SAMB for "Th1"

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- Group: No. 200 T_h^1 $Pm-3$ [cubic]
- Associated point group: No. 29 T_h $m-3$ [cubic]

- Generation condition
  - model type: `tight_binding`
  - time-reversal type: `electric`
  - irrep: `[Ag]`
  - `spinful`

- Unit cell:
  $a = 1.0,\ b = 1.0,\ c = 1.0,\ \alpha = 90.0,\ \beta = 90.0,\ \gamma = 90.0$
- Lattice vectors:
  $\boldsymbol{a}_1 = \begin{pmatrix} 1.0 & 0 & 0 \end{pmatrix}$
  $\boldsymbol{a}_2 = \begin{pmatrix} 0 & 1.0 & 0 \end{pmatrix}$
  $\boldsymbol{a}_3 = \begin{pmatrix} 0 & 0 & 1.0 \end{pmatrix}$

Table 1: High-symmetry line: Γ-X.

	symbol	position	symbol	position
	Γ	$\begin{pmatrix} 0 & 0 & 0 \end{pmatrix}$	X	$\begin{pmatrix} \frac{1}{2} & 0 & 0 \end{pmatrix}$

- Kets: dimension = 24

Table 2: Hilbert space for full matrix.

No.	ket	No.	ket	No.	ket	No.	ket	No.	ket
1	$(s,\uparrow)@\mathrm{A}_1$	2	$(s,\downarrow)@\mathrm{A}_1$	3	$(p_x,\uparrow)@\mathrm{A}_1$	4	$(p_x,\downarrow)@\mathrm{A}_1$	5	$(p_y,\uparrow)@\mathrm{A}_1$
6	$(p_y,\downarrow)@\mathrm{A}_1$	7	$(p_z,\uparrow)@\mathrm{A}_1$	8	$(p_z,\downarrow)@\mathrm{A}_1$	9	$(s,\uparrow)@\mathrm{A}_2$	10	$(s,\downarrow)@\mathrm{A}_2$
11	$(p_x,\uparrow)@\mathrm{A}_2$	12	$(p_x,\downarrow)@\mathrm{A}_2$	13	$(p_y,\uparrow)@\mathrm{A}_2$	14	$(p_y,\downarrow)@\mathrm{A}_2$	15	$(p_z,\uparrow)@\mathrm{A}_2$
16	$(p_z,\downarrow)@\mathrm{A}_2$	17	$(s,\uparrow)@\mathrm{A}_3$	18	$(s,\downarrow)@\mathrm{A}_3$	19	$(p_x,\uparrow)@\mathrm{A}_3$	20	$(p_x,\downarrow)@\mathrm{A}_3$
21	$(p_y,\uparrow)@\mathrm{A}_3$	22	$(p_y,\downarrow)@\mathrm{A}_3$	23	$(p_z,\uparrow)@\mathrm{A}_3$	24	$(p_z,\downarrow)@\mathrm{A}_3$		

- Sites in (primitive) unit cell:

Table 3: Site-clusters.

	site	position	mapping
S_1 [3d: mmm..]	A_1	$\begin{pmatrix}\frac{1}{2} & 0 & 0\end{pmatrix}$	[1,2,3,4,13,14,15,16]
	A_2	$\begin{pmatrix}0 & \frac{1}{2} & 0\end{pmatrix}$	[5,6,7,8,17,18,19,20]
	A_3	$\begin{pmatrix}0 & 0 & \frac{1}{2}\end{pmatrix}$	[9,10,11,12,21,22,23,24]

- Bonds in (primitive) unit cell:

Table 4: Bond-clusters.

	bond	tail	head	n	#	$\boldsymbol{b}@\boldsymbol{c}$	mapping
B_1 [12j: m..]	b_1	A_2	A_1	1	1	$\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{4} & \frac{1}{4} & 0\end{pmatrix}$	[1,14]
	b_2	A_2	A_1	1	1	$\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{3}{4} & \frac{3}{4} & 0\end{pmatrix}$	[2,13]
	b_3	A_2	A_1	1	1	$\begin{pmatrix}-\frac{1}{2} & -\frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{4} & \frac{3}{4} & 0\end{pmatrix}$	[3,16]
	b_4	A_2	A_1	1	1	$\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{3}{4} & \frac{1}{4} & 0\end{pmatrix}$	[4,15]
	b_5	A_3	A_2	1	1	$\begin{pmatrix}0 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}@\begin{pmatrix}0 & \frac{1}{4} & \frac{1}{4}\end{pmatrix}$	[5,19]
	b_6	A_3	A_2	1	1	$\begin{pmatrix}0 & \frac{1}{2} & \frac{1}{2}\end{pmatrix}@\begin{pmatrix}0 & \frac{3}{4} & \frac{1}{4}\end{pmatrix}$	[6,20]

continued ...

Table 4

	bond	tail	head	n	#	$\boldsymbol{b}$@$\boldsymbol{c}$	mapping
	b_7	A_3	A_2	1	1	$\begin{pmatrix}0 & \frac{1}{2} & -\frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}0 & \frac{3}{4} & \frac{3}{4}\end{pmatrix}$	[7,17]
	b_8	A_3	A_2	1	1	$\begin{pmatrix}0 & -\frac{1}{2} & -\frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}0 & \frac{1}{4} & \frac{3}{4}\end{pmatrix}$	[8,18]
	b_9	A_3	A_1	1	1	$\begin{pmatrix}-\frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}\frac{1}{4} & 0 & \frac{1}{4}\end{pmatrix}$	[-9,-22]
	b_{10}	A_3	A_1	1	1	$\begin{pmatrix}\frac{1}{2} & 0 & -\frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}\frac{3}{4} & 0 & \frac{3}{4}\end{pmatrix}$	[-10,-21]
	b_{11}	A_3	A_1	1	1	$\begin{pmatrix}\frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}\frac{3}{4} & 0 & \frac{1}{4}\end{pmatrix}$	[-11,-24]
	b_{12}	A_3	A_1	1	1	$\begin{pmatrix}-\frac{1}{2} & 0 & -\frac{1}{2}\end{pmatrix}$@$\begin{pmatrix}\frac{1}{4} & 0 & \frac{3}{4}\end{pmatrix}$	[-12,-23]
B_2 [3c: mmm..]	b_{13}	A_1	A_1	2	1	$\begin{pmatrix}0 & 0 & 1\end{pmatrix}$@$\begin{pmatrix}\frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}$	[1,2,-3,-4,-13,-14,15,16]
	b_{14}	A_2	A_2	2	1	$\begin{pmatrix}1 & 0 & 0\end{pmatrix}$@$\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$	[5,-6,7,-8,-17,18,-19,20]
	b_{15}	A_3	A_3	2	1	$\begin{pmatrix}0 & 1 & 0\end{pmatrix}$@$\begin{pmatrix}0 & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$	[9,10,-11,-12,-21,-22,23,24]
B_3 [3c: mmm..]	b_{16}	A_1	A_1	2	2	$\begin{pmatrix}0 & 1 & 0\end{pmatrix}$@$\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$	[1,-2,-3,4,-13,14,15,-16]
	b_{17}	A_2	A_2	2	2	$\begin{pmatrix}0 & 0 & 1\end{pmatrix}$@$\begin{pmatrix}0 & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$	[5,6,-7,-8,-17,-18,19,20]
	b_{18}	A_3	A_3	2	2	$\begin{pmatrix}1 & 0 & 0\end{pmatrix}$@$\begin{pmatrix}\frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}$	[9,-10,-11,12,-21,22,23,-24]
B_4 [1a: m-3.]	b_{19}	A_1	A_1	2	3	$\begin{pmatrix}1 & 0 & 0\end{pmatrix}$@$\begin{pmatrix}0 & 0 & 0\end{pmatrix}$	[1,-2,3,-4,-13,14,-15,16]
	b_{20}	A_2	A_2	2	3	$\begin{pmatrix}0 & 1 & 0\end{pmatrix}$@$\begin{pmatrix}0 & 0 & 0\end{pmatrix}$	[5,-6,-7,8,-17,18,19,-20]
	b_{21}	A_3	A_3	2	3	$\begin{pmatrix}0 & 0 & 1\end{pmatrix}$@$\begin{pmatrix}0 & 0 & 0\end{pmatrix}$	[9,-10,11,-12,-21,22,-23,24]

- SAMB:

No. 1 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1, \mathrm{S}_1]$

$\hat{\mathbb{Z}}_1 = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$

No. 2 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$\hat{\mathbb{Z}}_2 = \mathbb{X}_{23}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$

No. 3 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$\hat{\mathbb{Z}}_3 = \mathbb{X}_{24}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$

No. 4 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_4 = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g)}]}{2}$$

No. 5 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_5 = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g)}]}{2}$$

No. 6 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_6 = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g)}]}{2}$$

No. 7 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_7 = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g)}]}{2}$$

No. 8 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_8 = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

No. 9 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_9 = \frac{\sqrt{3}\mathbb{X}_2[\mathbb{M}_{1,0}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_3[\mathbb{M}_{1,1}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_4[\mathbb{M}_{1,2}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 10 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{10} = \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{1,2}^{(b,T_u)}]}{3}$$

No. 11 $\hat{\mathbb{Q}}_4^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{11} = \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{3,0}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{3,1}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{3,2}^{(b,T_u,1)}]}{3}$$

No. 12 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{12} = \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_7[\mathbb{Q}_{1,2}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,T_u)}]}{3}$$

No. 13 $\hat{\mathbb{Q}}_4^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{13} = \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{3,2}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{3,0}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{3,1}^{(b,T_u,1)}]}{3}$$

No. 14 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{14} = \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{G}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{G}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_7[\mathbb{Q}_{1,2}^{(b,T_u)}]}{3}$$

No. 15 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{15} = -\frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{G}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{3,0}^{(b,T_u,1)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{G}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{3,1}^{(b,T_u,1)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{3,2}^{(b,T_u,1)}]}{3}$$

No. 16 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{16} = \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 17 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{17} = -\frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{25}[\mathbb{T}_{3,0}^{(b,T_u,1)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{26}[\mathbb{T}_{3,1}^{(b,T_u,1)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{27}[\mathbb{T}_{3,2}^{(b,T_u,1)}]}{3}$$

No. 18 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{18} = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{T}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{T}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{T}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 19 $\hat{\mathbb{Q}}_4^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{19} = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{T}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{25}[\mathbb{T}_{3,0}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{T}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{26}[\mathbb{T}_{3,1}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{T}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{27}[\mathbb{T}_{3,2}^{(b,T_u,1)}]}{3}$$

No. 20 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{20} = \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{T}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{T}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{T}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_{19}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 21 $\hat{\mathbb{Q}}_4^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{21} = \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{T}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_{25}[\mathbb{T}_{3,0}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{T}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_{26}[\mathbb{T}_{3,1}^{(b,T_u,1)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{T}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_{27}[\mathbb{T}_{3,2}^{(b,T_u,1)}]}{3}$$

No. 22 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{22} = \mathbb{X}_{23}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

No. 23 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{23} = \mathbb{X}_{24}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

No. 24 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{24} = \frac{\sqrt{5}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{27}[\mathbb{Q}_{2,0}^{(a,T_g)}] \otimes \mathbb{Y}_{10}[\mathbb{Q}_{2,0}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{28}[\mathbb{Q}_{2,1}^{(a,T_g)}] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{2,1}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{29}[\mathbb{Q}_{2,2}^{(a,T_g)}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,2}^{(b,T_g)}]}{5}$$

No. 25 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{25} = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 26 $\hat{\mathbb{Q}}_4^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{26} = \frac{\sqrt{30}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{10} + \frac{\sqrt{30}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{10} - \frac{\sqrt{30}\mathbb{X}_{27}[\mathbb{Q}_{2,0}^{(a,T_g)}] \otimes \mathbb{Y}_{10}[\mathbb{Q}_{2,0}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{28}[\mathbb{Q}_{2,1}^{(a,T_g)}] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{2,1}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{29}[\mathbb{Q}_{2,2}^{(a,T_g)}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,2}^{(b,T_g)}]}{15}$$

No. 27 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{27} = \frac{\sqrt{5}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{32}[\mathbb{Q}_{2,0}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{Q}_{2,0}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{33}[\mathbb{Q}_{2,1}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{2,1}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{34}[\mathbb{Q}_{2,2}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,2}^{(b,T_g)}]}{5}$$

No. 28 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{28} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 29 $\hat{\mathbb{Q}}_4^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{29} = \frac{\sqrt{30}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,0}^{(b,E_g)}]}{10} + \frac{\sqrt{30}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_9[\mathbb{Q}_{2,1}^{(b,E_g)}]}{10} - \frac{\sqrt{30}\mathbb{X}_{32}[\mathbb{Q}_{2,0}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{Q}_{2,0}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{33}[\mathbb{Q}_{2,1}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{2,1}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{34}[\mathbb{Q}_{2,2}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,2}^{(b,T_g)}]}{15}$$

No. 30 $\hat{\mathbb{G}}_3^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{30} = \frac{\sqrt{3}\mathbb{X}_{35}[\mathbb{G}_{1,0}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{10}[\mathbb{Q}_{2,0}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{36}[\mathbb{G}_{1,1}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{2,1}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{37}[\mathbb{G}_{1,2}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,2}^{(b,T_g)}]}{3}$$

No. 31 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{31} = \frac{\sqrt{3}\mathbb{X}_{38}[\mathbb{M}_{1,0}^{(a,T_g)}] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{39}[\mathbb{M}_{1,1}^{(a,T_g)}] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{40}[\mathbb{M}_{1,2}^{(a,T_g)}] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 32 $\hat{\mathbb{G}}_3^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{32} = \frac{\sqrt{3}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,T_g)}(1,1)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,T_g)}(1,1)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{43}[\mathbb{M}_{1,2}^{(a,T_g)}(1,1)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 33 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{33} = \frac{\sqrt{3}\mathbb{X}_{44}[\mathbb{M}_{1,0}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{45}[\mathbb{M}_{1,1}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{46}[\mathbb{M}_{1,2}^{(a,T_g)}(1,-1)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 34 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{34} = \mathbb{X}_{56}[\mathbb{M}_3^{(a,A_g)}(1,-1)] \otimes \mathbb{Y}_{16}[\mathbb{T}_0^{(b,A_g)}]$$

No. 35 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{35} = -\frac{\sqrt{3}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,T_g,1)}(1,-1)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,T_g,1)}(1,-1)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{49}[\mathbb{M}_{3,2}^{(a,T_g,1)}(1,-1)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 36 $\hat{\mathbb{Q}}_4^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{36} = -\frac{\sqrt{3}\mathbb{X}_{50}[\mathbb{M}_{3,0}^{(a,T_g,2)}(1,-1)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{51}[\mathbb{M}_{3,1}^{(a,T_g,2)}(1,-1)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{52}[\mathbb{M}_{3,2}^{(a,T_g,2)}(1,-1)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{3}$$

No. 37 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\begin{aligned}\hat{\mathbb{Z}}_{37} = &\frac{\sqrt{5}\mathbb{X}_{53}[\mathbb{T}_{2,0}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{54}[\mathbb{T}_{2,1}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{55}[\mathbb{T}_{2,2}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{5} \\ &+ \frac{\sqrt{5}\mathbb{X}_{57}[\mathbb{T}_{2,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,0}^{(b,E_g)}]}{5} + \frac{\sqrt{5}\mathbb{X}_{58}[\mathbb{T}_{2,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{21}[\mathbb{T}_{2,1}^{(b,E_g)}]}{5}\end{aligned}$$

No. 38 $\hat{\mathbb{G}}_3^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{38} = \frac{\sqrt{2}\mathbb{X}_{57}[\mathbb{T}_{2,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{21}[\mathbb{T}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{58}[\mathbb{T}_{2,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,0}^{(b,E_g)}]}{2}$$

No. 39 $\hat{\mathbb{Q}}_4^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\begin{aligned}\hat{\mathbb{Z}}_{39} = &-\frac{\sqrt{30}\mathbb{X}_{53}[\mathbb{T}_{2,0}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{54}[\mathbb{T}_{2,1}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,T_g)}]}{15} - \frac{\sqrt{30}\mathbb{X}_{55}[\mathbb{T}_{2,2}^{(a,T_g)}(1,0)] \otimes \mathbb{Y}_{24}[\mathbb{T}_{2,2}^{(b,T_g)}]}{15} \\ &+ \frac{\sqrt{30}\mathbb{X}_{57}[\mathbb{T}_{2,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,0}^{(b,E_g)}]}{10} + \frac{\sqrt{30}\mathbb{X}_{58}[\mathbb{T}_{2,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_{21}[\mathbb{T}_{2,1}^{(b,E_g)}]}{10}\end{aligned}$$

No. 40 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{40} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_{28}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 41 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{41}=\frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)]\otimes\mathbb{Y}_{31}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)]\otimes\mathbb{Y}_{32}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)]\otimes\mathbb{Y}_{33}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 42 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{42}=\frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{T}_{1,0}^{(a,T_u)}(1,0)]\otimes\mathbb{Y}_{31}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{T}_{1,1}^{(a,T_u)}(1,0)]\otimes\mathbb{Y}_{32}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{T}_{1,2}^{(a,T_u)}(1,0)]\otimes\mathbb{Y}_{33}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 43 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{43}=\frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{T}_{1,0}^{(a,T_u)}]\otimes\mathbb{Y}_{31}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{T}_{1,1}^{(a,T_u)}]\otimes\mathbb{Y}_{32}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3}+\frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{T}_{1,2}^{(a,T_u)}]\otimes\mathbb{Y}_{33}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 44 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{44}=\mathbb{X}_{23}[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{Y}_{28}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 45 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{45}=\mathbb{X}_{24}[\mathbb{Q}_0^{(a,A_g)}(1,1)]\otimes\mathbb{Y}_{28}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 46 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{46}=\frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}]\otimes\mathbb{Y}_{29}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}]\otimes\mathbb{Y}_{30}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 47 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{47}=\frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}]\otimes\mathbb{Y}_{30}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}-\frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}]\otimes\mathbb{Y}_{29}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 48 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3,\mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{48}=\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{29}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{30}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 49 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{49} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{30}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{29}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 50 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{50} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_{34}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 51 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{51} = \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{37}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{38}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{39}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 52 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{52} = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{T}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{37}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{T}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{38}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{T}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{39}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 53 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{53} = \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{T}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_{37}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{T}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_{38}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{T}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_{39}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 54 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{54} = \mathbb{X}_{23}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_{34}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 55 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{55} = \mathbb{X}_{24}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_{34}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 56 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{56} = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_{35}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_{36}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 57 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{57} = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_{36}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_{35}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 58 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{58} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{35}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{36}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 59 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{59} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{36}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{35}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 60 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{60} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_{40}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 61 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_2, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{61} = \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{43}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{44}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)] \otimes \mathbb{Y}_{45}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 62 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{62} = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{T}_{1,0}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{43}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{T}_{1,1}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{44}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{T}_{1,2}^{(a,T_u)}(1,0)] \otimes \mathbb{Y}_{45}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 63 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{63} = \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{T}_{1,0}^{(a,T_u)}] \otimes \mathbb{Y}_{43}[\mathbb{T}_{1,0}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{T}_{1,1}^{(a,T_u)}] \otimes \mathbb{Y}_{44}[\mathbb{T}_{1,1}^{(b,T_u)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{T}_{1,2}^{(a,T_u)}] \otimes \mathbb{Y}_{45}[\mathbb{T}_{1,2}^{(b,T_u)}]}{3}$$

No. 64 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{64} = \mathbb{X}_{23}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_{40}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 65 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{65} = \mathbb{X}_{24}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_{40}[\mathbb{Q}_0^{(b,A_g)}]$$

No. 66 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{66} = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_{41}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_{42}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 67 $\hat{\mathbb{G}}_3^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{67} = \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,0}^{(a,E_g)}] \otimes \mathbb{Y}_{42}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,1}^{(a,E_g)}] \otimes \mathbb{Y}_{41}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

No. 68 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{68} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{41}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{42}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2}$$

No. 69 $\hat{\mathbb{G}}_3^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_4]$

$$\hat{\mathbb{Z}}_{69} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{42}[\mathbb{Q}_{2,1}^{(b,E_g)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{41}[\mathbb{Q}_{2,0}^{(b,E_g)}]}{2}$$

Table 5: Atomic SAMB group.

group	bra	ket
M_1	$(s,\uparrow),(s,\downarrow)$	$(s,\uparrow),(s,\downarrow)$
M_2	$(s,\uparrow),(s,\downarrow)$	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$
M_3	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$

Table 6: Atomic SAMB.

symbol	type	group	form
$\mathbb{X}_1$	$\mathbb{Q}_0^{(a,A_g)}$	M_1	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_2$	$\mathbb{M}_{1,0}^{(a,T_g)}(1,-1)$	M_1	$\begin{pmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{pmatrix}$
$\mathbb{X}_3$	$\mathbb{M}_{1,1}^{(a,T_g)}(1,-1)$	M_1	$\begin{pmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_4$	$\mathbb{M}_{1,2}^{(a,T_g)}(1,-1)$	M_1	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_5$	$\mathbb{Q}_{1,0}^{(a,T_u)}$	M_2	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_6$	$\mathbb{Q}_{1,1}^{(a,T_u)}$	M_2	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_7$	$\mathbb{Q}_{1,2}^{(a,T_u)}$	M_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_8$	$\mathbb{Q}_{1,0}^{(a,T_u)}(1,0)$	M_2	$\begin{pmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & \frac{i}{2} & -\frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_9$	$\mathbb{Q}_{1,1}^{(a,T_u)}(1,0)$	M_2	$\begin{pmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & -\frac{i}{2} & 0 & 0 & -\frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{10}$	$\mathbb{Q}_{1,2}^{(a,T_u)}(1,0)$	M_2	$\begin{pmatrix} 0 & -\frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 \\ \frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{11}$	$\mathbb{G}_{2,0}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & -\frac{i}{2} & -\frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{12}$	$\mathbb{G}_{2,1}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & -\frac{i}{2} & 0 & 0 & \frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{13}$	$\mathbb{G}_{2,2}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} 0 & \frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 \\ -\frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{14}$	$\mathbb{M}_{2,0}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & -\frac{1}{2} & \frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{15}$	$\mathbb{M}_{2,1}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & -\frac{1}{2} & 0 & 0 & \frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{16}$	$\mathbb{M}_{2,2}^{(a,T_u)}(1,-1)$	M_2	$\begin{pmatrix} 0 & -\frac{i}{2} & 0 & \frac{1}{2} & 0 & 0 \\ \frac{i}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{17}$	$\mathbb{T}^{(a,T_u)}_{1,0}(1,0)$	M_2	$\begin{pmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & \frac{1}{2} & \frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{18}$	$\mathbb{T}^{(a,T_u)}_{1,1}(1,0)$	M_2	$\begin{pmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & -\frac{1}{2} & 0 & 0 & -\frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{19}$	$\mathbb{T}^{(a,T_u)}_{1,2}(1,0)$	M_2	$\begin{pmatrix} 0 & \frac{i}{2} & 0 & \frac{1}{2} & 0 & 0 \\ -\frac{i}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{20}$	$\mathbb{T}^{(a,T_u)}_{1,0}$	M_2	$\begin{pmatrix} \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{21}$	$\mathbb{T}^{(a,T_u)}_{1,1}$	M_2	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{2}i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{22}$	$\mathbb{T}^{(a,T_u)}_{1,2}$	M_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} \end{pmatrix}$
$\mathbb{X}_{23}$	$\mathbb{Q}^{(a,A_g)}_{0}$	M_3	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{X}_{24}$	$\mathbb{Q}^{(a,A_g)}_{0}(1,1)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{25}$	$\mathbb{Q}^{(a,E_g)}_{2,0}$	M_3	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{26}$	$\mathbb{Q}_{2,1}^{(a,E_g)}$	M_3	$\begin{pmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{27}$	$\mathbb{Q}_{2,0}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{28}$	$\mathbb{Q}_{2,1}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{29}$	$\mathbb{Q}_{2,2}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{30}$	$\mathbb{Q}_{2,0}^{(a,E_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{31}$	$\mathbb{Q}_{2,1}^{(a,E_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{32}$	$\mathbb{Q}_{2,0}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{33}$	$\mathbb{Q}_{2,1}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{34}$	$\mathbb{Q}_{2,2}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{35}$	$\mathbb{G}_{1,0}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{36}$	$\mathbb{G}_{1,1}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{37}$	$\mathbb{G}_{1,2}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{38}$	$\mathbb{M}_{1,0}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{39}$	$\mathbb{M}_{1,1}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{40}$	$\mathbb{M}_{1,2}^{(a,T_g)}$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{41}$	$\mathbb{M}_{1,0}^{(a,T_g)}(1,1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{pmatrix}$
$\mathbb{X}_{42}$	$\mathbb{M}_{1,1}^{(a,T_g)}(1,1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{pmatrix}$
$\mathbb{X}_{43}$	$\mathbb{M}_{1,2}^{(a,T_g)}(1,1)$	M_3	$\begin{pmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{pmatrix}$
$\mathbb{X}_{44}$	$\mathbb{M}_{1,0}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{45}$	$\mathbb{M}_{1,1}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{46}$	$\mathbb{M}_{1,2}^{(a,T_g)}(1,-1)$	M_3	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{X}_{47}$	$\mathbb{M}_{3,0}^{(a,T_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{pmatrix}$
$\mathbb{X}_{48}$	$\mathbb{M}_{3,1}^{(a,T_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & -\frac{\sqrt{5}}{10} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \end{pmatrix}$
$\mathbb{X}_{49}$	$\mathbb{M}_{3,2}^{(a,T_g,1)}(1,-1)$	M_3	$\begin{pmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{pmatrix}$
$\mathbb{X}_{50}$	$\mathbb{M}_{3,0}^{(a,T_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{51}$	$\mathbb{M}_{3,1}^{(a,T_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{52}$	$\mathbb{M}_{3,2}^{(a,T_g,2)}(1,-1)$	M_3	$\begin{pmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{53}$	$\mathbb{T}_{2,0}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{54}$	$\mathbb{T}_{2,1}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{55}$	$\mathbb{T}_{2,2}^{(a,T_g)}(1,0)$	M_3	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{56}$	$\mathbb{M}_3^{(a,A_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{57}$	$\mathbb{T}_{2,0}^{(a,E_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{58}$	$\mathbb{T}_{2,1}^{(a,E_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{pmatrix}$

Table 7: Cluster SAMB.

symbol	type	cluster	form
$\mathbb{Y}_1$	$\mathbb{Q}_0^{(s,A_g)}$	S_1	$\left(\frac{\sqrt{3}}{3} \quad \frac{\sqrt{3}}{3} \quad \frac{\sqrt{3}}{3}\right)$
$\mathbb{Y}_2$	$\mathbb{Q}_{2,0}^{(s,E_g)}$	S_1	$\left(-\frac{11\sqrt{6}}{42} \quad -\frac{\sqrt{6}}{21} \quad \frac{13\sqrt{6}}{42}\right)$
$\mathbb{Y}_3$	$\mathbb{Q}_{2,1}^{(s,E_g)}$	S_1	$\left(\frac{5\sqrt{2}}{14} \quad -\frac{4\sqrt{2}}{7} \quad \frac{3\sqrt{2}}{14}\right)$
$\mathbb{Y}_4$	$\mathbb{Q}_0^{(b,A_g)}$	B_1	$\left(\frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6}\right)$
$\mathbb{Y}_5$	$\mathbb{Q}_{1,0}^{(b,T_u)}$	B_1	$\left(\frac{3\sqrt{13}}{26} \quad -\frac{3\sqrt{13}}{26} \quad \frac{3\sqrt{13}}{26} \quad -\frac{3\sqrt{13}}{26} \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{\sqrt{13}}{13} \quad -\frac{\sqrt{13}}{13} \quad -\frac{\sqrt{13}}{13} \quad \frac{\sqrt{13}}{13}\right)$
$\mathbb{Y}_6$	$\mathbb{Q}_{1,1}^{(b,T_u)}$	B_1	$\left(\frac{\sqrt{13}}{13} \quad -\frac{\sqrt{13}}{13} \quad -\frac{\sqrt{13}}{13} \quad \frac{\sqrt{13}}{13} \quad \frac{3\sqrt{13}}{26} \quad -\frac{3\sqrt{13}}{26} \quad -\frac{3\sqrt{13}}{26} \quad \frac{3\sqrt{13}}{26} \quad 0 \quad 0 \quad 0 \quad 0\right)$

continued ...

Table 7

symbol	type	cluster	form
$\mathbb{Y}_{7}$	$\mathbb{Q}_{1,2}^{(b,T_u)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad \frac{\sqrt{13}}{13}\quad \frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad \frac{3\sqrt{13}}{26}\quad -\frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad -\frac{3\sqrt{13}}{26}\right)$
$\mathbb{Y}_{8}$	$\mathbb{Q}_{2,0}^{(b,E_g)}$	B_1	$\left(-\frac{11\sqrt{6}}{84}\quad -\frac{11\sqrt{6}}{84}\quad -\frac{11\sqrt{6}}{84}\quad -\frac{11\sqrt{6}}{84}\quad -\frac{\sqrt{6}}{42}\quad -\frac{\sqrt{6}}{42}\quad -\frac{\sqrt{6}}{42}\quad -\frac{\sqrt{6}}{42}\quad \frac{13\sqrt{6}}{84}\quad \frac{13\sqrt{6}}{84}\quad \frac{13\sqrt{6}}{84}\quad \frac{13\sqrt{6}}{84}\right)$
$\mathbb{Y}_{9}$	$\mathbb{Q}_{2,1}^{(b,E_g)}$	B_1	$\left(\frac{5\sqrt{2}}{28}\quad \frac{5\sqrt{2}}{28}\quad \frac{5\sqrt{2}}{28}\quad \frac{5\sqrt{2}}{28}\quad -\frac{2\sqrt{2}}{7}\quad -\frac{2\sqrt{2}}{7}\quad -\frac{2\sqrt{2}}{7}\quad -\frac{2\sqrt{2}}{7}\quad \frac{3\sqrt{2}}{28}\quad \frac{3\sqrt{2}}{28}\quad \frac{3\sqrt{2}}{28}\quad \frac{3\sqrt{2}}{28}\right)$
$\mathbb{Y}_{10}$	$\mathbb{Q}_{2,0}^{(b,T_g)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad \frac{1}{2}\quad -\frac{1}{2}\quad \frac{1}{2}\quad -\frac{1}{2}\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{11}$	$\mathbb{Q}_{2,1}^{(b,T_g)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad \frac{1}{2}\quad \frac{1}{2}\quad -\frac{1}{2}\quad -\frac{1}{2}\right)$
$\mathbb{Y}_{12}$	$\mathbb{Q}_{2,2}^{(b,T_g)}$	B_1	$\left(\frac{1}{2}\quad \frac{1}{2}\quad -\frac{1}{2}\quad -\frac{1}{2}\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{13}$	$\mathbb{Q}_{3,0}^{(b,T_u,1)}$	B_1	$\left(\frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad \frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad 0\quad 0\quad 0\quad 0\quad -\frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad -\frac{3\sqrt{13}}{26}\right)$
$\mathbb{Y}_{14}$	$\mathbb{Q}_{3,1}^{(b,T_u,1)}$	B_1	$\left(-\frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad -\frac{3\sqrt{13}}{26}\quad \frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad \frac{\sqrt{13}}{13}\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{15}$	$\mathbb{Q}_{3,2}^{(b,T_u,1)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad -\frac{3\sqrt{13}}{26}\quad -\frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad \frac{3\sqrt{13}}{26}\quad \frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\quad \frac{\sqrt{13}}{13}\quad -\frac{\sqrt{13}}{13}\right)$
$\mathbb{Y}_{16}$	$\mathbb{T}_{0}^{(b,A_g)}$	B_1	$\left(\frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad \frac{\sqrt{3}i}{6}\quad -\frac{\sqrt{3}i}{6}\quad -\frac{\sqrt{3}i}{6}\quad -\frac{\sqrt{3}i}{6}\quad -\frac{\sqrt{3}i}{6}\right)$
$\mathbb{Y}_{17}$	$\mathbb{T}_{1,0}^{(b,T_u)}$	B_1	$\left(\frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad 0\quad 0\quad 0\quad 0\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\right)$
$\mathbb{Y}_{18}$	$\mathbb{T}_{1,1}^{(b,T_u)}$	B_1	$\left(\frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad \frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{19}$	$\mathbb{T}_{1,2}^{(b,T_u)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad \frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\right)$
$\mathbb{Y}_{20}$	$\mathbb{T}_{2,0}^{(b,E_g)}$	B_1	$\left(-\frac{11\sqrt{6}i}{84}\quad -\frac{11\sqrt{6}i}{84}\quad -\frac{11\sqrt{6}i}{84}\quad -\frac{11\sqrt{6}i}{84}\quad -\frac{\sqrt{6}i}{42}\quad -\frac{\sqrt{6}i}{42}\quad -\frac{\sqrt{6}i}{42}\quad -\frac{\sqrt{6}i}{42}\quad -\frac{13\sqrt{6}i}{84}\quad -\frac{13\sqrt{6}i}{84}\quad -\frac{13\sqrt{6}i}{84}\quad -\frac{13\sqrt{6}i}{84}\right)$
$\mathbb{Y}_{21}$	$\mathbb{T}_{2,1}^{(b,E_g)}$	B_1	$\left(\frac{5\sqrt{2}i}{28}\quad \frac{5\sqrt{2}i}{28}\quad \frac{5\sqrt{2}i}{28}\quad \frac{5\sqrt{2}i}{28}\quad -\frac{2\sqrt{2}i}{7}\quad -\frac{2\sqrt{2}i}{7}\quad -\frac{2\sqrt{2}i}{7}\quad -\frac{2\sqrt{2}i}{7}\quad -\frac{3\sqrt{2}i}{28}\quad -\frac{3\sqrt{2}i}{28}\quad -\frac{3\sqrt{2}i}{28}\quad -\frac{3\sqrt{2}i}{28}\right)$
$\mathbb{Y}_{22}$	$\mathbb{T}_{2,0}^{(b,T_g)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad \frac{i}{2}\quad -\frac{i}{2}\quad \frac{i}{2}\quad -\frac{i}{2}\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{23}$	$\mathbb{T}_{2,1}^{(b,T_g)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad -\frac{i}{2}\quad -\frac{i}{2}\quad \frac{i}{2}\quad \frac{i}{2}\right)$
$\mathbb{Y}_{24}$	$\mathbb{T}_{2,2}^{(b,T_g)}$	B_1	$\left(\frac{i}{2}\quad \frac{i}{2}\quad -\frac{i}{2}\quad -\frac{i}{2}\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{25}$	$\mathbb{T}_{3,0}^{(b,T_u,1)}$	B_1	$\left(\frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad 0\quad 0\quad 0\quad 0\quad \frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\right)$
$\mathbb{Y}_{26}$	$\mathbb{T}_{3,1}^{(b,T_u,1)}$	B_1	$\left(-\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad 0\quad 0\quad 0\quad 0\right)$
$\mathbb{Y}_{27}$	$\mathbb{T}_{3,2}^{(b,T_u,1)}$	B_1	$\left(0\quad 0\quad 0\quad 0\quad -\frac{3\sqrt{13}i}{26}\quad -\frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad \frac{3\sqrt{13}i}{26}\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\quad -\frac{\sqrt{13}i}{13}\quad \frac{\sqrt{13}i}{13}\right)$
$\mathbb{Y}_{28}$	$\mathbb{Q}_{0}^{(b,A_g)}$	B_2	$\left(\frac{\sqrt{3}}{3}\quad \frac{\sqrt{3}}{3}\quad \frac{\sqrt{3}}{3}\right)$
$\mathbb{Y}_{29}$	$\mathbb{Q}_{2,0}^{(b,E_g)}$	B_2	$\left(-\frac{11\sqrt{6}}{42}\quad -\frac{\sqrt{6}}{21}\quad \frac{13\sqrt{6}}{42}\right)$
$\mathbb{Y}_{30}$	$\mathbb{Q}_{2,1}^{(b,E_g)}$	B_2	$\left(\frac{5\sqrt{2}}{14}\quad -\frac{4\sqrt{2}}{7}\quad \frac{3\sqrt{2}}{14}\right)$
$\mathbb{Y}_{31}$	$\mathbb{T}_{1,0}^{(b,T_u)}$	B_2	$\left(0\quad i\quad 0\right)$
$\mathbb{Y}_{32}$	$\mathbb{T}_{1,1}^{(b,T_u)}$	B_2	$\left(0\quad 0\quad i\right)$
$\mathbb{Y}_{33}$	$\mathbb{T}_{1,2}^{(b,T_u)}$	B_2	$\left(i\quad 0\quad 0\right)$
$\mathbb{Y}_{34}$	$\mathbb{Q}_{0}^{(b,A_g)}$	B_3	$\left(\frac{\sqrt{3}}{3}\quad \frac{\sqrt{3}}{3}\quad \frac{\sqrt{3}}{3}\right)$

continued ...

Table 7

symbol	type	cluster	form
$\mathbb{Y}_{35}$	$\mathbb{Q}_{2,0}^{(b,E_g)}$	B_3	$\begin{pmatrix} -\frac{11\sqrt{6}}{42} & -\frac{\sqrt{6}}{21} & \frac{13\sqrt{6}}{42} \end{pmatrix}$
$\mathbb{Y}_{36}$	$\mathbb{Q}_{2,1}^{(b,E_g)}$	B_3	$\begin{pmatrix} \frac{5\sqrt{2}}{14} & -\frac{4\sqrt{2}}{7} & \frac{3\sqrt{2}}{14} \end{pmatrix}$
$\mathbb{Y}_{37}$	$\mathbb{T}_{1,0}^{(b,T_u)}$	B_3	$\begin{pmatrix} 0 & 0 & i \end{pmatrix}$
$\mathbb{Y}_{38}$	$\mathbb{T}_{1,1}^{(b,T_u)}$	B_3	$\begin{pmatrix} i & 0 & 0 \end{pmatrix}$
$\mathbb{Y}_{39}$	$\mathbb{T}_{1,2}^{(b,T_u)}$	B_3	$\begin{pmatrix} 0 & i & 0 \end{pmatrix}$
$\mathbb{Y}_{40}$	$\mathbb{Q}_{0}^{(b,A_g)}$	B_4	$\begin{pmatrix} \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{Y}_{41}$	$\mathbb{Q}_{2,0}^{(b,E_g)}$	B_4	$\begin{pmatrix} -\frac{11\sqrt{6}}{42} & -\frac{\sqrt{6}}{21} & \frac{13\sqrt{6}}{42} \end{pmatrix}$
$\mathbb{Y}_{42}$	$\mathbb{Q}_{2,1}^{(b,E_g)}$	B_4	$\begin{pmatrix} \frac{5\sqrt{2}}{14} & -\frac{4\sqrt{2}}{7} & \frac{3\sqrt{2}}{14} \end{pmatrix}$
$\mathbb{Y}_{43}$	$\mathbb{T}_{1,0}^{(b,T_u)}$	B_4	$\begin{pmatrix} i & 0 & 0 \end{pmatrix}$
$\mathbb{Y}_{44}$	$\mathbb{T}_{1,1}^{(b,T_u)}$	B_4	$\begin{pmatrix} 0 & i & 0 \end{pmatrix}$
$\mathbb{Y}_{45}$	$\mathbb{T}_{1,2}^{(b,T_u)}$	B_4	$\begin{pmatrix} 0 & 0 & i \end{pmatrix}$

Table 8: Polar harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{Q}_{0}^{(A_g)}$	0	A_g	–	–	1
2	$\mathbb{Q}_{1,0}^{(T_u)}$	1	T_u	–	0	x
3	$\mathbb{Q}_{1,1}^{(T_u)}$	1	T_u	–	1	y
4	$\mathbb{Q}_{1,2}^{(T_u)}$	1	T_u	–	2	z
5	$\mathbb{Q}_{2,0}^{(E_g)}$	2	E_g	–	0	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
6	$\mathbb{Q}_{2,1}^{(E_g)}$	2	E_g	–	1	$\frac{\sqrt{3}\left(x^2-y^2\right)}{2}$
7	$\mathbb{Q}_{2,0}^{(T_g)}$	2	T_g	–	0	$\sqrt{3}yz$
8	$\mathbb{Q}_{2,1}^{(T_g)}$	2	T_g	–	1	$\sqrt{3}xz$
9	$\mathbb{Q}_{2,2}^{(T_g)}$	2	T_g	–	2	$\sqrt{3}xy$
10	$\mathbb{Q}_{3,0}^{(T_u,1)}$	3	T_u	1	0	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 8

No.	symbol	rank	irrep.	mul.	comp.	form
11	$\mathbb{Q}_{3,1}^{(T_u,1)}$	3	T_u	1	1	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
12	$\mathbb{Q}_{3,2}^{(T_u,1)}$	3	T_u	1	2	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

Table 9: Axial harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{G}_{1,0}^{(T_g)}$	1	T_g	–	0	X
2	$\mathbb{G}_{1,1}^{(T_g)}$	1	T_g	–	1	Y
3	$\mathbb{G}_{1,2}^{(T_g)}$	1	T_g	–	2	Z
4	$\mathbb{G}_{2,0}^{(T_u)}$	2	T_u	–	0	$\sqrt{3}YZ$
5	$\mathbb{G}_{2,1}^{(T_u)}$	2	T_u	–	1	$\sqrt{3}XZ$
6	$\mathbb{G}_{2,2}^{(T_u)}$	2	T_u	–	2	$\sqrt{3}XY$
7	$\mathbb{G}_{3}^{(A_g)}$	3	A_g	–	–	$\sqrt{15}XYZ$
8	$\mathbb{G}_{3,0}^{(T_g,1)}$	3	T_g	1	0	$\frac{X\left(2X^2-3Y^2-3Z^2\right)}{2}$
9	$\mathbb{G}_{3,1}^{(T_g,1)}$	3	T_g	1	1	$-\frac{Y\left(3X^2-2Y^2+3Z^2\right)}{2}$
10	$\mathbb{G}_{3,2}^{(T_g,1)}$	3	T_g	1	2	$-\frac{Z\left(3X^2+3Y^2-2Z^2\right)}{2}$
11	$\mathbb{G}_{3,0}^{(T_g,2)}$	3	T_g	2	0	$\frac{\sqrt{15}X(Y-Z)(Y+Z)}{2}$
12	$\mathbb{G}_{3,1}^{(T_g,2)}$	3	T_g	2	1	$-\frac{\sqrt{15}Y(X-Z)(X+Z)}{2}$
13	$\mathbb{G}_{3,2}^{(T_g,2)}$	3	T_g	2	2	$\frac{\sqrt{15}Z(X-Y)(X+Y)}{2}$

- Group info.: Generator = $\{2_{001}|0\}$, $\{2_{010}|0\}$, $\{3^{+}_{111}|0\}$, $\{-1|0\}$

Table 10: Conjugacy class (point-group part).

rep. SO	symmetry operations
$\{1\|0\}$	$\{1\|0\}$
$\{2_{001}\|0\}$	$\{2_{001}\|0\},\ \{2_{100}\|0\},\ \{2_{010}\|0\}$
$\{3^{+}_{111}\|0\}$	$\{3^{+}_{111}\|0\},\ \{3^{+}_{1-1-1}\|0\},\ \{3^{+}_{-11-1}\|0\},\ \{3^{+}_{-1-11}\|0\}$
$\{3^{-}_{111}\|0\}$	$\{3^{-}_{111}\|0\},\ \{3^{-}_{1-1-1}\|0\},\ \{3^{-}_{-11-1}\|0\},\ \{3^{-}_{-1-11}\|0\}$
$\{-1\|0\}$	$\{-1\|0\}$
$\{\mathrm{m}_{001}\|0\}$	$\{\mathrm{m}_{001}\|0\},\ \{\mathrm{m}_{100}\|0\},\ \{\mathrm{m}_{010}\|0\}$
$\{-3^{+}_{111}\|0\}$	$\{-3^{+}_{111}\|0\},\ \{-3^{+}_{1-1-1}\|0\},\ \{-3^{+}_{-11-1}\|0\},\ \{-3^{+}_{-1-11}\|0\}$
$\{-3^{-}_{111}\|0\}$	$\{-3^{-}_{111}\|0\},\ \{-3^{-}_{1-1-1}\|0\},\ \{-3^{-}_{-11-1}\|0\},\ \{-3^{-}_{-1-11}\|0\}$

Table 11: Symmetry operations.

No.	SO	No.	SO	No.	SO	No.	SO	No.	SO
1	$\{1\|0\}$	2	$\{2_{001}\|0\}$	3	$\{2_{100}\|0\}$	4	$\{2_{010}\|0\}$	5	$\{3^{+}_{111}\|0\}$
6	$\{3^{+}_{1-1-1}\|0\}$	7	$\{3^{+}_{-11-1}\|0\}$	8	$\{3^{+}_{-1-11}\|0\}$	9	$\{3^{-}_{111}\|0\}$	10	$\{3^{-}_{1-1-1}\|0\}$
11	$\{3^{-}_{-11-1}\|0\}$	12	$\{3^{-}_{-1-11}\|0\}$	13	$\{-1\|0\}$	14	$\{\mathrm{m}_{001}\|0\}$	15	$\{\mathrm{m}_{100}\|0\}$
16	$\{\mathrm{m}_{010}\|0\}$	17	$\{-3^{+}_{111}\|0\}$	18	$\{-3^{+}_{1-1-1}\|0\}$	19	$\{-3^{+}_{-11-1}\|0\}$	20	$\{-3^{+}_{-1-11}\|0\}$
21	$\{-3^{-}_{111}\|0\}$	22	$\{-3^{-}_{1-1-1}\|0\}$	23	$\{-3^{-}_{-11-1}\|0\}$	24	$\{-3^{-}_{-1-11}\|0\}$		

Table 12: Character table (point-group part).

	1	2_{001}	3^{+}_{111}	3^{-}_{111}	-1	m_{001}	-3^{+}_{111}	-3^{-}_{111}
A_g	1	1	1	1	1	1	1	1
$E_g^{(a)}$	1	1	ω^*	ω	1	1	ω^*	ω
$E_g^{(b)}$	1	1	ω	ω^*	1	1	ω	ω^*
T_g	3	-1	0	0	3	-1	0	0
A_u	1	1	1	1	-1	-1	-1	-1

continued ...

Table 12

	1	2_{001}	3^+_{111}	3^-_{111}	-1	m_{001}	-3^+_{111}	-3^-_{111}
$E_u^{(a)}$	1	1	ω^*	ω	-1	-1	$-\omega^*$	$-\omega$
$E_u^{(b)}$	1	1	ω	ω^*	-1	-1	$-\omega$	$-\omega^*$
T_u	3	-1	0	0	-3	1	0	0

Table 13: Parity conversion.

$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$
A_g (A_u)	$E_g^{(a)}$ $(E_u^{(a)})$	$E_g^{(b)}$ $(E_u^{(b)})$	T_g (T_u)	A_u (A_g)
$E_u^{(a)}$ $(E_g^{(a)})$	$E_u^{(b)}$ $(E_g^{(b)})$	T_u (T_g)		

Table 14: Symmetric product, $[\Gamma \otimes \Gamma']_+$.

	A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
A_g	A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
$E_g^{(a)}$		$E_g^{(b)}$	A_g	T_g	$E_u^{(a)}$	$E_u^{(b)}$	A_u	T_u
$E_g^{(b)}$			$E_g^{(a)}$	T_g	$E_u^{(b)}$	A_u	$E_u^{(a)}$	T_u
T_g				$A_g + E_g^{(a)} + E_g^{(b)} + T_g$	T_u	T_u	T_u	$A_u + E_u^{(a)} + E_u^{(b)} + 2T_u$
A_u					A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g
$E_u^{(a)}$						$E_g^{(b)}$	A_g	T_g
$E_u^{(b)}$							$E_g^{(a)}$	T_g
T_u								$A_g + E_g^{(a)} + E_g^{(b)} + T_g$

Table 15: Anti-symmetric product, $[\Gamma \otimes \Gamma]_-$.

A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
$-$	$-$	$-$	T_g	$-$	$-$	$-$	T_g

Table 16: Virtual-cluster sites.

No.	position	No.	position	No.	position	No.	position
1	$\begin{pmatrix}3 & 2 & 1\end{pmatrix}$	2	$\begin{pmatrix}-3 & -2 & 1\end{pmatrix}$	3	$\begin{pmatrix}3 & -2 & -1\end{pmatrix}$	4	$\begin{pmatrix}-3 & 2 & -1\end{pmatrix}$
5	$\begin{pmatrix}1 & 3 & 2\end{pmatrix}$	6	$\begin{pmatrix}-1 & -3 & 2\end{pmatrix}$	7	$\begin{pmatrix}1 & -3 & -2\end{pmatrix}$	8	$\begin{pmatrix}-1 & 3 & -2\end{pmatrix}$
9	$\begin{pmatrix}2 & 1 & 3\end{pmatrix}$	10	$\begin{pmatrix}-2 & 1 & -3\end{pmatrix}$	11	$\begin{pmatrix}-2 & -1 & 3\end{pmatrix}$	12	$\begin{pmatrix}2 & -1 & -3\end{pmatrix}$
13	$\begin{pmatrix}-3 & -2 & -1\end{pmatrix}$	14	$\begin{pmatrix}3 & 2 & -1\end{pmatrix}$	15	$\begin{pmatrix}-3 & 2 & 1\end{pmatrix}$	16	$\begin{pmatrix}3 & -2 & 1\end{pmatrix}$
17	$\begin{pmatrix}-1 & -3 & -2\end{pmatrix}$	18	$\begin{pmatrix}1 & 3 & -2\end{pmatrix}$	19	$\begin{pmatrix}-1 & 3 & 2\end{pmatrix}$	20	$\begin{pmatrix}1 & -3 & 2\end{pmatrix}$
21	$\begin{pmatrix}-2 & -1 & -3\end{pmatrix}$	22	$\begin{pmatrix}2 & -1 & 3\end{pmatrix}$	23	$\begin{pmatrix}2 & 1 & -3\end{pmatrix}$	24	$\begin{pmatrix}-2 & 1 & 3\end{pmatrix}$

Table 17: Virtual-cluster basis.

symbol	1	2	3	4	5	6	7	8	9	10
$\mathbb{Q}_0^{(A_g)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{1,0}^{(T_u)}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$
	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$						
$\mathbb{Q}_{1,1}^{(T_u)}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$						
$\mathbb{Q}_{1,2}^{(T_u)}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$
	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$
	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$						
$\mathbb{Q}_{2,0}^{(E_g)}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$

continued ...

Table 17

symbol	1	2	3	4	5	6	7	8	9	10
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$						
$\mathbb{Q}_{2,1}^{(E_g)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$
	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$
	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$						
$\mathbb{Q}_{2,0}^{(T_g)}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$
	$-\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$
	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$						
$\mathbb{Q}_{2,1}^{(T_g)}$	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$
	$-\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{\sqrt{2}}{14}$
	$\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$						
$\mathbb{Q}_{2,2}^{(T_g)}$	$\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$
	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$-\frac{3\sqrt{2}}{14}$	$\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$
	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$	$\frac{\sqrt{2}}{14}$	$-\frac{\sqrt{2}}{14}$						
$\mathbb{Q}_{3}^{(A_u)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{3,0}^{(T_u,1)}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{3,1}^{(T_u,1)}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{3,2}^{(T_u,1)}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{3,0}^{(T_u,2)}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$
	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$
	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$						
$\mathbb{Q}_{3,1}^{(T_u,2)}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$

continued ...

Table 17

symbol	1	2	3	4	5	6	7	8	9	10
	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$
	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$						
$\mathbb{Q}_{3,2}^{(T_u,2)}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$
	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$
	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$						
$\mathbb{Q}_{4,0}^{(T_g,1)}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$
	$\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$
	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$						
$\mathbb{Q}_{4,1}^{(T_g,1)}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{9\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$
	$-\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{9\sqrt{829}}{23212}$
	$\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$						
$\mathbb{Q}_{4,2}^{(T_g,1)}$	$\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$
	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{125\sqrt{829}}{23212}$	$-\frac{64\sqrt{829}}{5803}$	$-\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$	$\frac{64\sqrt{829}}{5803}$
	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$	$\frac{9\sqrt{829}}{23212}$	$-\frac{9\sqrt{829}}{23212}$						
$\mathbb{Q}_{4,0}^{(T_g,2)}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$
	$\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$
	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$						
$\mathbb{Q}_{4,1}^{(T_g,2)}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$
	$\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$
	$-\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$						
$\mathbb{Q}_{4,2}^{(T_g,2)}$	$-\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$
	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$
	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$						
$\mathbb{Q}_{5,0}^{(E_u)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$
	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{2}{7}$
	$-\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$						
$\mathbb{Q}_{5,1}^{(E_u)}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$
	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$						