	0	0	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	
	0	$\frac{13\sqrt{77}i}{616}$	$-\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{308}$	
	$-\frac{13\sqrt{77}i}{616}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{1155}}{616}$	0	0	0	0	0	$\frac{\sqrt{77}}{308}$	0	
	$-\frac{2\sqrt{77}}{77}$	0	0	$\frac{5\sqrt{1155}i}{924}$	0	$-\frac{5\sqrt{1155}}{924}$	0	0	0	$\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	
	0	$\frac{2\sqrt{77}}{77}$	$-\frac{5\sqrt{1155}i}{924}$	0	$-\frac{5\sqrt{1155}}{924}$	0	0	0	$-\frac{\sqrt{77}i}{308}$	0	$\frac{\sqrt{77}}{308}$	0	0	0	
945	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														
$\mathbb{T}_{6,0}^{(1,0;a)}(E_g, 4)$	0	0	0	$-\frac{37\sqrt{154}i}{3696}$	0	$-\frac{37\sqrt{154}}{3696}$	0	0	0	$-\frac{5\sqrt{2310}i}{1232}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	
	0	0	$\frac{37\sqrt{154}i}{3696}$	0	$-\frac{37\sqrt{154}}{3696}$	0	0	0	$\frac{5\sqrt{2310}i}{1232}$	0	$\frac{5\sqrt{2310}}{1232}$	0	0	0	0	
	0	$-\frac{37\sqrt{154}i}{3696}$	$\frac{5\sqrt{2310}}{3696}$	0	0	0	0	$\frac{\sqrt{2310}}{924}$	$\frac{17\sqrt{154}}{3696}$	0	0	0	0	$\frac{\sqrt{154}}{528}$		
	$\frac{37\sqrt{154}i}{3696}$	0	0	$-\frac{5\sqrt{2310}}{3696}$	0	0	$\frac{\sqrt{2310}}{924}$	0	0	$-\frac{17\sqrt{154}}{3696}$	0	0	$\frac{\sqrt{154}}{528}$	0		
	0	$-\frac{37\sqrt{154}}{3696}$	0	0	$-\frac{5\sqrt{2310}}{3696}$	0	0	$\frac{\sqrt{2310}i}{924}$	0	0	$\frac{17\sqrt{154}}{3696}$	0	0	$-\frac{\sqrt{154}i}{528}$		
	$-\frac{37\sqrt{154}}{3696}$	0	0	0	0	$\frac{5\sqrt{2310}}{3696}$	$-\frac{\sqrt{2310}i}{924}$	0	0	0	0	$-\frac{17\sqrt{154}}{3696}$	$\frac{\sqrt{154}i}{528}$	0		
	0	0	0	$\frac{\sqrt{2310}}{924}$	0	$\frac{\sqrt{2310}i}{924}$	0	0	0	$\frac{17\sqrt{154}}{924}$	0	$-\frac{17\sqrt{154}i}{924}$	$\frac{2\sqrt{154}}{231}$	0		
	0	0	$\frac{\sqrt{2310}}{924}$	0	$-\frac{\sqrt{2310}i}{924}$	0	0	0	$\frac{17\sqrt{154}}{924}$	0	$\frac{17\sqrt{154}i}{924}$	0	0	$-\frac{2\sqrt{154}}{231}$		
	0	$-\frac{5\sqrt{2310}i}{1232}$	$\frac{17\sqrt{154}}{3696}$	0	0	0	$\frac{17\sqrt{154}}{924}$	$\frac{\sqrt{2310}}{1232}$	0	0	0	0	$\frac{5\sqrt{2310}}{3696}$			
	$\frac{5\sqrt{2310}i}{1232}$	0	0	$-\frac{17\sqrt{154}}{3696}$	0	0	$\frac{17\sqrt{154}}{924}$	0	0	$-\frac{\sqrt{2310}}{1232}$	0	0	$\frac{5\sqrt{2310}}{3696}$	0		
	0	$\frac{5\sqrt{2310}}{1232}$	0	0	$\frac{17\sqrt{154}}{3696}$	0	0	$-\frac{17\sqrt{154}i}{924}$	0	0	$-\frac{\sqrt{2310}}{1232}$	0	0	$\frac{5\sqrt{2310}i}{3696}$		
	$\frac{5\sqrt{2310}}{1232}$	0	0	0	0	$-\frac{17\sqrt{154}}{3696}$	$\frac{17\sqrt{154}i}{924}$	0	0	0	0	$\frac{\sqrt{2310}}{1232}$	$-\frac{5\sqrt{2310}i}{3696}$	0		
	0	0	0	$\frac{\sqrt{154}}{528}$	0	$\frac{\sqrt{154}i}{528}$	0	0	$-\frac{2\sqrt{154}}{231}$	$\frac{5\sqrt{2310}}{3696}$	0	$\frac{5\sqrt{2310}i}{3696}$	0	0	0	
	0	0	$\frac{\sqrt{154}}{528}$	0	$\frac{\sqrt{154}i}{528}$	0	0	$-\frac{2\sqrt{154}}{231}$	$\frac{5\sqrt{2310}}{3696}$	0	$-\frac{5\sqrt{2310}i}{3696}$	0	0	0		

$$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$$

946 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 4)$	0	0	0	$-\frac{17\sqrt{154}}{3696}$	0	$\frac{17\sqrt{154}i}{3696}$	$-\frac{2\sqrt{154}}{231}$	0	0	$-\frac{\sqrt{2310}}{1232}$	0	$-\frac{\sqrt{2310}i}{1232}$	0	0	0	
	0	0	$-\frac{17\sqrt{154}}{3696}$	0	$-\frac{17\sqrt{154}i}{3696}$	0	0	$\frac{2\sqrt{154}}{231}$	$-\frac{\sqrt{2310}}{1232}$	0	$\frac{\sqrt{2310}i}{1232}$	0	0	0	0	
	0	$-\frac{17\sqrt{154}}{3696}$	0	0	$-\frac{\sqrt{2310}}{3696}$	0	0	$\frac{\sqrt{2310}i}{231}$	0	0	$\frac{13\sqrt{154}}{3696}$	0	0	0	$-\frac{47\sqrt{154}i}{3696}$	
	$-\frac{17\sqrt{154}}{3696}$	0	0	0	0	$\frac{\sqrt{2310}}{3696}$	$-\frac{\sqrt{2310}i}{231}$	0	0	0	0	$-\frac{13\sqrt{154}}{3696}$	$\frac{47\sqrt{154}i}{3696}$	0	0	
	0	$\frac{17\sqrt{154}i}{3696}$	$-\frac{\sqrt{2310}}{3696}$	0	0	0	0	$-\frac{\sqrt{2310}}{231}$	$-\frac{13\sqrt{154}}{3696}$	0	0	0	0	$-\frac{47\sqrt{154}}{3696}$		
	$-\frac{17\sqrt{154}i}{3696}$	0	0	$\frac{\sqrt{2310}}{3696}$	0	0	$-\frac{\sqrt{2310}}{231}$	0	0	$\frac{13\sqrt{154}}{3696}$	0	0	$-\frac{47\sqrt{154}}{3696}$	0		
	$-\frac{2\sqrt{154}}{231}$	0	0	$\frac{\sqrt{2310}i}{231}$	0	$-\frac{\sqrt{2310}}{231}$	0	0	0	$\frac{2\sqrt{154}i}{231}$	0	$\frac{2\sqrt{154}}{231}$	0	0	0	
	0	$\frac{2\sqrt{154}}{231}$	$-\frac{\sqrt{2310}i}{231}$	0	$-\frac{\sqrt{2310}}{231}$	0	0	0	$-\frac{2\sqrt{154}i}{231}$	0	$\frac{2\sqrt{154}}{231}$	0	0	0	0	
	0	$-\frac{\sqrt{2310}}{1232}$	0	0	$-\frac{13\sqrt{154}}{3696}$	0	0	$\frac{2\sqrt{154}i}{231}$	0	0	$\frac{\sqrt{2310}}{528}$	0	0	0	$-\frac{13\sqrt{2310}i}{3696}$	
	$-\frac{\sqrt{2310}}{1232}$	0	0	0	0	$\frac{13\sqrt{154}}{3696}$	$-\frac{2\sqrt{154}i}{231}$	0	0	0	0	$-\frac{\sqrt{2310}}{528}$	$\frac{13\sqrt{2310}i}{3696}$	0	0	
	0	$-\frac{\sqrt{2310}i}{1232}$	$\frac{13\sqrt{154}}{3696}$	0	0	0	0	$\frac{2\sqrt{154}}{231}$	$\frac{\sqrt{2310}}{528}$	0	0	0	0	$\frac{13\sqrt{2310}}{3696}$		
	$\frac{\sqrt{2310}i}{1232}$	0	0	$-\frac{13\sqrt{154}}{3696}$	0	0	$\frac{2\sqrt{154}}{231}$	0	0	$-\frac{\sqrt{2310}}{528}$	0	0	0	$\frac{13\sqrt{2310}}{3696}$		
	0	0	0	$-\frac{47\sqrt{154}i}{3696}$	0	$-\frac{47\sqrt{154}}{3696}$	0	0	0	$-\frac{13\sqrt{2310}i}{3696}$	0	$\frac{13\sqrt{2310}}{3696}$	0	0	0	
	0	0	$\frac{47\sqrt{154}i}{3696}$	0	$-\frac{47\sqrt{154}}{3696}$	0	0	0	$\frac{13\sqrt{2310}i}{3696}$	0	$\frac{13\sqrt{2310}}{3696}$	0	0	0	0	

947 symmetry

z

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_1^{(a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{14}i}{14} 0$
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	$0 \frac{\sqrt{14}i}{14}$
	0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 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 0 0
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 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 0 0
	0 0 $-\frac{3\sqrt{14}i}{56}$ 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 0 0 0 0 0
	0 0 0 $-\frac{3\sqrt{14}i}{56}$ 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 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0	0 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 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0

948 symmetry

x

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,0}^{(a)}(E_g)$	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0	
	0 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$	
	0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0	
	$-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0	
	0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0	

949 symmetry

y

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,1}^{(a)}(E_g)$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0	
	0 0 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 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	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 0	
	0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{56}$ 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$	
	$-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{210}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0	
950	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(a)}(A_{1g})$	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0
	0	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0
	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0	0	0
	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	$\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$\frac{\sqrt{30}i}{24}$	0
	0	$\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{2}i}{8}$	0	0	0	0	0	$-\frac{\sqrt{30}i}{24}$	0	0	0	0	0

951 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(A_{2g}, 1)$	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 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
$\frac{\sqrt{10}x(x^2-3y^2)}{4}$		

952 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(a)}(A_{2g}, 2)$	0	0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0
	$-\frac{\sqrt{2}i}{8}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$
	0	0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0
	$-\frac{\sqrt{30}i}{24}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0
	0	0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0
953	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 10

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

954 symmetry

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

continued ...

Table 10

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

955 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,0}^{(a)}(E_g, 2)$	0	0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
$\sqrt{15}xyz$		

956 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	957 symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(a)}(A_{1g})$	0	0	0	0	$\frac{i}{8}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0
	0	0	0	0	0	$\frac{i}{8}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{15}i}{12}$	0	0	0	0	0	$\frac{i}{8}$	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{15}i}{12}$	0	0	0	0	0	$\frac{i}{8}$	0
	$-\frac{i}{8}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{i}{8}$	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	$\frac{i}{4}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{15}i}{12}$	0	0	0	0	0	$\frac{i}{4}$	0	0	0	0	0
	0	0	0	0	0	0	$-\frac{i}{4}$	0	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0	0
	$\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{15}i}{24}$	0
	0	$\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{i}{8}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	0	0	0	0	0
	0	0	0	$-\frac{i}{8}$	0	0	0	0	0	$-\frac{\sqrt{15}i}{24}$	0	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													
$\mathbb{M}_5^{(a)}(A_{2g}, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{21}$	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{42}i}{21}$	
	0 0 0 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{70}i}{112}$	0	0	0	0	
	0 0 0 0 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	$\frac{3\sqrt{70}i}{112}$	0	0	0	0	
	0 0 $\frac{5\sqrt{42}i}{336}$ 0 0 0 0 0 $\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0 0 0 $\frac{5\sqrt{42}i}{336}$ 0 0 0 0 0 $\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0 0 0 0 0 $-\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	$\frac{11\sqrt{42}i}{336}$	0	0	0	0	
	0 0 0 0 0 $-\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0	$\frac{11\sqrt{42}i}{336}$	0	0	0	0	
	0 0 $-\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 $-\frac{11\sqrt{42}i}{336}$ 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0 0 0 $-\frac{3\sqrt{70}i}{112}$ 0 0 0 0 0 $-\frac{11\sqrt{42}i}{336}$ 0 0 0 0 0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
959	symmetry	$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(a)}(A_{2g}, 2)$	0	0 0 $\frac{i}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0
	0	0 0 0 $\frac{i}{8}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0
	$-\frac{i}{8}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{i}{8}$ 0 0 0 0 0 0 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 $-\frac{i}{8}$ 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 0 $-\frac{i}{8}$
	0	0 0 0 0 $-\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{15}i}{12}$ 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0
	$-\frac{\sqrt{15}i}{24}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0
	0	0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 $\frac{\sqrt{15}i}{24}$
	0	0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0
	0	0 0 0 0 0 $\frac{i}{8}$ 0 0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0
960	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \end{bmatrix}$
961	symmetry	$-\frac{3\sqrt{14}y(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
962	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													
$\mathbb{M}_{5,0}^{(a)}(E_g, 2)$	0 0 $-\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0														
	0 0 0 $-\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 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														
	0 $\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0														
	0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0														
	0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0														
	0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0														
	$\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
	0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0														
	0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0														
	0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 0 0														
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0 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
$\mathbb{M}_{5,1}^{(a)}(E_g, 2)$	0	0 0 0 0 $\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{42}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$
	$-\frac{\sqrt{42}i}{24}$	0 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 0 0
	0	0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{28}$ 0
	$\frac{\sqrt{70}i}{56}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{28}$ 0 0 0 0 0
		$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
964	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,0}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
	965 symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

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

*continued ...*

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,0}^{(a)}(E_g, 4)$	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 $\frac{\sqrt{6}i}{12}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 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
	$-\frac{\sqrt{6}i}{6}$	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 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
967	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 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$	
	0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 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	
<i>continued ...</i>		
968	symmetry	<i>z</i>

Table 10

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

*continued ...*

Table 10

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

*continued ...*

Table 10

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

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_3^{(1,-1;a)}(A_{1g})$	0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0													
	0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0													
	0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{105}}{168}$ 0 0 0													
	0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{105}}{168}$ 0 0 0													
	0 0 0 $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0													
	0 0 $-\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{\sqrt{105}}{168}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0													
	0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$													
	$-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0													
	0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0													
	0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{168}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0 0													
	0 0 0 $-\frac{\sqrt{105}}{168}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0 0 0													
	0 0 $-\frac{\sqrt{105}}{168}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 $-\frac{5\sqrt{7}}{56}$ 0 0 0 0 0 0													
	0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0													
	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0 0													
972	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 1)$	0	0	0	$-\frac{\sqrt{42}i}{42}$	0	$\frac{\sqrt{42}}{42}$	0	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{42}i}{42}$	0	$\frac{\sqrt{42}}{42}$	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{42}i}{42}$	$-\frac{\sqrt{70}}{70}$	0	0	0	0	$\frac{\sqrt{70}}{280}$	$\frac{\sqrt{42}}{28}$	0	0	0	0	$-\frac{\sqrt{42}}{168}$	
	$\frac{\sqrt{42}i}{42}$	0	0	$\frac{\sqrt{70}}{70}$	0	0	$\frac{\sqrt{70}}{280}$	0	0	$-\frac{\sqrt{42}}{28}$	0	0	$-\frac{\sqrt{42}}{168}$	0	
	0	$\frac{\sqrt{42}}{42}$	0	0	$-\frac{\sqrt{70}}{70}$	0	0	$-\frac{\sqrt{70}i}{280}$	0	0	$-\frac{\sqrt{42}}{28}$	0	0	$-\frac{\sqrt{42}i}{168}$	
	$\frac{\sqrt{42}}{42}$	0	0	0	0	$\frac{\sqrt{70}}{70}$	$\frac{\sqrt{70}i}{280}$	0	0	0	0	$\frac{\sqrt{42}}{28}$	$\frac{\sqrt{42}i}{168}$	0	
	0	0	0	$\frac{\sqrt{70}}{280}$	0	$-\frac{\sqrt{70}i}{280}$	$\frac{\sqrt{70}}{35}$	0	0	$\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0	
	0	0	$\frac{\sqrt{70}}{280}$	0	$\frac{\sqrt{70}i}{280}$	0	0	$-\frac{\sqrt{70}}{35}$	$\frac{\sqrt{42}}{168}$	0	$-\frac{\sqrt{42}i}{168}$	0	0	0	
	0	0	$\frac{\sqrt{42}}{28}$	0	0	0	0	$\frac{\sqrt{42}}{168}$	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	
	0	0	0	$-\frac{\sqrt{42}}{28}$	0	0	$\frac{\sqrt{42}}{168}$	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	
	0	0	0	0	$-\frac{\sqrt{42}}{28}$	0	0	$\frac{\sqrt{42}i}{168}$	0	0	0	0	0	$-\frac{\sqrt{70}i}{56}$	
	0	0	0	0	0	$\frac{\sqrt{42}}{28}$	$-\frac{\sqrt{42}i}{168}$	0	0	0	0	0	$\frac{\sqrt{70}i}{56}$	0	
	0	0	0	$-\frac{\sqrt{42}}{168}$	0	$-\frac{\sqrt{42}i}{168}$	0	0	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	
	0	0	$-\frac{\sqrt{42}}{168}$	0	$\frac{\sqrt{42}i}{168}$	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	

973 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0	0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0	0 0 0 $\frac{\sqrt{7}}{14}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0	0 0 $\frac{\sqrt{7}}{14}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0	0 0 $\frac{\sqrt{7}i}{56}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0	0 $-\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0	$\frac{\sqrt{105}i}{42}$ 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0	0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0	0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 $\frac{5\sqrt{7}i}{56}$ 0 0 0 0	0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 $-\frac{5\sqrt{7}i}{56}$ 0 0 0 0	0 0 $\frac{\sqrt{105}i}{168}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 $\frac{5\sqrt{7}i}{56}$ 0 0 0 0 0	0 0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0	0 0 0 0 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$														

974 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{3,0}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 $-\frac{2\sqrt{7}}{21}$ 0 0 $-\frac{\sqrt{7}i}{42}$ 0 0 0 0 0 0 0															
	0 0 0 0 0 $\frac{2\sqrt{7}}{21}$ $\frac{\sqrt{7}i}{42}$ 0 0 0 0 0 0 0 0															
	0 0 0 $-\frac{\sqrt{105}}{70}$ 0 $-\frac{\sqrt{105}i}{840}$ $-\frac{\sqrt{105}}{210}$ 0 0 $\frac{5\sqrt{7}}{84}$ 0 $-\frac{\sqrt{7}i}{168}$ $\frac{\sqrt{7}}{42}$ 0															
	0 0 $-\frac{\sqrt{105}}{70}$ 0 $\frac{\sqrt{105}i}{840}$ 0 0 $\frac{\sqrt{105}}{210}$ $\frac{5\sqrt{7}}{84}$ 0 $\frac{\sqrt{7}i}{168}$ 0 0 $-\frac{\sqrt{7}}{42}$															
	$-\frac{2\sqrt{7}}{21}$ 0 0 $-\frac{\sqrt{105}i}{840}$ 0 $-\frac{\sqrt{105}}{210}$ 0 0 0 $\frac{\sqrt{7}i}{168}$ 0 $-\frac{\sqrt{7}}{12}$ 0 0															
	0 $\frac{2\sqrt{7}}{21}$ $\frac{\sqrt{105}i}{840}$ 0 $-\frac{\sqrt{105}}{210}$ 0 0 0 $-\frac{\sqrt{7}i}{168}$ 0 $-\frac{\sqrt{7}}{12}$ 0 0 0															
	0 $-\frac{\sqrt{7}i}{42}$ $-\frac{\sqrt{105}}{210}$ 0 0 0 0 $\frac{2\sqrt{105}}{105}$ $-\frac{\sqrt{7}}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$															
	$\frac{\sqrt{7}i}{42}$ 0 0 $\frac{\sqrt{105}}{210}$ 0 0 $\frac{2\sqrt{105}}{105}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 0 0 $\frac{\sqrt{7}}{42}$ 0															
	0 0 0 $\frac{5\sqrt{7}}{84}$ 0 $\frac{\sqrt{7}i}{168}$ $-\frac{\sqrt{7}}{42}$ 0 0 0 0 $-\frac{\sqrt{105}i}{168}$ $-\frac{\sqrt{105}}{42}$ 0															
	0 0 $\frac{5\sqrt{7}}{84}$ 0 $-\frac{\sqrt{7}i}{168}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 $\frac{\sqrt{105}}{42}$															
	0 0 0 $-\frac{\sqrt{7}i}{168}$ 0 $-\frac{\sqrt{7}}{12}$ 0 0 0 $-\frac{\sqrt{105}i}{168}$ 0 0 0 0 0															
	0 0 $\frac{\sqrt{7}i}{168}$ 0 $-\frac{\sqrt{7}}{12}$ 0 0 0 $\frac{\sqrt{105}i}{168}$ 0 0 0 0 0 0															
	0 0 $\frac{\sqrt{7}}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$ $-\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0															
	0 0 0 $-\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{105}}{42}$ 0 0 0 0 0 0															

975 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)$	0 0 $-\frac{2\sqrt{7}}{21}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{2\sqrt{7}}{21}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 0 0 0 0 0 0 0	
	$-\frac{2\sqrt{7}}{21}$ 0 0 $\frac{\sqrt{105}i}{210}$ 0 $\frac{\sqrt{105}}{840}$ 0 0 0 $-\frac{\sqrt{7}i}{12}$ 0 $\frac{\sqrt{7}}{168}$ 0 0 0	
	0 $\frac{2\sqrt{7}}{21}$ $-\frac{\sqrt{105}i}{210}$ 0 $\frac{\sqrt{105}}{840}$ 0 0 0 $\frac{\sqrt{7}i}{12}$ 0 $\frac{\sqrt{7}}{168}$ 0 0 0	
	0 0 0 $\frac{\sqrt{105}}{840}$ 0 $\frac{\sqrt{105}i}{70}$ $-\frac{\sqrt{105}}{210}$ 0 0 $-\frac{\sqrt{7}}{168}$ 0 $\frac{5\sqrt{7}i}{84}$ $-\frac{\sqrt{7}}{42}$ 0	
	0 0 $\frac{\sqrt{105}}{840}$ 0 $-\frac{\sqrt{105}i}{70}$ 0 0 $\frac{\sqrt{105}}{210}$ $-\frac{\sqrt{7}}{168}$ 0 $-\frac{5\sqrt{7}i}{84}$ 0 0 $\frac{\sqrt{7}}{42}$	
	0 $\frac{\sqrt{7}}{42}$ 0 0 $-\frac{\sqrt{105}}{210}$ 0 0 $-\frac{2\sqrt{105}i}{105}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{7}i}{42}$	
	$\frac{\sqrt{7}}{42}$ 0 0 0 0 $\frac{\sqrt{105}}{210}$ $\frac{2\sqrt{105}i}{105}$ 0 0 0 0 $-\frac{\sqrt{7}}{42}$ $-\frac{\sqrt{7}i}{42}$ 0	
	0 0 0 $-\frac{\sqrt{7}i}{12}$ 0 $-\frac{\sqrt{7}}{168}$ 0 0 0 0 0 $\frac{\sqrt{105}}{168}$ 0 0 0	
	0 0 $\frac{\sqrt{7}i}{12}$ 0 $-\frac{\sqrt{7}}{168}$ 0 0 0 0 0 $\frac{\sqrt{105}}{168}$ 0 0 0	
	0 0 0 $\frac{\sqrt{7}}{168}$ 0 $\frac{5\sqrt{7}i}{84}$ $\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{105}}{168}$ 0 0 $-\frac{\sqrt{105}}{42}$ 0	
	0 0 $\frac{\sqrt{7}}{168}$ 0 $-\frac{5\sqrt{7}i}{84}$ 0 0 $-\frac{\sqrt{7}}{42}$ $\frac{\sqrt{105}}{168}$ 0 0 0 0 $\frac{\sqrt{105}}{42}$	
	0 0 0 0 $-\frac{\sqrt{7}}{42}$ 0 0 $\frac{\sqrt{7}i}{42}$ 0 0 $-\frac{\sqrt{105}}{42}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}}{42}$ $-\frac{\sqrt{7}i}{42}$ 0 0 0 0 $\frac{\sqrt{105}}{42}$ 0 0	

976 symmetry

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

continued ...

Table 10

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

977 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

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

978 symmetry

$$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	0	$\frac{\sqrt{22}i}{132}$	$-\frac{\sqrt{330}}{330}$	0	0	0	0	$-\frac{\sqrt{330}}{330}$	$-\frac{\sqrt{22}}{66}$	0	0	0	0	$-\frac{\sqrt{22}}{132}$	
	$-\frac{\sqrt{22}i}{132}$	0	0	$\frac{\sqrt{330}}{330}$	0	0	$-\frac{\sqrt{330}}{330}$	0	0	$\frac{\sqrt{22}}{66}$	0	0	$-\frac{\sqrt{22}}{132}$	0	
	$-\frac{\sqrt{330}}{330}$	0	0	$\frac{3\sqrt{22}i}{176}$	0	$\frac{\sqrt{22}}{22}$	0	0	0	$-\frac{\sqrt{330}i}{528}$	0	$-\frac{\sqrt{330}}{220}$	0	0	
	0	$\frac{\sqrt{330}}{330}$	$-\frac{3\sqrt{22}i}{176}$	0	$\frac{\sqrt{22}}{22}$	0	0	0	$\frac{\sqrt{330}i}{528}$	0	$-\frac{\sqrt{330}}{220}$	0	0	0	
	0	0	0	$\frac{\sqrt{22}}{22}$	0	$-\frac{5\sqrt{22}i}{176}$	$\frac{\sqrt{22}}{22}$	0	0	$\frac{\sqrt{330}}{132}$	0	$-\frac{\sqrt{330}i}{880}$	$-\frac{\sqrt{330}}{330}$	0	
	0	0	$\frac{\sqrt{22}}{22}$	0	$\frac{5\sqrt{22}i}{176}$	0	0	$-\frac{\sqrt{22}}{22}$	$\frac{\sqrt{330}}{132}$	0	$\frac{\sqrt{330}i}{880}$	0	0	$\frac{\sqrt{330}}{330}$	
	0	$-\frac{\sqrt{330}}{330}$	0	0	$\frac{\sqrt{22}}{22}$	0	0	0	0	0	$\frac{\sqrt{330}}{110}$	0	0	$\frac{\sqrt{330}i}{330}$	
	$-\frac{\sqrt{330}}{330}$	0	0	0	0	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	$-\frac{\sqrt{330}}{110}$	$-\frac{\sqrt{330}i}{330}$	0	
	$-\frac{\sqrt{22}}{66}$	0	0	$-\frac{\sqrt{330}i}{528}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	$-\frac{25\sqrt{22}i}{528}$	0	$\frac{\sqrt{22}}{66}$	0	0	
	0	$\frac{\sqrt{22}}{66}$	$\frac{\sqrt{330}i}{528}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	$\frac{25\sqrt{22}i}{528}$	0	$\frac{\sqrt{22}}{66}$	0	0	0	
	0	0	0	$-\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{880}$	$\frac{\sqrt{330}}{110}$	0	0	$\frac{\sqrt{22}}{66}$	0	$\frac{31\sqrt{22}i}{528}$	$\frac{\sqrt{22}}{66}$	0	
	0	0	$-\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{880}$	0	0	$-\frac{\sqrt{330}}{110}$	$\frac{\sqrt{22}}{66}$	0	$-\frac{31\sqrt{22}i}{528}$	0	0	$-\frac{\sqrt{22}}{66}$	
	0	$-\frac{\sqrt{22}}{132}$	0	0	$-\frac{\sqrt{330}}{330}$	0	0	$\frac{\sqrt{330}i}{330}$	0	0	$\frac{\sqrt{22}}{66}$	0	0	$-\frac{\sqrt{22}i}{132}$	
	$-\frac{\sqrt{22}}{132}$	0	0	0	0	$\frac{\sqrt{330}}{330}$	$-\frac{\sqrt{330}i}{330}$	0	0	0	0	$-\frac{\sqrt{22}}{66}$	$\frac{\sqrt{22}i}{132}$	0	

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

979 symmetry

continued ...

Table 10

No.	multipole	matrix													
$M_5^{(1,-1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{385}}{66}$	0	0	$\frac{\sqrt{231}i}{924}$	0	$-\frac{\sqrt{231}}{924}$	0	0	0	$-\frac{\sqrt{385}i}{132}$	0	$-\frac{\sqrt{385}}{132}$	0	0	0
	0	$\frac{\sqrt{385}}{66}$	$-\frac{\sqrt{231}i}{924}$	0	$-\frac{\sqrt{231}}{924}$	0	0	0	$\frac{\sqrt{385}i}{132}$	0	$-\frac{\sqrt{385}}{132}$	0	0	0	0
	0	$\frac{\sqrt{231}i}{924}$	$\frac{3\sqrt{385}}{616}$	0	0	0	0	$\frac{\sqrt{385}}{308}$	$-\frac{5\sqrt{231}}{1848}$	0	0	0	0	$\frac{3\sqrt{231}}{308}$	
	$-\frac{\sqrt{231}i}{924}$	0	0	$-\frac{3\sqrt{385}}{616}$	0	0	$\frac{\sqrt{385}}{308}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	0	$\frac{3\sqrt{231}}{308}$	0	
	0	$-\frac{\sqrt{231}}{924}$	0	0	$\frac{3\sqrt{385}}{616}$	0	0	$-\frac{\sqrt{385}i}{308}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	0	$\frac{3\sqrt{231}i}{308}$	
	$-\frac{\sqrt{231}}{924}$	0	0	0	0	$-\frac{3\sqrt{385}}{616}$	$\frac{\sqrt{385}i}{308}$	0	0	0	0	$-\frac{5\sqrt{231}}{1848}$	$-\frac{3\sqrt{231}i}{308}$	0	
	0	0	0	$\frac{\sqrt{385}}{308}$	0	$-\frac{\sqrt{385}i}{308}$	$\frac{\sqrt{385}}{77}$	0	0	$\frac{5\sqrt{231}}{924}$	0	$\frac{5\sqrt{231}i}{924}$	0	0	
	0	0	$\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	$-\frac{\sqrt{385}}{77}$	$\frac{5\sqrt{231}}{924}$	0	$-\frac{5\sqrt{231}i}{924}$	0	0	0	
	0	$-\frac{\sqrt{385}i}{132}$	$-\frac{5\sqrt{231}}{1848}$	0	0	0	0	$\frac{5\sqrt{231}}{924}$	$\frac{\sqrt{385}}{264}$	0	0	0	0	$\frac{\sqrt{385}}{924}$	
	$\frac{\sqrt{385}i}{132}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	0	$\frac{5\sqrt{231}}{924}$	0	0	$-\frac{\sqrt{385}}{264}$	0	0	$\frac{\sqrt{385}}{924}$	0	
	0	$-\frac{\sqrt{385}}{132}$	0	0	$\frac{5\sqrt{231}}{1848}$	0	0	$\frac{5\sqrt{231}i}{924}$	0	0	$\frac{\sqrt{385}}{264}$	0	0	$-\frac{\sqrt{385}i}{924}$	
	$-\frac{\sqrt{385}}{132}$	0	0	0	0	$-\frac{5\sqrt{231}}{1848}$	$-\frac{5\sqrt{231}i}{924}$	0	0	0	0	$-\frac{\sqrt{385}}{264}$	$\frac{\sqrt{385}i}{924}$	0	
	0	0	0	$\frac{3\sqrt{231}}{308}$	0	$\frac{3\sqrt{231}i}{308}$	0	0	0	$\frac{\sqrt{385}}{924}$	0	$-\frac{\sqrt{385}i}{924}$	$-\frac{\sqrt{385}}{66}$	0	
	0	0	$\frac{3\sqrt{231}}{308}$	0	$-\frac{3\sqrt{231}i}{308}$	0	0	0	$\frac{\sqrt{385}}{924}$	0	$\frac{\sqrt{385}i}{924}$	0	0	$\frac{\sqrt{385}}{66}$	

980 symmetry

$$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	0	$\frac{\sqrt{22}}{132}$	0	0	$\frac{\sqrt{330}}{330}$	0	0	$-\frac{\sqrt{330}i}{330}$	0	0	$-\frac{\sqrt{22}}{66}$	0	0	$\frac{\sqrt{22}i}{132}$	
	$\frac{\sqrt{22}}{132}$	0	0	0	0	$-\frac{\sqrt{330}}{330}$	$\frac{\sqrt{330}i}{330}$	0	0	0	0	$\frac{\sqrt{22}}{66}$	$-\frac{\sqrt{22}i}{132}$	0	
	0	0	0	$-\frac{5\sqrt{22}}{176}$	0	$\frac{\sqrt{22}i}{22}$	$-\frac{\sqrt{22}}{22}$	0	0	$\frac{\sqrt{330}}{880}$	0	$-\frac{\sqrt{330}i}{132}$	$-\frac{\sqrt{330}}{330}$	0	
	0	0	$-\frac{5\sqrt{22}}{176}$	0	$-\frac{\sqrt{22}i}{22}$	0	0	$\frac{\sqrt{22}}{22}$	$\frac{\sqrt{330}}{880}$	0	$\frac{\sqrt{330}i}{132}$	0	0	$\frac{\sqrt{330}}{330}$	
	$\frac{\sqrt{330}}{330}$	0	0	$\frac{\sqrt{22}i}{22}$	0	$\frac{3\sqrt{22}}{176}$	0	0	0	$\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{528}$	0	0	
	0	$-\frac{\sqrt{330}}{330}$	$-\frac{\sqrt{22}i}{22}$	0	$\frac{3\sqrt{22}}{176}$	0	0	0	$-\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{528}$	0	0	0	
	0	$-\frac{\sqrt{330}i}{330}$	$-\frac{\sqrt{22}}{22}$	0	0	0	0	0	$\frac{\sqrt{330}}{110}$	0	0	0	0	$-\frac{\sqrt{330}}{330}$	
	$\frac{\sqrt{330}i}{330}$	0	0	$\frac{\sqrt{22}}{22}$	0	0	0	0	0	$-\frac{\sqrt{330}}{110}$	0	0	$-\frac{\sqrt{330}}{330}$	0	
	0	0	0	$\frac{\sqrt{330}}{880}$	0	$\frac{\sqrt{330}i}{220}$	$\frac{\sqrt{330}}{110}$	0	0	$\frac{31\sqrt{22}}{528}$	0	$\frac{\sqrt{22}i}{66}$	$-\frac{\sqrt{22}}{66}$	0	
	0	0	$\frac{\sqrt{330}}{880}$	0	$-\frac{\sqrt{330}i}{220}$	0	0	$-\frac{\sqrt{330}}{110}$	$\frac{31\sqrt{22}}{528}$	0	$-\frac{\sqrt{22}i}{66}$	0	0	$\frac{\sqrt{22}}{66}$	
	$-\frac{\sqrt{22}}{66}$	0	0	$-\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{528}$	0	0	0	$\frac{\sqrt{22}i}{66}$	0	$-\frac{25\sqrt{22}}{528}$	0	0	
	0	$\frac{\sqrt{22}}{66}$	$\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{528}$	0	0	0	$-\frac{\sqrt{22}i}{66}$	0	$-\frac{25\sqrt{22}}{528}$	0	0	0	
	0	$\frac{\sqrt{22}i}{132}$	$-\frac{\sqrt{330}}{330}$	0	0	0	0	$-\frac{\sqrt{330}}{330}$	$-\frac{\sqrt{22}}{66}$	0	0	0	0	$-\frac{\sqrt{22}}{132}$	
	$-\frac{\sqrt{22}i}{132}$	0	0	$\frac{\sqrt{330}}{330}$	0	0	$-\frac{\sqrt{330}}{330}$	0	0	$\frac{\sqrt{22}}{66}$	0	0	$-\frac{\sqrt{22}}{132}$	0	

981 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{110}}{44}$
	$-\frac{\sqrt{110}}{44}$	0
	0	0
	0	0
	0	$\frac{3\sqrt{110}}{176}$
	0	0
	0	$\frac{3\sqrt{110}}{176}$
	0	0
	0	$\frac{3\sqrt{110}}{176}$
	0	0
	0	$\frac{3\sqrt{110}}{176}$
	0	0
	0	$\frac{3\sqrt{110}}{176}$
	$-\frac{\sqrt{110}}{44}$	0
$-\frac{3\sqrt{14y}(5x^4 - 10x^2y^2 + y^4)}{16}$		

982 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	0	$-\frac{\sqrt{110}i}{44}$	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{110}}{44}$	
	$\frac{\sqrt{110}i}{44}$	0	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{110}}{44}$	0	
	0	0	0	$\frac{3\sqrt{110}i}{176}$	0	0	0	0	$\frac{\sqrt{66}i}{176}$	0	$\frac{\sqrt{66}}{44}$	0	0	0	
	0	0	$-\frac{3\sqrt{110}i}{176}$	0	0	0	0	$-\frac{\sqrt{66}i}{176}$	0	$\frac{\sqrt{66}}{44}$	0	0	0	0	
	0	0	0	0	$\frac{3\sqrt{110}i}{176}$	0	0	0	$\frac{\sqrt{66}}{44}$	0	$-\frac{\sqrt{66}i}{176}$	0	0	0	
	0	0	0	0	$-\frac{3\sqrt{110}i}{176}$	0	0	0	$\frac{\sqrt{66}}{44}$	0	$\frac{\sqrt{66}i}{176}$	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{66}i}{176}$	0	$\frac{\sqrt{66}}{44}$	0	0	$-\frac{3\sqrt{110}i}{176}$	0	0	0	0	0	
	0	0	$-\frac{\sqrt{66}i}{176}$	0	$\frac{\sqrt{66}}{44}$	0	0	0	$\frac{3\sqrt{110}i}{176}$	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{66}}{44}$	0	$-\frac{\sqrt{66}i}{176}$	0	0	0	0	$-\frac{3\sqrt{110}i}{176}$	0	0	0	
	0	$\frac{\sqrt{66}}{44}$	0	$\frac{\sqrt{66}i}{176}$	0	0	0	0	0	$\frac{3\sqrt{110}i}{176}$	0	0	0	0	
	0	$-\frac{\sqrt{110}}{44}$	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{110}i}{44}$		
	$-\frac{\sqrt{110}}{44}$	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{110}i}{44}$	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													
$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{\sqrt{231}}{66}$	0	0	$\frac{\sqrt{385}}{770}$	0	0	$-\frac{\sqrt{385}i}{770}$	0	0	$\frac{\sqrt{231}}{66}$	0	0	0	0
	$-\frac{\sqrt{231}}{66}$	0	0	0	0	$-\frac{\sqrt{385}}{770}$	$\frac{\sqrt{385}i}{770}$	0	0	0	$-\frac{\sqrt{231}}{66}$	0	0	0	0
	0	0	0	$\frac{5\sqrt{231}}{616}$	0	$\frac{\sqrt{231}i}{154}$	$-\frac{\sqrt{231}}{154}$	0	0	$-\frac{\sqrt{385}}{440}$	0	$-\frac{\sqrt{385}i}{385}$	$-\frac{9\sqrt{385}}{770}$	0	0
	0	0	$\frac{5\sqrt{231}}{616}$	0	$-\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{231}}{154}$	$-\frac{\sqrt{385}}{440}$	0	$\frac{\sqrt{385}i}{385}$	0	0	$\frac{9\sqrt{385}}{770}$	0
	$\frac{\sqrt{385}}{770}$	0	0	$\frac{\sqrt{231}i}{154}$	0	$\frac{\sqrt{231}}{616}$	0	0	0	$\frac{\sqrt{385}i}{385}$	0	$\frac{3\sqrt{385}}{3080}$	0	0	0
	0	$-\frac{\sqrt{385}}{770}$	$-\frac{\sqrt{231}i}{154}$	0	$\frac{\sqrt{231}}{616}$	0	0	0	$-\frac{\sqrt{385}i}{385}$	0	$\frac{3\sqrt{385}}{3080}$	0	0	0	0
	0	$-\frac{\sqrt{385}i}{770}$	$-\frac{\sqrt{231}}{154}$	0	0	0	0	$\frac{\sqrt{231}}{77}$	$-\frac{\sqrt{385}}{154}$	0	0	0	0	$\frac{\sqrt{385}}{770}$	0
	$\frac{\sqrt{385}i}{770}$	0	0	$\frac{\sqrt{231}}{154}$	0	0	$\frac{\sqrt{231}}{77}$	0	0	$\frac{\sqrt{385}}{154}$	0	0	$\frac{\sqrt{385}}{770}$	0	0
	0	0	0	$-\frac{\sqrt{385}}{440}$	0	$\frac{\sqrt{385}i}{385}$	$-\frac{\sqrt{385}}{154}$	0	0	$-\frac{\sqrt{231}}{264}$	0	$\frac{\sqrt{231}i}{462}$	$-\frac{\sqrt{231}}{462}$	0	0
	0	0	$-\frac{\sqrt{385}}{440}$	0	$-\frac{\sqrt{385}i}{385}$	0	0	$\frac{\sqrt{385}}{154}$	$-\frac{\sqrt{231}}{264}$	0	$-\frac{\sqrt{231}i}{462}$	0	0	$\frac{\sqrt{231}}{462}$	0
	$\frac{\sqrt{231}}{66}$	0	0	$-\frac{\sqrt{385}i}{385}$	0	$\frac{3\sqrt{385}}{3080}$	0	0	0	$\frac{\sqrt{231}i}{462}$	0	$\frac{\sqrt{231}}{88}$	0	0	0
	0	$-\frac{\sqrt{231}}{66}$	$\frac{\sqrt{385}i}{385}$	0	$\frac{3\sqrt{385}}{3080}$	0	0	0	$-\frac{\sqrt{231}i}{462}$	0	$\frac{\sqrt{231}}{88}$	0	0	0	0
	0	0	$-\frac{9\sqrt{385}}{770}$	0	0	0	0	$\frac{\sqrt{385}}{770}$	$-\frac{\sqrt{231}}{462}$	0	0	0	0	$-\frac{\sqrt{231}}{66}$	0
	0	0	0	$\frac{9\sqrt{385}}{770}$	0	0	$\frac{\sqrt{385}}{770}$	0	0	$\frac{\sqrt{231}}{462}$	0	0	0	$-\frac{\sqrt{231}}{66}$	0

$$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$$

984 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{231}i}{66}$	$\frac{\sqrt{385}}{770}$	0	0	0	0	$\frac{\sqrt{385}}{770}$	$-\frac{\sqrt{231}}{66}$	0	0	0	0	0	0
	$-\frac{\sqrt{231}i}{66}$	0	0	$-\frac{\sqrt{385}}{770}$	0	0	$\frac{\sqrt{385}}{770}$	0	0	$\frac{\sqrt{231}}{66}$	0	0	0	0	0
	$\frac{\sqrt{385}}{770}$	0	0	$-\frac{\sqrt{231}i}{616}$	0	$-\frac{\sqrt{231}}{154}$	0	0	0	$3\sqrt{385}i$	$0$	$\frac{\sqrt{385}}{385}$	0	0	0
	0	$-\frac{\sqrt{385}}{770}$	$\frac{\sqrt{231}i}{616}$	0	$-\frac{\sqrt{231}}{154}$	0	0	0	$-\frac{3\sqrt{385}i}{3080}$	0	$\frac{\sqrt{385}}{385}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{231}}{154}$	0	$-\frac{5\sqrt{231}i}{616}$	$-\frac{\sqrt{231}}{154}$	0	0	$-\frac{\sqrt{385}}{385}$	0	$-\frac{\sqrt{385}i}{440}$	$\frac{9\sqrt{385}}{770}$	0	0
	0	0	$-\frac{\sqrt{231}}{154}$	0	$\frac{5\sqrt{231}i}{616}$	0	0	$\frac{\sqrt{231}}{154}$	$-\frac{\sqrt{385}}{385}$	0	$\frac{\sqrt{385}i}{440}$	0	0	$-\frac{9\sqrt{385}}{770}$	0
	0	$\frac{\sqrt{385}}{770}$	0	0	$-\frac{\sqrt{231}}{154}$	0	0	$-\frac{\sqrt{231}i}{77}$	0	0	$\frac{\sqrt{385}i}{154}$	0	0	$\frac{\sqrt{385}i}{770}$	0
	$\frac{\sqrt{385}}{770}$	0	0	0	0	$\frac{\sqrt{231}}{154}$	$\frac{\sqrt{231}i}{77}$	0	0	0	0	$-\frac{\sqrt{385}}{154}$	$-\frac{\sqrt{385}i}{770}$	0	
	$-\frac{\sqrt{231}}{66}$	0	0	$\frac{3\sqrt{385}i}{3080}$	0	$-\frac{\sqrt{385}}{385}$	0	0	0	$-\frac{\sqrt{231}i}{88}$	0	$-\frac{\sqrt{231}}{462}$	0	0	0
	0	$\frac{\sqrt{231}}{66}$	$-\frac{3\sqrt{385}i}{3080}$	0	$-\frac{\sqrt{385}}{385}$	0	0	0	$\frac{\sqrt{231}i}{88}$	0	$-\frac{\sqrt{231}}{462}$	0	0	0	0
	0	0	0	$\frac{\sqrt{385}}{385}$	0	$-\frac{\sqrt{385}i}{440}$	$\frac{\sqrt{385}}{154}$	0	0	$-\frac{\sqrt{231}}{462}$	0	$\frac{\sqrt{231}i}{264}$	$-\frac{\sqrt{231}}{462}$	0	0
	0	0	$\frac{\sqrt{385}}{385}$	0	$\frac{\sqrt{385}i}{440}$	0	0	$-\frac{\sqrt{385}}{154}$	$-\frac{\sqrt{231}}{462}$	0	$-\frac{\sqrt{231}i}{264}$	0	0	$\frac{\sqrt{231}}{462}$	0
	0	0	0	0	$\frac{9\sqrt{385}}{770}$	0	0	$\frac{\sqrt{385}i}{770}$	0	0	$-\frac{\sqrt{231}}{462}$	0	0	$\frac{\sqrt{231}}{66}$	0
	0	0	0	0	0	$-\frac{9\sqrt{385}}{770}$	$-\frac{\sqrt{385}i}{770}$	0	0	0	0	$\frac{\sqrt{231}}{462}$	$-\frac{\sqrt{231}i}{66}$	0	0
985	symmetry	$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

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

986 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	$\frac{\sqrt{165}}{220}$	0	$\frac{\sqrt{165}i}{220}$	0	0	0	$\frac{\sqrt{11}}{44}$	0	$-\frac{\sqrt{11}i}{44}$	$-\frac{\sqrt{11}}{22}$	0	
	0	0	$\frac{\sqrt{165}}{220}$	0	$-\frac{\sqrt{165}i}{220}$	0	0	0	$\frac{\sqrt{11}}{44}$	0	$\frac{\sqrt{11}i}{44}$	0	0	$\frac{\sqrt{11}}{22}$	
	0	$\frac{\sqrt{165}}{220}$	0	0	0	0	0	$-\frac{3\sqrt{11}i}{44}$	0	0	$\frac{\sqrt{165}}{110}$	0	0	$-\frac{\sqrt{165}i}{220}$	
	$\frac{\sqrt{165}}{220}$	0	0	0	0	0	$\frac{3\sqrt{11}i}{44}$	0	0	0	0	$-\frac{\sqrt{165}}{110}$	$\frac{\sqrt{165}i}{220}$	0	
	0	$\frac{\sqrt{165}i}{220}$	0	0	0	0	0	$-\frac{3\sqrt{11}}{44}$	$\frac{\sqrt{165}}{110}$	0	0	0	0	$\frac{\sqrt{165}}{220}$	
	$-\frac{\sqrt{165}i}{220}$	0	0	0	0	0	$-\frac{3\sqrt{11}}{44}$	0	0	$-\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{165}}{220}$	0	
	0	0	0	$-\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	0	0	0	$\frac{3\sqrt{165}i}{220}$	0	$-\frac{3\sqrt{165}}{220}$	0	0	
	0	0	$\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	0	0	0	$-\frac{3\sqrt{165}i}{220}$	0	$-\frac{3\sqrt{165}}{220}$	0	0	0	
	0	$\frac{\sqrt{11}}{44}$	0	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{3\sqrt{165}i}{220}$	0	0	0	0	0	$-\frac{\sqrt{11}i}{44}$	
	$\frac{\sqrt{11}}{44}$	0	0	0	0	$-\frac{\sqrt{165}}{110}$	$-\frac{3\sqrt{165}i}{220}$	0	0	0	0	0	$\frac{\sqrt{11}i}{44}$	0	
	0	$-\frac{\sqrt{11}i}{44}$	$\frac{\sqrt{165}}{110}$	0	0	0	0	$-\frac{3\sqrt{165}}{220}$	0	0	0	0	0	$-\frac{\sqrt{11}}{44}$	
	$\frac{\sqrt{11}i}{44}$	0	0	$-\frac{\sqrt{165}}{110}$	0	0	$-\frac{3\sqrt{165}}{220}$	0	0	0	0	0	$-\frac{\sqrt{11}i}{44}$	0	
	$-\frac{\sqrt{11}}{22}$	0	0	$-\frac{\sqrt{165}i}{220}$	0	$\frac{\sqrt{165}}{220}$	0	0	0	$-\frac{\sqrt{11}i}{44}$	0	$-\frac{\sqrt{11}}{44}$	0	0	
	0	$\frac{\sqrt{11}}{22}$	$\frac{\sqrt{165}i}{220}$	0	$\frac{\sqrt{165}}{220}$	0	0	0	$\frac{\sqrt{11}i}{44}$	0	$-\frac{\sqrt{11}}{44}$	0	0	0	

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

987 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,0}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	0	0	0	$\frac{\sqrt{33}i}{33}$	0	$-\frac{\sqrt{33}}{33}$	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{33}i}{33}$	0	$-\frac{\sqrt{33}}{33}$	0	0	0	0
	0	0	$\frac{\sqrt{33}}{44}$	0	0	0	0	0	$-\frac{\sqrt{55}}{220}$	0	0	0	0	$\frac{\sqrt{55}}{55}$	0
	0	0	0	$-\frac{\sqrt{33}}{44}$	0	0	0	0	0	$\frac{\sqrt{55}}{220}$	0	0	$\frac{\sqrt{55}}{55}$	0	0
	0	0	0	0	$-\frac{\sqrt{33}}{44}$	0	0	0	0	0	$-\frac{\sqrt{55}}{220}$	0	0	$-\frac{\sqrt{55}i}{55}$	0
	0	0	0	0	0	$\frac{\sqrt{33}}{44}$	0	0	0	0	0	$\frac{\sqrt{55}}{220}$	$\frac{\sqrt{55}i}{55}$	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{55}}{55}$	0	$-\frac{\sqrt{55}i}{55}$	$\frac{\sqrt{55}}{110}$	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{55}}{55}$	0	$\frac{\sqrt{55}i}{55}$	0	0	$-\frac{\sqrt{55}}{110}$	0
	0	$\frac{\sqrt{33}i}{33}$	$-\frac{\sqrt{55}}{220}$	0	0	0	0	$\frac{\sqrt{55}}{55}$	$-\frac{7\sqrt{33}}{132}$	0	0	0	0	0	0
	$-\frac{\sqrt{33}i}{33}$	0	0	$\frac{\sqrt{55}}{220}$	0	0	$\frac{\sqrt{55}}{55}$	0	0	$\frac{7\sqrt{33}}{132}$	0	0	0	0	0
	0	$-\frac{\sqrt{33}}{33}$	0	0	$-\frac{\sqrt{55}}{220}$	0	0	$-\frac{\sqrt{55}i}{55}$	0	0	$\frac{7\sqrt{33}}{132}$	0	0	0	0
	$-\frac{\sqrt{33}}{33}$	0	0	0	0	$\frac{\sqrt{55}}{220}$	$\frac{\sqrt{55}i}{55}$	0	0	0	0	$-\frac{7\sqrt{33}}{132}$	0	0	0
	0	0	0	$\frac{\sqrt{55}}{55}$	0	$-\frac{\sqrt{55}i}{55}$	$\frac{\sqrt{55}}{110}$	0	0	0	0	0	0	0	0
	0	0	$\frac{\sqrt{55}}{55}$	0	$\frac{\sqrt{55}i}{55}$	0	0	$-\frac{\sqrt{55}}{110}$	0	0	0	0	0	0	0

988 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 0 0 $\frac{\sqrt{55}}{220}$ 0 $-\frac{\sqrt{55}i}{220}$ $-\frac{\sqrt{55}}{110}$ 0 0 $-\frac{\sqrt{33}}{44}$ 0 $-\frac{\sqrt{33}i}{44}$ 0 0
	0	0 0 $\frac{\sqrt{55}}{220}$ 0 $\frac{\sqrt{55}i}{220}$ 0 0 $\frac{\sqrt{55}}{110}$ $-\frac{\sqrt{33}}{44}$ 0 $\frac{\sqrt{33}i}{44}$ 0 0 0
	0	$\frac{\sqrt{55}}{220}$ 0 0 0 $\frac{\sqrt{33}}{22}$ 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 $-\frac{\sqrt{55}}{55}$ 0 0 $\frac{\sqrt{55}i}{44}$
	$\frac{\sqrt{55}}{220}$	0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 $\frac{\sqrt{55}}{55}$ $-\frac{\sqrt{55}i}{44}$ 0
	0	$-\frac{\sqrt{55}i}{220}$ $\frac{\sqrt{33}}{22}$ 0 0 0 0 $-\frac{\sqrt{33}}{44}$ $\frac{\sqrt{55}}{55}$ 0 0 0 0 $\frac{\sqrt{55}}{44}$
	$\frac{\sqrt{55}i}{220}$	0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 $-\frac{\sqrt{33}}{44}$ 0 0 $-\frac{\sqrt{55}}{55}$ 0 0 $\frac{\sqrt{55}}{44}$ 0
	$-\frac{\sqrt{55}}{110}$	0 0 $\frac{\sqrt{33}i}{44}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 0 $\frac{\sqrt{55}i}{220}$ 0 $\frac{\sqrt{55}}{220}$ 0 0
	0	$\frac{\sqrt{55}}{110}$ $-\frac{\sqrt{33}i}{44}$ 0 $-\frac{\sqrt{33}}{44}$ 0 0 0 $-\frac{\sqrt{55}i}{220}$ 0 $\frac{\sqrt{55}}{220}$ 0 0 0
	0	$-\frac{\sqrt{33}}{44}$ 0 0 $\frac{\sqrt{55}}{55}$ 0 0 0 $\frac{\sqrt{55}i}{220}$ 0 0 $\frac{\sqrt{33}}{66}$ 0 0 $\frac{\sqrt{33}i}{132}$
	$-\frac{\sqrt{33}}{44}$	0 0 0 0 0 $-\frac{\sqrt{55}}{55}$ $-\frac{\sqrt{55}i}{220}$ 0 0 0 0 $-\frac{\sqrt{33}}{66}$ $-\frac{\sqrt{33}i}{132}$ 0
	0	$-\frac{\sqrt{33}i}{44}$ $-\frac{\sqrt{55}}{55}$ 0 0 0 0 0 $\frac{\sqrt{55}}{220}$ $\frac{\sqrt{33}}{66}$ 0 0 0 0 $-\frac{\sqrt{33}}{132}$
	$\frac{\sqrt{33}i}{44}$	0 0 0 $\frac{\sqrt{55}}{55}$ 0 0 $\frac{\sqrt{55}}{220}$ 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 $-\frac{\sqrt{33}}{132}$ 0
	0	0 0 0 $\frac{\sqrt{55}i}{44}$ 0 $\frac{\sqrt{55}}{44}$ 0 0 0 $\frac{\sqrt{33}i}{132}$ 0 $-\frac{\sqrt{33}}{132}$ 0 0 0
	0	0 0 $-\frac{\sqrt{55}i}{44}$ 0 $\frac{\sqrt{55}}{44}$ 0 0 0 $-\frac{\sqrt{33}i}{132}$ 0 $-\frac{\sqrt{33}}{132}$ 0 0 0

989 symmetry

$$\frac{\sqrt{6006xyz(x^2-3y^2)(3x^2-y^2)}}{16}$$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{1g}, 1)$	0 0 0 $\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0	
	0 0 $\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{105}}{56}$ 0 0 $-\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 $-\frac{\sqrt{105}i}{56}$	
	$\frac{\sqrt{105}}{56}$ 0 0 0 0 $\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $\frac{\sqrt{105}}{112}$ $\frac{\sqrt{105}i}{56}$ 0	
	0 $-\frac{\sqrt{105}i}{56}$ $-\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 $-\frac{\sqrt{105}}{56}$	
	$\frac{\sqrt{105}i}{56}$ 0 0 $\frac{5\sqrt{7}}{112}$ 0 0 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{7}}{112}$ 0 0 $\frac{3\sqrt{7}i}{56}$	
	$-\frac{3\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{7}}{112}$ $-\frac{3\sqrt{7}i}{56}$ 0	
	0 $-\frac{3\sqrt{7}i}{56}$ $-\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{7}}{112}$ 0 0 0 0 $-\frac{3\sqrt{7}}{56}$	
	$\frac{3\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 $-\frac{3\sqrt{7}}{112}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0	
	0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0	
	0 0 $\frac{\sqrt{105}i}{56}$ 0 $-\frac{\sqrt{105}}{56}$ 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0	

$$\frac{\sqrt{21}y(3x^2-y^2)(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4)}{32}$$

990 symmetry

continued ...

Table 10

No.	multipole	matrix														
$M_7^{(1,-1;a)}(A_{1g}, 2)$	0	$\frac{3\sqrt{2002}i}{2002}$	$-\frac{3\sqrt{30030}}{4004}$	0	0	0	$\frac{\sqrt{30030}}{1001}$	$-\frac{15\sqrt{2002}}{4004}$	0	0	0	0	0	$-\frac{3\sqrt{2002}}{2002}$		
	$-\frac{3\sqrt{2002}i}{2002}$	0	0	$\frac{3\sqrt{30030}}{4004}$	0	0	$\frac{\sqrt{30030}}{1001}$	0	0	$\frac{15\sqrt{2002}}{4004}$	0	0	0	$-\frac{3\sqrt{2002}}{2002}$	0	
	$-\frac{3\sqrt{30030}}{4004}$	0	0	$-\frac{45\sqrt{2002}i}{32032}$	0	$\frac{15\sqrt{2002}}{32032}$	0	0	0	$-\frac{15\sqrt{30030}i}{32032}$	0	$-\frac{3\sqrt{30030}}{4576}$	0	0	0	
	0	$\frac{3\sqrt{30030}}{4004}$	$\frac{45\sqrt{2002}i}{32032}$	0	$\frac{15\sqrt{2002}}{32032}$	0	0	$\frac{15\sqrt{30030}i}{32032}$	0	$-\frac{3\sqrt{30030}}{4576}$	0	0	0	0		
	0	0	0	$\frac{15\sqrt{2002}}{32032}$	0	$\frac{15\sqrt{2002}i}{4576}$	$-\frac{5\sqrt{2002}}{2002}$	0	0	$\frac{5\sqrt{30030}}{32032}$	0	$-\frac{19\sqrt{30030}i}{32032}$	$-\frac{3\sqrt{30030}}{4004}$	0		
	0	0	$\frac{15\sqrt{2002}}{32032}$	0	$-\frac{15\sqrt{2002}i}{4576}$	0	0	$\frac{5\sqrt{2002}}{2002}$	$\frac{5\sqrt{30030}}{32032}$	0	$\frac{19\sqrt{30030}i}{32032}$	0	0	$\frac{3\sqrt{30030}}{4004}$		
	0	$\frac{\sqrt{30030}}{1001}$	0	0	$-\frac{5\sqrt{2002}}{2002}$	0	0	0	0	0	$-\frac{\sqrt{30030}}{2002}$	0	0	$-\frac{\sqrt{30030}i}{1001}$		
	$\frac{\sqrt{30030}}{1001}$	0	0	0	0	$\frac{5\sqrt{2002}}{2002}$	0	0	0	0	0	$\frac{\sqrt{30030}}{2002}$	$\frac{\sqrt{30030}i}{1001}$	0		
	$-\frac{15\sqrt{2002}}{4004}$	0	0	$-\frac{15\sqrt{30030}i}{32032}$	0	$\frac{5\sqrt{30030}}{32032}$	0	0	0	$-\frac{75\sqrt{2002}i}{32032}$	0	$-\frac{15\sqrt{2002}}{4576}$	0	0		
	0	$\frac{15\sqrt{2002}}{4004}$	$\frac{15\sqrt{30030}i}{32032}$	0	$\frac{5\sqrt{30030}}{32032}$	0	0	0	$\frac{75\sqrt{2002}i}{32032}$	0	$-\frac{15\sqrt{2002}}{4576}$	0	0	0		
	0	0	0	$-\frac{3\sqrt{30030}}{4576}$	0	$-\frac{19\sqrt{30030}i}{32032}$	$-\frac{\sqrt{30030}}{2002}$	0	0	$-\frac{15\sqrt{2002}}{4576}$	0	$\frac{15\sqrt{2002}i}{32032}$	$\frac{15\sqrt{2002}}{4004}$	0		
	0	0	$-\frac{3\sqrt{30030}}{4576}$	0	$\frac{19\sqrt{30030}i}{32032}$	0	0	$\frac{\sqrt{30030}}{2002}$	$-\frac{15\sqrt{2002}}{4576}$	0	$-\frac{15\sqrt{2002}i}{32032}$	0	0	$-\frac{15\sqrt{2002}}{4004}$		
	0	$-\frac{3\sqrt{2002}}{2002}$	0	0	$-\frac{3\sqrt{30030}}{4004}$	0	0	$-\frac{\sqrt{30030}i}{1001}$	0	0	0	$\frac{15\sqrt{2002}}{4004}$	0	0	$-\frac{3\sqrt{2002}i}{2002}$	
	$-\frac{3\sqrt{2002}}{2002}$	0	0	0	0	$\frac{3\sqrt{30030}}{4004}$	$\frac{\sqrt{30030}i}{1001}$	0	0	0	0	0	$-\frac{15\sqrt{2002}}{4004}$	$\frac{3\sqrt{2002}i}{2002}$	0	

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

991 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 1)$	$\frac{\sqrt{858}}{286}$	0	0	$\frac{\sqrt{1430}i}{1144}$	0	$-\frac{\sqrt{1430}}{1144}$	0	0	0	$\frac{3\sqrt{858}i}{1144}$	0	$\frac{3\sqrt{858}}{1144}$	0	0	
	0	$-\frac{\sqrt{858}}{286}$	$-\frac{\sqrt{1430}i}{1144}$	0	$-\frac{\sqrt{1430}}{1144}$	0	0	0	$-\frac{3\sqrt{858}i}{1144}$	0	$\frac{3\sqrt{858}}{1144}$	0	0	0	
	0	$\frac{\sqrt{1430}i}{1144}$	$-\frac{25\sqrt{858}}{6864}$	0	0	0	0	$\frac{5\sqrt{858}}{1144}$	$-\frac{7\sqrt{1430}}{2288}$	0	0	0	0	$-\frac{\sqrt{1430}}{572}$	
	$-\frac{\sqrt{1430}i}{1144}$	0	0	$\frac{25\sqrt{858}}{6864}$	0	0	$\frac{5\sqrt{858}}{1144}$	0	0	$\frac{7\sqrt{1430}}{2288}$	0	0	$-\frac{\sqrt{1430}}{572}$	0	
	0	$-\frac{\sqrt{1430}}{1144}$	0	0	$-\frac{25\sqrt{858}}{6864}$	0	0	$-\frac{5\sqrt{858}i}{1144}$	0	0	$\frac{7\sqrt{1430}}{2288}$	0	0	$-\frac{\sqrt{1430}i}{572}$	
	$-\frac{\sqrt{1430}}{1144}$	0	0	0	0	$\frac{25\sqrt{858}}{6864}$	$\frac{5\sqrt{858}i}{1144}$	0	0	0	$-\frac{7\sqrt{1430}}{2288}$	$\frac{\sqrt{1430}i}{572}$	0	0	
	0	0	0	$\frac{5\sqrt{858}}{1144}$	0	$-\frac{5\sqrt{858}i}{1144}$	$\frac{5\sqrt{858}}{429}$	0	0	$\frac{5\sqrt{1430}}{1144}$	0	$\frac{5\sqrt{1430}i}{1144}$	0	0	
	0	0	$\frac{5\sqrt{858}}{1144}$	0	$\frac{5\sqrt{858}i}{1144}$	0	0	$-\frac{5\sqrt{858}}{429}$	$\frac{5\sqrt{1430}}{1144}$	0	$-\frac{5\sqrt{1430}i}{1144}$	0	0	0	
	0	$\frac{3\sqrt{858}i}{1144}$	$-\frac{7\sqrt{1430}}{2288}$	0	0	0	0	$\frac{5\sqrt{1430}}{1144}$	$-\frac{\sqrt{858}}{176}$	0	0	0	0	$-\frac{\sqrt{858}}{572}$	
	$-\frac{3\sqrt{858}i}{1144}$	0	0	$\frac{7\sqrt{1430}}{2288}$	0	0	$\frac{5\sqrt{1430}}{1144}$	0	0	$\frac{\sqrt{858}}{176}$	0	0	$-\frac{\sqrt{858}}{572}$	0	
	0	$\frac{3\sqrt{858}}{1144}$	0	0	$\frac{7\sqrt{1430}}{2288}$	0	0	$\frac{5\sqrt{1430}i}{1144}$	0	0	$-\frac{\sqrt{858}}{176}$	0	0	$\frac{\sqrt{858}i}{572}$	
	$\frac{3\sqrt{858}}{1144}$	0	0	0	0	$-\frac{7\sqrt{1430}}{2288}$	$-\frac{5\sqrt{1430}i}{1144}$	0	0	0	0	$\frac{\sqrt{858}}{176}$	$-\frac{\sqrt{858}i}{572}$	0	
	0	0	0	$-\frac{\sqrt{1430}}{572}$	0	$-\frac{\sqrt{1430}i}{572}$	0	0	0	$-\frac{\sqrt{858}}{572}$	0	$\frac{\sqrt{858}i}{572}$	$\frac{\sqrt{858}}{286}$	0	
	0	0	$-\frac{\sqrt{1430}}{572}$	0	$\frac{\sqrt{1430}i}{572}$	0	0	0	$-\frac{\sqrt{858}}{572}$	0	$-\frac{\sqrt{858}i}{572}$	0	0	$-\frac{\sqrt{858}}{286}$	

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

992 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 $\frac{\sqrt{105}i}{56}$ 0 $\frac{\sqrt{105}}{56}$ 0 0 0 $-\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0	
	0 0 $-\frac{\sqrt{105}i}{56}$ 0 $\frac{\sqrt{105}}{56}$ 0 0 0 $\frac{3\sqrt{7}i}{56}$ 0 $\frac{3\sqrt{7}}{56}$ 0 0 0	
	0 $\frac{\sqrt{105}i}{56}$ $\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 0 0 $\frac{\sqrt{105}}{56}$	
	$-\frac{\sqrt{105}i}{56}$ 0 0 $-\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $\frac{\sqrt{105}}{112}$ 0 0 $\frac{\sqrt{105}}{56}$ 0	
	0 $\frac{\sqrt{105}}{56}$ 0 0 $-\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 $-\frac{\sqrt{105}i}{56}$	
	$\frac{\sqrt{105}}{56}$ 0 0 0 0 $\frac{5\sqrt{7}}{112}$ 0 0 0 0 0 0 $\frac{\sqrt{105}}{112}$ $\frac{\sqrt{105}i}{56}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{7}i}{56}$ $-\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{7}}{112}$ 0 0 0 0 $-\frac{3\sqrt{7}}{56}$	
	$\frac{3\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{7}}{112}$ 0 0 $-\frac{3\sqrt{7}}{56}$ 0	
	0 $\frac{3\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $-\frac{3\sqrt{7}}{112}$ 0 0 $-\frac{3\sqrt{7}i}{56}$	
	$\frac{3\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{105}}{112}$ 0 0 0 0 0 $\frac{3\sqrt{7}}{112}$ $\frac{3\sqrt{7}i}{56}$ 0	
	0 0 0 $\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $-\frac{3\sqrt{7}i}{56}$ 0 0	
	0 0 $\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 $\frac{3\sqrt{7}i}{56}$ 0 0 0	
993	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															
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 3)$	0	$\frac{3\sqrt{2002}}{2002}$	0	0	$\frac{3\sqrt{30030}}{4004}$	0	0	$\frac{\sqrt{30030}i}{1001}$	0	0	$-\frac{15\sqrt{2002}}{4004}$	0	0	$\frac{3\sqrt{2002}i}{2002}$			
	$\frac{3\sqrt{2002}}{2002}$	0	0	0	0	$-\frac{3\sqrt{30030}}{4004}$	$-\frac{\sqrt{30030}i}{1001}$	0	0	0	0	$\frac{15\sqrt{2002}}{4004}$	$-\frac{3\sqrt{2002}i}{2002}$	0			
	0	0	0	$\frac{15\sqrt{2002}}{4576}$	0	$\frac{15\sqrt{2002}i}{32032}$	$\frac{5\sqrt{2002}}{2002}$	0	0	$\frac{19\sqrt{30030}}{32032}$	0	$-\frac{5\sqrt{30030}i}{32032}$	$-\frac{3\sqrt{30030}}{4004}$	0			
	0	0	$\frac{15\sqrt{2002}}{4576}$	0	$-\frac{15\sqrt{2002}i}{32032}$	0	0	$-\frac{5\sqrt{2002}}{2002}$	$\frac{19\sqrt{30030}}{32032}$	0	$\frac{5\sqrt{30030}i}{32032}$	0	0	$\frac{3\sqrt{30030}}{4004}$			
	$\frac{3\sqrt{30030}}{4004}$	0	0	$\frac{15\sqrt{2002}i}{32032}$	0	$-\frac{45\sqrt{2002}}{32032}$	0	0	0	$\frac{3\sqrt{30030}i}{4576}$	0	$\frac{15\sqrt{30030}}{32032}$	0	0	0		
	0	$-\frac{3\sqrt{30030}}{4004}$	$-\frac{15\sqrt{2002}i}{32032}$	0	$-\frac{45\sqrt{2002}}{32032}$	0	0	0	$-\frac{3\sqrt{30030}i}{4576}$	0	$\frac{15\sqrt{30030}}{32032}$	0	0	0	0		
	0	$\frac{\sqrt{30030}i}{1001}$	$\frac{5\sqrt{2002}}{2002}$	0	0	0	0	0	$-\frac{\sqrt{30030}}{2002}$	0	0	0	0	$\frac{\sqrt{30030}}{1001}$			
	$-\frac{\sqrt{30030}i}{1001}$	0	0	$-\frac{5\sqrt{2002}}{2002}$	0	0	0	0	0	$\frac{\sqrt{30030}}{2002}$	0	0	0	$\frac{\sqrt{30030}}{1001}$	0		
	0	0	0	$\frac{19\sqrt{30030}}{32032}$	0	$\frac{3\sqrt{30030}i}{4576}$	$-\frac{\sqrt{30030}}{2002}$	0	0	$\frac{15\sqrt{2002}}{32032}$	0	$-\frac{15\sqrt{2002}i}{4576}$	$-\frac{15\sqrt{2002}}{4004}$	0			
	0	0	$\frac{19\sqrt{30030}}{32032}$	0	$-\frac{3\sqrt{30030}i}{4576}$	0	0	$\frac{\sqrt{30030}}{2002}$	$\frac{15\sqrt{2002}}{32032}$	0	$\frac{15\sqrt{2002}i}{4576}$	0	0	$\frac{15\sqrt{2002}}{4004}$			
	$-\frac{15\sqrt{2002}}{4004}$	0	0	$-\frac{5\sqrt{30030}i}{32032}$	0	$\frac{15\sqrt{30030}}{32032}$	0	0	0	$-\frac{15\sqrt{2002}i}{4576}$	0	$-\frac{75\sqrt{2002}}{32032}$	0	0	0		
	0	$\frac{15\sqrt{2002}}{4004}$	$\frac{5\sqrt{30030}i}{32032}$	0	$\frac{15\sqrt{30030}}{32032}$	0	0	0	$\frac{15\sqrt{2002}i}{4576}$	0	$-\frac{75\sqrt{2002}}{32032}$	0	0	0			
	0	$\frac{3\sqrt{2002}i}{2002}$	$-\frac{3\sqrt{30030}}{4004}$	0	0	0	0	$\frac{\sqrt{30030}}{1001}$	$-\frac{15\sqrt{2002}}{4004}$	0	0	0	0	$-\frac{3\sqrt{2002}}{2002}$			
	$-\frac{3\sqrt{2002}i}{2002}$	0	0	$\frac{3\sqrt{30030}}{4004}$	0	0	$\frac{\sqrt{30030}}{1001}$	0	0	$\frac{15\sqrt{2002}}{4004}$	0	0	0	$-\frac{3\sqrt{2002}}{2002}$	0		
$\frac{\sqrt{429}x(x^6 - 21x^4y^2 + 35x^2y^4 - 7y^6)}{32}$																	

994 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,0}^{(1,-1;a)}(E_g, 1)$	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{5\sqrt{2}}{32} \ 0 \ -\frac{5\sqrt{2}i}{32} \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ -\frac{\sqrt{30}i}{32} \ 0 \ 0$	
	$0 \ 0 \ \frac{5\sqrt{2}}{32} \ 0 \ \frac{5\sqrt{2}i}{32} \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ \frac{\sqrt{30}i}{32} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{5\sqrt{2}i}{32} \ 0 \ -\frac{5\sqrt{2}}{32} \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{32} \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ 0$	
	$0 \ 0 \ \frac{5\sqrt{2}i}{32} \ 0 \ -\frac{5\sqrt{2}}{32} \ 0 \ 0 \ 0 \ -\frac{\sqrt{30}i}{32} \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ \frac{\sqrt{30}i}{32} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}}{32} \ 0 \ \frac{3\sqrt{2}i}{32} \ 0 \ 0$	
	$0 \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ -\frac{\sqrt{30}i}{32} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}}{32} \ 0 \ -\frac{3\sqrt{2}i}{32} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ -\frac{\sqrt{30}i}{32} \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{32} \ 0 \ -\frac{3\sqrt{2}}{32} \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{\sqrt{30}i}{32} \ 0 \ -\frac{\sqrt{30}}{32} \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}i}{32} \ 0 \ -\frac{3\sqrt{2}}{32} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
995	symmetry	$\frac{\sqrt{429}y(7x^6 - 35x^4y^2 + 21x^2y^4 - y^6)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{2}i}{32} & 0 & -\frac{5\sqrt{2}}{32} & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{2}i}{32} & 0 & -\frac{5\sqrt{2}}{32} & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{2}}{32} & 0 & \frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{2}}{32} & 0 & -\frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	996 symmetry	$-\frac{\sqrt{231}x(x^2+y^2-12z^2)(x^4-10x^2y^2+5y^4)}{32}$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_{7,0}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{3\sqrt{182}}{182}$	0	0	$\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{3\sqrt{182}}{364}$	0	0	$\frac{3\sqrt{182}i}{182}$	
	$-\frac{3\sqrt{182}}{182}$	0	0	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$-\frac{3\sqrt{182}}{364}$	$-\frac{3\sqrt{182}i}{182}$	0	
	0	0	0	$-\frac{5\sqrt{182}}{416}$	0	$-\frac{5\sqrt{182}i}{2912}$	0	0	0	$-\frac{\sqrt{2730}}{2912}$	0	$\frac{\sqrt{2730}i}{416}$	$\frac{\sqrt{2730}}{364}$	
	0	0	$-\frac{5\sqrt{182}}{416}$	0	$\frac{5\sqrt{182}i}{2912}$	0	0	0	$-\frac{\sqrt{2730}}{2912}$	0	$-\frac{\sqrt{2730}i}{416}$	0	$-\frac{\sqrt{2730}}{364}$	
	$\frac{\sqrt{2730}}{364}$	0	0	$-\frac{5\sqrt{182}i}{2912}$	0	$-\frac{25\sqrt{182}}{2912}$	0	0	0	$\frac{9\sqrt{2730}i}{2912}$	0	$\frac{3\sqrt{2730}}{2912}$	0	
	0	$-\frac{\sqrt{2730}}{364}$	$\frac{5\sqrt{182}i}{2912}$	0	$-\frac{25\sqrt{182}}{2912}$	0	0	0	$-\frac{9\sqrt{2730}i}{2912}$	0	$\frac{3\sqrt{2730}}{2912}$	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{2730}}{2912}$	0	$\frac{9\sqrt{2730}i}{2912}$	0	0	0	$\frac{27\sqrt{182}}{2912}$	0	$\frac{3\sqrt{182}i}{2912}$	$-\frac{3\sqrt{182}}{364}$	
	0	0	$-\frac{\sqrt{2730}}{2912}$	0	$-\frac{9\sqrt{2730}i}{2912}$	0	0	0	$\frac{27\sqrt{182}}{2912}$	0	$-\frac{3\sqrt{182}i}{2912}$	0	$\frac{3\sqrt{182}}{364}$	
	$\frac{3\sqrt{182}}{364}$	0	0	$\frac{\sqrt{2730}i}{416}$	0	$\frac{3\sqrt{2730}}{2912}$	0	0	0	$\frac{3\sqrt{182}i}{2912}$	0	$\frac{33\sqrt{182}}{2912}$	0	
	0	$-\frac{3\sqrt{182}}{364}$	$-\frac{\sqrt{2730}i}{416}$	0	$\frac{3\sqrt{2730}}{2912}$	0	0	0	$-\frac{3\sqrt{182}i}{2912}$	0	$\frac{33\sqrt{182}}{2912}$	0	0	
	0	$\frac{3\sqrt{182}i}{182}$	$\frac{\sqrt{2730}}{364}$	0	0	0	0	0	$-\frac{3\sqrt{182}}{364}$	0	0	0	$\frac{3\sqrt{182}}{182}$	
	$-\frac{3\sqrt{182}i}{182}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{3\sqrt{182}}{364}$	0	0	$\frac{3\sqrt{182}}{182}$	0	
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
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{3\sqrt{182}i}{182} \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{182}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{182}}{182}$
	$\frac{3\sqrt{182}i}{182}$	$0 \quad 0 \quad \frac{\sqrt{2730}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{182}}{364} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{182}}{182} \quad 0$
	$-\frac{\sqrt{2730}}{364}$	$0 \quad 0 \quad -\frac{25\sqrt{182}i}{2912} \quad 0 \quad -\frac{5\sqrt{182}}{2912} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{2730}i}{2912} \quad 0 \quad -\frac{9\sqrt{2730}}{2912} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{2730}}{364} \quad \frac{25\sqrt{182}i}{2912} \quad 0 \quad -\frac{5\sqrt{182}}{2912} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{2730}i}{2912} \quad 0 \quad -\frac{9\sqrt{2730}}{2912} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{5\sqrt{182}}{2912} \quad 0 \quad -\frac{5\sqrt{182}i}{416} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{416} \quad 0 \quad \frac{\sqrt{2730}i}{2912} \quad \frac{\sqrt{2730}}{364} \quad 0$
	0	$0 \quad 0 \quad -\frac{5\sqrt{182}}{2912} \quad 0 \quad \frac{5\sqrt{182}i}{416} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{416} \quad 0 \quad -\frac{\sqrt{2730}i}{2912} \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{364}$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	$\frac{3\sqrt{182}}{364}$	$0 \quad 0 \quad -\frac{3\sqrt{2730}i}{2912} \quad 0 \quad -\frac{\sqrt{2730}}{416} \quad 0 \quad 0 \quad 0 \quad \frac{33\sqrt{182}i}{2912} \quad 0 \quad \frac{3\sqrt{182}}{2912} \quad 0 \quad 0$
	0	$-\frac{3\sqrt{182}}{364} \quad \frac{3\sqrt{2730}i}{2912} \quad 0 \quad -\frac{\sqrt{2730}}{416} \quad 0 \quad 0 \quad 0 \quad -\frac{33\sqrt{182}i}{2912} \quad 0 \quad \frac{3\sqrt{182}}{2912} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{9\sqrt{2730}}{2912} \quad 0 \quad \frac{\sqrt{2730}i}{2912} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{182}}{2912} \quad 0 \quad \frac{27\sqrt{182}i}{2912} \quad \frac{3\sqrt{182}}{364} \quad 0$
	0	$0 \quad 0 \quad -\frac{9\sqrt{2730}}{2912} \quad 0 \quad -\frac{\sqrt{2730}i}{2912} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{182}}{2912} \quad 0 \quad -\frac{27\sqrt{182}i}{2912} \quad 0 \quad 0 \quad -\frac{3\sqrt{182}}{364}$
	0	$0 \quad -\frac{3\sqrt{182}}{182} \quad 0 \quad 0 \quad \frac{\sqrt{2730}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{182}}{364} \quad 0 \quad 0 \quad \frac{3\sqrt{182}i}{182}$
	$-\frac{3\sqrt{182}}{182}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{182}}{364} \quad -\frac{3\sqrt{182}i}{182} \quad 0$

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														
$\mathbb{M}_{7,0}^{(1,-1;a)}(E_g, 3)$	0	$\frac{\sqrt{6006}}{1001}$	0	0	$\frac{\sqrt{10010}}{2002}$	0	0	$\frac{\sqrt{10010i}}{1001}$	0	0	$-\frac{3\sqrt{6006}}{2002}$	0	0	0	0	
	$\frac{\sqrt{6006}}{1001}$	0	0	0	0	$-\frac{\sqrt{10010}}{2002}$	$-\frac{\sqrt{10010i}}{1001}$	0	0	0	0	$\frac{3\sqrt{6006}}{2002}$	0	0	0	
	0	0	0	$-\frac{25\sqrt{6006}}{13728}$	0	$\frac{5\sqrt{6006i}}{32032}$	$-\frac{5\sqrt{6006}}{2002}$	0	0	$-\frac{45\sqrt{10010}}{32032}$	0	$-\frac{\sqrt{10010i}}{2464}$	$\frac{\sqrt{10010}}{1001}$	0	0	0
	0	0	$-\frac{25\sqrt{6006}}{13728}$	0	$-\frac{5\sqrt{6006i}}{32032}$	0	0	$\frac{5\sqrt{6006}}{2002}$	$-\frac{45\sqrt{10010}}{32032}$	0	$\frac{\sqrt{10010i}}{2464}$	0	0	$-\frac{\sqrt{10010}}{1001}$	0	
	$\frac{\sqrt{10010}}{2002}$	0	0	$\frac{5\sqrt{6006i}}{32032}$	0	$-\frac{25\sqrt{6006}}{96096}$	0	0	0	$\frac{\sqrt{10010i}}{2464}$	0	$\frac{\sqrt{10010}}{2912}$	0	0	0	
	0	$-\frac{\sqrt{10010}}{2002}$	$-\frac{5\sqrt{6006i}}{32032}$	0	$-\frac{25\sqrt{6006}}{96096}$	0	0	0	$-\frac{\sqrt{10010i}}{2464}$	0	$\frac{\sqrt{10010}}{2912}$	0	0	0	0	
	0	$\frac{\sqrt{10010i}}{1001}$	$-\frac{5\sqrt{6006}}{2002}$	0	0	0	0	$\frac{10\sqrt{6006}}{3003}$	$-\frac{5\sqrt{10010}}{2002}$	0	0	0	0	$-\frac{\sqrt{10010}}{1001}$	0	
	$-\frac{\sqrt{10010i}}{1001}$	0	0	$\frac{5\sqrt{6006}}{2002}$	0	0	$\frac{10\sqrt{6006}}{3003}$	0	0	$\frac{5\sqrt{10010}}{2002}$	0	0	0	$-\frac{\sqrt{10010}}{1001}$	0	
	0	0	0	$-\frac{45\sqrt{10010}}{32032}$	0	$\frac{\sqrt{10010i}}{2464}$	$-\frac{5\sqrt{10010}}{2002}$	0	0	$-\frac{67\sqrt{6006}}{32032}$	0	$-\frac{5\sqrt{6006i}}{4576}$	$\frac{\sqrt{6006}}{1001}$	0	0	0
	0	0	$-\frac{45\sqrt{10010}}{32032}$	0	$-\frac{\sqrt{10010i}}{2464}$	0	0	$\frac{5\sqrt{10010}}{2002}$	$-\frac{67\sqrt{6006}}{32032}$	0	$\frac{5\sqrt{6006i}}{4576}$	0	0	$-\frac{\sqrt{6006}}{1001}$	0	
	$-\frac{3\sqrt{6006}}{2002}$	0	0	$-\frac{\sqrt{10010i}}{2464}$	0	$\frac{\sqrt{10010}}{2912}$	0	0	0	$-\frac{5\sqrt{6006i}}{4576}$	0	$-\frac{37\sqrt{6006}}{32032}$	0	0	0	
	0	$\frac{3\sqrt{6006}}{2002}$	$\frac{\sqrt{10010i}}{2464}$	0	$\frac{\sqrt{10010}}{2912}$	0	0	0	$\frac{5\sqrt{6006i}}{4576}$	0	$-\frac{37\sqrt{6006}}{32032}$	0	0	0	0	
	0	0	$\frac{\sqrt{10010}}{1001}$	0	0	0	0	$-\frac{\sqrt{10010}}{1001}$	$\frac{\sqrt{6006}}{1001}$	0	0	0	0	$\frac{\sqrt{6006}}{1001}$	0	
	0	0	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$-\frac{\sqrt{6006}}{1001}$	0	0	$\frac{\sqrt{6006}}{1001}$	0	0	

$$-\frac{\sqrt{7}y(5x^6 + 15x^4y^2 - 120x^4z^2 + 15x^2y^4 - 240x^2y^2z^2 + 240x^2z^4 + 5y^6 - 120y^4z^2 + 240y^2z^4 - 64z^6)}{32}$$

999 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 3)$	0	$-\frac{\sqrt{6006}i}{1001}$	$\frac{\sqrt{10010}}{2002}$	0	0	0	0	$-\frac{\sqrt{10010}}{1001}$	$\frac{3\sqrt{6006}}{2002}$	0	0	0	0	0	0	
	$\frac{\sqrt{6006}i}{1001}$	0	0	$-\frac{\sqrt{10010}}{2002}$	0	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$-\frac{3\sqrt{6006}}{2002}$	0	0	0	0	0	
	$\frac{\sqrt{10010}}{2002}$	0	0	$\frac{25\sqrt{6006}i}{96096}$	0	$-\frac{5\sqrt{6006}}{32032}$	0	0	0	$\frac{\sqrt{10010}i}{2912}$	0	$\frac{\sqrt{10010}}{2464}$	0	$\frac{\sqrt{10010}}{2464}$	0	
	0	$-\frac{\sqrt{10010}}{2002}$	$-\frac{25\sqrt{6006}i}{96096}$	0	$-\frac{5\sqrt{6006}}{32032}$	0	0	0	$-\frac{\sqrt{10010}i}{2912}$	0	$\frac{\sqrt{10010}}{2464}$	0	0	0	0	
	0	0	0	$-\frac{5\sqrt{6006}}{32032}$	0	$\frac{25\sqrt{6006}i}{13728}$	$-\frac{5\sqrt{6006}}{2002}$	0	0	$-\frac{\sqrt{10010}}{2464}$	0	$-\frac{45\sqrt{10010}i}{32032}$	$-\frac{\sqrt{10010}}{1001}$	0	0	
	0	0	$-\frac{5\sqrt{6006}}{32032}$	0	$-\frac{25\sqrt{6006}i}{13728}$	0	0	$\frac{5\sqrt{6006}}{2002}$	$-\frac{\sqrt{10010}}{2464}$	0	$\frac{45\sqrt{10010}i}{32032}$	0	0	$\frac{\sqrt{10010}}{1001}$	0	
	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$-\frac{5\sqrt{6006}}{2002}$	0	0	$-\frac{10\sqrt{6006}i}{3003}$	0	0	$\frac{5\sqrt{10010}}{2002}$	0	0	0	$-\frac{\sqrt{10010}i}{1001}$	0
	$-\frac{\sqrt{10010}}{1001}$	0	0	0	0	$\frac{5\sqrt{6006}}{2002}$	$\frac{10\sqrt{6006}i}{3003}$	0	0	0	0	$-\frac{5\sqrt{10010}}{2002}$	$\frac{\sqrt{10010}i}{1001}$	0	0	
	$\frac{3\sqrt{6006}}{2002}$	0	0	$\frac{\sqrt{10010}i}{2912}$	0	$-\frac{\sqrt{10010}}{2464}$	0	0	0	$\frac{37\sqrt{6006}i}{32032}$	0	$\frac{5\sqrt{6006}}{4576}$	0	0	0	
	0	$-\frac{3\sqrt{6006}}{2002}$	$-\frac{\sqrt{10010}i}{2912}$	0	$-\frac{\sqrt{10010}}{2464}$	0	0	0	$-\frac{37\sqrt{6006}i}{32032}$	0	$\frac{5\sqrt{6006}}{4576}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{10010}}{2464}$	0	$-\frac{45\sqrt{10010}i}{32032}$	$\frac{5\sqrt{10010}}{2002}$	0	0	$\frac{5\sqrt{6006}}{4576}$	0	$\frac{67\sqrt{6006}i}{32032}$	$\frac{\sqrt{6006}}{1001}$	0	0	
	0	0	$\frac{\sqrt{10010}}{2464}$	0	$\frac{45\sqrt{10010}i}{32032}$	0	0	$-\frac{5\sqrt{10010}}{2002}$	$\frac{5\sqrt{6006}}{4576}$	0	$-\frac{67\sqrt{6006}i}{32032}$	0	0	$-\frac{\sqrt{6006}}{1001}$	0	
	0	0	0	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$-\frac{\sqrt{10010}i}{1001}$	0	0	$\frac{\sqrt{6006}}{1001}$	0	0	0	$-\frac{\sqrt{6006}i}{1001}$	0
	0	0	0	0	0	$\frac{\sqrt{10010}}{1001}$	$\frac{\sqrt{10010}i}{1001}$	0	0	0	0	0	$-\frac{\sqrt{6006}}{1001}$	$\frac{\sqrt{6006}i}{1001}$	0	
1000	symmetry	$\frac{\sqrt{231}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)(3x^2 + 3y^2 - 10z^2)}{16}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,0}^{(1,-1;a)}(E_g, 4)$	$\frac{3\sqrt{182}}{182}$	0	0	$\frac{\sqrt{2730}i}{728}$	0	$-\frac{\sqrt{2730}}{728}$	0	0	0	$\frac{9\sqrt{182}i}{728}$	0	$\frac{9\sqrt{182}}{728}$	0	0	0	
	0	$-\frac{3\sqrt{182}}{182}$	$-\frac{\sqrt{2730}i}{728}$	0	$-\frac{\sqrt{2730}}{728}$	0	0	0	$-\frac{9\sqrt{182}i}{728}$	0	$\frac{9\sqrt{182}}{728}$	0	0	0	0	
	0	$\frac{\sqrt{2730}i}{728}$	$\frac{15\sqrt{182}}{1456}$	0	0	0	0	$-\frac{5\sqrt{182}}{728}$	$\frac{\sqrt{2730}}{1456}$	0	0	0	0	$\frac{\sqrt{2730}}{364}$		
	$-\frac{\sqrt{2730}i}{728}$	0	0	$-\frac{15\sqrt{182}}{1456}$	0	0	$-\frac{5\sqrt{182}}{728}$	0	0	$-\frac{\sqrt{2730}}{1456}$	0	0	$\frac{\sqrt{2730}}{364}$	0		
	0	$-\frac{\sqrt{2730}}{728}$	0	0	$\frac{15\sqrt{182}}{1456}$	0	0	$\frac{5\sqrt{182}i}{728}$	0	0	$-\frac{\sqrt{2730}}{1456}$	0	0	$\frac{\sqrt{2730}i}{364}$		
	$-\frac{\sqrt{2730}}{728}$	0	0	0	0	$-\frac{15\sqrt{182}}{1456}$	$-\frac{5\sqrt{182}i}{728}$	0	0	0	0	$\frac{\sqrt{2730}}{1456}$	$-\frac{\sqrt{2730}i}{364}$	0		
	0	0	0	$-\frac{5\sqrt{182}}{728}$	0	$\frac{5\sqrt{182}i}{728}$	0	0	0	$\frac{\sqrt{2730}}{728}$	0	$\frac{\sqrt{2730}i}{728}$	0	0		
	0	0	$-\frac{5\sqrt{182}}{728}$	0	$-\frac{5\sqrt{182}i}{728}$	0	0	0	$\frac{\sqrt{2730}}{728}$	0	$-\frac{\sqrt{2730}i}{728}$	0	0	0		
	0	$\frac{9\sqrt{182}i}{728}$	$\frac{\sqrt{2730}}{1456}$	0	0	0	0	$\frac{\sqrt{2730}}{728}$	$-\frac{15\sqrt{182}}{1456}$	0	0	0	0	$\frac{3\sqrt{182}}{364}$		
	$-\frac{9\sqrt{182}i}{728}$	0	0	$-\frac{\sqrt{2730}}{1456}$	0	0	$\frac{\sqrt{2730}}{728}$	0	0	$\frac{15\sqrt{182}}{1456}$	0	0	$\frac{3\sqrt{182}}{364}$	0		
	0	$\frac{9\sqrt{182}}{728}$	0	0	$-\frac{\sqrt{2730}}{1456}$	0	0	$\frac{\sqrt{2730}i}{728}$	0	0	$-\frac{15\sqrt{182}}{1456}$	0	0	$-\frac{3\sqrt{182}i}{364}$		
	$\frac{9\sqrt{182}}{728}$	0	0	0	0	$\frac{\sqrt{2730}}{1456}$	$-\frac{\sqrt{2730}i}{728}$	0	0	0	0	$\frac{15\sqrt{182}}{1456}$	$\frac{3\sqrt{182}i}{364}$	0		
	0	0	0	$\frac{\sqrt{2730}}{364}$	0	$\frac{\sqrt{2730}i}{364}$	0	0	0	$\frac{3\sqrt{182}}{364}$	0	$-\frac{3\sqrt{182}i}{364}$	$-\frac{3\sqrt{182}}{182}$	0		
	0	0	$\frac{\sqrt{2730}}{364}$	0	$-\frac{\sqrt{2730}i}{364}$	0	0	0	$\frac{3\sqrt{182}}{364}$	0	$\frac{3\sqrt{182}i}{364}$	0	0	$\frac{3\sqrt{182}}{182}$		
1001	symmetry	$\frac{\sqrt{231}xyz(x-y)(x+y)(3x^2+3y^2-10z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 4)$	0	0	0	$\frac{\sqrt{2730}}{364}$	0	$\frac{\sqrt{2730}i}{364}$	0	0	0	$\frac{3\sqrt{182}}{364}$	0	$-\frac{3\sqrt{182}i}{364}$	$-\frac{3\sqrt{182}}{182}$	0		
	0	0	$\frac{\sqrt{2730}}{364}$	0	$-\frac{\sqrt{2730}i}{364}$	0	0	0	$\frac{3\sqrt{182}}{364}$	0	$\frac{3\sqrt{182}i}{364}$	0	0	$\frac{3\sqrt{182}}{182}$		
	0	$\frac{\sqrt{2730}}{364}$	0	0	0	0	0	$\frac{5\sqrt{182}i}{728}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$-\frac{\sqrt{2730}i}{728}$		
	$\frac{\sqrt{2730}}{364}$	0	0	0	0	0	$-\frac{5\sqrt{182}i}{728}$	0	0	0	0	$\frac{\sqrt{2730}}{364}$	$\frac{\sqrt{2730}i}{728}$	0		
	0	$\frac{\sqrt{2730}i}{364}$	0	0	0	0	0	$\frac{5\sqrt{182}}{728}$	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{\sqrt{2730}}{728}$		
	$-\frac{\sqrt{2730}i}{364}$	0	0	0	0	0	$\frac{5\sqrt{182}}{728}$	0	0	$\frac{\sqrt{2730}}{364}$	0	0	$\frac{\sqrt{2730}}{728}$	0		
	0	0	0	$\frac{5\sqrt{182}i}{728}$	0	$\frac{5\sqrt{182}}{728}$	0	0	0	$-\frac{\sqrt{2730}i}{728}$	0	$\frac{\sqrt{2730}}{728}$	0	0		
	0	0	$-\frac{5\sqrt{182}i}{728}$	0	$\frac{5\sqrt{182}}{728}$	0	0	0	$\frac{\sqrt{2730}i}{728}$	0	$\frac{\sqrt{2730}}{728}$	0	0	0		
	0	$\frac{3\sqrt{182}}{364}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$-\frac{\sqrt{2730}i}{728}$	0	0	0	0	0	$-\frac{9\sqrt{182}i}{728}$		
	$\frac{3\sqrt{182}}{364}$	0	0	0	0	$\frac{\sqrt{2730}}{364}$	$\frac{\sqrt{2730}i}{728}$	0	0	0	0	0	0	$\frac{9\sqrt{182}i}{728}$		
	0	$-\frac{3\sqrt{182}i}{364}$	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$\frac{\sqrt{2730}}{728}$	0	0	0	0	0	0	$-\frac{9\sqrt{182}}{728}$	
	$\frac{3\sqrt{182}i}{364}$	0	0	$\frac{\sqrt{2730}}{364}$	0	0	$\frac{\sqrt{2730}}{728}$	0	0	0	0	0	0	0	$-\frac{9\sqrt{182}}{728}$	
	$-\frac{3\sqrt{182}}{182}$	0	0	$-\frac{\sqrt{2730}i}{728}$	0	$\frac{\sqrt{2730}}{728}$	0	0	0	$-\frac{9\sqrt{182}i}{728}$	0	$-\frac{9\sqrt{182}}{728}$	0	0		
	0	$\frac{3\sqrt{182}}{182}$	$\frac{\sqrt{2730}i}{728}$	0	$\frac{\sqrt{2730}}{728}$	0	0	0	$\frac{9\sqrt{182}i}{728}$	0	$-\frac{9\sqrt{182}}{728}$	0	0	0		

$$-\frac{\sqrt{42}z(x-y)(x+y)(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{32}$$

1002 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{7,0}^{(1,-1;a)}(E_g, 5)$	0 0 0 $\frac{\sqrt{15015}i}{8008}$ 0 $\frac{\sqrt{15015}}{8008}$ 0 0 0 $-\frac{3\sqrt{1001}i}{8008}$ 0 $\frac{3\sqrt{1001}}{8008}$ 0 0		0 0 $-\frac{\sqrt{15015}i}{8008}$ 0 $\frac{\sqrt{15015}}{8008}$ 0 0 0 $\frac{3\sqrt{1001}i}{8008}$ 0 $\frac{3\sqrt{1001}}{8008}$ 0 0 0	0 $\frac{\sqrt{15015}i}{8008}$ $-\frac{75\sqrt{1001}}{16016}$ 0 0 0 0 $\frac{5\sqrt{1001}}{1001}$ $-\frac{17\sqrt{15015}}{16016}$ 0 0 0 $-\frac{\sqrt{15015}}{1144}$	0 $-\frac{\sqrt{15015}i}{8008}$ 0 0 $\frac{75\sqrt{1001}}{16016}$ 0 0 $\frac{5\sqrt{1001}}{1001}$ 0 0 $\frac{17\sqrt{15015}}{16016}$ 0 0 $-\frac{\sqrt{15015}}{1144}$ 0	0 $\frac{\sqrt{15015}}{8008}$ 0 0 $\frac{75\sqrt{1001}}{16016}$ 0 0 $\frac{5\sqrt{1001}i}{1001}$ 0 0 $-\frac{17\sqrt{15015}}{16016}$ 0 0 $\frac{\sqrt{15015}i}{1144}$	$\frac{\sqrt{15015}}{8008}$ 0 0 0 0 $-\frac{75\sqrt{1001}}{16016}$ $-\frac{5\sqrt{1001}i}{1001}$ 0 0 0 0 $\frac{17\sqrt{15015}}{16016}$ $-\frac{\sqrt{15015}i}{1144}$ 0	0 0 0 $\frac{5\sqrt{1001}}{1001}$ 0 $\frac{5\sqrt{1001}i}{1001}$ 0 0 0 $\frac{\sqrt{15015}}{1001}$ 0 $-\frac{\sqrt{15015}i}{1001}$ $-\frac{2\sqrt{15015}}{1001}$ 0	0 0 $\frac{5\sqrt{1001}}{1001}$ 0 $-\frac{5\sqrt{1001}i}{1001}$ 0 0 0 $\frac{\sqrt{15015}}{1001}$ 0 $\frac{\sqrt{15015}i}{1001}$ 0 0 $\frac{2\sqrt{15015}}{1001}$	0 $-\frac{3\sqrt{1001}i}{8008}$ $-\frac{17\sqrt{15015}}{16016}$ 0 0 0 0 $\frac{\sqrt{15015}}{1001}$ $-\frac{45\sqrt{1001}}{16016}$ 0 0 0 0 $-\frac{27\sqrt{1001}}{8008}$	$\frac{3\sqrt{1001}i}{8008}$ 0 0 $\frac{17\sqrt{15015}}{16016}$ 0 0 $\frac{\sqrt{15015}}{1001}$ 0 0 $\frac{45\sqrt{1001}}{16016}$ 0 0 0 $-\frac{27\sqrt{1001}}{8008}$ 0	0 $\frac{3\sqrt{1001}}{8008}$ 0 0 $-\frac{17\sqrt{15015}}{16016}$ 0 0 $-\frac{\sqrt{15015}i}{1001}$ 0 0 $\frac{45\sqrt{1001}}{16016}$ 0 0 0 $-\frac{27\sqrt{1001}i}{8008}$	$\frac{3\sqrt{1001}}{8008}$ 0 0 0 0 $\frac{17\sqrt{15015}}{16016}$ $\frac{\sqrt{15015}i}{1001}$ 0 0 0 0 $-\frac{45\sqrt{1001}}{16016}$ $\frac{27\sqrt{1001}i}{8008}$ 0	0 0 0 $-\frac{\sqrt{15015}}{1144}$ 0 $\frac{\sqrt{15015}i}{1144}$ 0 0 0 $-\frac{27\sqrt{1001}}{8008}$ 0 $-\frac{27\sqrt{1001}i}{8008}$ 0 0	0 0 $-\frac{\sqrt{15015}}{1144}$ 0 $-\frac{\sqrt{15015}i}{1144}$ 0 0 $\frac{2\sqrt{15015}}{1001}$ $-\frac{27\sqrt{1001}}{8008}$ 0 $\frac{27\sqrt{1001}i}{8008}$ 0 0 0
1003	symmetry	$\frac{\sqrt{42}xyz(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 5)$	0	0	0	$\frac{5\sqrt{15015}}{8008}$	0	$-\frac{5\sqrt{15015}i}{8008}$	$\frac{2\sqrt{15015}}{1001}$	0	0	$\frac{3\sqrt{1001}}{728}$	0	$\frac{3\sqrt{1001}i}{728}$	0	0	0	
	0	0	$\frac{5\sqrt{15015}}{8008}$	0	$\frac{5\sqrt{15015}i}{8008}$	0	0	$-\frac{2\sqrt{15015}}{1001}$	$\frac{3\sqrt{1001}}{728}$	0	$-\frac{3\sqrt{1001}i}{728}$	0	0	0	0	
	0	$\frac{5\sqrt{15015}}{8008}$	0	0	$\frac{15\sqrt{1001}}{16016}$	0	0	$\frac{5\sqrt{1001}i}{2002}$	0	0	$-\frac{\sqrt{15015}}{1232}$	0	0	0	$-\frac{\sqrt{15015}i}{8008}$	
	$\frac{5\sqrt{15015}}{8008}$	0	0	0	0	$-\frac{15\sqrt{1001}}{16016}$	$-\frac{5\sqrt{1001}i}{2002}$	0	0	0	0	$\frac{\sqrt{15015}}{1232}$	$\frac{\sqrt{15015}i}{8008}$	0		
	0	$-\frac{5\sqrt{15015}i}{8008}$	$\frac{15\sqrt{1001}}{16016}$	0	0	0	0	$-\frac{5\sqrt{1001}}{2002}$	$\frac{\sqrt{15015}}{1232}$	0	0	0	0	$-\frac{\sqrt{15015}}{8008}$		
	$\frac{5\sqrt{15015}i}{8008}$	0	0	$-\frac{15\sqrt{1001}}{16016}$	0	0	$-\frac{5\sqrt{1001}}{2002}$	0	0	$-\frac{\sqrt{15015}}{1232}$	0	0	0	$-\frac{\sqrt{15015}}{8008}$	0	
	$\frac{2\sqrt{15015}}{1001}$	0	0	$\frac{5\sqrt{1001}i}{2002}$	0	$-\frac{5\sqrt{1001}}{2002}$	0	0	0	$\frac{3\sqrt{15015}i}{2002}$	0	$\frac{3\sqrt{15015}}{2002}$	0	0	0	
	0	$-\frac{2\sqrt{15015}}{1001}$	$-\frac{5\sqrt{1001}i}{2002}$	0	$-\frac{5\sqrt{1001}}{2002}$	0	0	0	$-\frac{3\sqrt{15015}i}{2002}$	0	$\frac{3\sqrt{15015}}{2002}$	0	0	0		
	0	$\frac{3\sqrt{1001}}{728}$	0	0	$\frac{\sqrt{15015}}{1232}$	0	0	$\frac{3\sqrt{15015}i}{2002}$	0	0	$-\frac{15\sqrt{1001}}{2288}$	0	0	0	$\frac{3\sqrt{1001}i}{8008}$	
	$\frac{3\sqrt{1001}}{728}$	0	0	0	0	$-\frac{\sqrt{15015}}{1232}$	$-\frac{3\sqrt{15015}i}{2002}$	0	0	0	$\frac{15\sqrt{1001}}{2288}$	$-\frac{3\sqrt{1001}i}{8008}$	0			
	0	$\frac{3\sqrt{1001}i}{728}$	$-\frac{\sqrt{15015}}{1232}$	0	0	0	0	$\frac{3\sqrt{15015}}{2002}$	$-\frac{15\sqrt{1001}}{2288}$	0	0	0	0	$-\frac{3\sqrt{1001}}{8008}$		
	$-\frac{3\sqrt{1001}i}{728}$	0	0	$\frac{\sqrt{15015}}{1232}$	0	0	$\frac{3\sqrt{15015}}{2002}$	0	0	$\frac{15\sqrt{1001}}{2288}$	0	0	0	$-\frac{3\sqrt{1001}}{8008}$	0	
	0	0	0	$-\frac{\sqrt{15015}i}{8008}$	0	$-\frac{\sqrt{15015}}{8008}$	0	0	0	$\frac{3\sqrt{1001}i}{8008}$	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	0	
	0	0	$\frac{\sqrt{15015}i}{8008}$	0	$-\frac{\sqrt{15015}}{8008}$	0	0	0	$-\frac{3\sqrt{1001}i}{8008}$	0	$-\frac{3\sqrt{1001}}{8008}$	0	0	0		

1004 symmetry

z

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_1^{(1,1;a)}(A_{2g})$	0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0 0														
	0 0 $-\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0 0 0														
	0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{105}}{105}$ 0 0 0 0 $-\frac{\sqrt{105}}{280}$ $\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $\frac{\sqrt{7}}{56}$														
	$-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}}{105}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}}{56}$ 0														
	0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 $\frac{\sqrt{105}i}{280}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0														
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{105}}{105}$ $-\frac{\sqrt{105}i}{280}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{7}i}{56}$ 0														
	0 0 0 $-\frac{\sqrt{105}}{280}$ 0 $\frac{\sqrt{105}i}{280}$ $\frac{2\sqrt{105}}{105}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0														
	0 0 $-\frac{\sqrt{105}}{280}$ 0 $-\frac{\sqrt{105}i}{280}$ 0 0 $-\frac{2\sqrt{105}}{105}$ $-\frac{\sqrt{7}}{56}$ 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 0														
	0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$														
	0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0														
	0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{105}i}{56}$ 0														
	0 0 0 0 0 $\frac{\sqrt{7}}{14}$ $\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 $\frac{\sqrt{105}i}{56}$ 0														
	0 0 0 $\frac{\sqrt{7}}{56}$ 0 $-\frac{\sqrt{7}i}{56}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0														

1005 symmetry

x

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{1,0}^{(1,1;a)}(E_g)$	0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0															
	0 0 0 0 0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0 0 0															
	0 0 0 $\frac{2\sqrt{105}}{105}$ 0 $\frac{\sqrt{105}i}{280}$ $-\frac{\sqrt{105}}{280}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{56}$ $\frac{\sqrt{7}}{56}$ 0															
	0 0 $\frac{2\sqrt{105}}{105}$ 0 $-\frac{\sqrt{105}i}{280}$ 0 0 $\frac{\sqrt{105}}{280}$ 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{7}}{56}$															
	$-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{105}i}{280}$ 0 $-\frac{\sqrt{105}}{105}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0															
	0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}i}{280}$ 0 $-\frac{\sqrt{105}}{105}$ 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0															
	0 $\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{105}}{280}$ 0 0 0 0 $-\frac{\sqrt{105}}{105}$ $-\frac{\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$															
	$-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{105}}{280}$ 0 0 $-\frac{\sqrt{105}}{105}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0															
	0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$ $-\frac{\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{105}i}{56}$ $-\frac{\sqrt{105}}{56}$ 0															
	0 0 0 0 $\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{105}i}{56}$ 0 0 0 0															
	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 $\frac{\sqrt{7}}{14}$ 0 0 0 $-\frac{\sqrt{105}i}{56}$ 0 0 0 0 0															
	0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}}{56}$ 0 0 0 0 0															
	0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{105}}{56}$ 0 0 0 0 0															

1006 symmetry

y

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0															
	0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 0 0 0 0															
	$-\frac{\sqrt{7}}{14}$ 0 0 $\frac{\sqrt{105}i}{105}$ 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 0															
	0 $\frac{\sqrt{7}}{14}$ $-\frac{\sqrt{105}i}{105}$ 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 $-\frac{\sqrt{7}}{56}$ 0 0 0															
	0 0 0 $-\frac{\sqrt{105}}{280}$ 0 $-\frac{2\sqrt{105}i}{105}$ $-\frac{\sqrt{105}}{280}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{7}}{56}$ 0															
	0 0 $-\frac{\sqrt{105}}{280}$ 0 $\frac{2\sqrt{105}i}{105}$ 0 0 $\frac{\sqrt{105}}{280}$ $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $\frac{\sqrt{7}}{56}$															
	0 $-\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 $\frac{\sqrt{105}i}{105}$ 0 0 $\frac{\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{7}i}{14}$															
	$-\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{105}}{280}$ $-\frac{\sqrt{105}i}{105}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ $\frac{\sqrt{7}i}{14}$ 0															
	0 0 0 $\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0															
	0 0 $-\frac{\sqrt{7}i}{14}$ 0 $\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0															
	0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{105}}{56}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0															
	0 0 0 0 $-\frac{\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $-\frac{\sqrt{105}}{56}$ 0 0 0															
1007 symmetry	0 0 0 0 0 $\frac{\sqrt{7}}{56}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{105}}{56}$ 0 0 0	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_3^{(1,1;a)}(A_{1g})$	0	$-\frac{\sqrt{770}i}{132}$	$-\frac{\sqrt{462}}{528}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	$-\frac{\sqrt{770}}{528}$	0	0	0	0	$\frac{\sqrt{770}}{132}$
	$\frac{\sqrt{770}i}{132}$	0	0	$\frac{\sqrt{462}}{528}$	0	0	$\frac{\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{770}}{528}$	0	0	$\frac{\sqrt{770}}{132}$	0
	$-\frac{\sqrt{462}}{528}$	0	0	$\frac{3\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	$\frac{\sqrt{462}i}{462}$	0	$-\frac{\sqrt{462}}{154}$	0	0
	0	$\frac{\sqrt{462}}{528}$	$-\frac{3\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	$-\frac{\sqrt{462}i}{462}$	0	$-\frac{\sqrt{462}}{154}$	0	0	0
	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{154}$	$\frac{\sqrt{770}}{176}$	0	0	$-\frac{2\sqrt{462}}{231}$	0	$-\frac{\sqrt{462}i}{616}$	$-\frac{\sqrt{462}}{528}$	0
	0	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{154}$	0	0	$-\frac{\sqrt{770}}{176}$	$-\frac{2\sqrt{462}}{231}$	0	$\frac{\sqrt{462}i}{616}$	0	0	$\frac{\sqrt{462}}{528}$
	0	$\frac{\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{770}}{176}$	0	0	0	0	0	$\frac{\sqrt{462}}{176}$	0	0	$-\frac{\sqrt{462}i}{1848}$
	$\frac{\sqrt{462}}{1848}$	0	0	0	0	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{\sqrt{462}}{176}$	$\frac{\sqrt{462}i}{1848}$	0
	$-\frac{\sqrt{770}}{528}$	0	0	$\frac{\sqrt{462}i}{462}$	0	$-\frac{2\sqrt{462}}{231}$	0	0	0	$-\frac{\sqrt{770}i}{264}$	0	$-\frac{\sqrt{770}}{1848}$	0	0
	0	$\frac{\sqrt{770}}{528}$	$-\frac{\sqrt{462}i}{462}$	0	$-\frac{2\sqrt{462}}{231}$	0	0	0	$\frac{\sqrt{770}i}{264}$	0	$-\frac{\sqrt{770}}{1848}$	0	0	0
	0	0	0	$-\frac{\sqrt{462}}{154}$	0	$-\frac{\sqrt{462}i}{616}$	$\frac{\sqrt{462}}{176}$	0	0	$-\frac{\sqrt{770}}{1848}$	0	$-\frac{\sqrt{770}i}{132}$	$\frac{\sqrt{770}}{528}$	0
	0	0	$-\frac{\sqrt{462}}{154}$	0	$\frac{\sqrt{462}i}{616}$	0	0	$-\frac{\sqrt{462}}{176}$	$-\frac{\sqrt{770}}{1848}$	0	$\frac{\sqrt{770}i}{132}$	0	0	$-\frac{\sqrt{770}}{528}$
	0	$\frac{\sqrt{770}}{132}$	0	0	$-\frac{\sqrt{462}}{528}$	0	0	$-\frac{\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{770}}{528}$	0	0	$\frac{\sqrt{770}i}{132}$
	$\frac{\sqrt{770}}{132}$	0	0	0	0	$\frac{\sqrt{462}}{528}$	$\frac{\sqrt{462}i}{1848}$	0	0	0	0	$-\frac{\sqrt{770}}{528}$	$-\frac{\sqrt{770}i}{132}$	0

1008 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{77}}{33}$	0	0	$-\frac{\sqrt{1155}i}{1848}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	0	$\frac{5\sqrt{77}i}{264}$	0	$\frac{5\sqrt{77}}{264}$	0	0	
	0	$\frac{\sqrt{77}}{33}$	$\frac{\sqrt{1155}i}{1848}$	0	$\frac{\sqrt{1155}}{1848}$	0	0	0	$-\frac{5\sqrt{77}i}{264}$	0	$\frac{5\sqrt{77}}{264}$	0	0	0	
	0	$-\frac{\sqrt{1155}i}{1848}$	$\frac{3\sqrt{77}}{308}$	0	0	0	0	$-\frac{5\sqrt{77}}{616}$	$-\frac{\sqrt{1155}}{924}$	0	0	0	0	$-\frac{3\sqrt{1155}}{616}$	
	$\frac{\sqrt{1155}i}{1848}$	0	0	$-\frac{3\sqrt{77}}{308}$	0	0	$-\frac{5\sqrt{77}}{616}$	0	0	$\frac{\sqrt{1155}}{924}$	0	0	$-\frac{3\sqrt{1155}}{616}$	0	
	0	$\frac{\sqrt{1155}}{1848}$	0	0	$\frac{3\sqrt{77}}{308}$	0	0	$\frac{5\sqrt{77}i}{616}$	0	0	$\frac{\sqrt{1155}}{924}$	0	0	$-\frac{3\sqrt{1155}i}{616}$	
	$\frac{\sqrt{1155}}{1848}$	0	0	0	0	$-\frac{3\sqrt{77}}{308}$	$-\frac{5\sqrt{77}i}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{924}$	$\frac{3\sqrt{1155}i}{616}$	0	
	0	0	0	$-\frac{5\sqrt{77}}{616}$	0	$\frac{5\sqrt{77}i}{616}$	$\frac{2\sqrt{77}}{77}$	0	0	$-\frac{5\sqrt{1155}}{1848}$	0	$-\frac{5\sqrt{1155}i}{1848}$	0	0	
	0	$-\frac{5\sqrt{77}}{616}$	0	$-\frac{5\sqrt{77}i}{616}$	0	0	$-\frac{2\sqrt{77}}{77}$	$-\frac{5\sqrt{1155}}{1848}$	0	$\frac{5\sqrt{1155}i}{1848}$	0	0	0	$-\frac{5\sqrt{77}}{1848}$	
	0	$\frac{5\sqrt{77}i}{264}$	$-\frac{\sqrt{1155}}{924}$	0	0	0	0	$-\frac{5\sqrt{1155}}{1848}$	$\frac{\sqrt{77}}{132}$	0	0	0	0	$-\frac{5\sqrt{77}}{1848}$	
	$-\frac{5\sqrt{77}i}{264}$	0	0	$\frac{\sqrt{1155}}{924}$	0	0	$-\frac{5\sqrt{1155}}{1848}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$-\frac{5\sqrt{77}}{1848}$	0	
	0	$\frac{5\sqrt{77}}{264}$	0	0	$\frac{\sqrt{1155}}{924}$	0	0	$-\frac{5\sqrt{1155}i}{1848}$	0	0	$\frac{\sqrt{77}}{132}$	0	0	$\frac{5\sqrt{77}i}{1848}$	
	$\frac{5\sqrt{77}}{264}$	0	0	0	0	$-\frac{\sqrt{1155}}{924}$	$\frac{5\sqrt{1155}i}{1848}$	0	0	0	0	$-\frac{\sqrt{77}}{132}$	$-\frac{5\sqrt{77}i}{1848}$	0	
	0	0	0	$-\frac{3\sqrt{1155}}{616}$	0	$-\frac{3\sqrt{1155}i}{616}$	0	0	0	$-\frac{5\sqrt{77}}{1848}$	0	$\frac{5\sqrt{77}i}{1848}$	$-\frac{\sqrt{77}}{33}$	0	
	0	0	$-\frac{3\sqrt{1155}}{616}$	0	$\frac{3\sqrt{1155}i}{616}$	0	0	0	$-\frac{5\sqrt{77}}{1848}$	0	$-\frac{5\sqrt{77}i}{1848}$	0	0	$\frac{\sqrt{77}}{33}$	

1009 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	0	$-\frac{\sqrt{770}}{132}$	0	0	$\frac{\sqrt{462}}{528}$	0	0	$\frac{\sqrt{462}i}{1848}$	0	0	$-\frac{\sqrt{770}}{528}$	0	0	$-\frac{\sqrt{770}i}{132}$	
	$-\frac{\sqrt{770}}{132}$	0	0	0	0	$-\frac{\sqrt{462}}{528}$	$-\frac{\sqrt{462}i}{1848}$	0	0	0	$\frac{\sqrt{770}}{528}$	$\frac{\sqrt{770}i}{132}$	0	0	
	0	0	0	$\frac{\sqrt{770}}{154}$	0	$-\frac{\sqrt{770}i}{616}$	$-\frac{\sqrt{770}}{176}$	0	0	$\frac{\sqrt{462}}{616}$	0	$\frac{2\sqrt{462}i}{231}$	$-\frac{\sqrt{462}}{528}$	0	
	0	0	$\frac{\sqrt{770}}{154}$	0	$\frac{\sqrt{770}i}{616}$	0	0	$\frac{\sqrt{770}}{176}$	$\frac{\sqrt{462}}{616}$	0	$-\frac{2\sqrt{462}i}{231}$	0	0	$\frac{\sqrt{462}}{528}$	
	$\frac{\sqrt{462}}{528}$	0	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	$\frac{\sqrt{462}i}{154}$	0	$-\frac{\sqrt{462}}{462}$	0	0	
	0	$-\frac{\sqrt{462}}{528}$	$\frac{\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	$-\frac{\sqrt{462}i}{154}$	0	$-\frac{\sqrt{462}}{462}$	0	0	0	
	0	$\frac{\sqrt{462}i}{1848}$	$-\frac{\sqrt{770}}{176}$	0	0	0	0	0	$\frac{\sqrt{462}}{176}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	
	$-\frac{\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{770}}{176}$	0	0	0	0	0	$-\frac{\sqrt{462}}{176}$	0	0	$\frac{\sqrt{462}}{1848}$	0	
	0	0	0	$\frac{\sqrt{462}}{616}$	0	$\frac{\sqrt{462}i}{154}$	$\frac{\sqrt{462}}{176}$	0	0	$-\frac{\sqrt{770}}{132}$	0	$-\frac{\sqrt{770}i}{1848}$	$-\frac{\sqrt{770}}{528}$	0	
	0	0	$\frac{\sqrt{462}}{616}$	0	$-\frac{\sqrt{462}i}{154}$	0	0	$-\frac{\sqrt{462}}{176}$	$-\frac{\sqrt{770}}{132}$	0	$\frac{\sqrt{770}i}{1848}$	0	0	$\frac{\sqrt{770}}{528}$	
	$-\frac{\sqrt{770}}{528}$	0	0	$\frac{2\sqrt{462}i}{231}$	0	$-\frac{\sqrt{462}}{462}$	0	0	0	$-\frac{\sqrt{770}i}{1848}$	0	$-\frac{\sqrt{770}}{264}$	0	0	
	0	$\frac{\sqrt{770}}{528}$	$-\frac{2\sqrt{462}i}{231}$	0	$-\frac{\sqrt{462}}{462}$	0	0	0	$\frac{\sqrt{770}i}{1848}$	0	$-\frac{\sqrt{770}}{264}$	0	0	0	
	0	$-\frac{\sqrt{770}i}{132}$	$-\frac{\sqrt{462}}{528}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	$-\frac{\sqrt{770}}{528}$	0	0	0	0	$\frac{\sqrt{770}}{132}$	
	$\frac{\sqrt{770}i}{132}$	0	0	$\frac{\sqrt{462}}{528}$	0	0	$\frac{\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{770}}{528}$	0	0	$\frac{\sqrt{770}}{132}$	0	
1010	symmetry	$\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_{3,0}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{462}}{132}$	0	0	$\frac{\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{770}i}{616}$	0	0	$\frac{5\sqrt{462}}{528}$	0	0	0
	$\frac{\sqrt{462}}{132}$	0	0	0	0	$-\frac{\sqrt{770}}{1232}$	$-\frac{\sqrt{770}i}{616}$	0	0	0	$-\frac{5\sqrt{462}}{528}$	0	0	0
	0	0	0	$-\frac{\sqrt{462}}{154}$	0	$-\frac{5\sqrt{462}i}{616}$	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{308}$	$-\frac{9\sqrt{770}}{1232}$	0
	0	0	$-\frac{\sqrt{462}}{154}$	0	$\frac{5\sqrt{462}i}{616}$	0	0	$\frac{5\sqrt{462}}{1232}$	$\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{308}$	0	0	$\frac{9\sqrt{770}}{1232}$
	$\frac{\sqrt{770}}{1232}$	0	0	$-\frac{5\sqrt{462}i}{616}$	0	$\frac{\sqrt{462}}{616}$	0	0	0	$-\frac{\sqrt{770}i}{308}$	0	0	0	0
	0	$-\frac{\sqrt{770}}{1232}$	$\frac{5\sqrt{462}i}{616}$	0	$\frac{\sqrt{462}}{616}$	0	0	0	$\frac{\sqrt{770}i}{308}$	0	0	0	0	0
	0	$\frac{\sqrt{770}i}{616}$	$-\frac{5\sqrt{462}}{1232}$	0	0	0	0	$-\frac{\sqrt{462}}{154}$	$-\frac{5\sqrt{770}}{1232}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$
	$-\frac{\sqrt{770}i}{616}$	0	0	$\frac{5\sqrt{462}}{1232}$	0	0	$-\frac{\sqrt{462}}{154}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{770}}{616}$	0
	0	0	0	$\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{308}$	$-\frac{5\sqrt{770}}{1232}$	0	0	$\frac{\sqrt{462}}{132}$	0	$-\frac{5\sqrt{462}i}{1848}$	$-\frac{5\sqrt{462}}{3696}$	0
	0	0	$\frac{\sqrt{770}}{616}$	0	$\frac{\sqrt{770}i}{308}$	0	0	$\frac{5\sqrt{770}}{1232}$	$\frac{\sqrt{462}}{132}$	0	$\frac{5\sqrt{462}i}{1848}$	0	0	$\frac{5\sqrt{462}}{3696}$
	$\frac{5\sqrt{462}}{528}$	0	0	$\frac{\sqrt{770}i}{308}$	0	0	0	0	0	$-\frac{5\sqrt{462}i}{1848}$	0	$-\frac{\sqrt{462}}{88}$	0	0
	0	$-\frac{5\sqrt{462}}{528}$	$-\frac{\sqrt{770}i}{308}$	0	0	0	0	0	$\frac{5\sqrt{462}i}{1848}$	0	$-\frac{\sqrt{462}}{88}$	0	0	0
	0	0	$-\frac{9\sqrt{770}}{1232}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$	$-\frac{5\sqrt{462}}{3696}$	0	0	0	0	$\frac{\sqrt{462}}{132}$
	0	0	0	$\frac{9\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{770}}{616}$	0	0	$\frac{5\sqrt{462}}{3696}$	0	0	$\frac{\sqrt{462}}{132}$	0
1011	symmetry	$\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$												

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{462}i}{132}$	$\frac{\sqrt{770}}{1232}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$	$-\frac{5\sqrt{462}}{528}$	0	0	0	0	0	0
	$\frac{\sqrt{462}i}{132}$	0	0	$-\frac{\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{770}}{616}$	0	0	$\frac{5\sqrt{462}}{528}$	0	0	0	0	0
	$\frac{\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{462}i}{616}$	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}}{308}$	0	0	0
	0	$-\frac{\sqrt{770}}{1232}$	$\frac{\sqrt{462}i}{616}$	0	$\frac{5\sqrt{462}}{616}$	0	0	0	0	$-\frac{\sqrt{770}}{308}$	0	0	0	0	0
	0	0	0	$\frac{5\sqrt{462}}{616}$	0	$\frac{\sqrt{462}i}{154}$	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{770}}{308}$	0	$\frac{\sqrt{770}i}{616}$	$\frac{9\sqrt{770}}{1232}$	0	0
	0	0	$\frac{5\sqrt{462}}{616}$	0	$-\frac{\sqrt{462}i}{154}$	0	0	$\frac{5\sqrt{462}}{1232}$	$\frac{\sqrt{770}}{308}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	$-\frac{9\sqrt{770}}{1232}$	0
	0	$-\frac{\sqrt{770}}{616}$	0	0	$-\frac{5\sqrt{462}}{1232}$	0	0	$\frac{\sqrt{462}i}{154}$	0	0	$\frac{5\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{770}i}{616}$	0
	$-\frac{\sqrt{770}}{616}$	0	0	0	0	$\frac{5\sqrt{462}}{1232}$	$-\frac{\sqrt{462}i}{154}$	0	0	0	0	$-\frac{5\sqrt{770}}{1232}$	$\frac{\sqrt{770}i}{616}$	0	
	$-\frac{5\sqrt{462}}{528}$	0	0	0	0	$\frac{\sqrt{770}}{308}$	0	0	0	$\frac{\sqrt{462}i}{88}$	0	$\frac{5\sqrt{462}}{1848}$	0	0	0
	0	$\frac{5\sqrt{462}}{528}$	0	0	$\frac{\sqrt{770}}{308}$	0	0	0	$-\frac{\sqrt{462}i}{88}$	0	$\frac{5\sqrt{462}}{1848}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{770}}{308}$	0	$\frac{\sqrt{770}i}{616}$	$\frac{5\sqrt{770}}{1232}$	0	0	$\frac{5\sqrt{462}}{1848}$	0	$-\frac{\sqrt{462}i}{132}$	$-\frac{5\sqrt{462}}{3696}$	0	0
	0	0	$-\frac{\sqrt{770}}{308}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	$-\frac{5\sqrt{770}}{1232}$	$\frac{5\sqrt{462}}{1848}$	0	$\frac{\sqrt{462}i}{132}$	0	0	$\frac{5\sqrt{462}}{3696}$	0
	0	0	0	0	$\frac{9\sqrt{770}}{1232}$	0	0	$-\frac{\sqrt{770}i}{616}$	0	0	$-\frac{5\sqrt{462}}{3696}$	0	0	$-\frac{\sqrt{462}i}{132}$	0
	0	0	0	0	0	$-\frac{9\sqrt{770}}{1232}$	$\frac{\sqrt{770}i}{616}$	0	0	0	0	$\frac{5\sqrt{462}}{3696}$	$\frac{\sqrt{462}i}{132}$	0	0

1012 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,0}^{(1,1;a)}(E_g, 2)$	0	0	0	$-\frac{3\sqrt{77}i}{616}$	0	$-\frac{3\sqrt{77}}{616}$	0	0	0	$-\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{264}$	0	0	
	0	0	$\frac{3\sqrt{77}i}{616}$	0	$-\frac{3\sqrt{77}}{616}$	0	0	0	$\frac{\sqrt{1155}i}{264}$	0	$\frac{\sqrt{1155}}{264}$	0	0	0	
	0	$-\frac{3\sqrt{77}i}{616}$	$\frac{\sqrt{1155}}{308}$	0	0	0	0	$\frac{3\sqrt{1155}}{616}$	$-\frac{\sqrt{77}}{308}$	0	0	0	0	$-\frac{\sqrt{77}}{616}$	
	$\frac{3\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{1155}}{308}$	0	0	$\frac{3\sqrt{1155}}{616}$	0	0	$\frac{\sqrt{77}}{308}$	0	0	$-\frac{\sqrt{77}}{616}$	0	
	0	$-\frac{3\sqrt{77}}{616}$	0	0	$-\frac{\sqrt{1155}}{308}$	0	0	$\frac{3\sqrt{1155}i}{616}$	0	0	$-\frac{\sqrt{77}}{308}$	0	0	$\frac{\sqrt{77}i}{616}$	
	$-\frac{3\sqrt{77}}{616}$	0	0	0	0	$\frac{\sqrt{1155}}{308}$	$-\frac{3\sqrt{1155}i}{616}$	0	0	0	0	$\frac{\sqrt{77}}{308}$	$-\frac{\sqrt{77}i}{616}$	0	
	0	0	0	$\frac{3\sqrt{1155}}{616}$	0	$\frac{3\sqrt{1155}i}{616}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$\frac{13\sqrt{77}i}{616}$	$\frac{\sqrt{77}}{154}$	0	
	0	0	$\frac{3\sqrt{1155}}{616}$	0	$-\frac{3\sqrt{1155}i}{616}$	0	0	0	$-\frac{13\sqrt{77}}{616}$	0	$-\frac{13\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{77}}{154}$	
	0	$-\frac{\sqrt{1155}i}{264}$	$-\frac{\sqrt{77}}{308}$	0	0	0	0	$-\frac{13\sqrt{77}}{616}$	$-\frac{\sqrt{1155}}{132}$	0	0	0	0	$\frac{\sqrt{1155}}{616}$	
	$\frac{\sqrt{1155}i}{264}$	0	0	$\frac{\sqrt{77}}{308}$	0	0	$-\frac{13\sqrt{77}}{616}$	0	0	$\frac{\sqrt{1155}}{132}$	0	0	$\frac{\sqrt{1155}}{616}$	0	
	0	$\frac{\sqrt{1155}}{264}$	0	0	$-\frac{\sqrt{77}}{308}$	0	0	$\frac{13\sqrt{77}i}{616}$	0	0	$\frac{\sqrt{1155}}{132}$	0	0	$\frac{\sqrt{1155}i}{616}$	
	$\frac{\sqrt{1155}}{264}$	0	0	0	0	$\frac{\sqrt{77}}{308}$	$-\frac{13\sqrt{77}i}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{132}$	$-\frac{\sqrt{1155}i}{616}$	0	
	0	0	0	$-\frac{\sqrt{77}}{616}$	0	$\frac{\sqrt{77}i}{616}$	$\frac{\sqrt{77}}{154}$	0	0	$\frac{\sqrt{1155}}{616}$	0	$\frac{\sqrt{1155}i}{616}$	0	0	
	0	0	$-\frac{\sqrt{77}}{616}$	0	$-\frac{\sqrt{77}i}{616}$	0	0	$-\frac{\sqrt{77}}{154}$	$\frac{\sqrt{1155}}{616}$	0	$-\frac{\sqrt{1155}i}{616}$	0	0	0	

1013 symmetry

 $\sqrt{15}xyz$ 

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{77}}{154}$ 0 $\frac{\sqrt{77}i}{154}$ $-\frac{\sqrt{77}}{154}$ 0 0 0 0 0 0 0 0	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{77}}{154} & 0 & \frac{\sqrt{77}i}{154} & -\frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{154} & 0 & -\frac{\sqrt{77}i}{154} & 0 & 0 & \frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & -\frac{\sqrt{1155}i}{154} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{\sqrt{77}i}{77} \\ -\frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{154} & \frac{\sqrt{1155}i}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & \frac{\sqrt{77}i}{77} & 0 \\ 0 & \frac{\sqrt{77}i}{154} & \frac{\sqrt{1155}}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{154} & \frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} \\ -\frac{\sqrt{77}i}{154} & 0 & 0 & -\frac{\sqrt{1155}}{154} & 0 & 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 \\ -\frac{\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{1155}i}{154} & 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & 0 & \frac{\sqrt{77}i}{77} & 0 & \frac{\sqrt{77}}{77} & 0 & 0 \\ 0 & \frac{\sqrt{77}}{154} & \frac{\sqrt{1155}i}{154} & 0 & \frac{\sqrt{1155}}{154} & 0 & 0 & 0 & -\frac{\sqrt{77}i}{77} & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & \frac{\sqrt{77}i}{77} & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & -\frac{\sqrt{1155}i}{462} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & -\frac{\sqrt{77}i}{77} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{462} & \frac{\sqrt{1155}i}{462} & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{462} \\ 0 & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & -\frac{\sqrt{1155}}{462} & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{77}i}{77} & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{462} & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}i}{77} & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{462} & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 \end{pmatrix}$													
	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$														
	1014 symmetry														

continued ...

Table 10

No.	multipole	matrix														
$M_5^{(1,1;a)}(A_{1g})$	0	$-\frac{3\sqrt{1430}i}{572}$	$-\frac{9\sqrt{858}}{2288}$	0	0	0	0	$-\frac{\sqrt{858}}{429}$	$-\frac{9\sqrt{1430}}{2288}$	0	0	0	0	0	$\frac{3\sqrt{1430}}{572}$	
	$\frac{3\sqrt{1430}i}{572}$	0	0	$\frac{9\sqrt{858}}{2288}$	0	0	$-\frac{\sqrt{858}}{429}$	0	0	$\frac{9\sqrt{1430}}{2288}$	0	0	$\frac{3\sqrt{1430}}{572}$	0	0	
	$-\frac{9\sqrt{858}}{2288}$	0	0	$-\frac{5\sqrt{1430}i}{2288}$	0	$-\frac{\sqrt{1430}}{4576}$	0	0	0	$\frac{\sqrt{858}i}{6864}$	0	$\frac{73\sqrt{858}}{13728}$	0	0	0	
	0	$\frac{9\sqrt{858}}{2288}$	$\frac{5\sqrt{1430}i}{2288}$	0	$-\frac{\sqrt{1430}}{4576}$	0	0	0	$-\frac{\sqrt{858}i}{6864}$	0	$\frac{73\sqrt{858}}{13728}$	0	0	0	0	
	0	0	0	$-\frac{\sqrt{1430}}{4576}$	0	$-\frac{5\sqrt{1430}i}{1144}$	$-\frac{3\sqrt{1430}}{1144}$	0	0	$\frac{47\sqrt{858}}{13728}$	0	$\frac{\sqrt{858}i}{429}$	$-\frac{9\sqrt{858}}{2288}$	0	0	
	0	0	$-\frac{\sqrt{1430}}{4576}$	0	$\frac{5\sqrt{1430}i}{1144}$	0	0	$\frac{3\sqrt{1430}}{1144}$	$\frac{47\sqrt{858}}{13728}$	0	$-\frac{\sqrt{858}i}{429}$	0	0	$\frac{9\sqrt{858}}{2288}$	0	
	0	$-\frac{\sqrt{858}}{429}$	0	0	$-\frac{3\sqrt{1430}}{1144}$	0	0	0	0	0	$-\frac{3\sqrt{858}}{1144}$	0	0	$\frac{\sqrt{858}i}{429}$	0	
	$-\frac{\sqrt{858}}{429}$	0	0	0	0	$\frac{3\sqrt{1430}}{1144}$	0	0	0	0	0	$\frac{3\sqrt{858}}{1144}$	$-\frac{\sqrt{858}i}{429}$	0	0	
	$-\frac{9\sqrt{1430}}{2288}$	0	0	$\frac{\sqrt{858}i}{6864}$	0	$\frac{47\sqrt{858}}{13728}$	0	0	0	$\frac{9\sqrt{1430}i}{2288}$	0	$\frac{7\sqrt{1430}}{4576}$	0	0	0	
	0	$\frac{9\sqrt{1430}}{2288}$	$-\frac{\sqrt{858}i}{6864}$	0	$\frac{47\sqrt{858}}{13728}$	0	0	0	$-\frac{9\sqrt{1430}i}{2288}$	0	$\frac{7\sqrt{1430}}{4576}$	0	0	0	0	
	0	0	0	$\frac{73\sqrt{858}}{13728}$	0	$\frac{\sqrt{858}i}{429}$	$-\frac{3\sqrt{858}}{1144}$	0	0	$\frac{7\sqrt{1430}}{4576}$	0	$\frac{3\sqrt{1430}i}{1144}$	$\frac{9\sqrt{1430}}{2288}$	0	0	
	0	0	$\frac{73\sqrt{858}}{13728}$	0	$-\frac{\sqrt{858}i}{429}$	0	0	$\frac{3\sqrt{858}}{1144}$	$\frac{7\sqrt{1430}}{4576}$	0	$-\frac{3\sqrt{1430}i}{1144}$	0	0	$-\frac{9\sqrt{1430}}{2288}$	0	
	0	$\frac{3\sqrt{1430}}{572}$	0	0	$-\frac{9\sqrt{858}}{2288}$	0	0	$\frac{\sqrt{858}i}{429}$	0	0	$\frac{9\sqrt{1430}}{2288}$	0	0	$\frac{3\sqrt{1430}i}{572}$	0	
	$\frac{3\sqrt{1430}}{572}$	0	0	0	0	$\frac{9\sqrt{858}}{2288}$	$-\frac{\sqrt{858}i}{429}$	0	0	0	0	$-\frac{9\sqrt{1430}}{2288}$	$-\frac{3\sqrt{1430}i}{572}$	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													
$\mathbb{M}_5^{(1,1;a)}(A_{2g}, 1)$	$\frac{3\sqrt{1001}}{1001}$	0	0	$-\frac{\sqrt{15015}i}{3432}$	0	$\frac{\sqrt{15015}}{3432}$	0	0	0	$-\frac{3\sqrt{1001}i}{1144}$	0	$-\frac{3\sqrt{1001}}{1144}$	0	0	
	0	$-\frac{3\sqrt{1001}}{1001}$	$\frac{\sqrt{15015}i}{3432}$	0	$\frac{\sqrt{15015}}{3432}$	0	0	0	$\frac{3\sqrt{1001}i}{1144}$	0	$-\frac{3\sqrt{1001}}{1144}$	0	0	0	
	0	$-\frac{\sqrt{15015}i}{3432}$	$-\frac{25\sqrt{1001}}{8008}$	0	0	0	0	$-\frac{5\sqrt{1001}}{1144}$	$-\frac{\sqrt{15015}}{1144}$	0	0	0	0	$\frac{\sqrt{15015}}{1716}$	
	$\frac{\sqrt{15015}i}{3432}$	0	0	$\frac{25\sqrt{1001}}{8008}$	0	0	$-\frac{5\sqrt{1001}}{1144}$	0	0	$\frac{\sqrt{15015}}{1144}$	0	0	$\frac{\sqrt{15015}}{1716}$	0	
	0	$\frac{\sqrt{15015}}{3432}$	0	0	$-\frac{25\sqrt{1001}}{8008}$	0	0	$\frac{5\sqrt{1001}i}{1144}$	0	0	$\frac{\sqrt{15015}}{1144}$	0	0	$\frac{\sqrt{15015}}{1716}$	
	$\frac{\sqrt{15015}}{3432}$	0	0	0	0	$\frac{25\sqrt{1001}}{8008}$	$-\frac{5\sqrt{1001}i}{1144}$	0	0	0	$-\frac{\sqrt{15015}}{1144}$	$-\frac{\sqrt{15015}i}{1716}$	0	0	
	0	0	0	$-\frac{5\sqrt{1001}}{1144}$	0	$\frac{5\sqrt{1001}i}{1144}$	$\frac{10\sqrt{1001}}{1001}$	0	0	$-\frac{5\sqrt{15015}}{3432}$	0	$-\frac{5\sqrt{15015}i}{3432}$	0	0	
	0	0	$-\frac{5\sqrt{1001}}{1144}$	0	$-\frac{5\sqrt{1001}i}{1144}$	0	0	$-\frac{10\sqrt{1001}}{1001}$	$-\frac{5\sqrt{15015}}{3432}$	0	$\frac{5\sqrt{15015}i}{3432}$	0	0	0	
	0	$-\frac{3\sqrt{1001}i}{1144}$	$-\frac{\sqrt{15015}}{1144}$	0	0	0	0	$-\frac{5\sqrt{15015}}{3432}$	$-\frac{3\sqrt{1001}}{616}$	0	0	0	0	$\frac{\sqrt{1001}}{572}$	
	$\frac{3\sqrt{1001}i}{1144}$	0	0	$\frac{\sqrt{15015}}{1144}$	0	0	$-\frac{5\sqrt{15015}}{3432}$	0	0	$\frac{3\sqrt{1001}}{616}$	0	0	$\frac{\sqrt{1001}}{572}$	0	
	0	$-\frac{3\sqrt{1001}}{1144}$	0	0	$\frac{\sqrt{15015}}{1144}$	0	0	$-\frac{5\sqrt{15015}i}{3432}$	0	0	$-\frac{3\sqrt{1001}}{616}$	0	0	$-\frac{\sqrt{1001}i}{572}$	
	$-\frac{3\sqrt{1001}}{1144}$	0	0	0	0	$-\frac{\sqrt{15015}}{1144}$	$\frac{5\sqrt{15015}i}{3432}$	0	0	0	0	$\frac{3\sqrt{1001}}{616}$	$\frac{\sqrt{1001}i}{572}$	0	
	0	0	0	$\frac{\sqrt{15015}}{1716}$	0	$\frac{\sqrt{15015}i}{1716}$	0	0	0	$\frac{\sqrt{1001}}{572}$	0	$-\frac{\sqrt{1001}i}{572}$	$\frac{3\sqrt{1001}}{1001}$	0	
	0	0	$\frac{\sqrt{15015}}{1716}$	0	$-\frac{\sqrt{15015}i}{1716}$	0	0	0	$\frac{\sqrt{1001}}{572}$	0	$\frac{\sqrt{1001}i}{572}$	0	0	$-\frac{3\sqrt{1001}}{1001}$	
1016	symmetry	$\frac{\sqrt{70x(x^2-3y^2)(x^2+y^2-8z^2)}}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(1,1;a)}(A_{2g}, 2)$	0	$-\frac{3\sqrt{1430}}{572}$
	$-\frac{3\sqrt{1430}}{572}$	0
	0	$-\frac{5\sqrt{1430}}{1144}$
	$\frac{9\sqrt{858}}{2288}$	$0$
	$0$	$-\frac{\sqrt{1430}i}{4576}$
	$0$	$0$
	$0$	$-\frac{5\sqrt{1430}}{2288}$
	$0$	$0$
	$0$	$-\frac{5\sqrt{1430}i}{4576}$
	$0$	$0$
	$0$	$-\frac{3\sqrt{1430}}{1144}$
	$0$	$0$
1017 symmetry	$-\frac{9\sqrt{858}i}{2288}$	$0$
	$0$	$-\frac{9\sqrt{1430}i}{4576}$
	$0$	$0$
	$0$	$-\frac{5\sqrt{1430}}{2288}$
	$0$	$0$
	$0$	$-\frac{5\sqrt{1430}i}{4576}$
	$0$	$0$
	$0$	$-\frac{73\sqrt{858}i}{13728}$
	$0$	$0$
	$0$	$-\frac{73\sqrt{858}i}{13728}$
	$0$	$0$
	$0$	$-\frac{73\sqrt{858}i}{13728}$
$\frac{3\sqrt{1430}i}{572}$	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$
	$0$	$0$

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,0}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{286}}{572}$	0	0	$\frac{\sqrt{4290}}{624}$	0	0	0	0	0	$\frac{\sqrt{286}}{208}$	0	0	$-\frac{\sqrt{286}}{572}$	
	$\frac{\sqrt{286}}{572}$	0	0	0	0	$-\frac{\sqrt{4290}}{624}$	0	0	0	0	0	$-\frac{\sqrt{286}}{208}$	$\frac{\sqrt{286}i}{572}$	0	
	0	0	0	$\frac{15\sqrt{286}}{1144}$	0	$\frac{5\sqrt{286}i}{416}$	0	0	0	$-\frac{\sqrt{4290}}{429}$	0	$\frac{29\sqrt{4290}i}{13728}$	$\frac{\sqrt{4290}}{624}$	0	
	0	0	$\frac{15\sqrt{286}}{1144}$	0	$-\frac{5\sqrt{286}i}{416}$	0	0	0	$-\frac{\sqrt{4290}}{429}$	0	$-\frac{29\sqrt{4290}i}{13728}$	0	0	$-\frac{\sqrt{4290}}{624}$	
	$\frac{\sqrt{4290}}{624}$	0	0	$\frac{5\sqrt{286}i}{416}$	0	$-\frac{25\sqrt{286}}{2288}$	0	0	0	$-\frac{37\sqrt{4290}i}{13728}$	0	$-\frac{17\sqrt{4290}}{6864}$	0	0	
	0	$-\frac{\sqrt{4290}}{624}$	$-\frac{5\sqrt{286}i}{416}$	0	$-\frac{25\sqrt{286}}{2288}$	0	0	0	$\frac{37\sqrt{4290}i}{13728}$	0	$-\frac{17\sqrt{4290}}{6864}$	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{4290}}{429}$	0	$-\frac{37\sqrt{4290}i}{13728}$	0	0	0	$\frac{7\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{416}$	$-\frac{\sqrt{286}}{208}$	0	
	0	0	$-\frac{\sqrt{4290}}{429}$	0	$\frac{37\sqrt{4290}i}{13728}$	0	0	0	$\frac{7\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{416}$	0	0	$\frac{\sqrt{286}}{208}$	
	$\frac{\sqrt{286}}{208}$	0	0	$\frac{29\sqrt{4290}i}{13728}$	0	$-\frac{17\sqrt{4290}}{6864}$	0	0	0	$-\frac{3\sqrt{286}i}{416}$	0	$-\frac{19\sqrt{286}}{2288}$	0	0	
	0	$-\frac{\sqrt{286}}{208}$	$-\frac{29\sqrt{4290}i}{13728}$	0	$-\frac{17\sqrt{4290}}{6864}$	0	0	0	$\frac{3\sqrt{286}i}{416}$	0	$-\frac{19\sqrt{286}}{2288}$	0	0	0	
	0	$-\frac{\sqrt{286}i}{572}$	$\frac{\sqrt{4290}}{624}$	0	0	0	0	0	$-\frac{\sqrt{286}}{208}$	0	0	0	0	$-\frac{\sqrt{286}}{572}$	
	$\frac{\sqrt{286}i}{572}$	0	0	$-\frac{\sqrt{4290}}{624}$	0	0	0	0	$\frac{\sqrt{286}}{208}$	0	0	$-\frac{\sqrt{286}}{572}$	0	0	

1018 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{286}i}{572}$	$-\frac{\sqrt{4290}}{624}$	0	0	0	0	0	$\frac{\sqrt{286}}{208}$	0	0	0	0	$\frac{\sqrt{286}}{572}$	
	$-\frac{\sqrt{286}i}{572}$	0	0	$\frac{\sqrt{4290}}{624}$	0	0	0	0	$-\frac{\sqrt{286}}{208}$	0	0	$\frac{\sqrt{286}}{572}$	0	0	
	$-\frac{\sqrt{4290}}{624}$	0	0	$-\frac{25\sqrt{286}i}{2288}$	0	$\frac{5\sqrt{286}}{416}$	0	0	$\frac{17\sqrt{4290}i}{6864}$	0	$\frac{37\sqrt{4290}}{13728}$	0	0	0	
	0	$\frac{\sqrt{4290}}{624}$	$\frac{25\sqrt{286}i}{2288}$	0	$\frac{5\sqrt{286}}{416}$	0	0	0	$-\frac{17\sqrt{4290}i}{6864}$	0	$\frac{37\sqrt{4290}}{13728}$	0	0	0	
	0	0	0	$\frac{5\sqrt{286}}{416}$	0	$\frac{15\sqrt{286}i}{1144}$	0	0	0	$-\frac{29\sqrt{4290}}{13728}$	0	$\frac{\sqrt{4290}i}{429}$	$\frac{\sqrt{4290}}{624}$	0	
	0	0	$\frac{5\sqrt{286}}{416}$	0	$-\frac{15\sqrt{286}i}{1144}$	0	0	0	$-\frac{29\sqrt{4290}}{13728}$	0	$-\frac{\sqrt{4290}i}{429}$	0	0	$-\frac{\sqrt{4290}}{624}$	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{286}}{208}$	0	0	$\frac{17\sqrt{4290}i}{6864}$	0	$-\frac{29\sqrt{4290}}{13728}$	0	0	0	$-\frac{19\sqrt{286}i}{2288}$	0	$-\frac{3\sqrt{286}}{416}$	0	0	
	0	$-\frac{\sqrt{286}}{208}$	$-\frac{17\sqrt{4290}i}{6864}$	0	$-\frac{29\sqrt{4290}}{13728}$	0	0	0	$\frac{19\sqrt{286}i}{2288}$	0	$-\frac{3\sqrt{286}}{416}$	0	0	0	
	0	0	0	$\frac{37\sqrt{4290}}{13728}$	0	$\frac{\sqrt{4290}i}{429}$	0	0	0	$-\frac{3\sqrt{286}}{416}$	0	$\frac{7\sqrt{286}i}{1144}$	$\frac{\sqrt{286}}{208}$	0	
	0	0	$\frac{37\sqrt{4290}}{13728}$	0	$-\frac{\sqrt{4290}i}{429}$	0	0	0	$-\frac{3\sqrt{286}}{416}$	0	$-\frac{7\sqrt{286}i}{1144}$	0	0	$-\frac{\sqrt{286}}{208}$	
	0	$\frac{\sqrt{286}}{572}$	0	0	$\frac{\sqrt{4290}}{624}$	0	0	0	0	$\frac{\sqrt{286}}{208}$	0	0	0	$-\frac{\sqrt{286}i}{572}$	
	$\frac{\sqrt{286}}{572}$	0	0	0	0	$-\frac{\sqrt{4290}}{624}$	0	0	0	0	$-\frac{\sqrt{286}}{208}$	$\frac{\sqrt{286}i}{572}$	0	0	
1019	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														
$\mathbb{M}_{5,0}^{(1,1;a)}(E_g, 2)$	0	$-\frac{\sqrt{15015}}{2002}$	0	0	$\frac{5\sqrt{1001}}{3432}$	0	0	$-\frac{2\sqrt{1001}i}{429}$	0	0	$-\frac{\sqrt{15015}}{1144}$	0	0	0	0	0
	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{5\sqrt{1001}}{3432}$	$\frac{2\sqrt{1001}i}{429}$	0	0	0	0	$\frac{\sqrt{15015}}{1144}$	0	0	0	0
	0	0	0	$\frac{5\sqrt{15015}}{4004}$	0	$-\frac{\sqrt{15015}i}{6864}$	$-\frac{5\sqrt{15015}}{3432}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	$\frac{\sqrt{1001}i}{528}$	$\frac{5\sqrt{1001}}{1716}$	0	0	0
	$\frac{5\sqrt{1001}}{3432}$	0	0	$-\frac{\sqrt{15015}i}{6864}$	0	$-\frac{5\sqrt{15015}}{24024}$	0	0	0	$-\frac{\sqrt{1001}i}{528}$	0	$\frac{\sqrt{1001}}{3432}$	0	0	0	0
	0	$-\frac{5\sqrt{1001}}{3432}$	$\frac{\sqrt{15015}i}{6864}$	0	$-\frac{5\sqrt{15015}}{24024}$	0	0	0	$\frac{\sqrt{1001}i}{528}$	0	$\frac{\sqrt{1001}}{3432}$	0	0	0	0	0
	0	$-\frac{2\sqrt{1001}i}{429}$	$-\frac{5\sqrt{15015}}{3432}$	0	0	0	0	$-\frac{5\sqrt{15015}}{3003}$	$-\frac{25\sqrt{1001}}{3432}$	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	0	0
	$\frac{2\sqrt{1001}i}{429}$	0	0	$\frac{5\sqrt{15015}}{3432}$	0	0	$-\frac{5\sqrt{15015}}{3003}$	0	0	$\frac{25\sqrt{1001}}{3432}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	0	0
	0	0	0	$\frac{2\sqrt{1001}}{429}$	0	$-\frac{\sqrt{1001}i}{528}$	$-\frac{25\sqrt{1001}}{3432}$	0	0	$\frac{5\sqrt{15015}}{4004}$	0	$\frac{7\sqrt{15015}i}{6864}$	$\frac{\sqrt{15015}}{1716}$	0	0	0
	0	0	$\frac{2\sqrt{1001}}{429}$	0	$\frac{\sqrt{1001}i}{528}$	0	0	$\frac{25\sqrt{1001}}{3432}$	$\frac{5\sqrt{15015}}{4004}$	0	$-\frac{7\sqrt{15015}i}{6864}$	0	0	$-\frac{\sqrt{15015}}{1716}$	0	0
	$-\frac{\sqrt{15015}}{1144}$	0	0	$\frac{\sqrt{1001}i}{528}$	0	$\frac{\sqrt{1001}}{3432}$	0	0	0	$\frac{7\sqrt{15015}i}{6864}$	0	$\frac{3\sqrt{15015}}{8008}$	0	0	0	0
	0	$\frac{\sqrt{15015}}{1144}$	$-\frac{\sqrt{1001}i}{528}$	0	$\frac{\sqrt{1001}}{3432}$	0	0	0	$-\frac{7\sqrt{15015}i}{6864}$	0	$\frac{3\sqrt{15015}}{8008}$	0	0	0	0	0
	0	0	$\frac{5\sqrt{1001}}{1716}$	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	$\frac{\sqrt{15015}}{1716}$	0	0	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0
	0	0	0	$-\frac{5\sqrt{1001}}{1716}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	0	$-\frac{\sqrt{15015}}{1716}$	0	0	$-\frac{\sqrt{15015}}{2002}$	0	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													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 2)$	0	$\frac{\sqrt{15015}i}{2002}$	$\frac{5\sqrt{1001}}{3432}$	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	$\frac{\sqrt{15015}}{1144}$	0	0	0	0	0	0
	$-\frac{\sqrt{15015}i}{2002}$	0	0	$-\frac{5\sqrt{1001}}{3432}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	0	$-\frac{\sqrt{15015}}{1144}$	0	0	0	0	0
	$\frac{5\sqrt{1001}}{3432}$	0	0	$\frac{5\sqrt{15015}i}{24024}$	0	$\frac{\sqrt{15015}}{6864}$	0	0	0	$\frac{\sqrt{1001}i}{3432}$	0	$-\frac{\sqrt{1001}}{528}$	0	0	0
	0	$-\frac{5\sqrt{1001}}{3432}$	$-\frac{5\sqrt{15015}i}{24024}$	0	$\frac{\sqrt{15015}}{6864}$	0	0	0	$-\frac{\sqrt{1001}i}{3432}$	0	$-\frac{\sqrt{1001}}{528}$	0	0	0	0
	0	0	0	$\frac{\sqrt{15015}}{6864}$	0	$-\frac{5\sqrt{15015}i}{4004}$	$-\frac{5\sqrt{15015}}{3432}$	0	0	$\frac{\sqrt{1001}}{528}$	0	$\frac{2\sqrt{1001}i}{429}$	$-\frac{5\sqrt{1001}}{1716}$	0	0
	0	0	$\frac{\sqrt{15015}}{6864}$	0	$\frac{5\sqrt{15015}i}{4004}$	0	0	$\frac{5\sqrt{15015}}{3432}$	$\frac{\sqrt{1001}}{528}$	0	$-\frac{2\sqrt{1001}i}{429}$	0	0	$\frac{5\sqrt{1001}}{1716}$	0
	0	$\frac{2\sqrt{1001}}{429}$	0	0	$-\frac{5\sqrt{15015}}{3432}$	0	0	$\frac{5\sqrt{15015}i}{3003}$	0	0	$\frac{25\sqrt{1001}}{3432}$	0	0	$\frac{2\sqrt{1001}i}{429}$	0
	$\frac{2\sqrt{1001}}{429}$	0	0	0	0	$\frac{5\sqrt{15015}}{3432}$	$-\frac{5\sqrt{15015}i}{3003}$	0	0	0	0	$-\frac{25\sqrt{1001}}{3432}$	$-\frac{2\sqrt{1001}i}{429}$	0	
	$\frac{\sqrt{15015}}{1144}$	0	0	$\frac{\sqrt{1001}i}{3432}$	0	$\frac{\sqrt{1001}}{528}$	0	0	0	$-\frac{3\sqrt{15015}i}{8008}$	0	$-\frac{7\sqrt{15015}}{6864}$	0	0	0
	0	$-\frac{\sqrt{15015}}{1144}$	$-\frac{\sqrt{1001}i}{3432}$	0	$\frac{\sqrt{1001}}{528}$	0	0	0	$\frac{3\sqrt{15015}i}{8008}$	0	$-\frac{7\sqrt{15015}}{6864}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{1001}}{528}$	0	$\frac{2\sqrt{1001}i}{429}$	$\frac{25\sqrt{1001}}{3432}$	0	0	$-\frac{7\sqrt{15015}}{6864}$	0	$-\frac{5\sqrt{15015}i}{4004}$	$\frac{\sqrt{15015}}{1716}$	0	0
	0	0	$-\frac{\sqrt{1001}}{528}$	0	$-\frac{2\sqrt{1001}i}{429}$	0	0	$-\frac{25\sqrt{1001}}{3432}$	$-\frac{7\sqrt{15015}}{6864}$	0	$\frac{5\sqrt{15015}i}{4004}$	0	0	$-\frac{\sqrt{15015}}{1716}$	0
	0	0	0	0	$-\frac{5\sqrt{1001}}{1716}$	0	0	$\frac{2\sqrt{1001}i}{429}$	0	0	$\frac{\sqrt{15015}}{1716}$	0	0	$\frac{\sqrt{15015}i}{2002}$	0
	0	0	0	0	0	$\frac{5\sqrt{1001}}{1716}$	$-\frac{2\sqrt{1001}i}{429}$	0	0	0	0	$-\frac{\sqrt{15015}}{1716}$	$-\frac{\sqrt{15015}i}{2002}$	0	
1021	symmetry	$-\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,0}^{(1,1;a)}(E_g, 3)$	$\frac{\sqrt{715}}{143}$	0	0	$\frac{23\sqrt{429}i}{3432}$	0	$-\frac{23\sqrt{429}}{3432}$	0	0	0	$-\frac{7\sqrt{715}i}{1144}$	0	$-\frac{7\sqrt{715}}{1144}$	0	0	
	0	$-\frac{\sqrt{715}}{143}$	$-\frac{23\sqrt{429}i}{3432}$	0	$-\frac{23\sqrt{429}}{3432}$	0	0	0	$\frac{7\sqrt{715}i}{1144}$	0	$-\frac{7\sqrt{715}}{1144}$	0	0	0	
	0	$\frac{23\sqrt{429}i}{3432}$	$\frac{5\sqrt{715}}{1144}$	0	0	0	0	$\frac{\sqrt{715}}{1144}$	$\frac{5\sqrt{429}}{3432}$	0	0	0	0	$-\frac{4\sqrt{429}}{429}$	
	$-\frac{23\sqrt{429}i}{3432}$	0	0	$-\frac{5\sqrt{715}}{1144}$	0	0	$\frac{\sqrt{715}}{1144}$	0	0	$-\frac{5\sqrt{429}}{3432}$	0	0	$-\frac{4\sqrt{429}}{429}$	0	
	0	$-\frac{23\sqrt{429}}{3432}$	0	0	$\frac{5\sqrt{715}}{1144}$	0	0	$-\frac{\sqrt{715}i}{1144}$	0	0	$-\frac{5\sqrt{429}}{3432}$	0	0	$-\frac{4\sqrt{429}i}{429}$	
	$-\frac{23\sqrt{429}}{3432}$	0	0	0	0	$-\frac{5\sqrt{715}}{1144}$	$\frac{\sqrt{715}i}{1144}$	0	0	0	0	$\frac{5\sqrt{429}}{3432}$	$\frac{4\sqrt{429}i}{429}$	0	
	0	0	0	$\frac{\sqrt{715}}{1144}$	0	$-\frac{\sqrt{715}i}{1144}$	0	0	0	$-\frac{\sqrt{429}}{1144}$	0	$-\frac{\sqrt{429}i}{1144}$	0	0	
	0	$-\frac{7\sqrt{715}i}{1144}$	$\frac{5\sqrt{429}}{3432}$	0	0	0	0	$-\frac{\sqrt{429}}{1144}$	$-\frac{5\sqrt{715}}{1144}$	0	0	0	0	$\frac{\sqrt{715}}{286}$	
	$\frac{7\sqrt{715}i}{1144}$	0	0	$-\frac{5\sqrt{429}}{3432}$	0	0	$-\frac{\sqrt{429}}{1144}$	0	0	$\frac{5\sqrt{715}}{1144}$	0	0	$\frac{\sqrt{715}}{286}$	0	
	0	$-\frac{7\sqrt{715}}{1144}$	0	0	$-\frac{5\sqrt{429}}{3432}$	0	0	$-\frac{\sqrt{429}i}{1144}$	0	0	$-\frac{5\sqrt{715}}{1144}$	0	0	$-\frac{\sqrt{715}i}{286}$	
	$-\frac{7\sqrt{715}}{1144}$	0	0	0	0	$\frac{5\sqrt{429}}{3432}$	$\frac{\sqrt{429}i}{1144}$	0	0	0	0	$\frac{5\sqrt{715}}{1144}$	$\frac{\sqrt{715}i}{286}$	0	
	0	0	0	$-\frac{4\sqrt{429}}{429}$	0	$-\frac{4\sqrt{429}i}{429}$	0	0	0	$\frac{\sqrt{715}}{286}$	0	$-\frac{\sqrt{715}i}{286}$	$-\frac{\sqrt{715}}{143}$	0	
	0	0	$-\frac{4\sqrt{429}}{429}$	0	$\frac{4\sqrt{429}i}{429}$	0	0	0	$\frac{\sqrt{715}}{286}$	0	$\frac{\sqrt{715}i}{286}$	0	0	$\frac{\sqrt{715}}{143}$	

1022 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	$-\frac{4\sqrt{429}}{429}$	0	$-\frac{4\sqrt{429}i}{429}$	0	0	0	$\frac{\sqrt{715}}{286}$	0	$-\frac{\sqrt{715}i}{286}$	$-\frac{\sqrt{715}}{143}$	0	0	0
	0	0	$-\frac{4\sqrt{429}}{429}$	0	$\frac{4\sqrt{429}i}{429}$	0	0	0	$\frac{\sqrt{715}}{286}$	0	$\frac{\sqrt{715}i}{286}$	0	0	$\frac{\sqrt{715}}{143}$	0	0
	0	$-\frac{4\sqrt{429}}{429}$	0	0	0	0	0	$-\frac{\sqrt{715}i}{1144}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	0	$-\frac{23\sqrt{429}i}{3432}$	0
	$-\frac{4\sqrt{429}}{429}$	0	0	0	0	0	$\frac{\sqrt{715}i}{1144}$	0	0	0	0	$\frac{5\sqrt{429}}{858}$	$\frac{23\sqrt{429}i}{3432}$	0	0	0
	0	$-\frac{4\sqrt{429}i}{429}$	0	0	0	0	0	$-\frac{\sqrt{715}}{1144}$	$-\frac{5\sqrt{429}}{858}$	0	0	0	0	$\frac{23\sqrt{429}}{3432}$	0	0
	$\frac{4\sqrt{429}i}{429}$	0	0	0	0	0	$-\frac{\sqrt{715}}{1144}$	0	0	$\frac{5\sqrt{429}}{858}$	0	0	$\frac{23\sqrt{429}}{3432}$	0	0	0
	0	0	0	$-\frac{\sqrt{715}i}{1144}$	0	$-\frac{\sqrt{715}}{1144}$	0	0	0	$\frac{\sqrt{429}i}{1144}$	0	$-\frac{\sqrt{429}}{1144}$	0	0	0	0
	0	0	$\frac{\sqrt{715}i}{1144}$	0	$-\frac{\sqrt{715}}{1144}$	0	0	0	$-\frac{\sqrt{429}i}{1144}$	0	$-\frac{\sqrt{429}}{1144}$	0	0	0	0	0
	0	$\frac{\sqrt{715}}{286}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$\frac{\sqrt{429}i}{1144}$	0	0	0	0	0	$\frac{7\sqrt{715}i}{1144}$	0	0
	$\frac{\sqrt{715}}{286}$	0	0	0	0	$\frac{5\sqrt{429}}{858}$	$-\frac{\sqrt{429}i}{1144}$	0	0	0	0	0	0	$-\frac{7\sqrt{715}i}{1144}$	0	0
	0	$-\frac{\sqrt{715}i}{286}$	$-\frac{5\sqrt{429}}{858}$	0	0	0	0	$-\frac{\sqrt{429}}{1144}$	0	0	0	0	0	$\frac{7\sqrt{715}}{1144}$	0	0
	$\frac{\sqrt{715}i}{286}$	0	0	$\frac{5\sqrt{429}}{858}$	0	0	$-\frac{\sqrt{429}}{1144}$	0	0	0	0	0	0	$\frac{7\sqrt{715}}{1144}$	0	0
	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{23\sqrt{429}i}{3432}$	0	$\frac{23\sqrt{429}}{3432}$	0	0	0	$\frac{7\sqrt{715}i}{1144}$	0	$\frac{7\sqrt{715}}{1144}$	0	0	0	0
1023 symmetry		$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,0}^{(1,1;a)}(E_g, 4)$	0	0	0	$-\frac{\sqrt{143}i}{156}$	0	$-\frac{\sqrt{143}}{156}$	0	0	0	$-\frac{\sqrt{2145}i}{572}$	0	$\frac{\sqrt{2145}}{572}$	0	0	0	
	0	0	$\frac{\sqrt{143}i}{156}$	0	$-\frac{\sqrt{143}}{156}$	0	0	0	$\frac{\sqrt{2145}i}{572}$	0	$\frac{\sqrt{2145}}{572}$	0	0	0	0	
	0	$-\frac{\sqrt{143}i}{156}$	$-\frac{5\sqrt{2145}}{1716}$	0	0	0	0	$-\frac{\sqrt{2145}}{312}$	$-\frac{17\sqrt{143}}{1716}$	0	0	0	0	$\frac{37\sqrt{143}}{3432}$		
	$\frac{\sqrt{143}i}{156}$	0	0	$\frac{5\sqrt{2145}}{1716}$	0	0	$-\frac{\sqrt{2145}}{312}$	0	0	$\frac{17\sqrt{143}}{1716}$	0	0	$\frac{37\sqrt{143}}{3432}$	0		
	0	$-\frac{\sqrt{143}}{156}$	0	0	$\frac{5\sqrt{2145}}{1716}$	0	0	$-\frac{\sqrt{2145}i}{312}$	0	0	$-\frac{17\sqrt{143}}{1716}$	0	0	$-\frac{37\sqrt{143}i}{3432}$		
	$-\frac{\sqrt{143}}{156}$	0	0	0	0	$-\frac{5\sqrt{2145}}{1716}$	$\frac{\sqrt{2145}i}{312}$	0	0	0	0	$\frac{17\sqrt{143}}{1716}$	$\frac{37\sqrt{143}i}{3432}$	0		
	0	0	0	$-\frac{\sqrt{2145}}{312}$	0	$-\frac{\sqrt{2145}i}{312}$	0	0	0	$-\frac{7\sqrt{143}}{3432}$	0	$-\frac{7\sqrt{143}i}{3432}$	0	$-\frac{8\sqrt{143}}{429}$	0	
	0	0	$-\frac{\sqrt{2145}}{312}$	0	$\frac{\sqrt{2145}i}{312}$	0	0	0	$-\frac{7\sqrt{143}}{3432}$	0	$-\frac{7\sqrt{143}i}{3432}$	0	$\frac{8\sqrt{143}}{429}$			
	0	$-\frac{\sqrt{2145}i}{572}$	$-\frac{17\sqrt{143}}{1716}$	0	0	0	0	$-\frac{7\sqrt{143}}{3432}$	$-\frac{\sqrt{2145}}{572}$	0	0	0	0	$\frac{\sqrt{2145}}{312}$		
	$\frac{\sqrt{2145}i}{572}$	0	0	$\frac{17\sqrt{143}}{1716}$	0	0	$-\frac{7\sqrt{143}}{3432}$	0	0	$\frac{\sqrt{2145}}{572}$	0	0	$\frac{\sqrt{2145}}{312}$	0		
	0	$\frac{\sqrt{2145}}{572}$	0	0	$-\frac{17\sqrt{143}}{1716}$	0	0	$\frac{7\sqrt{143}i}{3432}$	0	0	$\frac{\sqrt{2145}}{572}$	0	0	$\frac{\sqrt{2145}i}{312}$		
	$\frac{\sqrt{2145}}{572}$	0	0	0	0	$\frac{17\sqrt{143}}{1716}$	$-\frac{7\sqrt{143}i}{3432}$	0	0	0	0	$-\frac{\sqrt{2145}}{572}$	$-\frac{\sqrt{2145}i}{312}$	0		
	0	0	0	$\frac{37\sqrt{143}}{3432}$	0	$-\frac{37\sqrt{143}i}{3432}$	$-\frac{8\sqrt{143}}{429}$	0	0	$\frac{\sqrt{2145}}{312}$	0	$\frac{\sqrt{2145}i}{312}$	0	0		
	0	0	$\frac{37\sqrt{143}}{3432}$	0	$\frac{37\sqrt{143}i}{3432}$	0	0	$\frac{8\sqrt{143}}{429}$	$\frac{\sqrt{2145}}{312}$	0	$-\frac{\sqrt{2145}i}{312}$	0	0	0		

1024 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 0 $-\frac{4\sqrt{143}}{429}$ 0 $\frac{4\sqrt{143}i}{429}$ $\frac{8\sqrt{143}}{429}$ 0 0 $-\frac{\sqrt{2145}}{286}$ 0 $-\frac{\sqrt{2145}i}{286}$ 0 0		0 0 $-\frac{4\sqrt{143}}{429}$ 0 $-\frac{4\sqrt{143}i}{429}$ 0 0 $-\frac{8\sqrt{143}}{429}$ $-\frac{\sqrt{2145}}{286}$ 0 $\frac{\sqrt{2145}i}{286}$ 0 0 0		0 - $\frac{4\sqrt{143}}{429}$ 0 0 $\frac{\sqrt{2145}}{1716}$ 0 0 $\frac{\sqrt{2145}i}{3432}$ 0 0 $-\frac{\sqrt{143}}{132}$ 0 0 $-\frac{17\sqrt{143}i}{3432}$		$-\frac{4\sqrt{143}}{429}$ 0 0 0 0 $-\frac{\sqrt{2145}}{1716}$ $-\frac{\sqrt{2145}i}{3432}$ 0 0 0 $\frac{\sqrt{143}}{132}$ $\frac{17\sqrt{143}i}{3432}$ 0		0 $\frac{4\sqrt{143}i}{429}$ $\frac{\sqrt{2145}}{1716}$ 0 0 0 0 $-\frac{\sqrt{2145}}{3432}$ $\frac{\sqrt{143}}{132}$ 0 0 0 $-\frac{17\sqrt{143}}{3432}$		$-\frac{4\sqrt{143}i}{429}$ 0 0 $-\frac{\sqrt{2145}}{1716}$ 0 0 $-\frac{\sqrt{2145}}{3432}$ 0 0 $-\frac{\sqrt{143}}{132}$ 0 0 $-\frac{17\sqrt{143}}{3432}$ 0		$\frac{8\sqrt{143}}{429}$ 0 0 $\frac{\sqrt{2145}i}{3432}$ 0 $-\frac{\sqrt{2145}}{3432}$ 0 0 0 $-\frac{43\sqrt{143}i}{3432}$ 0 $-\frac{43\sqrt{143}}{3432}$ 0 0 0		0 $-\frac{8\sqrt{143}}{429}$ $-\frac{\sqrt{2145}i}{3432}$ 0 $-\frac{\sqrt{2145}}{3432}$ 0 0 0 $\frac{43\sqrt{143}i}{3432}$ 0 $-\frac{43\sqrt{143}}{3432}$ 0 0 0 0		0 $-\frac{\sqrt{2145}}{286}$ 0 0 $\frac{\sqrt{143}}{132}$ 0 0 $-\frac{43\sqrt{143}i}{3432}$ 0 0 $-\frac{7\sqrt{2145}}{1716}$ 0 0 $-\frac{7\sqrt{2145}i}{3432}$		$-\frac{\sqrt{2145}}{286}$ 0 0 0 0 $-\frac{\sqrt{143}}{132}$ $\frac{43\sqrt{143}i}{3432}$ 0 0 0 $\frac{7\sqrt{2145}}{1716}$ $\frac{7\sqrt{2145}i}{3432}$ 0		0 $-\frac{\sqrt{2145}i}{286}$ $-\frac{\sqrt{143}}{132}$ 0 0 0 0 $-\frac{43\sqrt{143}}{3432}$ $-\frac{7\sqrt{2145}}{1716}$ 0 0 0 $\frac{7\sqrt{2145}}{3432}$		$\frac{\sqrt{2145}i}{286}$ 0 0 $\frac{\sqrt{143}}{132}$ 0 0 $-\frac{43\sqrt{143}}{3432}$ 0 0 $\frac{7\sqrt{2145}}{1716}$ 0 0 $\frac{7\sqrt{2145}i}{3432}$ 0		0 0 0 $-\frac{17\sqrt{143}i}{3432}$ 0 $-\frac{17\sqrt{143}}{3432}$ 0 0 0 $-\frac{7\sqrt{2145}i}{3432}$ 0 $\frac{7\sqrt{2145}}{3432}$ 0 0 0		0 0 $\frac{17\sqrt{143}i}{3432}$ 0 $-\frac{17\sqrt{143}}{3432}$ 0 0 0 $\frac{7\sqrt{2145}i}{3432}$ 0 $\frac{7\sqrt{2145}}{3432}$ 0 0 0