

PG No. 20 D_{3d} $\bar{3}m$ (-3m1 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
	$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$
4	symmetry	y
	$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$

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

Table 2: (s,p) block.

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

continued ...

Table 2

No.	multipole	matrix
7	symmetry	y $\mathbb{Q}_{1,2}^{(a)}(E_u)$ $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
8	symmetry	z $\mathbb{Q}_1^{(1,0;a)}(A_{2u})$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
9	symmetry	x $\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
10	symmetry	y $\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)$ $\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
11	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{G}_2^{(1,-1;a)}(A_{1u})$ $\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$
12	symmetry	$\sqrt{3}yz$ $\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
13	symmetry	$-\sqrt{3}xz$ $\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)$ $\begin{bmatrix} -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
14	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
15	symmetry	$-\sqrt{3}xy$ $\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)$ $\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
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
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
26	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
27	symmetry	$-\sqrt{3}xy$
	$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
28	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$

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

Table 3: (s,d) block.

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

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

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

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
70	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
71	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
72	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
73	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
74	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
75	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
76	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
77	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
78	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
79	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
80	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
81	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \end{bmatrix}$
82	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
83	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & \frac{\sqrt{7}i}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{7}i}{7} \end{bmatrix}$
84	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & -\frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
85	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
86	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & \frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & -\frac{\sqrt{70}}{28} & 0 \end{bmatrix}$
87	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 \end{bmatrix}$
88	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
89	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
90	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \\ -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
91	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \end{bmatrix}$
93	symmetry	$\sqrt{3}yz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
94	symmetry	$-\sqrt{3}xz$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
95	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{70}i}{28} & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
96	symmetry	$-\sqrt{3}xy$
	$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{28} & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ -\frac{\sqrt{70}}{28} & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
97	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(a)}(A_{1u})$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
98	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
99	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{T}_3^{(a)}(A_{2u}, 2)$	$\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
100	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
101	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \end{bmatrix}$
102	symmetry ...	$\sqrt{15}xyz$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
103	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
104	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{4} & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
105	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \end{bmatrix}$
106	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	$\begin{bmatrix} \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
107	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
108	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
109	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \end{bmatrix}$
110	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
111	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{7} \end{bmatrix}$
112	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & 0 & \frac{1}{4} & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & \frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
113	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_{2u})$	$\begin{bmatrix} \frac{1}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
114	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & \frac{\sqrt{70}i}{28} & 0 \end{bmatrix}$
115	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 \end{bmatrix}$
116	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
117	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
118	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
119	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
	$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \\ -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 4

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

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

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	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
130	symmetry	$-\sqrt{3}xy$

continued ...

Table 5

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

continued ...

Table 5

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

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	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
144	symmetry	$-\sqrt{3}xy$
		$\begin{bmatrix} -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
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	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
157	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
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: = $|d_v, \uparrow \rangle, |d_v, \downarrow \rangle, |d_{xy}, \uparrow \rangle, |d_{xy}, \downarrow \rangle, |d_{xz}, \uparrow \rangle, |d_{xz}, \downarrow \rangle, |d_{yz}, \uparrow \rangle, |d_{yz}, \downarrow \rangle, |d_u, \uparrow \rangle, |d_u, \downarrow \rangle$

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	z

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \end{bmatrix}$
222	symmetry	x
	$\mathbb{T}_{1,1}^{(a)}(E_u)$	$\begin{bmatrix} \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \end{bmatrix}$
223	symmetry	y
	$\mathbb{T}_{1,2}^{(a)}(E_u)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
224	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
	$\mathbb{T}_3^{(a)}(A_{1u})$	$\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
225	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
226	$\mathbb{T}_3^{(a)}(A_{2u}, 1)$	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
227	$\mathbb{T}_3^{(a)}(A_{2u}, 2)$	$\frac{-\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 \end{bmatrix}$
228	$\mathbb{T}_{3,1}^{(a)}(E_u, 1)$	$\frac{-\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 \end{bmatrix}$
229	$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$	$\sqrt{15}xyz$

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_{1,1}^{(1,1;a)}(E_u)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \end{bmatrix}$
250	symmetry	$\begin{bmatrix} y \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
251	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
252	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
253	symmetry	$-\sqrt{3}xz$

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ \frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & \frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & \frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{105}}{35} \end{bmatrix}$
262	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
263	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
264	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & \frac{\sqrt{42}}{28} & 0 \\ 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & \frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
265	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{4\sqrt{35}i}{105} & \frac{2\sqrt{105}}{105} & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{2\sqrt{105}}{105} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & -\frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
278	symmetry	$\begin{bmatrix} \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & -\frac{2\sqrt{105}}{105} & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{2\sqrt{105}}{105} \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 \end{bmatrix}$
279	symmetry	$\begin{bmatrix} 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & -\frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{105}i}{210} & 0 \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
280	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{35}i}{30} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{\sqrt{35}i}{30} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{105}i}{210} & 0 \\ 0 & -\frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ -\frac{\sqrt{35}}{30} & 0 & -\frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$

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

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

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry $\mathbb{Q}_2^{(a)}(A_{1g})$	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \end{bmatrix}$
282	symmetry $\mathbb{Q}_{2,1}^{(a)}(E_g, 1)$	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 \end{bmatrix}$
283	symmetry $\mathbb{Q}_{2,2}^{(a)}(E_g, 1)$	$-\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
284	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
285	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
286	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 \end{bmatrix}$
287	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
288	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
289	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{28} & 0 & 0 \end{bmatrix}$
290	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
291	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
293	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
294	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 \\ -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
295	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & \frac{\sqrt{35}}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \end{bmatrix}$
296	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & -\frac{\sqrt{5}}{16} & 0 & 0 \\ \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 \\ -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 \\ \frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 \\ \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & -\frac{\sqrt{5}}{16} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
298	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{112} & 0 & -\frac{5\sqrt{35}}{112} & \frac{\sqrt{210}i}{56} & 0 \\ -\frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & -\frac{\sqrt{35}i}{112} & 0 & \frac{5\sqrt{35}}{112} & 0 & 0 & -\frac{\sqrt{210}i}{56} \\ 0 & \frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 \\ -\frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & -\frac{3\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
299	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{35}}{112} & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 \\ -\frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & -\frac{\sqrt{35}}{112} & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & \frac{\sqrt{210}i}{56} & 0 \\ \frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & -\frac{5\sqrt{35}i}{112} & 0 & \frac{\sqrt{35}}{112} & 0 & 0 & -\frac{\sqrt{210}i}{56} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 \end{bmatrix}$
300	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
302	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{56} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 \\ 0 & \frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 \\ -\frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
303	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{56} & 0 \\ 0 & -\frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{42} & -\frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 \end{bmatrix}$
309	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
310	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{5}i}{80} & 0 & -\frac{\sqrt{5}}{16} & \frac{3\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 \\ -\frac{3\sqrt{5}i}{80} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & -\frac{3\sqrt{30}i}{80} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{80} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & -\frac{3\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 \\ \frac{3\sqrt{5}}{80} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{80} & -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}}{16} & 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & -\frac{3\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 \\ \frac{\sqrt{5}}{16} & 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}i}{80} & -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{16} & 0 & \frac{3\sqrt{5}}{80} & -\frac{3\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 \\ \frac{\sqrt{5}i}{16} & 0 & -\frac{3\sqrt{5}}{80} & 0 & 0 & \frac{3\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
312	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{4,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{112} & 0 & -\frac{3\sqrt{21}}{112} & \frac{\sqrt{14}i}{56} & 0 \\ \frac{3\sqrt{35}i}{560} & 0 & -\frac{3\sqrt{35}}{560} & 0 & 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & \frac{\sqrt{21}i}{112} & 0 & \frac{3\sqrt{21}}{112} & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & -\frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{3\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{16} & 0 & 0 \\ \frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & \frac{3\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & -\frac{3\sqrt{210}}{280} & \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 \end{bmatrix}$
313	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & \frac{\sqrt{21}}{16} & 0 & -\frac{3\sqrt{21}i}{112} & 0 & 0 \\ \frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & -\frac{\sqrt{21}}{16} & 0 & -\frac{3\sqrt{21}i}{112} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}i}{560} & 0 & -\frac{3\sqrt{35}}{560} & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & \frac{\sqrt{14}i}{56} & 0 \\ -\frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{3\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}}{280} & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} & \frac{\sqrt{14}}{14} & 0 \end{bmatrix}$
314	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
315	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
316	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & \frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & -\frac{3\sqrt{7}}{56} & 0 \\ -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{70}}{80} & 0 & \frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 \\ \frac{\sqrt{70}}{80} & 0 & \frac{\sqrt{70}i}{80} & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & -\frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
317	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & \frac{3\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{70}i}{80} & 0 & \frac{\sqrt{70}}{80} & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 \\ \frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 & 0 \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
319	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{11\sqrt{14}}{168} & \frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{11\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
320	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{11\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{21} & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{11\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 \end{bmatrix}$
321	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{84} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{84} & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
322	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{21}}{84} & 0 \\ 0 & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
323	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
325	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
326	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \end{bmatrix}$
327	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
328	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
329	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
330	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
331	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & -\frac{\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & -\frac{\sqrt{210}}{105} & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 \end{bmatrix}$
332	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 \\ -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
333	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & \frac{13\sqrt{35}i}{420} & 0 & \frac{\sqrt{35}}{420} & -\frac{\sqrt{210}i}{105} & 0 \\ -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & \frac{13\sqrt{35}i}{420} & 0 & -\frac{\sqrt{35}}{420} & 0 & 0 & \frac{\sqrt{210}i}{105} \\ 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{35}}{420} & 0 & \frac{11\sqrt{35}i}{420} & 0 & 0 \\ -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & -\frac{\sqrt{35}}{420} & 0 & \frac{11\sqrt{35}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & \frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 \end{bmatrix}$
334	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{11\sqrt{35}}{420} & 0 & \frac{\sqrt{35}i}{420} & 0 & 0 \\ -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & -\frac{11\sqrt{35}}{420} & 0 & \frac{\sqrt{35}i}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{420} & 0 & \frac{13\sqrt{35}}{420} & -\frac{\sqrt{210}i}{105} & 0 \\ \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{35}i}{420} & 0 & -\frac{13\sqrt{35}}{420} & 0 & 0 & \frac{\sqrt{210}i}{105} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{210}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{105} & -\frac{\sqrt{210}}{70} & 0 & 0 \end{bmatrix}$
335	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_{3,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
336	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
337	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{21} \end{bmatrix}$
339	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{15} & -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
340	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{5,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
341	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$ $\begin{bmatrix} 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
342	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{840} & 0 & -\frac{\sqrt{210}}{840} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ \frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 \end{bmatrix}$
343	symmetry	$\frac{\sqrt{15}y(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ \frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{840} & 0 & -\frac{\sqrt{210}}{840} & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{21}i}{21} & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & -\frac{\sqrt{21}}{21} & 0 & 0 \end{bmatrix}$
344	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & \frac{i}{16} & 0 & -\frac{1}{16} & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 \\ \frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 \\ 0 & \frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 \\ -\frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & \frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 \\ \frac{3i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3i}{8} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
349	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
350	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
	$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & \frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 \\ -\frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 \\ 0 & -\frac{i}{16} & 0 & \frac{1}{16} & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 \\ -\frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 \\ 0 & 0 & \frac{3i}{8} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{8} & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
351	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{G}_{3,1}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & \frac{5i}{48} & 0 & -\frac{7}{48} & -\frac{\sqrt{6}i}{24} & 0 \\ \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & \frac{5i}{48} & 0 & \frac{7}{48} & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & \frac{17}{48} & 0 & -\frac{5i}{48} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{48} & -\frac{17}{48} & 0 & -\frac{5i}{48} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & \frac{i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
352	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{5}{48} & 0 & \frac{17i}{48} & 0 & 0 \\ \frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{48} & \frac{5}{48} & 0 & \frac{17i}{48} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & -\frac{7i}{48} & 0 & \frac{5}{48} & -\frac{\sqrt{6}i}{24} & 0 \\ -\frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{7i}{48} & 0 & -\frac{5}{48} & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & \frac{i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & 0 & 0 \end{bmatrix}$
353	symmetry	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{15}}{24} & 0 \\ \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & \frac{1}{6} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 \\ -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 \end{bmatrix}$
354	symmetry	$\begin{bmatrix} -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 \end{bmatrix}$
355	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}i}{70} \end{bmatrix}$
356	symmetry	x

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & -\frac{\sqrt{210}i}{140} & 0 \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
357	symmetry	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{3\sqrt{35}}{140} & -\frac{\sqrt{210}i}{140} & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 \end{bmatrix}$
358	symmetry	$\begin{bmatrix} 0 & \frac{29\sqrt{7}i}{336} & 0 & \frac{9\sqrt{7}}{112} & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & 0 & 0 \\ \frac{29\sqrt{7}i}{336} & 0 & -\frac{9\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & 0 \\ 0 & \frac{29\sqrt{7}}{336} & 0 & -\frac{9\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 \\ -\frac{29\sqrt{7}}{336} & 0 & -\frac{9\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & -\frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{24} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
359	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{7}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & \frac{2\sqrt{7}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{2\sqrt{7}i}{21} \end{bmatrix}$
360	symmetry	$\begin{bmatrix} \frac{\sqrt{10}y(3x^2-y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{9\sqrt{7}}{112} & 0 & \frac{29\sqrt{7}i}{336} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 \\ \frac{9\sqrt{7}}{112} & 0 & \frac{29\sqrt{7}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{7}i}{112} & 0 & \frac{29\sqrt{7}}{336} & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & 0 & 0 \\ \frac{9\sqrt{7}i}{112} & 0 & -\frac{29\sqrt{7}}{336} & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{24} & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
361	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}i}{112} & 0 & \frac{5\sqrt{7}}{112} & \frac{5\sqrt{42}i}{168} & 0 \\ -\frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & \frac{9\sqrt{7}i}{112} & 0 & -\frac{5\sqrt{7}}{112} & 0 & 0 & -\frac{5\sqrt{42}i}{168} \\ 0 & \frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & \frac{5\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 \\ -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & -\frac{5\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{42} \end{bmatrix}$
362	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 \\ -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & \frac{\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{112} & 0 & \frac{9\sqrt{7}}{112} & \frac{5\sqrt{42}i}{168} & 0 \\ \frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & \frac{5\sqrt{7}i}{112} & 0 & -\frac{9\sqrt{7}}{112} & 0 & 0 & -\frac{5\sqrt{42}i}{168} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & \frac{\sqrt{42}}{42} & 0 \end{bmatrix}$
363	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{168} & 0 \\ \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & -\frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
364	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_{3,2}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \end{bmatrix}$
366	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 \end{bmatrix}$
367	symmetry	$-\sqrt{3}xz$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
368	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,1}^{(a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
369	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
370	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{7} & 0 & 0 \end{bmatrix}$
371	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
372	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_{2g})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
373	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{28} & 0 & 0 \end{bmatrix}$
374	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{28} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
375	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,2}^{(a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
377	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
378	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 \\ -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
379	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \end{bmatrix}$
380	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_{1g}, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 \\ -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{5}}{16} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 \\ -\frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 \\ \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{16} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 \\ -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{8} & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
382	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{112} & 0 & -\frac{5\sqrt{35}i}{112} & -\frac{\sqrt{210}}{56} & 0 \\ \frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{35}}{112} & 0 & \frac{5\sqrt{35}i}{112} & 0 & 0 & \frac{\sqrt{210}}{56} \\ 0 & \frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & 0 & 0 \\ -\frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & -\frac{3\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
383	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{35}i}{112} & 0 & -\frac{3\sqrt{35}}{112} & 0 & 0 \\ -\frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & -\frac{\sqrt{35}i}{112} & 0 & -\frac{3\sqrt{35}}{112} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & -\frac{\sqrt{210}}{56} & 0 \\ -\frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & \frac{5\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 & \frac{\sqrt{210}}{56} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 \end{bmatrix}$
384	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
386	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{56} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 \\ 0 & \frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ -\frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
387	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
393	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
394	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{5}}{80} & 0 & \frac{\sqrt{5}i}{16} & \frac{3\sqrt{30}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 \\ -\frac{3\sqrt{5}}{80} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & -\frac{3\sqrt{30}}{80} & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{80} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & -\frac{3\sqrt{30}}{80} & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 \\ -\frac{3\sqrt{5}i}{80} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{80} & \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & \frac{\sqrt{5}i}{16} & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & -\frac{3\sqrt{30}}{80} & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 \\ -\frac{\sqrt{5}i}{16} & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & \frac{3\sqrt{30}}{80} & \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{16} & 0 & -\frac{3\sqrt{5}i}{80} & -\frac{3\sqrt{30}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 \\ \frac{\sqrt{5}}{16} & 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & \frac{3\sqrt{30}}{80} & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
396	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{3\sqrt{35}}{560} & 0 & -\frac{3\sqrt{35}i}{560} & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{112} & 0 & \frac{3\sqrt{21}i}{112} & \frac{\sqrt{14}}{56} & 0 \\ \frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & 0 & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & \frac{\sqrt{21}}{112} & 0 & -\frac{3\sqrt{21}i}{112} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & \frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & \frac{3\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{16} & 0 & 0 \\ -\frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{560} & -\frac{3\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & \frac{3\sqrt{210}i}{280} & \frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \end{bmatrix}$
397	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & \frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & -\frac{\sqrt{21}i}{16} & 0 & -\frac{3\sqrt{21}}{112} & 0 & 0 \\ -\frac{3\sqrt{35}i}{560} & 0 & \frac{3\sqrt{35}}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{560} & \frac{\sqrt{21}i}{16} & 0 & -\frac{3\sqrt{21}}{112} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{560} & 0 & \frac{3\sqrt{35}i}{560} & \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{112} & \frac{\sqrt{14}}{56} & 0 \\ -\frac{3\sqrt{35}}{560} & 0 & -\frac{3\sqrt{35}i}{560} & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & -\frac{3\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & \frac{\sqrt{21}}{56} & 0 & 0 & \frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} & -\frac{\sqrt{14}i}{14} & 0 \end{bmatrix}$
398	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
400	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & -\frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{3\sqrt{7}i}{56} & 0 \\ -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{70}i}{80} & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 \\ -\frac{\sqrt{70}i}{80} & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & \frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
401	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & -\frac{3\sqrt{7}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 \\ \frac{\sqrt{70}}{80} & 0 & \frac{\sqrt{70}i}{80} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
403	symmetry	$\sqrt{3}yz$ $\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{11\sqrt{14}i}{168} & -\frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{11\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
404	symmetry	$-\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_{2,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{21} & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{11\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 \end{bmatrix}$
405	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \end{bmatrix}$
406	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 \\ -\frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
407	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
409	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \end{bmatrix}$
411	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
412	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
413	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
414	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
415	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & \frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & \frac{\sqrt{210}i}{105} & \frac{3\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{70} \end{bmatrix}$
416	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
417	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & \frac{13\sqrt{35}}{420} & 0 & -\frac{\sqrt{35}i}{420} & -\frac{\sqrt{210}}{105} & 0 \\ -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & \frac{13\sqrt{35}}{420} & 0 & \frac{\sqrt{35}i}{420} & 0 & 0 & \frac{\sqrt{210}}{105} \\ 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{35}i}{420} & 0 & \frac{11\sqrt{35}}{420} & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{21} & \frac{\sqrt{35}i}{420} & 0 & \frac{11\sqrt{35}}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & \frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & \frac{\sqrt{210}}{70} \end{bmatrix}$
418	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{11\sqrt{35}i}{420} & 0 & \frac{\sqrt{35}}{420} & 0 & 0 \\ \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{21} & \frac{11\sqrt{35}i}{420} & 0 & \frac{\sqrt{35}}{420} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{420} & 0 & -\frac{13\sqrt{35}i}{420} & -\frac{\sqrt{210}}{105} & 0 \\ \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & \frac{\sqrt{35}}{420} & 0 & \frac{13\sqrt{35}i}{420} & 0 & 0 & \frac{\sqrt{210}}{105} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & \frac{\sqrt{210}i}{70} & 0 & 0 \end{bmatrix}$
419	symmetry	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & -\frac{\sqrt{21}i}{42} & 0 & 0 \\ -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
420	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	$\begin{bmatrix} \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
421	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \\ -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{21} \end{bmatrix}$
423	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
	$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{15} & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
424	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
425	symmetry	$-\frac{3\sqrt{14}y(5x^4-10x^2y^2+y^4)}{16}$ $\begin{bmatrix} 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
426	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{210}}{840} & 0 & -\frac{\sqrt{210}i}{840} & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{21} & 0 \\ \frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \end{bmatrix}$
427	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & \frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{840} & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & \frac{\sqrt{21}i}{21} & 0 \end{bmatrix}$
428	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 7

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

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_{1g})$	$\begin{bmatrix} 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 \\ -\frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 \\ 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 \\ -\frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & \frac{\sqrt{15}i}{48} & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 \\ -\frac{3}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3}{8} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
433	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \end{bmatrix}$
434	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$ $\begin{bmatrix} 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 \\ -\frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & -\frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 \\ 0 & \frac{1}{16} & 0 & \frac{i}{16} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 \\ \frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3}{8} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3}{8} & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
435	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & -\frac{5}{48} & 0 & -\frac{7i}{48} & \frac{\sqrt{6}}{24} & 0 \\ -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & -\frac{5}{48} & 0 & \frac{7i}{48} & 0 & -\frac{\sqrt{6}}{24} \\ 0 & -\frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & \frac{17i}{48} & 0 & \frac{5}{48} & 0 & 0 \\ \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{48} & -\frac{17i}{48} & 0 & \frac{5}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & -\frac{1}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{1}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
436	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{3,2}^{(1,0;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & -\frac{5i}{48} & 0 & -\frac{17}{48} & 0 & 0 \\ \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{48} & \frac{5i}{48} & 0 & -\frac{17}{48} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & \frac{7}{48} & 0 & \frac{5i}{48} & \frac{\sqrt{6}}{24} & 0 \\ \frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & \frac{7}{48} & 0 & -\frac{5i}{48} & 0 & -\frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & -\frac{1}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & 0 \end{bmatrix}$
437	symmetry	$\sqrt{15}xyz$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{24} & 0 \\ -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 \end{bmatrix}$
438	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & \frac{\sqrt{15}i}{24} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 \end{bmatrix}$
439	symmetry	z $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} \end{bmatrix}$
440	symmetry	x

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_{1,1}^{(1,1;a)}(E_g)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & -\frac{\sqrt{210}}{140} & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \end{bmatrix}$
441	symmetry	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{3\sqrt{35}i}{140} & -\frac{\sqrt{210}}{140} & 0 \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
442	symmetry	$\begin{bmatrix} 0 & \frac{29\sqrt{7}}{336} & 0 & -\frac{9\sqrt{7}i}{112} & \frac{\sqrt{42}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 \\ \frac{29\sqrt{7}}{336} & 0 & \frac{9\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & -\frac{29\sqrt{7}i}{336} & 0 & -\frac{9\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & 0 & 0 \\ \frac{29\sqrt{7}i}{336} & 0 & -\frac{9\sqrt{7}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{48} & \frac{\sqrt{105}i}{336} & 0 & \frac{\sqrt{105}}{336} & 0 & 0 & 0 \\ \frac{\sqrt{7}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{24} & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
443	symmetry	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & \frac{5\sqrt{7}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & \frac{2\sqrt{7}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{2\sqrt{7}}{21} \end{bmatrix}$
444	symmetry	$\begin{bmatrix} \frac{\sqrt{10}y(3x^2-y^2)}{4} \end{bmatrix}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	$\begin{bmatrix} 0 & \frac{9\sqrt{7}i}{112} & 0 & \frac{29\sqrt{7}}{336} & 0 & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 \\ -\frac{9\sqrt{7}i}{112} & 0 & \frac{29\sqrt{7}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{48} & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{7}}{112} & 0 & -\frac{29\sqrt{7}i}{336} & \frac{\sqrt{42}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 \\ \frac{9\sqrt{7}}{112} & 0 & \frac{29\sqrt{7}i}{336} & 0 & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{24} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{24} & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
445	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & \frac{9\sqrt{7}}{112} & 0 & -\frac{5\sqrt{7}i}{112} & \frac{5\sqrt{42}}{168} & 0 \\ -\frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & \frac{9\sqrt{7}}{112} & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 & -\frac{5\sqrt{42}}{168} \\ 0 & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 \\ \frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & \frac{5\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \end{bmatrix}$
446	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
	$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & \frac{5\sqrt{7}}{112} & 0 & 0 \\ \frac{\sqrt{105}i}{336} & 0 & -\frac{\sqrt{105}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & -\frac{\sqrt{7}i}{112} & 0 & \frac{5\sqrt{7}}{112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{336} & 0 & -\frac{\sqrt{105}i}{336} & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{112} & 0 & -\frac{9\sqrt{7}i}{112} & \frac{5\sqrt{42}}{168} & 0 \\ \frac{\sqrt{105}}{336} & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & \frac{5\sqrt{7}}{112} & 0 & \frac{9\sqrt{7}i}{112} & 0 & 0 & -\frac{5\sqrt{42}}{168} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & -\frac{\sqrt{42}i}{42} & 0 \end{bmatrix}$
447	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{168} & 0 \\ \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ -\frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
448	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

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

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

Table 8: (d,d) block.

No.	multipole	matrix
449	symmetry	1
$\left[\begin{array}{cccccccccc} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{array} \right]$		
450	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
455	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$ $\begin{bmatrix} \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{35} \end{bmatrix}$
456	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
457	$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
458	$\mathbb{Q}_4^{(a)}(A_{2g})$	$\frac{-\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
463	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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 $-\frac{\sqrt{30}i}{15}$ 0 0 $-\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0
	0	0 0 0 $\frac{\sqrt{30}i}{15}$ $\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0
	$\frac{\sqrt{30}i}{15}$	0 0 0 0 0 $\frac{\sqrt{30}i}{60}$ 0 $-\frac{\sqrt{30}}{60}$ 0 0
	0	$-\frac{\sqrt{30}i}{15}$ 0 0 0 $\frac{\sqrt{30}i}{60}$ 0 $\frac{\sqrt{30}}{60}$ 0 0 0
	0	$\frac{\sqrt{30}}{60}$ 0 $-\frac{\sqrt{30}i}{60}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $-\frac{\sqrt{10}}{20}$
	$-\frac{\sqrt{30}}{60}$	0 $-\frac{\sqrt{30}i}{60}$ 0 0 0 0 0 $\frac{\sqrt{30}i}{30}$ $\frac{\sqrt{10}}{20}$ 0
	0	$\frac{\sqrt{30}i}{60}$ 0 0 $\frac{\sqrt{30}}{60}$ $\frac{\sqrt{30}i}{30}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$
	$\frac{\sqrt{30}i}{60}$	0 0 $-\frac{\sqrt{30}}{60}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0
	0	0 0 0 0 $-\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0
465 symmetry	$\sqrt{3}yz$	
	0	0 0 0 $-\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0
	0	0 0 $\frac{\sqrt{10}}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0
	0	$\frac{\sqrt{10}}{10}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 0 0
	$-\frac{\sqrt{10}}{10}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 0
	$-\frac{\sqrt{10}i}{20}$	0 0 0 0 0 0 0 $-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{30}i}{20}$ 0
	0	$\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 0 $-\frac{\sqrt{30}i}{20}$
	0	0 0 $-\frac{\sqrt{10}i}{20}$ 0 0 $\frac{\sqrt{10}}{20}$ 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 $-\frac{\sqrt{30}i}{20}$ 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0
466 symmetry	$-\sqrt{3}xz$	
	continued ...	

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix	
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 $\frac{\sqrt{14}}{28}$ $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$	
	0	0 0 $-\frac{\sqrt{14}}{28}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{42}i}{56}$ 0	
	0	$-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{42}}{56}$	
	$\frac{\sqrt{14}}{28}$	0 0 0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ $\frac{\sqrt{42}}{56}$ 0	
	$\frac{3\sqrt{14}i}{56}$	0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ $\frac{\sqrt{42}i}{28}$ 0	
	0	$-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 $-\frac{\sqrt{42}i}{28}$	
	0	0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0	
	0	0 0 0 $-\frac{3\sqrt{14}i}{56}$ $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0	
	0	$\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ $-\frac{\sqrt{42}i}{28}$ 0 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 0	
$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$			
473	symmetry	$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	
0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{42}}{56}$			
0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ $-\frac{\sqrt{42}}{56}$ 0			
0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$			
$\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 $-\frac{\sqrt{42}i}{56}$			
0 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0			
0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0			
$-\frac{3\sqrt{14}i}{56}$ 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 $\frac{\sqrt{42}i}{28}$ 0			
0 $\frac{3\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 $-\frac{\sqrt{42}i}{28}$			
0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0			
$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0			
$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$			
474	symmetry		

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(1,1;a)}(E_g, 2)$	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $-\frac{3\sqrt{35}}{70}$ $-\frac{3\sqrt{35}i}{70}$ 0	
	0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $\frac{3\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{105}i}{42}$	
	0 $-\frac{\sqrt{35}}{35}$ 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}}{210}$	
	$\frac{\sqrt{35}}{35}$ 0 $\frac{3\sqrt{35}i}{70}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{210}$ 0	
	0 $\frac{\sqrt{35}i}{35}$ 0 $\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{210}$	
	$\frac{\sqrt{35}i}{35}$ 0 $-\frac{3\sqrt{35}}{70}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{210}$ 0	
	0 0 $\frac{\sqrt{105}i}{42}$ 0 0 $-\frac{\sqrt{105}}{210}$ 0 $-\frac{\sqrt{105}i}{210}$ 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{42}$ $\frac{\sqrt{105}}{210}$ 0 $-\frac{\sqrt{105}i}{210}$ 0 0 0	
483 symmetry	$-\sqrt{3}xy$	
	0 0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $-\frac{3\sqrt{35}}{70}$ $-\frac{\sqrt{105}i}{42}$ 0	
	0 0 0 0 $-\frac{3\sqrt{35}i}{70}$ 0 $\frac{3\sqrt{35}}{70}$ 0 0 $\frac{\sqrt{105}i}{42}$	
	0 0 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{35}}{35}$ 0 $\frac{\sqrt{35}i}{35}$ 0 0	
	0 $\frac{3\sqrt{35}i}{70}$ 0 $\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{210}$	
	$\frac{3\sqrt{35}i}{70}$ 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{210}$ 0	
	0 $\frac{3\sqrt{35}}{70}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{210}$	
	$-\frac{3\sqrt{35}}{70}$ 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 0 $\frac{\sqrt{105}}{210}$ 0	
	$\frac{\sqrt{105}i}{42}$ 0 0 0 0 $-\frac{\sqrt{105}i}{210}$ 0 $\frac{\sqrt{105}}{210}$ 0 0	
484 symmetry	z	
	<i>continued ...</i>	

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$-\frac{\sqrt{70}}{140}$
	$-\frac{\sqrt{70}}{140}$	0
	0	0
	$-\frac{\sqrt{70}}{140}$	0
	$-\frac{\sqrt{70}}{280}$	0
	0	0
	$-\frac{\sqrt{70}}{280}$	0
	0	0
	$-\frac{3\sqrt{210}}{280}$	0
	$-\frac{3\sqrt{210}}{280}$	0
503	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{70}i}{140}$
	$-\frac{\sqrt{70}i}{140}$	0
	0	0
	$\frac{\sqrt{70}i}{140}$	0
	0	0
	$-\frac{\sqrt{70}i}{140}$	0
	0	0
	$\frac{\sqrt{70}}{280}$	0
	0	0
	$-\frac{3\sqrt{210}i}{280}$	0
504	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
505	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
506	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
509	symmetry	<i>x</i>
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 \end{bmatrix}$
510	symmetry	<i>y</i>

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & \frac{\sqrt{10}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ \frac{\sqrt{10}i}{60} & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & \frac{\sqrt{30}i}{30} & 0 \\ 0 & -\frac{\sqrt{10}}{60} & 0 & \frac{\sqrt{10}i}{60} & \frac{\sqrt{10}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{30} \\ -\frac{\sqrt{10}}{60} & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & \frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{15} & 0 & 0 & -\frac{\sqrt{10}i}{15} & 0 & \frac{\sqrt{10}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{15} & \frac{\sqrt{10}i}{15} & 0 & \frac{\sqrt{10}}{15} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{15} & 0 & \frac{\sqrt{10}i}{15} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{15} & 0 & 0 & \frac{\sqrt{10}}{15} & 0 & -\frac{\sqrt{10}i}{15} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
531	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
		$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
532	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 8

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

continued ...

Table 8

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	$0 \quad -\frac{\sqrt{105}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70}$	
	$\frac{\sqrt{105}i}{210} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{105} \quad \frac{\sqrt{35}i}{70} \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{210} \quad -\frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70}$	
	$0 \quad 0 \quad \frac{\sqrt{105}i}{210} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70}$	
	$0 \quad 0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{105} \quad 0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{105} \quad -\frac{\sqrt{105}i}{105} \quad 0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad \frac{\sqrt{105}i}{35} \quad \frac{2\sqrt{35}}{35} \quad 0$	
	$0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{105} \quad 0 \quad -\frac{\sqrt{105}i}{35} \quad 0 \quad 0 \quad -\frac{2\sqrt{35}}{35}$	
	$0 \quad -\frac{\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad \frac{2\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{35}$	
	$\frac{\sqrt{35}i}{70} \quad 0 \quad -\frac{\sqrt{35}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{2\sqrt{35}}{35} \quad \frac{\sqrt{105}i}{35} \quad 0$	
535	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	$0 \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{10} \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{10} \quad -\frac{\sqrt{5}i}{10} \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{10} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad \frac{\sqrt{5}i}{10} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{5}i}{10} \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{5}i}{10} \quad 0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{5}}{10} \quad 0 \quad -\frac{\sqrt{5}i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{5}}{10} \quad 0 \quad \frac{\sqrt{5}i}{10} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0$	
536	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 8

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
537	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
538	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

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

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

Table 9: (d,f) block.

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

continued ...

Table 9

No.	multipole	matrix
550	symmetry $\mathbb{Q}_{1,1}^{(a)}(E_u)$	x $\begin{bmatrix} \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
551	symmetry $\mathbb{Q}_{1,2}^{(a)}(E_u)$	y $\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 \end{bmatrix}$
552	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
553	symmetry	
$\mathbb{Q}_3^{(a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
554	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(a)}(E_u, 1)$		$\begin{bmatrix} -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \end{bmatrix}$
557	$\mathbb{Q}_{3,2}^{(a)}(E_u, 1)$	$\sqrt{15}xyz$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
558	$\mathbb{Q}_{3,1}^{(a)}(E_u, 2)$	$\sqrt{15}z(x-y)(x+y)/2$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
559	$\mathbb{Q}_{3,2}^{(a)}(E_u, 2)$	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
560	$\mathbb{Q}_5^{(a)}(A_{1u})$	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
		<i>continued ...</i>

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 \end{bmatrix}$
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
561	symmetry	
$\mathbb{Q}_5^{(a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
562	symmetry	

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
563	$\mathbb{Q}_{5,1}^{(a)}(E_u, 1)$	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
564	$\mathbb{Q}_{5,2}^{(a)}(E_u, 1)$	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad \frac{\sqrt{42}}{21} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad \frac{\sqrt{42}}{21}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
565	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{Q}_{5,2}^{(a)}(E_u, 2)$	$0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad \frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{420} \quad 0 \quad \frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{105}}{420} \quad 0 \quad -\frac{\sqrt{7}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{70} \quad 0 \quad \frac{\sqrt{42}}{21} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{70} \quad 0 \quad \frac{\sqrt{42}}{21}$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{14} \quad 0 \quad 0 \quad 0$	
566	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
567	$\mathbb{Q}_{5,1}^{(a)}(E_u, 3)$	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
568	$\mathbb{Q}_{5,2}^{(a)}(E_u, 3)$	$\frac{-\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
569	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
570	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
		$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 1)$
571	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{70}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 \end{bmatrix}$
572	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,-1;a)}(A_{2u}, 2)$	0 0 0 0 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 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 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0	
	$-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0	
	0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0	
	$\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0	
573	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{42}i}{42}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 $\frac{\sqrt{105}}{420}$	
	0 0 0 $\frac{\sqrt{42}i}{42}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ $-\frac{\sqrt{105}}{420}$ 0	
	$\frac{\sqrt{42}i}{42}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 0 0 $-\frac{\sqrt{105}i}{420}$	
	0 $-\frac{\sqrt{42}i}{42}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 $-\frac{\sqrt{105}i}{420}$ 0	
	0 $\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0	
	$-\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0	
	0 $\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{280}$ $-\frac{2\sqrt{105}i}{105}$ 0	
	$\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{280}$ 0 0 $\frac{2\sqrt{105}i}{105}$	
	0 0 0 0 0 $\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{84}$ 0 0 $\frac{\sqrt{210}i}{105}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{21}}{84}$ 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 $-\frac{\sqrt{210}i}{105}$ 0 0	
574	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{42}i}{42}$	0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ $\frac{\sqrt{70}i}{70}$ 0 0 0 0 $\frac{\sqrt{105}i}{420}$
	0	$-\frac{\sqrt{42}i}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{70}i}{70}$ 0 0 $\frac{\sqrt{105}i}{420}$ 0
	0	0 $\frac{\sqrt{42}i}{42}$ 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0 0 $\frac{\sqrt{70}i}{70}$ 0 0 $\frac{\sqrt{105}}{420}$
	0	0 0 0 $-\frac{\sqrt{42}i}{42}$ $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{70}$ $-\frac{\sqrt{105}}{420}$ 0
	0	$\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ 0 $-\frac{\sqrt{70}}{56}$ $\frac{2\sqrt{105}i}{105}$ 0
	$\frac{\sqrt{42}i}{168}$	0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 $-\frac{2\sqrt{105}i}{105}$
	0	$-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{3\sqrt{70}}{280}$ 0 $\frac{\sqrt{70}i}{280}$ 0 0 0
	$\frac{\sqrt{42}}{168}$	0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $\frac{\sqrt{70}i}{280}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 $\frac{\sqrt{21}}{84}$ $-\frac{\sqrt{210}i}{105}$ 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{210}i}{105}$ 0 0 0 0
575	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(1,-1;a)}(E_u, 2)$	0	$\frac{\sqrt{105}i}{84}$ 0 $-\frac{\sqrt{105}}{84}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 $\frac{\sqrt{7}}{28}$ $-\frac{\sqrt{42}i}{84}$ 0
	$\frac{\sqrt{105}i}{84}$	0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 $-\frac{\sqrt{7}}{28}$ 0 0 $\frac{\sqrt{42}i}{84}$
	0	$\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0
	$-\frac{\sqrt{105}}{84}$	0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 $\frac{\sqrt{7}i}{28}$ 0 0 0
	$-\frac{\sqrt{105}i}{84}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{42}$
	0	$\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{42}i}{42}$ 0
	0	0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 $-\frac{\sqrt{42}}{42}$
	0	0 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $\frac{\sqrt{42}}{42}$ 0
	0	0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $\frac{\sqrt{21}}{42}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0 0
576	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,-1;a)}(E_u, 2)$	0	$-\frac{\sqrt{105}}{84}$
	$\frac{\sqrt{105}}{84}$	$0 - \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 -\frac{\sqrt{7}}{28} 0 \frac{\sqrt{7}i}{28} 0 0 0$
	0	$\frac{\sqrt{105}i}{84} 0 -\frac{\sqrt{105}i}{84} 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 -\frac{\sqrt{7}i}{28} \frac{\sqrt{42}i}{84} 0$
	$\frac{\sqrt{105}i}{84}$	$0 \frac{\sqrt{105}}{84} 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 \frac{\sqrt{7}}{28} 0 0 -\frac{\sqrt{42}i}{84}$
	0	$0 \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 0 0 -\frac{\sqrt{42}}{42}$
	0	$0 0 0 -\frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 \frac{\sqrt{7}i}{28} \frac{\sqrt{42}}{42} 0$
	$-\frac{\sqrt{105}i}{84}$	$0 0 0 0 0 0 0 0 -\frac{\sqrt{7}i}{28} 0 0 0 0 -\frac{\sqrt{42}i}{42}$
	0	$0 \frac{\sqrt{105}i}{84} 0 0 0 0 0 0 0 \frac{\sqrt{7}i}{28} 0 0 -\frac{\sqrt{42}i}{42} 0$
	0	$0 0 0 0 0 \frac{\sqrt{210}i}{84} 0 0 \frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 0$
	0	$0 0 0 0 0 0 -\frac{\sqrt{210}i}{84} -\frac{\sqrt{21}}{42} 0 \frac{\sqrt{21}i}{42} 0 0 0$
577	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{1u})$	0	$0 0 0 0 0 -\frac{\sqrt{2}}{60} 0 \frac{\sqrt{2}i}{60} 0 0 0 -\frac{\sqrt{5}i}{15} 0 0 -\frac{\sqrt{30}}{30}$
	0	$0 0 0 0 \frac{\sqrt{2}}{60} 0 \frac{\sqrt{2}i}{60} 0 0 0 0 0 \frac{\sqrt{5}i}{15} \frac{\sqrt{30}}{30} 0$
	0	$0 0 0 0 0 \frac{\sqrt{2}i}{60} 0 \frac{\sqrt{2}}{60} -\frac{\sqrt{5}i}{15} 0 0 0 0 0 -\frac{\sqrt{30}i}{30}$
	0	$0 0 0 0 \frac{\sqrt{2}i}{60} 0 -\frac{\sqrt{2}}{60} 0 0 \frac{\sqrt{5}i}{15} 0 0 0 -\frac{\sqrt{30}i}{30} 0$
	0	$0 -\frac{\sqrt{3}}{30} 0 -\frac{\sqrt{3}i}{15} 0 0 \frac{\sqrt{2}i}{30} 0 0 0 -\frac{\sqrt{5}}{60} 0 -\frac{\sqrt{5}i}{60} 0 0 0$
	$\frac{\sqrt{3}}{30}$	$0 -\frac{\sqrt{3}i}{15} 0 0 0 0 -\frac{\sqrt{2}i}{30} \frac{\sqrt{5}}{60} 0 -\frac{\sqrt{5}i}{60} 0 0 0 0 0$
	0	$\frac{\sqrt{3}i}{30} 0 -\frac{\sqrt{3}}{15} \frac{\sqrt{2}i}{30} 0 0 0 0 -\frac{\sqrt{5}i}{60} 0 \frac{\sqrt{5}}{60} 0 0 0$
	$\frac{\sqrt{3}i}{30}$	$0 \frac{\sqrt{3}}{15} 0 0 -\frac{\sqrt{2}i}{30} 0 0 -\frac{\sqrt{5}i}{60} 0 -\frac{\sqrt{5}}{60} 0 0 0 0$
	0	$0 0 \frac{i}{5} 0 0 \frac{\sqrt{6}}{15} 0 \frac{\sqrt{6}i}{15} 0 0 0 0 0 0 0$
	0	$0 0 0 -\frac{i}{5} -\frac{\sqrt{6}}{15} 0 \frac{\sqrt{6}i}{15} 0 0 0 0 0 0 0 0$
578	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 1)$	0	$\frac{\sqrt{210}}{420} \quad 0 \quad -\frac{\sqrt{210}i}{420} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{42} \quad 0 \quad \frac{\sqrt{14}i}{42} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{420}$	$0 \quad -\frac{\sqrt{210}i}{420} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{42} \quad -\frac{\sqrt{14}}{42} \quad 0 \quad \frac{\sqrt{14}i}{42} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{210}i}{420} \quad 0 \quad \frac{\sqrt{210}}{420} \quad -\frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{42} \quad 0 \quad \frac{\sqrt{14}}{42} \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{420}$	$0 \quad -\frac{\sqrt{210}}{420} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{42} \quad 0 \quad -\frac{\sqrt{14}}{42} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{60} \quad 0 \quad \frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad \frac{\sqrt{35}i}{60} \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}i}{84} \quad \frac{\sqrt{21}}{42} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad -\frac{\sqrt{35}}{60} \quad \frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{60} \quad 0 \quad \frac{\sqrt{35}}{60} \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{84} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad 0 \quad 0$
579	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{Q}_5^{(1,-1;a)}(A_{2u}, 2)$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{60} \quad 0 \quad -\frac{\sqrt{2}}{60} \quad \frac{\sqrt{5}i}{15} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{30}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{60} \quad 0 \quad \frac{\sqrt{2}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{15} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{30}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{60} \quad 0 \quad \frac{\sqrt{2}i}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{15} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{30}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{60} \quad 0 \quad \frac{\sqrt{2}i}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{15} \quad \frac{\sqrt{30}}{30} \quad 0$
	0	$0 \quad \frac{\sqrt{3}i}{15} \quad 0 \quad -\frac{\sqrt{3}}{30} \quad -\frac{\sqrt{2}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{60} \quad 0 \quad -\frac{\sqrt{5}}{60} \quad 0 \quad 0$
	$\frac{\sqrt{3}i}{15}$	$0 \quad \frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{30} \quad 0 \quad 0 \quad \frac{\sqrt{5}i}{60} \quad 0 \quad \frac{\sqrt{5}}{60} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{3}}{15} \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{60} \quad 0 \quad -\frac{\sqrt{5}i}{60} \quad 0 \quad 0$
	$-\frac{\sqrt{3}}{15}$	$0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{30} \quad \frac{\sqrt{5}}{60} \quad 0 \quad -\frac{\sqrt{5}i}{60} \quad 0 \quad 0 \quad 0$
	$-\frac{i}{5}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{15} \quad 0 \quad \frac{\sqrt{6}}{15} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{i}{5} \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{15} \quad 0 \quad -\frac{\sqrt{6}}{15} \quad 0 \quad 0$
580	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,1}^{(1,-1;a)}(E_u, 2)$	$0 \quad 0 \quad \frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{105} \quad \frac{\sqrt{35}}{70} \quad 0$	
	$-\frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70}$	
	$0 \quad \frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{70} \quad 0$	
	$0 \quad -\frac{3\sqrt{14}}{280} \quad 0 \quad \frac{3\sqrt{14}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{840} \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0$	
	$\frac{3\sqrt{14}}{280} \quad 0 \quad \frac{3\sqrt{14}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{30} \quad \frac{\sqrt{210}}{840} \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{14}i}{280} \quad 0 \quad -\frac{3\sqrt{14}}{280} \quad \frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{11\sqrt{210}i}{840} \quad 0 \quad \frac{\sqrt{210}}{840} \quad -\frac{\sqrt{35}i}{35} \quad 0$	
	$-\frac{3\sqrt{14}i}{280} \quad 0 \quad \frac{3\sqrt{14}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad \frac{11\sqrt{210}i}{840} \quad 0 \quad -\frac{\sqrt{210}}{840} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{35}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{35} \quad 0 \quad -\frac{\sqrt{7}i}{35} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{35} \quad 0 \quad -\frac{\sqrt{7}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0$	
583	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{Q}_{5,2}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad -\frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70}$	
	$0 \quad \frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{70} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{14}i}{70} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{105} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{70}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{70} \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{105} \quad \frac{\sqrt{35}}{70} \quad 0$	
	$0 \quad -\frac{3\sqrt{14}i}{280} \quad 0 \quad -\frac{3\sqrt{14}}{280} \quad \frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{840} \quad 0 \quad -\frac{11\sqrt{210}}{840} \quad \frac{\sqrt{35}i}{35} \quad 0$	
	$-\frac{3\sqrt{14}i}{280} \quad 0 \quad \frac{3\sqrt{14}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{840} \quad 0 \quad \frac{11\sqrt{210}}{840} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35}$	
	$0 \quad \frac{3\sqrt{14}}{280} \quad 0 \quad -\frac{3\sqrt{14}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{30} \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{840} \quad 0 \quad 0$	
	$-\frac{3\sqrt{14}}{280} \quad 0 \quad -\frac{3\sqrt{14}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{30} \quad -\frac{3\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{840} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{35} \quad 0 \quad \frac{\sqrt{7}}{35} \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{35} \quad 0 \quad -\frac{\sqrt{7}}{35} \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0$	
584	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

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

continued ...

Table 9

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

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad \frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28}$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28}$	$0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28}$	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28}$	$0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad \frac{\sqrt{105}i}{70}$	$0 \quad 0 \quad -\frac{3\sqrt{70}i}{140}$
	$0 \quad 0 \quad -\frac{\sqrt{105}i}{70}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}i}{140} \quad 0$
591	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{Q}_3^{(1,0;a)}(A_{1u})$	$0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24}$	
	$0 \quad 0 \quad -\frac{i}{8} \quad \frac{\sqrt{6}}{24} \quad 0$	
	$0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24}$	
	$0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0$	
	$0 \quad \frac{\sqrt{15}}{48} \quad 0 \quad \frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad \frac{1}{16} \quad 0 \quad \frac{i}{16} \quad 0 \quad 0$	
	$-\frac{\sqrt{15}}{48} \quad 0 \quad \frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad -\frac{1}{16} \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad \frac{\sqrt{15}}{48} \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{16} \quad 0 \quad -\frac{1}{16} \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{15}i}{48} \quad 0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad \frac{i}{16} \quad 0 \quad \frac{1}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{5}i}{8} \quad 0 \quad 0$	
592	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 1)$	0	$\frac{\sqrt{6}}{24} \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{24}$	$0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{6}i}{24} \quad 0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{6}i}{24}$	$0 \quad -\frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{60}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{8} \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{60} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{60} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad 0 \quad 0 \quad 0$
593	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$\mathbb{Q}_3^{(1,0;a)}(A_{2u}, 2)$	0	$0 \quad 0 \quad -\frac{i}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24}$
	0	$0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0$
	0	$0 \quad 0 \quad \frac{i}{8} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24}$
	0	$0 \quad 0 \quad -\frac{i}{8} \quad \frac{\sqrt{6}}{24} \quad 0$
	0	$0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad \frac{\sqrt{15}}{48} \quad \frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{16} \quad 0 \quad \frac{1}{16} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{15}i}{48}$	$0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{16} \quad 0 \quad -\frac{1}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{16} \quad 0 \quad 0 \quad \frac{1}{16} \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{15}}{48}$	$0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{16} \quad -\frac{1}{16} \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{5}i}{8}$	$0 \quad 0 \quad 0$
	0	$0 \quad \frac{\sqrt{5}i}{8} \quad 0 \quad 0$
594	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 1)$	0 0 $\frac{i}{24}$ 0 0 $-\frac{\sqrt{6}}{12}$ 0 0 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 $\frac{\sqrt{10}}{24}$	
	0 0 0 $-\frac{i}{24}$ $\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 $-\frac{\sqrt{15}i}{60}$ $-\frac{\sqrt{10}}{24}$ 0	
	$-\frac{i}{24}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 $-\frac{\sqrt{10}i}{24}$	
	0 $\frac{i}{24}$ 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 $-\frac{\sqrt{10}i}{24}$ 0	
	0 $-\frac{5}{48}$ 0 $\frac{5i}{48}$ 0 0 $-\frac{\sqrt{6}i}{48}$ 0 0 $-\frac{\sqrt{15}}{240}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0	
	$\frac{5}{48}$ 0 $\frac{5i}{48}$ 0 0 0 0 $\frac{\sqrt{6}i}{48}$ $\frac{\sqrt{15}}{240}$ 0 $\frac{\sqrt{15}i}{48}$ 0 0 0	
	0 $-\frac{5i}{48}$ 0 $-\frac{5}{48}$ $\frac{\sqrt{6}i}{48}$ 0 0 0 0 $\frac{\sqrt{15}i}{48}$ 0 $\frac{3\sqrt{15}}{80}$ $-\frac{\sqrt{10}i}{120}$ 0	
	$-\frac{5i}{48}$ 0 $\frac{5}{48}$ 0 0 $-\frac{\sqrt{6}i}{48}$ 0 0 $\frac{\sqrt{15}i}{48}$ 0 $-\frac{3\sqrt{15}}{80}$ 0 0 $\frac{\sqrt{10}i}{120}$	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 $\frac{\sqrt{30}}{30}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{40}$ $-\frac{\sqrt{30}}{30}$ 0	
595	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 1)$	$-\frac{i}{24}$ 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 $\frac{\sqrt{10}i}{24}$	
	0 $\frac{i}{24}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 $-\frac{\sqrt{15}i}{60}$ 0 0 $\frac{\sqrt{10}i}{24}$ 0	
	0 0 $-\frac{i}{24}$ 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 $\frac{\sqrt{15}i}{60}$ 0 0 $\frac{\sqrt{10}}{24}$	
	0 0 0 $\frac{i}{24}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 $-\frac{\sqrt{15}i}{60}$ $-\frac{\sqrt{10}}{24}$ 0	
	0 $-\frac{5i}{48}$ 0 $-\frac{5}{48}$ $\frac{\sqrt{6}i}{48}$ 0 0 0 0 $-\frac{3\sqrt{15}i}{80}$ 0 $-\frac{\sqrt{15}}{48}$ $\frac{\sqrt{10}i}{120}$ 0	
	$-\frac{5i}{48}$ 0 $\frac{5}{48}$ 0 0 $-\frac{\sqrt{6}i}{48}$ 0 0 $-\frac{3\sqrt{15}i}{80}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 $-\frac{\sqrt{10}i}{120}$	
	0 $\frac{5}{48}$ 0 $-\frac{5i}{48}$ 0 0 $\frac{\sqrt{6}i}{48}$ 0 0 $-\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{240}$ 0 0 0	
	$-\frac{5}{48}$ 0 $-\frac{5i}{48}$ 0 0 0 0 $-\frac{\sqrt{6}i}{48}$ $\frac{\sqrt{15}}{48}$ 0 $\frac{\sqrt{15}i}{240}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{40}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{40}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0	
596	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,1}^{(1,0;a)}(E_u, 2)$	0	$\frac{\sqrt{10}i}{48} \quad 0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad -\frac{i}{6} \quad 0$
	$\frac{\sqrt{10}i}{48}$	$0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad \frac{i}{6}$
	0	$\frac{\sqrt{10}}{48} \quad 0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{10}}{48}$	$0 \quad \frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{10}i}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24}$
	0	$-\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{i}{24} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad \frac{1}{24}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{24} \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad -\frac{1}{24} \quad 0$
	0	$\frac{\sqrt{30}i}{48} \quad 0 \quad \frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{30}i}{48}$	$0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad -\frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0$
597	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
$\mathbb{Q}_{3,2}^{(1,0;a)}(E_u, 2)$	0	$0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0$
	$\frac{\sqrt{10}}{48}$	$0 \quad 0 \quad -\frac{\sqrt{10}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{16} \quad 0 \quad -\frac{\sqrt{6}i}{16} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{10}i}{48} \quad 0 \quad -\frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad \frac{\sqrt{6}}{48} \quad \frac{i}{6} \quad 0$
	$\frac{\sqrt{10}i}{48}$	$0 \quad \frac{\sqrt{10}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{48} \quad 0 \quad -\frac{\sqrt{6}}{48} \quad 0 \quad 0 \quad -\frac{i}{6}$
	0	$0 \quad 0 \quad -\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad \frac{1}{24}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad -\frac{1}{24} \quad 0$
	$\frac{\sqrt{10}i}{24}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{i}{24}$
	0	$0 \quad -\frac{\sqrt{10}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad 0 \quad \frac{i}{24} \quad 0$
	0	$0 \quad \frac{\sqrt{30}}{48} \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad \frac{\sqrt{2}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{30}}{48}$	$0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{16} \quad 0 \quad \frac{\sqrt{2}}{16} \quad 0 \quad 0 \quad 0 \quad 0$
598	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{1u})$	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{3\sqrt{2}}{40} \ 0 \ \frac{3\sqrt{2}i}{40} \ 0 \ 0 \ -\frac{\sqrt{5}i}{20} \ 0 \ 0 \ \frac{\sqrt{30}}{60}$	
	$0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}}{40} \ 0 \ \frac{3\sqrt{2}i}{40} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}i}{20} \ -\frac{\sqrt{30}}{60} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{40} \ 0 \ \frac{3\sqrt{2}}{40} \ -\frac{\sqrt{5}i}{20} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{30}i}{60}$	
	$0 \ 0 \ 0 \ 0 \ \frac{3\sqrt{2}i}{40} \ 0 \ -\frac{3\sqrt{2}}{40} \ 0 \ 0 \ \frac{\sqrt{5}i}{20} \ 0 \ 0 \ \frac{\sqrt{30}i}{60} \ 0$	
	$0 \ -\frac{\sqrt{3}}{15} \ 0 \ \frac{\sqrt{3}i}{30} \ 0 \ 0 \ -\frac{\sqrt{2}i}{10} \ 0 \ 0 \ \frac{\sqrt{5}}{20} \ 0 \ \frac{\sqrt{5}i}{20} \ 0 \ 0$	
	$\frac{\sqrt{3}}{15} \ 0 \ \frac{\sqrt{3}i}{30} \ 0 \ 0 \ 0 \ \frac{\sqrt{2}i}{10} \ -\frac{\sqrt{5}}{20} \ 0 \ \frac{\sqrt{5}i}{20} \ 0 \ 0 \ 0 \ 0$	
	$0 \ \frac{\sqrt{3}i}{15} \ 0 \ \frac{\sqrt{3}}{30} \ -\frac{\sqrt{2}i}{10} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{5}i}{20} \ 0 \ -\frac{\sqrt{5}}{20} \ 0 \ 0$	
	$\frac{\sqrt{3}i}{15} \ 0 \ -\frac{\sqrt{3}}{30} \ 0 \ 0 \ \frac{\sqrt{2}i}{10} \ 0 \ 0 \ \frac{\sqrt{5}i}{20} \ 0 \ \frac{\sqrt{5}}{20} \ 0 \ 0 \ 0$	
	$0 \ 0 \ -\frac{i}{10} \ 0 \ 0 \ \frac{\sqrt{6}}{20} \ 0 \ \frac{\sqrt{6}i}{20} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ \frac{i}{10} \ -\frac{\sqrt{6}}{20} \ 0 \ \frac{\sqrt{6}i}{20} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0$	
599	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 1)$	$0 \ -\frac{\sqrt{210}}{840} \ 0 \ \frac{\sqrt{210}i}{840} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}}{56} \ 0 \ \frac{\sqrt{14}i}{56} \ 0 \ 0$	
	$\frac{\sqrt{210}}{840} \ 0 \ \frac{\sqrt{210}i}{840} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{14}}{56} \ 0 \ \frac{\sqrt{14}i}{56} \ 0 \ 0 \ 0$	
	$0 \ -\frac{\sqrt{210}i}{840} \ 0 \ -\frac{\sqrt{210}}{840} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{14}i}{56} \ 0 \ \frac{\sqrt{14}}{56} \ 0 \ 0$	
	$-\frac{\sqrt{210}i}{840} \ 0 \ \frac{\sqrt{210}}{840} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{14}i}{56} \ 0 \ -\frac{\sqrt{14}}{56} \ 0 \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}}{70} \ 0 \ -\frac{\sqrt{35}i}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{21}}{21}$	
	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{35}}{70} \ 0 \ -\frac{\sqrt{35}i}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{21}}{21} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{70} \ 0 \ \frac{\sqrt{35}}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{21}i}{21}$	
	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{70} \ 0 \ -\frac{\sqrt{35}}{70} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{21}i}{21} \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{42}}{28} \ 0 \ \frac{\sqrt{42}i}{28} \ 0 \ 0$	
	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{42}}{28} \ 0 \ \frac{\sqrt{42}i}{28} \ 0 \ 0$	
600	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_5^{(1,0;a)}(A_{2u}, 2)$	0 0 0 0 0 $-\frac{3\sqrt{2}i}{40}$ 0 $-\frac{3\sqrt{2}}{40}$ $\frac{\sqrt{5}i}{20}$ 0 0 0 0 $-\frac{\sqrt{30}i}{60}$	
	0 0 0 0 $-\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 $-\frac{\sqrt{30}i}{60}$ 0	
	0 0 0 0 0 $-\frac{3\sqrt{2}}{40}$ 0 $\frac{3\sqrt{2}i}{40}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 $\frac{\sqrt{30}}{60}$	
	0 0 0 0 $\frac{3\sqrt{2}}{40}$ 0 $\frac{3\sqrt{2}i}{40}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$ $-\frac{\sqrt{30}}{60}$ 0	
	0 $-\frac{\sqrt{3}i}{30}$ 0 $-\frac{\sqrt{3}}{15}$ $\frac{\sqrt{2}i}{10}$ 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 $\frac{\sqrt{5}}{20}$ 0 0	
	$-\frac{\sqrt{3}i}{30}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 $-\frac{\sqrt{2}i}{10}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 $-\frac{\sqrt{5}}{20}$ 0 0 0	
	0 $-\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 $-\frac{\sqrt{2}i}{10}$ 0 0 $\frac{\sqrt{5}}{20}$ 0 $\frac{\sqrt{5}i}{20}$ 0 0	
	$\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{3}i}{15}$ 0 0 0 0 $\frac{\sqrt{2}i}{10}$ $-\frac{\sqrt{5}}{20}$ 0 $\frac{\sqrt{5}i}{20}$ 0 0 0	
	$\frac{i}{10}$ 0 0 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0	
	0 $-\frac{i}{10}$ 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0	
601	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{15}i}{12}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{15}i}{12}$ $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{12}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}i}{12}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}}{60}$ 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}}{60}$ 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}i}{60}$ 0 $-\frac{\sqrt{15}}{60}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{15}i}{60}$ 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
602	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{60} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
603	$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}i}{840} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & -\frac{\sqrt{35}}{60} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{840} & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{840} & \frac{\sqrt{35}}{60} & 0 \\ \frac{\sqrt{14}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} \\ 0 & -\frac{\sqrt{14}i}{840} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 \\ 0 & \frac{\sqrt{14}}{120} & 0 & -\frac{\sqrt{14}i}{120} & 0 & 0 & \frac{\sqrt{21}i}{210} & 0 & 0 & -\frac{17\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{120} & 0 & 0 \\ -\frac{\sqrt{14}}{120} & 0 & -\frac{\sqrt{14}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{210} & \frac{17\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{120} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{120} & 0 & \frac{\sqrt{14}}{120} & -\frac{\sqrt{21}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{120} & 0 & -\frac{\sqrt{210}}{280} & -\frac{\sqrt{35}i}{105} & 0 \\ \frac{\sqrt{14}i}{120} & 0 & -\frac{\sqrt{14}}{120} & 0 & 0 & \frac{\sqrt{21}i}{210} & 0 & 0 & \frac{\sqrt{210}i}{120} & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & \frac{\sqrt{35}i}{105} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{20} & 0 & \frac{\sqrt{7}i}{20} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & \frac{\sqrt{7}i}{20} & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & -\frac{\sqrt{105}}{42} & 0 \end{bmatrix}$
604	$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{14}i}{840}$	0 0 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 $-\frac{\sqrt{210}i}{840}$ 0 0 0 0 $-\frac{\sqrt{35}i}{60}$
	0	$-\frac{\sqrt{14}i}{840}$ 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 $\frac{\sqrt{210}i}{840}$ 0 0 0 $-\frac{\sqrt{35}i}{60}$ 0
	0	0 0 $\frac{\sqrt{14}i}{840}$ 0 0 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 $-\frac{\sqrt{210}i}{840}$ 0 0 0 $-\frac{\sqrt{35}}{60}$
	0	0 0 0 $-\frac{\sqrt{14}i}{840}$ 0 0 $-\frac{\sqrt{21}i}{84}$ 0 0 0 0 $\frac{\sqrt{210}i}{840}$ $\frac{\sqrt{35}}{60}$ 0
	0	$\frac{\sqrt{14}i}{120}$ 0 $\frac{\sqrt{14}}{120}$ $-\frac{\sqrt{21}i}{210}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{120}$ $\frac{\sqrt{35}i}{105}$ 0
	$\frac{\sqrt{14}i}{120}$	0 $-\frac{\sqrt{14}}{120}$ 0 0 $\frac{\sqrt{21}i}{210}$ 0 0 $-\frac{\sqrt{210}i}{280}$ 0 $\frac{\sqrt{210}}{120}$ 0 0 $-\frac{\sqrt{35}i}{105}$
	0	$-\frac{\sqrt{14}}{120}$ 0 $\frac{\sqrt{14}i}{120}$ 0 0 $-\frac{\sqrt{21}i}{210}$ 0 0 $-\frac{\sqrt{210}}{120}$ 0 $\frac{17\sqrt{210}i}{840}$ 0 0 0
	$\frac{\sqrt{14}}{120}$	0 $\frac{\sqrt{14}i}{120}$ 0 0 0 0 $\frac{\sqrt{21}i}{210}$ $\frac{\sqrt{210}}{120}$ 0 $\frac{17\sqrt{210}i}{840}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 $-\frac{\sqrt{7}}{20}$ $\frac{\sqrt{70}i}{140}$ 0 0 0 0 $-\frac{\sqrt{105}i}{42}$
	0	0 0 0 0 $-\frac{\sqrt{7}i}{20}$ 0 $\frac{\sqrt{7}}{20}$ 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0
605	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{Q}_{5,1}^{(1,0;a)}(E_u, 3)$	$\frac{\sqrt{6}i}{24}$	0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{i}{5}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0
	$\frac{\sqrt{6}i}{24}$	0 $-\frac{\sqrt{6}}{24}$ 0 0 0 $\frac{i}{5}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0
	0	$\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 $\frac{i}{5}$ 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0
	$-\frac{\sqrt{6}}{24}$	0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $-\frac{i}{5}$ $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0
	$-\frac{\sqrt{6}i}{15}$	0 0 0 0 0 $\frac{i}{10}$ 0 $-\frac{1}{10}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{6}i}{15}$ 0 0 $\frac{i}{10}$ 0 $\frac{1}{10}$ 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{6}i}{15}$ 0 0 $-\frac{1}{10}$ 0 $-\frac{i}{10}$ 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{6}i}{15}$ $\frac{1}{10}$ 0 $-\frac{i}{10}$ 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{2}i}{20}$	0 $\frac{\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
606	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_{5,2}^{(1,0;a)}(E_u, 4)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 \\ -\frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{30} & 0 \\ -\frac{\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{5}i}{30} \\ 0 & 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{5}}{15} & 0 & \\ -\frac{\sqrt{2}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{3}}{30} & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 \\ 0 & -\frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & 0 & 0 & \frac{i}{10} & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
609	symmetry	z
	$\mathbb{Q}_1^{(1,1;a)}(A_{2u})$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 \\ \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 \end{bmatrix}$
610	symmetry	x

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{1,1}^{(1,1;a)}(E_u)$	0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{140}$ 0	
	$\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $\frac{\sqrt{105}i}{140}$	
	0 $-\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $\frac{\sqrt{105}i}{140}$ 0	
	0 $-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{280}$ 0 0 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{280}$ 0 0 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{3\sqrt{70}}{280}$ $-\frac{\sqrt{105}i}{70}$ 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 $\frac{\sqrt{105}i}{70}$	
	0 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 $\frac{\sqrt{21}i}{140}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 $-\frac{\sqrt{21}i}{140}$ 0 0	
$\mathbb{Q}_{1,2}^{(1,1;a)}(E_u)$	611 symmetry y	
	$\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}}{28}$ $\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{\sqrt{105}i}{140}$	
	0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$ 0	
	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$	
	0 0 0 $-\frac{\sqrt{42}i}{56}$ $\frac{\sqrt{7}}{28}$ 0 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{140}$ 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{56}$ $\frac{\sqrt{105}i}{70}$ 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 $-\frac{\sqrt{105}i}{70}$	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0	
	$-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{280}$ 0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0	
	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ $-\frac{\sqrt{21}i}{140}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $\frac{\sqrt{21}}{28}$ 0 0 $\frac{\sqrt{21}i}{140}$ 0 0 0 0	
612	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{1u})$	0 0 0 0 0 $\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 0 $\frac{\sqrt{42}}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 0 $\frac{\sqrt{7}i}{24}$ $-\frac{\sqrt{42}}{168}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{70}i}{60}$ 0 $-\frac{\sqrt{70}}{60}$ $-\frac{\sqrt{7}i}{24}$ 0 0 0 0 $\frac{\sqrt{42}i}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ 0 0 0 $\frac{\sqrt{7}i}{24}$ 0 0 $\frac{\sqrt{42}i}{168}$ 0	
	0 $-\frac{5\sqrt{105}}{336}$ 0 $\frac{31\sqrt{105}i}{1680}$ 0 0 $\frac{\sqrt{70}i}{240}$ 0 0 0 $\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0	
	$\frac{5\sqrt{105}}{336}$ 0 $\frac{31\sqrt{105}i}{1680}$ 0 0 0 0 $-\frac{\sqrt{70}i}{240}$ $-\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0 0	
	0 $\frac{5\sqrt{105}i}{336}$ 0 $\frac{31\sqrt{105}}{1680}$ $\frac{\sqrt{70}i}{240}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0	
	$\frac{5\sqrt{105}i}{336}$ 0 $-\frac{31\sqrt{105}}{1680}$ 0 0 $-\frac{\sqrt{70}i}{240}$ 0 0 0 $\frac{\sqrt{7}i}{336}$ 0 $\frac{\sqrt{7}}{336}$ 0 0 0	
	0 0 $\frac{\sqrt{35}i}{40}$ 0 0 $-\frac{\sqrt{210}}{420}$ 0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{35}i}{40}$ $\frac{\sqrt{210}}{420}$ 0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 0 0	
613	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{Q}_3^{(1,1;a)}(A_{2u}, 1)$	0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 $\frac{\sqrt{7}i}{21}$ 0 0 $-\frac{\sqrt{70}}{84}$ 0 $-\frac{\sqrt{70}i}{84}$ 0 0	
	$\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 $-\frac{\sqrt{7}i}{21}$ $\frac{\sqrt{70}}{84}$ 0 $-\frac{\sqrt{70}i}{84}$ 0 0 0	
	0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ $-\frac{\sqrt{7}i}{21}$ 0 0 0 0 $\frac{\sqrt{70}i}{84}$ 0 $-\frac{\sqrt{70}}{84}$ 0 0	
	$-\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 $\frac{\sqrt{7}i}{21}$ 0 0 $\frac{\sqrt{70}i}{84}$ 0 $\frac{\sqrt{70}}{84}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}}{24}$ 0 $-\frac{\sqrt{7}i}{24}$ 0 0 $-\frac{\sqrt{70}i}{42}$ 0 0 $\frac{\sqrt{105}}{84}$	
	0 0 0 0 $-\frac{\sqrt{7}}{24}$ 0 $-\frac{\sqrt{7}i}{24}$ 0 0 0 0 $\frac{\sqrt{70}i}{42}$ $-\frac{\sqrt{105}}{84}$ 0	
	0 0 0 0 0 $\frac{\sqrt{7}i}{24}$ 0 $\frac{\sqrt{7}}{24}$ $\frac{\sqrt{70}i}{42}$ 0 0 0 0 $-\frac{\sqrt{105}i}{84}$	
	0 0 0 0 $\frac{\sqrt{7}i}{24}$ 0 $-\frac{\sqrt{7}}{24}$ 0 0 $-\frac{\sqrt{70}i}{42}$ 0 0 $-\frac{\sqrt{105}i}{84}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0	
614	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_3^{(1,1;a)}(A_{2u}, 2)$	0 0 0 0 0 $\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ $\frac{\sqrt{7}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{168}$	
	0 0 0 0 0 $\frac{\sqrt{70}i}{60}$ 0 $-\frac{\sqrt{70}}{60}$ 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 0 0 $\frac{\sqrt{42}}{168}$	
	0 0 0 0 0 $-\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 0 0 $\frac{\sqrt{7}i}{24}$ $-\frac{\sqrt{42}}{168}$ 0	
	0 $-\frac{31\sqrt{105}i}{1680}$ 0 $-\frac{5\sqrt{105}}{336}$ $-\frac{\sqrt{70}i}{240}$ 0 0 0 0 $-\frac{\sqrt{7}i}{336}$ 0 $\frac{\sqrt{7}}{336}$ 0 0 0	
	$-\frac{31\sqrt{105}i}{1680}$ 0 $\frac{5\sqrt{105}}{336}$ 0 0 $\frac{\sqrt{70}i}{240}$ 0 0 $-\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0 0 0	
	0 $-\frac{31\sqrt{105}}{1680}$ 0 $\frac{5\sqrt{105}i}{336}$ 0 0 $\frac{\sqrt{70}i}{240}$ 0 0 $\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0 0	
	$\frac{31\sqrt{105}}{1680}$ 0 $\frac{5\sqrt{105}i}{336}$ 0 0 0 0 $-\frac{\sqrt{70}i}{240}$ $-\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0 0	
	$-\frac{\sqrt{35}i}{40}$ 0 0 0 0 $\frac{\sqrt{210}i}{420}$ 0 $-\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{35}i}{40}$ 0 0 $\frac{\sqrt{210}i}{420}$ 0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 0 0	
615	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 1)$	0 0 $\frac{\sqrt{7}i}{56}$ 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}}{56}$	
	0 0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 $\frac{\sqrt{105}i}{84}$ $-\frac{\sqrt{70}}{56}$ 0	
	$-\frac{\sqrt{7}i}{56}$ 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$	
	0 $\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $-\frac{\sqrt{70}i}{56}$ 0	
	0 $\frac{3\sqrt{7}}{112}$ 0 $-\frac{3\sqrt{7}i}{112}$ 0 0 $-\frac{\sqrt{42}i}{48}$ 0 0 $\frac{\sqrt{105}}{336}$ 0 $\frac{\sqrt{105}i}{112}$ 0 0 0	
	$-\frac{3\sqrt{7}}{112}$ 0 $-\frac{3\sqrt{7}i}{112}$ 0 0 0 0 $\frac{\sqrt{42}i}{48}$ $-\frac{\sqrt{105}}{336}$ 0 $\frac{\sqrt{105}i}{112}$ 0 0 0	
	0 $\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{112}$ $\frac{\sqrt{42}i}{48}$ 0 0 0 0 $-\frac{5\sqrt{105}i}{336}$ 0 $-\frac{\sqrt{105}}{336}$ $-\frac{\sqrt{70}i}{56}$ 0	
	$\frac{3\sqrt{7}i}{112}$ 0 $-\frac{3\sqrt{7}}{112}$ 0 0 $-\frac{\sqrt{42}i}{48}$ 0 0 $-\frac{5\sqrt{105}i}{336}$ 0 $\frac{\sqrt{105}}{336}$ 0 0 $\frac{\sqrt{70}i}{56}$	
	0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{35}i}{56}$ 0 0	
616	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{7}i}{56}$	0 0 0 0 0 0 0 $-\frac{\sqrt{42}}{84}$ $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 $\frac{\sqrt{70}i}{56}$
	0	$\frac{\sqrt{7}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}i}{56}$ 0
	0	0 0 $-\frac{\sqrt{7}i}{56}$ 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}}{56}$
	0	0 0 0 $\frac{\sqrt{7}i}{56}$ $-\frac{\sqrt{42}}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ $-\frac{\sqrt{70}}{56}$ 0
	0	$\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{112}$ $\frac{\sqrt{42}i}{48}$ 0 0 0 0 $\frac{\sqrt{105}i}{336}$ 0 $\frac{5\sqrt{105}}{336}$ $\frac{\sqrt{70}i}{56}$ 0
	$\frac{3\sqrt{7}i}{112}$	0 $-\frac{3\sqrt{7}}{112}$ 0 0 $-\frac{\sqrt{42}i}{48}$ 0 0 $\frac{\sqrt{105}i}{336}$ 0 $-\frac{5\sqrt{105}}{336}$ 0 0 $-\frac{\sqrt{70}i}{56}$
	0	$-\frac{3\sqrt{7}}{112}$ 0 $\frac{3\sqrt{7}i}{112}$ 0 0 $\frac{\sqrt{42}i}{48}$ 0 0 $-\frac{\sqrt{105}}{112}$ 0 $-\frac{\sqrt{105}i}{336}$ 0 0 0
	$\frac{3\sqrt{7}}{112}$	0 $\frac{3\sqrt{7}i}{112}$ 0 0 0 0 $-\frac{\sqrt{42}i}{48}$ $\frac{\sqrt{105}}{112}$ 0 $-\frac{\sqrt{105}i}{336}$ 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{35}i}{56}$ 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{35}i}{56}$ 0 0 0 0
617	symmetry	$\sqrt{15}xyz$
$\mathbb{Q}_{3,1}^{(1,1;a)}(E_u, 2)$	0	$\frac{\sqrt{70}i}{560}$ 0 $-\frac{\sqrt{70}}{560}$ 0 0 0 0 0 $\frac{3\sqrt{42}i}{112}$ 0 $\frac{3\sqrt{42}}{112}$ $\frac{\sqrt{7}i}{14}$ 0
	$\frac{\sqrt{70}i}{560}$	0 $\frac{\sqrt{70}}{560}$ 0 0 0 0 0 0 $\frac{3\sqrt{42}i}{112}$ 0 $-\frac{3\sqrt{42}}{112}$ 0 0 $-\frac{\sqrt{7}i}{14}$
	0	$\frac{\sqrt{70}}{560}$ 0 $\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 $\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0
	$-\frac{\sqrt{70}}{560}$	0 $\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 0 $-\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0
	$\frac{3\sqrt{70}i}{280}$	0 0 0 0 $-\frac{\sqrt{105}i}{120}$ 0 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{56}$
	0	$-\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}i}{120}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 $-\frac{\sqrt{7}i}{56}$
	0	0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{120}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 0 $\frac{\sqrt{7}}{56}$
	0	0 0 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{120}$ 0 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ $-\frac{\sqrt{7}}{56}$ 0
	0	$-\frac{\sqrt{210}i}{80}$ 0 $-\frac{\sqrt{210}}{80}$ 0 0 $-\frac{\sqrt{35}i}{35}$ 0 0 0 0 $\frac{\sqrt{14}i}{112}$ 0 $-\frac{\sqrt{14}}{112}$ 0 0
	$-\frac{\sqrt{210}i}{80}$	0 $\frac{\sqrt{210}}{80}$ 0 0 0 $\frac{\sqrt{35}i}{35}$ 0 0 $\frac{\sqrt{14}i}{112}$ 0 $\frac{\sqrt{14}}{112}$ 0 0 0
618	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{Q}_{3,2}^{(1,1;a)}(E_u, 2)$	0	$-\frac{\sqrt{70}}{560}$ 0 $-\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 $\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0
	$\frac{\sqrt{70}}{560}$	0 $-\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 $-\frac{5\sqrt{42}}{336}$ 0 $-\frac{5\sqrt{42}i}{336}$ 0 0 0
	0	$\frac{\sqrt{70}i}{560}$ 0 $-\frac{\sqrt{70}}{560}$ 0 0 0 0 0 $-\frac{3\sqrt{42}i}{112}$ 0 $-\frac{3\sqrt{42}}{112}$ $-\frac{\sqrt{7}i}{14}$ 0
	$\frac{\sqrt{70}i}{560}$	0 $\frac{\sqrt{70}}{560}$ 0 0 0 0 0 $-\frac{3\sqrt{42}i}{112}$ 0 $\frac{3\sqrt{42}}{112}$ 0 0 $\frac{\sqrt{7}i}{14}$
	0	0 $-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $\frac{\sqrt{105}i}{120}$ 0 0 $-\frac{\sqrt{42}i}{168}$ 0 0 $\frac{\sqrt{7}}{56}$
	0	0 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $\frac{\sqrt{105}i}{120}$ 0 0 0 0 $\frac{\sqrt{42}i}{168}$ $-\frac{\sqrt{7}}{56}$ 0
	$\frac{3\sqrt{70}i}{280}$	0 0 0 0 0 0 $\frac{\sqrt{105}}{120}$ $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 $\frac{\sqrt{7}i}{56}$
	0	$-\frac{3\sqrt{70}i}{280}$ 0 0 0 0 $-\frac{\sqrt{105}}{120}$ 0 0 $\frac{\sqrt{42}i}{168}$ 0 0 $\frac{\sqrt{7}i}{56}$ 0
	0	$-\frac{\sqrt{210}}{80}$ 0 $\frac{\sqrt{210}i}{80}$ 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{14}}{112}$ 0 $-\frac{\sqrt{14}i}{112}$ 0 0 0
	$\frac{\sqrt{210}}{80}$	0 $\frac{\sqrt{210}i}{80}$ 0 0 0 0 $-\frac{\sqrt{35}i}{35}$ $\frac{\sqrt{14}}{112}$ 0 $-\frac{\sqrt{14}i}{112}$ 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 $\frac{\sqrt{70}}{28}$ 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 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{7}}{14}$ 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{7}}{14}$ 0 0 0 0 0	
	0 0 0 0 0 0 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	
620	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(a)}(E_u, 1)$		$\begin{bmatrix} -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
		621 symmetry
		$-\sqrt{3}xz$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \end{bmatrix}$
		$\mathbb{G}_{2,2}^{(a)}(E_u, 1)$
		622 symmetry
		$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(a)}(E_u, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0	0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 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
623	symmetry	$-\sqrt{3}xy$
$\mathbb{G}_{2,2}^{(a)}(E_u, 2)$	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 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0	0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0	0 0 0 $-\frac{\sqrt{35}}{28}$ 0 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 0 0	0 0 0 0 $-\frac{\sqrt{70}}{28}$ 0 0 0 0 0 0 0 0 0 0
	0 0 0 0 0 $-\frac{\sqrt{70}}{28}$ 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
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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
625	$\mathbb{G}_4^{(a)}(A_{1u}, 1)$	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
626	$\mathbb{G}_4^{(a)}(A_{1u}, 2)$	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
		<i>continued ...</i>

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
627	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{G}_{4,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
628	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \end{bmatrix}$
629	$\mathbb{G}_{4,2}^{(a)}(E_u, 1)$	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
630	$\mathbb{G}_{4,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
		<i>continued ...</i>

Table 9

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

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
633	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
		$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{105} & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{210}i}{70} \end{bmatrix}$
634	symmetry	$\sqrt{3}yz$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)$	0	$\frac{\sqrt{21}i}{28} \ 0 \ -\frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ -\frac{\sqrt{35}}{140} \ 0 \ 0$
	$\frac{\sqrt{21}i}{28}$	$0 \ \frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ \frac{\sqrt{35}}{140} \ 0 \ 0 \ 0$
	0	$\frac{\sqrt{21}}{28} \ 0 \ \frac{\sqrt{21}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}}{140} \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ 0 \ 0$
	$-\frac{\sqrt{21}}{28}$	$0 \ \frac{\sqrt{21}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{35}}{140} \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ -\frac{\sqrt{14}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{210}i}{140}$
	0	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ \frac{\sqrt{14}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{210}i}{140} \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}}{28} \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{210}}{140}$
	0	$0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{14}}{28} \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{210}}{140} \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{105}i}{70} \ 0 \ -\frac{\sqrt{105}}{70} \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{105}i}{70} \ 0 \ \frac{\sqrt{105}}{70} \ 0 \ 0 \ 0$
$\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)$	637	symmetry
		$-\sqrt{3}xy$
	0	$0 \ -\frac{\sqrt{21}}{28} \ 0 \ -\frac{\sqrt{21}i}{28} \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}}{140} \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ 0$
	$\frac{\sqrt{21}}{28}$	$0 \ -\frac{\sqrt{21}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{35}}{140} \ 0 \ -\frac{\sqrt{35}i}{140} \ 0 \ 0 \ 0$
	0	$\frac{\sqrt{21}i}{28} \ 0 \ -\frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{140} \ 0 \ \frac{\sqrt{35}}{140} \ 0 \ 0 \ 0$
	$\frac{\sqrt{21}i}{28}$	$0 \ \frac{\sqrt{21}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{35}i}{140} \ 0 \ -\frac{\sqrt{35}}{140} \ 0 \ 0 \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{14}}{28} \ 0 \ -\frac{\sqrt{14}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{210}}{140}$
	0	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}}{28} \ 0 \ -\frac{\sqrt{14}i}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ -\frac{\sqrt{210}}{140} \ 0$
	0	$0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ -\frac{\sqrt{14}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{210}i}{140}$
	0	$0 \ 0 \ 0 \ 0 \ \frac{\sqrt{14}i}{28} \ 0 \ \frac{\sqrt{14}}{28} \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ \frac{\sqrt{210}i}{140} \ 0$
638	symmetry	
		$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{14}i}{56} \quad 0 \quad \frac{\sqrt{14}}{56} \quad -\frac{\sqrt{21}i}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad \frac{\sqrt{210}}{140} \quad 0 \quad 0$
	$\frac{\sqrt{14}i}{56}$	$0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{14}}{56} \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad 0$
	$\frac{\sqrt{14}}{56}$	$0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{21} \quad \frac{\sqrt{210}}{140} \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad -\frac{\sqrt{21}}{56} \quad \frac{\sqrt{210}i}{210} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad \frac{\sqrt{21}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{210} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{56} \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{210} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{56} \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{210} \quad \frac{\sqrt{35}}{140} \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad \frac{2\sqrt{105}i}{105} \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad \frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{2\sqrt{105}i}{105}$
639	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{G}_4^{(1,-1;a)}(A_{1u}, 2)$	0	$0 \quad 0 \quad -\frac{\sqrt{3}i}{24} \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{8}$
	0	$0 \quad 0 \quad \frac{\sqrt{3}i}{24} \quad \frac{\sqrt{2}}{8} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{3}i}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{8}$
	0	$0 \quad 0 \quad \frac{\sqrt{3}i}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}i}{8}$
	0	$0 \quad \frac{\sqrt{5}}{16} \quad 0 \quad \frac{\sqrt{5}i}{16} \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad \frac{\sqrt{3}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{5}}{16}$	$0 \quad \frac{\sqrt{5}i}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad -\frac{\sqrt{3}}{16} \quad 0 \quad \frac{\sqrt{3}i}{16} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{5}i}{16} \quad 0 \quad \frac{\sqrt{5}}{16} \quad \frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{16} \quad 0 \quad -\frac{\sqrt{3}}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{5}i}{16}$	$0 \quad -\frac{\sqrt{5}}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{48} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{16} \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{15}i}{24} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{15}i}{24} \quad 0 \quad 0$
640	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & -\frac{\sqrt{2}}{8} & 0 \\ 0 & \frac{\sqrt{5}i}{16} & 0 & -\frac{\sqrt{5}}{16} & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 \\ \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{16} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 \\ -\frac{\sqrt{5}}{16} & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & \frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
641	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & \frac{\sqrt{14}}{56} & 0 \\ \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ 0 & \frac{\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & 0 & 0 & \frac{\sqrt{210}i}{112} & 0 & 0 & \frac{\sqrt{21}}{48} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 \\ -\frac{\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & -\frac{\sqrt{21}}{48} & 0 & -\frac{\sqrt{21}i}{112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{112} & 0 & \frac{\sqrt{35}}{112} & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{112} & 0 & \frac{\sqrt{21}}{336} & \frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & 0 & 0 & \frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{21}i}{112} & 0 & -\frac{\sqrt{21}}{336} & 0 & 0 & -\frac{\sqrt{14}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{42}}{42} & 0 & 0 \end{bmatrix}$
642	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{35}i}{56} 0 0 0 0 \frac{\sqrt{210}i}{84} 0 0 -\frac{\sqrt{21}i}{28} 0 0 0 0 -\frac{\sqrt{14}i}{56}$	
	$0 -\frac{\sqrt{35}i}{56} 0 0 \frac{\sqrt{210}i}{84} 0 0 0 0 \frac{\sqrt{21}i}{28} 0 0 -\frac{\sqrt{14}i}{56} 0$	
	$0 0 \frac{\sqrt{35}i}{56} 0 0 0 0 \frac{\sqrt{210}i}{84} 0 0 -\frac{\sqrt{21}i}{28} 0 0 -\frac{\sqrt{14}i}{56}$	
	$0 0 0 -\frac{\sqrt{35}i}{56} 0 0 \frac{\sqrt{210}i}{84} 0 0 0 0 \frac{\sqrt{21}i}{28} \frac{\sqrt{14}}{56} 0$	
	$0 \frac{\sqrt{35}i}{112} 0 \frac{\sqrt{35}}{112} -\frac{\sqrt{210}i}{112} 0 0 0 0 -\frac{\sqrt{21}i}{336} 0 \frac{\sqrt{21}}{112} -\frac{\sqrt{14}i}{56} 0$	
	$\frac{\sqrt{35}i}{112} 0 -\frac{\sqrt{35}}{112} 0 0 \frac{\sqrt{210}i}{112} 0 0 -\frac{\sqrt{21}i}{336} 0 -\frac{\sqrt{21}}{112} 0 0 \frac{\sqrt{14}i}{56}$	
	$0 -\frac{\sqrt{35}}{112} 0 \frac{\sqrt{35}i}{112} 0 0 -\frac{\sqrt{210}i}{112} 0 0 \frac{\sqrt{21}}{112} 0 -\frac{\sqrt{21}i}{48} 0 0$	
	$\frac{\sqrt{35}}{112} 0 \frac{\sqrt{35}i}{112} 0 0 0 0 \frac{\sqrt{210}i}{112} -\frac{\sqrt{21}}{112} 0 -\frac{\sqrt{21}i}{48} 0 0 0$	
	$0 0 0 0 0 0 0 0 -\frac{3\sqrt{7}i}{56} 0 0 0 0 -\frac{\sqrt{42}i}{42}$	
	$0 0 0 0 0 0 0 0 0 \frac{3\sqrt{7}i}{56} 0 0 0 -\frac{\sqrt{42}i}{42}$	
643	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{G}_{4,1}^{(1,-1;a)}(E_u, 2)$	$0 0 0 0 0 0 0 0 0 -\frac{\sqrt{6}i}{24} 0 \frac{\sqrt{6}}{24} 0 0$	
	$0 0 0 0 0 0 0 0 0 -\frac{\sqrt{6}i}{24} 0 -\frac{\sqrt{6}}{24} 0 0 0 0$	
	$0 0 0 0 0 0 0 0 0 0 \frac{\sqrt{6}}{24} 0 \frac{\sqrt{6}i}{24} 0 0$	
	$0 0 0 0 0 0 0 0 0 -\frac{\sqrt{6}}{24} 0 \frac{\sqrt{6}i}{24} 0 0 0$	
	$0 0 0 0 0 \frac{\sqrt{15}i}{24} 0 -\frac{\sqrt{15}}{24} 0 0 0 0 0 0 0$	
	$0 0 0 0 \frac{\sqrt{15}i}{24} 0 \frac{\sqrt{15}}{24} 0 0 0 0 0 0 0 0$	
	$0 0 0 0 0 -\frac{\sqrt{15}}{24} 0 -\frac{\sqrt{15}i}{24} 0 0 0 0 0 0 0$	
	$0 0 0 0 \frac{\sqrt{15}}{24} 0 -\frac{\sqrt{15}i}{24} 0 0 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{30}i}{24} 0 \frac{\sqrt{30}}{24} 0 0 0 0 0 0 0 0 0 0 0$	
	$-\frac{\sqrt{30}i}{24} 0 -\frac{\sqrt{30}}{24} 0 0 0 0 0 0 0 0 0 0 0 0$	
644	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
645	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ $\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & -\frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & \frac{5\sqrt{42}i}{336} & 0 & 0 \\ \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 & \frac{5\sqrt{42}i}{336} & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{56} & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{112} & 0 & -\frac{3\sqrt{14}}{112} & 0 & 0 \\ \frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{112} & 0 & \frac{3\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
646	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,-1;a)}(E_u, 3)$	$0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}}{336} \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad 0$	
	$-\frac{\sqrt{70}}{112} \quad 0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{48} \quad 0 \quad -\frac{\sqrt{42}}{48} \quad \frac{\sqrt{7}i}{14} \quad 0$	
	$-\frac{\sqrt{70}i}{112} \quad 0 \quad -\frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{48} \quad 0 \quad \frac{\sqrt{42}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{14}$	
	$0 \quad 0 \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{56} \quad \frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad \frac{\sqrt{7}}{56} \quad 0$	
	$\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad -\frac{\sqrt{105}}{168} \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56}$	
	$0 \quad -\frac{\sqrt{70}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad \frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{56}$	
	$0 \quad \frac{\sqrt{210}}{336} \quad 0 \quad -\frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}}{112} \quad 0 \quad -\frac{3\sqrt{14}i}{112} \quad 0 \quad 0$	
	$-\frac{\sqrt{210}}{336} \quad 0 \quad -\frac{\sqrt{210}i}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}}{112} \quad 0 \quad -\frac{3\sqrt{14}i}{112} \quad 0 \quad 0 \quad 0$	
647	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$
$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 1)$	$0 \quad -\frac{\sqrt{462}i}{1848} \quad 0 \quad -\frac{\sqrt{462}}{1848} \quad \frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{616} \quad 0 \quad -\frac{\sqrt{770}}{616} \quad 0 \quad 0$	
	$-\frac{\sqrt{462}i}{1848} \quad 0 \quad \frac{\sqrt{462}}{1848} \quad 0 \quad 0 \quad -\frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{616} \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{462}}{1848} \quad 0 \quad -\frac{\sqrt{462}i}{1848} \quad 0 \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad \frac{\sqrt{770}i}{616} \quad 0 \quad 0$	
	$-\frac{\sqrt{462}}{1848} \quad 0 \quad -\frac{\sqrt{462}i}{1848} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{77}i}{154} \quad -\frac{\sqrt{770}}{616} \quad 0 \quad \frac{\sqrt{770}i}{616} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad \frac{\sqrt{77}}{154} \quad -\frac{\sqrt{770}i}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}i}{231}$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad -\frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{154} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}i}{231}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{77}}{154} \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad -\frac{\sqrt{770}i}{154} \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{231}$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}i}{154} \quad \frac{\sqrt{1155}}{231} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{2310}i}{308} \quad 0 \quad -\frac{\sqrt{2310}}{308} \quad \frac{\sqrt{385}i}{77} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{2310}i}{308} \quad 0 \quad \frac{\sqrt{2310}}{308} \quad 0 \quad 0 \quad -\frac{\sqrt{385}i}{77}$	
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
		$\begin{bmatrix} 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
649	$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 2)$	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{440} & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{44} & -\frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & -\frac{\sqrt{330}}{440} & \frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & \frac{\sqrt{330}}{440} & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{55}i}{110} & 0 & 0 & \frac{\sqrt{330}i}{110} & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}i}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{110} & -\frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{55}}{110} & \frac{\sqrt{330}i}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}i}{110} & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{165}i}{110} & 0 & 0 & \frac{3\sqrt{110}}{220} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}i}{110} & -\frac{3\sqrt{110}}{220} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
650	$\mathbb{G}_6^{(1,-1;a)}(A_{1u}, 3)$	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
651	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 1)$	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & -\frac{\sqrt{330}}{440} & \frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & \frac{\sqrt{330}}{440} & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & \frac{\sqrt{330}i}{440} & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{440} & 0 & \frac{\sqrt{330}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & \frac{\sqrt{22}}{44} & 0 \\ 0 & -\frac{\sqrt{55}i}{110} & 0 & 0 & \frac{\sqrt{330}i}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 \\ -\frac{\sqrt{55}i}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{110} & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{110} & 0 & 0 & -\frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 \\ \frac{\sqrt{55}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{110} & \frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{110} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 & -\frac{3\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}i}{110} & 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 & \frac{3\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
652	$\mathbb{G}_6^{(1,-1;a)}(A_{2u}, 2)$	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 9

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

continued ..

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 2)$	0 0 $\frac{\sqrt{22}i}{264}$ 0 0 $\frac{\sqrt{33}}{132}$ 0 0 0 0 0 $\frac{\sqrt{330}i}{264}$ 0 0 $\frac{\sqrt{55}}{132}$	
	0 0 0 $-\frac{\sqrt{22}i}{264}$ $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{264}$ $-\frac{\sqrt{55}}{132}$ 0	
	$-\frac{\sqrt{22}i}{264}$ 0 0 0 0 0 0 $\frac{\sqrt{33}}{132}$ $-\frac{\sqrt{330}i}{264}$ 0 0 0 0 $-\frac{\sqrt{55}i}{132}$	
	0 $\frac{\sqrt{22}i}{264}$ 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 $\frac{\sqrt{330}i}{264}$ 0 0 $-\frac{\sqrt{55}i}{132}$ 0	
	0 $-\frac{\sqrt{22}}{264}$ 0 $\frac{\sqrt{22}i}{264}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 $-\frac{\sqrt{330}}{264}$ 0 $-\frac{\sqrt{330}i}{264}$ 0 0	
	$\frac{\sqrt{22}}{264}$ 0 $\frac{\sqrt{22}i}{264}$ 0 0 0 0 $\frac{\sqrt{33}i}{66}$ $\frac{\sqrt{330}}{264}$ 0 $-\frac{\sqrt{330}i}{264}$ 0 0 0	
	0 $-\frac{\sqrt{22}i}{264}$ 0 $-\frac{\sqrt{22}}{264}$ $\frac{\sqrt{33}i}{66}$ 0 0 0 0 $-\frac{\sqrt{330}i}{264}$ 0 $-\frac{\sqrt{330}}{88}$ $\frac{\sqrt{55}i}{33}$ 0	
	$-\frac{\sqrt{22}i}{264}$ 0 $\frac{\sqrt{22}}{264}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 $-\frac{\sqrt{330}i}{264}$ 0 $\frac{\sqrt{330}}{88}$ 0 0 $-\frac{\sqrt{55}i}{33}$	
	0 0 0 0 0 $\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 $\frac{\sqrt{110}i}{44}$ 0 0 $\frac{\sqrt{165}}{66}$	
	0 0 0 0 $-\frac{\sqrt{11}}{44}$ 0 $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{\sqrt{110}i}{44}$ $-\frac{\sqrt{165}}{66}$ 0	
655 symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$	
	$-\frac{\sqrt{22}i}{264}$ 0 0 0 0 $-\frac{\sqrt{33}i}{132}$ 0 0 $\frac{\sqrt{330}i}{264}$ 0 0 0 0 $\frac{\sqrt{55}i}{132}$	
	0 $\frac{\sqrt{22}i}{264}$ 0 0 $-\frac{\sqrt{33}i}{132}$ 0 0 0 0 $-\frac{\sqrt{330}i}{264}$ 0 0 $\frac{\sqrt{55}i}{132}$ 0	
	0 0 $-\frac{\sqrt{22}i}{264}$ 0 0 0 0 $-\frac{\sqrt{33}i}{132}$ 0 0 $\frac{\sqrt{330}i}{264}$ 0 0 $\frac{\sqrt{55}}{132}$	
	0 0 0 $\frac{\sqrt{22}i}{264}$ 0 0 $-\frac{\sqrt{33}i}{132}$ 0 0 0 0 $-\frac{\sqrt{330}i}{264}$ $-\frac{\sqrt{55}}{132}$ 0	
	0 $-\frac{\sqrt{22}i}{264}$ 0 $-\frac{\sqrt{22}}{264}$ $\frac{\sqrt{33}i}{66}$ 0 0 0 0 $\frac{\sqrt{330}i}{88}$ 0 $\frac{\sqrt{330}}{264}$ $-\frac{\sqrt{55}i}{33}$ 0	
	$-\frac{\sqrt{22}i}{264}$ 0 $\frac{\sqrt{22}}{264}$ 0 0 $-\frac{\sqrt{33}i}{66}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 $-\frac{\sqrt{330}i}{264}$ 0 0 $\frac{\sqrt{55}i}{33}$	
	0 $\frac{\sqrt{22}}{264}$ 0 $-\frac{\sqrt{22}i}{264}$ 0 0 $\frac{\sqrt{33}i}{66}$ 0 0 $\frac{\sqrt{330}}{264}$ 0 $\frac{\sqrt{330}i}{264}$ 0 0	
	$-\frac{\sqrt{22}}{264}$ 0 $-\frac{\sqrt{22}i}{264}$ 0 0 0 0 $-\frac{\sqrt{33}i}{66}$ $-\frac{\sqrt{330}}{264}$ 0 $\frac{\sqrt{330}i}{264}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{11}i}{44}$ 0 $\frac{\sqrt{11}}{44}$ $-\frac{\sqrt{11}i}{44}$ 0 0 0 0 $-\frac{\sqrt{165}i}{66}$	
656 symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 3)$	$0 - \frac{\sqrt{66}i}{264} 0 - \frac{\sqrt{66}}{264} \frac{\sqrt{11}i}{22} 0 0 0 0 \frac{\sqrt{110}i}{88} 0 - \frac{\sqrt{110}}{88} 0 0$	
	$- \frac{\sqrt{66}i}{264} 0 \frac{\sqrt{66}}{264} 0 0 - \frac{\sqrt{11}i}{22} 0 0 \frac{\sqrt{110}i}{88} 0 \frac{\sqrt{110}}{88} 0 0 0$	
	$0 - \frac{\sqrt{66}}{264} 0 \frac{\sqrt{66}i}{264} 0 0 - \frac{\sqrt{11}i}{22} 0 0 - \frac{\sqrt{110}}{88} 0 - \frac{\sqrt{110}i}{88} 0 0$	
	$\frac{\sqrt{66}}{264} 0 \frac{\sqrt{66}i}{264} 0 0 0 \frac{\sqrt{11}i}{22} \frac{\sqrt{110}}{88} 0 - \frac{\sqrt{110}i}{88} 0 0 0$	
	$\frac{\sqrt{66}i}{66} 0 0 0 0 \frac{\sqrt{11}i}{22} 0 - \frac{\sqrt{11}}{22} 0 0 0 0 0 0$	
	$0 - \frac{\sqrt{66}i}{66} 0 0 \frac{\sqrt{11}i}{22} 0 \frac{\sqrt{11}}{22} 0 0 0 0 0 0 0$	
	$0 0 - \frac{\sqrt{66}i}{66} 0 0 - \frac{\sqrt{11}}{22} 0 - \frac{\sqrt{11}i}{22} 0 0 0 0 0 0$	
	$0 0 0 \frac{\sqrt{66}i}{66} \frac{\sqrt{11}}{22} 0 - \frac{\sqrt{11}i}{22} 0 0 0 0 0 0 0$	
	$0 \frac{\sqrt{22}i}{44} 0 - \frac{\sqrt{22}}{44} 0 0 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{22}i}{44} 0 \frac{\sqrt{22}}{44} 0 0 0 0 0 0 0 0 0 0 0$	
657	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 3)$	$0 \frac{\sqrt{66}}{264} 0 - \frac{\sqrt{66}i}{264} 0 0 \frac{\sqrt{11}i}{22} 0 0 \frac{\sqrt{110}}{88} 0 \frac{\sqrt{110}i}{88} 0 0$	
	$- \frac{\sqrt{66}}{264} 0 - \frac{\sqrt{66}i}{264} 0 0 0 0 - \frac{\sqrt{11}i}{22} - \frac{\sqrt{110}}{88} 0 \frac{\sqrt{110}i}{88} 0 0 0$	
	$0 - \frac{\sqrt{66}i}{264} 0 - \frac{\sqrt{66}}{264} \frac{\sqrt{11}i}{22} 0 0 0 0 \frac{\sqrt{110}i}{88} 0 - \frac{\sqrt{110}}{88} 0 0$	
	$- \frac{\sqrt{66}i}{264} 0 \frac{\sqrt{66}}{264} 0 0 - \frac{\sqrt{11}i}{22} 0 0 \frac{\sqrt{110}i}{88} 0 \frac{\sqrt{110}}{88} 0 0 0$	
	$0 0 \frac{\sqrt{66}i}{66} 0 0 \frac{\sqrt{11}}{22} 0 \frac{\sqrt{11}i}{22} 0 0 0 0 0 0$	
	$0 0 0 - \frac{\sqrt{66}i}{66} - \frac{\sqrt{11}}{22} 0 \frac{\sqrt{11}i}{22} 0 0 0 0 0 0 0$	
	$\frac{\sqrt{66}i}{66} 0 0 0 0 \frac{\sqrt{11}i}{22} 0 - \frac{\sqrt{11}}{22} 0 0 0 0 0 0$	
	$0 - \frac{\sqrt{66}i}{66} 0 0 \frac{\sqrt{11}i}{22} 0 \frac{\sqrt{11}}{22} 0 0 0 0 0 0 0$	
	$0 \frac{\sqrt{22}}{44} 0 \frac{\sqrt{22}i}{44} 0 0 0 0 0 0 0 0 0 0$	
	$- \frac{\sqrt{22}}{44} 0 \frac{\sqrt{22}i}{44} 0 0 0 0 0 0 0 0 0 0 0$	
658	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{6,1}^{(1,-1;a)}(E_u, 4)$	0	$\begin{bmatrix} 0 & \frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & \frac{\sqrt{22}i}{33} & 0 \end{bmatrix}$
	$\frac{\sqrt{55}i}{660}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & -\frac{\sqrt{22}i}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & \frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{55}}{660}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{55}i}{165}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & \frac{\sqrt{55}i}{165} & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & -\frac{\sqrt{22}}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{55}i}{165} & \frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{33} & \frac{\sqrt{22}}{33} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & \frac{\sqrt{110}i}{55} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 \end{bmatrix}$
	$-\frac{\sqrt{165}i}{330}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{165}}{330} & 0 & 0 & -\frac{\sqrt{110}i}{55} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 \end{bmatrix}$
659	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$
$\mathbb{G}_{6,2}^{(1,-1;a)}(E_u, 4)$	0	$\begin{bmatrix} 0 & -\frac{\sqrt{55}}{660} & 0 & -\frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{55}}{660}$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & \frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{66} & -\frac{\sqrt{22}i}{33} & 0 \end{bmatrix}$
	$\frac{\sqrt{55}i}{660}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & \frac{\sqrt{22}i}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & -\frac{\sqrt{22}}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & \frac{\sqrt{330}i}{165} & 0 & 0 & 0 & \frac{\sqrt{33}i}{33} & \frac{\sqrt{22}}{33} & 0 \end{bmatrix}$
	$-\frac{\sqrt{55}i}{165}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & -\frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{33} \end{bmatrix}$
	0	$\begin{bmatrix} 0 & \frac{\sqrt{55}i}{165} & 0 & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & -\frac{\sqrt{22}i}{33} & 0 \end{bmatrix}$
	0	$\begin{bmatrix} 0 & -\frac{\sqrt{165}}{330} & 0 & \frac{\sqrt{165}i}{330} & 0 & 0 & -\frac{\sqrt{110}i}{55} & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{165}}{330}$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{165}i}{330} & 0 & 0 & 0 & \frac{\sqrt{110}i}{55} & \frac{\sqrt{11}}{22} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 \end{bmatrix}$
660	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
661	symmetry	$\sqrt{3}yz$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{84} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \end{bmatrix}$
662	symmetry	$-\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{210}i}{168}$	0 0 0 0 0 0 $\frac{\sqrt{35}}{28}$ $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{84}$
	0	- $\frac{\sqrt{210}i}{168}$ 0 0 0 0 - $\frac{\sqrt{35}}{28}$ 0 0 - $\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{21}i}{84}$ 0
	0	0 0 $\frac{\sqrt{210}i}{168}$ 0 0 - $\frac{\sqrt{35}}{28}$ 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 $\frac{\sqrt{21}}{84}$
	0	0 0 0 - $\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{35}}{28}$ 0 0 0 0 0 - $\frac{\sqrt{14}i}{56}$ - $\frac{\sqrt{21}}{84}$ 0
	0	$\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 - $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ $\frac{\sqrt{21}i}{42}$ 0
	$\frac{\sqrt{210}i}{168}$	0 - $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 - $\frac{\sqrt{14}i}{56}$ 0 - $\frac{\sqrt{14}}{56}$ 0 0 0 - $\frac{\sqrt{21}i}{42}$
	0	- $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 - $\frac{3\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	$\frac{\sqrt{210}}{168}$	0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ - $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 - $\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0
663	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
$\mathbb{G}_{2,1}^{(1,0;a)}(E_u, 2)$	0	$\frac{\sqrt{210}i}{168}$ 0 - $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ $\frac{\sqrt{21}i}{42}$ 0
	$\frac{\sqrt{210}i}{168}$	0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 - $\frac{\sqrt{14}}{56}$ 0 0 0 - $\frac{\sqrt{21}i}{42}$
	0	$\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 - $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	- $\frac{\sqrt{210}}{168}$	0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	$\frac{\sqrt{210}i}{84}$	0 0 0 0 0 0 0 - $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$
	0	- $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 $\frac{\sqrt{21}i}{42}$ 0
	0	0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 - $\frac{\sqrt{21}}{42}$
	0	0 0 0 - $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 - $\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{21}}{42}$ 0
	0	0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0 0 - $\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
664	symmetry	$-\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,2}^{(1,0;a)}(E_u, 2)$	0	$-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0
	$\frac{\sqrt{210}}{168}$	0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0
	0	$\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ $-\frac{\sqrt{21}i}{42}$ 0
	$\frac{\sqrt{210}i}{168}$	0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 $\frac{\sqrt{21}i}{42}$
	0	0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{21}}{42}$ 0
	$\frac{\sqrt{210}i}{84}$	0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $-\frac{\sqrt{21}i}{42}$
	0	$-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0 0 $\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{84}$ 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ $-\frac{\sqrt{42}}{84}$ 0 $\frac{\sqrt{42}i}{84}$ 0 0 0
665	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 1)$	0	$-\frac{\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{280}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0
	$-\frac{\sqrt{210}i}{280}$	0 $\frac{\sqrt{210}}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0
	0	$\frac{\sqrt{210}}{280}$ 0 $-\frac{\sqrt{210}i}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0
	$-\frac{\sqrt{210}}{280}$	0 $-\frac{\sqrt{210}i}{280}$ 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{35}i}{40}$ 0 $\frac{\sqrt{35}}{40}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$
	0	0 0 0 0 0 $\frac{\sqrt{35}i}{40}$ 0 $-\frac{\sqrt{35}}{40}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$
	0	0 0 0 0 0 $-\frac{\sqrt{35}}{40}$ 0 $\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 $\frac{\sqrt{21}}{28}$
	0	0 0 0 0 0 $\frac{\sqrt{35}}{40}$ 0 $\frac{\sqrt{35}i}{40}$ 0 0 0 0 0 $-\frac{\sqrt{21}}{28}$
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0
666	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,0;a)}(A_{1u}, 2)$	0 0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $\frac{\sqrt{2}i}{20}$ 0 0 0 $-\frac{3\sqrt{5}i}{40}$ 0 0 $\frac{\sqrt{30}}{40}$	
	0 0 0 0 $\frac{\sqrt{2}}{20}$ 0 $\frac{\sqrt{2}i}{20}$ 0 0 0 0 $\frac{3\sqrt{5}i}{40}$ $-\frac{\sqrt{30}}{40}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{2}}{20}$ $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 $\frac{\sqrt{30}i}{40}$	
	0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{2}}{20}$ 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 $\frac{\sqrt{30}i}{40}$ 0	
	0 $\frac{7\sqrt{3}}{80}$ 0 $-\frac{\sqrt{3}i}{80}$ 0 0 $\frac{3\sqrt{2}i}{80}$ 0 0 $\frac{\sqrt{5}}{80}$ 0 $\frac{\sqrt{5}i}{80}$ 0 0	
	$-\frac{7\sqrt{3}}{80}$ 0 $-\frac{\sqrt{3}i}{80}$ 0 0 0 0 $-\frac{3\sqrt{2}i}{80}$ $-\frac{\sqrt{5}}{80}$ 0 $\frac{\sqrt{5}i}{80}$ 0 0 0	
	0 $-\frac{7\sqrt{3}i}{80}$ 0 $-\frac{\sqrt{3}}{80}$ $\frac{3\sqrt{2}i}{80}$ 0 0 0 0 $\frac{\sqrt{5}i}{80}$ 0 $-\frac{\sqrt{5}}{80}$ 0 0	
	$-\frac{7\sqrt{3}i}{80}$ 0 $\frac{\sqrt{3}}{80}$ 0 0 $-\frac{3\sqrt{2}i}{80}$ 0 0 $\frac{\sqrt{5}i}{80}$ 0 $\frac{\sqrt{5}}{80}$ 0 0 0	
	0 0 $\frac{9i}{40}$ 0 0 $-\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{9i}{40}$ $\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0 0	
667	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
$\mathbb{G}_4^{(1,0;a)}(A_{2u})$	0 0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{2}}{20}$ $-\frac{3\sqrt{5}i}{40}$ 0 0 0 0 $\frac{\sqrt{30}i}{40}$	
	0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{2}}{20}$ 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 0 $\frac{\sqrt{30}i}{40}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{2}i}{20}$ 0 0 $\frac{3\sqrt{5}i}{40}$ 0 0 $-\frac{\sqrt{30}}{40}$	
	0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{2}i}{20}$ 0 0 0 0 $-\frac{3\sqrt{5}i}{40}$ $\frac{\sqrt{30}}{40}$ 0	
	0 $-\frac{\sqrt{3}i}{80}$ 0 $-\frac{7\sqrt{3}}{80}$ $\frac{3\sqrt{2}i}{80}$ 0 0 0 0 $\frac{\sqrt{5}i}{80}$ 0 $-\frac{\sqrt{5}}{80}$ 0 0	
	$-\frac{\sqrt{3}i}{80}$ 0 $\frac{7\sqrt{3}}{80}$ 0 0 $-\frac{3\sqrt{2}i}{80}$ 0 0 $\frac{\sqrt{5}i}{80}$ 0 $\frac{\sqrt{5}}{80}$ 0 0 0	
	0 $-\frac{\sqrt{3}}{80}$ 0 $\frac{7\sqrt{3}i}{80}$ 0 0 $-\frac{3\sqrt{2}i}{80}$ 0 0 $-\frac{\sqrt{5}}{80}$ 0 $-\frac{\sqrt{5}i}{80}$ 0 0	
	$\frac{\sqrt{3}}{80}$ 0 $\frac{7\sqrt{3}i}{80}$ 0 0 0 0 $\frac{3\sqrt{2}i}{80}$ $\frac{\sqrt{5}}{80}$ 0 $-\frac{\sqrt{5}i}{80}$ 0 0 0	
	$\frac{9i}{40}$ 0 0 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0	
	0 $-\frac{9i}{40}$ 0 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $-\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0	
668	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 1)$	$0 \quad 0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{280}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad \frac{3\sqrt{210}}{280} \quad 0$	
	$-\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}i}{280}$	
	$0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}i}{280} \quad 0$	
	$0 \quad -\frac{9\sqrt{21}}{560} \quad 0 \quad \frac{9\sqrt{21}i}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad -\frac{3\sqrt{35}}{560} \quad 0 \quad \frac{23\sqrt{35}i}{560} \quad 0 \quad 0$	
	$\frac{9\sqrt{21}}{560} \quad 0 \quad \frac{9\sqrt{21}i}{560} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{80} \quad \frac{3\sqrt{35}}{560} \quad 0 \quad \frac{23\sqrt{35}i}{560} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{9\sqrt{21}i}{560} \quad 0 \quad -\frac{9\sqrt{21}}{560} \quad \frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{17\sqrt{35}i}{560} \quad 0 \quad \frac{3\sqrt{35}}{560} \quad -\frac{\sqrt{210}i}{280} \quad 0$	
	$-\frac{9\sqrt{21}i}{560} \quad 0 \quad \frac{9\sqrt{21}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad -\frac{17\sqrt{35}i}{560} \quad 0 \quad -\frac{3\sqrt{35}}{560} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{280}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{140} \quad 0 \quad -\frac{3\sqrt{42}i}{140} \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{140} \quad 0 \quad -\frac{3\sqrt{42}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{280} \quad 0 \quad 0$	
669	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 1)$	$-\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280}$	
	$0 \quad \frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}i}{280} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{21}i}{280} \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{140} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{210}}{280}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{280} \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140} \quad \frac{3\sqrt{210}}{280} \quad 0$	
	$0 \quad -\frac{9\sqrt{21}i}{560} \quad 0 \quad -\frac{9\sqrt{21}}{560} \quad \frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{35}i}{560} \quad 0 \quad \frac{17\sqrt{35}}{560} \quad \frac{\sqrt{210}i}{280} \quad 0$	
	$-\frac{9\sqrt{21}i}{560} \quad 0 \quad \frac{9\sqrt{21}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad -\frac{3\sqrt{35}i}{560} \quad 0 \quad -\frac{17\sqrt{35}}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{280}$	
	$0 \quad \frac{9\sqrt{21}}{560} \quad 0 \quad -\frac{9\sqrt{21}i}{560} \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{80} \quad 0 \quad 0 \quad -\frac{23\sqrt{35}}{560} \quad 0 \quad \frac{3\sqrt{35}i}{560} \quad 0 \quad 0$	
	$-\frac{9\sqrt{21}}{560} \quad 0 \quad -\frac{9\sqrt{21}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{80} \quad \frac{23\sqrt{35}}{560} \quad 0 \quad \frac{3\sqrt{35}i}{560} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}i}{140} \quad 0 \quad \frac{3\sqrt{42}}{140} \quad -\frac{\sqrt{105}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
670	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 0 0 $-\frac{i}{5}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0	
	0 0 0 0 0 $\frac{i}{5}$ 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0	
	0 0 0 0 0 0 $\frac{i}{5}$ 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0	
	0 0 0 0 0 0 0 $-\frac{i}{5}$ $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0	
	$\frac{\sqrt{6}i}{10}$ 0 0 0 0 $-\frac{i}{40}$ 0 $\frac{1}{40}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{10}$ 0 0 $-\frac{i}{40}$ 0 $-\frac{1}{40}$ 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{6}i}{10}$ 0 0 $\frac{1}{40}$ 0 $\frac{i}{40}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}i}{10}$ $-\frac{1}{40}$ 0 $\frac{i}{40}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{2}i}{40}$ 0 $-\frac{3\sqrt{2}}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0	
671	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 0 $-\frac{i}{5}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0	
	0 0 0 0 0 0 0 $\frac{i}{5}$ $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0	
	0 0 0 0 $-\frac{i}{5}$ 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0	
	0 0 0 0 0 $\frac{i}{5}$ 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0	
	0 0 $\frac{\sqrt{6}i}{10}$ 0 0 $-\frac{1}{40}$ 0 $-\frac{i}{40}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}i}{10}$ $\frac{1}{40}$ 0 $-\frac{i}{40}$ 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}i}{10}$ 0 0 0 0 $-\frac{i}{40}$ 0 $\frac{1}{40}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{10}$ 0 0 $-\frac{i}{40}$ 0 $-\frac{1}{40}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{2}}{40}$ 0 $-\frac{3\sqrt{2}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{2}}{40}$ 0 $-\frac{3\sqrt{2}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0	
672	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,1}^{(1,0;a)}(E_u, 3)$	0	$-\frac{3\sqrt{42}i}{560}$ 0 $\frac{3\sqrt{42}}{560}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{560}$ 0 $\frac{\sqrt{70}}{560}$ $-\frac{\sqrt{105}i}{70}$ 0
	$-\frac{3\sqrt{42}i}{560}$	0 $-\frac{3\sqrt{42}}{560}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{560}$ 0 $-\frac{\sqrt{70}}{560}$ 0 0 $\frac{\sqrt{105}i}{70}$
	0	$-\frac{3\sqrt{42}}{560}$ 0 $-\frac{3\sqrt{42}i}{560}$ 0 0 0 0 0 $\frac{13\sqrt{70}}{560}$ 0 $-\frac{13\sqrt{70}i}{560}$ 0 0 0
	$\frac{3\sqrt{42}}{560}$	0 $-\frac{3\sqrt{42}i}{560}$ 0 0 0 0 0 $-\frac{13\sqrt{70}}{560}$ 0 $-\frac{13\sqrt{70}i}{560}$ 0 0 0
	$-\frac{3\sqrt{42}i}{280}$	0 0 0 0 $\frac{\sqrt{7}i}{40}$ 0 $-\frac{\sqrt{7}}{20}$ $-\frac{\sqrt{70}i}{280}$ 0 0 0 0 $\frac{3\sqrt{105}i}{280}$
	0	$\frac{3\sqrt{42}i}{280}$ 0 0 $\frac{\sqrt{7}i}{40}$ 0 $\frac{\sqrt{7}}{20}$ 0 0 $\frac{\sqrt{70}i}{280}$ 0 0 0 $\frac{3\sqrt{105}i}{280}$ 0
	0	0 $-\frac{3\sqrt{42}i}{280}$ 0 0 $\frac{\sqrt{7}}{40}$ 0 $\frac{\sqrt{7}i}{20}$ 0 0 $\frac{\sqrt{70}i}{280}$ 0 0 0 $-\frac{3\sqrt{105}}{280}$
	0	0 0 0 $\frac{3\sqrt{42}i}{280}$ $-\frac{\sqrt{7}}{40}$ 0 $\frac{\sqrt{7}i}{20}$ 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ $\frac{3\sqrt{105}}{280}$ 0 0
	0	$-\frac{3\sqrt{14}i}{80}$ 0 $-\frac{3\sqrt{14}}{80}$ $\frac{\sqrt{21}i}{35}$ 0 0 0 0 $-\frac{3\sqrt{210}i}{560}$ 0 $\frac{3\sqrt{210}}{560}$ 0 0 0
	$-\frac{3\sqrt{14}i}{80}$	0 $\frac{3\sqrt{14}}{80}$ 0 0 $-\frac{\sqrt{21}i}{35}$ 0 0 $-\frac{3\sqrt{210}i}{560}$ 0 $-\frac{3\sqrt{210}}{560}$ 0 0 0
673	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{G}_{4,2}^{(1,0;a)}(E_u, 3)$	0	$\frac{3\sqrt{42}}{560}$ 0 $\frac{3\sqrt{42}i}{560}$ 0 0 0 0 0 $\frac{13\sqrt{70}}{560}$ 0 $-\frac{13\sqrt{70}i}{560}$ 0 0 0
	$-\frac{3\sqrt{42}}{560}$	0 $-\frac{3\sqrt{42}i}{560}$ 0 0 0 0 0 0 $-\frac{13\sqrt{70}}{560}$ 0 $-\frac{13\sqrt{70}i}{560}$ 0 0 0
	0	$-\frac{3\sqrt{42}i}{560}$ 0 $\frac{3\sqrt{42}}{560}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{560}$ 0 $-\frac{\sqrt{70}}{560}$ $\frac{\sqrt{105}i}{70}$ 0
	$-\frac{3\sqrt{42}i}{560}$	0 $-\frac{3\sqrt{42}}{560}$ 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{560}$ 0 $\frac{\sqrt{70}}{560}$ 0 0 $-\frac{\sqrt{105}i}{70}$
	0	0 $-\frac{3\sqrt{42}i}{280}$ 0 0 $-\frac{\sqrt{7}}{20}$ 0 $-\frac{\sqrt{7}i}{40}$ 0 0 $\frac{\sqrt{70}i}{280}$ 0 0 0 $-\frac{3\sqrt{105}}{280}$
	0	0 0 0 $-\frac{3\sqrt{42}i}{280}$ $\frac{\sqrt{7}}{20}$ 0 $-\frac{\sqrt{7}i}{40}$ 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ $\frac{3\sqrt{105}}{280}$ 0 0
	$-\frac{3\sqrt{42}i}{280}$	0 0 0 0 $\frac{\sqrt{7}i}{20}$ 0 $-\frac{\sqrt{7}}{40}$ $\frac{\sqrt{70}i}{280}$ 0 0 0 0 0 $-\frac{3\sqrt{105}}{280}$
	0	$\frac{3\sqrt{42}i}{280}$ 0 0 $\frac{\sqrt{7}i}{20}$ 0 $\frac{\sqrt{7}}{40}$ 0 0 $-\frac{\sqrt{70}i}{280}$ 0 0 0 $-\frac{3\sqrt{105}i}{280}$ 0
	0	$-\frac{3\sqrt{14}}{80}$ 0 $\frac{3\sqrt{14}i}{80}$ 0 0 0 $-\frac{\sqrt{21}i}{35}$ 0 0 $\frac{3\sqrt{210}}{560}$ 0 $\frac{3\sqrt{210}i}{560}$ 0 0 0
	$\frac{3\sqrt{14}}{80}$	0 $\frac{3\sqrt{14}i}{80}$ 0 0 0 0 0 $\frac{\sqrt{21}i}{35}$ $-\frac{3\sqrt{210}}{560}$ 0 $\frac{3\sqrt{210}i}{560}$ 0 0 0
674	symmetry	1

continued ...

Table 9

continued ..

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{2,1}^{(1,1;a)}(E_u, 2)$	0	$\frac{\sqrt{14}i}{168} \quad 0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad -\frac{\sqrt{210}}{120} \quad -\frac{\sqrt{35}i}{42} \quad 0$
	$\frac{\sqrt{14}i}{168}$	$0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{42}$
	0	$\frac{\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{14}}{168}$	$0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	$\frac{5\sqrt{14}i}{168}$	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad \frac{\sqrt{21}}{28} \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420}$
	0	$-\frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{42} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420} \quad 0$
	0	$0 \quad 0 \quad \frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{420}$
	0	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}i}{168} \quad -\frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad -\frac{\sqrt{35}}{420} \quad 0$
	0	$0 \quad -\frac{5\sqrt{42}i}{168} \quad 0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$
	$-\frac{5\sqrt{42}i}{168}$	$0 \quad 0 \quad \frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$
679	symmetry	$-\sqrt{3}xy$
$\mathbb{G}_{2,2}^{(1,1;a)}(E_u, 2)$	0	$0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0$
	$\frac{\sqrt{14}}{168}$	$0 \quad 0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{120} \quad 0 \quad \frac{\sqrt{210}}{120} \quad \frac{\sqrt{35}i}{42} \quad 0$
	$\frac{\sqrt{14}i}{168}$	$0 \quad 0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{120} \quad 0 \quad -\frac{\sqrt{210}}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{42}$
	0	$0 \quad 0 \quad -\frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{420}$
	0	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}i}{168} \quad -\frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad -\frac{\sqrt{35}}{420} \quad 0$
	$\frac{5\sqrt{14}i}{168}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{42} \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{420}$
	0	$-\frac{5\sqrt{14}i}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{420} \quad 0$
	0	$0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad \frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0$
	$\frac{5\sqrt{42}}{168}$	$0 \quad 0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad \frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0$
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	$\frac{\sqrt{385}i}{1540} \quad 0 \quad \frac{\sqrt{385}}{1540} \quad \frac{\sqrt{2310}i}{924} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad \frac{\sqrt{231}}{308} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{385}i}{1540}$	$0 \quad -\frac{\sqrt{385}}{1540} \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{924} \quad 0 \quad 0 \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad -\frac{\sqrt{385}}{1540}$	$0 \quad \frac{\sqrt{385}i}{1540} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}i}{924} \quad 0 \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{385}}{1540}$	$0 \quad \frac{\sqrt{385}i}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{924} \quad \frac{\sqrt{231}}{308} \quad 0 \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad -\frac{\sqrt{2310}}{770} \quad -\frac{5\sqrt{231}i}{462} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{154}i}{77}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad \frac{\sqrt{2310}}{770} \quad 0 \quad 0 \quad \frac{5\sqrt{231}i}{462} \quad 0 \quad 0 \quad \frac{\sqrt{154}i}{77} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}}{770} \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad -\frac{5\sqrt{231}i}{462} \quad 0 \quad 0 \quad \frac{\sqrt{154}}{77}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{231}i}{462} \quad -\frac{\sqrt{154}}{77} \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{77}i}{154} \quad 0 \quad \frac{3\sqrt{77}}{154} \quad \frac{5\sqrt{462}i}{462} \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{77}i}{154} \quad 0 \quad -\frac{3\sqrt{77}}{154} \quad 0 \quad 0 \quad -\frac{5\sqrt{462}i}{462}$
681	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{G}_4^{(1,1;a)}(A_{1u}, 2)$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{33}}{110} \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{220}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{165} \quad \frac{\sqrt{55}}{220} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad \frac{3\sqrt{33}}{110} \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}i}{220}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad -\frac{3\sqrt{33}}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{55}i}{220} \quad 0$
	0	$-\frac{\sqrt{22}}{40} \quad 0 \quad \frac{13\sqrt{22}i}{440} \quad 0 \quad 0 \quad \frac{4\sqrt{33}i}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{22}}{40}$	$0 \quad \frac{13\sqrt{22}i}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{4\sqrt{33}i}{165} \quad \frac{\sqrt{330}}{440} \quad 0 \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad 0 \quad 0 \quad 0$
	$0 \quad \frac{\sqrt{22}i}{40}$	$0 \quad \frac{13\sqrt{22}}{440} \quad \frac{4\sqrt{33}i}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad \frac{\sqrt{330}}{440} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{22}i}{40}$	$0 \quad -\frac{13\sqrt{22}}{440} \quad 0 \quad 0 \quad -\frac{4\sqrt{33}i}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{2\sqrt{66}i}{165} \quad 0 \quad 0 \quad -\frac{3\sqrt{11}}{220} \quad 0 \quad -\frac{3\sqrt{11}i}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{2\sqrt{66}i}{165} \quad \frac{3\sqrt{11}}{220} \quad 0 \quad -\frac{3\sqrt{11}i}{220} \quad 0 \quad 0$
682	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_4^{(1,1;a)}(A_{2u})$	0 0 0 0 0 $\frac{3\sqrt{33}i}{110}$ 0 $\frac{3\sqrt{33}}{110}$ $\frac{\sqrt{330}i}{165}$ 0 0 0 0 $-\frac{\sqrt{55}i}{220}$	
	0 0 0 0 $\frac{3\sqrt{33}i}{110}$ 0 $-\frac{3\sqrt{33}}{110}$ 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 $-\frac{\sqrt{55}i}{220}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{33}}{110}$ 0 $-\frac{3\sqrt{33}i}{110}$ 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 $\frac{\sqrt{55}}{220}$	
	0 0 0 0 $-\frac{3\sqrt{33}}{110}$ 0 $-\frac{3\sqrt{33}i}{110}$ 0 0 0 0 $\frac{\sqrt{330}i}{165}$ $-\frac{\sqrt{55}}{220}$ 0	
	0 $\frac{13\sqrt{22}i}{440}$ 0 $\frac{\sqrt{22}}{40}$ $\frac{4\sqrt{33}i}{165}$ 0 0 0 0 $-\frac{\sqrt{330}i}{440}$ 0 $\frac{\sqrt{330}}{440}$ 0 0	
	$\frac{13\sqrt{22}i}{440}$ 0 $-\frac{\sqrt{22}}{40}$ 0 0 $-\frac{4\sqrt{33}i}{165}$ 0 0 $-\frac{\sqrt{330}i}{440}$ 0 $-\frac{\sqrt{330}}{440}$ 0 0 0	
	0 $\frac{13\sqrt{22}}{440}$ 0 $-\frac{\sqrt{22}i}{40}$ 0 0 $-\frac{4\sqrt{33}i}{165}$ 0 0 $\frac{\sqrt{330}}{440}$ 0 $\frac{\sqrt{330}i}{440}$ 0 0	
	$-\frac{13\sqrt{22}}{440}$ 0 $-\frac{\sqrt{22}i}{40}$ 0 0 0 0 $\frac{4\sqrt{33}i}{165}$ $-\frac{\sqrt{330}}{440}$ 0 $\frac{\sqrt{330}i}{440}$ 0 0 0	
	$\frac{2\sqrt{66}i}{165}$ 0 0 0 0 $-\frac{3\sqrt{11}i}{220}$ 0 $\frac{3\sqrt{11}}{220}$ 0 0 0 0 0 0	
	0 $-\frac{2\sqrt{66}i}{165}$ 0 0 $-\frac{3\sqrt{11}i}{220}$ 0 $-\frac{3\sqrt{11}}{220}$ 0 0 0 0 0 0	
683	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 1)$	0 0 $\frac{\sqrt{154}i}{770}$ 0 0 $-\frac{\sqrt{231}}{462}$ 0 0 0 0 $\frac{\sqrt{2310}i}{770}$ 0 0 $-\frac{\sqrt{385}}{220}$	
	0 0 0 $-\frac{\sqrt{154}i}{770}$ $\frac{\sqrt{231}}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{770}$ $\frac{\sqrt{385}}{220}$ 0	
	$-\frac{\sqrt{154}i}{770}$ 0 0 0 0 0 0 $-\frac{\sqrt{231}}{462}$ $-\frac{\sqrt{2310}i}{770}$ 0 0 0 0 $\frac{\sqrt{385}i}{220}$	
	0 $\frac{\sqrt{154}i}{770}$ 0 0 0 0 $\frac{\sqrt{231}}{462}$ 0 0 $\frac{\sqrt{2310}i}{770}$ 0 0 $\frac{\sqrt{385}i}{220}$ 0	
	0 $\frac{\sqrt{154}}{440}$ 0 $-\frac{\sqrt{154}i}{440}$ 0 0 $-\frac{2\sqrt{231}i}{385}$ 0 0 $-\frac{\sqrt{2310}}{9240}$ 0 $\frac{\sqrt{2310}i}{440}$ 0 0	
	$-\frac{\sqrt{154}}{440}$ 0 $-\frac{\sqrt{154}i}{440}$ 0 0 0 0 $\frac{2\sqrt{231}i}{385}$ $\frac{\sqrt{2310}}{9240}$ 0 $\frac{\sqrt{2310}i}{440}$ 0 0 0	
	0 $\frac{\sqrt{154}i}{440}$ 0 $\frac{\sqrt{154}}{440}$ $\frac{2\sqrt{231}i}{385}$ 0 0 0 0 $\frac{\sqrt{2310}i}{440}$ 0 $\frac{41\sqrt{2310}}{9240}$ $\frac{4\sqrt{385}i}{385}$ 0	
	$\frac{\sqrt{154}i}{440}$ 0 $-\frac{\sqrt{154}}{440}$ 0 0 $-\frac{2\sqrt{231}i}{385}$ 0 0 $\frac{\sqrt{2310}i}{440}$ 0 $-\frac{41\sqrt{2310}}{9240}$ 0 0 $-\frac{4\sqrt{385}i}{385}$	
	0 0 0 0 0 $-\frac{3\sqrt{77}}{220}$ 0 $\frac{3\sqrt{77}i}{220}$ 0 0 $\frac{3\sqrt{77}i}{385}$ 0 0 $-\frac{3\sqrt{77}i}{385}$ $\frac{\sqrt{1155}}{231}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{77}}{220}$ 0 $\frac{3\sqrt{77}i}{220}$ 0 0 0 0 $-\frac{3\sqrt{77}i}{385}$ $\frac{\sqrt{1155}}{231}$ 0	
684	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{G}_{4,2}^{(1,1;a)}(E_u, 1)$	$-\frac{\sqrt{154}i}{770}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{462} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{385}i}{220}$
	$0 \quad \frac{\sqrt{154}i}{770}$	$0 \quad 0 \quad \frac{\sqrt{231}i}{462} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad -\frac{\sqrt{385}i}{220} \quad 0$
	$0 \quad 0 \quad -\frac{\sqrt{154}i}{770}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{462} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad -\frac{\sqrt{385}i}{220}$
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{154}i}{770}$	$0 \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{462} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad \frac{\sqrt{385}}{220} \quad 0$
	$0 \quad \frac{\sqrt{154}i}{440}$	$0 \quad \frac{\sqrt{154}}{440} \quad \frac{2\sqrt{231}i}{385} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{41\sqrt{2310}i}{9240} \quad 0 \quad -\frac{\sqrt{2310}}{440} \quad -\frac{4\sqrt{385}i}{385} \quad 0$
	$\frac{\sqrt{154}i}{440}$	$0 \quad -\frac{\sqrt{154}}{440} \quad 0 \quad 0 \quad -\frac{2\sqrt{231}i}{385} \quad 0 \quad 0 \quad 0 \quad -\frac{41\sqrt{2310}i}{9240} \quad 0 \quad \frac{\sqrt{2310}}{440} \quad 0 \quad 0 \quad \frac{4\sqrt{385}i}{385}$
	$0 \quad -\frac{\sqrt{154}}{440}$	$0 \quad \frac{\sqrt{154}i}{440} \quad 0 \quad 0 \quad 0 \quad \frac{2\sqrt{231}i}{385} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{440} \quad 0 \quad \frac{\sqrt{2310}i}{9240} \quad 0 \quad 0$
	$\frac{\sqrt{154}}{440}$	$0 \quad \frac{\sqrt{154}i}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{2\sqrt{231}i}{385} \quad \frac{\sqrt{2310}}{440} \quad 0 \quad 0 \quad \frac{\sqrt{2310}i}{9240} \quad 0 \quad 0 \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{77}i}{220}$	$0 \quad -\frac{3\sqrt{77}}{220} \quad -\frac{3\sqrt{770}i}{385} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{770}i}{385} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{231} \quad 0$
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{77}i}{220}$	$0 \quad \frac{3\sqrt{77}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{770}i}{385} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{231} \quad 0$
685	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{G}_{4,1}^{(1,1;a)}(E_u, 2)$	$0 \quad \frac{3\sqrt{11}i}{44} \quad 0 \quad \frac{3\sqrt{11}}{44} \quad \frac{3\sqrt{66}i}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{660} \quad 0 \quad \frac{\sqrt{165}}{660} \quad 0 \quad 0$	
	$\frac{3\sqrt{11}i}{44} \quad 0 \quad -\frac{3\sqrt{11}}{44} \quad 0 \quad 0 \quad -\frac{3\sqrt{66}i}{220} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{660} \quad 0 \quad -\frac{\sqrt{165}}{660} \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{11}}{44} \quad 0 \quad -\frac{3\sqrt{11}i}{44} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{66}i}{220} \quad 0 \quad 0 \quad \frac{\sqrt{165}}{660} \quad 0 \quad \frac{\sqrt{165}i}{660} \quad 0 \quad 0$	
	$-\frac{3\sqrt{11}}{44} \quad 0 \quad -\frac{3\sqrt{11}i}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{66}i}{220} \quad -\frac{\sqrt{165}}{660} \quad 0 \quad \frac{\sqrt{165}i}{660} \quad 0 \quad 0$	
	$\frac{3\sqrt{11}i}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{330} \quad 0 \quad \frac{\sqrt{66}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{3\sqrt{11}i}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{66}i}{330} \quad 0 \quad -\frac{\sqrt{66}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{3\sqrt{11}i}{110} \quad 0 \quad 0 \quad \frac{\sqrt{66}}{330} \quad 0 \quad \frac{\sqrt{66}i}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{11}i}{110} \quad -\frac{\sqrt{66}}{330} \quad 0 \quad \frac{\sqrt{66}i}{330} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{33}i}{330} \quad 0 \quad \frac{\sqrt{33}}{330} \quad 0 \quad 0$	
	$-\frac{\sqrt{33}i}{330} \quad 0 \quad -\frac{\sqrt{33}}{330} \quad 0 \quad 0$	
686	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

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

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(a)}(E_u)$	$\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0
	0	$\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0
	0	0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 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 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
	0	0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0 0
691	symmetry	y
$\mathbb{T}_{1,2}^{(a)}(E_u)$	0	0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{70}i}{140}$ 0 0
	$-\frac{\sqrt{42}i}{28}$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0 0
	0	$-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{140}$ 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 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 0 0 0 $-\frac{\sqrt{105}i}{70}$
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{70}$ 0 0 0
692	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
693	symmetry	
$\mathbb{T}_3^{(a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
694	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$ $\begin{bmatrix} -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
695	symmetry	
696	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ..

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(a)}(E_u, 1)$		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \end{bmatrix}$
697	symmetry	$\sqrt{15}xyz$
$\mathbb{T}_{3,1}^{(a)}(E_u, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
698	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
699	symmetry	$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
$\mathbb{T}_5^{(a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} \end{bmatrix}$
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
701	symmetry	
$\mathbb{T}_5^{(a)}(A_{2u}, 2)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
702	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(a)}(E_u, 2)$	$\frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad \frac{\sqrt{42}i}{21} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad \frac{\sqrt{42}i}{21}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}i}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
705	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{T}_{5,2}^{(a)}(E_u, 2)$	$0 \quad 0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad \frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{420} \quad 0 \quad \frac{\sqrt{7}i}{28} \quad 0 \quad 0$	
	$-\frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{105}i}{420} \quad 0 \quad -\frac{\sqrt{7}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad \frac{\sqrt{42}i}{21} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{70} \quad 0 \quad \frac{\sqrt{42}i}{21}$	
	$0 \quad 0 \quad \frac{\sqrt{21}i}{14} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}i}{14} \quad 0 \quad 0 \quad 0$	
706	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
707	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
708	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
709	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
710	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,-1;a)}(A_{1u})$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(1,-1;a)}(A_{2u}, 1)$		$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{\sqrt{70}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 \end{bmatrix}$
		$-\frac{z(3x^2+3y^2-2z^2)}{2}$
712	symmetry	$\begin{bmatrix} & & & & & & & \frac{\sqrt{10}y(3x^2-y^2)}{4} & & & & & & & \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
713	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{105}i}{420} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & -\frac{\sqrt{105}i}{420} & 0 \\ -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & \frac{\sqrt{105}}{420} \\ 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & \frac{\sqrt{105}}{420} \\ 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 \\ -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{280} & \frac{2\sqrt{105}}{105} & 0 \\ -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{2\sqrt{105}}{105} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & 0 \end{bmatrix}$
714	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} \\ 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{105}i}{420} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{42} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & -\frac{\sqrt{105}i}{420} & 0 \\ 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{56} & -\frac{2\sqrt{105}}{105} & 0 \\ -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{2\sqrt{105}}{105} \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 \\ \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$	
	715 symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_{3,1}^{(1,-1;a)}(E_u, 2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
		$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,-1;a)}(E_u, 2)$	0	$-\frac{\sqrt{105}i}{84}$
	$\frac{\sqrt{105}i}{84}$	0
	0	$\frac{\sqrt{105}}{84}$
	$-\frac{\sqrt{105}}{84}$	0
	0	$-\frac{\sqrt{105}i}{84}$
	$-\frac{\sqrt{105}}{84}$	0
	0	$-\frac{\sqrt{105}}{84}$
	$\frac{\sqrt{105}}{84}$	0
	0	$\frac{\sqrt{105}}{84}$
	0	$-\frac{\sqrt{105}i}{84}$
717	symmetry	$-\frac{\sqrt{70}x(x^2+3y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(1,-1;a)}(A_{1u})$	0	0
	0	$-\frac{\sqrt{2}i}{60}$
	0	$\frac{\sqrt{2}i}{60}$
	0	$-\frac{\sqrt{2}}{60}$
	0	$-\frac{\sqrt{2}i}{60}$
	0	$-\frac{\sqrt{2}}{60}$
	0	$-\frac{\sqrt{2}i}{60}$
	$-\frac{\sqrt{3}i}{30}$	0
	$\frac{\sqrt{3}i}{30}$	0
	0	$-\frac{\sqrt{3}i}{15}$
718	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 1)$	0	$\frac{\sqrt{210}i}{420}$ 0 $\frac{\sqrt{210}}{420}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}}{42}$ 0 0
	$-\frac{\sqrt{210}i}{420}$	0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ $-\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}}{42}$ 0 0 0
	0	$-\frac{\sqrt{210}}{420}$ 0 $\frac{\sqrt{210}i}{420}$ $\frac{\sqrt{35}}{42}$ 0 0 0 0 $\frac{\sqrt{14}}{42}$ 0 $\frac{\sqrt{14}i}{42}$ 0 0
	$-\frac{\sqrt{210}}{420}$	0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}i}{42}$ 0 $-\frac{\sqrt{14}i}{42}$ 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 0 $\frac{5\sqrt{14}}{84}$ 0 0 $-\frac{\sqrt{21}i}{42}$
	0	0 0 0 0 0 $\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 0 0 $-\frac{5\sqrt{14}}{84}$ $\frac{\sqrt{21}i}{42}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{35}}{60}$ 0 $-\frac{\sqrt{35}i}{60}$ $-\frac{5\sqrt{14}}{84}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 0 0 $\frac{\sqrt{35}}{60}$ 0 $\frac{\sqrt{35}i}{60}$ 0 0 0 $\frac{5\sqrt{14}}{84}$ 0 0 $-\frac{\sqrt{21}}{42}$
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 $\frac{\sqrt{42}}{84}$ 0 0 0
719	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$
$\mathbb{T}_5^{(1,-1;a)}(A_{2u}, 2)$	0	0 0 0 0 0 $\frac{\sqrt{2}}{60}$ 0 $-\frac{\sqrt{2}i}{60}$ $-\frac{\sqrt{5}}{15}$ 0 0 0 0 $-\frac{\sqrt{30}}{30}$
	0	0 0 0 0 0 $\frac{\sqrt{2}}{60}$ 0 $\frac{\sqrt{2}i}{60}$ 0 0 $\frac{\sqrt{5}}{15}$ 0 0 $-\frac{\sqrt{30}}{30}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{2}i}{60}$ 0 $-\frac{\sqrt{2}}{60}$ 0 0 $\frac{\sqrt{5}}{15}$ 0 0 $-\frac{\sqrt{30}i}{30}$
	0	0 0 0 0 0 $\frac{\sqrt{2}i}{60}$ 0 $-\frac{\sqrt{2}}{60}$ 0 0 0 0 $-\frac{\sqrt{5}}{15}$ $\frac{\sqrt{30}i}{30}$ 0
	0	$-\frac{\sqrt{3}}{15}$ 0 $-\frac{\sqrt{3}i}{30}$ $\frac{\sqrt{2}}{30}$ 0 0 0 0 $-\frac{\sqrt{5}}{60}$ 0 $-\frac{\sqrt{5}i}{60}$ 0 0 0
	$-\frac{\sqrt{3}}{15}$	0 $\frac{\sqrt{3}i}{30}$ 0 0 $-\frac{\sqrt{2}}{30}$ 0 0 $-\frac{\sqrt{5}}{60}$ 0 $\frac{\sqrt{5}i}{60}$ 0 0 0
	0	$\frac{\sqrt{3}i}{15}$ 0 $-\frac{\sqrt{3}}{30}$ 0 0 $-\frac{\sqrt{2}}{30}$ 0 0 $-\frac{\sqrt{5}i}{60}$ 0 $\frac{\sqrt{5}}{60}$ 0 0 0
	$-\frac{\sqrt{3}i}{15}$	0 $-\frac{\sqrt{3}}{30}$ 0 0 0 0 $\frac{\sqrt{2}}{30}$ $\frac{\sqrt{5}i}{60}$ 0 $\frac{\sqrt{5}}{60}$ 0 0 0
	$\frac{1}{5}$	0 0 0 0 0 $\frac{\sqrt{6}}{15}$ 0 $\frac{\sqrt{6}i}{15}$ 0 0 0 0 0 0 0
	0	$-\frac{1}{5}$ 0 0 0 $\frac{\sqrt{6}}{15}$ 0 $-\frac{\sqrt{6}i}{15}$ 0 0 0 0 0 0 0
720	symmetry	$\frac{3\sqrt{14}x(x^4-10x^2y^2+5y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}i}{20}$ 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}i}{20}$ 0 $-\frac{\sqrt{15}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{20}$ 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}}{20}$ 0 $\frac{\sqrt{15}i}{20}$ 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 0 0 0	
721	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 1)$	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}}{20}$ 0 $-\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}}{20}$ 0 $\frac{\sqrt{15}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{20}$ 0 $\frac{\sqrt{15}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{15}i}{20}$ 0 $\frac{\sqrt{15}}{20}$ 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	
722	symmetry	$\frac{\sqrt{15}x(x^4 + 2x^2y^2 - 12x^2z^2 + y^4 - 12y^2z^2 + 8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 2)$	0 0 $-\frac{\sqrt{14}}{70}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 $\frac{\sqrt{210}}{105}$ 0 0 $-\frac{\sqrt{35}i}{70}$	
	0 0 0 $\frac{\sqrt{14}}{70}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{105}$ $\frac{\sqrt{35}i}{70}$ 0	
	$\frac{\sqrt{14}}{70}$ 0 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 0 0 $-\frac{\sqrt{35}}{70}$	
	0 $-\frac{\sqrt{14}}{70}$ 0 0 0 $\frac{\sqrt{21}}{42}$ 0 0 0 0 $\frac{\sqrt{210}}{105}$ 0 0 $-\frac{\sqrt{35}}{70}$ 0	
	0 $-\frac{3\sqrt{14}i}{280}$ 0 $-\frac{3\sqrt{14}}{280}$ 0 0 $\frac{\sqrt{21}}{30}$ 0 0 $-\frac{\sqrt{210}i}{840}$ 0 $\frac{3\sqrt{210}}{280}$ 0 0	
	$\frac{3\sqrt{14}i}{280}$ 0 $-\frac{3\sqrt{14}}{280}$ 0 0 0 0 $-\frac{\sqrt{21}}{30}$ $\frac{\sqrt{210}i}{840}$ 0 $\frac{3\sqrt{210}}{280}$ 0 0 0	
	0 $\frac{3\sqrt{14}}{280}$ 0 $-\frac{3\sqrt{14}i}{280}$ $-\frac{\sqrt{21}}{30}$ 0 0 0 0 $-\frac{11\sqrt{210}}{840}$ 0 $\frac{\sqrt{210}i}{840}$ $\frac{\sqrt{35}}{35}$ 0	
	$\frac{3\sqrt{14}}{280}$ 0 $\frac{3\sqrt{14}i}{280}$ 0 0 $\frac{\sqrt{21}}{30}$ 0 0 0 $-\frac{11\sqrt{210}}{840}$ 0 $-\frac{\sqrt{210}i}{840}$ 0 0 $-\frac{\sqrt{35}}{35}$	
	0 0 0 0 0 $\frac{\sqrt{7}i}{35}$ 0 $\frac{\sqrt{7}}{35}$ 0 0 0 $-\frac{\sqrt{70}}{70}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}i}{35}$ 0 $-\frac{\sqrt{7}i}{35}$ 0 0 0 $-\frac{\sqrt{70}}{70}$ 0 0 0	
723	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 2)$	$\frac{\sqrt{14}}{70}$ 0 0 0 0 0 0 $\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{210}}{105}$ 0 0 0 0 $\frac{\sqrt{35}}{70}$	
	0 $-\frac{\sqrt{14}}{70}$ 0 0 0 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 $-\frac{\sqrt{210}}{105}$ 0 0 $\frac{\sqrt{35}}{70}$ 0	
	0 0 $\frac{\sqrt{14}}{70}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 $\frac{\sqrt{210}}{105}$ 0 0 0 $-\frac{\sqrt{35}i}{70}$	
	0 0 0 $-\frac{\sqrt{14}}{70}$ $\frac{\sqrt{21}i}{42}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{105}$ $\frac{\sqrt{35}i}{70}$ 0	
	0 $\frac{3\sqrt{14}}{280}$ 0 $-\frac{3\sqrt{14}i}{280}$ $-\frac{\sqrt{21}}{30}$ 0 0 0 0 0 $\frac{\sqrt{210}}{840}$ 0 $-\frac{11\sqrt{210}i}{840}$ $-\frac{\sqrt{35}}{35}$ 0	
	$\frac{3\sqrt{14}}{280}$ 0 $\frac{3\sqrt{14}i}{280}$ 0 0 $\frac{\sqrt{21}}{30}$ 0 0 0 $\frac{\sqrt{210}}{840}$ 0 $\frac{11\sqrt{210}i}{840}$ 0 0 $\frac{\sqrt{35}}{35}$	
	0 $\frac{3\sqrt{14}i}{280}$ 0 $\frac{3\sqrt{14}}{280}$ 0 0 $-\frac{\sqrt{21}}{30}$ 0 0 $\frac{3\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{840}$ 0 0 0	
	$-\frac{3\sqrt{14}i}{280}$ 0 $\frac{3\sqrt{14}}{280}$ 0 0 0 0 $\frac{\sqrt{21}}{30}$ $-\frac{3\sqrt{210}i}{280}$ 0 $-\frac{\sqrt{210}}{840}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}}{35}$ 0 $\frac{\sqrt{7}i}{35}$ $\frac{\sqrt{70}}{70}$ 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{7}}{35}$ 0 $-\frac{\sqrt{7}i}{35}$ 0 0 $-\frac{\sqrt{70}}{70}$ 0 0 0 0	
724	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,1}^{(1,-1;a)}(E_u, 3)$	0 0 0 0 $\frac{1}{10}$ 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 0 $-\frac{1}{10}$ 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{1}{10}$ 0 0 0 $\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0	
	0 0 0 0 0 0 0 $\frac{1}{10}$ $-\frac{\sqrt{10}i}{20}$ 0 $-\frac{\sqrt{10}}{20}$ 0 0 0	
	$-\frac{\sqrt{6}}{20}$ 0 0 0 0 $-\frac{1}{20}$ 0 $-\frac{i}{20}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}}{20}$ 0 0 $-\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}}{20}$ 0 0 $-\frac{i}{20}$ 0 $\frac{1}{20}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{20}$ $\frac{i}{20}$ 0 $\frac{1}{20}$ 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{2}}{20}$ 0 $-\frac{3\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{2}}{20}$ 0 $\frac{3\sqrt{2}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
725	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
$\mathbb{T}_{5,2}^{(1,-1;a)}(E_u, 3)$	0 0 0 0 0 0 $\frac{1}{10}$ 0 0 $-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0	
	0 0 0 0 0 0 0 $-\frac{1}{10}$ $\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0	
	0 0 0 0 $\frac{1}{10}$ 0 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 0 0 0 $-\frac{1}{10}$ 0 0 0 $\frac{\sqrt{10}}{20}$ 0 $-\frac{\sqrt{10}i}{20}$ 0 0	
	0 0 $-\frac{\sqrt{6}}{20}$ 0 0 $\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}}{20}$ $-\frac{i}{20}$ 0 $-\frac{1}{20}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{6}}{20}$ 0 0 0 $-\frac{1}{20}$ 0 $-\frac{i}{20}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}}{20}$ 0 0 $-\frac{1}{20}$ 0 $\frac{i}{20}$ 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{2}i}{20}$ 0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{2}i}{20}$ 0 $-\frac{3\sqrt{2}}{20}$ 0 0 0 0 0 0 0 0 0 0 0	
726	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$

continued ...

Table 9

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

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,2}^{(1,0;a)}(E_u)$	$\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{140} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{140} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{140} \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{105}}{70} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{70}}{140} \quad 0 \quad 0$	
731	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
$\mathbb{T}_3^{(1,0;a)}(A_{1u})$	$0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{6}i}{24}$	
	$0 \quad 0 \quad -\frac{1}{8} \quad -\frac{\sqrt{6}i}{24} \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{1}{8} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24}$	
	$0 \quad 0 \quad -\frac{1}{8} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{6}}{24} \quad 0$	
	$0 \quad -\frac{\sqrt{15}i}{48} \quad 0 \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad -\frac{i}{16} \quad 0 \quad \frac{1}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{15}i}{48} \quad 0 \quad \frac{\sqrt{15}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{16} \quad \frac{i}{16} \quad 0 \quad \frac{1}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{15}}{48} \quad 0 \quad -\frac{\sqrt{15}i}{48} \quad -\frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{16} \quad 0 \quad \frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$-\frac{\sqrt{15}}{48} \quad 0 \quad \frac{\sqrt{15}i}{48} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{16} \quad 0 \quad 0 \quad \frac{1}{16} \quad 0 \quad -\frac{i}{16} \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad \frac{\sqrt{5}}{8} \quad 0 \quad 0$	
732	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 1)$	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$	
733	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
$\mathbb{T}_3^{(1,0;a)}(A_{2u}, 2)$	$\frac{\sqrt{15}i}{48}$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & -\frac{\sqrt{6}i}{24} & 0 \\ 0 & -\frac{\sqrt{15}}{48} & 0 & -\frac{\sqrt{15}i}{48} & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{16} & 0 & -\frac{i}{16} & 0 & 0 \\ -\frac{\sqrt{15}}{48} & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & -\frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{48} & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & \frac{i}{16} & 0 & \frac{1}{16} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	$\frac{\sqrt{15}i}{48}$	
734	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 1)$	0 0 $\frac{1}{24}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 $-\frac{\sqrt{10}i}{24}$	
	0 0 0 $-\frac{1}{24}$ $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{15}}{60}$ $\frac{\sqrt{10}i}{24}$ 0	
	$-\frac{1}{24}$ 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ $-\frac{\sqrt{15}}{60}$ 0 0 0 0 $-\frac{\sqrt{10}}{24}$	
	0 $\frac{1}{24}$ 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 $-\frac{\sqrt{10}}{24}$ 0	
	0 $\frac{5i}{48}$ 0 $\frac{5}{48}$ 0 0 $-\frac{\sqrt{6}}{48}$ 0 0 $\frac{\sqrt{15}i}{240}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	$-\frac{5i}{48}$ 0 $\frac{5}{48}$ 0 0 0 0 $\frac{\sqrt{6}}{48}$ $-\frac{\sqrt{15}i}{240}$ 0 $\frac{\sqrt{15}}{48}$ 0 0 0	
	0 $-\frac{5}{48}$ 0 $\frac{5i}{48}$ $\frac{\sqrt{6}}{48}$ 0 0 0 0 $\frac{\sqrt{15}}{48}$ 0 $-\frac{3\sqrt{15}i}{80}$ $-\frac{\sqrt{10}}{120}$ 0	
	$-\frac{5}{48}$ 0 $-\frac{5i}{48}$ 0 0 $-\frac{\sqrt{6}}{48}$ 0 0 $\frac{\sqrt{15}}{48}$ 0 $\frac{3\sqrt{15}i}{80}$ 0 0 0 $\frac{\sqrt{10}}{120}$	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{40}$ 0 0 0 $-\frac{\sqrt{30}i}{30}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}}{40}$ $\frac{\sqrt{30}i}{30}$ 0	
735	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 1)$	$-\frac{1}{24}$ 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 $\frac{\sqrt{10}}{24}$	
	0 $\frac{1}{24}$ 0 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 $-\frac{\sqrt{15}}{60}$ 0 0 0 $\frac{\sqrt{10}}{24}$ 0	
	0 0 $-\frac{1}{24}$ 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 0 0 $\frac{\sqrt{15}}{60}$ 0 0 $-\frac{\sqrt{10}i}{24}$	
	0 0 0 $\frac{1}{24}$ 0 0 $\frac{\sqrt{6}}{12}$ 0 0 0 0 $-\frac{\sqrt{15}}{60}$ $\frac{\sqrt{10}i}{24}$ 0	
	0 $-\frac{5}{48}$ 0 $\frac{5i}{48}$ $\frac{\sqrt{6}}{48}$ 0 0 0 0 $-\frac{3\sqrt{15}}{80}$ 0 $\frac{\sqrt{15}i}{48}$ $\frac{\sqrt{10}}{120}$ 0	
	$-\frac{5}{48}$ 0 $-\frac{5i}{48}$ 0 0 $-\frac{\sqrt{6}}{48}$ 0 0 $-\frac{3\sqrt{15}}{80}$ 0 $-\frac{\sqrt{15}i}{48}$ 0 0 $-\frac{\sqrt{10}}{120}$	
	0 $-\frac{5i}{48}$ 0 $-\frac{5}{48}$ 0 0 $\frac{\sqrt{6}}{48}$ 0 0 $\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{240}$ 0 0 0	
	$\frac{5i}{48}$ 0 $-\frac{5}{48}$ 0 0 0 0 $-\frac{\sqrt{6}}{48}$ $-\frac{\sqrt{15}i}{48}$ 0 $\frac{\sqrt{15}}{240}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{5}}{40}$ 0 0 0 0 $-\frac{\sqrt{30}}{30}$	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}}{40}$ 0 0 0 $-\frac{\sqrt{30}}{30}$ 0	
736	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,1}^{(1,0;a)}(E_u, 2)$	0	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & -\frac{1}{6} & 0 \\ \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{6} \\ 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{24} \\ 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{24} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & -\frac{i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & \frac{i}{24} & 0 & 0 \\ 0 & \frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \\ \frac{\sqrt{30}}{48} & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
	737	symmetry
		$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_{3,2}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & \frac{1}{6} & 0 \\ \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{1}{6} \\ 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & \frac{i}{24} & 0 \\ \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} \\ 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 \\ 0 & -\frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \end{bmatrix}$
		symmetry
		$-\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{40} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & \frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{40} & 0 & -\frac{3\sqrt{2}i}{40} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{40} & 0 & \frac{3\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 \\ 0 & \frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ -\frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{10} & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{15} & 0 & -\frac{\sqrt{3}i}{30} & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ \frac{\sqrt{3}}{15} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{2}}{10} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{10} & \frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
739	symmetry	$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$
		$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{840} & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \end{bmatrix}$
740	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_5^{(1,0;a)}(A_{2u}, 2)$	0 0 0 0 0 $-\frac{3\sqrt{2}}{40}$ 0 $\frac{3\sqrt{2}i}{40}$ $\frac{\sqrt{5}}{20}$ 0 0 0 0 $-\frac{\sqrt{30}}{60}$	
	0 0 0 0 $-\frac{3\sqrt{2}}{40}$ 0 $-\frac{3\sqrt{2}i}{40}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{30}}{60}$ 0	
	0 0 0 0 0 0 $\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 0 $-\frac{\sqrt{30}i}{60}$	
	0 0 0 0 $-\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 0 0 $\frac{\sqrt{5}}{20}$ $\frac{\sqrt{30}i}{60}$ 0	
	0 $-\frac{\sqrt{3}}{30}$ 0 $\frac{\sqrt{3}i}{15}$ $\frac{\sqrt{2}}{10}$ 0 0 0 0 $-\frac{\sqrt{5}}{20}$ 0 $-\frac{\sqrt{5}i}{20}$ 0 0	
	$-\frac{\sqrt{3}}{30}$ 0 $-\frac{\sqrt{3}i}{15}$ 0 0 $-\frac{\sqrt{2}}{10}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 $\frac{\sqrt{5}i}{20}$ 0 0	
	0 $\frac{\sqrt{3}i}{30}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 $-\frac{\sqrt{2}}{10}$ 0 0 $-\frac{\sqrt{5}}{20}$ 0 $\frac{\sqrt{5}}{20}$ 0 0	
	$-\frac{\sqrt{3}i}{30}$ 0 $\frac{\sqrt{3}}{15}$ 0 0 0 0 $\frac{\sqrt{2}}{10}$ $\frac{\sqrt{5}i}{20}$ 0 $\frac{\sqrt{5}}{20}$ 0 0	
	$\frac{1}{10}$ 0 0 0 0 $-\frac{\sqrt{6}}{20}$ 0 $-\frac{\sqrt{6}i}{20}$ 0 0 0 0 0	
	0 $-\frac{1}{10}$ 0 0 $-\frac{\sqrt{6}}{20}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0	
741	symmetry	$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{15}}{12}$ 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{15}}{12}$ $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{15}}{12}$ 0 0 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}}{12}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{15}i}{60}$ 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{15}i}{60}$ 0 $\frac{\sqrt{15}}{60}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{15}}{60}$ 0 $\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{15}}{60}$ 0 $-\frac{\sqrt{15}i}{60}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
742	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{15}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{12} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{12} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{12} & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
743	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$
	$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}}{840} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{840} & 0 & 0 & \frac{\sqrt{35}i}{60} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{840} & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{840} & -\frac{\sqrt{35}i}{60} & 0 \\ \frac{\sqrt{14}}{840} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} \\ 0 & -\frac{\sqrt{14}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{840} & 0 & 0 & \frac{\sqrt{35}}{60} & 0 \\ 0 & -\frac{\sqrt{14}i}{120} & 0 & -\frac{\sqrt{14}}{120} & 0 & 0 & \frac{\sqrt{21}}{210} & 0 & 0 & \frac{17\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{120} & 0 & 0 \\ \frac{\sqrt{14}i}{120} & 0 & -\frac{\sqrt{14}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{210} & -\frac{17\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{120} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{120} & 0 & -\frac{\sqrt{14}i}{120} & -\frac{\sqrt{21}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{280} & -\frac{\sqrt{35}}{105} & 0 \\ \frac{\sqrt{14}}{120} & 0 & \frac{\sqrt{14}i}{120} & 0 & 0 & \frac{\sqrt{21}}{210} & 0 & 0 & \frac{\sqrt{210}}{120} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & \frac{\sqrt{35}}{105} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{20} & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & \frac{\sqrt{105}i}{42} & 0 \end{bmatrix}$
744	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 2)$	$\frac{\sqrt{14}}{840} 0 0 0 0 -\frac{\sqrt{21}}{84} 0 0 0 -\frac{\sqrt{210}}{840} 0 0 0 0 -\frac{\sqrt{35}}{60}$	
	$0 -\frac{\sqrt{14}}{840} 0 0 -\frac{\sqrt{21}}{84} 0 0 0 0 \frac{\sqrt{210}}{840} 0 0 0 -\frac{\sqrt{35}}{60} 0$	
	$0 0 \frac{\sqrt{14}}{840} 0 0 0 0 -\frac{\sqrt{21}}{84} 0 0 0 -\frac{\sqrt{210}}{840} 0 0 0 \frac{\sqrt{35}i}{60}$	
	$0 0 0 -\frac{\sqrt{14}}{840} 0 0 -\frac{\sqrt{21}}{84} 0 0 0 0 \frac{\sqrt{210}}{840} -\frac{\sqrt{35}i}{60} 0$	
	$0 \frac{\sqrt{14}}{120} 0 -\frac{\sqrt{14}i}{120} -\frac{\sqrt{21}}{210} 0 0 0 0 \frac{\sqrt{210}}{280} 0 \frac{\sqrt{210}i}{120} \frac{\sqrt{35}}{105} 0$	
	$\frac{\sqrt{14}}{120} 0 \frac{\sqrt{14}i}{120} 0 0 \frac{\sqrt{21}}{210} 0 0 0 \frac{\sqrt{210}}{280} 0 -\frac{\sqrt{210}i}{120} 0 0 -\frac{\sqrt{35}}{105}$	
	$0 \frac{\sqrt{14}i}{120} 0 \frac{\sqrt{14}}{120} 0 0 -\frac{\sqrt{21}}{210} 0 0 \frac{\sqrt{210}i}{120} 0 \frac{17\sqrt{210}}{840} 0 0 0$	
	$-\frac{\sqrt{14}i}{120} 0 \frac{\sqrt{14}}{120} 0 0 0 0 \frac{\sqrt{21}}{210} -\frac{\sqrt{210}i}{120} 0 \frac{17\sqrt{210}}{840} 0 0 0 0$	
	$0 0 0 0 0 -\frac{\sqrt{7}}{20} 0 \frac{\sqrt{7}i}{20} \frac{\sqrt{70}}{140} 0 0 0 0 0 -\frac{\sqrt{105}}{42}$	
	$0 0 0 0 -\frac{\sqrt{7}}{20} 0 -\frac{\sqrt{7}i}{20} 0 0 -\frac{\sqrt{70}}{140} 0 0 0 -\frac{\sqrt{105}}{42} 0$	
745	symmetry	$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 3)$	$0 \frac{\sqrt{6}}{24} 0 -\frac{\sqrt{6}i}{24} -\frac{1}{5} 0 0 0 0 \frac{\sqrt{10}}{40} 0 \frac{\sqrt{10}i}{40} 0 0$	
	$\frac{\sqrt{6}}{24} 0 \frac{\sqrt{6}i}{24} 0 0 \frac{1}{5} 0 0 0 \frac{\sqrt{10}}{40} 0 -\frac{\sqrt{10}i}{40} 0 0 0$	
	$0 -\frac{\sqrt{6}i}{24} 0 -\frac{\sqrt{6}}{24} 0 0 0 \frac{1}{5} 0 0 \frac{\sqrt{10}i}{40} 0 -\frac{\sqrt{10}}{40} 0 0$	
	$\frac{\sqrt{6}i}{24} 0 -\frac{\sqrt{6}}{24} 0 0 0 0 -\frac{1}{5} -\frac{\sqrt{10}i}{40} 0 -\frac{\sqrt{10}}{40} 0 0 0$	
	$-\frac{\sqrt{6}}{15} 0 0 0 0 0 \frac{1}{10} 0 \frac{i}{10} 0 0 0 0 0 0$	
	$0 \frac{\sqrt{6}}{15} 0 0 \frac{1}{10} 0 -\frac{i}{10} 0 0 0 0 0 0 0 0$	
	$0 0 \frac{\sqrt{6}}{15} 0 0 \frac{i}{10} 0 -\frac{1}{10} 0 0 0 0 0 0 0 0$	
	$0 0 0 -\frac{\sqrt{6}}{15} -\frac{i}{10} 0 -\frac{1}{10} 0 0 0 0 0 0 0 0 0$	
	$0 \frac{\sqrt{2}}{20} 0 \frac{\sqrt{2}i}{20} 0 0 0 0 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{2}}{20} 0 -\frac{\sqrt{2}i}{20} 0 0 0 0 0 0 0 0 0 0 0 0 0$	
746	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 3)$	0	$\frac{\sqrt{6}i}{24} \quad 0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad -\frac{1}{5} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{6}i}{24}$	$0 \quad \frac{\sqrt{6}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{5} \quad \frac{\sqrt{10}i}{40} \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{6}}{24} \quad 0 \quad -\frac{\sqrt{6}i}{24} \quad -\frac{1}{5} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad \frac{\sqrt{10}i}{40} \quad 0 \quad 0$
	$\frac{\sqrt{6}}{24}$	$0 \quad \frac{\sqrt{6}i}{24} \quad 0 \quad 0 \quad \frac{1}{5} \quad 0 \quad 0 \quad \frac{\sqrt{10}}{40} \quad 0 \quad -\frac{\sqrt{10}i}{40} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{6}}{15} \quad 0 \quad 0 \quad -\frac{i}{10} \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{6}}{15} \quad \frac{i}{10} \quad 0 \quad \frac{1}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{15}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad \frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{6}}{15} \quad 0 \quad 0 \quad \frac{1}{10} \quad 0 \quad -\frac{i}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{2}i}{20} \quad 0 \quad \frac{\sqrt{2}}{20} \quad 0 \quad 0$
	$\frac{\sqrt{2}i}{20}$	$0 \quad \frac{\sqrt{2}}{20} \quad 0 \quad 0$
747	symmetry	$-\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
$\mathbb{T}_{5,1}^{(1,0;a)}(E_u, 4)$	0	$-\frac{\sqrt{2}}{120} \quad 0 \quad -\frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad \frac{\sqrt{5}}{30} \quad 0$
	$-\frac{\sqrt{2}}{120}$	$0 \quad \frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{120} \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{30}$
	0	$\frac{\sqrt{2}i}{120} \quad 0 \quad -\frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{2}i}{120}$	$0 \quad -\frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{30} \quad 0 \quad \frac{\sqrt{3}i}{10} \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{15}$
	0	$\frac{\sqrt{2}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{3}}{30} \quad 0 \quad -\frac{\sqrt{3}i}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{5}}{15}$
	0	$0 \quad 0 \quad -\frac{\sqrt{2}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{15}$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{2}}{60} \quad -\frac{\sqrt{3}i}{30} \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad \frac{\sqrt{5}i}{15} \quad 0$
	0	$0 \quad -\frac{\sqrt{6}}{30} \quad 0 \quad \frac{\sqrt{6}i}{30} \quad \frac{1}{10} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad 0$
	$-\frac{\sqrt{6}}{30}$	$0 \quad -\frac{\sqrt{6}i}{30} \quad 0 \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}}{20} \quad 0 \quad \frac{\sqrt{10}i}{20} \quad 0 \quad 0 \quad 0$
748	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{5,2}^{(1,0;a)}(E_u, 4)$	0	$-\frac{\sqrt{2}i}{120} \quad 0 \quad \frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0$
	$\frac{\sqrt{2}i}{120}$	$0 \quad \frac{\sqrt{2}}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}i}{40} \quad 0 \quad \frac{\sqrt{30}}{40} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{2}}{120} \quad 0 \quad -\frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad -\frac{\sqrt{30}i}{120} \quad -\frac{\sqrt{5}}{30} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{120}$	$0 \quad \frac{\sqrt{2}i}{120} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{120} \quad 0 \quad \frac{\sqrt{30}i}{120} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{30}$
	0	$0 \quad \frac{\sqrt{2}}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}i}{10} \quad 0 \quad \frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad -\frac{\sqrt{5}i}{15}$
	0	$0 \quad 0 \quad -\frac{\sqrt{2}}{60} \quad -\frac{\sqrt{3}i}{10} \quad 0 \quad \frac{\sqrt{3}}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad \frac{\sqrt{5}i}{15} \quad 0 \quad 0$
	$-\frac{\sqrt{2}}{60}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad -\frac{\sqrt{3}i}{30} \quad -\frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{15}$
	0	$\frac{\sqrt{2}}{60} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{10} \quad 0 \quad \frac{\sqrt{3}i}{30} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{60} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{5}}{15} \quad 0$
	0	$\frac{\sqrt{6}i}{30} \quad 0 \quad \frac{\sqrt{6}}{30} \quad 0 \quad 0 \quad -\frac{1}{10} \quad 0 \quad 0 \quad -\frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{6}i}{30}$	$0 \quad \frac{\sqrt{6}}{30} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{10} \quad \frac{\sqrt{10}i}{20} \quad 0 \quad \frac{\sqrt{10}}{20} \quad 0 \quad 0 \quad 0 \quad 0$
749	symmetry	z
$\mathbb{T}_1^{(1,1;a)}(A_{2u})$	0	$\frac{\sqrt{42}i}{56} \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad 0$
	$-\frac{\sqrt{42}i}{56}$	$0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{42}}{56} \quad 0 \quad \frac{\sqrt{42}i}{56} \quad -\frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{280} \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{42}}{56}$	$0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{7}}{14} \quad 0 \quad 0 \quad \frac{3\sqrt{70}}{280} \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{70}$
	0	$0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad -\frac{\sqrt{105}i}{70} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{70}}{70} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{70}$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{70} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{70}$
	0	$0 \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0 \quad 0$
750	symmetry	x

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{1,1}^{(1,1;a)}(E_u)$	0 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$	
	0 0 0 $-\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}}{28}$ 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{105}i}{140}$ 0	
	$-\frac{\sqrt{42}}{56}$ 0 0 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 0 0 $-\frac{\sqrt{105}}{140}$	
	0 $\frac{\sqrt{42}}{56}$ 0 0 $\frac{\sqrt{7}}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}}{140}$ 0	
	0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0	
	$\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}i}{280}$ 0 $\frac{\sqrt{70}}{280}$ 0 0 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{3\sqrt{70}i}{280}$ $\frac{\sqrt{105}}{70}$ 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{3\sqrt{70}i}{280}$ 0 0 $-\frac{\sqrt{105}}{70}$	
	0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $\frac{\sqrt{210}}{140}$ 0 0	
$\mathbb{T}_{1,2}^{(1,1;a)}(E_u)$	751 symmetry	y
	$-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{7}i}{28}$ $-\frac{3\sqrt{70}}{280}$ 0 0 0 0 $\frac{\sqrt{105}}{140}$	
	0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $\frac{3\sqrt{70}}{280}$ 0 0 $\frac{\sqrt{105}}{140}$ 0	
	0 0 $-\frac{\sqrt{42}}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}i}{140}$	
	0 0 0 $\frac{\sqrt{42}}{56}$ $\frac{\sqrt{7}i}{28}$ 0 0 0 0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{105}i}{140}$ 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $\frac{\sqrt{70}i}{56}$ $-\frac{\sqrt{105}}{70}$ 0	
	$\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{3\sqrt{70}}{280}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 $\frac{\sqrt{105}}{70}$	
	0 $\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0	
	$-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{280}$ 0 $\frac{3\sqrt{70}}{280}$ 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $-\frac{\sqrt{21}i}{28}$ $\frac{\sqrt{210}}{140}$ 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 $\frac{\sqrt{21}i}{28}$ 0 0 $-\frac{\sqrt{210}}{140}$ 0 0 0 0	
752	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{1u})$	0 0 0 0 0 $\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ 0 0 0 $\frac{\sqrt{7}}{24}$ 0 0 $\frac{\sqrt{42}i}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ 0 0 0 0 $-\frac{\sqrt{7}}{24}$ $-\frac{\sqrt{42}i}{168}$ 0	
	0 0 0 0 0 $\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ $\frac{\sqrt{7}}{24}$ 0 0 0 0 $-\frac{\sqrt{42}}{168}$	
	0 0 0 0 $\frac{\sqrt{70}}{60}$ 0 $\frac{\sqrt{70}i}{60}$ 0 0 0 $-\frac{\sqrt{7}}{24}$ 0 0 $-\frac{\sqrt{42}}{168}$ 0	
	0 $-\frac{5\sqrt{105}i}{336}$ 0 $-\frac{31\sqrt{105}}{1680}$ 0 0 $-\frac{\sqrt{70}}{240}$ 0 0 $\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0	
	$\frac{5\sqrt{105}i}{336}$ 0 $-\frac{31\sqrt{105}}{1680}$ 0 0 0 $\frac{\sqrt{70}}{240}$ $-\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0 0	
	0 $-\frac{5\sqrt{105}}{336}$ 0 $\frac{31\sqrt{105}i}{1680}$ $-\frac{\sqrt{70}}{240}$ 0 0 0 0 $-\frac{\sqrt{7}}{336}$ 0 $-\frac{\sqrt{7}i}{336}$ 0 0	
	$-\frac{5\sqrt{105}}{336}$ 0 $-\frac{31\sqrt{105}i}{1680}$ 0 0 $\frac{\sqrt{70}}{240}$ 0 0 $-\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0 0	
	0 0 $-\frac{\sqrt{35}}{40}$ 0 0 $-\frac{\sqrt{210}i}{420}$ 0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{35}}{40}$ $\frac{\sqrt{210}i}{420}$ 0 $\frac{\sqrt{210}}{420}$ 0 0 0 0 0 0 0 0	
753	symmetry	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 1)$	0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 $-\frac{\sqrt{7}}{21}$ 0 0 $-\frac{\sqrt{70}i}{84}$ 0 $\frac{\sqrt{70}}{84}$ 0 0	
	$\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 $\frac{\sqrt{7}}{21}$ $\frac{\sqrt{70}i}{84}$ 0 $\frac{\sqrt{70}}{84}$ 0 0 0	
	0 $\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ $\frac{\sqrt{7}}{21}$ 0 0 0 0 $-\frac{\sqrt{70}}{84}$ 0 $-\frac{\sqrt{70}i}{84}$ 0 0	
	$\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 $-\frac{\sqrt{7}}{21}$ 0 0 $-\frac{\sqrt{70}}{84}$ 0 $\frac{\sqrt{70}i}{84}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{7}i}{24}$ 0 $\frac{\sqrt{7}}{24}$ 0 0 $\frac{\sqrt{70}}{42}$ 0 0 $\frac{\sqrt{105}i}{84}$	
	0 0 0 0 $-\frac{\sqrt{7}i}{24}$ 0 $\frac{\sqrt{7}}{24}$ 0 0 0 0 $-\frac{\sqrt{70}}{42}$ $-\frac{\sqrt{105}i}{84}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{7}}{24}$ 0 $\frac{\sqrt{7}i}{24}$ $-\frac{\sqrt{70}}{42}$ 0 0 0 0 $\frac{\sqrt{105}}{84}$	
	0 0 0 0 $-\frac{\sqrt{7}}{24}$ 0 $-\frac{\sqrt{7}i}{24}$ 0 0 $\frac{\sqrt{70}}{42}$ 0 0 $\frac{\sqrt{105}}{84}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
754	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_3^{(1,1;a)}(A_{2u}, 2)$	0 0 0 0 0 $-\frac{\sqrt{70}}{60}$ 0 $\frac{\sqrt{70}i}{60}$ $-\frac{\sqrt{7}}{24}$ 0 0 0 0 $\frac{\sqrt{42}}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}}{60}$ 0 $-\frac{\sqrt{70}i}{60}$ 0 0 0 $\frac{\sqrt{7}}{24}$ 0 0 $\frac{\sqrt{42}}{168}$ 0	
	0 0 0 0 0 $\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ 0 0 0 $\frac{\sqrt{7}}{24}$ 0 0 $\frac{\sqrt{42}i}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}i}{60}$ 0 $\frac{\sqrt{70}}{60}$ 0 0 0 0 $-\frac{\sqrt{7}}{24}$ $-\frac{\sqrt{42}i}{168}$ 0	
	0 $\frac{31\sqrt{105}}{1680}$ 0 $-\frac{5\sqrt{105}i}{336}$ $\frac{\sqrt{70}}{240}$ 0 0 0 0 $\frac{\sqrt{7}}{336}$ 0 $\frac{\sqrt{7}i}{336}$ 0 0	
	$\frac{31\sqrt{105}}{1680}$ 0 $\frac{5\sqrt{105}i}{336}$ 0 0 $-\frac{\sqrt{70}}{240}$ 0 0 $\frac{\sqrt{7}}{336}$ 0 $-\frac{\sqrt{7}i}{336}$ 0 0 0	
	0 $-\frac{31\sqrt{105}i}{1680}$ 0 $-\frac{5\sqrt{105}}{336}$ 0 0 $-\frac{\sqrt{70}}{240}$ 0 0 $\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0 0	
	$\frac{31\sqrt{105}i}{1680}$ 0 $-\frac{5\sqrt{105}}{336}$ 0 0 0 0 $\frac{\sqrt{70}}{240}$ $-\frac{\sqrt{7}i}{336}$ 0 $-\frac{\sqrt{7}}{336}$ 0 0 0	
	$\frac{\sqrt{35}}{40}$ 0 0 0 0 $-\frac{\sqrt{210}}{420}$ 0 $-\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{35}}{40}$ 0 0 $-\frac{\sqrt{210}}{420}$ 0 $\frac{\sqrt{210}i}{420}$ 0 0 0 0 0 0 0	
755	symmetry	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
$\mathbb{T}_{3,1}^{(1,1;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{7}}{56}$ 0 0 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 $\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{70}i}{56}$	
	0 0 0 $\frac{\sqrt{7}}{56}$ 0 0 $\frac{\sqrt{42}}{84}$ 0 0 0 0 $-\frac{\sqrt{105}}{84}$ $-\frac{\sqrt{70}i}{56}$ 0	
	$\frac{\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 $-\frac{\sqrt{105}}{84}$ 0 0 0 0 $\frac{\sqrt{70}}{56}$	
	0 $-\frac{\sqrt{7}}{56}$ 0 0 $-\frac{\sqrt{42}}{84}$ 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 0 0 $\frac{\sqrt{70}}{56}$ 0	
	0 $\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{112}$ 0 0 $\frac{\sqrt{42}}{48}$ 0 0 $\frac{\sqrt{105}i}{336}$ 0 $-\frac{\sqrt{105}}{112}$ 0 0 0	
	$-\frac{3\sqrt{7}i}{112}$ 0 $\frac{3\sqrt{7}}{112}$ 0 0 0 0 $-\frac{\sqrt{42}}{48}$ $-\frac{\sqrt{105}i}{336}$ 0 $-\frac{\sqrt{105}}{112}$ 0 0 0	
	0 $-\frac{3\sqrt{7}}{112}$ 0 $\frac{3\sqrt{7}i}{112}$ $-\frac{\sqrt{42}}{48}$ 0 0 0 0 $\frac{5\sqrt{105}}{336}$ 0 $-\frac{\sqrt{105}i}{336}$ $\frac{\sqrt{70}}{56}$ 0	
	$-\frac{3\sqrt{7}}{112}$ 0 $-\frac{3\sqrt{7}i}{112}$ 0 0 $\frac{\sqrt{42}}{48}$ 0 0 $\frac{5\sqrt{105}}{336}$ 0 $\frac{\sqrt{105}i}{336}$ 0 0 $-\frac{\sqrt{70}}{56}$	
	0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{\sqrt{35}}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{35}}{56}$ 0 0	
756	symmetry	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 1)$	$\frac{\sqrt{7}}{56}$	0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{84}$ $\frac{\sqrt{105}}{84}$ 0 0 0 0 $-\frac{\sqrt{70}}{56}$
	0	$-\frac{\sqrt{7}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 $-\frac{\sqrt{105}}{84}$ 0 0 $-\frac{\sqrt{70}}{56}$ 0
	0	0 $\frac{\sqrt{7}}{56}$ 0 0 0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 0 $\frac{\sqrt{70}i}{56}$
	0	0 0 0 $-\frac{\sqrt{7}}{56}$ $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{105}}{84}$ $-\frac{\sqrt{70}i}{56}$ 0
	0	$-\frac{3\sqrt{7}}{112}$ 0 $\frac{3\sqrt{7}i}{112}$ $-\frac{\sqrt{42}}{48}$ 0 0 0 0 $-\frac{\sqrt{105}}{336}$ 0 $\frac{5\sqrt{105}i}{336}$ $-\frac{\sqrt{70}}{56}$ 0
	$-\frac{3\sqrt{7}}{112}$	0 $-\frac{3\sqrt{7}i}{112}$ 0 0 $\frac{\sqrt{42}}{48}$ 0 0 $-\frac{\sqrt{105}}{336}$ 0 $-\frac{5\sqrt{105}i}{336}$ 0 0 $\frac{\sqrt{70}}{56}$
	0	$-\frac{3\sqrt{7}i}{112}$ 0 $-\frac{3\sqrt{7}}{112}$ 0 0 $-\frac{\sqrt{42}}{48}$ 0 0 $-\frac{\sqrt{105}i}{112}$ 0 $\frac{\sqrt{105}}{336}$ 0 0
	$\frac{3\sqrt{7}i}{112}$	0 $-\frac{3\sqrt{7}}{112}$ 0 0 0 0 $\frac{\sqrt{42}}{48}$ $\frac{\sqrt{105}i}{112}$ 0 $\frac{\sqrt{105}}{336}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{35}}{56}$ 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{35}}{56}$ 0 0 0
757	symmetry	$\sqrt{15}xyz$
$\mathbb{T}_{3,1}^{(1,1;a)}(E_u, 2)$	0	$-\frac{\sqrt{70}}{560}$ 0 $-\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 $-\frac{3\sqrt{42}}{112}$ 0 $\frac{3\sqrt{42}i}{112}$ $-\frac{\sqrt{7}}{14}$ 0
	$-\frac{\sqrt{70}}{560}$	0 $\frac{\sqrt{70}i}{560}$ 0 0 0 0 0 0 $-\frac{3\sqrt{42}}{112}$ 0 $-\frac{3\sqrt{42}i}{112}$ 0 0 $\frac{\sqrt{7}}{14}$
	0	$\frac{\sqrt{70}i}{560}$ 0 $-\frac{\sqrt{70}}{560}$ 0 0 0 0 0 $\frac{5\sqrt{42}i}{336}$ 0 $\frac{5\sqrt{42}}{336}$ 0 0
	$-\frac{\sqrt{70}i}{560}$	0 $-\frac{\sqrt{70}}{560}$ 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{336}$ 0 $\frac{5\sqrt{42}}{336}$ 0 0 0
	$-\frac{3\sqrt{70}}{280}$	0 0 0 0 0 $\frac{\sqrt{105}}{120}$ 0 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 $\frac{\sqrt{7}}{56}$
	0	$\frac{3\sqrt{70}}{280}$ 0 0 $\frac{\sqrt{105}}{120}$ 0 0 0 0 $\frac{\sqrt{42}}{168}$ 0 0 0 $\frac{\sqrt{7}}{56}$
	0	0 0 $-\frac{3\sqrt{70}}{280}$ 0 0 $-\frac{\sqrt{105}i}{120}$ 0 0 0 0 $\frac{\sqrt{42}}{168}$ 0 0 $\frac{\sqrt{7}i}{56}$
	0	0 0 0 $\frac{3\sqrt{70}}{280}$ $\frac{\sqrt{105}i}{120}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{168}$ $-\frac{\sqrt{7}i}{56}$ 0
	0	$\frac{\sqrt{210}}{80}$ 0 $\frac{\sqrt{210}i}{80}$ 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 0 $-\frac{\sqrt{14}}{112}$ 0 $-\frac{\sqrt{14}i}{112}$ 0 0
	$\frac{\sqrt{210}}{80}$	0 $\frac{\sqrt{210}i}{80}$ 0 0 0 $-\frac{\sqrt{35}}{35}$ 0 0 $-\frac{\sqrt{14}}{112}$ 0 $\frac{\sqrt{14}i}{112}$ 0 0 0
758	symmetry	$\sqrt{15}z(x-y)(x+y)$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{T}_{3,2}^{(1,1;a)}(E_u, 2)$	0	$-\frac{\sqrt{70}i}{560} \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0$
	$\frac{\sqrt{70}i}{560}$	$0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{112} \quad 0 \quad -\frac{3\sqrt{42}i}{112} \quad \frac{\sqrt{7}}{14} \quad 0$
	$-\frac{\sqrt{70}}{560}$	$0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{112} \quad 0 \quad \frac{3\sqrt{42}i}{112} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14} \quad 0$
	0	$0 \quad \frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{120} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad -\frac{\sqrt{7}i}{56} \quad 0 \quad 0$
	$-\frac{3\sqrt{70}}{280}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{120} \quad \frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56}$
	0	$\frac{3\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56} \quad 0$
	0	$-\frac{\sqrt{210}i}{80} \quad 0 \quad -\frac{\sqrt{210}}{80} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{35} \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{80}$	$0 \quad -\frac{\sqrt{210}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{35} \quad \frac{\sqrt{14}i}{112} \quad 0 \quad \frac{\sqrt{14}}{112} \quad 0 \quad 0 \quad 0$
759	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(a)}(A_{1u})$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{28} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{28} \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{7}i}{14} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
760	symmetry	$\sqrt{3}yz$

continued ...

Table 9

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

continued ..

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
763	symmetry	$-\sqrt{3}xy$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
765	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
766	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_{2u})$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
767	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
	$\mathbb{M}_{4,1}^{(a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
768	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 1)$	0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0	
	$\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{105}i}{140}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{70}i}{40}$ 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 $-\frac{\sqrt{70}i}{40}$ 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 $\frac{\sqrt{42}i}{28}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0	
769	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{4,1}^{(a)}(E_u, 2)$	0 0 0 0 0 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 $-\frac{\sqrt{5}i}{10}$ 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 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{30}i}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
770	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(a)}(E_u, 3)$		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
773	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
$\mathbb{M}_2^{(1,-1;a)}(A_{1u})$		$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{42}i}{84} & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{2\sqrt{105}}{105} & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & 0 & -\frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}}{105} & \frac{\sqrt{70}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{210}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} \end{bmatrix}$
774	symmetry	$\sqrt{3}yz$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)$	0	$\frac{\sqrt{21}}{28}, 0, \frac{\sqrt{21}i}{28}, 0, 0, 0, 0, 0, -\frac{\sqrt{35}}{140}, 0, \frac{\sqrt{35}i}{140}, 0, 0$
	$\frac{\sqrt{21}}{28}$	$0, -\frac{\sqrt{21}i}{28}, 0, 0, 0, 0, 0, -\frac{\sqrt{35}}{140}, 0, -\frac{\sqrt{35}i}{140}, 0, 0, 0$
	0	$-\frac{\sqrt{21}i}{28}, 0, \frac{\sqrt{21}}{28}, 0, 0, 0, 0, 0, -\frac{\sqrt{35}i}{140}, 0, -\frac{\sqrt{35}}{140}, 0, 0$
	$\frac{\sqrt{21}i}{28}$	$0, \frac{\sqrt{21}}{28}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{35}i}{140}, 0, -\frac{\sqrt{35}}{140}, 0, 0$
	0	$0, 0, 0, 0, 0, \frac{\sqrt{14}}{28}, 0, \frac{\sqrt{14}i}{28}, 0, 0, 0, 0, -\frac{\sqrt{210}}{140}$
	0	$0, 0, 0, 0, \frac{\sqrt{14}}{28}, 0, -\frac{\sqrt{14}i}{28}, 0, 0, 0, 0, -\frac{\sqrt{210}}{140}, 0$
	0	$0, 0, 0, 0, 0, -\frac{\sqrt{14}i}{28}, 0, \frac{\sqrt{14}}{28}, 0, 0, 0, 0, -\frac{\sqrt{210}i}{140}$
	0	$0, 0, 0, 0, \frac{\sqrt{14}i}{28}, 0, \frac{\sqrt{14}}{28}, 0, 0, 0, 0, \frac{\sqrt{210}i}{140}, 0$
	0	$0, 0, 0, 0, 0, 0, 0, 0, \frac{\sqrt{105}}{70}, 0, \frac{\sqrt{105}i}{70}, 0, 0$
	0	$0, 0, 0, 0, 0, 0, 0, 0, -\frac{\sqrt{105}i}{70}, 0, -\frac{\sqrt{105}}{70}, 0, 0$
$\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)$	777	symmetry
		$-\sqrt{3}xy$
	0	$\frac{\sqrt{21}i}{28}, 0, -\frac{\sqrt{21}}{28}, 0, 0, 0, 0, 0, -\frac{\sqrt{35}i}{140}, 0, -\frac{\sqrt{35}}{140}, 0, 0$
	$-\frac{\sqrt{21}i}{28}$	$0, -\frac{\sqrt{21}}{28}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{35}i}{140}, 0, -\frac{\sqrt{35}}{140}, 0, 0$
	0	$\frac{\sqrt{21}}{28}, 0, \frac{\sqrt{21}i}{28}, 0, 0, 0, 0, 0, \frac{\sqrt{35}}{140}, 0, -\frac{\sqrt{35}i}{140}, 0, 0$
	$\frac{\sqrt{21}}{28}$	$0, -\frac{\sqrt{21}i}{28}, 0, 0, 0, 0, 0, 0, \frac{\sqrt{35}}{140}, 0, \frac{\sqrt{35}i}{140}, 0, 0$
	0	$0, 0, 0, 0, 0, \frac{\sqrt{14}i}{28}, 0, -\frac{\sqrt{14}}{28}, 0, 0, 0, 0, -\frac{\sqrt{210}i}{140}$
	0	$0, 0, 0, 0, 0, -\frac{\sqrt{14}i}{28}, 0, -\frac{\sqrt{14}}{28}, 0, 0, 0, 0, \frac{\sqrt{210}i}{140}$
	0	$0, 0, 0, 0, 0, 0, \frac{\sqrt{14}}{28}, 0, \frac{\sqrt{14}i}{28}, 0, 0, 0, 0, \frac{\sqrt{210}}{140}$
	0	$0, 0, 0, 0, 0, \frac{\sqrt{14}}{28}, 0, -\frac{\sqrt{14}i}{28}, 0, 0, 0, 0, \frac{\sqrt{210}}{140}, 0$
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	$\frac{\sqrt{14}}{56} \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad 0$
	$\frac{\sqrt{14}}{56}$	$0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{14}i}{56} \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{21} \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{140} \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0$
	$-\frac{\sqrt{14}i}{56}$	$0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{21} \quad -\frac{\sqrt{210}i}{140} \quad 0 \quad -\frac{\sqrt{210}}{140} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{56} \quad 0 \quad \frac{\sqrt{21}i}{56} \quad \frac{\sqrt{210}}{210} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{56} \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{210} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{140} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{56} \quad 0 \quad -\frac{\sqrt{21}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{210} \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{140}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{56} \quad 0 \quad -\frac{\sqrt{21}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{210} \quad -\frac{\sqrt{35}i}{140} \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad \frac{3\sqrt{70}i}{280} \quad \frac{2\sqrt{105}}{105} \quad 0$
	0	$0 \quad 0 \quad -\frac{3\sqrt{70}}{280} \quad 0 \quad -\frac{3\sqrt{70}i}{280} \quad 0 \quad 0 \quad -\frac{2\sqrt{105}}{105}$
779	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{M}_4^{(1,-1;a)}(A_{1u}, 2)$	0	$0 \quad 0 \quad -\frac{\sqrt{3}}{24} \quad 0 \quad 0 \quad \frac{\sqrt{2}i}{8}$
	0	$0 \quad 0 \quad \frac{\sqrt{3}}{24} \quad -\frac{\sqrt{2}i}{8} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{3}}{24} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{8}$
	0	$0 \quad 0 \quad \frac{\sqrt{3}}{24} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2}}{8} \quad 0$
	0	$0 \quad -\frac{\sqrt{5}i}{16} \quad 0 \quad \frac{\sqrt{5}}{16} \quad 0 \quad 0 \quad \frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{3}i}{16} \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{5}i}{16}$	$0 \quad \frac{\sqrt{5}}{16} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{48} \quad \frac{\sqrt{3}i}{16} \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{5}}{16} \quad 0 \quad -\frac{\sqrt{5}i}{16} \quad \frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad \frac{\sqrt{5}i}{16} \quad 0 \quad 0$
	$-\frac{\sqrt{5}}{16}$	$0 \quad \frac{\sqrt{5}i}{16} \quad 0 \quad 0 \quad -\frac{\sqrt{30}}{48} \quad 0 \quad 0 \quad \frac{\sqrt{3}}{16} \quad 0 \quad -\frac{\sqrt{3}i}{16} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{15}}{24} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad \frac{\sqrt{15}}{24} \quad 0 \quad 0$
780	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{16} & 0 & \frac{\sqrt{5}i}{16} & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{16} & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{16} & 0 & \frac{\sqrt{5}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & -\frac{\sqrt{3}i}{16} & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
781	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{35}}{56} & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & -\frac{\sqrt{14}i}{56} & 0 \\ \frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} \\ 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 \\ 0 & -\frac{\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & 0 & 0 & \frac{\sqrt{210}}{112} & 0 & 0 & -\frac{\sqrt{21}i}{48} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 \\ \frac{\sqrt{35}i}{112} & 0 & -\frac{\sqrt{35}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & \frac{\sqrt{21}i}{48} & 0 & -\frac{\sqrt{21}}{112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{112} & 0 & -\frac{\sqrt{35}i}{112} & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{112} & 0 & -\frac{\sqrt{21}i}{336} & \frac{\sqrt{14}}{56} & 0 \\ \frac{\sqrt{35}}{112} & 0 & \frac{\sqrt{35}i}{112} & 0 & 0 & \frac{\sqrt{210}}{112} & 0 & 0 & -\frac{\sqrt{21}}{112} & 0 & \frac{\sqrt{21}i}{336} & 0 & 0 & -\frac{\sqrt{14}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & \frac{\sqrt{42}i}{42} & 0 & 0 \end{bmatrix}$
782	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 1)$	$\frac{\sqrt{35}}{56}$	0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$
	0	$-\frac{\sqrt{35}}{56}$ 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ 0 0 0 $-\frac{\sqrt{14}}{56}$ 0
	0	0 $\frac{\sqrt{35}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 $-\frac{\sqrt{21}}{28}$ 0 0 0 $\frac{\sqrt{14}}{56}$
	0	0 0 0 $-\frac{\sqrt{35}}{56}$ 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 $\frac{\sqrt{21}}{28}$ $-\frac{\sqrt{14}}{56}$ 0
	0	$\frac{\sqrt{35}}{112}$ 0 $-\frac{\sqrt{35}i}{112}$ $-\frac{\sqrt{210}}{112}$ 0 0 0 0 $-\frac{\sqrt{21}}{336}$ 0 $-\frac{\sqrt{21}i}{112}$ $-\frac{\sqrt{14}}{56}$ 0
	$\frac{\sqrt{35}}{112}$	0 $\frac{\sqrt{35}i}{112}$ 0 0 $\frac{\sqrt{210}}{112}$ 0 0 $-\frac{\sqrt{21}}{336}$ 0 $\frac{\sqrt{21}i}{112}$ 0 0 $\frac{\sqrt{14}}{56}$
	0	$\frac{\sqrt{35}i}{112}$ 0 $\frac{\sqrt{35}}{112}$ 0 0 $-\frac{\sqrt{210}}{112}$ 0 0 $-\frac{\sqrt{21}i}{112}$ 0 $-\frac{\sqrt{21}}{48}$ 0 0 0
	$-\frac{\sqrt{35}i}{112}$	0 $\frac{\sqrt{35}}{112}$ 0 0 0 0 $\frac{\sqrt{210}}{112}$ $\frac{\sqrt{21}i}{112}$ 0 $-\frac{\sqrt{21}}{48}$ 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}}{56}$ 0 0 0 0 $-\frac{\sqrt{42}}{42}$
	0	0 0 0 0 0 0 0 0 $\frac{3\sqrt{7}}{56}$ 0 0 0 $-\frac{\sqrt{42}}{42}$ 0
783	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$
$\mathbb{M}_{4,1}^{(1,-1;a)}(E_u, 2)$	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{15}}{24}$ 0 $-\frac{\sqrt{15}i}{24}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{15}i}{24}$ 0 $-\frac{\sqrt{15}}{24}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{30}}{24}$	0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
784	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
785	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
		$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{48} & 0 & -\frac{\sqrt{42}i}{48} & -\frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 \\ -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{56} & 0 & 0 \\ 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{112} & 0 & \frac{3\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{112} & 0 & -\frac{3\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
786	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,-1;a)}(E_u, 3)$	0	$-\frac{\sqrt{70}i}{112} \quad 0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0$
	$\frac{\sqrt{70}i}{112}$	$0 \quad \frac{\sqrt{70}}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{42}i}{336} \quad 0 \quad \frac{5\sqrt{42}}{336} \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{70}}{112} \quad 0 \quad -\frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{48} \quad 0 \quad \frac{\sqrt{42}i}{48} \quad \frac{\sqrt{7}}{14} \quad 0$
	$-\frac{\sqrt{70}}{112}$	$0 \quad \frac{\sqrt{70}i}{112} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{48} \quad 0 \quad -\frac{\sqrt{42}i}{48} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{14}$
	0	$0 \quad -\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}i}{84} \quad 0 \quad -\frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{56}$
	0	$0 \quad 0 \quad \frac{\sqrt{70}}{56} \quad -\frac{\sqrt{105}i}{84} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad -\frac{\sqrt{7}i}{56} \quad 0$
	$\frac{\sqrt{70}}{56}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad \frac{\sqrt{105}i}{168} \quad -\frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56}$
	0	$-\frac{\sqrt{70}}{56} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{84} \quad 0 \quad -\frac{\sqrt{105}i}{168} \quad 0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{56} \quad 0$
	0	$0 \quad -\frac{\sqrt{210}i}{336} \quad 0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{14}i}{112} \quad 0 \quad -\frac{3\sqrt{14}}{112} \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{336}$	$0 \quad -\frac{\sqrt{210}}{336} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{14}i}{112} \quad 0 \quad -\frac{3\sqrt{14}}{112} \quad 0 \quad 0 \quad 0$
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	$-\frac{\sqrt{462}}{1848} \quad 0 \quad \frac{\sqrt{462}i}{1848} \quad \frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad \frac{\sqrt{770}i}{616} \quad 0 \quad 0$
	$-\frac{\sqrt{462}}{1848}$	$0 \quad -\frac{\sqrt{462}i}{1848} \quad 0 \quad 0 \quad -\frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad -\frac{\sqrt{770}i}{616} \quad 0 \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{462}i}{1848} \quad 0 \quad -\frac{\sqrt{462}}{1848} \quad 0 \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad -\frac{\sqrt{770}i}{616} \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad 0$
	$\frac{\sqrt{462}i}{1848}$	$0 \quad -\frac{\sqrt{462}}{1848} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{77}}{154} \quad \frac{\sqrt{770}i}{616} \quad 0 \quad \frac{\sqrt{770}}{616} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad -\frac{\sqrt{77}i}{154} \quad -\frac{\sqrt{770}}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{231}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad 0 \quad \frac{\sqrt{770}}{154} \quad 0 \quad 0 \quad -\frac{\sqrt{1155}}{231} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{77}i}{154} \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad -\frac{\sqrt{770}}{154} \quad 0 \quad 0 \quad \frac{\sqrt{1155}i}{231}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{77}i}{154} \quad 0 \quad \frac{\sqrt{77}}{154} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{770}}{154} \quad -\frac{\sqrt{1155}i}{231} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{2310}}{308} \quad 0 \quad \frac{\sqrt{2310}i}{308} \quad \frac{\sqrt{385}}{77} \quad 0$
	0	$0 \quad 0 \quad -\frac{\sqrt{2310}}{308} \quad 0 \quad -\frac{\sqrt{2310}i}{308} \quad 0 \quad 0 \quad -\frac{\sqrt{385}}{77}$
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
	$\mathbb{M}_6^{(1,-1;a)}(A_{1u}, 2)$	$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
789	symmetry	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & -\frac{\sqrt{330}}{440} & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & -\frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{440} & 0 & -\frac{\sqrt{330}}{440} & 0 & 0 & 0 & -\frac{\sqrt{33}}{44} & \frac{\sqrt{22}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & \frac{\sqrt{330}i}{440} & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & -\frac{\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}}{110} & 0 & 0 & -\frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{110} & \frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{55}i}{110} & \frac{\sqrt{330}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}i}{110} & 0 & 0 & -\frac{\sqrt{330}}{110} & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & -\frac{3\sqrt{110}i}{220} & 0 & \frac{3\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & \frac{3\sqrt{110}i}{220} & 0 & \frac{3\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
790	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
		$\begin{bmatrix} 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
791	$\mathbb{M}_6^{(1,-1;a)}(A_{2u}, 1)$	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & \frac{\sqrt{330}i}{440} & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{440} & 0 & -\frac{\sqrt{330}i}{440} & 0 & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{440} & 0 & \frac{\sqrt{330}}{440} & 0 & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{440} & 0 & \frac{\sqrt{330}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & -\frac{\sqrt{22}i}{44} & 0 \\ 0 & -\frac{\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 \\ -\frac{\sqrt{55}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{110} & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{55}i}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{110} & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 \\ -\frac{\sqrt{55}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{110} & -\frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & 0 \\ \frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{220} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}}{110} & 0 & 0 & \frac{3\sqrt{110}}{220} & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
792	$\mathbb{M}_6^{(1,-1;a)}(A_{2u}, 2)$	$\frac{3\sqrt{154}yz(5x^4-10x^2y^2+y^4)}{16}$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 2)$	$0 \quad 0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{55}i}{132}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{264} \quad \frac{\sqrt{33}i}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{264} \quad \frac{\sqrt{55}i}{132} \quad 0$	
	$-\frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}i}{132} \quad -\frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{132}$	
	$0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}i}{132} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{132} \quad 0$	
	$0 \quad \frac{\sqrt{22}i}{264} \quad 0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{264} \quad 0 \quad -\frac{\sqrt{330}}{264} \quad 0 \quad 0$	
	$-\frac{\sqrt{22}i}{264} \quad 0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad -\frac{\sqrt{330}i}{264} \quad 0 \quad -\frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{22}}{264} \quad 0 \quad \frac{\sqrt{22}i}{264} \quad \frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{264} \quad 0 \quad \frac{\sqrt{330}i}{88} \quad \frac{\sqrt{55}}{33} \quad 0$	
	$-\frac{\sqrt{22}}{264} \quad 0 \quad -\frac{\sqrt{22}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{264} \quad 0 \quad -\frac{\sqrt{330}i}{88} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{33}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{11}i}{44} \quad 0 \quad -\frac{\sqrt{11}}{44} \quad 0 \quad 0 \quad \frac{\sqrt{110}}{44} \quad 0 \quad 0 \quad -\frac{\sqrt{165}i}{66}$	
	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{44} \quad 0 \quad -\frac{\sqrt{11}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{44} \quad \frac{\sqrt{165}i}{66} \quad 0$	
795	symmetry	$-\frac{\sqrt{21}xz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$
$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 2)$	$-\frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{132}$	
	$0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{132} \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{55}i}{132}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{132} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{264} \quad \frac{\sqrt{55}i}{132} \quad 0$	
	$0 \quad -\frac{\sqrt{22}}{264} \quad 0 \quad \frac{\sqrt{22}i}{264} \quad \frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}}{88} \quad 0 \quad -\frac{\sqrt{330}i}{264} \quad -\frac{\sqrt{55}}{33} \quad 0$	
	$-\frac{\sqrt{22}}{264} \quad 0 \quad -\frac{\sqrt{22}i}{264} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{88} \quad 0 \quad \frac{\sqrt{330}i}{264} \quad 0 \quad 0 \quad \frac{\sqrt{55}}{33}$	
	$0 \quad -\frac{\sqrt{22}i}{264} \quad 0 \quad -\frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{264} \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0$	
	$\frac{\sqrt{22}i}{264} \quad 0 \quad -\frac{\sqrt{22}}{264} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad \frac{\sqrt{330}i}{264} \quad 0 \quad \frac{\sqrt{330}}{264} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{44} \quad 0 \quad -\frac{\sqrt{11}i}{44} \quad -\frac{\sqrt{11}}{44} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{66}$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{44} \quad 0 \quad \frac{\sqrt{11}i}{44} \quad 0 \quad 0 \quad \frac{\sqrt{110}}{44} \quad 0 \quad 0 \quad -\frac{\sqrt{165}}{66} \quad 0$	
796	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 3)$	$0 - \frac{\sqrt{66}}{264} 0 \frac{\sqrt{66}i}{264} \frac{\sqrt{11}}{22} 0 0 0 0 \frac{\sqrt{110}}{88} 0 \frac{\sqrt{110}i}{88} 0 0$	
	$-\frac{\sqrt{66}}{264} 0 -\frac{\sqrt{66}i}{264} 0 0 -\frac{\sqrt{11}}{22} 0 0 \frac{\sqrt{110}}{88} 0 -\frac{\sqrt{110}i}{88} 0 0 0$	
	$0 \frac{\sqrt{66}i}{264} 0 \frac{\sqrt{66}}{264} 0 0 -\frac{\sqrt{11}}{22} 0 0 \frac{\sqrt{110}i}{88} 0 -\frac{\sqrt{110}}{88} 0 0$	
	$-\frac{\sqrt{66}i}{264} 0 \frac{\sqrt{66}}{264} 0 0 0 0 \frac{\sqrt{11}}{22} -\frac{\sqrt{110}i}{88} 0 -\frac{\sqrt{110}}{88} 0 0 0$	
	$\frac{\sqrt{66}}{66} 0 0 0 0 \frac{\sqrt{11}}{22} 0 \frac{\sqrt{11}i}{22} 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{66}}{66} 0 0 \frac{\sqrt{11}}{22} 0 -\frac{\sqrt{11}i}{22} 0 0 0 0 0 0 0$	
	$0 0 -\frac{\sqrt{66}}{66} 0 0 \frac{\sqrt{11}i}{22} 0 -\frac{\sqrt{11}}{22} 0 0 0 0 0 0$	
	$0 0 0 \frac{\sqrt{66}}{66} -\frac{\sqrt{11}i}{22} 0 -\frac{\sqrt{11}}{22} 0 0 0 0 0 0 0$	
	$0 \frac{\sqrt{22}}{44} 0 \frac{\sqrt{22}i}{44} 0 0 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{22}}{44} 0 -\frac{\sqrt{22}i}{44} 0 0 0 0 0 0 0 0 0 0 0$	
797	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$
$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 3)$	$0 -\frac{\sqrt{66}i}{264} 0 -\frac{\sqrt{66}}{264} 0 0 \frac{\sqrt{11}}{22} 0 0 -\frac{\sqrt{110}i}{88} 0 \frac{\sqrt{110}}{88} 0 0$	
	$\frac{\sqrt{66}i}{264} 0 -\frac{\sqrt{66}}{264} 0 0 0 0 -\frac{\sqrt{11}}{22} \frac{\sqrt{110}i}{88} 0 \frac{\sqrt{110}}{88} 0 0 0$	
	$0 -\frac{\sqrt{66}}{264} 0 \frac{\sqrt{66}i}{264} \frac{\sqrt{11}}{22} 0 0 0 0 \frac{\sqrt{110}}{88} 0 \frac{\sqrt{110}i}{88} 0 0$	
	$-\frac{\sqrt{66}}{264} 0 -\frac{\sqrt{66}i}{264} 0 0 -\frac{\sqrt{11}}{22} 0 0 0 \frac{\sqrt{110}}{88} 0 -\frac{\sqrt{110}i}{88} 0 0 0$	
	$0 0 \frac{\sqrt{66}}{66} 0 0 -\frac{\sqrt{11}i}{22} 0 \frac{\sqrt{11}}{22} 0 0 0 0 0 0$	
	$0 0 0 -\frac{\sqrt{66}}{66} \frac{\sqrt{11}i}{22} 0 \frac{\sqrt{11}}{22} 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{66}}{66} 0 0 0 0 \frac{\sqrt{11}}{22} 0 \frac{\sqrt{11}i}{22} 0 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{66}}{66} 0 0 \frac{\sqrt{11}}{22} 0 -\frac{\sqrt{11}i}{22} 0 0 0 0 0 0 0$	
	$0 -\frac{\sqrt{22}i}{44} 0 \frac{\sqrt{22}}{44} 0 0 0 0 0 0 0 0 0 0 0$	
	$\frac{\sqrt{22}i}{44} 0 \frac{\sqrt{22}}{44} 0 0 0 0 0 0 0 0 0 0 0 0$	
798	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{6,1}^{(1,-1;a)}(E_u, 4)$	$0 \quad \frac{\sqrt{55}}{660} \quad 0 \quad \frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad \frac{\sqrt{33}i}{66} \quad \frac{\sqrt{22}}{33} \quad 0$	
	$\frac{\sqrt{55}}{660} \quad 0 \quad -\frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{66} \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{33}$	
	$0 \quad -\frac{\sqrt{55}i}{660} \quad 0 \quad \frac{\sqrt{55}}{660} \quad 0 \quad 0$	
	$\frac{\sqrt{55}i}{660} \quad 0 \quad \frac{\sqrt{55}}{660} \quad 0 \quad 0$	
	$-\frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{33}$	
	$0 \quad \frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{22}}{33}$	
	$0 \quad 0 \quad -\frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad \frac{\sqrt{22}i}{33}$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{55}}{165} \quad -\frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{33} \quad -\frac{\sqrt{22}i}{33} \quad 0$	
	$0 \quad -\frac{\sqrt{165}}{330} \quad 0 \quad \frac{\sqrt{165}i}{330} \quad \frac{\sqrt{110}}{55} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad \frac{\sqrt{11}i}{22} \quad 0 \quad 0$	
	$-\frac{\sqrt{165}}{330} \quad 0 \quad -\frac{\sqrt{165}i}{330} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{55} \quad 0 \quad 0 \quad \frac{\sqrt{11}}{22} \quad 0 \quad -\frac{\sqrt{11}i}{22} \quad 0 \quad 0 \quad 0$	
799	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$
$\mathbb{M}_{6,2}^{(1,-1;a)}(E_u, 4)$	$0 \quad \frac{\sqrt{55}i}{660} \quad 0 \quad -\frac{\sqrt{55}}{660} \quad 0 \quad 0$	
	$-\frac{\sqrt{55}i}{660} \quad 0 \quad -\frac{\sqrt{55}}{660} \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{55}}{660} \quad 0 \quad \frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad -\frac{\sqrt{33}i}{66} \quad -\frac{\sqrt{22}}{33} \quad 0$	
	$\frac{\sqrt{55}}{660} \quad 0 \quad -\frac{\sqrt{55}i}{660} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{66} \quad 0 \quad \frac{\sqrt{33}i}{66} \quad 0 \quad 0 \quad \frac{\sqrt{22}}{33}$	
	$0 \quad 0 \quad \frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad \frac{\sqrt{22}i}{33}$	
	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{33}}{33} \quad -\frac{\sqrt{22}i}{33} \quad 0$	
	$-\frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}i}{165} \quad -\frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{33}$	
	$0 \quad \frac{\sqrt{55}}{165} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{165} \quad 0 \quad 0 \quad \frac{\sqrt{33}}{33} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{22}}{33} \quad 0$	
	$0 \quad \frac{\sqrt{165}i}{330} \quad 0 \quad \frac{\sqrt{165}}{330} \quad 0 \quad 0 \quad -\frac{\sqrt{110}}{55} \quad 0 \quad 0 \quad \frac{\sqrt{11}i}{22} \quad 0 \quad -\frac{\sqrt{11}}{22} \quad 0 \quad 0$	
	$-\frac{\sqrt{165}i}{330} \quad 0 \quad \frac{\sqrt{165}}{330} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{110}}{55} \quad -\frac{\sqrt{11}i}{22} \quad 0 \quad -\frac{\sqrt{11}i}{22} \quad 0 \quad 0 \quad 0$	
800	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_2^{(1,0;a)}(A_{1u})$		$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 \end{bmatrix}$
		801 symmetry
		$\sqrt{3}yz$
		$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{84} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
		802 symmetry
		$-\sqrt{3}xz$

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,2}^{(1,0;a)}(E_u, 2)$	0	$-\frac{\sqrt{210}i}{168} \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{210}i}{168}$	$0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad -\frac{\sqrt{14}}{56} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$-\frac{\sqrt{210}}{168} \quad 0 \quad -\frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad -\frac{\sqrt{14}i}{56} \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{168}$	$0 \quad \frac{\sqrt{210}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{56} \quad 0 \quad \frac{\sqrt{14}i}{56} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{42}$
	0	$0 \quad \frac{\sqrt{210}}{84} \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42}$
	0	$0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{84} \quad 0 \quad \frac{\sqrt{14}}{28} \quad \frac{\sqrt{21}i}{42} \quad 0 \quad 0$
	$-\frac{\sqrt{210}}{84}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42}$
	0	$0 \quad \frac{\sqrt{210}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{105}}{42} \quad 0 \quad 0 \quad \frac{\sqrt{42}i}{84} \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{42} \quad -\frac{\sqrt{42}i}{84} \quad 0 \quad -\frac{\sqrt{42}}{84} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
805	symmetry	$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 1)$	0	$\frac{\sqrt{210}}{280} \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0$
	$\frac{\sqrt{210}}{280}$	$0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad 0 \quad 0$
	0	$0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{210}i}{280}$	$0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{14}i}{28} \quad 0 \quad \frac{\sqrt{14}}{28} \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{40} \quad 0 \quad \frac{\sqrt{35}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{40} \quad 0 \quad -\frac{\sqrt{35}i}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{40} \quad 0 \quad -\frac{\sqrt{35}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}i}{28}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}i}{40} \quad 0 \quad -\frac{\sqrt{35}}{40} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad -\frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{42}}{56} \quad 0 \quad \frac{\sqrt{42}i}{56} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
806	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,0;a)}(A_{1u}, 2)$	0 0 0 0 0 $-\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{2}}{20}$ 0 0 0 $\frac{3\sqrt{5}}{40}$ 0 0 $\frac{\sqrt{30}i}{40}$	
	0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $-\frac{\sqrt{2}}{20}$ 0 0 0 0 $-\frac{3\sqrt{5}}{40}$ $-\frac{\sqrt{30}i}{40}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $\frac{\sqrt{2}i}{20}$ $\frac{3\sqrt{5}}{40}$ 0 0 0 0 $-\frac{\sqrt{30}}{40}$	
	0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{2}i}{20}$ 0 0 $-\frac{3\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{30}}{40}$ 0	
	0 $\frac{7\sqrt{3}i}{80}$ 0 $\frac{\sqrt{3}}{80}$ 0 0 $-\frac{3\sqrt{2}}{80}$ 0 0 $\frac{\sqrt{5}i}{80}$ 0 $-\frac{\sqrt{5}}{80}$ 0 0	
	$-\frac{7\sqrt{3}i}{80}$ 0 $\frac{\sqrt{3}}{80}$ 0 0 0 0 $\frac{3\sqrt{2}}{80}$ $-\frac{\sqrt{5}i}{80}$ 0 $-\frac{\sqrt{5}}{80}$ 0 0	
	0 $\frac{7\sqrt{3}}{80}$ 0 $-\frac{\sqrt{3}i}{80}$ $-\frac{3\sqrt{2}}{80}$ 0 0 0 0 $-\frac{\sqrt{5}}{80}$ 0 $-\frac{\sqrt{5}i}{80}$ 0 0	
	$\frac{7\sqrt{3}}{80}$ 0 $\frac{\sqrt{3}i}{80}$ 0 0 $\frac{3\sqrt{2}}{80}$ 0 0 $-\frac{\sqrt{5}}{80}$ 0 $\frac{\sqrt{5}i}{80}$ 0 0	
	0 0 $-\frac{9}{40}$ 0 0 $-\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0	
	0 0 0 $\frac{9}{40}$ $\frac{\sqrt{6}i}{20}$ 0 $\frac{\sqrt{6}}{20}$ 0 0 0 0 0 0 0	
807 symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$	
	0 0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $\frac{\sqrt{2}i}{20}$ $\frac{3\sqrt{5}}{40}$ 0 0 0 0 $-\frac{\sqrt{30}}{40}$	
	0 0 0 0 $-\frac{\sqrt{2}}{20}$ 0 $-\frac{\sqrt{2}i}{20}$ 0 0 $-\frac{3\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{30}}{40}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{2}}{20}$ 0 0 $-\frac{3\sqrt{5}}{40}$ 0 0 $-\frac{\sqrt{30}i}{40}$	
	0 0 0 0 $-\frac{\sqrt{2}i}{20}$ 0 $\frac{\sqrt{2}}{20}$ 0 0 0 0 $\frac{3\sqrt{5}}{40}$ $\frac{\sqrt{30}i}{40}$ 0	
	0 $\frac{\sqrt{3}}{80}$ 0 $-\frac{7\sqrt{3}i}{80}$ $-\frac{3\sqrt{2}}{80}$ 0 0 0 0 $-\frac{\sqrt{5}}{80}$ 0 $-\frac{\sqrt{5}i}{80}$ 0 0	
	$\frac{\sqrt{3}}{80}$ 0 $\frac{7\sqrt{3}i}{80}$ 0 0 $\frac{3\sqrt{2}}{80}$ 0 0 $-\frac{\sqrt{5}}{80}$ 0 $\frac{\sqrt{5}i}{80}$ 0 0	
	0 $-\frac{\sqrt{3}i}{80}$ 0 $-\frac{7\sqrt{3}}{80}$ 0 0 $\frac{3\sqrt{2}}{80}$ 0 0 $-\frac{\sqrt{5}i}{80}$ 0 $\frac{\sqrt{5}}{80}$ 0 0	
	$\frac{\sqrt{3}i}{80}$ 0 $-\frac{7\sqrt{3}}{80}$ 0 0 0 0 $-\frac{3\sqrt{2}}{80}$ $\frac{\sqrt{5}i}{80}$ 0 $\frac{\sqrt{5}}{80}$ 0 0	
	$-\frac{9}{40}$ 0 0 0 0 $\frac{\sqrt{6}}{20}$ 0 $\frac{\sqrt{6}i}{20}$ 0 0 0 0 0 0	
808 symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$	

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 1)$	0 0 $-\frac{\sqrt{21}}{280}$ 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 0 $\frac{\sqrt{35}}{140}$ 0 0 $-\frac{3\sqrt{210}i}{280}$	
	0 0 0 $\frac{\sqrt{21}}{280}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 $-\frac{\sqrt{35}}{140}$ $\frac{3\sqrt{210}i}{280}$ 0	
	$\frac{\sqrt{21}}{280}$ 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 0 0 $-\frac{3\sqrt{210}}{280}$	
	0 $-\frac{\sqrt{21}}{280}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 $\frac{\sqrt{35}}{140}$ 0 0 $-\frac{3\sqrt{210}}{280}$ 0	
	0 $-\frac{9\sqrt{21}i}{560}$ 0 $-\frac{9\sqrt{21}}{560}$ 0 0 $\frac{\sqrt{14}}{80}$ 0 0 $-\frac{3\sqrt{35}i}{560}$ 0 $-\frac{23\sqrt{35}}{560}$ 0 0	
	$\frac{9\sqrt{21}i}{560}$ 0 $-\frac{9\sqrt{21}}{560}$ 0 0 0 0 $-\frac{\sqrt{14}}{80}$ $\frac{3\sqrt{35}i}{560}$ 0 $-\frac{23\sqrt{35}}{560}$ 0 0 0	
	0 $\frac{9\sqrt{21}}{560}$ 0 $-\frac{9\sqrt{21}i}{560}$ $-\frac{\sqrt{14}}{80}$ 0 0 0 0 $\frac{17\sqrt{35}}{560}$ 0 $\frac{3\sqrt{35}i}{560}$ $\frac{\sqrt{210}}{280}$ 0	
	$\frac{9\sqrt{21}}{560}$ 0 $\frac{9\sqrt{21}i}{560}$ 0 0 $\frac{\sqrt{14}}{80}$ 0 0 $\frac{17\sqrt{35}}{560}$ 0 $-\frac{3\sqrt{35}i}{560}$ 0 0 $-\frac{\sqrt{210}}{280}$	
	0 0 0 0 0 $\frac{3\sqrt{42}i}{140}$ 0 $\frac{3\sqrt{42}}{140}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{42}i}{140}$ 0 $\frac{3\sqrt{42}}{140}$ 0 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 0	
809	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 1)$	$\frac{\sqrt{21}}{280}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ $\frac{\sqrt{35}}{140}$ 0 0 0 0 $\frac{3\sqrt{210}}{280}$	
	0 $-\frac{\sqrt{21}}{280}$ 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{35}}{140}$ 0 0 $-\frac{3\sqrt{210}}{280}$ 0	
	0 0 $\frac{\sqrt{21}}{280}$ 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{35}}{140}$ 0 0 $-\frac{3\sqrt{210}i}{280}$	
	0 0 0 $-\frac{\sqrt{21}}{280}$ $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 $-\frac{\sqrt{35}}{140}$ $\frac{3\sqrt{210}i}{280}$ 0	
	0 $\frac{9\sqrt{21}}{560}$ 0 $-\frac{9\sqrt{21}i}{560}$ $-\frac{\sqrt{14}}{80}$ 0 0 0 0 $\frac{3\sqrt{35}}{560}$ 0 $\frac{17\sqrt{35}i}{560}$ $-\frac{\sqrt{210}}{280}$ 0	
	$\frac{9\sqrt{21}}{560}$ 0 $\frac{9\sqrt{21}i}{560}$ 0 0 $\frac{\sqrt{14}}{80}$ 0 0 $\frac{3\sqrt{35}}{560}$ 0 $-\frac{17\sqrt{35}i}{560}$ 0 0 $\frac{\sqrt{210}}{280}$	
	0 $\frac{9\sqrt{21}i}{560}$ 0 $\frac{9\sqrt{21}}{560}$ 0 0 $-\frac{\sqrt{14}}{80}$ 0 0 $-\frac{23\sqrt{35}i}{560}$ 0 $-\frac{3\sqrt{35}}{560}$ 0 0	
	$-\frac{9\sqrt{21}i}{560}$ 0 $\frac{9\sqrt{21}}{560}$ 0 0 0 0 $\frac{\sqrt{14}}{80}$ $\frac{23\sqrt{35}i}{560}$ 0 $-\frac{3\sqrt{35}}{560}$ 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{42}}{140}$ 0 $\frac{3\sqrt{42}i}{140}$ $\frac{\sqrt{105}}{280}$ 0 0 0 0 0	
	0 0 0 0 $-\frac{3\sqrt{42}}{140}$ 0 $-\frac{3\sqrt{42}i}{140}$ 0 0 $-\frac{\sqrt{105}}{280}$ 0 0 0 0	
810	symmetry	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 2)$	0 0 0 0 $\frac{1}{5}$ 0 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0	
	0 0 0 0 0 $-\frac{1}{5}$ 0 0 $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0	
	0 0 0 0 0 0 $-\frac{1}{5}$ 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0	
	0 0 0 0 0 0 0 $\frac{1}{5}$ $\frac{\sqrt{10}i}{40}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 0 0	
	$-\frac{\sqrt{6}}{10}$ 0 0 0 0 $\frac{1}{40}$ 0 $\frac{i}{40}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}}{10}$ 0 0 $\frac{1}{40}$ 0 $-\frac{i}{40}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{6}}{10}$ 0 0 $\frac{i}{40}$ 0 $-\frac{1}{40}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{6}}{10}$ $-\frac{i}{40}$ 0 $-\frac{1}{40}$ 0 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{2}}{40}$ 0 $\frac{3\sqrt{2}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{2}}{40}$ 0 $-\frac{3\sqrt{2}i}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0	
811	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 2)$	0 0 0 0 0 0 $\frac{1}{5}$ 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0	
	0 0 0 0 0 0 0 $-\frac{1}{5}$ $-\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0	
	0 0 0 0 $\frac{1}{5}$ 0 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0	
	0 0 0 0 0 $-\frac{1}{5}$ 0 0 $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0	
	0 0 $-\frac{\sqrt{6}}{10}$ 0 0 $-\frac{i}{40}$ 0 $\frac{1}{40}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{6}}{10}$ $\frac{i}{40}$ 0 $\frac{1}{40}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{6}}{10}$ 0 0 0 0 $\frac{1}{40}$ 0 $\frac{i}{40}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{6}}{10}$ 0 0 $\frac{1}{40}$ 0 $-\frac{i}{40}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{2}i}{40}$ 0 $\frac{3\sqrt{2}}{40}$ 0 0 0 0 0 0 0 0 0 0 0 0	
812	symmetry	$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,1}^{(1,0;a)}(E_u, 3)$	$0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad \frac{\sqrt{70}i}{560} \quad \frac{\sqrt{105}}{70} \quad 0$	
	$\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad -\frac{\sqrt{105}}{70}$	
	$0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{42}i}{560} \quad 0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}i}{560} \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{105}}{280}$	
	$0 \quad -\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{40} \quad 0 \quad \frac{\sqrt{7}i}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{105}}{280}$	
	$0 \quad 0 \quad \frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad \frac{\sqrt{7}i}{40} \quad 0 \quad -\frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{105}i}{280}$	
	$0 \quad 0 \quad 0 \quad -\frac{3\sqrt{42}}{280} \quad -\frac{\sqrt{7}i}{40} \quad 0 \quad -\frac{\sqrt{7}}{20} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad \frac{3\sqrt{105}i}{280} \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{14}}{80} \quad 0 \quad -\frac{3\sqrt{14}i}{80} \quad -\frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{560} \quad 0 \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad 0$	
	$\frac{3\sqrt{14}}{80} \quad 0 \quad \frac{3\sqrt{14}i}{80} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad \frac{3\sqrt{210}}{560} \quad 0 \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad 0 \quad 0$	
813	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
$\mathbb{M}_{4,2}^{(1,0;a)}(E_u, 3)$	$0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{13\sqrt{70}i}{560} \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad 0$	
	$-\frac{3\sqrt{42}i}{560} \quad 0 \quad -\frac{3\sqrt{42}}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{13\sqrt{70}i}{560} \quad 0 \quad \frac{13\sqrt{70}}{560} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{3\sqrt{42}}{560} \quad 0 \quad \frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad -\frac{\sqrt{70}i}{560} \quad -\frac{\sqrt{105}}{70} \quad 0$	
	$\frac{3\sqrt{42}}{560} \quad 0 \quad -\frac{3\sqrt{42}i}{560} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{560} \quad 0 \quad \frac{\sqrt{70}i}{560} \quad 0 \quad 0 \quad \frac{\sqrt{105}}{70}$	
	$0 \quad 0 \quad -\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}i}{20} \quad 0 \quad \frac{\sqrt{7}}{40} \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad -\frac{3\sqrt{105}i}{280}$	
	$0 \quad 0 \quad 0 \quad \frac{3\sqrt{42}}{280} \quad \frac{\sqrt{7}i}{20} \quad 0 \quad \frac{\sqrt{7}}{40} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad \frac{3\sqrt{105}i}{280} \quad 0 \quad 0$	
	$\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{20} \quad 0 \quad -\frac{\sqrt{7}i}{40} \quad -\frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280}$	
	$0 \quad -\frac{3\sqrt{42}}{280} \quad 0 \quad 0 \quad -\frac{\sqrt{7}}{20} \quad 0 \quad \frac{\sqrt{7}i}{40} \quad 0 \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{105}}{280}$	
	$0 \quad -\frac{3\sqrt{14}i}{80} \quad 0 \quad -\frac{3\sqrt{14}}{80} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{35} \quad 0 \quad 0 \quad \frac{3\sqrt{210}i}{560} \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad 0$	
	$\frac{3\sqrt{14}i}{80} \quad 0 \quad -\frac{3\sqrt{14}}{80} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{35} \quad -\frac{3\sqrt{210}i}{560} \quad 0 \quad -\frac{3\sqrt{210}}{560} \quad 0 \quad 0 \quad 0$	
814	symmetry	1

continued ...

Table 9

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

continued ...

Table 9

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

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{2,1}^{(1,1;a)}(E_u, 2)$	$0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{120} \quad 0 \quad \frac{\sqrt{210}i}{120} \quad -\frac{\sqrt{35}}{42} \quad 0$	
	$\frac{\sqrt{14}}{168} \quad 0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{120} \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad 0 \quad 0 \quad \frac{\sqrt{35}}{42}$	
	$0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad 0$	
	$\frac{\sqrt{14}i}{168} \quad 0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad 0$	
	$\frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{420}$	
	$0 \quad -\frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad \frac{\sqrt{21}}{42} \quad 0 \quad \frac{\sqrt{21}i}{28} \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{420}$	
	$0 \quad 0 \quad \frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420}$	
	$0 \quad 0 \quad 0 \quad -\frac{5\sqrt{14}}{168} \quad \frac{\sqrt{21}i}{42} \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad \frac{\sqrt{35}i}{420} \quad 0$	
	$0 \quad -\frac{5\sqrt{42}}{168} \quad 0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0$	
	$-\frac{5\sqrt{42}}{168} \quad 0 \quad -\frac{5\sqrt{42}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}}{280} \quad 0 \quad \frac{\sqrt{70}i}{280} \quad 0 \quad 0 \quad 0$	
819	symmetry	$-\sqrt{3}xy$
$\mathbb{M}_{2,2}^{(1,1;a)}(E_u, 2)$	$0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}i}{280} \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0$	
	$-\frac{\sqrt{14}i}{168} \quad 0 \quad -\frac{\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}i}{280} \quad 0 \quad \frac{\sqrt{210}}{280} \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{14}}{168} \quad 0 \quad \frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad -\frac{\sqrt{210}i}{120} \quad \frac{\sqrt{35}}{42} \quad 0$	
	$\frac{\sqrt{14}}{168} \quad 0 \quad -\frac{\sqrt{14}i}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{120} \quad 0 \quad \frac{\sqrt{210}i}{120} \quad 0 \quad 0 \quad -\frac{\sqrt{35}}{42}$	
	$0 \quad 0 \quad -\frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{35}i}{420}$	
	$0 \quad 0 \quad 0 \quad \frac{5\sqrt{14}}{168} \quad \frac{\sqrt{21}i}{28} \quad 0 \quad -\frac{\sqrt{21}}{42} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad \frac{\sqrt{35}i}{420} \quad 0$	
	$\frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad \frac{\sqrt{21}i}{42} \quad -\frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{420}$	
	$0 \quad -\frac{5\sqrt{14}}{168} \quad 0 \quad 0 \quad -\frac{\sqrt{21}}{28} \quad 0 \quad -\frac{\sqrt{21}i}{42} \quad 0 \quad 0 \quad \frac{\sqrt{210}}{168} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{35}}{420}$	
	$0 \quad \frac{5\sqrt{42}i}{168} \quad 0 \quad \frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{70}i}{280} \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$	
	$-\frac{5\sqrt{42}i}{168} \quad 0 \quad \frac{5\sqrt{42}}{168} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{70}i}{280} \quad 0 \quad \frac{\sqrt{70}}{280} \quad 0 \quad 0 \quad 0$	
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	$\frac{\sqrt{385}}{1540} \quad 0 \quad -\frac{\sqrt{385}i}{1540} \quad \frac{\sqrt{2310}}{924} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad 0$
	$\frac{\sqrt{385}}{1540}$	$0 \quad \frac{\sqrt{385}i}{1540} \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{924} \quad 0 \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad \frac{\sqrt{231}i}{308} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{385}i}{1540} \quad 0 \quad \frac{\sqrt{385}}{1540} \quad 0 \quad 0 \quad \frac{\sqrt{2310}}{924} \quad 0 \quad 0 \quad \frac{\sqrt{231}i}{308} \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad 0$
	$-\frac{\sqrt{385}i}{1540}$	$0 \quad \frac{\sqrt{385}}{1540} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{924} \quad -\frac{\sqrt{231}i}{308} \quad 0 \quad -\frac{\sqrt{231}}{308} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{770} \quad 0 \quad \frac{\sqrt{2310}i}{770} \quad -\frac{5\sqrt{231}}{462} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{154}}{77}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}}{770} \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad 0 \quad \frac{5\sqrt{231}}{462} \quad 0 \quad 0 \quad \frac{\sqrt{154}}{77}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2310}i}{770} \quad 0 \quad -\frac{\sqrt{2310}}{770} \quad 0 \quad 0 \quad -\frac{5\sqrt{231}}{462} \quad 0 \quad 0 \quad -\frac{\sqrt{154}i}{77}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2310}i}{770} \quad 0 \quad -\frac{\sqrt{2310}}{770} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{231}}{462} \quad \frac{\sqrt{154}i}{77}$
	0	$0 \quad 0 \quad \frac{3\sqrt{77}}{154} \quad 0 \quad -\frac{3\sqrt{77}i}{154} \quad \frac{5\sqrt{462}}{462} \quad 0$
	0	$0 \quad 0 \quad \frac{3\sqrt{77}}{154} \quad 0 \quad \frac{3\sqrt{77}i}{154} \quad 0 \quad 0 \quad -\frac{5\sqrt{462}}{462}$
821	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
$\mathbb{M}_4^{(1,1;a)}(A_{1u}, 2)$	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0 \quad 0 \quad \frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{55}i}{220}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{33}i}{110} \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{165} \quad -\frac{\sqrt{55}i}{220} \quad 0$
	0	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0 \quad -\frac{3\sqrt{33}i}{110} \quad \frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{220}$
	0	$0 \quad 0 \quad 0 \quad 0 \quad \frac{3\sqrt{33}}{110} \quad 0 \quad \frac{3\sqrt{33}i}{110} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{55}}{220} \quad 0$
	0	$0 \quad \frac{\sqrt{22}i}{40} \quad 0 \quad \frac{13\sqrt{22}}{440} \quad 0 \quad 0 \quad \frac{4\sqrt{33}}{165} \quad 0 \quad 0 \quad \frac{\sqrt{330}i}{440} \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad 0$
	$-\frac{\sqrt{22}i}{40}$	$0 \quad \frac{13\sqrt{22}}{440} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{4\sqrt{33}}{165} \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{22}}{40} \quad 0 \quad -\frac{13\sqrt{22}i}{440} \quad \frac{4\sqrt{33}}{165} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad -\frac{\sqrt{330}i}{440} \quad 0 \quad 0$
	$\frac{\sqrt{22}}{40}$	$0 \quad \frac{13\sqrt{22}i}{440} \quad 0 \quad 0 \quad -\frac{4\sqrt{33}}{165} \quad 0 \quad 0 \quad -\frac{\sqrt{330}}{440} \quad 0 \quad \frac{\sqrt{330}i}{440} \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{2\sqrt{66}}{165} \quad 0 \quad 0 \quad \frac{3\sqrt{11}i}{220} \quad 0 \quad -\frac{3\sqrt{11}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0 \quad -\frac{2\sqrt{66}}{165} \quad -\frac{3\sqrt{11}i}{220} \quad 0 \quad -\frac{3\sqrt{11}}{220} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
822	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_4^{(1,1;a)}(A_{2u})$	0 0 0 0 0 $\frac{3\sqrt{33}}{110}$ 0 $-\frac{3\sqrt{33}i}{110}$ $\frac{\sqrt{330}}{165}$ 0 0 0 0 0 $-\frac{\sqrt{55}}{220}$	
	0 0 0 0 0 $\frac{3\sqrt{33}}{110}$ 0 $\frac{3\sqrt{33}i}{110}$ 0 0 $-\frac{\sqrt{330}}{165}$ 0 0 $-\frac{\sqrt{55}}{220}$ 0	
	0 0 0 0 0 $-\frac{3\sqrt{33}i}{110}$ 0 $-\frac{3\sqrt{33}}{110}$ 0 0 0 $-\frac{\sqrt{330}}{165}$ 0 0 $-\frac{\sqrt{55}i}{220}$	
	0 0 0 0 0 $\frac{3\sqrt{33}i}{110}$ 0 $-\frac{3\sqrt{33}}{110}$ 0 0 0 0 $\frac{\sqrt{330}}{165}$ $\frac{\sqrt{55}i}{220}$ 0	
	0 $\frac{13\sqrt{22}}{440}$ 0 $-\frac{\sqrt{22}i}{40}$ $\frac{4\sqrt{33}}{165}$ 0 0 0 0 $-\frac{\sqrt{330}}{440}$ 0 $-\frac{\sqrt{330}i}{440}$ 0 0 0	
	$\frac{13\sqrt{22}}{440}$ 0 $\frac{\sqrt{22}i}{40}$ 0 0 $-\frac{4\sqrt{33}}{165}$ 0 0 0 $-\frac{\sqrt{330}}{440}$ 0 $\frac{\sqrt{330}i}{440}$ 0 0 0	
	0 $-\frac{13\sqrt{22}i}{440}$ 0 $-\frac{\sqrt{22}}{40}$ 0 0 $-\frac{4\sqrt{33}}{165}$ 0 0 0 $-\frac{\sqrt{330}i}{440}$ 0 $\frac{\sqrt{330}}{440}$ 0 0 0	
	$\frac{13\sqrt{22}i}{440}$ 0 $-\frac{\sqrt{22}}{40}$ 0 0 0 0 $\frac{4\sqrt{33}}{165}$ $\frac{\sqrt{330}i}{440}$ 0 $\frac{\sqrt{330}}{440}$ 0 0 0 0	
	$\frac{2\sqrt{66}}{165}$ 0 0 0 0 $-\frac{3\sqrt{11}}{220}$ 0 $-\frac{3\sqrt{11}i}{220}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{2\sqrt{66}}{165}$ 0 0 0 $-\frac{3\sqrt{11}}{220}$ 0 $\frac{3\sqrt{11}i}{220}$ 0 0 0 0 0 0 0 0	
823	symmetry	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 1)$	0 0 $\frac{\sqrt{154}}{770}$ 0 0 $\frac{\sqrt{231}i}{462}$ 0 0 0 0 $\frac{\sqrt{2310}}{770}$ 0 0 $\frac{\sqrt{385}i}{220}$	
	0 0 0 $-\frac{\sqrt{154}}{770}$ $-\frac{\sqrt{231}i}{462}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}}{770}$ $-\frac{\sqrt{385}i}{220}$ 0	
	$-\frac{\sqrt{154}}{770}$ 0 0 0 0 0 0 $\frac{\sqrt{231}i}{462}$ $-\frac{\sqrt{2310}}{770}$ 0 0 0 0 $\frac{\sqrt{385}}{220}$	
	0 $\frac{\sqrt{154}}{770}$ 0 0 0 0 0 $-\frac{\sqrt{231}i}{462}$ 0 0 $\frac{\sqrt{2310}}{770}$ 0 0 $\frac{\sqrt{385}}{220}$ 0	
	0 $-\frac{\sqrt{154}i}{440}$ 0 $-\frac{\sqrt{154}}{440}$ 0 0 0 $-\frac{2\sqrt{231}}{385}$ 0 0 $\frac{\sqrt{2310}i}{9240}$ 0 $\frac{\sqrt{2310}}{440}$ 0 0 0	
	$\frac{\sqrt{154}i}{440}$ 0 $-\frac{\sqrt{154}}{440}$ 0 0 0 0 $\frac{2\sqrt{231}}{385}$ $-\frac{\sqrt{2310}i}{9240}$ 0 $\frac{\sqrt{2310}}{440}$ 0 0 0	
	0 $\frac{\sqrt{154}}{440}$ 0 $-\frac{\sqrt{154}i}{440}$ $\frac{2\sqrt{231}}{385}$ 0 0 0 0 $\frac{\sqrt{2310}}{440}$ 0 $-\frac{41\sqrt{2310}i}{9240}$ $\frac{4\sqrt{385}}{385}$ 0	
	$\frac{\sqrt{154}}{440}$ 0 $\frac{\sqrt{154}i}{440}$ 0 0 $-\frac{2\sqrt{231}}{385}$ 0 0 0 $\frac{\sqrt{2310}}{440}$ 0 $\frac{41\sqrt{2310}i}{9240}$ 0 0 $-\frac{4\sqrt{385}}{385}$	
	0 0 0 0 0 $\frac{3\sqrt{77}i}{220}$ 0 $\frac{3\sqrt{77}}{220}$ 0 0 $\frac{3\sqrt{77}}{385}$ 0 0 $\frac{\sqrt{1155}i}{231}$	
	0 0 0 0 0 $-\frac{3\sqrt{77}i}{220}$ 0 $\frac{3\sqrt{77}}{220}$ 0 0 0 $-\frac{3\sqrt{77}}{385}$ $-\frac{\sqrt{1155}i}{231}$ 0	
824	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 9

No.	multipole	matrix	
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 1)$	$\begin{bmatrix} -\frac{\sqrt{154}}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{462} & 0 & 0 & \frac{\sqrt{2310}}{770} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{220} \\ 0 & \frac{\sqrt{154}}{770} & 0 & 0 & \frac{\sqrt{231}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{770} & 0 & 0 & -\frac{\sqrt{385}}{220} & 0 \\ 0 & 0 & -\frac{\sqrt{154}}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{462} & 0 & 0 & 0 & \frac{\sqrt{2310}}{770} & 0 & 0 & \frac{\sqrt{385}i}{220} \\ 0 & 0 & 0 & \frac{\sqrt{154}}{770} & 0 & 0 & \frac{\sqrt{231}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{770} & -\frac{\sqrt{385}i}{220} & 0 \\ 0 & \frac{\sqrt{154}}{440} & 0 & -\frac{\sqrt{154}i}{440} & \frac{2\sqrt{231}}{385} & 0 & 0 & 0 & 0 & -\frac{41\sqrt{2310}}{9240} & 0 & \frac{\sqrt{2310}i}{440} & -\frac{4\sqrt{385}}{385} & 0 \\ \frac{\sqrt{154}}{440} & 0 & \frac{\sqrt{154}i}{440} & 0 & 0 & -\frac{2\sqrt{231}}{385} & 0 & 0 & -\frac{41\sqrt{2310}}{9240} & 0 & -\frac{\sqrt{2310}i}{440} & 0 & 0 & \frac{4\sqrt{385}}{385} \\ 0 & \frac{\sqrt{154}i}{440} & 0 & \frac{\sqrt{154}}{440} & 0 & 0 & \frac{2\sqrt{231}}{385} & 0 & 0 & \frac{\sqrt{2310}i}{440} & 0 & \frac{\sqrt{2310}}{9240} & 0 & 0 \\ -\frac{\sqrt{154}i}{440} & 0 & \frac{\sqrt{154}}{440} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{231}}{385} & -\frac{\sqrt{2310}i}{440} & 0 & \frac{\sqrt{2310}}{9240} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{220} & 0 & \frac{3\sqrt{77}i}{220} & -\frac{3\sqrt{77}}{385} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{231} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{220} & 0 & -\frac{3\sqrt{77}i}{220} & 0 & 0 & \frac{3\sqrt{77}i}{385} & 0 & 0 & 0 & \frac{\sqrt{1155}}{231} \\ \end{bmatrix}$		
		$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$	
		$\begin{bmatrix} 0 & \frac{3\sqrt{11}}{44} & 0 & -\frac{3\sqrt{11}i}{44} & \frac{3\sqrt{66}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & -\frac{3\sqrt{66}}{220} & 0 & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & \frac{\sqrt{165}i}{660} & 0 & 0 \\ 0 & -\frac{3\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & -\frac{3\sqrt{66}}{220} & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & \frac{\sqrt{165}}{660} & 0 & 0 \\ \frac{3\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & \frac{3\sqrt{66}}{220} & \frac{\sqrt{165}i}{660} & 0 & \frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ \frac{3\sqrt{11}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}}{110} & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{11}}{110} & 0 & 0 & -\frac{\sqrt{66}i}{330} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{11}}{110} & \frac{\sqrt{66}i}{330} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{330} & 0 & -\frac{\sqrt{33}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}}{330} & 0 & \frac{\sqrt{33}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \end{bmatrix}$	
		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$	
825	symmetry		
826	symmetry		

continued ...

Table 9

No.	multipole	matrix
$\mathbb{M}_{4,2}^{(1,1;a)}(E_u, 2)$	0	$\begin{bmatrix} 0 & \frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & 0 & 0 & \frac{3\sqrt{66}}{220} & 0 & 0 & \frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 \\ -\frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}}{220} & -\frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{11}}{44} & 0 & -\frac{3\sqrt{11}i}{44} & \frac{3\sqrt{66}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & -\frac{3\sqrt{66}}{220} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & \frac{\sqrt{165}i}{660} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{11}}{110} & 0 & 0 & \frac{\sqrt{66}i}{330} & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}}{110} & -\frac{\sqrt{66}i}{330} & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{11}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}}{110} & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}i}{330} & 0 & -\frac{\sqrt{33}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}i}{330} & 0 & -\frac{\sqrt{33}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
	827	symmetry
		$-\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
	$\mathbb{M}_{4,1}^{(1,1;a)}(E_u, 3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{77}}{1540} & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}}{4620} & 0 & -\frac{17\sqrt{1155}i}{4620} & \frac{\sqrt{770}}{220} & 0 \\ -\frac{\sqrt{77}}{1540} & 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}}{4620} & 0 & \frac{17\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}}{220} \\ 0 & \frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{420} & 0 & -\frac{\sqrt{1155}}{420} & 0 & 0 \\ -\frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{420} & 0 & -\frac{\sqrt{1155}}{420} & 0 & 0 & 0 \\ -\frac{\sqrt{77}}{220} & 0 & 0 & 0 & 0 & \frac{17\sqrt{462}}{2310} & 0 & -\frac{\sqrt{462}i}{210} & \frac{\sqrt{1155}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & \frac{\sqrt{77}}{220} & 0 & 0 & \frac{17\sqrt{462}}{2310} & 0 & \frac{\sqrt{462}i}{210} & 0 & 0 & -\frac{\sqrt{1155}}{220} & 0 & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & 0 & -\frac{\sqrt{77}}{220} & 0 & 0 & -\frac{17\sqrt{462}i}{2310} & 0 & -\frac{\sqrt{462}}{210} & 0 & 0 & -\frac{\sqrt{1155}}{220} & 0 & 0 & -\frac{\sqrt{770}i}{385} \\ 0 & 0 & 0 & \frac{\sqrt{77}}{220} & \frac{17\sqrt{462}i}{2310} & 0 & -\frac{\sqrt{462}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{220} & \frac{\sqrt{770}i}{385} & 0 \\ 0 & \frac{\sqrt{231}}{165} & 0 & -\frac{\sqrt{231}i}{165} & \frac{3\sqrt{154}}{220} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{770} & 0 & -\frac{3\sqrt{385}i}{770} & 0 & 0 \\ \frac{\sqrt{231}}{165} & 0 & \frac{\sqrt{231}i}{165} & 0 & 0 & -\frac{3\sqrt{154}}{220} & 0 & 0 & -\frac{3\sqrt{385}}{770} & 0 & \frac{3\sqrt{385}i}{770} & 0 & 0 & 0 \end{bmatrix}$
		symmetry
		$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 9

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

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

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,1}^{(a)}(E_g, 2)$	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{210}}{84}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0
	0	0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{210}}{42}$ 0 0 0 0 0 0 0 0 0 0

834 symmetry

 $-\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(a)}(E_g, 2)$	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 $-\frac{\sqrt{210}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{210}}{42}$	
	0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0	
	0 0 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0	
	$-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{14}$ 0 0 0 0 0	
	0 0 0 0 0 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	
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													
$\mathbb{Q}_4^{(a)}(A_{1g}, 1)$	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$\frac{3\sqrt{77}}{154}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$\frac{3\sqrt{77}}{154}$	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	$-\frac{\sqrt{77}}{22}$	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	$-\frac{\sqrt{77}}{22}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{77}}{154}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{77}}{154}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{77}}{154}$	0	0	0	0
	0	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	0	0	0	0	0	$\frac{3\sqrt{77}}{77}$	0	0
836	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(a)}(A_{1g}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{11}}{22}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{11}}{22}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{11}}{22}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{3\sqrt{11}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{11}}{22}$ 0 0 0 0 0 0 0 0 0 0 0 0	
837	symmetry	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 1)$	0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{77}}{77}$ 0 0 0	
	0 0 0 $-\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 $-\frac{2\sqrt{77}}{77}$ 0 0 0	
	$\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 0 $\frac{2\sqrt{77}}{77}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{1155}}{154}$ 0 0 0 0 0 0 $\frac{2\sqrt{77}}{77}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{2\sqrt{77}}{77}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{2\sqrt{77}}{77}$ 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0	
	0 0 0 0 0 $-\frac{2\sqrt{77}}{77}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{1155}}{154}$ 0 0 0	
839	symmetry	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,2}^{(a)}(E_g, 1)$	0	0	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	0
	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0	0
	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0
	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{1155}}{154}$	0	0	0
	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{1155}}{154}$	0	0
	0	0	0	0	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	0	0	$-\frac{\sqrt{1155}}{154}$	0
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{1155}}{154}$	0	0	0	0	0	0
$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$															

840 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{22}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{22}$ 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 $\frac{\sqrt{55}}{22}$ 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 $-\frac{\sqrt{55}}{22}$ 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	
	$-\frac{\sqrt{33}}{22}$ 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 $\frac{\sqrt{33}}{22}$ 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 0	
841	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

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

842 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0 0 0 0	
	0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $\frac{\sqrt{385}}{77}$ 0 0 0 0	
	0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0 0	
	0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0	
	0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 0	
843	symmetry	$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{231}}{154}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{231}}{154}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{231}}{154}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{231}}{154}$	
	0 0 $-\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0 0	
	0 0 0 $-\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0 0	
	$\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0 0 0 0	
	0 $\frac{3\sqrt{231}}{154}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{385}}{77}$ 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 0 0 0	
844	symmetry	$-\frac{5x^6}{16} - \frac{15x^4y^2}{16} + \frac{45x^4z^2}{8} - \frac{15x^2y^4}{16} + \frac{45x^2y^2z^2}{4} - \frac{15x^2z^4}{2} - \frac{5y^6}{16} + \frac{45y^4z^2}{8} - \frac{15y^2z^4}{2} + z^6$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(a)}(A_{1g}, 1)$	$-\frac{\sqrt{462}}{924}$	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{462}}{924}$	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{462}}{924}$	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{462}}{924}$	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	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	$-\frac{5\sqrt{462}}{308}$	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{308}$	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{308}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{308}$	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{462}}{231}$	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	$\frac{5\sqrt{462}}{231}$	0	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
		$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
846	$\mathbb{Q}_6^{(a)}(A_{1g}, 2)$	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(a)}(A_{1g}, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & 0 \end{bmatrix}$
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
847	symmetry	$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$

continued ...

Table 10

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
851	symmetry	$\frac{\sqrt{21}yz(5x^4+10x^2y^2-20x^2z^2+5y^4-20y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 2)$	0 0 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0	
	0 0 0 $\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0	
	$-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0 0	
	0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0 $\frac{5\sqrt{33}}{66}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 $\frac{5\sqrt{33}}{66}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{33}}{66}$ 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
$\mathbb{Q}_{6,2}^{(a)}(E_g, 2)$	0	0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{33}}{132}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{33}}{132}$ 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0
	0	0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{33}}{66}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{33}}{66}$
	0	0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{5\sqrt{33}}{66}$ 0 0 0 0 0 0
853	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,1}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0	
	0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 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 0 0 0 $-\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0	
	$\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
854	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(a)}(E_g, 3)$	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{66}}{22}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
855	symmetry	$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix
		$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{22} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
856	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(a)}(E_g, 4)$	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{2\sqrt{33}}{33}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{2\sqrt{33}}{33}$	
	0 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{22}$ 0 0 0	
	0 0 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{22}$ 0 0 0	
	$-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{22}$ 0 0 0 0 0 0	
	0 0 0 0 0 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	
857	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_2^{(1,-1;a)}(A_{1g})$	0 0 $-\frac{\sqrt{21}i}{14}$ 0 0 $-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{21}i}{14}$ $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{21}i}{14}$ 0 0 0 0 $\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{21}i}{14}$ 0 0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0	
	$-\frac{\sqrt{14}}{56}$ 0 $-\frac{\sqrt{14}i}{56}$ 0 0 0 0 $\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0	
	0 $\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ $\frac{\sqrt{21}i}{21}$ 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	$\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{21}i}{42}$ 0 0 0 $-\frac{\sqrt{14}}{28}$	
	0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 $\frac{\sqrt{21}i}{42}$ $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
858 symmetry		
$\sqrt{3}yz$		

continued ...

Table 10

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

continued ...

Table 10

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

860 symmetry

continued ...

Table 10

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

861 symmetry

 $-\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 2)$	0 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{42}}{56}$ 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}i}{56}$ 0 $-\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0	
	$\frac{\sqrt{42}i}{56}$ 0 $\frac{\sqrt{42}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0	
	0 $\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0	
	$-\frac{\sqrt{42}}{56}$ 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$	
	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{42}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 $-\frac{\sqrt{42}}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0	
$\frac{3x^4}{8} + \frac{3x^2y^2}{4} - 3x^2z^2 + \frac{3y^4}{8} - 3y^2z^2 + z^4$		

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 1)$	0 0 $\frac{\sqrt{21}i}{21}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{21}i}{21}$ $-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{21}i}{21}$ 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 $\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{14}i}{28}$ 0 $-\frac{\sqrt{14}}{28}$ $\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0 0 $-\frac{\sqrt{14}}{28}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{21}$ $\frac{\sqrt{14}}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{21}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{21}i}{21}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
863	symmetry	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{1g}, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ $-\frac{\sqrt{3}i}{12}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{3}i}{12}$	
	0 0 0 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 0 $\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 $\frac{\sqrt{2}i}{8}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $\frac{\sqrt{2}i}{8}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{2}}{8}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ $\frac{\sqrt{2}}{8}$ 0	
	0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2}}{8}$ 0 $-\frac{\sqrt{2}i}{8}$ 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{2}}{8}$ 0 $-\frac{\sqrt{2}i}{8}$ 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0	
	$\frac{\sqrt{3}i}{12}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 0 0 0 0 0	
$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$		
864	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_4^{(1,-1;a)}(A_{2g})$	0 0 0 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 0 $\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ $\frac{\sqrt{3}i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ 0 0 $-\frac{\sqrt{3}i}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 $-\frac{\sqrt{2}}{8}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ $\frac{\sqrt{2}}{8}$ $\frac{\sqrt{2}}{8}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 $-\frac{\sqrt{2}i}{8}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{2}i}{8}$ 0	
	0 $\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2}i}{8}$ 0 $\frac{\sqrt{2}}{8}$ $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{2}i}{8}$ 0 $-\frac{\sqrt{2}}{8}$ 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}i}{12}$ $-\frac{\sqrt{2}}{8}$ 0 $\frac{\sqrt{2}i}{8}$ 0 0 0 0 0 0 0	
$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$		

865 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 1)$	0	0	0	$\frac{\sqrt{210}}{84}$	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	$-\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	0	0	0
	0	0	$-\frac{\sqrt{210}}{84}$	0	0	$\frac{\sqrt{35}i}{28}$	0	0	$-\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	0	0
	0	$-\frac{\sqrt{210}}{84}$	0	0	0	0	$-\frac{\sqrt{35}i}{28}$	0	0	$-\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0
	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	$\frac{\sqrt{35}i}{28}$	$\frac{\sqrt{14}}{56}$	0	$-\frac{\sqrt{14}i}{56}$	0	0	0	0	0
	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	0	$-\frac{\sqrt{14}i}{56}$	0
	0	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	$-\frac{\sqrt{14}i}{56}$	0	0
	0	0	$\frac{\sqrt{35}i}{28}$	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0	0	0	$-\frac{\sqrt{14}}{56}$	0
	0	0	0	$-\frac{\sqrt{35}i}{28}$	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	0	$\frac{\sqrt{14}}{56}$	0	0	0
	0	$\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{210}}{84}$	$\frac{\sqrt{35}i}{28}$	0	0
	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	$-\frac{\sqrt{35}i}{28}$	0
	0	$-\frac{\sqrt{14}}{56}$	0	$\frac{\sqrt{14}i}{56}$	0	0	0	0	0	$\frac{\sqrt{210}}{84}$	0	0	0	0	0
	$\frac{\sqrt{14}}{56}$	0	$\frac{\sqrt{14}i}{56}$	0	0	0	0	0	$-\frac{\sqrt{210}}{84}$	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{14}i}{56}$	0	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{35}i}{28}$	0	0	0	0	0	0	0
	0	0	0	0	$\frac{\sqrt{14}i}{56}$	0	$-\frac{\sqrt{14}}{56}$	0	0	$\frac{\sqrt{35}i}{28}$	0	0	0	0	0

866 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 1)$	0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0	
	0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0	
	0 $\frac{\sqrt{210}i}{84}$ 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0	
	$\frac{\sqrt{210}i}{84}$ 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0	
	0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{14}}{56}$	
	0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0	
	$-\frac{\sqrt{35}i}{28}$ 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$	
	0 $\frac{\sqrt{35}i}{28}$ 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{56}$ 0	
	0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0	
	$\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 0 0	
	0 $-\frac{\sqrt{14}i}{56}$ 0 $-\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 $\frac{\sqrt{35}i}{28}$ 0	
	$-\frac{\sqrt{14}i}{56}$ 0 $\frac{\sqrt{14}}{56}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 $-\frac{\sqrt{35}i}{28}$	
	0 0 0 0 0 $-\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}}{56}$ 0 $\frac{\sqrt{14}i}{56}$ 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0	
$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$		

867 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 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 $\frac{\sqrt{6}i}{12}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{6}}{12}$ 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 $-\frac{\sqrt{6}}{12}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}}{12}$ 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0	
868 symmetry		$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}}{168}$	
	0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{42}}{168}$ 0	
	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$	
	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}i}{168}$ 0	
	0 $-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0	
	$\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0	
	0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ $-\frac{\sqrt{7}i}{14}$ 0	
	$\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 $\frac{\sqrt{7}i}{14}$	
	0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0	
	0 0 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$ 0	
	$-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$	
	0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0	
	0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0	
	$\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0	
$\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$		
870	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,-1;a)}(E_g, 3)$	0	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ $-\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{42}i}{168}$
	0	0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}i}{168}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}}{168}$
	0	0 0 0 0 $\frac{\sqrt{70}}{56}$ 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{42}}{168}$ 0
	0	$-\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ $-\frac{\sqrt{7}i}{14}$ 0
	$-\frac{\sqrt{70}i}{56}$	0 $-\frac{\sqrt{70}}{56}$ 0 0 0 0 0 $\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 $\frac{\sqrt{7}i}{14}$
	0	$-\frac{\sqrt{70}}{56}$ 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0
	$\frac{\sqrt{70}}{56}$	0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 $-\frac{\sqrt{42}}{168}$ 0 $-\frac{\sqrt{42}i}{168}$ 0 0 0
	$\frac{\sqrt{7}i}{14}$	0 0 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $-\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$
	0	$-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0
	0	0 $\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{70}}{56}$
	0	0 0 0 $-\frac{\sqrt{7}i}{14}$ $\frac{\sqrt{42}}{168}$ 0 $\frac{\sqrt{42}i}{168}$ 0 0 0 0 0 $-\frac{\sqrt{70}}{56}$ 0
	0	$\frac{\sqrt{42}i}{168}$ 0 $\frac{\sqrt{42}}{168}$ $\frac{\sqrt{7}i}{14}$ 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $-\frac{\sqrt{70}}{56}$ 0 0
	$\frac{\sqrt{42}i}{168}$	0 $-\frac{\sqrt{42}}{168}$ 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 $\frac{\sqrt{70}}{56}$ 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	$-\frac{\sqrt{77}i}{154}$	0	0	$-\frac{5\sqrt{462}}{1848}$	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{77}i}{154}$	$\frac{5\sqrt{462}}{1848}$	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{77}i}{154}$	0	0	0	0	$\frac{5\sqrt{462}i}{1848}$	0	$-\frac{5\sqrt{462}}{1848}$	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{77}i}{154}$	0	0	$\frac{5\sqrt{462}i}{1848}$	0	$\frac{5\sqrt{462}}{1848}$	0	0	0	0	0	0	0	0	0
	0	$\frac{5\sqrt{462}}{1848}$	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	$\frac{2\sqrt{77}i}{77}$	0	0	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0
	$-\frac{5\sqrt{462}}{1848}$	0	$-\frac{5\sqrt{462}i}{1848}$	0	0	0	0	$-\frac{2\sqrt{77}i}{77}$	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0	0
	0	$\frac{5\sqrt{462}i}{1848}$	0	$\frac{5\sqrt{462}}{1848}$	$-\frac{2\sqrt{77}i}{77}$	0	0	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0
	$\frac{5\sqrt{462}i}{1848}$	0	$-\frac{5\sqrt{462}}{1848}$	0	0	$\frac{2\sqrt{77}i}{77}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$-\frac{3\sqrt{770}}{616}$	0	0	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	$-\frac{5\sqrt{77}i}{154}$	0	0	$-\frac{5\sqrt{462}}{924}$	0
	0	0	0	0	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0	$\frac{5\sqrt{77}i}{154}$	$\frac{5\sqrt{462}}{924}$	0	0	0
	0	0	0	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$-\frac{3\sqrt{770}}{616}$	$\frac{5\sqrt{77}i}{154}$	0	0	0	0	$\frac{5\sqrt{462}i}{924}$	0	
	0	0	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	$-\frac{5\sqrt{77}i}{154}$	0	0	$\frac{5\sqrt{462}i}{924}$	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{924}$	0	$-\frac{5\sqrt{462}i}{924}$	0	0	0	0	0
	0	0	0	0	0	0	0	0	$-\frac{5\sqrt{462}}{924}$	0	$-\frac{5\sqrt{462}i}{924}$	0	0	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
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
873	$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 2)$	$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_6^{(1,-1;a)}(A_{1g}, 3)$	0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{22}i}{88}$ 0 $-\frac{3\sqrt{22}}{88}$ $\frac{\sqrt{33}i}{22}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{22}i}{88}$ 0 $\frac{3\sqrt{22}}{88}$ 0 0 $-\frac{\sqrt{33}i}{22}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{22}}{88}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}}{88}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 0 0 $\frac{\sqrt{22}i}{22}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 $\frac{\sqrt{22}i}{22}$ 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 $-\frac{\sqrt{22}}{22}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{44}$ $\frac{\sqrt{22}}{22}$ 0	
	0 $\frac{3\sqrt{22}i}{88}$ 0 $-\frac{\sqrt{22}}{88}$ $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{22}i}{88}$ 0 $\frac{\sqrt{22}}{88}$ 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{22}}{88}$ 0 $\frac{\sqrt{22}i}{88}$ 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0	
	$-\frac{3\sqrt{22}}{88}$ 0 $\frac{\sqrt{22}i}{88}$ 0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0	
	$-\frac{\sqrt{33}i}{22}$ 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ 0 $\frac{\sqrt{22}}{22}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{33}i}{22}$ 0 0 $-\frac{\sqrt{22}i}{22}$ 0 $-\frac{\sqrt{22}}{22}$ 0 0 0 0 0 0 0	

874 symmetry

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

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
875	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_6^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{22}}{88}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}}{88}$ 0 $-\frac{\sqrt{22}i}{88}$ 0 0 0	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}i}{88}$ 0 0 $\frac{3\sqrt{22}}{88}$ $-\frac{\sqrt{33}i}{22}$ 0	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{22}i}{88}$ 0 $-\frac{3\sqrt{22}}{88}$ 0 0 $\frac{\sqrt{33}i}{22}$	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 $-\frac{\sqrt{22}}{22}$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{33}i}{44}$ $\frac{\sqrt{22}}{22}$ 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{22}i}{22}$ 0	0 $-\frac{\sqrt{22}}{88}$ 0 $-\frac{3\sqrt{22}i}{88}$ 0 0 $\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0	$\frac{\sqrt{22}}{88}$ 0 $-\frac{3\sqrt{22}i}{88}$ 0 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0	0 $\frac{\sqrt{22}i}{88}$ 0 $-\frac{3\sqrt{22}}{88}$ $\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{22}i}{88}$ 0 $\frac{3\sqrt{22}}{88}$ 0 0 $-\frac{\sqrt{33}i}{44}$ 0 0 0 0 0 0 0 0	0 0 $\frac{\sqrt{33}i}{22}$ 0 0 $\frac{\sqrt{22}}{22}$ 0 $\frac{\sqrt{22}i}{22}$ 0 0 0 0 0 0 0	0 0 0 $-\frac{\sqrt{33}i}{22}$ $-\frac{\sqrt{22}}{22}$ 0 $\frac{\sqrt{22}i}{22}$ 0 0 0 0 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
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 $\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 0
	0	0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0
	$-\frac{\sqrt{3}i}{12}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{30}i}{24}$	0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{30}}{24}$	0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
877 symmetry		
$\frac{3\sqrt{154}xz(x^4 - 10x^2y^2 + 5y^4)}{16}$		

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{24}$ 0 0
	0	0 0 0 0 0 $\frac{\sqrt{3}i}{12}$ 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0
	0	0 0 $\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{3}i}{12}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{30}}{24}$	0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{30}i}{24}$	0 $\frac{\sqrt{30}}{24}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0

878 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 2)$	0	0	0	$-\frac{\sqrt{33}}{132}$	$\frac{5\sqrt{22}i}{264}$	0	0	0	0	$\frac{\sqrt{55}i}{132}$	0	$-\frac{\sqrt{55}}{132}$	0	0	
	0	0	$\frac{\sqrt{33}}{132}$	0	0	$-\frac{5\sqrt{22}i}{264}$	0	0	$\frac{\sqrt{55}i}{132}$	0	$\frac{\sqrt{55}}{132}$	0	0	0	
	0	$\frac{\sqrt{33}}{132}$	0	0	0	0	$\frac{5\sqrt{22}i}{264}$	0	0	$\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	
	$-\frac{\sqrt{33}}{132}$	0	0	0	0	0	0	$-\frac{5\sqrt{22}i}{264}$	$-\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	
	$-\frac{5\sqrt{22}i}{264}$	0	0	0	0	0	0	$\frac{\sqrt{33}}{33}$	$-\frac{\sqrt{330}i}{88}$	0	0	0	0	$-\frac{\sqrt{55}i}{66}$	
	0	$\frac{5\sqrt{22}i}{264}$	0	0	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{330}i}{88}$	0	0	$-\frac{\sqrt{55}i}{66}$	0	
	0	0	$-\frac{5\sqrt{22}i}{264}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	0	$-\frac{\sqrt{330}i}{88}$	0	0	$-\frac{\sqrt{55}}{66}$	0	
	0	0	0	$\frac{5\sqrt{22}i}{264}$	$\frac{\sqrt{33}}{33}$	0	0	0	0	0	$\frac{\sqrt{330}i}{88}$	$\frac{\sqrt{55}}{66}$	0	0	
	0	$-\frac{\sqrt{55}i}{132}$	0	$-\frac{\sqrt{55}}{132}$	$\frac{\sqrt{330}i}{88}$	0	0	0	0	0	$-\frac{5\sqrt{33}}{132}$	$\frac{5\sqrt{22}i}{132}$	0	0	
	$-\frac{\sqrt{55}i}{132}$	0	$\frac{\sqrt{55}}{132}$	0	0	$-\frac{\sqrt{330}i}{88}$	0	0	0	$\frac{5\sqrt{33}}{132}$	0	0	$-\frac{5\sqrt{22}i}{132}$	0	
	0	$\frac{\sqrt{55}}{132}$	0	$-\frac{\sqrt{55}i}{132}$	0	0	$\frac{\sqrt{330}i}{88}$	0	0	$\frac{5\sqrt{33}}{132}$	0	0	0	0	
	$-\frac{\sqrt{55}}{132}$	0	$-\frac{\sqrt{55}i}{132}$	0	0	0	0	$-\frac{\sqrt{330}i}{88}$	$-\frac{5\sqrt{33}}{132}$	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{55}i}{66}$	0	$\frac{\sqrt{55}}{66}$	$-\frac{5\sqrt{22}i}{132}$	0	0	0	0	0	0	
	0	0	0	0	$\frac{\sqrt{55}i}{66}$	0	$-\frac{\sqrt{55}}{66}$	0	0	$\frac{5\sqrt{22}i}{132}$	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
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 2)$	0 0 0 $\frac{\sqrt{33}i}{132}$ 0 0 $-\frac{5\sqrt{22}i}{264}$ 0 0 $-\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0	
	0 0 $\frac{\sqrt{33}i}{132}$ 0 0 0 0 $\frac{5\sqrt{22}i}{264}$ $\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 0	
	0 $-\frac{\sqrt{33}i}{132}$ 0 0 $\frac{5\sqrt{22}i}{264}$ 0 0 0 0 $\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ 0 0	
	$-\frac{\sqrt{33}i}{132}$ 0 0 0 0 $-\frac{5\sqrt{22}i}{264}$ 0 0 $\frac{\sqrt{55}i}{132}$ 0 $\frac{\sqrt{55}}{132}$ 0 0 0	
	0 0 $-\frac{5\sqrt{22}i}{264}$ 0 0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 $\frac{\sqrt{55}}{66}$	
	0 0 0 $\frac{5\sqrt{22}i}{264}$ 0 0 $-\frac{\sqrt{33}i}{33}$ 0 0 0 0 $-\frac{\sqrt{330}i}{88}$ $-\frac{\sqrt{55}}{66}$ 0	
	$\frac{5\sqrt{22}i}{264}$ 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 0 $-\frac{\sqrt{330}i}{88}$ 0 0 0 0 $-\frac{\sqrt{55}i}{66}$	
	0 $-\frac{5\sqrt{22}i}{264}$ 0 0 $\frac{\sqrt{33}i}{33}$ 0 0 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 $-\frac{\sqrt{55}i}{66}$ 0	
	0 $\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 0 0 $\frac{5\sqrt{33}i}{132}$ 0 0	
	$-\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 0 0 $-\frac{\sqrt{330}i}{88}$ 0 0 $\frac{5\sqrt{33}i}{132}$ 0 0 0	
	0 $\frac{\sqrt{55}i}{132}$ 0 $\frac{\sqrt{55}}{132}$ $-\frac{\sqrt{330}i}{88}$ 0 0 0 0 $-\frac{5\sqrt{33}i}{132}$ 0 0 $\frac{5\sqrt{22}i}{132}$ 0	
	$\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ 0 0 $\frac{\sqrt{330}i}{88}$ 0 0 $-\frac{5\sqrt{33}i}{132}$ 0 0 0 0 $-\frac{5\sqrt{22}i}{132}$	
	0 0 0 0 0 $-\frac{\sqrt{55}}{66}$ 0 $\frac{\sqrt{55}i}{66}$ 0 0 $-\frac{5\sqrt{22}i}{132}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{55}}{66}$ 0 $\frac{\sqrt{55}i}{66}$ 0 0 0 0 $\frac{5\sqrt{22}i}{132}$ 0 0	
880	symmetry	$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	0	$-\frac{\sqrt{66}}{264}$	0	$\frac{\sqrt{66}i}{264}$	0	0	$-\frac{\sqrt{165}i}{66}$	0	0	$-\frac{\sqrt{110}}{44}$
	0	0	0	0	$\frac{\sqrt{66}}{264}$	0	$\frac{\sqrt{66}i}{264}$	0	0	0	$\frac{\sqrt{165}i}{66}$	$\frac{\sqrt{110}}{44}$	0	0
	0	0	0	0	0	$\frac{\sqrt{66}i}{264}$	0	$\frac{\sqrt{66}}{264}$	$-\frac{\sqrt{165}i}{66}$	0	0	0	0	$-\frac{\sqrt{110}i}{44}$
	0	0	0	0	$\frac{\sqrt{66}i}{264}$	0	$-\frac{\sqrt{66}}{264}$	0	0	$\frac{\sqrt{165}i}{66}$	0	0	$-\frac{\sqrt{110}i}{44}$	0
	0	$\frac{\sqrt{66}}{264}$	0	$-\frac{\sqrt{66}i}{264}$	0	0	0	0	$-\frac{\sqrt{110}}{88}$	0	$-\frac{\sqrt{110}i}{88}$	0	0	0
	$-\frac{\sqrt{66}}{264}$	0	$-\frac{\sqrt{66}i}{264}$	0	0	0	0	$\frac{\sqrt{110}}{88}$	0	$-\frac{\sqrt{110}i}{88}$	0	0	0	0
	0	$-\frac{\sqrt{66}i}{264}$	0	$-\frac{\sqrt{66}}{264}$	0	0	0	0	0	$-\frac{\sqrt{110}i}{88}$	0	$\frac{\sqrt{110}}{88}$	0	0
	$-\frac{\sqrt{66}i}{264}$	0	$\frac{\sqrt{66}}{264}$	0	0	0	0	0	$-\frac{\sqrt{110}i}{88}$	0	$-\frac{\sqrt{110}}{88}$	0	0	0
	0	0	$\frac{\sqrt{165}i}{66}$	0	0	$\frac{\sqrt{110}}{88}$	0	$\frac{\sqrt{110}i}{88}$	0	0	0	0	0	0
	0	0	0	$-\frac{\sqrt{165}i}{66}$	$-\frac{\sqrt{110}}{88}$	0	$\frac{\sqrt{110}i}{88}$	0	0	0	0	0	0	0
	$\frac{\sqrt{165}i}{66}$	0	0	0	0	$\frac{\sqrt{110}i}{88}$	0	$-\frac{\sqrt{110}}{88}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{165}i}{66}$	0	0	$\frac{\sqrt{110}i}{88}$	0	$\frac{\sqrt{110}}{88}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{110}}{44}$	0	$\frac{\sqrt{110}i}{44}$	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{110}}{44}$	0	$\frac{\sqrt{110}i}{44}$	0	0	0	0	0	0	0	0	0	0	0

881 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 3)$	0 0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ $\frac{\sqrt{165}i}{66}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{44}$	
	0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{110}i}{44}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 $-\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{110}i}{44}$	
	0 0 0 0 $\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 $\frac{\sqrt{165}i}{66}$ $\frac{\sqrt{110}}{44}$ 0	
	0 $\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0	
	$\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0	
	0 $\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0	
	$-\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0 0	
	$-\frac{\sqrt{165}i}{66}$ 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0 0 0 0	
	0 $\frac{\sqrt{165}i}{66}$ 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{165}i}{66}$ 0 0 $\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{165}i}{66}$ $-\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{110}i}{44}$ 0 $\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
$\frac{\sqrt{210}(x-y)(x+y)(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{32}$		

882 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{6,1}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	$-\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	$-\frac{\sqrt{22}i}{33}$	0	0	$-\frac{\sqrt{33}}{66}$	
	0	0	0	0	$\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	0	$\frac{\sqrt{22}i}{33}$	$\frac{\sqrt{33}}{66}$	0	
	0	0	0	0	0	$-\frac{\sqrt{55}i}{132}$	0	$-\frac{\sqrt{55}}{132}$	$\frac{\sqrt{22}i}{33}$	0	0	0	0	$\frac{\sqrt{33}i}{66}$	
	0	0	0	0	$-\frac{\sqrt{55}i}{132}$	0	$\frac{\sqrt{55}}{132}$	0	0	$-\frac{\sqrt{22}i}{33}$	0	0	$\frac{\sqrt{33}i}{66}$	0	
	0	$\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	0	0	$\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{66}$	0	0	
	$-\frac{\sqrt{55}}{132}$	0	$\frac{\sqrt{55}i}{132}$	0	0	0	0	0	$-\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{66}$	0	0	0	
	0	$-\frac{\sqrt{55}i}{132}$	0	$\frac{\sqrt{55}}{132}$	0	0	0	0	0	$\frac{\sqrt{33}i}{33}$	0	$\frac{\sqrt{33}}{33}$	$-\frac{2\sqrt{22}i}{33}$	0	
	$-\frac{\sqrt{55}i}{132}$	0	$-\frac{\sqrt{55}}{132}$	0	0	0	0	0	$\frac{\sqrt{33}i}{33}$	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{2\sqrt{22}i}{33}$	
	0	0	$-\frac{\sqrt{22}i}{33}$	0	0	$-\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{33}$	0	0	0	0	0	$-\frac{\sqrt{55}}{66}$	
	0	0	0	$\frac{\sqrt{22}i}{33}$	$\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{33}$	0	0	0	0	0	$\frac{\sqrt{55}}{66}$	0	
	$\frac{\sqrt{22}i}{33}$	0	0	0	0	$\frac{\sqrt{33}i}{66}$	0	$-\frac{\sqrt{33}}{33}$	0	0	0	0	0	$-\frac{\sqrt{55}i}{66}$	
	0	$-\frac{\sqrt{22}i}{33}$	0	0	$\frac{\sqrt{33}i}{66}$	0	$\frac{\sqrt{33}}{33}$	0	0	0	0	0	$-\frac{\sqrt{55}i}{66}$	0	
	0	$\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{66}$	0	0	$\frac{2\sqrt{22}i}{33}$	0	0	$\frac{\sqrt{55}}{66}$	0	$\frac{\sqrt{55}i}{66}$	0	0	
	$-\frac{\sqrt{33}}{66}$	0	$-\frac{\sqrt{33}i}{66}$	0	0	0	$-\frac{2\sqrt{22}i}{33}$	$-\frac{\sqrt{55}}{66}$	0	$\frac{\sqrt{55}i}{66}$	0	0	0	0	
883	symmetry	$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{6,2}^{(1,-1;a)}(E_g, 4)$	0	0 0 0 0 0 $-\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ $\frac{\sqrt{22}i}{33}$ 0 0 0 0 $\frac{\sqrt{33}i}{66}$
	0	0 0 0 0 $-\frac{\sqrt{55}i}{132}$ 0 $\frac{\sqrt{55}}{132}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{33}i}{66}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 0 $\frac{\sqrt{33}}{66}$
	0	0 0 0 0 $-\frac{\sqrt{55}}{132}$ 0 $-\frac{\sqrt{55}i}{132}$ 0 0 0 0 $-\frac{\sqrt{22}i}{33}$ $-\frac{\sqrt{33}}{66}$ 0
	0	$\frac{\sqrt{55}i}{132}$ 0 $-\frac{\sqrt{55}}{132}$ 0 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 $\frac{\sqrt{33}}{33}$ $-\frac{2\sqrt{22}i}{33}$ 0
	$\frac{\sqrt{55}i}{132}$	0 $\frac{\sqrt{55}}{132}$ 0 0 0 0 0 $\frac{\sqrt{33}i}{33}$ 0 $-\frac{\sqrt{33}}{33}$ 0 0 $\frac{2\sqrt{22}i}{33}$
	0	$\frac{\sqrt{55}}{132}$ 0 $\frac{\sqrt{55}i}{132}$ 0 0 0 0 0 $-\frac{\sqrt{33}}{66}$ 0 $\frac{\sqrt{33}i}{66}$ 0 0 0
	$-\frac{\sqrt{55}}{132}$	0 $\frac{\sqrt{55}i}{132}$ 0 0 0 0 0 0 $\frac{\sqrt{33}}{66}$ 0 $\frac{\sqrt{33}i}{66}$ 0 0 0
	$-\frac{\sqrt{22}i}{33}$	0 0 0 0 $-\frac{\sqrt{33}i}{33}$ 0 $\frac{\sqrt{33}}{66}$ 0 0 0 0 0 $-\frac{\sqrt{55}i}{66}$
	0	$\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{33}i}{33}$ 0 $-\frac{\sqrt{33}}{66}$ 0 0 0 0 0 $-\frac{\sqrt{55}i}{66}$
	0	0 0 $-\frac{\sqrt{22}i}{33}$ 0 0 $-\frac{\sqrt{33}}{33}$ 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 0 $\frac{\sqrt{55}}{66}$
	0	0 0 0 $\frac{\sqrt{22}i}{33}$ $\frac{\sqrt{33}}{33}$ 0 $-\frac{\sqrt{33}i}{66}$ 0 0 0 0 0 $-\frac{\sqrt{55}}{66}$
	0	$-\frac{\sqrt{33}i}{66}$ 0 $-\frac{\sqrt{33}}{66}$ $\frac{2\sqrt{22}i}{33}$ 0 0 0 0 $\frac{\sqrt{55}i}{66}$ 0 $-\frac{\sqrt{55}}{66}$ 0 0
	$-\frac{\sqrt{33}i}{66}$	0 $\frac{\sqrt{33}}{66}$ 0 0 $-\frac{2\sqrt{22}i}{33}$ 0 0 0 $\frac{\sqrt{55}i}{66}$ 0 $\frac{\sqrt{55}}{66}$ 0 0 0

884 symmetry

1

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

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

887 symmetry

 $-\sqrt{3}xz$

continued ...

Table 10

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

888 symmetry

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

continued ...

Table 10

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

889 symmetry

 $-\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{2,2}^{(1,1;a)}(E_g, 2)$	0	0 0 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ $-\frac{\sqrt{35}i}{42}$ 0 0 0 0 $\frac{\sqrt{210}i}{84}$
	0	0 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{210}i}{84}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{210}}{84}$
	0	0 0 0 0 $-\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0 0 $\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{210}}{84}$ 0
	0	$\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ $-\frac{\sqrt{35}i}{42}$ 0
	$\frac{\sqrt{14}i}{84}$	0 $\frac{\sqrt{14}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ 0 0 $\frac{\sqrt{35}i}{42}$
	0	$\frac{\sqrt{14}}{84}$ 0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{84}$ 0 $\frac{\sqrt{210}i}{84}$ 0 0
	$-\frac{\sqrt{14}}{84}$	0 $\frac{\sqrt{14}i}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{84}$ 0 $\frac{\sqrt{210}i}{84}$ 0 0 0
	$\frac{\sqrt{35}i}{42}$	0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$
	0	$-\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 0 0 0 $\frac{\sqrt{14}i}{84}$ 0
	0	0 0 $\frac{\sqrt{35}i}{42}$ 0 0 $\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 $-\frac{\sqrt{14}}{84}$
	0	0 0 0 $-\frac{\sqrt{35}i}{42}$ $-\frac{\sqrt{210}}{84}$ 0 $-\frac{\sqrt{210}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{14}}{84}$ 0
	0	$-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ $\frac{\sqrt{35}i}{42}$ 0 0 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0
	$-\frac{\sqrt{210}i}{84}$	0 $\frac{\sqrt{210}}{84}$ 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $-\frac{\sqrt{14}}{84}$ 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	$-\frac{\sqrt{2310}i}{924}$	0	0	$\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{2310}i}{924}$	$-\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{2310}i}{924}$	0	0	0	0	$-\frac{\sqrt{385}i}{308}$	0	$\frac{\sqrt{385}}{308}$	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{2310}i}{924}$	0	0	$-\frac{\sqrt{385}i}{308}$	0	$-\frac{\sqrt{385}}{308}$	0	0	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	$\frac{\sqrt{2310}i}{231}$	0	0	0	$-\frac{3\sqrt{231}}{308}$	0	$-\frac{3\sqrt{231}i}{308}$	0	0	0
	$\frac{\sqrt{385}}{308}$	0	$\frac{\sqrt{385}i}{308}$	0	0	0	0	$-\frac{\sqrt{2310}i}{231}$	$\frac{3\sqrt{231}}{308}$	0	$-\frac{3\sqrt{231}i}{308}$	0	0	0	0	0
	0	$-\frac{\sqrt{385}i}{308}$	0	$-\frac{\sqrt{385}}{308}$	$-\frac{\sqrt{2310}i}{231}$	0	0	0	0	$\frac{3\sqrt{231}i}{308}$	0	$-\frac{3\sqrt{231}}{308}$	0	0	0	0
	$-\frac{\sqrt{385}i}{308}$	0	$\frac{\sqrt{385}}{308}$	0	0	$\frac{\sqrt{2310}i}{231}$	0	0	0	$\frac{3\sqrt{231}i}{308}$	0	$\frac{3\sqrt{231}}{308}$	0	0	0	0
	0	0	0	0	0	$\frac{3\sqrt{231}}{308}$	0	$-\frac{3\sqrt{231}i}{308}$	0	0	$-\frac{5\sqrt{231}i}{924}$	0	0	0	$\frac{\sqrt{385}}{154}$	0
	0	0	0	0	$-\frac{3\sqrt{231}}{308}$	0	$-\frac{3\sqrt{231}i}{308}$	0	0	0	0	$\frac{5\sqrt{2310}i}{924}$	$-\frac{\sqrt{385}}{154}$	0	0	0
	0	0	0	0	0	$\frac{3\sqrt{231}i}{308}$	0	$\frac{3\sqrt{231}}{308}$	$\frac{5\sqrt{2310}i}{924}$	0	0	0	0	0	$-\frac{\sqrt{385}i}{154}$	
	0	0	0	0	$\frac{3\sqrt{231}i}{308}$	0	$-\frac{3\sqrt{231}}{308}$	0	0	$-\frac{5\sqrt{2310}i}{924}$	0	0	$-\frac{\sqrt{385}i}{154}$	0	0	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{385}}{154}$	0	$\frac{\sqrt{385}i}{154}$	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{385}}{154}$	0	$\frac{\sqrt{385}i}{154}$	0	0	0	0	0

891 symmetry

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

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{Q}_4^{(1,1;a)}(A_{1g}, 2)$	0	0	0	0	0	0	0	0	$\frac{7\sqrt{55}i}{220}$	0	$\frac{7\sqrt{55}}{220}$	$\frac{2\sqrt{330}i}{165}$	0
	0	0	0	0	0	0	0	$\frac{7\sqrt{55}i}{220}$	0	$-\frac{7\sqrt{55}}{220}$	0	0	$-\frac{2\sqrt{330}i}{165}$
	0	0	0	0	0	0	0	0	$\frac{\sqrt{55}}{44}$	0	$-\frac{\sqrt{55}i}{44}$	0	0
	0	0	0	0	0	0	0	$-\frac{\sqrt{55}}{44}$	0	$-\frac{\sqrt{55}i}{44}$	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{330}i}{165}$	0	0	0	0	$-\frac{\sqrt{55}i}{110}$
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{330}i}{165}$	0	0	$-\frac{\sqrt{55}i}{110}$	0
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{330}i}{165}$	0	0	$\frac{\sqrt{55}}{110}$
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{330}i}{165}$	$-\frac{\sqrt{55}}{110}$	0	0
	0	$-\frac{7\sqrt{55}i}{220}$	0	$-\frac{\sqrt{55}}{44}$	$-\frac{\sqrt{330}i}{165}$	0	0	0	0	0	0	0	0
	$-\frac{7\sqrt{55}i}{220}$	0	$\frac{\sqrt{55}}{44}$	0	0	$\frac{\sqrt{330}i}{165}$	0	0	0	0	0	0	0
	0	$-\frac{7\sqrt{55}}{220}$	0	$\frac{\sqrt{55}i}{44}$	0	0	$\frac{\sqrt{330}i}{165}$	0	0	0	0	0	0
	$\frac{7\sqrt{55}}{220}$	0	$\frac{\sqrt{55}i}{44}$	0	0	0	0	$-\frac{\sqrt{330}i}{165}$	0	0	0	0	0
	$-\frac{2\sqrt{330}i}{165}$	0	0	0	0	$\frac{\sqrt{55}i}{110}$	0	$-\frac{\sqrt{55}}{110}$	0	0	0	0	0
	0	$\frac{2\sqrt{330}i}{165}$	0	0	$\frac{\sqrt{55}i}{110}$	0	$\frac{\sqrt{55}}{110}$	0	0	0	0	0	0

892 symmetry

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

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{Q}_4^{(1,1;a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{55}}{44}$ 0 $-\frac{\sqrt{55}i}{44}$ 0 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{55}}{44}$ 0 $-\frac{\sqrt{55}i}{44}$ 0 0 0	0 0 0 0 0 0 0 0 $-\frac{7\sqrt{55}i}{220}$ 0 $-\frac{7\sqrt{55}}{220}$ $-\frac{2\sqrt{330}i}{165}$ 0	0 0 0 0 0 0 0 0 $-\frac{7\sqrt{55}i}{220}$ 0 $\frac{7\sqrt{55}}{220}$ 0 0 $\frac{2\sqrt{330}i}{165}$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 $\frac{\sqrt{55}}{110}$	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{165}$ $-\frac{\sqrt{55}}{110}$ 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 0 $\frac{\sqrt{55}i}{110}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{165}$ 0 0 0 $\frac{\sqrt{55}i}{110}$	0 $-\frac{\sqrt{55}}{44}$ 0 $\frac{7\sqrt{55}i}{220}$ 0 0 $\frac{\sqrt{330}i}{165}$ 0 0 0 0 0 0	$\frac{\sqrt{55}}{44}$ 0 $\frac{7\sqrt{55}i}{220}$ 0 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 0 0 0 0	0 $\frac{\sqrt{55}i}{44}$ 0 $\frac{7\sqrt{55}}{220}$ $\frac{\sqrt{330}i}{165}$ 0 0 0 0 0 0 0 0	$\frac{\sqrt{55}i}{44}$ 0 $-\frac{7\sqrt{55}}{220}$ 0 0 $-\frac{\sqrt{330}i}{165}$ 0 0 0 0 0 0	0 0 $\frac{2\sqrt{330}i}{165}$ 0 0 $-\frac{\sqrt{55}}{110}$ 0 $-\frac{\sqrt{55}i}{110}$ 0 0 0 0 0	0 0 0 $-\frac{2\sqrt{330}i}{165}$ $\frac{\sqrt{55}}{110}$ 0 $-\frac{\sqrt{55}i}{110}$ 0 0 0 0 0 0
	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$													
893	symmetry													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 1)$	0	0 0 0 $\frac{\sqrt{231}}{462}$ $\frac{\sqrt{154}i}{154}$ 0 0 0 0 $-\frac{\sqrt{385}i}{220}$ 0 $\frac{\sqrt{385}}{220}$ 0 0
	0	0 0 $-\frac{\sqrt{231}}{462}$ 0 0 $-\frac{\sqrt{154}i}{154}$ 0 0 $-\frac{\sqrt{385}i}{220}$ 0 $-\frac{\sqrt{385}}{220}$ 0 0 0
	0	$-\frac{\sqrt{231}}{462}$ 0 0 0 0 0 $\frac{\sqrt{154}i}{154}$ 0 0 $-\frac{\sqrt{385}}{220}$ 0 $-\frac{\sqrt{385}i}{220}$ 0 0
	$\frac{\sqrt{231}}{462}$	0 0 0 0 0 0 $-\frac{\sqrt{154}i}{154}$ $\frac{\sqrt{385}}{220}$ 0 $-\frac{\sqrt{385}i}{220}$ 0 0 0 0
	$-\frac{\sqrt{154}i}{154}$	0 0 0 0 0 0 $-\frac{2\sqrt{231}}{231}$ $-\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 $\frac{\sqrt{385}i}{110}$
	0	$\frac{\sqrt{154}i}{154}$ 0 0 0 0 0 $\frac{2\sqrt{231}}{231}$ 0 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 $\frac{\sqrt{385}i}{110}$ 0
	0	0 0 $-\frac{\sqrt{154}i}{154}$ 0 0 $\frac{2\sqrt{231}}{231}$ 0 0 0 0 $-\frac{3\sqrt{2310}i}{770}$ 0 0 $\frac{\sqrt{385}}{110}$
	0	0 0 0 $\frac{\sqrt{154}i}{154}$ $-\frac{2\sqrt{231}}{231}$ 0 0 0 0 0 $\frac{3\sqrt{2310}i}{770}$ $-\frac{\sqrt{385}}{110}$ 0
	0	$\frac{\sqrt{385}i}{220}$ 0 $\frac{\sqrt{385}}{220}$ $\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 0 0 $\frac{5\sqrt{231}}{462}$ $\frac{\sqrt{154}i}{77}$ 0
	$\frac{\sqrt{385}i}{220}$	0 $-\frac{\sqrt{385}}{220}$ 0 0 $-\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 $-\frac{5\sqrt{231}}{462}$ 0 0 $-\frac{\sqrt{154}i}{77}$
	0	$-\frac{\sqrt{385}}{220}$ 0 $\frac{\sqrt{385}i}{220}$ 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 $-\frac{5\sqrt{231}}{462}$ 0 0 0 0
	$\frac{\sqrt{385}}{220}$	0 $\frac{\sqrt{385}i}{220}$ 0 0 0 0 $-\frac{3\sqrt{2310}i}{770}$ $\frac{5\sqrt{231}}{462}$ 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{385}i}{110}$ 0 $-\frac{\sqrt{385}}{110}$ $-\frac{\sqrt{154}i}{77}$ 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{385}i}{110}$ 0 $\frac{\sqrt{385}}{110}$ 0 0 $\frac{\sqrt{154}i}{77}$ 0 0 0 0
$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$		

894 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{231}i}{462}$ 0 0 $-\frac{\sqrt{154}i}{154}$ 0 0 $\frac{\sqrt{385}}{220}$ 0 $\frac{\sqrt{385}i}{220}$ 0 0
	0	0 0 $-\frac{\sqrt{231}i}{462}$ 0 0 0 0 $\frac{\sqrt{154}i}{154}$ $-\frac{\sqrt{385}}{220}$ 0 $\frac{\sqrt{385}i}{220}$ 0 0 0
	0	$\frac{\sqrt{231}i}{462}$ 0 0 0 $\frac{\sqrt{154}i}{154}$ 0 0 0 0 $-\frac{\sqrt{385}i}{220}$ 0 $\frac{\sqrt{385}}{220}$ 0 0 0
	$\frac{\sqrt{231}i}{462}$	0 0 0 0 0 $-\frac{\sqrt{154}i}{154}$ 0 0 $-\frac{\sqrt{385}i}{220}$ 0 $-\frac{\sqrt{385}}{220}$ 0 0 0 0
	0	0 0 $-\frac{\sqrt{154}i}{154}$ 0 0 0 0 $\frac{2\sqrt{231}i}{231}$ 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 $-\frac{\sqrt{385}}{110}$
	0	0 0 0 $\frac{\sqrt{154}i}{154}$ 0 0 $\frac{2\sqrt{231}i}{231}$ 0 0 0 0 $-\frac{3\sqrt{2310}i}{770}$ $\frac{\sqrt{385}}{110}$ 0 0
	$\frac{\sqrt{154}i}{154}$	0 0 0 0 0 $-\frac{2\sqrt{231}i}{231}$ 0 0 $-\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 $\frac{\sqrt{385}i}{110}$
	0	$-\frac{\sqrt{154}i}{154}$ 0 0 $-\frac{2\sqrt{231}i}{231}$ 0 0 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 0 $\frac{\sqrt{385}i}{110}$ 0 0
	0	$-\frac{\sqrt{385}}{220}$ 0 $\frac{\sqrt{385}i}{220}$ 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 $-\frac{5\sqrt{231}i}{462}$ 0 0 0
	$\frac{\sqrt{385}}{220}$	0 $\frac{\sqrt{385}i}{220}$ 0 0 0 0 $-\frac{3\sqrt{2310}i}{770}$ 0 0 $-\frac{5\sqrt{231}i}{462}$ 0 0 0 0
	0	$-\frac{\sqrt{385}i}{220}$ 0 $-\frac{\sqrt{385}}{220}$ $-\frac{3\sqrt{2310}i}{770}$ 0 0 0 0 $\frac{5\sqrt{231}i}{462}$ 0 0 $\frac{\sqrt{154}i}{77}$ 0
	$-\frac{\sqrt{385}i}{220}$	0 $\frac{\sqrt{385}}{220}$ 0 0 0 $\frac{3\sqrt{2310}i}{770}$ 0 0 $\frac{5\sqrt{231}i}{462}$ 0 0 0 0 $-\frac{\sqrt{154}i}{77}$
	0	0 0 0 0 0 $\frac{\sqrt{385}}{110}$ 0 $-\frac{\sqrt{385}i}{110}$ 0 0 $-\frac{\sqrt{154}i}{77}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{385}}{110}$ 0 $-\frac{\sqrt{385}i}{110}$ 0 0 0 0 $\frac{\sqrt{154}i}{77}$ 0 0
$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$		
895	symmetry	

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{Q}_{4,1}^{(1,1;a)}(E_g, 2)$	0	0	0	0	0	$\frac{3\sqrt{11}}{44}$	0	$-\frac{3\sqrt{11}i}{44}$	0	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$\frac{\sqrt{165}}{330}$	
	0	0	0	0	$-\frac{3\sqrt{11}}{44}$	0	$-\frac{3\sqrt{11}i}{44}$	0	0	0	$\frac{3\sqrt{110}i}{220}$	$-\frac{\sqrt{165}}{330}$	0	0	
	0	0	0	0	0	$-\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	$\frac{\sqrt{165}i}{330}$	
	0	0	0	0	$-\frac{3\sqrt{11}i}{44}$	0	$\frac{3\sqrt{11}}{44}$	0	0	$\frac{3\sqrt{110}i}{220}$	0	0	$\frac{\sqrt{165}i}{330}$	0	
	0	$-\frac{3\sqrt{11}}{44}$	0	$\frac{3\sqrt{11}i}{44}$	0	0	0	0	0	$\frac{\sqrt{165}}{660}$	0	$\frac{\sqrt{165}i}{660}$	0	0	
	$\frac{3\sqrt{11}}{44}$	0	$\frac{3\sqrt{11}i}{44}$	0	0	0	0	0	$-\frac{\sqrt{165}}{660}$	0	$\frac{\sqrt{165}i}{660}$	0	0	0	
	0	$\frac{3\sqrt{11}i}{44}$	0	$\frac{3\sqrt{11}}{44}$	0	0	0	0	0	$\frac{\sqrt{165}i}{660}$	0	$-\frac{\sqrt{165}}{660}$	0	0	
	$\frac{3\sqrt{11}i}{44}$	0	$-\frac{3\sqrt{11}}{44}$	0	0	0	0	0	$\frac{\sqrt{165}i}{660}$	0	$\frac{\sqrt{165}}{660}$	0	0	0	
	0	0	$\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{165}}{660}$	0	$-\frac{\sqrt{165}i}{660}$	0	0	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{110}i}{220}$	$\frac{\sqrt{165}}{660}$	0	$-\frac{\sqrt{165}i}{660}$	0	0	0	0	0	0	0	
	$\frac{3\sqrt{110}i}{220}$	0	0	0	0	$-\frac{\sqrt{165}i}{660}$	0	$\frac{\sqrt{165}}{660}$	0	0	0	0	0	0	
	0	$-\frac{3\sqrt{110}i}{220}$	0	0	$-\frac{\sqrt{165}i}{660}$	0	$-\frac{\sqrt{165}}{660}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{165}}{330}$	0	$-\frac{\sqrt{165}i}{330}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{165}}{330}$	0	$-\frac{\sqrt{165}i}{330}$	0	0	0	0	0	0	0	0	0	0	0	

896 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{Q}_{4,2}^{(1,1;a)}(E_g, 2)$	0 0 0 0 0 $\frac{3\sqrt{11}i}{44}$ 0 $\frac{3\sqrt{11}}{44}$ $\frac{3\sqrt{110}i}{220}$ 0 0 0 0 $-\frac{\sqrt{165}i}{330}$	
	0 0 0 0 $\frac{3\sqrt{11}i}{44}$ 0 $-\frac{3\sqrt{11}}{44}$ 0 0 $-\frac{3\sqrt{110}i}{220}$ 0 0 $-\frac{\sqrt{165}i}{330}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{11}}{44}$ 0 $-\frac{3\sqrt{11}i}{44}$ 0 0 $-\frac{3\sqrt{110}i}{220}$ 0 0 $\frac{\sqrt{165}}{330}$	
	0 0 0 0 $-\frac{3\sqrt{11}}{44}$ 0 $-\frac{3\sqrt{11}i}{44}$ 0 0 0 0 $\frac{3\sqrt{110}i}{220}$ $-\frac{\sqrt{165}}{330}$ 0	
	0 $-\frac{3\sqrt{11}i}{44}$ 0 $-\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 $-\frac{\sqrt{165}i}{660}$ 0 $\frac{\sqrt{165}}{660}$ 0 0	
	$-\frac{3\sqrt{11}i}{44}$ 0 $\frac{3\sqrt{11}}{44}$ 0 0 0 0 0 $-\frac{\sqrt{165}i}{660}$ 0 $-\frac{\sqrt{165}}{660}$ 0 0 0	
	0 $-\frac{3\sqrt{11}i}{44}$ 0 $\frac{3\sqrt{11}i}{44}$ 0 0 0 0 0 0 $\frac{\sqrt{165}}{660}$ 0 $\frac{\sqrt{165}i}{660}$ 0 0	
	$\frac{3\sqrt{11}}{44}$ 0 $\frac{3\sqrt{11}i}{44}$ 0 0 0 0 0 0 $-\frac{\sqrt{165}}{660}$ 0 $\frac{\sqrt{165}i}{660}$ 0 0 0	
	$-\frac{3\sqrt{110}i}{220}$ 0 0 0 0 $\frac{\sqrt{165}i}{660}$ 0 $-\frac{\sqrt{165}}{660}$ 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{110}i}{220}$ 0 0 $\frac{\sqrt{165}i}{660}$ 0 $\frac{\sqrt{165}}{660}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{3\sqrt{110}i}{220}$ 0 0 $-\frac{\sqrt{165}}{660}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{110}i}{220}$ $\frac{\sqrt{165}}{660}$ 0 $-\frac{\sqrt{165}i}{660}$ 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{165}i}{330}$ 0 $-\frac{\sqrt{165}}{330}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{165}i}{330}$ 0 $\frac{\sqrt{165}}{330}$ 0 0 0 0 0 0 0 0 0 0 0 0	
$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$		

897 symmetry

continued ...

Table 10

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

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

898 symmetry

continued ...

Table 10

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

899 symmetry

z

continued ...

Table 10

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

900 symmetry

x

continued ...

Table 10

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

901 symmetry

y

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{1,2}^{(1,0;a)}(E_g)$	0	0 0 0 $\frac{3\sqrt{7}i}{28}$ 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0
	0	0 0 $\frac{3\sqrt{7}i}{28}$ 0 0 0 0 $-\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0
	0	- $\frac{3\sqrt{7}i}{28}$ 0 0 - $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{3\sqrt{7}i}{28}$	0 0 0 0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{42}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0
	0	0 0 0 - $\frac{\sqrt{42}i}{56}$ 0 0 $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0
	$-\frac{\sqrt{42}i}{56}$	0 0 0 0 0 $-\frac{\sqrt{7}i}{14}$ 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}i}{56}$ 0 0 - $\frac{\sqrt{7}i}{14}$ 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{70}i}{56}$ 0 0 0 $\frac{\sqrt{7}i}{28}$ 0 0 0
	0	0 0 0 0 - $\frac{\sqrt{70}i}{56}$ 0 0 0 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{70}i}{56}$ 0 0 $-\frac{\sqrt{7}i}{28}$ 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{28}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0
$\frac{\sqrt{10}x(x^2-3y^2)}{4}$		
902	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_3^{(1,0;a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $\frac{i}{4}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{4}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 0 0 $\frac{\sqrt{6}i}{24}$	
	0 0 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 $\frac{\sqrt{6}i}{24}$ 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{i}{4}$ 0 0 $-\frac{\sqrt{6}}{24}$	
	0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $\frac{i}{4}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $\frac{i}{4}$ 0 0 0 0 0 0	
	$-\frac{i}{4}$ 0 0 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0	
	0 $\frac{i}{4}$ 0 0 $-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 0 0	
903 symmetry		$-\frac{z(3x^2+3y^2-2z^2)}{2}$

continued ...

Table 10

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

904 symmetry

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

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{G}_3^{(1,0;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $\frac{i}{4}$ 0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{4}$	0 0 0 0 0 0 0 0 0 0 0 $-\frac{i}{4}$ 0 0 $\frac{\sqrt{6}}{24}$	0 0 0 0 0 0 0 0 0 0 0 $\frac{i}{4}$ $-\frac{\sqrt{6}}{24}$ 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{24}$	0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 $\frac{i}{4}$ 0 0 0 0 0 0 0	$\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0	0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ $\frac{i}{4}$ 0 0 0 0 0 0 0 0 0	$\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ 0 0 $-\frac{i}{4}$ 0 0 0 0 0 0 0 0	0 0 $-\frac{i}{4}$ 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 0	0 0 0 $\frac{i}{4}$ $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 0 0
	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$												
905	symmetry												

continued ...

Table 10

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

906 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{3,2}^{(1,0;a)}(E_g, 1)$	0	0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 $-\frac{i}{12}$ 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 0 $\frac{i}{12}$ $\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0
	0	$\frac{\sqrt{6}i}{12}$ 0 0 0 $\frac{i}{12}$ 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0 $-\frac{\sqrt{10}}{24}$ 0 0 0
	$\frac{\sqrt{6}i}{12}$	0 0 0 0 0 $-\frac{i}{12}$ 0 0 $\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 0 0
	0	0 0 $-\frac{i}{12}$ 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{24}$
	0	0 0 0 $\frac{i}{12}$ 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 $\frac{\sqrt{10}}{24}$ 0
	$\frac{i}{12}$	0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$
	0	$-\frac{i}{12}$ 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{10}i}{24}$ 0
	0	$\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0
	$-\frac{\sqrt{10}}{24}$	0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0
	0	$\frac{\sqrt{10}i}{24}$ 0 $\frac{\sqrt{10}}{24}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 $-\frac{i}{12}$ 0
	$\frac{\sqrt{10}i}{24}$	0 $-\frac{\sqrt{10}}{24}$ 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 $\frac{i}{12}$
	0	0 0 0 0 0 $\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 $\frac{i}{12}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{10}}{24}$ 0 $-\frac{\sqrt{10}i}{24}$ 0 0 0 0 $-\frac{i}{12}$ 0 0 0

907 symmetry

 $\sqrt{15}xyz$

continued ...

Table 10

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

908 symmetry

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

continued ...

Table 10

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

909 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{5}i}{10}$ 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{5}i}{10}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 0 $\frac{\sqrt{30}i}{30}$ 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 $-\frac{\sqrt{30}}{30}$	
	0 $-\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{24}$ $\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0	
	$\frac{\sqrt{5}i}{10}$ 0 0 0 0 $-\frac{\sqrt{30}i}{30}$ 0 $\frac{\sqrt{30}}{30}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{5}i}{10}$ 0 0 $-\frac{\sqrt{30}i}{30}$ 0 $-\frac{\sqrt{30}}{30}$ 0 0 0 0 0 0 0 0	
		$\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$

910 symmetry

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 1)$	0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 $\frac{3\sqrt{14}}{56}$ 0 0	
	$-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0	
	0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 $-\frac{3\sqrt{14}i}{56}$ 0 0	
	$-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 $\frac{3\sqrt{14}}{56}$ 0 $-\frac{3\sqrt{14}i}{56}$ 0 0 0	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 $\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$	
	0 0 0 0 0 $\frac{3\sqrt{14}i}{56}$ 0 $-\frac{3\sqrt{14}}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{84}$ 0	
	0 0 0 0 0 0 $-\frac{3\sqrt{14}}{56}$ 0 $\frac{3\sqrt{14}i}{56}$ 0 0 0 0 0 $\frac{\sqrt{210}}{84}$	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $-\frac{\sqrt{210}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{84}$ 0 $\frac{\sqrt{210}}{84}$ 0 0 0	
911	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_5^{(1,0;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{5}i}{10}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{5}i}{10}$	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 $\frac{\sqrt{30}}{30}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ $-\frac{\sqrt{30}}{30}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$	
	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 $\frac{\sqrt{30}i}{30}$ 0	
	0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{120}$ 0 0 $\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0	
	$-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{120}$ 0 0 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{120}$ $\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0 0 0	
	$-\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 $-\frac{\sqrt{5}i}{20}$ 0 0 0 0 0 0 0 0	
	0 0 $\frac{\sqrt{5}i}{10}$ 0 0 $-\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{30}i}{30}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{5}i}{10}$ $\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{30}i}{30}$ 0 0 0 0 0 0 0	

912 symmetry

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

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
913	symmetry	$-\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$

continued ...

Table 10

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

914 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 2)$	0 0 0 $-\frac{\sqrt{21}}{84}$ $-\frac{\sqrt{14}i}{168}$ 0 0 0 0 $-\frac{\sqrt{35}i}{60}$ 0 $\frac{\sqrt{35}}{60}$ 0 0	
	0 0 $\frac{\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{14}i}{168}$ 0 0 $-\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 0	
	0 $\frac{\sqrt{21}}{84}$ 0 0 0 0 $-\frac{\sqrt{14}i}{168}$ 0 0 $-\frac{\sqrt{35}}{60}$ 0 $-\frac{\sqrt{35}i}{60}$ 0 0	
	$-\frac{\sqrt{21}}{84}$ 0 0 0 0 0 0 $\frac{\sqrt{14}i}{168}$ $\frac{\sqrt{35}}{60}$ 0 $-\frac{\sqrt{35}i}{60}$ 0 0 0	
	$\frac{\sqrt{14}i}{168}$ 0 0 0 0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{210}i}{280}$ 0 0 0 0 $\frac{\sqrt{35}i}{30}$	
	0 $-\frac{\sqrt{14}i}{168}$ 0 0 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{210}i}{280}$ 0 0 $\frac{\sqrt{35}i}{30}$ 0	
	0 0 $\frac{\sqrt{14}i}{168}$ 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 0 0 $\frac{\sqrt{210}i}{280}$ 0 0 $\frac{\sqrt{35}}{30}$	
	0 0 0 $-\frac{\sqrt{14}i}{168}$ $\frac{\sqrt{21}}{21}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}i}{280}$ $-\frac{\sqrt{35}}{30}$ 0	
	0 $\frac{\sqrt{35}i}{60}$ 0 $\frac{\sqrt{35}}{60}$ $-\frac{\sqrt{210}i}{280}$ 0 0 0 0 0 0 $-\frac{5\sqrt{21}}{84}$ $-\frac{\sqrt{14}i}{84}$ 0	
	$\frac{\sqrt{35}i}{60}$ 0 $-\frac{\sqrt{35}}{60}$ 0 0 $\frac{\sqrt{210}i}{280}$ 0 0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{14}i}{84}$	
	0 $-\frac{\sqrt{35}}{60}$ 0 $\frac{\sqrt{35}i}{60}$ 0 0 $-\frac{\sqrt{210}i}{280}$ 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 0 0	
	$\frac{\sqrt{35}}{60}$ 0 $\frac{\sqrt{35}i}{60}$ 0 0 0 0 $\frac{\sqrt{210}i}{280}$ $-\frac{5\sqrt{21}}{84}$ 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}i}{30}$ 0 $-\frac{\sqrt{35}}{30}$ 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{35}i}{30}$ 0 $\frac{\sqrt{35}}{30}$ 0 0 $-\frac{\sqrt{14}i}{84}$ 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													
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 2)$	0	0	0	$\frac{\sqrt{21}i}{84}$	0	0	$\frac{\sqrt{14}i}{168}$	0	0	$\frac{\sqrt{35}}{60}$	0	$\frac{\sqrt{35}i}{60}$	0	0	0
	0	0	$\frac{\sqrt{21}i}{84}$	0	0	0	0	$-\frac{\sqrt{14}i}{168}$	$-\frac{\sqrt{35}}{60}$	0	$\frac{\sqrt{35}i}{60}$	0	0	0	0
	0	$-\frac{\sqrt{21}i}{84}$	0	0	$-\frac{\sqrt{14}i}{168}$	0	0	0	0	$-\frac{\sqrt{35}i}{60}$	0	$\frac{\sqrt{35}}{60}$	0	0	0
	$-\frac{\sqrt{21}i}{84}$	0	0	0	0	$\frac{\sqrt{14}i}{168}$	0	0	$-\frac{\sqrt{35}i}{60}$	0	$-\frac{\sqrt{35}}{60}$	0	0	0	0
	0	0	$\frac{\sqrt{14}i}{168}$	0	0	0	0	$-\frac{\sqrt{21}i}{21}$	0	0	$-\frac{\sqrt{210}i}{280}$	0	0	$-\frac{\sqrt{35}}{30}$	0
	0	0	0	$-\frac{\sqrt{14}i}{168}$	0	0	$-\frac{\sqrt{21}i}{21}$	0	0	0	$\frac{\sqrt{210}i}{280}$	$\frac{\sqrt{35}}{30}$	0	0	0
	$-\frac{\sqrt{14}i}{168}$	0	0	0	0	$\frac{\sqrt{21}i}{21}$	0	0	$\frac{\sqrt{210}i}{280}$	0	0	0	0	$\frac{\sqrt{35}i}{30}$	0
	0	$\frac{\sqrt{14}i}{168}$	0	0	$\frac{\sqrt{21}i}{21}$	0	0	0	0	$-\frac{\sqrt{210}i}{280}$	0	0	$\frac{\sqrt{35}i}{30}$	0	0
	0	$-\frac{\sqrt{35}}{60}$	0	$\frac{\sqrt{35}i}{60}$	0	0	$-\frac{\sqrt{210}i}{280}$	0	0	0	0	$\frac{5\sqrt{21}i}{84}$	0	0	0
	$\frac{\sqrt{35}}{60}$	0	$\frac{\sqrt{35}i}{60}$	0	0	0	0	$\frac{\sqrt{210}i}{280}$	0	0	$\frac{5\sqrt{21}i}{84}$	0	0	0	0
	0	$-\frac{\sqrt{35}i}{60}$	0	$-\frac{\sqrt{35}}{60}$	$\frac{\sqrt{210}i}{280}$	0	0	0	0	$-\frac{5\sqrt{21}i}{84}$	0	0	$-\frac{\sqrt{14}i}{84}$	0	0
	$-\frac{\sqrt{35}i}{60}$	0	$\frac{\sqrt{35}}{60}$	0	0	$-\frac{\sqrt{210}i}{280}$	0	0	$-\frac{5\sqrt{21}i}{84}$	0	0	0	0	$\frac{\sqrt{14}i}{84}$	0
	0	0	0	0	0	$\frac{\sqrt{35}}{30}$	0	$-\frac{\sqrt{35}i}{30}$	0	0	$\frac{\sqrt{14}i}{84}$	0	0	0	0
	0	0	0	0	$-\frac{\sqrt{35}}{30}$	0	$-\frac{\sqrt{35}i}{30}$	0	0	0	0	$-\frac{\sqrt{14}i}{84}$	0	0	0

916 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	$\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	$\frac{\sqrt{15}i}{15}$	0	0	$-\frac{\sqrt{10}}{20}$	
	0	0	0	0	$-\frac{\sqrt{6}}{24}$	0	$-\frac{\sqrt{6}i}{24}$	0	0	0	$-\frac{\sqrt{15}i}{15}$	$\frac{\sqrt{10}}{20}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{15}i}{15}$	0	0	0	0	$-\frac{\sqrt{10}i}{20}$	
	0	0	0	0	$-\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	0	0	$-\frac{\sqrt{15}i}{15}$	0	0	$-\frac{\sqrt{10}i}{20}$	0	
	0	$-\frac{\sqrt{6}}{24}$	0	$\frac{\sqrt{6}i}{24}$	0	0	0	0	$-\frac{\sqrt{10}}{40}$	0	$-\frac{\sqrt{10}i}{40}$	0	0	0	
	$\frac{\sqrt{6}}{24}$	0	$\frac{\sqrt{6}i}{24}$	0	0	0	0	$\frac{\sqrt{10}}{40}$	0	$-\frac{\sqrt{10}i}{40}$	0	0	0	0	
	0	$\frac{\sqrt{6}i}{24}$	0	$\frac{\sqrt{6}}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{40}$	0	$\frac{\sqrt{10}}{40}$	0	0	0	
	$\frac{\sqrt{6}i}{24}$	0	$-\frac{\sqrt{6}}{24}$	0	0	0	0	$-\frac{\sqrt{10}i}{40}$	0	$-\frac{\sqrt{10}}{40}$	0	0	0	0	
	0	0	$-\frac{\sqrt{15}i}{15}$	0	0	$\frac{\sqrt{10}}{40}$	0	$\frac{\sqrt{10}i}{40}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{15}i}{15}$	$-\frac{\sqrt{10}}{40}$	0	$\frac{\sqrt{10}i}{40}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{15}i}{15}$	0	0	0	0	$\frac{\sqrt{10}i}{40}$	0	$-\frac{\sqrt{10}}{40}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{15}i}{15}$	0	0	$\frac{\sqrt{10}i}{40}$	0	$\frac{\sqrt{10}}{40}$	0	0	0	0	0	0	0	
	0	$\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}i}{20}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}i}{20}$	0	0	0	0	0	0	0	0	0	0	0	
$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$															

917 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 3)$	0	0 0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $\frac{\sqrt{6}}{24}$ $-\frac{\sqrt{15}i}{15}$ 0 0 0 0 $\frac{\sqrt{10}i}{20}$
	0	0 0 0 0 $\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}i}{20}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 $\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{10}}{20}$
	0	0 0 0 0 $-\frac{\sqrt{6}}{24}$ 0 $-\frac{\sqrt{6}i}{24}$ 0 0 0 0 $-\frac{\sqrt{15}i}{15}$ $\frac{\sqrt{10}}{20}$ 0
	0	$-\frac{\sqrt{6}i}{24}$ 0 $-\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0
	$-\frac{\sqrt{6}i}{24}$	0 $\frac{\sqrt{6}}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0
	0	$-\frac{\sqrt{6}}{24}$ 0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0
	$\frac{\sqrt{6}}{24}$	0 $\frac{\sqrt{6}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{10}}{40}$ 0 $-\frac{\sqrt{10}i}{40}$ 0 0 0
	$\frac{\sqrt{15}i}{15}$	0 0 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{15}i}{15}$ 0 0 $-\frac{\sqrt{10}i}{40}$ 0 $-\frac{\sqrt{10}}{40}$ 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{15}i}{15}$ 0 0 $\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{15}i}{15}$ $-\frac{\sqrt{10}}{40}$ 0 $\frac{\sqrt{10}i}{40}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{10}i}{20}$ 0 $\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{10}i}{20}$	0 $-\frac{\sqrt{10}}{20}$ 0 0 0 0 0 0 0 0 0 0 0 0

918 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,1}^{(1,0;a)}(E_g, 4)$	0	0 0 0 0 0 $\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $-\frac{\sqrt{30}}{30}$
	0	0 0 0 0 $-\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 $\frac{\sqrt{5}i}{30}$ $\frac{\sqrt{30}}{30}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $\frac{\sqrt{2}}{24}$ $\frac{\sqrt{5}i}{30}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$
	0	0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}i}{30}$ 0
	0	$-\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0
	$\frac{\sqrt{2}}{24}$	0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0
	0	$\frac{\sqrt{2}i}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{5}i}{15}$ 0
	$\frac{\sqrt{2}i}{24}$	0 $\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{5}i}{15}$
	0	0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{120}$ 0 0 0 0 0 $\frac{\sqrt{2}}{12}$
	0	0 0 0 $\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{30}}{24}$ 0 $\frac{\sqrt{30}i}{120}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{12}$ 0
	$\frac{\sqrt{5}i}{30}$	0 0 0 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$
	0	$-\frac{\sqrt{5}i}{30}$ 0 0 $-\frac{\sqrt{30}i}{24}$ 0 $-\frac{\sqrt{30}}{120}$ 0 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$ 0
	0	$\frac{\sqrt{30}}{30}$ 0 $-\frac{\sqrt{30}i}{30}$ 0 0 0 $\frac{\sqrt{5}i}{15}$ 0 0 $-\frac{\sqrt{2}}{12}$ 0 $-\frac{\sqrt{2}i}{12}$ 0 0
	$-\frac{\sqrt{30}}{30}$	0 $-\frac{\sqrt{30}i}{30}$ 0 0 0 0 0 $-\frac{\sqrt{5}i}{15}$ $\frac{\sqrt{2}}{12}$ 0 $-\frac{\sqrt{2}i}{12}$ 0 0 0
$\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$		
919	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{G}_{5,2}^{(1,0;a)}(E_g, 4)$	0 0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $\frac{\sqrt{2}}{24}$ $\frac{\sqrt{5}i}{30}$ 0 0 0 0 $\frac{\sqrt{30}i}{30}$	
	0 0 0 0 0 $\frac{\sqrt{2}i}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}i}{30}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{2}}{24}$ 0 $\frac{\sqrt{2}i}{24}$ 0 0 $\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}}{30}$	
	0 0 0 0 0 $\frac{\sqrt{2}}{24}$ 0 $\frac{\sqrt{2}i}{24}$ 0 0 0 0 $-\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{30}}{30}$ 0	
	0 $-\frac{\sqrt{2}i}{24}$ 0 $\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{120}$ $-\frac{\sqrt{5}i}{15}$ 0	
	$-\frac{\sqrt{2}i}{24}$ 0 $-\frac{\sqrt{2}}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{120}$ 0 0 $\frac{\sqrt{5}i}{15}$	
	0 $-\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0	
	$\frac{\sqrt{2}}{24}$ 0 $-\frac{\sqrt{2}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{30}}{24}$ 0 $-\frac{\sqrt{30}i}{24}$ 0 0 0	
	$-\frac{\sqrt{5}i}{30}$ 0 0 0 0 $\frac{\sqrt{30}i}{120}$ 0 $-\frac{\sqrt{30}}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$	
	0 $\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}i}{120}$ 0 $\frac{\sqrt{30}}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}i}{12}$ 0	
	0 0 $-\frac{\sqrt{5}i}{30}$ 0 0 $\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $-\frac{\sqrt{2}}{12}$	
	0 0 0 $\frac{\sqrt{5}i}{30}$ $-\frac{\sqrt{30}}{120}$ 0 $\frac{\sqrt{30}i}{24}$ 0 0 0 0 0 $\frac{\sqrt{2}}{12}$ 0	
	0 $-\frac{\sqrt{30}i}{30}$ 0 $-\frac{\sqrt{30}}{30}$ $\frac{\sqrt{5}i}{15}$ 0 0 0 0 $-\frac{\sqrt{2}i}{12}$ 0 $\frac{\sqrt{2}}{12}$ 0 0	
	$-\frac{\sqrt{30}i}{30}$ 0 $\frac{\sqrt{30}}{30}$ 0 0 $-\frac{\sqrt{5}i}{15}$ 0 0 0 $-\frac{\sqrt{2}i}{12}$ 0 $-\frac{\sqrt{2}}{12}$ 0 0	

920 symmetry

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

continued ...

Table 10

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

921 symmetry

 $\sqrt{3}yz$

continued ...

Table 10

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

922 symmetry

 $-\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)$	0	$-\frac{5\sqrt{21}i}{84}$ 0 0 0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0
	$\frac{5\sqrt{21}i}{84}$	0 0 0 0 0 0 $\frac{5\sqrt{14}}{168}$ $-\frac{\sqrt{35}i}{84}$ 0 $-\frac{\sqrt{35}}{84}$ 0 0 0
	0	0 0 0 $-\frac{5\sqrt{21}i}{84}$ $\frac{5\sqrt{14}}{168}$ 0 0 0 $\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ 0 0
	0	0 0 $\frac{5\sqrt{21}i}{84}$ 0 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $\frac{\sqrt{35}}{84}$ 0 $-\frac{\sqrt{35}i}{84}$ 0 0
	0	0 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 $\frac{\sqrt{35}i}{42}$
	0	0 0 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ $-\frac{\sqrt{35}i}{42}$ 0
	$-\frac{5\sqrt{14}}{168}$	0 0 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$
	0	$\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 0 0 $\frac{\sqrt{35}}{42}$ 0
	0	$\frac{\sqrt{35}i}{84}$ 0 $\frac{\sqrt{35}}{84}$ 0 0 $\frac{\sqrt{210}}{168}$ 0 0 $\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0
	$-\frac{\sqrt{35}i}{84}$	0 $\frac{\sqrt{35}}{84}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ $-\frac{\sqrt{21}i}{84}$ 0 $-\frac{\sqrt{21}}{42}$ 0 0
	0	$-\frac{\sqrt{35}}{84}$ 0 $\frac{\sqrt{35}i}{84}$ $-\frac{\sqrt{210}}{168}$ 0 0 0 0 $-\frac{\sqrt{21}}{42}$ 0 $\frac{5\sqrt{21}i}{84}$ $\frac{\sqrt{14}}{84}$ 0
	$-\frac{\sqrt{35}}{84}$	0 $-\frac{\sqrt{35}i}{84}$ 0 0 0 $\frac{\sqrt{210}}{168}$ 0 0 $-\frac{\sqrt{21}}{42}$ 0 $-\frac{5\sqrt{21}i}{84}$ 0 0 $-\frac{\sqrt{14}}{84}$
	0	0 0 0 0 0 $\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{14}}{84}$ 0 0 $\frac{\sqrt{21}i}{21}$
	0	0 0 0 0 $-\frac{\sqrt{35}i}{42}$ 0 $\frac{\sqrt{35}}{42}$ 0 0 0 $-\frac{\sqrt{14}}{84}$ $-\frac{\sqrt{21}i}{21}$ 0
923 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 0 0 $-\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 $\frac{5\sqrt{14}i}{168}$ 0 $-\frac{5\sqrt{14}}{168}$ 0 0 0 0 $\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ $\frac{\sqrt{35}}{42}$ 0 0 0 0 0	
	0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 0	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	$\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $-\frac{\sqrt{210}}{168}$ 0 0 0	
	0 $-\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{35}}{21}$ 0	
	$-\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{35}}{21}$	
	0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 $-\frac{\sqrt{21}}{21}$ 0 0 $-\frac{\sqrt{14}i}{84}$	
	0 0 0 $-\frac{\sqrt{35}}{42}$ $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 $\frac{\sqrt{21}}{21}$ $\frac{\sqrt{14}i}{84}$ 0	
	$-\frac{\sqrt{35}}{42}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{21}}{21}$ 0 0 0 0 0 $\frac{\sqrt{14}}{84}$	
	0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 $\frac{\sqrt{21}}{21}$ 0 0 $\frac{\sqrt{14}}{84}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{35}}{21}$ 0 0 0 $-\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{35}}{21}$ $\frac{\sqrt{14}i}{84}$ 0 $\frac{\sqrt{14}}{84}$ 0 0 0 0	
924 symmetry $-\sqrt{3}xy$		

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)$	0 0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ $\frac{\sqrt{35}}{42}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 $-\frac{\sqrt{35}}{42}$ 0 0 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 $\frac{\sqrt{35}}{42}$ 0 0 0	
	0 0 0 0 $-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 $-\frac{\sqrt{35}}{42}$ 0 0	
	0 $\frac{5\sqrt{14}}{168}$ 0 $\frac{5\sqrt{14}i}{168}$ 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ $\frac{\sqrt{35}}{21}$ 0	
	$\frac{5\sqrt{14}}{168}$ 0 $-\frac{5\sqrt{14}i}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 $-\frac{\sqrt{35}}{21}$	
	0 $-\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0	
	$\frac{5\sqrt{14}i}{168}$ 0 $\frac{5\sqrt{14}}{168}$ 0 0 0 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0	
	$\frac{\sqrt{35}}{42}$ 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ $-\frac{\sqrt{21}}{21}$ 0 0 0 0 0 $\frac{\sqrt{14}}{84}$	
	0 $-\frac{\sqrt{35}}{42}$ 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 $\frac{\sqrt{21}}{21}$ 0 0 0 $\frac{\sqrt{14}}{84}$ 0	
	0 0 $\frac{\sqrt{35}}{42}$ 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 $\frac{\sqrt{21}}{21}$ 0 0 0 $\frac{\sqrt{14}i}{84}$	
	0 0 0 $-\frac{\sqrt{35}}{42}$ $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 $-\frac{\sqrt{21}}{21}$ $-\frac{\sqrt{14}i}{84}$ 0	
	0 0 0 0 $\frac{\sqrt{35}}{21}$ 0 0 0 0 $\frac{\sqrt{14}}{84}$ 0 $\frac{\sqrt{14}i}{84}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{35}}{21}$ 0 0 $\frac{\sqrt{14}}{84}$ 0 $-\frac{\sqrt{14}i}{84}$ 0 0 0	
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
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 1)$	0 0 0 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $\frac{\sqrt{2310}i}{308}$ 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{2310}i}{308}$ 0 $-\frac{\sqrt{2310}}{308}$ 0 0 0 0 0 $\frac{\sqrt{154}i}{77}$ 0 $-\frac{\sqrt{154}}{77}$ 0 0	
	$\frac{\sqrt{2310}i}{308}$ 0 $-\frac{\sqrt{2310}}{308}$ 0 0 0 0 0 $-\frac{\sqrt{154}i}{77}$ 0 $-\frac{\sqrt{154}}{77}$ 0 0 0	
	0 $\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ 0 0 0 0 0 0 $\frac{\sqrt{154}}{77}$ 0 $\frac{\sqrt{154}i}{77}$ 0 0	
	$\frac{\sqrt{2310}}{308}$ 0 $\frac{\sqrt{2310}i}{308}$ 0 0 0 0 0 0 $\frac{\sqrt{154}}{77}$ 0 $-\frac{\sqrt{154}i}{77}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{154}i}{77}$ 0 $\frac{\sqrt{154}}{77}$ 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{308}$	
	0 0 0 0 0 $-\frac{\sqrt{154}i}{77}$ 0 $\frac{\sqrt{154}}{77}$ 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{308}$ 0	
	0 0 0 0 0 $-\frac{\sqrt{154}}{77}$ 0 $-\frac{\sqrt{154}i}{77}$ 0 0 0 0 0 0 $\frac{\sqrt{154}i}{77}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0	
$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$		

926 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{1g}, 2)$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{440}$	0	$\frac{\sqrt{330}i}{440}$	$-\frac{9\sqrt{55}}{220}$	0		
	0	0	0	0	0	0	0	$-\frac{\sqrt{330}}{440}$	0	$-\frac{\sqrt{330}i}{440}$	0	0	$\frac{9\sqrt{55}}{220}$		
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{330}i}{88}$	0	$-\frac{\sqrt{330}}{88}$	0	0	0	
	0	0	0	0	0	0	0	$\frac{\sqrt{330}i}{88}$	0	$-\frac{\sqrt{330}}{88}$	0	0	0	0	
	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	$\frac{3\sqrt{55}}{220}$	0	0	0	0	$\frac{\sqrt{330}}{440}$	
	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	$-\frac{3\sqrt{55}}{220}$	0	0	$\frac{\sqrt{330}}{440}$	0	
	0	0	0	0	0	$\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	$-\frac{3\sqrt{55}}{220}$	0	0	$\frac{\sqrt{330}i}{440}$	
	0	0	0	0	$-\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	0	$\frac{3\sqrt{55}}{220}$	$-\frac{\sqrt{330}i}{440}$	0		
	0	$-\frac{\sqrt{330}}{440}$	0	$-\frac{\sqrt{330}i}{88}$	$\frac{3\sqrt{55}}{220}$	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	
	$-\frac{\sqrt{330}}{440}$	0	$\frac{\sqrt{330}i}{88}$	0	0	$-\frac{3\sqrt{55}}{220}$	0	0	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	0	
	0	$\frac{\sqrt{330}i}{440}$	0	$-\frac{\sqrt{330}}{88}$	0	0	$-\frac{3\sqrt{55}}{220}$	0	0	$-\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	
	$-\frac{\sqrt{330}i}{440}$	0	$-\frac{\sqrt{330}}{88}$	0	0	0	0	$\frac{3\sqrt{55}}{220}$	$\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	0	
	$-\frac{9\sqrt{55}}{220}$	0	0	0	0	$\frac{\sqrt{330}}{440}$	0	$\frac{\sqrt{330}i}{440}$	0	0	0	0	0	0	
	0	$\frac{9\sqrt{55}}{220}$	0	0	$\frac{\sqrt{330}}{440}$	0	$-\frac{\sqrt{330}i}{440}$	0	0	0	0	0	0	0	
927	symmetry	$\frac{\sqrt{70}xz(x^2 - 3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_4^{(1,0;a)}(A_{2g})$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{88}$ 0 $-\frac{\sqrt{330}}{88}$ 0 0														
	0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{88}$ 0 $-\frac{\sqrt{330}}{88}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{330}}{440}$ 0 $-\frac{\sqrt{330}i}{440}$ $\frac{9\sqrt{55}}{220}$ 0														
	0 0 0 0 0 0 0 0 $\frac{\sqrt{330}}{440}$ 0 $\frac{\sqrt{330}i}{440}$ 0 0 $-\frac{9\sqrt{55}}{220}$														
	0 0 0 0 0 $\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0 $-\frac{3\sqrt{55}}{220}$ 0 0 $\frac{\sqrt{330}i}{440}$														
	0 0 0 0 $-\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0 0 $\frac{3\sqrt{55}}{220}$ $-\frac{\sqrt{330}i}{440}$ 0														
	0 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 $-\frac{\sqrt{22}i}{44}$ $-\frac{3\sqrt{55}}{220}$ 0 0 0 0 $-\frac{\sqrt{330}}{440}$														
	0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 $\frac{\sqrt{22}i}{44}$ 0 0 $\frac{3\sqrt{55}}{220}$ 0 0 0 $-\frac{\sqrt{330}i}{440}$														
	0 $-\frac{\sqrt{330}i}{88}$ 0 $\frac{\sqrt{330}}{440}$ 0 0 $-\frac{3\sqrt{55}}{220}$ 0 0 $-\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0														
	$\frac{\sqrt{330}i}{88}$ 0 $\frac{\sqrt{330}}{440}$ 0 0 0 $\frac{3\sqrt{55}}{220}$ $\frac{\sqrt{22}i}{44}$ 0 $\frac{\sqrt{22}}{44}$ 0 0 0														
	0 $-\frac{\sqrt{330}}{88}$ 0 $-\frac{\sqrt{330}i}{440}$ $-\frac{3\sqrt{55}}{220}$ 0 0 0 0 $\frac{\sqrt{22}}{44}$ 0 $\frac{\sqrt{22}i}{44}$ 0 0														
	$-\frac{\sqrt{330}}{88}$ 0 $\frac{\sqrt{330}i}{440}$ 0 0 $\frac{3\sqrt{55}}{220}$ 0 0 $\frac{\sqrt{22}}{44}$ 0 $-\frac{\sqrt{22}i}{44}$ 0 0 0														
	0 0 $\frac{9\sqrt{55}}{220}$ 0 0 $\frac{\sqrt{330}i}{440}$ 0 $-\frac{\sqrt{330}}{440}$ 0 0 0 0 0 0														
	0 0 0 $-\frac{9\sqrt{55}}{220}$ $-\frac{\sqrt{330}i}{440}$ 0 $-\frac{\sqrt{330}}{440}$ 0 0 0 0 0 0 0														

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

928 symmetry

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 1)$	0	$-\frac{3\sqrt{154}}{308}$	0	0	$-\frac{\sqrt{231}}{308}$	0	0	0	0	$-\frac{9\sqrt{2310}}{3080}$	0	$-\frac{9\sqrt{2310}i}{3080}$	0	0	0	
	$-\frac{3\sqrt{154}}{308}$	0	0	0	0	$\frac{\sqrt{231}}{308}$	0	0	$-\frac{9\sqrt{2310}}{3080}$	0	$\frac{9\sqrt{2310}i}{3080}$	0	0	0	0	
	0	0	0	$-\frac{3\sqrt{154}}{308}$	0	0	$-\frac{\sqrt{231}}{308}$	0	0	$\frac{9\sqrt{2310}i}{3080}$	0	$-\frac{9\sqrt{2310}}{3080}$	0	0	0	
	$-\frac{\sqrt{231}}{308}$	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0	$\frac{\sqrt{385}}{385}$	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$		
	0	$\frac{\sqrt{231}}{308}$	0	0	$\frac{\sqrt{154}}{44}$	0	0	0	0	$-\frac{\sqrt{385}}{385}$	0	0	0	$\frac{3\sqrt{2310}}{3080}$	0	
	0	0	$-\frac{\sqrt{231}}{308}$	0	0	0	0	$\frac{\sqrt{154}}{44}$	0	0	$\frac{\sqrt{385}}{385}$	0	0	$-\frac{3\sqrt{2310}i}{3080}$		
	0	0	0	$\frac{\sqrt{231}}{308}$	0	0	$\frac{\sqrt{154}}{44}$	0	0	0	0	$-\frac{\sqrt{385}}{385}$	$\frac{3\sqrt{2310}i}{3080}$	0		
	0	$-\frac{9\sqrt{2310}}{3080}$	0	$\frac{9\sqrt{2310}i}{3080}$	$\frac{\sqrt{385}}{385}$	0	0	0	0	$-\frac{\sqrt{154}}{77}$	0	$\frac{3\sqrt{154}i}{308}$	$\frac{\sqrt{231}}{308}$	0		
	$-\frac{9\sqrt{2310}}{3080}$	0	$-\frac{9\sqrt{2310}i}{3080}$	0	0	$-\frac{\sqrt{385}}{385}$	0	0	$-\frac{\sqrt{154}}{77}$	0	$-\frac{3\sqrt{154}i}{308}$	0	0	$-\frac{\sqrt{231}}{308}$		
	0	$-\frac{9\sqrt{2310}i}{3080}$	0	$-\frac{9\sqrt{2310}}{3080}$	0	0	$\frac{\sqrt{385}}{385}$	0	0	$\frac{3\sqrt{154}i}{308}$	0	$\frac{\sqrt{154}}{154}$	0	0	0	
	$\frac{9\sqrt{2310}i}{3080}$	0	$-\frac{9\sqrt{2310}}{3080}$	0	0	0	0	$-\frac{\sqrt{385}}{385}$	$-\frac{3\sqrt{154}i}{308}$	0	$\frac{\sqrt{154}}{154}$	0	0	0	0	
	0	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	0	$-\frac{3\sqrt{2310}i}{3080}$	$\frac{\sqrt{231}}{308}$	0	0	0	0	$-\frac{3\sqrt{154}}{154}$		
	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	0	$\frac{3\sqrt{2310}i}{3080}$	0	0	$-\frac{\sqrt{231}}{308}$	0	0	$-\frac{3\sqrt{154}}{154}$	0		

929 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 1)$	0	$\frac{3\sqrt{154}i}{308}$	0	0	0	0	$\frac{\sqrt{231}}{308}$	0	0	$-\frac{9\sqrt{2310}i}{3080}$	0	$\frac{9\sqrt{2310}}{3080}$	0	0	
	$-\frac{3\sqrt{154}i}{308}$	0	0	0	0	0	0	$-\frac{\sqrt{231}}{308}$	$\frac{9\sqrt{2310}i}{3080}$	0	$\frac{9\sqrt{2310}}{3080}$	0	0	0	
	0	0	0	$\frac{3\sqrt{154}i}{308}$	$-\frac{\sqrt{231}}{308}$	0	0	0	$-\frac{9\sqrt{2310}}{3080}$	0	$-\frac{9\sqrt{2310}i}{3080}$	0	0	0	
	0	0	$-\frac{3\sqrt{154}i}{308}$	0	0	$\frac{\sqrt{231}}{308}$	0	0	$-\frac{9\sqrt{2310}}{3080}$	0	$\frac{9\sqrt{2310}i}{3080}$	0	0	0	
	0	0	$-\frac{\sqrt{231}}{308}$	0	0	$-\frac{\sqrt{154}i}{44}$	0	0	0	0	$-\frac{\sqrt{385}}{385}$	0	0	$\frac{3\sqrt{2310}i}{3080}$	
	0	0	0	$\frac{\sqrt{231}}{308}$	$\frac{\sqrt{154}i}{44}$	0	0	0	0	0	$\frac{\sqrt{385}}{385}$	$-\frac{3\sqrt{2310}i}{3080}$	0	0	
	$\frac{\sqrt{231}}{308}$	0	0	0	0	0	0	$-\frac{\sqrt{154}i}{44}$	$\frac{\sqrt{385}}{385}$	0	0	0	0	$\frac{3\sqrt{2310}}{3080}$	
	0	$-\frac{\sqrt{231}}{308}$	0	0	0	0	$\frac{\sqrt{154}i}{44}$	0	0	$-\frac{\sqrt{385}}{385}$	0	0	$\frac{3\sqrt{2310}}{3080}$	0	
	0	$-\frac{9\sqrt{2310}i}{3080}$	0	$-\frac{9\sqrt{2310}}{3080}$	0	0	$\frac{\sqrt{385}}{385}$	0	0	$-\frac{\sqrt{154}i}{154}$	0	$-\frac{3\sqrt{154}}{308}$	0	0	
	$\frac{9\sqrt{2310}i}{3080}$	0	$-\frac{9\sqrt{2310}}{3080}$	0	0	0	0	$-\frac{\sqrt{385}}{385}$	$\frac{\sqrt{154}i}{154}$	0	$-\frac{3\sqrt{154}}{308}$	0	0	0	
	0	$\frac{9\sqrt{2310}}{3080}$	0	$-\frac{9\sqrt{2310}i}{3080}$	$-\frac{\sqrt{385}}{385}$	0	0	0	0	$-\frac{3\sqrt{154}}{308}$	0	$\frac{\sqrt{154}i}{77}$	$\frac{\sqrt{231}}{308}$	0	
	$\frac{9\sqrt{2310}}{3080}$	0	$\frac{9\sqrt{2310}i}{3080}$	0	0	$\frac{\sqrt{385}}{385}$	0	0	$-\frac{3\sqrt{154}}{308}$	0	$-\frac{\sqrt{154}i}{77}$	0	0	$-\frac{\sqrt{231}}{308}$	
	0	0	0	0	0	$\frac{3\sqrt{2310}i}{3080}$	0	$\frac{3\sqrt{2310}}{3080}$	0	0	$\frac{\sqrt{231}}{308}$	0	0	$\frac{3\sqrt{154}i}{154}$	
	0	0	0	0	$-\frac{3\sqrt{2310}i}{3080}$	0	$\frac{3\sqrt{2310}}{3080}$	0	0	0	$-\frac{\sqrt{231}}{308}$	$-\frac{3\sqrt{154}i}{154}$	0	0	
930	symmetry	$\frac{\sqrt{35}(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 2)$	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{110}i}{220}$		
	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	$-\frac{3\sqrt{110}i}{220}$	0	0		
	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	0	0	$-\frac{3\sqrt{110}}{220}$		
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	0	0	$-\frac{3\sqrt{110}}{220}$	0		
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	
	0	0	0	0	0	0	$\frac{\sqrt{11}}{11}$	$\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	
	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	0	0	$\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	
	0	0	0	0	$\frac{\sqrt{11}}{11}$	0	0	$\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	0	0	
	0	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{165}}{55}$	$\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	0	
	$\frac{\sqrt{165}}{55}$	0	0	0	0	$\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{165}}{55}$	0	0	$\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	0	
	0	$\frac{3\sqrt{110}i}{220}$	0	$-\frac{3\sqrt{110}}{220}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{110}i}{220}$	0	$-\frac{3\sqrt{110}}{220}$	0	0	0	0	0	0	0	0	0	0	0	
931	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 2)$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	0	0	0	0	$\frac{3\sqrt{110}}{220}$	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{110}}{220}$	0		
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{55}$	0	0	$\frac{3\sqrt{110}i}{220}$		
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{55}$	$-\frac{3\sqrt{110}i}{220}$	0		
	0	0	0	0	$\frac{\sqrt{11}}{11}$	0	0	0	0	$-\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{11}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	
	$-\frac{\sqrt{165}}{55}$	0	0	0	0	$-\frac{\sqrt{110}}{220}$	0	$-\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}}{220}$	0	$\frac{\sqrt{110}i}{220}$	0	0	0	0	0	0	0	
	0	0	$\frac{\sqrt{165}}{55}$	0	0	$-\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{165}}{55}$	$\frac{\sqrt{110}i}{220}$	0	$\frac{\sqrt{110}}{220}$	0	0	0	0	0	0	0	
	0	$\frac{3\sqrt{110}}{220}$	0	$\frac{3\sqrt{110}i}{220}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{3\sqrt{110}}{220}$	0	$-\frac{3\sqrt{110}i}{220}$	0	0	0	0	0	0	0	0	0	0	0	

932 symmetry

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

continued ...

Table 10

No.	multipole	matrix															
$\mathbb{T}_{4,1}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	$\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{770}i}{440}$			
	0	0	0	0	$-\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	$-\frac{3\sqrt{1155}}{770}$	$\frac{3\sqrt{770}i}{440}$	0	0			
	0	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	$-\frac{3\sqrt{1155}}{770}$	0	0	0	0	$-\frac{3\sqrt{770}}{440}$			
	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	0	$-\frac{3\sqrt{770}}{440}$	0		
	0	$\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0		
	$-\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$-\frac{\sqrt{770}}{616}$	0	0	0	0		
	0	$\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	$\frac{\sqrt{1155}}{770}$	0			
	$\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$\frac{19\sqrt{770}i}{3080}$	0	0	$-\frac{\sqrt{1155}}{770}$			
	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{19\sqrt{770}}{3080}$	0	0	$-\frac{\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{462}i}{616}$			
	0	0	0	$\frac{3\sqrt{1155}}{770}$	$\frac{\sqrt{770}i}{616}$	0	$\frac{19\sqrt{770}}{3080}$	0	0	0	$\frac{\sqrt{77}}{77}$	$\frac{3\sqrt{462}i}{616}$	0				
	$\frac{3\sqrt{1155}}{770}$	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{19\sqrt{770}i}{3080}$	$-\frac{\sqrt{77}}{77}$	0	0	0	0	$\frac{3\sqrt{462}}{616}$			
	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{\sqrt{770}}{616}$	0	$\frac{19\sqrt{770}i}{3080}$	0	0	$\frac{\sqrt{77}}{77}$	0	0	$\frac{3\sqrt{462}}{616}$	0			
	0	$-\frac{3\sqrt{770}i}{440}$	0	$-\frac{3\sqrt{770}}{440}$	0	0	$\frac{\sqrt{1155}}{770}$	0	0	$-\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0		
	$\frac{3\sqrt{770}i}{440}$	0	$-\frac{3\sqrt{770}}{440}$	0	0	0	0	$-\frac{\sqrt{1155}}{770}$	$\frac{3\sqrt{462}i}{616}$	0	$\frac{3\sqrt{462}}{616}$	0	0	0	0		

933 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{4,2}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	$-\frac{3\sqrt{1155}}{770}$	0	0	0	0	0	$-\frac{3\sqrt{770}}{440}$	
	0	0	0	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	$\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{3\sqrt{770}}{440}$	0		
	0	0	0	0	0	$-\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{770}i}{440}$		
	0	0	0	0	$\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	$\frac{3\sqrt{1155}}{770}$	$-\frac{3\sqrt{770}i}{440}$	0			
	0	$-\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$-\frac{19\sqrt{770}i}{3080}$	$\frac{\sqrt{1155}}{770}$	0			
	$-\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$\frac{19\sqrt{770}i}{3080}$	0	0	$-\frac{\sqrt{1155}}{770}$		
	0	$\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0		
	$-\frac{3\sqrt{462}i}{616}$	0	$-\frac{3\sqrt{462}}{616}$	0	0	0	0	0	$-\frac{\sqrt{770}i}{616}$	0	$\frac{\sqrt{770}}{616}$	0	0	0		
	$-\frac{3\sqrt{1155}}{770}$	0	0	0	0	$\frac{19\sqrt{770}}{3080}$	0	$\frac{\sqrt{770}i}{616}$	$-\frac{\sqrt{77}}{77}$	0	0	0	0	$\frac{3\sqrt{462}}{616}$		
	0	$\frac{3\sqrt{1155}}{770}$	0	0	$\frac{19\sqrt{770}}{3080}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	$\frac{\sqrt{77}}{77}$	0	0	$\frac{3\sqrt{462}}{616}$	0		
	0	0	$-\frac{3\sqrt{1155}}{770}$	0	0	$-\frac{19\sqrt{770}i}{3080}$	0	$\frac{\sqrt{770}}{616}$	0	0	$\frac{\sqrt{77}}{77}$	0	0	$\frac{3\sqrt{462}i}{616}$		
	0	0	0	$\frac{3\sqrt{1155}}{770}$	$\frac{19\sqrt{770}i}{3080}$	0	$\frac{\sqrt{770}}{616}$	0	0	0	0	$-\frac{\sqrt{77}}{77}$	$-\frac{3\sqrt{462}i}{616}$	0		
	0	$-\frac{3\sqrt{770}}{440}$	0	$\frac{3\sqrt{770}i}{440}$	$\frac{\sqrt{1155}}{770}$	0	0	0	0	$\frac{3\sqrt{462}}{616}$	0	$\frac{3\sqrt{462}i}{616}$	0	0		
	$-\frac{3\sqrt{770}}{440}$	0	$-\frac{3\sqrt{770}i}{440}$	0	0	$-\frac{\sqrt{1155}}{770}$	0	0	$\frac{3\sqrt{462}}{616}$	0	$-\frac{3\sqrt{462}i}{616}$	0	0	0		

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 0 0 $\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 0 0 0 0														
	0 0 0 0 $-\frac{\sqrt{66}i}{264}$ 0 $-\frac{\sqrt{66}}{264}$ 0 0 0 0 0 0 0														
	0 0 0 0 0 $\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 0														
	0 0 0 0 $\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 0 0														
	0 $\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0														
	$-\frac{\sqrt{66}i}{264}$ 0 $\frac{\sqrt{66}}{264}$ 0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $\frac{\sqrt{110}}{88}$ 0 0 0														
	0 $-\frac{\sqrt{66}}{264}$ 0 $\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0														
	$-\frac{\sqrt{66}}{264}$ 0 $-\frac{\sqrt{66}i}{264}$ 0 0 0 0 0 $-\frac{\sqrt{110}}{88}$ 0 $\frac{\sqrt{110}i}{88}$ 0 0 0														
	0 0 0 0 0 $-\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 0 $\frac{5\sqrt{66}i}{132}$														
	0 0 0 0 0 $\frac{\sqrt{110}i}{88}$ 0 $-\frac{\sqrt{110}}{88}$ 0 0 0 0 0 $-\frac{5\sqrt{66}i}{132}$ 0														
	0 0 0 0 0 $\frac{\sqrt{110}}{88}$ 0 $-\frac{\sqrt{110}i}{88}$ 0 0 0 0 0 0 $\frac{5\sqrt{66}}{132}$														
	0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{66}i}{132}$ 0 $\frac{5\sqrt{66}}{132}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{66}i}{132}$ 0 $\frac{5\sqrt{66}}{132}$ 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
		$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{14} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 2)$		$-\frac{\sqrt{210}yz(3x^2-y^2)(3x^2+3y^2-8z^2)}{16}$
936	symmetry	

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_6^{(1,0;a)}(A_{1g}, 3)$	0 0 0 0 0 0 0 0 0 $-\frac{3\sqrt{154}}{616}$ 0 $\frac{3\sqrt{154}i}{616}$ $\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{3\sqrt{154}}{616}$ 0 $-\frac{3\sqrt{154}i}{616}$ 0 0 $-\frac{\sqrt{231}}{154}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{88}$ 0 $\frac{\sqrt{154}}{88}$ 0 $\frac{\sqrt{154}}{88}$ 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{154}i}{88}$ 0 $\frac{\sqrt{154}}{88}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $\frac{\sqrt{2310}i}{308}$ $\frac{3\sqrt{231}}{308}$ 0 0 0 $-\frac{\sqrt{154}}{77}$	
	0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{154}}{77}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{154}i}{77}$	
	0 0 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0 0 $\frac{3\sqrt{231}}{308}$ $\frac{\sqrt{154}i}{77}$ 0	
	0 $-\frac{3\sqrt{154}}{616}$ 0 $\frac{\sqrt{154}i}{88}$ $\frac{3\sqrt{231}}{308}$ 0 0 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ 0 0	
	$-\frac{3\sqrt{154}}{616}$ 0 $-\frac{\sqrt{154}i}{88}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{2310}}{308}$ 0 $\frac{\sqrt{2310}i}{308}$ 0 0 0	
	0 $\frac{3\sqrt{154}i}{616}$ 0 $\frac{\sqrt{154}}{88}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0	
	$-\frac{3\sqrt{154}i}{616}$ 0 $\frac{\sqrt{154}}{88}$ 0 0 0 0 $\frac{3\sqrt{231}}{308}$ $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0	
	$\frac{\sqrt{231}}{154}$ 0 0 0 0 $-\frac{\sqrt{154}}{77}$ 0 $-\frac{\sqrt{154}i}{77}$ 0 0 0 0 0 0	
	0 $-\frac{\sqrt{231}}{154}$ 0 0 $-\frac{\sqrt{154}}{77}$ 0 $\frac{\sqrt{154}i}{77}$ 0 0 0 0 0 0 0	
$\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$		

937 symmetry

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
938	symmetry	$-\frac{\sqrt{210}xz(x^2-3y^2)(3x^2+3y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_6^{(1,0;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{154}i}{88}$ 0 $\frac{\sqrt{154}}{88}$ 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{154}i}{88}$ 0 $\frac{\sqrt{154}}{88}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 $-\frac{3\sqrt{154}i}{616}$ $-\frac{\sqrt{231}}{154}$ 0	
	0 0 0 0 0 0 0 0 $\frac{3\sqrt{154}}{616}$ 0 $\frac{3\sqrt{154}i}{616}$ 0 0 $\frac{\sqrt{231}}{154}$	
	0 0 0 0 0 $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{154}i}{77}$	
	0 0 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0 0 0 $\frac{3\sqrt{231}}{308}$ $\frac{\sqrt{154}i}{77}$ 0	
	0 0 0 0 0 $\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ $-\frac{3\sqrt{231}}{308}$ 0 0 0 0 $\frac{\sqrt{154}}{77}$	
	0 0 0 $\frac{\sqrt{2310}}{308}$ 0 0 $-\frac{3\sqrt{231}}{308}$ 0 0 $-\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0	
	$-\frac{\sqrt{154}i}{88}$ 0 $\frac{3\sqrt{154}}{616}$ 0 0 0 0 $\frac{3\sqrt{231}}{308}$ $\frac{\sqrt{2310}i}{308}$ 0 $\frac{\sqrt{2310}}{308}$ 0 0	
	0 $\frac{\sqrt{154}}{88}$ 0 $-\frac{3\sqrt{154}i}{616}$ $-\frac{3\sqrt{231}}{308}$ 0 0 0 0 $\frac{\sqrt{2310}}{308}$ 0 $\frac{\sqrt{2310}i}{308}$ 0 0	
	$\frac{\sqrt{154}}{88}$ 0 $\frac{3\sqrt{154}i}{616}$ 0 0 $\frac{3\sqrt{231}}{308}$ 0 0 $\frac{\sqrt{2310}}{308}$ 0 $-\frac{\sqrt{2310}i}{308}$ 0 0 0	
	0 0 $-\frac{\sqrt{231}}{154}$ 0 0 $-\frac{\sqrt{154}i}{77}$ 0 $\frac{\sqrt{154}}{77}$ 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{231}}{154}$ $\frac{\sqrt{154}i}{77}$ 0 $\frac{\sqrt{154}}{77}$ 0 0 0 0 0 0 0	

939 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 1)$	0	$-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ $\frac{5\sqrt{21}}{84}$ 0 0 0 0 $-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0
	$-\frac{\sqrt{14}}{28}$	0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0
	0	$\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0
	$-\frac{\sqrt{14}i}{28}$	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $\frac{5\sqrt{21}}{84}$ $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0
	$\frac{5\sqrt{21}}{84}$	0 0 0 0 0 $-\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0
	0	$-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 0
	0	0 $-\frac{5\sqrt{21}}{84}$ 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0
	0	0 0 0 $\frac{5\sqrt{21}}{84}$ $\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{210}}{168}$	0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{210}i}{168}$	0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0

940 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 1)$	0	$\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 $-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0
	$-\frac{\sqrt{14}i}{28}$	0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 $\frac{5\sqrt{21}}{84}$ $\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0
	0	$\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ $-\frac{5\sqrt{21}}{84}$ 0 0 0 0 $\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0
	$\frac{\sqrt{14}}{28}$	0 $\frac{\sqrt{14}i}{28}$ 0 0 0 $\frac{5\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{210}}{168}$ 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0
	0	0 $-\frac{5\sqrt{21}}{84}$ 0 0 $-\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 0
	0	0 0 $\frac{5\sqrt{21}}{84}$ $\frac{\sqrt{14}i}{28}$ 0 $\frac{\sqrt{14}}{28}$ 0 0 0 0 0 0 0 0
	$-\frac{5\sqrt{21}}{84}$	0 0 0 0 0 $\frac{\sqrt{14}}{28}$ 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0
	0	$\frac{5\sqrt{21}}{84}$ 0 0 $\frac{\sqrt{14}}{28}$ 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{210}i}{168}$ 0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{210}i}{168}$	0 $\frac{\sqrt{210}}{168}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{210}}{168}$ 0 $\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{210}}{168}$	0 0 $-\frac{\sqrt{210}i}{168}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0

941 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 2)$	0	$\frac{\sqrt{231}}{924}$ 0 0 $\frac{\sqrt{154}}{1848}$ 0 0 0 0 $\frac{\sqrt{385}}{462}$ 0 $\frac{\sqrt{385}i}{462}$ 0 0
	$\frac{\sqrt{231}}{924}$	0 0 0 0 0 $-\frac{\sqrt{154}}{1848}$ 0 0 $\frac{\sqrt{385}}{462}$ 0 $-\frac{\sqrt{385}i}{462}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{231}}{924}$ 0 0 $\frac{\sqrt{154}}{1848}$ 0 0 $-\frac{\sqrt{385}i}{462}$ 0 $\frac{\sqrt{385}}{462}$ 0 0
	0	0 0 $\frac{\sqrt{231}}{924}$ 0 0 0 0 $-\frac{\sqrt{154}}{1848}$ $\frac{\sqrt{385}i}{462}$ 0 $\frac{\sqrt{385}}{462}$ 0 0 0
	$\frac{\sqrt{154}}{1848}$	0 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 0 0 $-\frac{2\sqrt{385}}{231}$
	0	$-\frac{\sqrt{154}}{1848}$ 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 $\frac{\sqrt{2310}}{1848}$ 0 0 $-\frac{2\sqrt{385}}{231}$ 0
	0	0 0 $\frac{\sqrt{154}}{1848}$ 0 0 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 $\frac{2\sqrt{385}i}{231}$
	0	0 0 0 $-\frac{\sqrt{154}}{1848}$ 0 0 $-\frac{\sqrt{231}}{154}$ 0 0 0 0 $\frac{\sqrt{2310}}{1848}$ $-\frac{2\sqrt{385}i}{231}$ 0
	0	$\frac{\sqrt{385}}{462}$ 0 $-\frac{\sqrt{385}i}{462}$ $-\frac{\sqrt{2310}}{1848}$ 0 0 0 0 $\frac{5\sqrt{231}}{924}$ 0 $\frac{5\sqrt{231}i}{462}$ $\frac{5\sqrt{154}}{924}$ 0
	$\frac{\sqrt{385}}{462}$	0 $\frac{\sqrt{385}i}{462}$ 0 0 $\frac{\sqrt{2310}}{1848}$ 0 0 $\frac{5\sqrt{231}}{924}$ 0 $-\frac{5\sqrt{231}i}{462}$ 0 0 0 $-\frac{5\sqrt{154}}{924}$
	0	$\frac{\sqrt{385}i}{462}$ 0 $\frac{\sqrt{385}}{462}$ 0 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 $\frac{5\sqrt{231}i}{462}$ 0 $\frac{25\sqrt{231}}{924}$ 0 0
	$-\frac{\sqrt{385}i}{462}$	0 $\frac{\sqrt{385}}{462}$ 0 0 0 0 0 $\frac{\sqrt{2310}}{1848}$ $-\frac{5\sqrt{231}i}{462}$ 0 $\frac{25\sqrt{231}}{924}$ 0 0 0
	0	0 0 0 0 0 $-\frac{2\sqrt{385}}{231}$ 0 $\frac{2\sqrt{385}i}{231}$ $\frac{5\sqrt{154}}{924}$ 0 0 0 0 $-\frac{5\sqrt{231}}{231}$
	0	0 0 0 0 $-\frac{2\sqrt{385}}{231}$ 0 $-\frac{2\sqrt{385}i}{231}$ 0 0 0 $-\frac{5\sqrt{154}}{924}$ 0 0 0 $-\frac{5\sqrt{231}}{231}$

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
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 2)$	0	$-\frac{\sqrt{231}i}{924}$ 0 0 0 0 0 $-\frac{\sqrt{154}}{1848}$ 0 0 $\frac{\sqrt{385}i}{462}$ 0 $-\frac{\sqrt{385}}{462}$ 0 0
	$\frac{\sqrt{231}i}{924}$	0 0 0 0 0 0 $\frac{\sqrt{154}}{1848}$ $-\frac{\sqrt{385}i}{462}$ 0 $-\frac{\sqrt{385}}{462}$ 0 0 0
	0	0 0 0 $-\frac{\sqrt{231}i}{924}$ $\frac{\sqrt{154}}{1848}$ 0 0 0 $\frac{\sqrt{385}}{462}$ 0 $\frac{\sqrt{385}i}{462}$ 0 0 0
	0	0 0 $\frac{\sqrt{231}i}{924}$ 0 0 $-\frac{\sqrt{154}}{1848}$ 0 0 $\frac{\sqrt{385}}{462}$ 0 $-\frac{\sqrt{385}i}{462}$ 0 0 0
	0	0 0 $\frac{\sqrt{154}}{1848}$ 0 0 $\frac{\sqrt{231}i}{154}$ 0 0 0 0 $\frac{\sqrt{2310}}{1848}$ 0 0 $-\frac{2\sqrt{385}i}{231}$
	0	0 0 0 $-\frac{\sqrt{154}}{1848}$ $-\frac{\sqrt{231}i}{154}$ 0 0 0 0 0 $-\frac{\sqrt{2310}}{1848}$ $\frac{2\sqrt{385}i}{231}$ 0
	$-\frac{\sqrt{154}}{1848}$	0 0 0 0 0 0 $\frac{\sqrt{231}i}{154}$ $-\frac{\sqrt{2310}}{1848}$ 0 0 0 0 $-\frac{2\sqrt{385}i}{231}$
	0	$\frac{\sqrt{154}}{1848}$ 0 0 0 0 $-\frac{\sqrt{231}i}{154}$ 0 0 $\frac{\sqrt{2310}}{1848}$ 0 0 $-\frac{2\sqrt{385}i}{231}$ 0
	0	$\frac{\sqrt{385}i}{462}$ 0 $\frac{\sqrt{385}}{462}$ 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 $-\frac{25\sqrt{231}i}{924}$ 0 $-\frac{5\sqrt{231}}{462}$ 0 0
	$-\frac{\sqrt{385}i}{462}$	0 $\frac{\sqrt{385}}{462}$ 0 0 0 0 $\frac{\sqrt{2310}}{1848}$ $\frac{25\sqrt{231}i}{924}$ 0 $-\frac{5\sqrt{231}}{462}$ 0 0 0
	0	$-\frac{\sqrt{385}}{462}$ 0 $\frac{\sqrt{385}i}{462}$ $\frac{\sqrt{2310}}{1848}$ 0 0 0 0 $-\frac{5\sqrt{231}}{462}$ 0 $-\frac{5\sqrt{231}i}{924}$ $\frac{5\sqrt{154}}{924}$ 0
	$-\frac{\sqrt{385}}{462}$	0 $-\frac{\sqrt{385}i}{462}$ 0 0 0 $-\frac{\sqrt{2310}}{1848}$ 0 0 $-\frac{5\sqrt{231}}{462}$ 0 $\frac{5\sqrt{231}i}{924}$ 0 0 $-\frac{5\sqrt{154}}{924}$
	0	0 0 0 0 $-\frac{2\sqrt{385}i}{231}$ 0 $-\frac{2\sqrt{385}}{231}$ 0 0 $\frac{5\sqrt{154}}{924}$ 0 0 $\frac{5\sqrt{231}i}{231}$
	0	0 0 0 0 $\frac{2\sqrt{385}i}{231}$ 0 $-\frac{2\sqrt{385}}{231}$ 0 0 0 0 $-\frac{5\sqrt{154}}{924}$ $-\frac{5\sqrt{231}i}{231}$ 0
$-\frac{3\sqrt{7}(x^2+y^2-10z^2)(x^2-2xy-y^2)(x^2+2xy-y^2)}{16}$		

943 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}i}{308}$	
	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{\sqrt{770}i}{308}$	0	
	0	0	0	0	0	$\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	$-\frac{\sqrt{1155}}{231}$	0	0	0	0	$\frac{\sqrt{770}}{308}$	
	0	0	0	0	$\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$\frac{\sqrt{770}}{308}$	0	
	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	
	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	$\frac{2\sqrt{77}}{77}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	
	0	$\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	$-\frac{2\sqrt{77}}{77}$	0	0	0	0	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	
	$\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	0	0	$\frac{2\sqrt{77}}{77}$	0	0	$\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	0	
	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{1155}}{231}$	0	0	0	0	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{1155}}{231}$	0	0	$\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{770}i}{308}$	0	$\frac{\sqrt{770}}{308}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{770}i}{308}$	0	$\frac{\sqrt{770}}{308}$	0	0	0	0	0	0	0	0	0	0	0	

944 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 3)$	0	0	0	0	0	$-\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{\sqrt{770}}{308}$		
	0	0	0	0	$-\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}}{308}$	0		
	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}i}{308}$		
	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{\sqrt{770}i}{308}$	0		
	0	$-\frac{\sqrt{462}}{168}$	0	$\frac{\sqrt{462}i}{168}$	$\frac{2\sqrt{77}}{77}$	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0		
	$-\frac{\sqrt{462}}{168}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0		
	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{2\sqrt{77}}{77}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0		
	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{2\sqrt{77}}{77}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0		
	$\frac{\sqrt{1155}}{231}$	0	0	0	0	$-\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0		
	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0	0	0	0		
	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0		
	0	0	0	$\frac{\sqrt{1155}}{231}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	0	0	0		
	0	$-\frac{\sqrt{770}}{308}$	0	$-\frac{\sqrt{770}i}{308}$	0	0	0	0	0	0	0	0	0	0		
	$-\frac{\sqrt{770}}{308}$	0	$\frac{\sqrt{770}i}{308}$	0	0	0	0	0	0	0	0	0	0	0		

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

945 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{T}_{6,1}^{(1,0;a)}(E_g, 4)$	0 0 0 0 0 $-\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 $-\frac{\sqrt{154}}{462}$ 0 0 $\frac{\sqrt{231}i}{154}$	
	0 0 0 0 $\frac{\sqrt{385}i}{924}$ 0 $-\frac{\sqrt{385}}{924}$ 0 0 0 0 $\frac{\sqrt{154}}{462}$ $-\frac{\sqrt{231}i}{154}$ 0	
	0 0 0 0 0 $\frac{\sqrt{385}}{924}$ 0 $-\frac{\sqrt{385}i}{924}$ $\frac{\sqrt{154}}{462}$ 0 0 0 0 $\frac{\sqrt{231}}{154}$	
	0 0 0 0 $\frac{\sqrt{385}}{924}$ 0 $\frac{\sqrt{385}i}{924}$ 0 0 0 $-\frac{\sqrt{154}}{462}$ 0 0 0 $\frac{\sqrt{231}}{154}$	
	0 $-\frac{\sqrt{385}i}{924}$ 0 $\frac{\sqrt{385}}{924}$ 0 0 0 0 0 $\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{66}$ 0 0	
	$\frac{\sqrt{385}i}{924}$ 0 $\frac{\sqrt{385}}{924}$ 0 0 0 0 0 $-\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{66}$ 0 0	
	0 $-\frac{\sqrt{385}}{924}$ 0 $-\frac{\sqrt{385}i}{924}$ 0 0 0 0 0 $\frac{\sqrt{231}}{231}$ 0 $-\frac{\sqrt{231}i}{231}$ $-\frac{2\sqrt{154}}{231}$ 0	
	$-\frac{\sqrt{385}}{924}$ 0 $\frac{\sqrt{385}i}{924}$ 0 0 0 0 0 $\frac{\sqrt{231}}{231}$ 0 $\frac{\sqrt{231}i}{231}$ 0 0 $\frac{2\sqrt{154}}{231}$	
	0 0 $\frac{\sqrt{154}}{462}$ 0 0 $\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{231}$ 0 0 $-\frac{\sqrt{2310}}{462}$ 0 0 $-\frac{5\sqrt{385}i}{462}$	
	0 0 0 $-\frac{\sqrt{154}}{462}$ $-\frac{\sqrt{231}i}{66}$ 0 $\frac{\sqrt{231}}{231}$ 0 0 0 0 $\frac{\sqrt{2310}}{462}$ $\frac{5\sqrt{385}i}{462}$ 0	
	$-\frac{\sqrt{154}}{462}$ 0 0 0 0 $\frac{\sqrt{231}}{66}$ 0 $-\frac{\sqrt{231}i}{231}$ $-\frac{\sqrt{2310}}{462}$ 0 0 0 0 $\frac{5\sqrt{385}}{462}$	
	0 $\frac{\sqrt{154}}{462}$ 0 0 $\frac{\sqrt{231}}{66}$ 0 $\frac{\sqrt{231}i}{231}$ 0 0 $\frac{\sqrt{2310}}{462}$ 0 0 $\frac{5\sqrt{385}}{462}$ 0	
	0 $\frac{\sqrt{231}i}{154}$ 0 $\frac{\sqrt{231}}{154}$ 0 0 $-\frac{2\sqrt{154}}{231}$ 0 0 $-\frac{5\sqrt{385}i}{462}$ 0 $\frac{5\sqrt{385}}{462}$ 0 0	
	$-\frac{\sqrt{231}i}{154}$ 0 $\frac{\sqrt{231}}{154}$ 0 0 0 0 $\frac{2\sqrt{154}}{231}$ $\frac{5\sqrt{385}i}{462}$ 0 $\frac{5\sqrt{385}}{462}$ 0 0	
$-\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$		

946 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{T}_{6,2}^{(1,0;a)}(E_g, 4)$	0	0	0	0	0	$\frac{\sqrt{385}}{924}$	0	$-\frac{\sqrt{385}i}{924}$	$\frac{\sqrt{154}}{462}$	0	0	0	0	$\frac{\sqrt{231}}{154}$	
	0	0	0	0	$\frac{\sqrt{385}}{924}$	0	$\frac{\sqrt{385}i}{924}$	0	0	$-\frac{\sqrt{154}}{462}$	0	0	$\frac{\sqrt{231}}{154}$	0	
	0	0	0	0	0	$\frac{\sqrt{385}i}{924}$	0	$\frac{\sqrt{385}}{924}$	0	0	$\frac{\sqrt{154}}{462}$	0	0	$-\frac{\sqrt{231}i}{154}$	
	0	0	0	0	$-\frac{\sqrt{385}i}{924}$	0	$\frac{\sqrt{385}}{924}$	0	0	0	0	$-\frac{\sqrt{154}}{462}$	$\frac{\sqrt{231}i}{154}$	0	
	0	$\frac{\sqrt{385}}{924}$	0	$\frac{\sqrt{385}i}{924}$	0	0	0	0	0	$\frac{\sqrt{231}}{231}$	0	$-\frac{\sqrt{231}i}{231}$	$-\frac{2\sqrt{154}}{231}$	0	
	$\frac{\sqrt{385}}{924}$	0	$-\frac{\sqrt{385}i}{924}$	0	0	0	0	0	$\frac{\sqrt{231}}{231}$	0	$\frac{\sqrt{231}i}{231}$	0	0	$\frac{2\sqrt{154}}{231}$	
	0	$-\frac{\sqrt{385}i}{924}$	0	$\frac{\sqrt{385}}{924}$	0	0	0	0	0	$-\frac{\sqrt{231}i}{66}$	0	$-\frac{\sqrt{231}}{66}$	0	0	
	$\frac{\sqrt{385}i}{924}$	0	$\frac{\sqrt{385}}{924}$	0	0	0	0	0	$\frac{\sqrt{231}i}{66}$	0	$-\frac{\sqrt{231}}{66}$	0	0	0	
	$\frac{\sqrt{154}}{462}$	0	0	0	0	$\frac{\sqrt{231}}{231}$	0	$-\frac{\sqrt{231}i}{66}$	$-\frac{\sqrt{231}0}{462}$	0	0	0	0	$\frac{5\sqrt{385}}{462}$	
	0	$-\frac{\sqrt{154}}{462}$	0	0	$\frac{\sqrt{231}}{231}$	0	$\frac{\sqrt{231}i}{66}$	0	0	$\frac{\sqrt{231}0}{462}$	0	0	$\frac{5\sqrt{385}}{462}$	0	
	0	0	$\frac{\sqrt{154}}{462}$	0	0	$-\frac{\sqrt{231}i}{231}$	0	$-\frac{\sqrt{231}}{66}$	0	0	$\frac{\sqrt{231}0}{462}$	0	0	$\frac{5\sqrt{385}i}{462}$	
	0	0	0	$-\frac{\sqrt{154}}{462}$	$\frac{\sqrt{231}i}{231}$	0	$-\frac{\sqrt{231}}{66}$	0	0	0	0	$-\frac{\sqrt{231}0}{462}$	$-\frac{5\sqrt{385}i}{462}$	0	
	0	$\frac{\sqrt{231}}{154}$	0	$-\frac{\sqrt{231}i}{154}$	$-\frac{2\sqrt{154}}{231}$	0	0	0	0	$\frac{5\sqrt{385}}{462}$	0	$\frac{5\sqrt{385}i}{462}$	0	0	
	$\frac{\sqrt{231}}{154}$	0	$\frac{\sqrt{231}i}{154}$	0	0	$\frac{2\sqrt{154}}{231}$	0	0	$\frac{5\sqrt{385}}{462}$	0	$-\frac{5\sqrt{385}i}{462}$	0	0	0	

947 symmetry

z

continued ...

Table 10

No.	multipole	matrix
$M_1^{(a)}(A_{2g})$	0 0 $-\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{3\sqrt{14}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{14}i}{14}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{14}i}{28}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{14}i}{28}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
948 symmetry		x

continued ...

Table 10

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

949 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{1,2}^{(a)}(E_g)$	0	0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{21}i}{28}$	0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0
	0	0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{21}i}{28}$ 0 0 0 0 0 0 0 0 $\frac{\sqrt{35}i}{28}$ 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{21}i}{14}$
	0	0 0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{\sqrt{35}i}{28}$ 0 0 0 0 0 0 0 0
		$\frac{\sqrt{10x(x^2-3y^2)}}{4}$
950	symmetry	

continued ...

Table 10

No.	multipole	matrix
$M_3^{(a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 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 $-\frac{\sqrt{3}i}{6}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 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 $\frac{\sqrt{3}i}{6}$ 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	
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	$\frac{\sqrt{3}i}{6}$
	0	$\frac{\sqrt{3}i}{6}$
	$-\frac{\sqrt{3}i}{6}$	0
	0	$-\frac{\sqrt{3}i}{6}$
	0	$-\frac{\sqrt{3}i}{6}$
	0	$-\frac{\sqrt{3}i}{6}$
	0	$\frac{\sqrt{3}i}{6}$
	0	$\frac{\sqrt{3}i}{6}$
	0	$-\frac{\sqrt{3}i}{6}$
	0	$-\frac{\sqrt{3}i}{6}$
	0	$\frac{\sqrt{3}i}{6}$
	0	$\frac{\sqrt{3}i}{6}$
	0	0
952 symmetry		$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 10

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

953 symmetry

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

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(a)}(E_g, 1)$	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	
	$\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 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 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0	
955	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,1}^{(a)}(E_g, 2)$	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$ 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{3}i}{6}$
	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$-\frac{\sqrt{3}i}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{3}i}{6}$ 0 0 0 0 0 0 0 0 0
956 symmetry		$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$M_5^{(a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{6}i}{6}$
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$-\frac{\sqrt{6}i}{6}$
	0 0 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	$\frac{\sqrt{6}i}{12}$
	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	$\frac{\sqrt{6}i}{6}$
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 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 $-\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{42}i}{84}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $-\frac{\sqrt{42}i}{21}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{5\sqrt{42}i}{84}$ 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{42}i}{84}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{42}i}{84}$ 0 0 0	
959	symmetry	$-\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 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 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 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	
	$-\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{6}i}{6}$ 0 0 0 0 0 0 0 0 0 0 0 0 0	
960 symmetry		$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
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
$\mathbb{M}_{5,1}^{(a)}(E_g, 2)$	0	0 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{105}i}{84}$ 0 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{28}$ 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 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
	0	0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 $-\frac{3\sqrt{7}i}{28}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{3\sqrt{7}i}{28}$ 0 0 0 0 0 0 0 $-\frac{\sqrt{105}i}{42}$ 0
	0	0 0 0 0 0 $\frac{3\sqrt{7}i}{28}$ 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 0 0 0 0 0 0 0 0 $\frac{\sqrt{105}i}{42}$ 0 0
963	symmetry	$\frac{\sqrt{15}y(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(a)}(E_g, 2)$	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0
	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	$-\frac{3\sqrt{7}i}{28}$	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	$-\frac{3\sqrt{7}i}{28}$	0	0	0	0	0
	0	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0	$-\frac{3\sqrt{7}i}{28}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	$-\frac{3\sqrt{7}i}{28}$	0	0	0	0
	0	0	0	0	$\frac{3\sqrt{7}i}{28}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0	0
	0	0	0	0	0	$\frac{3\sqrt{7}i}{28}$	0	0	0	0	0	0	$\frac{\sqrt{105}i}{42}$	0	0
	0	0	0	0	0	0	$\frac{3\sqrt{7}i}{28}$	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
$-\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$															
964	symmetry														

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
965	symmetry	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 10

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

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(a)}(E_g, 4)$	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{12}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $\frac{\sqrt{6}i}{12}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{6}i}{6}$ 0	
	0 0 $-\frac{\sqrt{6}i}{12}$ 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 $\frac{\sqrt{6}i}{12}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 $\frac{\sqrt{6}i}{6}$ 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	

968 symmetry

z

continued ...

Table 10

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

continued ...

Table 10

No.	multipole	matrix
$M_{1,1}^{(1,-1;a)}(E_g)$	0	$\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{14}}{14}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 $\frac{\sqrt{14}}{14}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 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

970 symmetry

y

continued ...

Table 10

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

continued ...

Table 10

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

972 symmetry

continued ...

Table 10

No.	multipole	matrix												
$\mathbb{M}_3^{(1,-1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{70}}{28}$	0	0	0	0	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0
	0	$\frac{\sqrt{70}}{28}$	0	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{70}}{28}$	0	0	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{70}}{28}$	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	0	0
	0	$-\frac{\sqrt{105}}{84}$	0	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0
	$-\frac{\sqrt{105}}{84}$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0
	0	$-\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0
	$\frac{\sqrt{105}i}{84}$	0	$-\frac{\sqrt{105}}{84}$	0	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0
	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	$\frac{3\sqrt{70}}{140}$	0	0	0	0	$-\frac{\sqrt{105}}{210}$	
	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	$-\frac{3\sqrt{70}}{140}$	0	0	$-\frac{\sqrt{105}}{210}$	0
	0	0	0	0	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{3\sqrt{70}}{140}$	0	0	$\frac{\sqrt{105}i}{210}$
	0	0	0	0	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	$-\frac{3\sqrt{70}}{140}$	$-\frac{\sqrt{105}i}{210}$	0	
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{210}$	0	$\frac{\sqrt{105}i}{210}$	$\frac{\sqrt{70}}{35}$	0	
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{105}}{210}$	0	$-\frac{\sqrt{105}i}{210}$	0	0	$-\frac{\sqrt{70}}{35}$
973	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$												

continued ...

Table 10

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

continued ...

Table 10

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

975 symmetry

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

continued ...

Table 10

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

976 symmetry

 $\sqrt{15}xyz$

continued ...

Table 10

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

977 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)$	0 0 0 0 0 $\frac{5\sqrt{7}}{84}$ 0 $-\frac{5\sqrt{7}i}{84}$ $-\frac{\sqrt{70}}{84}$ 0 0 0 0 0 0	
	0 0 0 0 $\frac{5\sqrt{7}}{84}$ 0 $\frac{5\sqrt{7}i}{84}$ 0 0 $\frac{\sqrt{70}}{84}$ 0 0 0 0 0	
	0 0 0 0 0 $\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 $-\frac{\sqrt{70}}{84}$ 0 0 0 0	
	0 0 0 0 $-\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 $\frac{\sqrt{70}}{84}$ 0 0 0	
	0 $\frac{5\sqrt{7}}{84}$ 0 $\frac{5\sqrt{7}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{84}$ $-\frac{\sqrt{70}}{42}$ 0	
	$\frac{5\sqrt{7}}{84}$ 0 $-\frac{5\sqrt{7}i}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ 0 0 $\frac{\sqrt{70}}{42}$	
	0 $-\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 0 $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0	
	$\frac{5\sqrt{7}i}{84}$ 0 $\frac{5\sqrt{7}}{84}$ 0 0 0 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0	
	$-\frac{\sqrt{70}}{84}$ 0 0 0 0 $\frac{\sqrt{105}}{84}$ 0 $\frac{\sqrt{105}i}{84}$ $\frac{\sqrt{42}}{42}$ 0 0 0 0 0 $\frac{\sqrt{7}}{42}$	
	0 $\frac{\sqrt{70}}{84}$ 0 0 $\frac{\sqrt{105}}{84}$ 0 $-\frac{\sqrt{105}i}{84}$ 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 $\frac{\sqrt{7}}{42}$ 0	
	0 0 $-\frac{\sqrt{70}}{84}$ 0 0 $-\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 $-\frac{\sqrt{42}}{42}$ 0 0 $\frac{\sqrt{7}i}{42}$	
	0 0 0 $\frac{\sqrt{70}}{84}$ $\frac{\sqrt{105}i}{84}$ 0 $\frac{\sqrt{105}}{84}$ 0 0 0 0 $\frac{\sqrt{42}}{42}$ $-\frac{\sqrt{7}i}{42}$ 0	
	0 0 0 0 $-\frac{\sqrt{70}}{42}$ 0 0 0 0 $\frac{\sqrt{7}}{42}$ 0 $\frac{\sqrt{7}i}{42}$ 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{70}}{42}$ 0 0 $\frac{\sqrt{7}}{42}$ 0 $-\frac{\sqrt{7}i}{42}$ 0 0 0 0	
$\frac{\sqrt{70}x(x^2 - 3y^2)(x^2 + y^2 - 8z^2)}{16}$		

978 symmetry

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_5^{(1,-1;a)}(A_{1g})$	0 0 0 0 0 0 0 0 0 $\frac{7\sqrt{330}}{660}$ 0 $-\frac{7\sqrt{330}i}{660}$ $-\frac{2\sqrt{55}}{55}$ 0	
	0 0 0 0 0 0 0 0 0 $\frac{7\sqrt{330}}{660}$ 0 $\frac{7\sqrt{330}i}{660}$ 0 0 $\frac{2\sqrt{55}}{55}$	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{132}$ 0 $\frac{\sqrt{330}}{132}$ 0 0 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 $\frac{\sqrt{330}}{132}$ 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{22}}{132}$ 0 $\frac{\sqrt{22}i}{132}$ $\frac{2\sqrt{55}}{165}$ 0 0 0 0 $-\frac{\sqrt{330}}{330}$	
	0 0 0 0 $-\frac{\sqrt{22}}{132}$ 0 $-\frac{\sqrt{22}i}{132}$ 0 0 $-\frac{2\sqrt{55}}{165}$ 0 0 0 $-\frac{\sqrt{330}}{330}$ 0	
	0 0 0 0 0 $\frac{\sqrt{22}i}{132}$ 0 $\frac{\sqrt{22}}{132}$ 0 0 0 $-\frac{2\sqrt{55}}{165}$ 0 0 0 $-\frac{\sqrt{330}i}{330}$	
	0 0 0 0 $-\frac{\sqrt{22}i}{132}$ 0 $\frac{\sqrt{22}}{132}$ 0 0 0 0 0 $\frac{2\sqrt{55}}{165}$ $\frac{\sqrt{330}i}{330}$ 0	
	0 $\frac{7\sqrt{330}}{660}$ 0 $\frac{\sqrt{330}i}{132}$ $\frac{2\sqrt{55}}{165}$ 0 0 0 0 $\frac{\sqrt{22}}{33}$ 0 $\frac{\sqrt{22}i}{33}$ 0 0 0	
	$\frac{7\sqrt{330}}{660}$ 0 $-\frac{\sqrt{330}i}{132}$ 0 0 $-\frac{2\sqrt{55}}{165}$ 0 0 $\frac{\sqrt{22}}{33}$ 0 $-\frac{\sqrt{22}i}{33}$ 0 0 0	
	0 $-\frac{7\sqrt{330}i}{660}$ 0 $\frac{\sqrt{330}}{132}$ 0 0 $-\frac{2\sqrt{55}}{165}$ 0 0 $\frac{\sqrt{22}i}{33}$ 0 $-\frac{\sqrt{22}}{33}$ 0 0 0	
	$\frac{7\sqrt{330}i}{660}$ 0 $\frac{\sqrt{330}}{132}$ 0 0 0 0 $\frac{2\sqrt{55}}{165}$ $-\frac{\sqrt{22}i}{33}$ 0 $-\frac{\sqrt{22}}{33}$ 0 0 0	
	$-\frac{2\sqrt{55}}{55}$ 0 0 0 0 $-\frac{\sqrt{330}}{330}$ 0 $-\frac{\sqrt{330}i}{330}$ 0 0 0 0 0 0 0	
	0 $\frac{2\sqrt{55}}{55}$ 0 0 $-\frac{\sqrt{330}}{330}$ 0 $\frac{\sqrt{330}i}{330}$ 0 0 0 0 0 0 0 0	

979 symmetry

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

continued ...

Table 10

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

980 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,-1;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{330}i}{132}$ 0 $-\frac{\sqrt{330}}{132}$ 0 0 0														
	0 0 0 0 0 0 0 0 $\frac{\sqrt{330}i}{132}$ 0 $-\frac{\sqrt{330}}{132}$ 0 0 0 0														
	0 0 0 0 0 0 0 0 0 $\frac{7\sqrt{330}}{660}$ 0 $-\frac{7\sqrt{330}i}{660}$ $-\frac{2\sqrt{55}}{55}$ 0														
	0 0 0 0 0 0 0 0 $\frac{7\sqrt{330}}{660}$ 0 $\frac{7\sqrt{330}i}{660}$ 0 0 $\frac{2\sqrt{55}}{55}$														
	0 0 0 0 0 $-\frac{\sqrt{22}i}{132}$ 0 $-\frac{\sqrt{22}}{132}$ 0 0 $\frac{2\sqrt{55}}{165}$ 0 0 $\frac{\sqrt{330}i}{330}$														
	0 0 0 0 $\frac{\sqrt{22}i}{132}$ 0 $-\frac{\sqrt{22}}{132}$ 0 0 0 $-\frac{2\sqrt{55}}{165}$ $-\frac{\sqrt{330}i}{330}$ 0														
	0 0 0 0 0 $-\frac{\sqrt{22}}{132}$ 0 $-\frac{\sqrt{22}i}{132}$ 0 0 0 0 $-\frac{\sqrt{330}}{330}$														
	0 $-\frac{\sqrt{330}i}{132}$ 0 $\frac{7\sqrt{330}}{660}$ 0 0 $\frac{2\sqrt{55}}{165}$ 0 0 $-\frac{\sqrt{22}i}{33}$ 0 $\frac{\sqrt{22}}{33}$ 0 0														
	$\frac{\sqrt{330}i}{132}$ 0 $\frac{7\sqrt{330}}{660}$ 0 0 0 0 $-\frac{2\sqrt{55}}{165}$ $\frac{\sqrt{22}i}{33}$ 0 $\frac{\sqrt{22}}{33}$ 0 0														
	0 $-\frac{\sqrt{330}}{132}$ 0 $-\frac{7\sqrt{330}i}{660}$ $\frac{2\sqrt{55}}{165}$ 0 0 0 0 $\frac{\sqrt{22}}{33}$ 0 $-\frac{\sqrt{22}i}{33}$ 0 0														
	$-\frac{\sqrt{330}}{132}$ 0 $\frac{7\sqrt{330}i}{660}$ 0 0 $-\frac{2\sqrt{55}}{165}$ 0 0 $\frac{\sqrt{22}}{33}$ 0 $-\frac{\sqrt{22}i}{33}$ 0 0														
	0 0 $-\frac{2\sqrt{55}}{55}$ 0 0 $\frac{\sqrt{330}i}{330}$ 0 $-\frac{\sqrt{330}}{330}$ 0 0 0 0 0 0														
	0 0 0 $\frac{2\sqrt{55}}{55}$ $-\frac{\sqrt{330}i}{330}$ 0 $-\frac{\sqrt{330}}{330}$ 0 0 0 0 0 0 0														

981 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 1)$	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{44}$ 0 $-\frac{\sqrt{66}i}{44}$ 0 0
	0	0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}}{44}$ 0 $\frac{\sqrt{66}i}{44}$ 0 0 0
	0	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0
	0	0 0 0 0 0 0 0 0 $\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 $\frac{\sqrt{110}i}{44}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $\frac{\sqrt{110}}{44}$ 0 $-\frac{\sqrt{110}i}{44}$ 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{110}i}{44}$ 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0
	0	0 0 0 0 $-\frac{\sqrt{110}i}{44}$ 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{66}}{44}$ 0 $-\frac{\sqrt{66}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0
	- $\frac{\sqrt{66}}{44}$	0 $\frac{\sqrt{66}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{66}i}{44}$	0 $\frac{\sqrt{66}}{44}$ 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
$\frac{3\sqrt{14}y(5x^4 - 10x^2y^2 + y^4)}{16}$		

982 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 1)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0 0	
	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{44}$ 0 $\frac{\sqrt{66}i}{44}$ 0 0 0	
	0 0 0 0 0 0 0 0 $\frac{\sqrt{66}}{44}$ 0 $-\frac{\sqrt{66}i}{44}$ 0 0 0 0	
	0 0 0 0 0 $\frac{\sqrt{110}i}{44}$ 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{110}i}{44}$ 0 $-\frac{\sqrt{110}}{44}$ 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 $-\frac{\sqrt{110}i}{44}$ 0 0 0 0 0 0 0	
	0 0 0 0 $-\frac{\sqrt{110}}{44}$ 0 $\frac{\sqrt{110}i}{44}$ 0 0 0 0 0 0 0 0	
	0 $-\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{66}i}{44}$ 0 $\frac{\sqrt{66}}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 $\frac{\sqrt{66}}{44}$ 0 $\frac{\sqrt{66}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0	
	$\frac{\sqrt{66}}{44}$ 0 $-\frac{\sqrt{66}i}{44}$ 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
983	symmetry	$\frac{\sqrt{15}x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}{8}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{231}}{154}$	0	0	$-\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{3\sqrt{385}}{770}$	0	$-\frac{3\sqrt{385}i}{770}$	0	0	0	
	$\frac{\sqrt{231}}{154}$	0	0	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{3\sqrt{385}}{770}$	0	$\frac{3\sqrt{385}i}{770}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{231}}{154}$	0	0	$-\frac{\sqrt{154}}{77}$	0	0	$\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	0	
	0	0	$\frac{\sqrt{231}}{154}$	0	0	0	0	$\frac{\sqrt{154}}{77}$	$-\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	0	0	
	$-\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{\sqrt{231}}{66}$	0	0	$\frac{4\sqrt{2310}}{1155}$	0	0	0	0	$\frac{\sqrt{385}}{770}$		
	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{\sqrt{231}}{66}$	0	0	0	0	$-\frac{4\sqrt{2310}}{1155}$	0	0	$\frac{\sqrt{385}}{770}$	0		
	0	0	$-\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{\sqrt{231}}{66}$	0	0	$\frac{4\sqrt{2310}}{1155}$	0	0	$-\frac{\sqrt{385}i}{770}$		
	0	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{\sqrt{231}}{66}$	0	0	0	0	$-\frac{4\sqrt{2310}}{1155}$	$\frac{\sqrt{385}i}{770}$	0		
	0	$-\frac{3\sqrt{385}}{770}$	0	$\frac{3\sqrt{385}i}{770}$	$\frac{4\sqrt{2310}}{1155}$	0	0	0	0	$-\frac{\sqrt{231}}{462}$	0	$\frac{\sqrt{231}i}{231}$	$\frac{\sqrt{154}}{77}$	0		
	$-\frac{3\sqrt{385}}{770}$	0	$-\frac{3\sqrt{385}i}{770}$	0	0	$-\frac{4\sqrt{2310}}{1155}$	0	0	$-\frac{\sqrt{231}}{462}$	0	$-\frac{\sqrt{231}i}{231}$	0	0	$-\frac{\sqrt{154}}{77}$		
	0	$-\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	$\frac{4\sqrt{2310}}{1155}$	0	0	$\frac{\sqrt{231}i}{231}$	0	$\frac{\sqrt{231}}{154}$	0	0		
	$\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	0	0	$-\frac{4\sqrt{2310}}{1155}$	$-\frac{\sqrt{231}i}{231}$	0	$\frac{\sqrt{231}}{154}$	0	0	0		
	0	0	0	0	0	$\frac{\sqrt{385}}{770}$	0	$-\frac{\sqrt{385}i}{770}$	$\frac{\sqrt{154}}{77}$	0	0	0	0	$\frac{\sqrt{231}}{77}$		
	0	0	0	0	$\frac{\sqrt{385}}{770}$	0	$\frac{\sqrt{385}i}{770}$	0	0	$-\frac{\sqrt{154}}{77}$	0	0	$\frac{\sqrt{231}}{77}$	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													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{\sqrt{231}i}{154}$	0	0	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{3\sqrt{385}i}{770}$	0	$\frac{3\sqrt{385}}{770}$	0	0	0
	$\frac{\sqrt{231}i}{154}$	0	0	0	0	0	0	$-\frac{\sqrt{154}}{77}$	$\frac{3\sqrt{385}i}{770}$	0	$\frac{3\sqrt{385}}{770}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{231}i}{154}$	$-\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{3\sqrt{385}}{770}$	0	$-\frac{3\sqrt{385}i}{770}$	0	0	0
	0	0	$\frac{\sqrt{231}i}{154}$	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{3\sqrt{385}}{770}$	0	$\frac{3\sqrt{385}i}{770}$	0	0	0	0
	0	0	$-\frac{\sqrt{154}}{77}$	0	0	$\frac{\sqrt{231}i}{66}$	0	0	0	0	$-\frac{4\sqrt{2310}}{1155}$	0	0	$\frac{\sqrt{385}i}{770}$	
	0	0	0	$\frac{\sqrt{154}}{77}$	$-\frac{\sqrt{231}i}{66}$	0	0	0	0	0	$\frac{4\sqrt{2310}}{1155}$	$-\frac{\sqrt{385}i}{770}$	0		
	$\frac{\sqrt{154}}{77}$	0	0	0	0	0	0	$\frac{\sqrt{231}i}{66}$	$\frac{4\sqrt{2310}}{1155}$	0	0	0	0	$\frac{\sqrt{385}}{770}$	
	0	$-\frac{\sqrt{154}}{77}$	0	0	0	0	$-\frac{\sqrt{231}i}{66}$	0	0	$-\frac{4\sqrt{2310}}{1155}$	0	0	$\frac{\sqrt{385}}{770}$	0	
	0	$-\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	$\frac{4\sqrt{2310}}{1155}$	0	0	$-\frac{\sqrt{231}i}{154}$	0	$-\frac{\sqrt{231}}{231}$	0	0	0
	$\frac{3\sqrt{385}i}{770}$	0	$-\frac{3\sqrt{385}}{770}$	0	0	0	0	$-\frac{4\sqrt{2310}}{1155}$	$\frac{\sqrt{231}i}{154}$	0	$-\frac{\sqrt{231}}{231}$	0	0	0	0
	0	$\frac{3\sqrt{385}}{770}$	0	$-\frac{3\sqrt{385}i}{770}$	$-\frac{4\sqrt{2310}}{1155}$	0	0	0	0	$-\frac{\sqrt{231}}{231}$	0	$\frac{\sqrt{231}i}{462}$	$\frac{\sqrt{154}}{77}$	0	
	$\frac{3\sqrt{385}}{770}$	0	$\frac{3\sqrt{385}i}{770}$	0	0	$\frac{4\sqrt{2310}}{1155}$	0	0	$-\frac{\sqrt{231}}{231}$	0	$-\frac{\sqrt{231}i}{462}$	0	0	$-\frac{\sqrt{154}}{77}$	
	0	0	0	0	0	$\frac{\sqrt{385}i}{770}$	0	$\frac{\sqrt{385}}{770}$	0	0	$\frac{\sqrt{154}}{77}$	0	0	$-\frac{\sqrt{231}i}{77}$	
	0	0	0	0	$-\frac{\sqrt{385}i}{770}$	0	$\frac{\sqrt{385}}{770}$	0	0	0	$-\frac{\sqrt{154}}{77}$	$\frac{\sqrt{231}i}{77}$	0		

985 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	0	$-\frac{3\sqrt{110}i}{110}$		
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	$\frac{3\sqrt{110}i}{110}$	0			
	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	0	0	$\frac{3\sqrt{110}}{110}$			
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	0	0	$\frac{3\sqrt{110}}{110}$	0			
	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0				
	0	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	$-\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0			
	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	0	0	$-\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0			
	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	$-\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	0			
	0	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	0		
	0	0	0	$-\frac{\sqrt{165}}{110}$	$-\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	0		
	$\frac{\sqrt{165}}{110}$	0	0	0	0	$-\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0		
	0	$-\frac{\sqrt{165}}{110}$	0	0	$-\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0	0		
	0	$-\frac{3\sqrt{110}i}{110}$	0	$\frac{3\sqrt{110}}{110}$	0	0	0	0	0	0	0	0	0	0		
	$\frac{3\sqrt{110}i}{110}$	0	$\frac{3\sqrt{110}}{110}$	0	0	0	0	0	0	0	0	0	0	0		
$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$																

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 3)$	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$-\frac{3\sqrt{110}}{110}$		
	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	$-\frac{3\sqrt{110}}{110}$	0		
	0	0	0	0	0	0	0	0	0	$\frac{\sqrt{165}}{110}$	0	0	$-\frac{3\sqrt{110}i}{110}$		
	0	0	0	0	0	0	0	0	0	0	$-\frac{\sqrt{165}}{110}$	$\frac{3\sqrt{110}i}{110}$	0		
	0	0	0	0	$\frac{\sqrt{11}}{22}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	
	0	0	0	0	0	0	$-\frac{\sqrt{11}}{22}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	
	$-\frac{\sqrt{165}}{110}$	0	0	0	0	$\frac{\sqrt{110}}{110}$	0	$\frac{\sqrt{110}i}{110}$	0	0	$-\frac{\sqrt{110}}{110}$	0	0	0	
	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}}{110}$	0	$-\frac{\sqrt{110}i}{110}$	0	0	0	0	0	0	0	
	0	0	$\frac{\sqrt{165}}{110}$	0	0	$\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	
	0	0	0	$-\frac{\sqrt{165}}{110}$	$-\frac{\sqrt{110}i}{110}$	0	$-\frac{\sqrt{110}}{110}$	0	0	0	0	0	0	0	
	0	$-\frac{3\sqrt{110}}{110}$	0	$-\frac{3\sqrt{110}i}{110}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{3\sqrt{110}}{110}$	0	$\frac{3\sqrt{110}i}{110}$	0	0	0	0	0	0	0	0	0	0	0	

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

987 symmetry

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	$\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}i}{220}$	
	0	0	0	0	$-\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	0	$\frac{3\sqrt{55}}{110}$	$-\frac{\sqrt{330}i}{220}$	0	0	
	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	$\frac{3\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	
	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}}{220}$	0	
	0	$\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	0	$-\frac{\sqrt{330}}{132}$	0	0	
	$-\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	$\frac{\sqrt{330}i}{132}$	0	$-\frac{\sqrt{330}}{132}$	0	0	0	
	0	$\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{220}$	$-\frac{\sqrt{55}}{110}$	0	
	$\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$\frac{\sqrt{55}}{110}$	
	0	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{220}$	0	0	$\frac{\sqrt{33}}{33}$	0	0	$-\frac{\sqrt{22}i}{44}$	
	0	0	0	$-\frac{3\sqrt{55}}{110}$	$\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{220}$	0	0	0	$-\frac{\sqrt{33}}{33}$	$\frac{\sqrt{22}i}{44}$	0	0	
	$-\frac{3\sqrt{55}}{110}$	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	0	$-\frac{\sqrt{330}i}{220}$	$\frac{\sqrt{33}}{33}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	
	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{22}}{44}$	0	
	0	$\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{220}$	0	0	$-\frac{\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	
	$-\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{220}$	0	0	0	0	$\frac{\sqrt{55}}{110}$	$\frac{\sqrt{22}i}{44}$	0	$\frac{\sqrt{22}}{44}$	0	0	0	

988 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	$\frac{3\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	
	0	0	0	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}}{220}$	0	
	0	0	0	0	0	$-\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{220}$	
	0	0	0	0	$\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	$-\frac{3\sqrt{55}}{110}$	$\frac{\sqrt{330}i}{220}$	0	0	
	0	$-\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{220}$	$-\frac{\sqrt{55}}{110}$	0	0	
	$-\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$\frac{\sqrt{55}}{110}$	
	0	$\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	$\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{132}$	0	0	
	$-\frac{\sqrt{22}i}{44}$	0	$-\frac{\sqrt{22}}{44}$	0	0	0	0	0	$-\frac{\sqrt{330}i}{132}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	
	$\frac{3\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{132}$	$\frac{\sqrt{33}}{33}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	
	0	$-\frac{3\sqrt{55}}{110}$	0	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{132}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{22}}{44}$	0	
	0	0	$\frac{3\sqrt{55}}{110}$	0	0	$-\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{132}$	0	0	$-\frac{\sqrt{33}}{33}$	0	0	$\frac{\sqrt{22}i}{44}$	
	0	0	0	$-\frac{3\sqrt{55}}{110}$	$\frac{\sqrt{330}i}{220}$	0	$\frac{\sqrt{330}}{132}$	0	0	0	0	$\frac{\sqrt{33}}{33}$	$-\frac{\sqrt{22}i}{44}$	0	
	0	$\frac{\sqrt{330}}{220}$	0	$-\frac{\sqrt{330}i}{220}$	$-\frac{\sqrt{55}}{110}$	0	0	0	0	$\frac{\sqrt{22}}{44}$	0	$\frac{\sqrt{22}i}{44}$	0	0	
	$\frac{\sqrt{330}}{220}$	0	$\frac{\sqrt{330}i}{220}$	0	0	$\frac{\sqrt{55}}{110}$	0	0	$\frac{\sqrt{22}}{44}$	0	$-\frac{\sqrt{22}i}{44}$	0	0	0	

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 $\frac{\sqrt{7}}{14}$ 0 0 $-\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{7}}{14}$ $\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0
	$\frac{\sqrt{7}}{14}$	0 0 0 0 0 $\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{7}}{14}$ 0 0 0 $\frac{\sqrt{42}}{28}$ 0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{42}i}{28}$ 0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{42}i}{28}$	0 $\frac{\sqrt{42}}{28}$ 0 0 0 0 0 0 0 0 0 0 0
	0	$\frac{\sqrt{42}}{28}$ 0 $\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{42}}{28}$	0 $-\frac{\sqrt{42}i}{28}$ 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
	0	0 0 0 0 0 0 0 0 0 0 0 0 0
990	symmetry	$\frac{\sqrt{21}x(x^2 - 3y^2)(3x^4 + 6x^2y^2 - 60x^2z^2 + 3y^4 - 60y^2z^2 + 80z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{1g}, 2)$	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30030}}{2002}$ 0 $\frac{\sqrt{30030}i}{2002}$ $\frac{2\sqrt{5005}}{1001}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30030}}{2002}$ 0 $-\frac{\sqrt{30030}i}{2002}$ 0 $-\frac{\sqrt{30030}i}{2002}$ 0 0 $-\frac{2\sqrt{5005}}{1001}$	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 $-\frac{3\sqrt{2002}}{2002}$ 0 $\frac{3\sqrt{2002}i}{2002}$ $\frac{3\sqrt{5005}}{1001}$ 0 0 0 0 0 $\frac{\sqrt{30030}}{1001}$	
	0 0 0 0 $-\frac{3\sqrt{2002}}{2002}$ 0 $-\frac{3\sqrt{2002}i}{2002}$ 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{\sqrt{30030}}{1001}$ 0	
	0 0 0 0 0 $\frac{3\sqrt{2002}i}{2002}$ 0 $\frac{3\sqrt{2002}}{2002}$ 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{\sqrt{30030}i}{1001}$	
	0 0 0 0 $-\frac{3\sqrt{2002}i}{2002}$ 0 $\frac{3\sqrt{2002}}{2002}$ 0 0 0 0 $\frac{3\sqrt{5005}}{1001}$ $-\frac{\sqrt{30030}i}{1001}$ 0	
	0 $-\frac{\sqrt{30030}}{2002}$ 0 0 $\frac{3\sqrt{5005}}{1001}$ 0 0 0 0 $\frac{15\sqrt{2002}}{4004}$ 0 $\frac{15\sqrt{2002}i}{4004}$ 0 0	
	$-\frac{\sqrt{30030}}{2002}$ 0 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{15\sqrt{2002}}{4004}$ 0 $-\frac{15\sqrt{2002}i}{4004}$ 0 0 0	
	0 $\frac{\sqrt{30030}i}{2002}$ 0 0 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{15\sqrt{2002}i}{4004}$ 0 $-\frac{15\sqrt{2002}}{4004}$ 0 0	
	$-\frac{\sqrt{30030}i}{2002}$ 0 0 0 0 0 0 $\frac{3\sqrt{5005}}{1001}$ $-\frac{15\sqrt{2002}i}{4004}$ 0 $-\frac{15\sqrt{2002}}{4004}$ 0 0	
	$\frac{2\sqrt{5005}}{1001}$ 0 0 0 0 $\frac{\sqrt{30030}}{1001}$ 0 $\frac{\sqrt{30030}i}{1001}$ 0 0 0 0 0 0	
	0 $-\frac{2\sqrt{5005}}{1001}$ 0 0 $\frac{\sqrt{30030}}{1001}$ 0 $-\frac{\sqrt{30030}i}{1001}$ 0 0 0 0 0 0	
991	symmetry	$\frac{z(35x^6+105x^4y^2-210x^4z^2+105x^2y^4-420x^2y^2z^2+168x^2z^4+35y^6-210y^4z^2+168y^2z^4-16z^6)}{16}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad \frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad \frac{\sqrt{143}i}{572} \quad 0 \quad 0$	
	$0 \quad 0 \quad -\frac{\sqrt{858}}{1716} \quad 0 \quad 0 \quad \frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad \frac{\sqrt{858}}{1716} \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad \frac{\sqrt{143}i}{572} \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad 0$	
	$-\frac{\sqrt{143}}{572} \quad 0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad 0 \quad 0$	
	$0 \quad -\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0 \quad \frac{\sqrt{858}}{286} \quad 0 \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0$	
	$\frac{\sqrt{143}i}{572} \quad 0 \quad -\frac{\sqrt{143}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{858}}{286} \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad -\frac{5\sqrt{858}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0$	
	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad -\frac{5\sqrt{858}}{572} \quad 0 \quad 0 \quad \frac{5\sqrt{143}i}{286}$	
	$0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2145}i}{572} \quad 0 \quad \frac{\sqrt{2145}}{572} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{5\sqrt{858}}{572} \quad -\frac{5\sqrt{143}i}{286} \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0 \quad \frac{5\sqrt{143}i}{286} \quad \frac{5\sqrt{858}}{429} \quad 0$	
	$0 \quad 0 \quad -\frac{5\sqrt{143}}{286} \quad 0 \quad -\frac{5\sqrt{143}i}{286} \quad 0 \quad 0 \quad -\frac{5\sqrt{858}}{429}$	
$\frac{\sqrt{6006}z(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$		
992	symmetry	

continued ...

Table 10

No.	multipole	matrix
		$\begin{bmatrix} \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
993	symmetry	$\frac{\sqrt{21}y(3x^2-y^2)(3x^4+6x^2y^2-60x^2z^2+3y^4-60y^2z^2+80z^4)}{32}$

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_7^{(1,-1;a)}(A_{2g}, 3)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0 0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30030}}{2002}$ 0 $\frac{\sqrt{30030}i}{2002}$ $\frac{2\sqrt{5005}}{1001}$ 0	
	0 0 0 0 0 0 0 0 0 $-\frac{\sqrt{30030}}{2002}$ 0 $-\frac{\sqrt{30030}i}{2002}$ 0 0 $-\frac{2\sqrt{5005}}{1001}$	
	0 0 0 0 0 $-\frac{3\sqrt{2002}i}{2002}$ 0 $-\frac{3\sqrt{2002}}{2002}$ 0 0 0 $\frac{3\sqrt{5005}}{1001}$ 0 0 $-\frac{\sqrt{30030}i}{1001}$	
	0 0 0 0 $\frac{3\sqrt{2002}i}{2002}$ 0 $-\frac{3\sqrt{2002}}{2002}$ 0 0 0 0 $-\frac{3\sqrt{5005}}{1001}$ $\frac{\sqrt{30030}i}{1001}$ 0	
	0 0 0 0 0 $-\frac{3\sqrt{2002}}{2002}$ 0 $\frac{3\sqrt{2002}i}{2002}$ $\frac{3\sqrt{5005}}{1001}$ 0 0 0 0 $\frac{\sqrt{30030}}{1001}$	
	0 0 0 0 $-\frac{3\sqrt{2002}}{2002}$ 0 $-\frac{3\sqrt{2002}i}{2002}$ 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{\sqrt{30030}}{1001}$ 0	
	0 0 0 $-\frac{\sqrt{30030}}{2002}$ 0 0 $\frac{3\sqrt{5005}}{1001}$ 0 0 $-\frac{15\sqrt{2002}i}{4004}$ 0 $\frac{15\sqrt{2002}}{4004}$ 0 0	
	0 0 $-\frac{\sqrt{30030}}{2002}$ 0 0 0 0 $-\frac{3\sqrt{5005}}{1001}$ $\frac{15\sqrt{2002}i}{4004}$ 0 $\frac{15\sqrt{2002}}{4004}$ 0 0	
	0 0 0 $\frac{\sqrt{30030}i}{2002}$ $\frac{3\sqrt{5005}}{1001}$ 0 0 0 0 $\frac{15\sqrt{2002}}{4004}$ 0 $\frac{15\sqrt{2002}i}{4004}$ 0 0	
	0 0 $-\frac{\sqrt{30030}i}{2002}$ 0 0 $-\frac{3\sqrt{5005}}{1001}$ 0 0 $\frac{15\sqrt{2002}}{4004}$ 0 $-\frac{15\sqrt{2002}i}{4004}$ 0 0 0	
	0 0 $\frac{2\sqrt{5005}}{1001}$ 0 0 $-\frac{\sqrt{30030}i}{1001}$ 0 $\frac{\sqrt{30030}}{1001}$ 0 0 0 0 0 0	
	0 0 0 $-\frac{2\sqrt{5005}}{1001}$ $\frac{\sqrt{30030}i}{1001}$ 0 $\frac{\sqrt{30030}}{1001}$ 0 0 0 0 0 0 0	

continued ..

Table 10

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

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 10

No.	multipole	matrix											
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 2)$	0	$-\frac{\sqrt{182}}{364}$	0	$\frac{\sqrt{182}i}{364}$	$\frac{\sqrt{273}}{91}$	0	0	0	$\frac{\sqrt{2730}}{364}$	0	$\frac{\sqrt{2730}i}{364}$	0	0
	$-\frac{\sqrt{182}}{364}$	0	$-\frac{\sqrt{182}i}{364}$	0	0	$-\frac{\sqrt{273}}{91}$	0	0	$\frac{\sqrt{2730}}{364}$	0	$-\frac{\sqrt{2730}i}{364}$	0	0
	0	$\frac{\sqrt{182}i}{364}$	0	$\frac{\sqrt{182}}{364}$	0	0	$-\frac{\sqrt{273}}{91}$	0	0	$\frac{\sqrt{2730}i}{364}$	0	$-\frac{\sqrt{2730}}{364}$	0
	$-\frac{\sqrt{182}i}{364}$	0	$\frac{\sqrt{182}}{364}$	0	0	0	0	$\frac{\sqrt{273}}{91}$	$-\frac{\sqrt{2730}i}{364}$	0	$-\frac{\sqrt{2730}}{364}$	0	0
	$\frac{\sqrt{273}}{91}$	0	0	0	0	$\frac{3\sqrt{182}}{182}$	0	$\frac{3\sqrt{182}i}{182}$	0	0	0	0	0
	0	$-\frac{\sqrt{273}}{91}$	0	0	$\frac{3\sqrt{182}}{182}$	0	$-\frac{3\sqrt{182}i}{182}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{273}}{91}$	0	0	$\frac{3\sqrt{182}i}{182}$	0	$-\frac{3\sqrt{182}}{182}$	0	0	0	0	0
	0	0	0	$\frac{\sqrt{273}}{91}$	$-\frac{3\sqrt{182}i}{182}$	0	$-\frac{3\sqrt{182}}{182}$	0	0	0	0	0	0
	0	$\frac{\sqrt{2730}}{364}$	0	$\frac{\sqrt{2730}i}{364}$	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{2730}}{364}$	0	$-\frac{\sqrt{2730}i}{364}$	0	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{2730}i}{364}$	0	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{2730}i}{364}$	0	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	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
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 2)$	0	$\frac{\sqrt{182}i}{364} \quad 0 \quad \frac{\sqrt{182}}{364} \quad 0 \quad 0 \quad -\frac{\sqrt{273}}{91} \quad 0 \quad 0 \quad \frac{\sqrt{2730}i}{364} \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0$
	$-\frac{\sqrt{182}i}{364}$	$0 \quad \frac{\sqrt{182}}{364} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{273}}{91} \quad -\frac{\sqrt{2730}i}{364} \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{182}}{364} \quad 0 \quad -\frac{\sqrt{182}i}{364} \quad -\frac{\sqrt{273}}{91} \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad -\frac{\sqrt{2730}i}{364} \quad 0 \quad 0$
	$\frac{\sqrt{182}}{364}$	$0 \quad \frac{\sqrt{182}i}{364} \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{273}}{91} \quad 0 \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad \frac{\sqrt{2730}i}{364} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{273}}{91} \quad 0 \quad 0 \quad \frac{3\sqrt{182}i}{182} \quad 0 \quad -\frac{3\sqrt{182}}{182} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad \frac{\sqrt{273}}{91} \quad -\frac{3\sqrt{182}i}{182} \quad 0 \quad -\frac{3\sqrt{182}}{182} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	$-\frac{\sqrt{273}}{91}$	$0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{3\sqrt{182}i}{182} \quad 0 \quad -\frac{3\sqrt{182}i}{182} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{273}}{91} \quad 0 \quad 0 \quad -\frac{3\sqrt{182}i}{182} \quad 0 \quad \frac{3\sqrt{182}i}{182} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0$
	0	$\frac{\sqrt{2730}i}{364} \quad 0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0$
	$-\frac{\sqrt{2730}i}{364}$	$0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad 0$
	0	$0 \quad -\frac{\sqrt{2730}}{364} \quad 0 \quad -\frac{\sqrt{2730}i}{364} \quad 0 \quad 0$
	$-\frac{\sqrt{2730}}{364}$	$0 \quad 0 \quad \frac{\sqrt{2730}i}{364} \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$
	0	$0 \quad 0 \quad 0$

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
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 3)$	0	$-\frac{\sqrt{6006}}{6006}$
	$-\frac{\sqrt{6006}}{6006}$	0
	0	$-\frac{\sqrt{6006}}{6006}$
	$\frac{\sqrt{1001}}{1001}$	0
	0	$-\frac{\sqrt{1001}}{1001}$
	$-\frac{\sqrt{1001}}{1001}$	0
	0	$\frac{\sqrt{1001}}{1001}$
	0	$-\frac{\sqrt{1001}}{1001}$
	$\frac{\sqrt{10010}}{4004}$	0
	0	$-\frac{\sqrt{10010}}{4004}$
	$-\frac{\sqrt{10010}}{4004}$	0
	0	$-\frac{\sqrt{10010}}{1001}$
999	symmetry	$-\frac{\sqrt{7y}(5x^6+15x^4y^2-120x^4z^2+15x^2y^4-240x^2y^2z^2+240x^2z^4+5y^6-120y^4z^2+240y^2z^4-64z^6)}{32}$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 3)$	0	$\frac{\sqrt{6006}i}{6006}$	0	0	0	0	$-\frac{\sqrt{1001}}{1001}$	0	0	$\frac{\sqrt{10010}i}{4004}$	0	$-\frac{\sqrt{10010}}{4004}$	0	0	0	
	$-\frac{\sqrt{6006}i}{6006}$	0	0	0	0	0	0	$\frac{\sqrt{1001}}{1001}$	$-\frac{\sqrt{10010}i}{4004}$	0	$-\frac{\sqrt{10010}}{4004}$	0	0	0	0	
	0	0	0	$\frac{\sqrt{6006}i}{6006}$	$\frac{\sqrt{1001}}{1001}$	0	0	0	0	$\frac{\sqrt{10010}}{4004}$	0	$\frac{\sqrt{10010}i}{4004}$	0	0	0	
	0	0	$-\frac{\sqrt{6006}i}{6006}$	0	0	$-\frac{\sqrt{1001}}{1001}$	0	0	$\frac{\sqrt{10010}}{4004}$	0	$-\frac{\sqrt{10010}i}{4004}$	0	0	0	0	
	0	0	$\frac{\sqrt{1001}}{1001}$	0	0	$-\frac{\sqrt{6006}i}{1001}$	0	0	0	0	$\frac{\sqrt{15015}}{1001}$	0	0	0	$-\frac{\sqrt{10010}i}{1001}$	
	0	0	0	$-\frac{\sqrt{1001}}{1001}$	$\frac{\sqrt{6006}i}{1001}$	0	0	0	0	0	0	$-\frac{\sqrt{15015}}{1001}$	$\frac{\sqrt{10010}i}{1001}$	0	0	
	$-\frac{\sqrt{1001}}{1001}$	0	0	0	0	0	0	$-\frac{\sqrt{6006}i}{1001}$	$-\frac{\sqrt{15015}}{1001}$	0	0	0	0	0	$-\frac{\sqrt{10010}}{1001}$	
	0	$\frac{\sqrt{1001}}{1001}$	0	0	0	0	$\frac{\sqrt{6006}i}{1001}$	0	0	$\frac{\sqrt{15015}}{1001}$	0	0	$-\frac{\sqrt{10010}}{1001}$	0	0	
	0	$\frac{\sqrt{10010}i}{4004}$	0	$\frac{\sqrt{10010}}{4004}$	0	0	$-\frac{\sqrt{15015}}{1001}$	0	0	$\frac{5\sqrt{6006}i}{4004}$	0	$-\frac{5\sqrt{6006}}{4004}$	0	0	0	
	$-\frac{\sqrt{10010}i}{4004}$	0	$\frac{\sqrt{10010}}{4004}$	0	0	0	0	$\frac{\sqrt{15015}}{1001}$	$-\frac{5\sqrt{6006}i}{4004}$	0	$-\frac{5\sqrt{6006}}{4004}$	0	0	0	0	
	0	$-\frac{\sqrt{10010}}{4004}$	0	$\frac{\sqrt{10010}i}{4004}$	$\frac{\sqrt{15015}}{1001}$	0	0	0	0	$-\frac{5\sqrt{6006}}{4004}$	0	$\frac{15\sqrt{6006}i}{4004}$	$\frac{10\sqrt{1001}}{1001}$	0	0	
	$-\frac{\sqrt{10010}}{4004}$	0	$-\frac{\sqrt{10010}i}{4004}$	0	0	$-\frac{\sqrt{15015}}{1001}$	0	0	$-\frac{5\sqrt{6006}}{4004}$	0	$-\frac{15\sqrt{6006}i}{4004}$	0	0	0	$-\frac{10\sqrt{1001}}{1001}$	
	0	0	0	0	0	$-\frac{\sqrt{10010}i}{1001}$	0	$-\frac{\sqrt{10010}}{1001}$	0	0	$\frac{10\sqrt{1001}}{1001}$	0	0	0	$-\frac{10\sqrt{6006}i}{3003}$	
	0	0	0	0	$\frac{\sqrt{10010}i}{1001}$	0	$-\frac{\sqrt{10010}}{1001}$	0	0	0	0	$-\frac{10\sqrt{1001}}{1001}$	$\frac{10\sqrt{6006}i}{3003}$	0	0	
1000	symmetry	$\frac{\sqrt{231}xyz(x-y)(x+y)(3x^2+3y^2-10z^2)}{4}$														

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 4)$	0	0	0	0	0	$\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{\sqrt{455}i}{182}$		
	0	0	0	0	$-\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	0	0	$\frac{\sqrt{2730}}{364}$	$-\frac{\sqrt{455}i}{182}$	0		
	0	0	0	0	0	$\frac{\sqrt{273}}{364}$	0	$-\frac{\sqrt{273}i}{364}$	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$-\frac{\sqrt{455}}{182}$		
	0	0	0	0	$\frac{\sqrt{273}}{364}$	0	$\frac{\sqrt{273}i}{364}$	0	0	$\frac{\sqrt{2730}}{364}$	0	0	$-\frac{\sqrt{455}}{182}$	0		
	0	$\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	$-\frac{3\sqrt{182}}{182}$	0	0	$\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0		
	$-\frac{\sqrt{273}i}{364}$	0	$\frac{\sqrt{273}}{364}$	0	0	0	0	$\frac{3\sqrt{182}}{182}$	$-\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0		
	0	$\frac{\sqrt{273}}{364}$	0	$-\frac{\sqrt{273}i}{364}$	$-\frac{3\sqrt{182}}{182}$	0	0	0	0	$-\frac{3\sqrt{455}}{364}$	0	$-\frac{3\sqrt{455}i}{364}$	0	0		
	$\frac{\sqrt{273}}{364}$	0	$\frac{\sqrt{273}i}{364}$	0	0	$\frac{3\sqrt{182}}{182}$	0	0	$-\frac{3\sqrt{455}i}{364}$	0	$\frac{3\sqrt{455}i}{364}$	0	0	0		
	0	0	$-\frac{\sqrt{2730}}{364}$	0	0	$\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{2730}}{364}$	$-\frac{3\sqrt{455}i}{364}$	0	$-\frac{3\sqrt{455}}{364}$	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{2730}}{364}$	0	0	0	0	$-\frac{3\sqrt{455}}{364}$	0	$-\frac{3\sqrt{455}i}{364}$	0	0	0	0	0	0	0	
	0	$\frac{\sqrt{2730}}{364}$	0	0	$-\frac{3\sqrt{455}}{364}$	0	$\frac{3\sqrt{455}i}{364}$	0	0	0	0	0	0	0	0	
	0	$\frac{\sqrt{455}i}{182}$	0	$-\frac{\sqrt{455}}{182}$	0	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{455}i}{182}$	0	$-\frac{\sqrt{455}}{182}$	0	0	0	0	0	0	0	0	0	0	0	0	

1001 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 4)$	0	0 0 0 0 0 $-\frac{\sqrt{273}}{364}$ 0 $\frac{\sqrt{273}i}{364}$ $\frac{\sqrt{2730}}{364}$ 0 0 0 0 $\frac{\sqrt{455}}{182}$
	0	0 0 0 0 $-\frac{\sqrt{273}}{364}$ 0 $-\frac{\sqrt{273}i}{364}$ 0 0 $-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{\sqrt{455}}{182}$ 0
	0	0 0 0 0 0 $\frac{\sqrt{273}i}{364}$ 0 $\frac{\sqrt{273}}{364}$ 0 0 $-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{\sqrt{455}i}{182}$
	0	0 0 0 0 $-\frac{\sqrt{273}i}{364}$ 0 $\frac{\sqrt{273}}{364}$ 0 0 0 0 $\frac{\sqrt{2730}}{364}$ $-\frac{\sqrt{455}i}{182}$ 0
	0	$-\frac{\sqrt{273}}{364}$ 0 $\frac{\sqrt{273}i}{364}$ $\frac{3\sqrt{182}}{182}$ 0 0 0 0 $\frac{3\sqrt{455}}{364}$ 0 $\frac{3\sqrt{455}i}{364}$ 0 0
	$-\frac{\sqrt{273}}{364}$	0 $-\frac{\sqrt{273}i}{364}$ 0 0 $-\frac{3\sqrt{182}}{182}$ 0 0 $\frac{3\sqrt{455}}{364}$ 0 $-\frac{3\sqrt{455}i}{364}$ 0 0 0
	0	$\frac{\sqrt{273}i}{364}$ 0 $\frac{\sqrt{273}}{364}$ 0 0 $-\frac{3\sqrt{182}}{182}$ 0 0 $\frac{3\sqrt{455}i}{364}$ 0 $-\frac{3\sqrt{455}}{364}$ 0 0
	$-\frac{\sqrt{273}i}{364}$	0 $\frac{\sqrt{273}}{364}$ 0 0 0 0 $\frac{3\sqrt{182}}{182}$ $-\frac{3\sqrt{455}i}{364}$ 0 $-\frac{3\sqrt{455}}{364}$ 0 0 0
	$\frac{\sqrt{2730}}{364}$	0 0 0 0 $\frac{3\sqrt{455}}{364}$ 0 $\frac{3\sqrt{455}i}{364}$ 0 0 0 0 0 0 0
	0	$-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{3\sqrt{455}}{364}$ 0 $-\frac{3\sqrt{455}i}{364}$ 0 0 0 0 0 0 0
	0	0 $-\frac{\sqrt{2730}}{364}$ 0 0 $\frac{3\sqrt{455}i}{364}$ 0 $-\frac{3\sqrt{455}}{364}$ 0 0 0 0 0 0 0
	0	0 0 0 $\frac{\sqrt{2730}}{364}$ $-\frac{3\sqrt{455}i}{364}$ 0 $-\frac{3\sqrt{455}}{364}$ 0 0 0 0 0 0 0
	0	$\frac{\sqrt{455}}{182}$ 0 $\frac{\sqrt{455}i}{182}$ 0 0 0 0 0 0 0 0 0 0 0
	$\frac{\sqrt{455}}{182}$	0 $-\frac{\sqrt{455}i}{182}$ 0 0 0 0 0 0 0 0 0 0 0 0

1002 symmetry

$$\frac{\sqrt{42}xyz(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{16}$$

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{7,1}^{(1,-1;a)}(E_g, 5)$	0	0	0	0	0	$-\frac{\sqrt{6006}i}{4004}$	0	$-\frac{\sqrt{6006}}{4004}$	0	0	$\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{\sqrt{10010}i}{2002}$		
	0	0	0	0	$\frac{\sqrt{6006}i}{4004}$	0	$-\frac{\sqrt{6006}}{4004}$	0	0	0	$-\frac{\sqrt{15015}}{2002}$	$\frac{\sqrt{10010}i}{2002}$	0	0		
	0	0	0	0	0	$\frac{\sqrt{6006}}{4004}$	0	$-\frac{\sqrt{6006}i}{4004}$	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{\sqrt{10010}}{2002}$		
	0	0	0	0	$\frac{\sqrt{6006}}{4004}$	0	$-\frac{\sqrt{6006}i}{4004}$	0	0	$\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{\sqrt{10010}}{2002}$	0		
	0	$-\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	0	0	0	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{6006}}{4004}$	0	$-\frac{\sqrt{6006}i}{4004}$	0	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	$\frac{3\sqrt{10010}i}{2002}$	$\frac{2\sqrt{15015}}{1001}$	0		
	$-\frac{\sqrt{6006}}{4004}$	0	$\frac{\sqrt{6006}i}{4004}$	0	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	$-\frac{3\sqrt{10010}i}{2002}$	0	0	$-\frac{2\sqrt{15015}}{1001}$		
	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	0	$\frac{15\sqrt{1001}}{2002}$	0	0	$-\frac{5\sqrt{6006}i}{2002}$		
	0	0	0	$\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	0	0	$-\frac{15\sqrt{1001}}{2002}$	$\frac{5\sqrt{6006}i}{2002}$	0			
	$\frac{\sqrt{15015}}{2002}$	0	0	0	0	0	0	$\frac{3\sqrt{10010}i}{2002}$	$\frac{15\sqrt{1001}}{2002}$	0	0	0	0	$\frac{5\sqrt{6006}}{2002}$		
	0	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{3\sqrt{10010}i}{2002}$	0	0	$-\frac{15\sqrt{1001}}{2002}$	0	0	$\frac{5\sqrt{6006}}{2002}$	0		
	0	$-\frac{\sqrt{10010}i}{2002}$	0	$-\frac{\sqrt{10010}}{2002}$	0	0	$\frac{2\sqrt{15015}}{1001}$	0	0	$-\frac{5\sqrt{6006}i}{2002}$	0	$\frac{5\sqrt{6006}}{2002}$	0	0	0	
	$\frac{\sqrt{10010}i}{2002}$	0	$-\frac{\sqrt{10010}}{2002}$	0	0	0	0	$-\frac{2\sqrt{15015}}{1001}$	$\frac{5\sqrt{6006}i}{2002}$	0	$\frac{5\sqrt{6006}}{2002}$	0	0	0	0	
1003	symmetry	$\frac{\sqrt{42z(x-y)(x+y)(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}}{32}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{7,2}^{(1,-1;a)}(E_g, 5)$	0	0	0	0	0	$\frac{\sqrt{6006}}{4004}$	0	$-\frac{\sqrt{6006}i}{4004}$	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{\sqrt{10010}}{2002}$	
	0	0	0	0	$\frac{\sqrt{6006}}{4004}$	0	$\frac{\sqrt{6006}i}{4004}$	0	0	$\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{\sqrt{10010}}{2002}$	0	
	0	0	0	0	0	$\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	$\frac{\sqrt{10010}i}{2002}$	
	0	0	0	0	$-\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	0	0	$\frac{\sqrt{15015}}{2002}$	$-\frac{\sqrt{10010}i}{2002}$	0	
	0	$\frac{\sqrt{6006}}{4004}$	0	$\frac{\sqrt{6006}i}{4004}$	0	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	$\frac{3\sqrt{10010}i}{2002}$	$\frac{2\sqrt{15015}}{1001}$	0	
	$\frac{\sqrt{6006}}{4004}$	0	$-\frac{\sqrt{6006}i}{4004}$	0	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	$-\frac{3\sqrt{10010}i}{2002}$	0	0	$-\frac{2\sqrt{15015}}{1001}$	
	0	$-\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	0	0	0	0	0	0	0	0	0
	$\frac{\sqrt{6006}i}{4004}$	0	$\frac{\sqrt{6006}}{4004}$	0	0	0	0	0	0	0	0	0	0	0	0
	$-\frac{\sqrt{15015}}{2002}$	0	0	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	0	$\frac{15\sqrt{1001}}{2002}$	0	0	0	0	$\frac{5\sqrt{6006}}{2002}$	
	0	$\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{3\sqrt{10010}}{2002}$	0	0	0	$-\frac{15\sqrt{1001}}{2002}$	0	0	$\frac{5\sqrt{6006}}{2002}$	0	0	
	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	$\frac{3\sqrt{10010}i}{2002}$	0	0	0	0	$-\frac{15\sqrt{1001}}{2002}$	0	0	$\frac{5\sqrt{6006}i}{2002}$	
	0	0	0	$\frac{\sqrt{15015}}{2002}$	$-\frac{3\sqrt{10010}i}{2002}$	0	0	0	0	0	$\frac{15\sqrt{1001}}{2002}$	$-\frac{5\sqrt{6006}i}{2002}$	0	0	
	0	$-\frac{\sqrt{10010}}{2002}$	0	$\frac{\sqrt{10010}i}{2002}$	$\frac{2\sqrt{15015}}{1001}$	0	0	0	$\frac{5\sqrt{6006}}{2002}$	0	$\frac{5\sqrt{6006}i}{2002}$	0	0	0	
	$-\frac{\sqrt{10010}}{2002}$	0	$-\frac{\sqrt{10010}i}{2002}$	0	0	$-\frac{2\sqrt{15015}}{1001}$	0	0	$\frac{5\sqrt{6006}}{2002}$	0	$-\frac{5\sqrt{6006}i}{2002}$	0	0	0	

1004 symmetry

z

continued ...

Table 10

No.	multipole	matrix														
$M_1^{(1,1;a)}(A_{2g})$	$-\frac{\sqrt{105}}{42}$	0	0	0	0	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{105}}{42}$	0	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{105}}{42}$	0	0	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	0
	0	0	0	$\frac{\sqrt{105}}{42}$	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	0	0
	0	$\frac{\sqrt{70}}{56}$	0	$-\frac{\sqrt{70}i}{56}$	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{56}$	0	0	0	0
	$\frac{\sqrt{70}}{56}$	0	$\frac{\sqrt{70}i}{56}$	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0
	0	$\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0
	$-\frac{\sqrt{70}i}{56}$	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$-\frac{\sqrt{42}i}{56}$	$\frac{\sqrt{105}}{70}$	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	0	0
	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	$\frac{\sqrt{42}i}{56}$	0	0	$-\frac{\sqrt{105}}{70}$	0	0	$\frac{\sqrt{70}}{140}$	0	0	0
	0	0	0	0	0	$\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	$\frac{\sqrt{105}}{70}$	0	0	$-\frac{\sqrt{70}i}{140}$	0	0
	0	0	0	0	$-\frac{\sqrt{42}i}{56}$	0	$\frac{\sqrt{42}}{56}$	0	0	0	0	$-\frac{\sqrt{105}}{70}$	$\frac{\sqrt{70}i}{140}$	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	$-\frac{\sqrt{70}i}{140}$	$\frac{2\sqrt{105}}{105}$	0	0	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{70}}{140}$	0	$\frac{\sqrt{70}i}{140}$	0	0	$-\frac{2\sqrt{105}}{105}$	0	0

1005 symmetry

x

continued ...

Table 10

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

1006 symmetry

y

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{1,2}^{(1,1;a)}(E_g)$	0	$-\frac{\sqrt{105}i}{84}$	0	0	0	0	$-\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	0	0	0
	$\frac{\sqrt{105}i}{84}$	0	0	0	0	0	0	$\frac{\sqrt{70}}{56}$	$\frac{\sqrt{7}i}{28}$	0	$\frac{\sqrt{7}}{28}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{105}i}{84}$	$\frac{\sqrt{70}}{56}$	0	0	0	0	$-\frac{\sqrt{7}}{28}$	0	$-\frac{\sqrt{7}i}{28}$	0	0	0
	0	0	$\frac{\sqrt{105}i}{84}$	0	0	$-\frac{\sqrt{70}}{56}$	0	0	$-\frac{\sqrt{7}}{28}$	0	$\frac{\sqrt{7}i}{28}$	0	0	0	0
	0	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	0	0	$-\frac{\sqrt{7}i}{14}$
	0	0	0	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	$\frac{\sqrt{7}i}{14}$	0	0	0
	$-\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$\frac{\sqrt{42}}{56}$	0	0	0	0	0	$-\frac{\sqrt{7}}{14}$
	0	$\frac{\sqrt{70}}{56}$	0	0	0	0	0	0	0	$-\frac{\sqrt{42}}{56}$	0	0	$-\frac{\sqrt{7}}{14}$	0	0
	0	$-\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	$\frac{\sqrt{42}}{56}$	0	0	$\frac{3\sqrt{105}i}{140}$	0	$\frac{\sqrt{105}}{70}$	0	0	0
	$\frac{\sqrt{7}i}{28}$	0	$-\frac{\sqrt{7}}{28}$	0	0	0	0	$-\frac{\sqrt{42}}{56}$	$-\frac{3\sqrt{105}i}{140}$	0	$\frac{\sqrt{105}}{70}$	0	0	0	0
1007	symmetry	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix													
$M_3^{(1,1;a)}(A_{1g})$	0	0	0	0	0	0	0	0	$-\frac{17\sqrt{462}}{1848}$	0	$\frac{17\sqrt{462}i}{1848}$	$-\frac{\sqrt{77}}{44}$	0		
	0	0	0	0	0	0	0	$-\frac{17\sqrt{462}}{1848}$	0	$-\frac{17\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{77}}{44}$		
	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	
	0	0	0	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	
	0	0	0	0	0	$\frac{\sqrt{770}}{132}$	0	$-\frac{\sqrt{770}i}{132}$	$\frac{\sqrt{77}}{132}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	
	0	0	0	0	$\frac{\sqrt{770}}{132}$	0	$\frac{\sqrt{770}i}{132}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$\frac{\sqrt{462}}{1848}$	0	
	0	0	0	0	0	$-\frac{\sqrt{770}i}{132}$	0	$-\frac{\sqrt{770}}{132}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$\frac{\sqrt{462}i}{1848}$	
	0	0	0	0	$\frac{\sqrt{770}i}{132}$	0	$-\frac{\sqrt{770}}{132}$	0	0	0	0	$\frac{\sqrt{77}}{132}$	$-\frac{\sqrt{462}i}{1848}$	0	
	0	$-\frac{17\sqrt{462}}{1848}$	0	$\frac{\sqrt{462}i}{168}$	$\frac{\sqrt{77}}{132}$	0	0	0	0	$-\frac{\sqrt{770}}{924}$	0	$-\frac{\sqrt{770}i}{924}$	0	0	0
	$-\frac{17\sqrt{462}}{1848}$	0	$-\frac{\sqrt{462}i}{168}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$-\frac{\sqrt{770}}{924}$	0	$\frac{\sqrt{770}i}{924}$	0	0	0	0
	0	$\frac{17\sqrt{462}i}{1848}$	0	$\frac{\sqrt{462}}{168}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$-\frac{\sqrt{770}i}{924}$	0	$\frac{\sqrt{770}}{924}$	0	0	0
	$-\frac{17\sqrt{462}i}{1848}$	0	$\frac{\sqrt{462}}{168}$	0	0	0	0	$\frac{\sqrt{77}}{132}$	$\frac{\sqrt{770}i}{924}$	0	$\frac{\sqrt{770}}{924}$	0	0	0	0
	$-\frac{\sqrt{77}}{44}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	0	$\frac{\sqrt{462}i}{1848}$	0	0	0	0	0	0	0
	0	$\frac{\sqrt{77}}{44}$	0	0	$\frac{\sqrt{462}}{1848}$	0	$-\frac{\sqrt{462}i}{1848}$	0	0	0	0	0	0	0	0

1008 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 1)$	$\frac{\sqrt{77}}{77}$	0 0 0 0 0 $-\frac{5\sqrt{462}}{924}$ 0 $-\frac{5\sqrt{462}i}{924}$ 0 0 0 0 0 0
	0	$-\frac{\sqrt{77}}{77}$ 0 0 0 $-\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ 0 0 0 0 0 0 0
	0	0 $\frac{\sqrt{77}}{77}$ 0 0 0 $\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 0 0
	0	0 0 0 $-\frac{\sqrt{77}}{77}$ $-\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 0 0
	0	$-\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ $-\frac{\sqrt{77}}{33}$ 0 0 0 0 $\frac{\sqrt{770}}{231}$ 0 $\frac{\sqrt{770}i}{231}$ 0 0
	$-\frac{5\sqrt{462}}{924}$	0 $-\frac{5\sqrt{462}i}{924}$ 0 0 0 $\frac{\sqrt{77}}{33}$ 0 0 $\frac{\sqrt{770}}{231}$ 0 $-\frac{\sqrt{770}i}{231}$ 0 0 0
	0	$-\frac{5\sqrt{462}i}{924}$ 0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 $-\frac{\sqrt{77}}{33}$ 0 0 $-\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0
	$\frac{5\sqrt{462}i}{924}$	0 $-\frac{5\sqrt{462}}{924}$ 0 0 0 0 0 $\frac{\sqrt{77}}{33}$ $\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 0
	0	0 0 0 0 0 $\frac{\sqrt{770}}{231}$ 0 $-\frac{\sqrt{770}i}{231}$ $\frac{\sqrt{77}}{231}$ 0 0 0 0 $\frac{5\sqrt{462}}{924}$
	0	0 0 0 0 0 $\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 $-\frac{\sqrt{77}}{231}$ 0 0 $\frac{5\sqrt{462}}{924}$ 0
	0	0 0 0 0 0 $-\frac{\sqrt{770}i}{231}$ 0 $\frac{\sqrt{770}}{231}$ 0 0 0 0 $-\frac{\sqrt{77}}{231}$ $\frac{5\sqrt{462}i}{924}$ 0
	0	0 0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 $-\frac{5\sqrt{462}i}{924}$ $\frac{2\sqrt{77}}{77}$ 0
	0	0 0 0 0 0 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 $\frac{5\sqrt{462}i}{924}$ 0 0 $-\frac{2\sqrt{77}}{77}$
1009	symmetry	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_3^{(1,1;a)}(A_{2g}, 2)$	0	0	0	0	0	0	0	0	$-\frac{\sqrt{462}i}{168}$	0	$-\frac{\sqrt{462}}{168}$	0	0	0	
	0	0	0	0	0	0	0	0	$\frac{\sqrt{462}i}{168}$	0	$-\frac{\sqrt{462}}{168}$	0	0	0	
	0	0	0	0	0	0	0	0	$-\frac{17\sqrt{462}}{1848}$	0	$\frac{17\sqrt{462}i}{1848}$	$-\frac{\sqrt{77}}{44}$	0	0	
	0	0	0	0	0	0	0	0	$-\frac{17\sqrt{462}}{1848}$	0	$-\frac{17\sqrt{462}i}{1848}$	0	0	$\frac{\sqrt{77}}{44}$	
	0	0	0	0	0	$\frac{\sqrt{770}i}{132}$	0	$\frac{\sqrt{770}}{132}$	0	0	$\frac{\sqrt{77}}{132}$	0	0	$-\frac{\sqrt{462}i}{1848}$	
	0	0	0	0	$-\frac{\sqrt{770}i}{132}$	0	$\frac{\sqrt{770}}{132}$	0	0	0	$-\frac{\sqrt{77}}{132}$	$\frac{\sqrt{462}i}{1848}$	0	0	
	0	0	0	0	0	$\frac{\sqrt{770}}{132}$	0	$-\frac{\sqrt{770}i}{132}$	$\frac{\sqrt{77}}{132}$	0	0	0	0	$\frac{\sqrt{462}}{1848}$	
	0	0	0	0	$\frac{\sqrt{770}}{132}$	0	$\frac{\sqrt{770}i}{132}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$\frac{\sqrt{462}}{1848}$	0	
	0	$-\frac{\sqrt{462}i}{168}$	0	$-\frac{17\sqrt{462}}{1848}$	0	0	$\frac{\sqrt{77}}{132}$	0	0	$\frac{\sqrt{770}i}{924}$	0	$-\frac{\sqrt{770}}{924}$	0	0	
	$\frac{\sqrt{462}i}{168}$	0	$-\frac{17\sqrt{462}}{1848}$	0	0	0	0	$-\frac{\sqrt{77}}{132}$	$-\frac{\sqrt{770}i}{924}$	0	$-\frac{\sqrt{770}}{924}$	0	0	0	
	0	$-\frac{\sqrt{462}}{168}$	0	$\frac{17\sqrt{462}i}{1848}$	$\frac{\sqrt{77}}{132}$	0	0	0	0	$-\frac{\sqrt{770}}{924}$	0	$-\frac{\sqrt{770}i}{924}$	0	0	
	$-\frac{\sqrt{462}}{168}$	0	$-\frac{17\sqrt{462}i}{1848}$	0	0	$-\frac{\sqrt{77}}{132}$	0	0	$-\frac{\sqrt{770}}{924}$	0	$\frac{\sqrt{770}i}{924}$	0	0	0	
	0	0	$-\frac{\sqrt{77}}{44}$	0	0	$-\frac{\sqrt{462}i}{1848}$	0	$\frac{\sqrt{462}}{1848}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{77}}{44}$	$\frac{\sqrt{462}i}{1848}$	0	$\frac{\sqrt{462}}{1848}$	0	0	0	0	0	0	0	

1010 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{3,1}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{462}}{308}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	0	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	0	0
	$-\frac{\sqrt{462}}{308}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	0	0	$\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{462}}{308}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0
	0	0	$-\frac{\sqrt{462}}{308}$	0	0	0	0	$\frac{5\sqrt{77}}{308}$	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0
	$-\frac{5\sqrt{77}}{308}$	0	0	0	0	$\frac{\sqrt{462}}{132}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	0	0	0	$-\frac{\sqrt{770}}{616}$
	0	$\frac{5\sqrt{77}}{308}$	0	0	$\frac{\sqrt{462}}{132}$	0	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$-\frac{\sqrt{770}}{616}$	0	0	0
	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	0	0	$\frac{\sqrt{462}}{132}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$\frac{\sqrt{770}i}{616}$	0
	0	0	0	$\frac{5\sqrt{77}}{308}$	0	0	$\frac{\sqrt{462}}{132}$	0	0	0	0	$-\frac{\sqrt{1155}}{231}$	$-\frac{\sqrt{770}i}{616}$	0	0
	0	$\frac{3\sqrt{770}}{616}$	0	$-\frac{3\sqrt{770}i}{616}$	$\frac{\sqrt{1155}}{231}$	0	0	0	$\frac{\sqrt{462}}{231}$	0	$-\frac{5\sqrt{462}i}{924}$	$\frac{5\sqrt{77}}{308}$	0	0	0
	$\frac{3\sqrt{770}}{616}$	0	$\frac{3\sqrt{770}i}{616}$	0	0	$-\frac{\sqrt{1155}}{231}$	0	0	$\frac{\sqrt{462}}{231}$	0	$\frac{5\sqrt{462}i}{924}$	0	0	$-\frac{5\sqrt{77}}{308}$	0
	0	$\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	$\frac{\sqrt{1155}}{231}$	0	0	$-\frac{5\sqrt{462}i}{924}$	0	$-\frac{\sqrt{462}}{154}$	0	0	0
	$-\frac{3\sqrt{770}i}{616}$	0	$\frac{3\sqrt{770}}{616}$	0	0	0	0	$-\frac{\sqrt{1155}}{231}$	$\frac{5\sqrt{462}i}{924}$	0	$-\frac{\sqrt{462}}{154}$	0	0	0	0
	0	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	$\frac{\sqrt{770}i}{616}$	$\frac{5\sqrt{77}}{308}$	0	0	0	0	$-\frac{\sqrt{462}}{154}$
	0	0	0	0	$-\frac{\sqrt{770}}{616}$	0	$-\frac{\sqrt{770}i}{616}$	0	0	$-\frac{5\sqrt{77}}{308}$	0	0	$-\frac{\sqrt{462}}{154}$	0	0
1011	symmetry	$\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$													

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{462}i}{308}$ 0 0 0 0 0 $\frac{5\sqrt{77}}{308}$ 0 0 $\frac{3\sqrt{770}i}{616}$ 0 $-\frac{3\sqrt{770}}{616}$ 0 0
	$-\frac{\sqrt{462}i}{308}$	0 0 0 0 0 0 0 $-\frac{5\sqrt{77}}{308}$ $-\frac{3\sqrt{770}i}{616}$ 0 $-\frac{3\sqrt{770}}{616}$ 0 0 0
	0	0 0 0 $\frac{\sqrt{462}i}{308}$ $-\frac{5\sqrt{77}}{308}$ 0 0 0 0 $\frac{3\sqrt{770}}{616}$ 0 $\frac{3\sqrt{770}i}{616}$ 0 0
	0	0 0 $-\frac{\sqrt{462}i}{308}$ 0 0 $\frac{5\sqrt{77}}{308}$ 0 0 $\frac{3\sqrt{770}}{616}$ 0 $-\frac{3\sqrt{770}i}{616}$ 0 0 0
	0	0 0 $-\frac{5\sqrt{77}}{308}$ 0 0 $-\frac{\sqrt{462}i}{132}$ 0 0 0 0 $-\frac{\sqrt{1155}}{231}$ 0 0 $-\frac{\sqrt{770}i}{616}$
	0	0 0 0 $\frac{5\sqrt{77}}{308}$ $\frac{\sqrt{462}i}{132}$ 0 0 0 0 0 0 $\frac{\sqrt{1155}}{231}$ $\frac{\sqrt{770}i}{616}$ 0
	$\frac{5\sqrt{77}}{308}$	0 0 0 0 0 0 0 $-\frac{\sqrt{462}i}{132}$ $\frac{\sqrt{1155}}{231}$ 0 0 0 0 $-\frac{\sqrt{770}}{616}$
	0	$-\frac{5\sqrt{77}}{308}$ 0 0 0 0 $\frac{\sqrt{462}i}{132}$ 0 0 $-\frac{\sqrt{1155}}{231}$ 0 0 $-\frac{\sqrt{770}}{616}$ 0
	0	$\frac{3\sqrt{770}i}{616}$ 0 $\frac{3\sqrt{770}}{616}$ 0 0 $\frac{\sqrt{1155}}{231}$ 0 0 $\frac{\sqrt{462}i}{154}$ 0 $\frac{5\sqrt{462}}{924}$ 0 0
	$-\frac{3\sqrt{770}i}{616}$	0 $\frac{3\sqrt{770}}{616}$ 0 0 0 0 0 $-\frac{\sqrt{1155}}{231}$ $-\frac{\sqrt{462}i}{154}$ 0 $\frac{5\sqrt{462}}{924}$ 0 0 0
	0	$-\frac{3\sqrt{770}}{616}$ 0 $\frac{3\sqrt{770}i}{616}$ $-\frac{\sqrt{1155}}{231}$ 0 0 0 0 $\frac{5\sqrt{462}}{924}$ 0 $-\frac{\sqrt{462}i}{231}$ $\frac{5\sqrt{77}}{308}$ 0
	$-\frac{3\sqrt{770}}{616}$	0 $-\frac{3\sqrt{770}i}{616}$ 0 0 0 $\frac{\sqrt{1155}}{231}$ 0 0 $\frac{5\sqrt{462}}{924}$ 0 $\frac{\sqrt{462}i}{231}$ 0 0 $-\frac{5\sqrt{77}}{308}$
	0	0 0 0 0 0 $-\frac{\sqrt{770}i}{616}$ 0 $-\frac{\sqrt{770}}{616}$ 0 0 $\frac{5\sqrt{77}}{308}$ 0 0 $\frac{\sqrt{462}i}{154}$
	0	0 0 0 0 $\frac{\sqrt{770}i}{616}$ 0 $-\frac{\sqrt{770}}{616}$ 0 0 0 0 $-\frac{5\sqrt{77}}{308}$ $-\frac{\sqrt{462}i}{154}$ 0
$\sqrt{15}xyz$		

continued ...

Table 10

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

1013 symmetry

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

continued ...

Table 10

No.	multipole	matrix
$\mathbb{M}_{3,2}^{(1,1;a)}(E_g, 2)$	0 0 0 0 0 $\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ $\frac{3\sqrt{77}}{154}$ 0 0 0 0 $-\frac{\sqrt{462}}{88}$	
	0 0 0 0 0 $\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ 0 0 $-\frac{3\sqrt{77}}{154}$ 0 0 $-\frac{\sqrt{462}}{88}$ 0	
	0 0 0 0 0 0 $\frac{\sqrt{770}i}{616}$ 0 $\frac{\sqrt{770}}{616}$ 0 0 0 $\frac{3\sqrt{77}}{154}$ 0 0 $\frac{\sqrt{462}i}{88}$	
	0 0 0 0 0 $-\frac{\sqrt{770}i}{616}$ 0 $\frac{\sqrt{770}}{616}$ 0 0 0 0 $-\frac{3\sqrt{77}}{154}$ $-\frac{\sqrt{462}i}{88}$ 0	
	0 $\frac{\sqrt{770}}{616}$ 0 0 $\frac{\sqrt{770}i}{616}$ 0 0 0 0 $\frac{\sqrt{462}}{616}$ 0 $-\frac{\sqrt{462}i}{616}$ $-\frac{\sqrt{77}}{154}$ 0	
	$\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ 0 0 0 0 0 $\frac{\sqrt{462}}{616}$ 0 $\frac{\sqrt{462}i}{616}$ 0 0 $\frac{\sqrt{77}}{154}$	
	0 $-\frac{\sqrt{770}i}{616}$ 0 $\frac{\sqrt{770}}{616}$ 0 0 0 0 0 $-\frac{\sqrt{462}i}{168}$ 0 $-\frac{\sqrt{462}}{168}$ 0 0 0	
	$\frac{\sqrt{770}i}{616}$ 0 $\frac{\sqrt{770}}{616}$ 0 0 0 0 0 $\frac{\sqrt{462}i}{168}$ 0 $-\frac{\sqrt{462}}{168}$ 0 0 0	
	$\frac{3\sqrt{77}}{154}$ 0 0 0 0 $\frac{\sqrt{462}}{616}$ 0 $-\frac{\sqrt{462}i}{168}$ $\frac{\sqrt{1155}}{231}$ 0 0 0 0 $-\frac{\sqrt{770}}{616}$	
	0 $-\frac{3\sqrt{77}}{154}$ 0 0 $\frac{\sqrt{462}}{616}$ 0 $\frac{\sqrt{462}i}{168}$ 0 0 $-\frac{\sqrt{1155}}{231}$ 0 0 0 $-\frac{\sqrt{770}}{616}$ 0	
	0 0 $\frac{3\sqrt{77}}{154}$ 0 0 $-\frac{\sqrt{462}i}{616}$ 0 $-\frac{\sqrt{462}}{168}$ 0 0 $-\frac{\sqrt{1155}}{231}$ 0 0 0 $-\frac{\sqrt{770}i}{616}$	
	0 0 0 $-\frac{3\sqrt{77}}{154}$ $\frac{\sqrt{462}i}{616}$ 0 $-\frac{\sqrt{462}}{168}$ 0 0 0 0 $\frac{\sqrt{1155}}{231}$ $\frac{\sqrt{770}i}{616}$ 0	
	0 $-\frac{\sqrt{462}}{88}$ 0 $\frac{\sqrt{462}i}{88}$ $-\frac{\sqrt{77}}{154}$ 0 0 0 0 $-\frac{\sqrt{770}}{616}$ 0 $-\frac{\sqrt{770}i}{616}$ 0 0	
	$-\frac{\sqrt{462}}{88}$ 0 $-\frac{\sqrt{462}i}{88}$ 0 0 $\frac{\sqrt{77}}{154}$ 0 0 $-\frac{\sqrt{770}}{616}$ 0 $\frac{\sqrt{770}i}{616}$ 0 0 0	
$\frac{\sqrt{70}x(x^2-3y^2)(x^2+y^2-8z^2)}{16}$		

1014 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$M_5^{(1,1;a)}(A_{1g})$	0	0	0	0	0	0	0	0	$\frac{17\sqrt{858}}{3432}$	0	$-\frac{17\sqrt{858}i}{3432}$	$\frac{3\sqrt{143}}{286}$	0	0	
	0	0	0	0	0	0	0	0	$\frac{17\sqrt{858}}{3432}$	0	$\frac{17\sqrt{858}i}{3432}$	0	0	$-\frac{3\sqrt{143}}{286}$	
	0	0	0	0	0	0	0	0	$-\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0
	0	0	0	0	0	0	0	0	$\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0	0
	0	0	0	0	0	$\frac{3\sqrt{1430}}{572}$	0	$-\frac{3\sqrt{1430}i}{572}$	$\frac{9\sqrt{143}}{572}$	0	0	0	0	$-\frac{\sqrt{858}}{429}$	
	0	0	0	0	$\frac{3\sqrt{1430}}{572}$	0	$\frac{3\sqrt{1430}i}{572}$	0	0	$-\frac{9\sqrt{143}}{572}$	0	0	$-\frac{\sqrt{858}}{429}$	0	
	0	0	0	0	0	$-\frac{3\sqrt{1430}i}{572}$	0	$-\frac{3\sqrt{1430}}{572}$	0	0	$-\frac{9\sqrt{143}}{572}$	0	0	$-\frac{\sqrt{858}i}{429}$	
	0	0	0	0	$\frac{3\sqrt{1430}i}{572}$	0	$-\frac{3\sqrt{1430}}{572}$	0	0	0	$-\frac{9\sqrt{143}}{572}$	$\frac{9\sqrt{143}}{572}$	$\frac{\sqrt{858}i}{429}$	0	
	0	$\frac{17\sqrt{858}}{3432}$	0	$-\frac{\sqrt{858}i}{264}$	$\frac{9\sqrt{143}}{572}$	0	0	0	0	$-\frac{\sqrt{1430}}{572}$	0	$-\frac{\sqrt{1430}i}{572}$	0	0	
	$\frac{17\sqrt{858}}{3432}$	0	$\frac{\sqrt{858}i}{264}$	0	0	$-\frac{9\sqrt{143}}{572}$	0	0	$-\frac{\sqrt{1430}}{572}$	0	$\frac{\sqrt{1430}i}{572}$	0	0	0	
	0	$-\frac{17\sqrt{858}i}{3432}$	0	$-\frac{\sqrt{858}}{264}$	0	0	$-\frac{9\sqrt{143}}{572}$	0	0	$-\frac{\sqrt{1430}i}{572}$	0	$\frac{\sqrt{1430}}{572}$	0	0	
	$\frac{17\sqrt{858}i}{3432}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0	0	$\frac{9\sqrt{143}}{572}$	$\frac{\sqrt{1430}i}{572}$	0	$\frac{\sqrt{1430}}{572}$	0	0	0	
	$\frac{3\sqrt{143}}{286}$	0	0	0	0	$-\frac{\sqrt{858}}{429}$	0	$-\frac{\sqrt{858}i}{429}$	0	0	0	0	0	0	
	0	$-\frac{3\sqrt{143}}{286}$	0	0	$-\frac{\sqrt{858}}{429}$	0	$\frac{\sqrt{858}i}{429}$	0	0	0	0	0	0	0	

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

1015 symmetry

continued ...

Table 10

No.	multipole	matrix														
$M_5^{(1,1;a)}(A_{2g}, 1)$	$-\frac{\sqrt{1001}}{2002} 0 0 0 0 \frac{\sqrt{6006}}{3432} 0 \frac{\sqrt{6006i}}{3432} 0 0 0 0 0 0 0$															
	$0 \frac{\sqrt{1001}}{2002} 0 0 0 \frac{\sqrt{6006}}{3432} 0 -\frac{\sqrt{6006i}}{3432} 0 0 0 0 0 0 0 0$															
	$0 0 -\frac{\sqrt{1001}}{2002} 0 0 -\frac{\sqrt{6006i}}{3432} 0 \frac{\sqrt{6006}}{3432} 0 0 0 0 0 0 0 0$															
	$0 0 0 \frac{\sqrt{1001}}{2002} \frac{\sqrt{6006i}}{3432} 0 \frac{\sqrt{6006}}{3432} 0 0 0 0 0 0 0 0 0 0$															
	$0 \frac{\sqrt{6006}}{3432} 0 -\frac{\sqrt{6006i}}{3432} \frac{3\sqrt{1001}}{1001} 0 0 0 0 -\frac{\sqrt{10010}}{1144} 0 -\frac{\sqrt{10010i}}{1144} 0 0 0$															
	$\frac{\sqrt{6006}}{3432} 0 \frac{\sqrt{6006i}}{3432} 0 0 -\frac{3\sqrt{1001}}{1001} 0 0 -\frac{\sqrt{10010}}{1144} 0 \frac{\sqrt{10010i}}{1144} 0 0 0 0$															
	$0 \frac{\sqrt{6006i}}{3432} 0 \frac{\sqrt{6006}}{3432} 0 0 0 \frac{3\sqrt{1001}}{1001} 0 0 \frac{\sqrt{10010i}}{1144} 0 -\frac{\sqrt{10010}}{1144} 0 0 0$															
	$-\frac{\sqrt{6006i}}{3432} 0 \frac{\sqrt{6006}}{3432} 0 0 0 0 -\frac{3\sqrt{1001}}{1001} -\frac{\sqrt{10010i}}{1144} 0 0 -\frac{\sqrt{10010}}{1144} 0 0 0 0$															
	$0 0 0 0 0 -\frac{\sqrt{10010}}{1144} 0 -\frac{\sqrt{10010i}}{1144} 0 0 -\frac{15\sqrt{1001}}{2002} 0 0 0 0 \frac{5\sqrt{6006}}{1716}$															
	$0 0 0 0 0 0 -\frac{\sqrt{10010i}}{1144} 0 -\frac{\sqrt{10010}}{1144} 0 0 -\frac{15\sqrt{1001}}{2002} 0 0 0 0 -\frac{5\sqrt{6006i}}{1716}$															
	$0 0 0 0 0 \frac{\sqrt{10010i}}{1144} 0 -\frac{\sqrt{10010}}{1144} 0 0 0 0 \frac{15\sqrt{1001}}{2002} \frac{5\sqrt{6006i}}{1716} 0 -\frac{5\sqrt{6006i}}{1716} \frac{10\sqrt{1001}}{1001} 0$															
	$0 0 0 0 0 0 0 0 \frac{5\sqrt{6006}}{1716} 0 0 \frac{5\sqrt{6006i}}{1716} 0 0 0 -\frac{10\sqrt{1001}}{1001}$															
1016	symmetry	$\frac{\sqrt{70}y(3x^2-y^2)(x^2+y^2-8z^2)}{16}$														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_5^{(1,1;a)}(A_{2g}, 2)$	0 0 0 0 0 0 0 0 0 $\frac{\sqrt{858}i}{264}$ 0 $\frac{\sqrt{858}}{264}$ 0 0														
	0 0 0 0 0 0 0 0 $-\frac{\sqrt{858}i}{264}$ 0 $\frac{\sqrt{858}}{264}$ 0 0 0														
	0 0 0 0 0 0 0 0 0 $\frac{17\sqrt{858}}{3432}$ 0 $-\frac{17\sqrt{858}i}{3432}$ $-\frac{17\sqrt{858}i}{3432}$ $\frac{3\sqrt{143}}{286}$ 0														
	0 0 0 0 0 0 0 0 $\frac{17\sqrt{858}}{3432}$ 0 $\frac{17\sqrt{858}i}{3432}$ 0 0 $-\frac{3\sqrt{143}}{286}$														
	0 0 0 0 0 $\frac{3\sqrt{1430}i}{572}$ 0 $\frac{3\sqrt{1430}}{572}$ 0 0 $\frac{9\sqrt{143}}{572}$ 0 0 $\frac{\sqrt{858}i}{429}$														
	0 0 0 0 $-\frac{3\sqrt{1430}i}{572}$ 0 $\frac{3\sqrt{1430}}{572}$ 0 0 0 0 $-\frac{9\sqrt{143}}{572}$ $-\frac{\sqrt{858}i}{429}$ 0														
	0 0 0 0 0 $\frac{3\sqrt{1430}}{572}$ 0 $-\frac{3\sqrt{1430}i}{572}$ $\frac{9\sqrt{143}}{572}$ 0 0 0 0 $-\frac{\sqrt{858}i}{429}$														
	0 0 0 0 0 $\frac{3\sqrt{1430}}{572}$ 0 $\frac{3\sqrt{1430}i}{572}$ 0 0 $-\frac{9\sqrt{143}}{572}$ 0 0 $-\frac{\sqrt{858}i}{429}$ 0														
	0 $\frac{\sqrt{858}i}{264}$ 0 $\frac{17\sqrt{858}}{3432}$ 0 $\frac{9\sqrt{143}}{572}$ 0 0 $\frac{\sqrt{1430}i}{572}$ 0 $-\frac{\sqrt{1430}}{572}$ 0 0 0														
	- $\frac{\sqrt{858}i}{264}$ 0 $\frac{17\sqrt{858}}{3432}$ 0 0 0 $-\frac{9\sqrt{143}}{572}$ $-\frac{\sqrt{1430}i}{572}$ 0 $-\frac{\sqrt{1430}}{572}$ 0 0 0														
	0 $\frac{\sqrt{858}}{264}$ 0 $-\frac{17\sqrt{858}i}{3432}$ $\frac{9\sqrt{143}}{572}$ 0 0 0 0 $-\frac{\sqrt{1430}}{572}$ 0 $-\frac{\sqrt{1430}i}{572}$ 0 0														
	$\frac{\sqrt{858}}{264}$ 0 $\frac{17\sqrt{858}i}{3432}$ 0 0 $-\frac{9\sqrt{143}}{572}$ 0 0 $-\frac{\sqrt{1430}}{572}$ 0 $\frac{\sqrt{1430}i}{572}$ 0 0 0														
	0 0 $\frac{3\sqrt{143}}{286}$ 0 0 $\frac{\sqrt{858}i}{429}$ 0 $-\frac{\sqrt{858}}{429}$ 0 0 0 0 0 0 0														
	0 0 0 $-\frac{3\sqrt{143}}{286}$ $-\frac{\sqrt{858}i}{429}$ 0 $-\frac{\sqrt{858}}{429}$ 0 0 0 0 0 0 0 0														
$\frac{3\sqrt{14}x(x^4 - 10x^2y^2 + 5y^4)}{16}$															
1017	symmetry														

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 1)$	0	$\frac{\sqrt{286}}{52}$	0	$-\frac{\sqrt{286}i}{52}$	$\frac{\sqrt{429}}{156}$	0	0	0	0	$-\frac{\sqrt{4290}}{3432}$	0	$-\frac{\sqrt{4290}i}{3432}$	0	0	
	$\frac{\sqrt{286}}{52}$	0	$\frac{\sqrt{286}i}{52}$	0	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{4290}}{3432}$	0	$\frac{\sqrt{4290}i}{3432}$	0	0	0	
	0	$-\frac{\sqrt{286}i}{52}$	0	$-\frac{\sqrt{286}}{52}$	0	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	
	$\frac{\sqrt{286}i}{52}$	0	$-\frac{\sqrt{286}}{52}$	0	0	0	0	$\frac{\sqrt{429}}{156}$	$\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	0	
	$\frac{\sqrt{429}}{156}$	0	0	0	0	$-\frac{\sqrt{286}}{572}$	0	$-\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	
	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{286}}{572}$	0	$\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	0	
	0	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{429}}{156}$	$\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{4290}}{3432}$	0	$-\frac{\sqrt{4290}i}{3432}$	0	0	0	0	0	0	0	0	0	0	
	$-\frac{\sqrt{4290}}{3432}$	0	$\frac{\sqrt{4290}i}{3432}$	0	0	0	0	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

1018 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 1)$	0	$-\frac{\sqrt{286}i}{52}$	0	$-\frac{\sqrt{286}}{52}$	0	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	
	$\frac{\sqrt{286}i}{52}$	0	$-\frac{\sqrt{286}}{52}$	0	0	0	0	$\frac{\sqrt{429}}{156}$	$\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	0	
	0	$-\frac{\sqrt{286}}{52}$	0	$\frac{\sqrt{286}i}{52}$	$-\frac{\sqrt{429}}{156}$	0	0	0	0	$\frac{\sqrt{4290}}{3432}$	0	$\frac{\sqrt{4290}i}{3432}$	0	0	
	$-\frac{\sqrt{286}}{52}$	0	$-\frac{\sqrt{286}i}{52}$	0	0	$\frac{\sqrt{429}}{156}$	0	0	$\frac{\sqrt{4290}}{3432}$	0	$-\frac{\sqrt{4290}i}{3432}$	0	0	0	
	0	0	$-\frac{\sqrt{429}}{156}$	0	0	$-\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	
	0	0	0	$\frac{\sqrt{429}}{156}$	$\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	
	$-\frac{\sqrt{429}}{156}$	0	0	0	0	$\frac{\sqrt{286}}{572}$	0	$\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	
	0	$\frac{\sqrt{429}}{156}$	0	0	$\frac{\sqrt{286}}{572}$	0	$-\frac{\sqrt{286}i}{572}$	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{4290}i}{3432}$	0	$\frac{\sqrt{4290}}{3432}$	0	$\frac{\sqrt{4290}i}{3432}$	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{4290}}{3432}$	0	$-\frac{\sqrt{4290}i}{3432}$	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1019	symmetry	$\frac{\sqrt{15x(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4)}}{8}$													

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 2)$	0	$\frac{\sqrt{15015}}{12012}$	0	0	$\frac{\sqrt{10010}}{3432}$	0	0	0	0	$-\frac{\sqrt{1001}}{858}$	0	$-\frac{\sqrt{1001i}}{858}$	0	0	
	$\frac{\sqrt{15015}}{12012}$	0	0	0	0	$-\frac{\sqrt{10010}}{3432}$	0	0	$-\frac{\sqrt{1001}}{858}$	0	$\frac{\sqrt{1001i}}{858}$	0	0	0	
	0	0	0	$\frac{\sqrt{15015}}{12012}$	0	0	$\frac{\sqrt{10010}}{3432}$	0	0	$\frac{\sqrt{1001i}}{858}$	0	$-\frac{\sqrt{1001}}{858}$	0	0	
	0	0	$\frac{\sqrt{15015}}{12012}$	0	0	0	0	$-\frac{\sqrt{10010}}{3432}$	$-\frac{\sqrt{1001i}}{858}$	0	$-\frac{\sqrt{1001}}{858}$	0	0	0	
	$\frac{\sqrt{10010}}{3432}$	0	0	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{5\sqrt{6006}}{3432}$	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	
	0	$-\frac{\sqrt{10010}}{3432}$	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	0	$\frac{5\sqrt{6006}}{3432}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	0	
	0	0	$\frac{\sqrt{10010}}{3432}$	0	0	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	$-\frac{5\sqrt{6006}}{3432}$	0	0	$-\frac{2\sqrt{1001i}}{429}$	
	0	0	0	$-\frac{\sqrt{10010}}{3432}$	0	0	$-\frac{\sqrt{15015}}{2002}$	0	0	0	$\frac{5\sqrt{6006}}{3432}$	$\frac{2\sqrt{1001i}}{429}$	0	0	
	0	$-\frac{\sqrt{1001}}{858}$	0	$\frac{\sqrt{1001i}}{858}$	$-\frac{5\sqrt{6006}}{3432}$	0	0	0	$\frac{29\sqrt{15015}}{12012}$	0	$-\frac{\sqrt{15015i}}{858}$	$\frac{5\sqrt{10010}}{1716}$	0	0	
	$-\frac{\sqrt{1001}}{858}$	0	$-\frac{\sqrt{1001i}}{858}$	0	0	$\frac{5\sqrt{6006}}{3432}$	0	0	$\frac{29\sqrt{15015}}{12012}$	0	$\frac{\sqrt{15015i}}{858}$	0	0	$-\frac{5\sqrt{10010}}{1716}$	
	0	$-\frac{\sqrt{1001i}}{858}$	0	$-\frac{\sqrt{1001}}{858}$	0	0	$-\frac{5\sqrt{6006}}{3432}$	0	0	$-\frac{\sqrt{15015i}}{858}$	0	$\frac{\sqrt{15015}}{12012}$	0	0	0
	$\frac{\sqrt{1001i}}{858}$	0	$-\frac{\sqrt{1001}}{858}$	0	0	0	0	$\frac{5\sqrt{6006}}{3432}$	$\frac{\sqrt{15015i}}{858}$	0	$\frac{\sqrt{15015}}{12012}$	0	0	0	
	0	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	0	$-\frac{2\sqrt{1001i}}{429}$	$\frac{5\sqrt{10010}}{1716}$	0	0	0	0	$-\frac{5\sqrt{15015}}{3003}$	
	0	0	0	0	$\frac{2\sqrt{1001}}{429}$	0	$\frac{2\sqrt{1001i}}{429}$	0	0	$-\frac{5\sqrt{10010}}{1716}$	0	0	$-\frac{5\sqrt{15015}}{3003}$	0	

1020 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 2)$	0	$-\frac{\sqrt{15015}i}{12012}$	0	0	0	0	$-\frac{\sqrt{10010}}{3432}$	0	0	$-\frac{\sqrt{1001}i}{858}$	0	$\frac{\sqrt{1001}}{858}$	0	0	0
	$\frac{\sqrt{15015}i}{12012}$	0	0	0	0	0	0	$\frac{\sqrt{10010}}{3432}$	$\frac{\sqrt{1001}i}{858}$	0	$\frac{\sqrt{1001}}{858}$	0	0	0	0
	0	0	0	$-\frac{\sqrt{15015}i}{12012}$	$\frac{\sqrt{10010}}{3432}$	0	0	0	0	$-\frac{\sqrt{1001}}{858}$	0	$-\frac{\sqrt{1001}i}{858}$	0	0	0
	0	0	$\frac{\sqrt{15015}i}{12012}$	0	0	$-\frac{\sqrt{10010}}{3432}$	0	0	$-\frac{\sqrt{1001}i}{858}$	0	$\frac{\sqrt{1001}i}{858}$	0	0	0	0
	0	0	$\frac{\sqrt{10010}}{3432}$	0	0	$\frac{\sqrt{15015}i}{2002}$	0	0	0	0	$\frac{5\sqrt{6006}}{3432}$	0	0	0	$\frac{2\sqrt{1001}i}{429}$
	0	0	0	$-\frac{\sqrt{10010}}{3432}$	$-\frac{\sqrt{15015}i}{2002}$	0	0	0	0	0	$-\frac{5\sqrt{6006}}{3432}$	$-\frac{2\sqrt{1001}i}{429}$	0	0	0
	$-\frac{\sqrt{10010}}{3432}$	0	0	0	0	0	0	$\frac{\sqrt{15015}i}{2002}$	$-\frac{5\sqrt{6006}}{3432}$	0	0	0	0	0	$\frac{2\sqrt{1001}}{429}$
	0	$\frac{\sqrt{10010}}{3432}$	0	0	0	0	$-\frac{\sqrt{15015}i}{2002}$	0	0	$\frac{5\sqrt{6006}}{3432}$	0	0	$\frac{2\sqrt{1001}}{429}$	0	0
	0	$-\frac{\sqrt{1001}i}{858}$	0	$-\frac{\sqrt{1001}}{858}$	0	0	$-\frac{5\sqrt{6006}}{3432}$	0	0	$-\frac{\sqrt{15015}i}{12012}$	0	$\frac{\sqrt{15015}}{858}$	0	0	0
	$\frac{\sqrt{1001}i}{858}$	0	$-\frac{\sqrt{1001}i}{858}$	0	0	0	0	$\frac{5\sqrt{6006}}{3432}$	$\frac{\sqrt{15015}i}{12012}$	0	$\frac{\sqrt{15015}}{858}$	0	0	0	0
	0	$\frac{\sqrt{1001}}{858}$	0	$-\frac{\sqrt{1001}i}{858}$	$\frac{5\sqrt{6006}}{3432}$	0	0	0	0	$\frac{\sqrt{15015}}{858}$	0	$-\frac{29\sqrt{15015}i}{12012}$	$\frac{5\sqrt{10010}}{1716}$	0	0
	$\frac{\sqrt{1001}}{858}$	0	$\frac{\sqrt{1001}i}{858}$	0	0	$-\frac{5\sqrt{6006}}{3432}$	0	0	$\frac{\sqrt{15015}i}{858}$	0	$\frac{29\sqrt{15015}i}{12012}$	0	0	0	$-\frac{5\sqrt{10010}}{1716}$
	0	0	0	0	0	$\frac{2\sqrt{1001}i}{429}$	0	$\frac{2\sqrt{1001}}{429}$	0	0	$\frac{5\sqrt{10010}}{1716}$	0	0	0	$\frac{5\sqrt{15015}i}{3003}$
	0	0	0	0	$-\frac{2\sqrt{1001}i}{429}$	0	$\frac{2\sqrt{1001}}{429}$	0	0	0	0	$-\frac{5\sqrt{10010}}{1716}$	$-\frac{5\sqrt{15015}i}{3003}$	0	0

1021 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 3)$	0	0	0	0	0	$-\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{\sqrt{286}i}{572}$		
	0	0	0	0	$\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	0	0	$\frac{5\sqrt{429}}{858}$	$\frac{\sqrt{286}i}{572}$	0		
	0	0	0	0	0	$-\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	$-\frac{5\sqrt{429}}{858}$	0	0	0	0	$\frac{\sqrt{286}}{572}$		
	0	0	0	0	$-\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	0	0	$\frac{5\sqrt{429}}{858}$	0	0	$\frac{\sqrt{286}}{572}$	0		
	0	$-\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	$-\frac{\sqrt{715}}{143}$	0	0	$-\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0		
	$\frac{\sqrt{4290}i}{312}$	0	$-\frac{\sqrt{4290}}{312}$	0	0	0	0	$\frac{\sqrt{715}}{143}$	$\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0		
	0	$-\frac{\sqrt{4290}}{312}$	0	$\frac{\sqrt{4290}i}{312}$	$-\frac{\sqrt{715}}{143}$	0	0	0	0	$\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0		
	$-\frac{\sqrt{4290}}{312}$	0	$-\frac{\sqrt{4290}i}{312}$	0	0	$\frac{\sqrt{715}}{143}$	0	0	$\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	0		
	0	0	$-\frac{5\sqrt{429}}{858}$	0	0	$-\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	0	
	0	0	0	$\frac{5\sqrt{429}}{858}$	$\frac{3\sqrt{286}i}{1144}$	0	$\frac{3\sqrt{286}}{1144}$	0	0	0	0	0	0	0	0	
	$-\frac{5\sqrt{429}}{858}$	0	0	0	0	$\frac{3\sqrt{286}}{1144}$	0	$\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	0	
	0	$\frac{5\sqrt{429}}{858}$	0	0	$\frac{3\sqrt{286}}{1144}$	0	$-\frac{3\sqrt{286}i}{1144}$	0	0	0	0	0	0	0	0	
	0	$-\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	0	0	0	0	
	$\frac{\sqrt{286}i}{572}$	0	$\frac{\sqrt{286}}{572}$	0	0	0	0	0	0	0	0	0	0	0	0	
$\frac{3\sqrt{35}z(x^2 - 2xy - y^2)(x^2 + 2xy - y^2)}{8}$																
1022	symmetry															

continued ...

Table 10

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

1023 symmetry

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

continued ...

Table 10

No.	multipole	matrix														
$\mathbb{M}_{5,1}^{(1,1;a)}(E_g, 4)$	0	0	0	0	0	$\frac{\sqrt{1430}i}{3432}$	0	$\frac{\sqrt{1430}}{3432}$	0	0	$\frac{2\sqrt{143}}{429}$	0	0	$\frac{\sqrt{858}i}{286}$		
	0	0	0	0	$-\frac{\sqrt{1430}i}{3432}$	0	$\frac{\sqrt{1430}}{3432}$	0	0	0	$-\frac{2\sqrt{143}}{429}$	$-\frac{\sqrt{858}i}{286}$	0	0		
	0	0	0	0	0	$-\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	$-\frac{2\sqrt{143}}{429}$	0	0	0	0	$\frac{\sqrt{858}}{286}$		
	0	0	0	0	$-\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	0	0	$\frac{2\sqrt{143}}{429}$	0	0	$\frac{\sqrt{858}}{286}$	0		
	0	$\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$\frac{\sqrt{858}i}{264}$	0	$\frac{\sqrt{858}}{264}$	0	0	0	
	$-\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$-\frac{\sqrt{858}i}{264}$	0	$\frac{\sqrt{858}}{264}$	0	0	0	0	
	0	$\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$\frac{23\sqrt{858}}{3432}$	0	$-\frac{23\sqrt{858}i}{3432}$	$\frac{8\sqrt{143}}{429}$	0	0	
	$\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$\frac{23\sqrt{858}}{3432}$	0	$\frac{23\sqrt{858}i}{3432}$	0	0	$-\frac{8\sqrt{143}}{429}$		
	0	0	$-\frac{2\sqrt{143}}{429}$	0	0	$\frac{\sqrt{858}i}{264}$	0	$\frac{23\sqrt{858}}{3432}$	0	0	$\frac{2\sqrt{2145}}{429}$	0	0	$\frac{5\sqrt{1430}i}{1716}$		
	0	0	0	$\frac{2\sqrt{143}}{429}$	$-\frac{\sqrt{858}i}{264}$	0	$\frac{23\sqrt{858}}{3432}$	0	0	0	$-\frac{2\sqrt{2145}}{429}$	$-\frac{5\sqrt{1430}i}{1716}$	0			
	$\frac{2\sqrt{143}}{429}$	0	0	0	0	$\frac{\sqrt{858}}{264}$	0	$-\frac{23\sqrt{858}i}{3432}$	$\frac{2\sqrt{2145}}{429}$	0	0	0	0	$-\frac{5\sqrt{1430}}{1716}$		
	0	$-\frac{2\sqrt{143}}{429}$	0	0	$\frac{\sqrt{858}}{264}$	0	$\frac{23\sqrt{858}i}{3432}$	0	0	$-\frac{2\sqrt{2145}}{429}$	0	0	$-\frac{5\sqrt{1430}}{1716}$	0		
	0	$\frac{\sqrt{858}i}{286}$	0	$\frac{\sqrt{858}}{286}$	0	0	$\frac{8\sqrt{143}}{429}$	0	0	$\frac{5\sqrt{1430}i}{1716}$	0	$-\frac{5\sqrt{1430}}{1716}$	0	0		
	$-\frac{\sqrt{858}i}{286}$	0	$\frac{\sqrt{858}}{286}$	0	0	0	$-\frac{8\sqrt{143}}{429}$	$-\frac{5\sqrt{1430}i}{1716}$	0	$-\frac{5\sqrt{1430}}{1716}$	0	0	0	0		

1024 symmetry

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

continued ...

Table 10

No.	multipole	matrix													
$\mathbb{M}_{5,2}^{(1,1;a)}(E_g, 4)$	0	0	0	0	0	$-\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	$-\frac{2\sqrt{143}}{429}$	0	0	0	$\frac{\sqrt{858}}{286}$		
	0	0	0	0	$-\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	0	0	$\frac{2\sqrt{143}}{429}$	0	0	$\frac{\sqrt{858}}{286}$	0	
	0	0	0	0	0	$-\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	$-\frac{2\sqrt{143}}{429}$	0	0	$-\frac{\sqrt{858}i}{286}$	
	0	0	0	0	$\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	$\frac{2\sqrt{143}}{429}$	$\frac{\sqrt{858}i}{286}$	0		
	0	$-\frac{\sqrt{1430}}{3432}$	0	$-\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$\frac{23\sqrt{858}}{3432}$	0	$-\frac{23\sqrt{858}i}{3432}$	$\frac{8\sqrt{143}}{429}$	0	
	$-\frac{\sqrt{1430}}{3432}$	0	$\frac{\sqrt{1430}i}{3432}$	0	0	0	0	0	$\frac{23\sqrt{858}}{3432}$	0	$\frac{23\sqrt{858}i}{3432}$	0	0	$-\frac{8\sqrt{143}}{429}$	
	0	$\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$-\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0	
	$-\frac{\sqrt{1430}i}{3432}$	0	$-\frac{\sqrt{1430}}{3432}$	0	0	0	0	0	$\frac{\sqrt{858}i}{264}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0	
	$-\frac{2\sqrt{143}}{429}$	0	0	0	0	$\frac{23\sqrt{858}}{3432}$	0	$-\frac{\sqrt{858}i}{264}$	$\frac{2\sqrt{2145}}{429}$	0	0	0	0	$-\frac{5\sqrt{1430}}{1716}$	
	0	$\frac{2\sqrt{143}}{429}$	0	0	$\frac{23\sqrt{858}}{3432}$	0	$\frac{\sqrt{858}i}{264}$	0	0	$-\frac{2\sqrt{2145}}{429}$	0	0	$-\frac{5\sqrt{1430}}{1716}$	0	
	0	0	$-\frac{2\sqrt{143}}{429}$	0	0	$-\frac{23\sqrt{858}i}{3432}$	0	$-\frac{\sqrt{858}}{264}$	0	0	$-\frac{2\sqrt{2145}}{429}$	0	0	$-\frac{5\sqrt{1430}i}{1716}$	
	0	0	0	$\frac{2\sqrt{143}}{429}$	$\frac{23\sqrt{858}i}{3432}$	0	$-\frac{\sqrt{858}}{264}$	0	0	0	0	$\frac{2\sqrt{2145}}{429}$	$\frac{5\sqrt{1430}i}{1716}$	0	
	0	$\frac{\sqrt{858}}{286}$	0	$-\frac{\sqrt{858}i}{286}$	$\frac{8\sqrt{143}}{429}$	0	0	0	0	$-\frac{5\sqrt{1430}}{1716}$	0	$-\frac{5\sqrt{1430}i}{1716}$	0	0	
	$\frac{\sqrt{858}}{286}$	0	$\frac{\sqrt{858}i}{286}$	0	0	$-\frac{8\sqrt{143}}{429}$	0	0	$-\frac{5\sqrt{1430}}{1716}$	0	$\frac{5\sqrt{1430}i}{1716}$	0	0	0	