SAMB for "kagome"

Generated on 2023-06-01 18:10 by MultiPie 1.1.2

- Group: No. 147 C_{3i}^{1} $P-3$ [trigonal]
- Associated point group: No. 17 C_{3i} -3 [trigonal]

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

- Unit cell:
  $a = 1.0,\ b = 1.0,\ c = 1.0,\ \alpha = 90.0,\ \beta = 90.0,\ \gamma = 120.0$
- Lattice vectors:
  $\boldsymbol{a}_1 = \begin{pmatrix} 1.0 & 0 & 0 \end{pmatrix}$
  $\boldsymbol{a}_2 = \begin{pmatrix} -0.5 & 0.86602540378444 & 0 \end{pmatrix}$
  $\boldsymbol{a}_3 = \begin{pmatrix} 0 & 0 & 1.0 \end{pmatrix}$

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	A_1	$\begin{pmatrix}\frac{1}{2} & 0 & 0\end{pmatrix}$	[1,4]
	A_2	$\begin{pmatrix}0 & \frac{1}{2} & 0\end{pmatrix}$	[2,5]
	A_3	$\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$	[3,6]

- Bonds in (primitive) unit cell:

Table 4: Bond-clusters.

	bond	tail	head	n	#	$\boldsymbol{b}@\boldsymbol{c}$	mapping
B_1	b_1	A_1	A_2	1	1	$\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{3}{4} & \frac{1}{4} & 0\end{pmatrix}$	[1]
	b_2	A_2	A_3	1	1	$\begin{pmatrix}-\frac{1}{2} & 0 & 0\end{pmatrix}@\begin{pmatrix}\frac{3}{4} & \frac{1}{2} & 0\end{pmatrix}$	[2]
	b_3	A_1	A_3	1	1	$\begin{pmatrix}0 & \frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{2} & \frac{1}{4} & 0\end{pmatrix}$	[-3]
	b_4	A_1	A_2	1	1	$\begin{pmatrix}-\frac{1}{2} & -\frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{4} & \frac{3}{4} & 0\end{pmatrix}$	[4]
	b_5	A_2	A_3	1	1	$\begin{pmatrix}\frac{1}{2} & 0 & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{4} & \frac{1}{2} & 0\end{pmatrix}$	[5]
	b_6	A_1	A_3	1	1	$\begin{pmatrix}0 & -\frac{1}{2} & 0\end{pmatrix}@\begin{pmatrix}\frac{1}{2} & \frac{3}{4} & 0\end{pmatrix}$	[-6]

- SAMB:

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

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

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

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

$$\hat{\mathbb{Z}}_2 = \mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$$

$$\hat{\mathbb{Z}}_2(\boldsymbol{k}) = \mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_g)}]$$

No. 3 $\hat{\mathbb{Q}}_2^{(A_g)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_3 = \mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$$

$$\hat{\mathbb{Z}}_3(\boldsymbol{k}) = \mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_g)}]$$

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

$$\hat{\mathbb{Z}}_4 = \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_4(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

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

$$\hat{\mathbb{Z}}_5 = -\frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_5(\boldsymbol{k}) = -\frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

No. 6 $\hat{\mathbb{G}}_3^{(A_g,2)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_6 = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_6(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

No. 7 $\hat{\mathbb{G}}_3^{(A_g,3)}$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_7 = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_7(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

No. 8 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_8 = \mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$$

$$\hat{\mathbb{Z}}_8(\boldsymbol{k}) = \mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_g)}]$$

No. 9 $\hat{\mathbb{Q}}_2^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_9 = \mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$$

$$\hat{\mathbb{Z}}_9(\boldsymbol{k}) = \mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_g)}]$$

No. 10 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{10} = \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{10}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

No. 11 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{11} = -\frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{11}(\boldsymbol{k}) = -\frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

No. 12 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{12} = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{12}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

No. 13 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{13} = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{13}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

No. 14 $\hat{\mathbb{G}}_1^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{14} = \mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_g)}]$$

$$\hat{\mathbb{Z}}_{14}(\boldsymbol{k}) = \mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_g)}]$$

No. 15 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,0)$ $[\mathrm{M}_3, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{15} = -\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{15}(\boldsymbol{k}) = -\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}$$

No. 16 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,0)$ $[\mathrm{M}_3,\mathrm{S}_1]$

$$\hat{\mathbb{Z}}_{16}=\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)]\otimes\mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)]\otimes\mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{16}(\boldsymbol{k})=\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)]\otimes\mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)]\otimes\mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_g,2)}]}{2}$$

No. 17 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{17}=\mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{17}(\boldsymbol{k})=\frac{\sqrt{3}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3}+\frac{\sqrt{3}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3}+\frac{\sqrt{3}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 18 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{18}=\mathbb{X}_2[\mathbb{M}_1^{(a,A_g)}(1,-1)]\otimes\mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{18}(\boldsymbol{k})=&\frac{\sqrt{3}\mathbb{X}_2[\mathbb{M}_1^{(a,A_g)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3}+\frac{\sqrt{3}\mathbb{X}_2[\mathbb{M}_1^{(a,A_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3}\\&+\frac{\sqrt{3}\mathbb{X}_2[\mathbb{M}_1^{(a,A_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}\end{aligned}$$

No. 19 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{19}=-\frac{\sqrt{2}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{19}(\boldsymbol{k})=&-\frac{\sqrt{6}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}+\frac{\sqrt{3}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&-\frac{\sqrt{6}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}+\frac{\sqrt{3}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}+\frac{\sqrt{6}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 20 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{20}=\frac{\sqrt{2}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{20}(\boldsymbol{k})=&\frac{\sqrt{6}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}+\frac{\sqrt{6}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_3[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}-\frac{\sqrt{3}\mathbb{X}_4[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 21 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{21}=\frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}+\frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{21}(\boldsymbol{k})=&-\frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}-\frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}-\frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}-\frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}+\frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}-\frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 22 $\hat{\mathbb{G}}_1^{(A_g)}$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{22}=\frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}-\frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{22}(\boldsymbol{k})=&-\frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}+\frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}+\frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\&-\frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{1,0}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}+\frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}+\frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}-\frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{1,1}^{(a,E_u)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 23 $\hat{\mathbb{G}}_3^{(A_g,2)}$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{23} = \mathbb{X}_5[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{23}(\boldsymbol{k}) = -\frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 24 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{24} = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{24}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 25 $\hat{\mathbb{G}}_1^{(A_g)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{25} = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{25}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 26 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,0)$ $[\mathrm{M}_2, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{26} = \mathbb{X}_8[\mathbb{Q}_1^{(a,A_u)}(1,0)] \otimes \mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{26}(\boldsymbol{k}) = -\frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 27 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{27} = \mathbb{X}_9[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{27}(\boldsymbol{k}) = -\frac{\sqrt{3}\mathbb{X}_9[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 28 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{28} = \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{28}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\ &- \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &- \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &+ \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 29 $\hat{\mathbb{Q}}_2^{(A_g)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{29} = \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{29}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &+ \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\\ &+ \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\ &+ \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 30 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{30} = \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{30}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &+\frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\\ &+\frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\ &+\frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 31 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{31} = \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{31}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}\\ &-\frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{15}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &-\frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\\ &+\frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 32 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_2,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{32} = -\mathbb{X}_{10}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{32}(\boldsymbol{k}) = &\frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3}\\ &+\frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}\end{aligned}$$

No. 33 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{33} = \frac{\sqrt{2}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{33}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 34 $\hat{\mathbb{G}}_1^{(A_g)}$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{34} = \frac{\sqrt{2}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{34}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{54}[\mathbb{Q}_{1,0}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{55}[\mathbb{Q}_{1,1}^{(a,E_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 35 $\hat{\mathbb{G}}_3^{(A_g,2)}$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{35} = \mathbb{X}_{53}[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{35}(\boldsymbol{k}) = -\frac{\sqrt{3}\mathbb{X}_{53}[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{53}[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{53}[\mathbb{Q}_1^{(a,A_u)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 36 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{36} = \frac{\sqrt{2}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\hat{\mathbb{Z}}_{36}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}$$

No. 37 $\hat{\mathbb{G}}_1^{(A_g)}(1,0)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{37} = \frac{\sqrt{2}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\hat{\mathbb{Z}}_{37}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{59}[\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{60}[\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$

No. 38 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,0)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{38} = \mathbb{X}_{56}[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{38}(\boldsymbol{k})$$
$$= -\frac{\sqrt{3}\mathbb{X}_{56}[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{56}[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{56}[\mathbb{Q}_1^{(a,A_u)}(1,0)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 39 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,1)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{39} = \mathbb{X}_{57}[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{39}(\boldsymbol{k})$$
$$= -\frac{\sqrt{3}\mathbb{X}_{57}[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{57}[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3} - \frac{\sqrt{3}\mathbb{X}_{57}[\mathbb{G}_0^{(a,A_u)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 40 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{40} = \frac{\sqrt{2}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{40}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}\end{aligned}$$

No. 41 $\hat{\mathbb{Q}}_2^{(A_g)}(1,-1)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{41} = \frac{\sqrt{2}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{41}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{61}[\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{62}[\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}\end{aligned}$$

No. 42 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_4, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{42} = \frac{\sqrt{2}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2}$$

$$\hat{\mathbb{Z}}_{42}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$

No. 43 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_4,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{43} = \frac{\sqrt{2}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_5[\mathbb{Q}_{1,0}^{(b,E_u)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{Y}_6[\mathbb{Q}_{1,1}^{(b,E_u)}]}{2}$$

$$\hat{\mathbb{Z}}_{43}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{63}[\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{64}[\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{6}$$

No. 44 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_4,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{44} = -\mathbb{X}_{58}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{Y}_9[\mathbb{Q}_3^{(b,A_u,3)}]$$

$$\hat{\mathbb{Z}}_{44}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{58}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,A_u,3)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{58}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_u)}]}{3}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{58}[\mathbb{G}_2^{(a,A_u)}(1,-1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_u)}]}{3}$$

No. 45 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{45} = \mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}]\otimes\mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{45}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{Q}_0^{(a,A_g)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 46 $\hat{\mathbb{Q}}_2^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{46} = \mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{46}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{Q}_2^{(a,A_g)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 47 $\hat{\mathbb{Q}}_0^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{47} = \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{47}(\boldsymbol{k}) = {} & \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} \\ & - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ & + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 48 $\hat{\mathbb{G}}_1^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{48} = -\frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{48}(\boldsymbol{k}) = {} & -\frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ & + \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{Q}_{2,0}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ & + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{Q}_{2,1}^{(a,E_g,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 49 $\hat{\mathbb{G}}_3^{(A_g,2)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{49} = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{49}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 50 $\hat{\mathbb{G}}_3^{(A_g,3)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{50} = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{50}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{Q}_{2,0}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{Q}_{2,1}^{(a,E_g,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 51 $\hat{\mathbb{Q}}_0^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{51} = \mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{51}(\boldsymbol{k})$$
$$= \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{19}[\mathbb{Q}_0^{(a,A_g)}(1,1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 52 $\hat{\mathbb{Q}}_2^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{52} = \mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{52}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{20}[\mathbb{Q}_2^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 53 $\hat{\mathbb{Q}}_0^{(A_g)}(1,-1)$ $[\mathrm{M}_3,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{53}=\frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{53}(\boldsymbol{k})=&\frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}+\frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}-\frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 54 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_3,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{54}=-\frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{54}(\boldsymbol{k})=&-\frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}+\frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\\&-\frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}+\frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\\&+\frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}+\frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}\\&+\frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}-\frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)]\otimes\mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 55 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_3,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{55}=\frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)]\otimes\mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}+\frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)]\otimes\mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{55}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 56 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{56} = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{56}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 57 $\hat{\mathbb{G}}_1^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{57} = \mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{57}(\boldsymbol{k})$$
$$= \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{21}[\mathbb{G}_1^{(a,A_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 58 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{58} = -\frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{58}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 59 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{59} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{59}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{G}_{1,0}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{G}_{1,1}^{(a,E_g)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 60 $\hat{\mathbb{G}}_1^{(A_g)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{60} = \mathbb{X}_{32}[\mathbb{M}_1^{(a,A_g)}] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{60}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{M}_1^{(a,A_g)}] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{M}_1^{(a,A_g)}] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{M}_1^{(a,A_g)}] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 61 $\hat{\mathbb{G}}_3^{(A_g,2)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{61} = -\frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{61}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 62 $\hat{\mathbb{G}}_3^{(A_g,3)}$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{62} = \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{62}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{M}_{1,0}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{34}[\mathbb{M}_{1,1}^{(a,E_g)}]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 63 $\hat{\mathbb{G}}_1^{(A_g)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{63} = \mathbb{X}_{35}[\mathbb{M}_1^{(a,A_g)}(1,1)]\otimes\mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{63}(\boldsymbol{k})$$
$$= \frac{\sqrt{3}\mathbb{X}_{35}[\mathbb{M}_1^{(a,A_g)}(1,1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{35}[\mathbb{M}_1^{(a,A_g)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{35}[\mathbb{M}_1^{(a,A_g)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 64 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{64} = -\frac{\sqrt{2}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)]\otimes\mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)]\otimes\mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{64}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)]\otimes\mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 65 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{65} = \frac{\sqrt{2}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{65}(\boldsymbol{k}) = &\frac{\sqrt{6}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{41}[\mathbb{M}_{1,0}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{42}[\mathbb{M}_{1,1}^{(a,E_g)}(1,1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 66 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{66} = \mathbb{X}_{36}[\mathbb{M}_1^{(a,A_g)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{66}(\boldsymbol{k}) = &\frac{\sqrt{3}\mathbb{X}_{36}[\mathbb{M}_1^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{36}[\mathbb{M}_1^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} \\ &+ \frac{\sqrt{3}\mathbb{X}_{36}[\mathbb{M}_1^{(a,A_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}\end{aligned}$$

No. 67 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{67} = -\frac{\sqrt{2}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{67}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 68 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{68} = \frac{\sqrt{2}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{68}(\boldsymbol{k}) = &\frac{\sqrt{6}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ &+ \frac{\sqrt{3}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{43}[\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{44}[\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}\end{aligned}$$

No. 69 $\hat{\mathbb{G}}_3^{(A_g,1)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{69} = \mathbb{X}_{37}[\mathbb{M}_3^{(a,A_g,1)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{69}(\boldsymbol{k}) = &\frac{\sqrt{3}\mathbb{X}_{37}[\mathbb{M}_3^{(a,A_g,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{37}[\mathbb{M}_3^{(a,A_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} \\ &+ \frac{\sqrt{3}\mathbb{X}_{37}[\mathbb{M}_3^{(a,A_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}\end{aligned}$$

No. 70 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{70} = \mathbb{X}_{38}[\mathbb{M}_3^{(a,A_g,2)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{70}(\boldsymbol{k}) = &\frac{\sqrt{3}\mathbb{X}_{38}[\mathbb{M}_3^{(a,A_g,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{38}[\mathbb{M}_3^{(a,A_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} \\ &+ \frac{\sqrt{3}\mathbb{X}_{38}[\mathbb{M}_3^{(a,A_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}\end{aligned}$$

No. 71 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{71} = \mathbb{X}_{39}[\mathbb{M}_3^{(a,A_g,3)}(1,-1)] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{71}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{39}[\mathbb{M}_3^{(a,A_g,3)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{39}[\mathbb{M}_3^{(a,A_g,3)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{39}[\mathbb{M}_3^{(a,A_g,3)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 72 $\hat{\mathbb{G}}_1^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{72} = \frac{\sqrt{2}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{72}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 73 $\hat{\mathbb{Q}}_2^{(A_g)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{73} = -\frac{\sqrt{2}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{73}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{47}[\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{48}[\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 74 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{74} = \frac{\sqrt{2}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{74}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 75 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,-1)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{75} = -\frac{\sqrt{2}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{75}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{45}[\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{46}[\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 76 $\hat{\mathbb{Q}}_2^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{76} = \mathbb{X}_{40}[\mathbb{T}_2^{(a,A_g)}(1,0)] \otimes \mathbb{Y}_{10}[\mathbb{T}_0^{(b,A_g)}]$$

$$\hat{\mathbb{Z}}_{76}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{40}[\mathbb{T}_2^{(a,A_g)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{40}[\mathbb{T}_2^{(a,A_g)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{3} + \frac{\sqrt{3}\mathbb{X}_{40}[\mathbb{T}_2^{(a,A_g)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{3}$$

No. 77 $\hat{\mathbb{Q}}_0^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{77} = \frac{\sqrt{2}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{77}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 78 $\hat{\mathbb{G}}_1^{(A_g)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{78} = -\frac{\sqrt{2}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{78}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{51}[\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{52}[\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$

No. 79 $\hat{\mathbb{G}}_3^{(A_g,2)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{79} = \frac{\sqrt{2}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2}$$

$$\hat{\mathbb{Z}}_{79}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6}$$

No. 80 $\hat{\mathbb{G}}_3^{(A_g,3)}(1,0)$ $[\mathrm{M}_3, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{80} = \frac{\sqrt{2}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{T}_{2,1}^{(b,E_g,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{T}_{2,0}^{(b,E_g,2)}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{80}(\boldsymbol{k}) = &\frac{\sqrt{6}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{49}[\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} \\ &- \frac{\sqrt{6}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_7[\mathbb{T}_0^{(u,A_g)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_g)}]}{6} \\ &- \frac{\sqrt{3}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_8[\mathbb{T}_{2,0}^{(u,E_g,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_g,2)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{50}[\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)] \otimes \mathbb{U}_9[\mathbb{T}_{2,1}^{(u,E_g,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_g,2)}]}{6}\end{aligned}$$

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	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$
M_4	$(p_x,\uparrow),(p_x,\downarrow),(p_y,\uparrow),(p_y,\downarrow),(p_z,\uparrow),(p_z,\downarrow)$	$(s,\uparrow),(s,\downarrow)$

Table 6: Atomic SAMB.

symbol	type	group	form
$\mathbb{X}_1$	$\mathbb{Q}_0^{(a,A_g)}$	M_1	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_2$	$\mathbb{M}_1^{(a,A_g)}(1,-1)$	M_1	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_3$	$\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)$	M_1	$\begin{pmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_4$	$\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)$	M_1	$\begin{pmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_5$	$\mathbb{Q}_1^{(a,A_u)}$	M_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_6$	$\mathbb{Q}_{1,0}^{(a,E_u)}$	M_2	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_7$	$\mathbb{Q}_{1,1}^{(a,E_u)}$	M_2	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_8$	$\mathbb{Q}_1^{(a,A_u)}(1,0)$	M_2	$\begin{pmatrix} 0 & -\frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 \\ \frac{1}{2} & 0 & \frac{i}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_9$	$\mathbb{G}_0^{(a,A_u)}(1,1)$	M_2	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{6} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{pmatrix}$
$\mathbb{X}_{10}$	$\mathbb{G}_2^{(a,A_u)}(1,-1)$	M_2	$\begin{pmatrix} 0 & -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{3} & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{3} \end{pmatrix}$
$\mathbb{X}_{11}$	$\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)$	M_2	$\begin{pmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & \frac{i}{2} & -\frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{12}$	$\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)$	M_2	$\begin{pmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & -\frac{i}{2} & 0 & 0 & -\frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{13}$	$\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)$	M_2	$\begin{pmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & -\frac{i}{2} & 0 & 0 & \frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{14}$	$\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)$	M_2	$\begin{pmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & -\frac{i}{2} & -\frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{15}$	$\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)$	M_2	$\begin{pmatrix} 0 & \frac{i}{2} & 0 & -\frac{1}{2} & 0 & 0 \\ \frac{i}{2} & 0 & \frac{1}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{16}$	$\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)$	M_2	$\begin{pmatrix} 0 & -\frac{1}{2} & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{1}{2} & 0 & -\frac{i}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{17}$	$\mathbb{Q}_0^{(a,A_g)}$	M_3	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{18}$	$\mathbb{Q}_2^{(a,A_g)}$	M_3	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{X}_{19}$	$\mathbb{Q}_0^{(a,A_g)}(1,1)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{20}$	$\mathbb{Q}_2^{(a,A_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{21}$	$\mathbb{G}_1^{(a,A_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{22}$	$\mathbb{Q}_{2,0}^{(a,E_g,1)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued …

Table 6

symbol	type	group	form
$\mathbb{X}_{23}$	$\mathbb{Q}_{2,1}^{(a,E_g,1)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{24}$	$\mathbb{Q}_{2,0}^{(a,E_g,2)}$	M_3	$\begin{pmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{25}$	$\mathbb{Q}_{2,1}^{(a,E_g,2)}$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{26}$	$\mathbb{Q}_{2,0}^{(a,E_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{27}$	$\mathbb{Q}_{2,1}^{(a,E_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{28}$	$\mathbb{Q}_{2,0}^{(a,E_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{29}$	$\mathbb{Q}_{2,1}^{(a,E_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{30}$	$\mathbb{G}_{1,0}^{(a,E_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{31}$	$\mathbb{G}_{1,1}^{(a,E_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{32}$	$\mathbb{M}_1^{(a,A_g)}$	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
$\mathbb{X}_{33}$	$\mathbb{M}_{1,0}^{(a,E_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{34}$	$\mathbb{M}_{1,1}^{(a,E_g)}$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{35}$	$\mathbb{M}_{1}^{(a,A_g)}(1,1)$	M_3	$\begin{pmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{pmatrix}$
$\mathbb{X}_{36}$	$\mathbb{M}_{1}^{(a,A_g)}(1,-1)$	M_3	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{X}_{37}$	$\mathbb{M}_{3}^{(a,A_g,1)}(1,-1)$	M_3	$\begin{pmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{38}$	$\mathbb{M}_3^{(a,A_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{39}$	$\mathbb{M}_3^{(a,A_g,3)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{40}$	$\mathbb{T}_2^{(a,A_g)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{41}$	$\mathbb{M}_{1,0}^{(a,E_g)}(1,1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{pmatrix}$
$\mathbb{X}_{42}$	$\mathbb{M}_{1,1}^{(a,E_g)}(1,1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{43}$	$\mathbb{M}_{1,0}^{(a,E_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{44}$	$\mathbb{M}_{1,1}^{(a,E_g)}(1,-1)$	M_3	$\begin{pmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{45}$	$\mathbb{M}_{3,0}^{(a,E_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} \\ 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & \frac{\sqrt{30}}{15} & 0 \end{pmatrix}$
$\mathbb{X}_{46}$	$\mathbb{M}_{3,1}^{(a,E_g,1)}(1,-1)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{15} & \frac{\sqrt{30}i}{15} & 0 \end{pmatrix}$
$\mathbb{X}_{47}$	$\mathbb{M}_{3,0}^{(a,E_g,2)}(1,-1)$	M_3	$\begin{pmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{48}$	$\mathbb{M}_{3,1}^{(a,E_g,2)}(1,-1)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{49}$	$\mathbb{T}_{2,0}^{(a,E_g,1)}(1,0)$	M_3	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{50}$	$\mathbb{T}_{2,1}^{(a,E_g,1)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{51}$	$\mathbb{T}_{2,0}^{(a,E_g,2)}(1,0)$	M_3	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{52}$	$\mathbb{T}_{2,1}^{(a,E_g,2)}(1,0)$	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
$\mathbb{X}_{53}$	$\mathbb{Q}_1^{(a,A_u)}$	M_4	$\begin{pmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_{54}$	$\mathbb{Q}_{1,0}^{(a,E_u)}$	M_4	$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$
$\mathbb{X}_{55}$	$\mathbb{Q}_{1,1}^{(a,E_u)}$	M_4	$\begin{pmatrix} 0 & 0 \\ 0 & 0 \\ \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$
$\mathbb{X}_{56}$	$\mathbb{Q}_1^{(a,A_u)}(1,0)$	M_4	$\begin{pmatrix} 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 \\ 0 & -\frac{i}{2} \\ -\frac{i}{2} & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$
$\mathbb{X}_{57}$	$\mathbb{G}_0^{(a,A_u)}(1,1)$	M_4	$\begin{pmatrix} 0 & -\frac{\sqrt{6}i}{6} \\ -\frac{\sqrt{6}i}{6} & 0 \\ 0 & -\frac{\sqrt{6}}{6} \\ \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}i}{6} & 0 \\ 0 & \frac{\sqrt{6}i}{6} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{58}$	$\mathbb{G}_2^{(a,A_u)}(1,-1)$	M_4	$\begin{pmatrix} 0 & \frac{\sqrt{3}i}{6} \\ \frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} \\ -\frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}i}{3} & 0 \\ 0 & \frac{\sqrt{3}i}{3} \end{pmatrix}$
$\mathbb{X}_{59}$	$\mathbb{Q}_{1,0}^{(a,E_u)}(1,0)$	M_4	$\begin{pmatrix} 0 & 0 \\ 0 & 0 \\ \frac{i}{2} & 0 \\ 0 & -\frac{i}{2} \\ 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{60}$	$\mathbb{Q}_{1,1}^{(a,E_u)}(1,0)$	M_4	$\begin{pmatrix} -\frac{i}{2} & 0 \\ 0 & \frac{i}{2} \\ 0 & 0 \\ 0 & 0 \\ 0 & \frac{i}{2} \\ \frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{61}$	$\mathbb{G}_{2,0}^{(a,E_u,1)}(1,-1)$	M_4	$\begin{pmatrix} -\frac{i}{2} & 0 \\ 0 & \frac{i}{2} \\ 0 & 0 \\ 0 & 0 \\ 0 & -\frac{i}{2} \\ -\frac{i}{2} & 0 \end{pmatrix}$
$\mathbb{X}_{62}$	$\mathbb{G}_{2,1}^{(a,E_u,1)}(1,-1)$	M_4	$\begin{pmatrix} 0 & 0 \\ 0 & 0 \\ -\frac{i}{2} & 0 \\ 0 & \frac{i}{2} \\ 0 & -\frac{1}{2} \\ \frac{1}{2} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{63}$	$\mathbb{G}_{2,0}^{(a,E_u,2)}(1,-1)$	M_4	$\begin{pmatrix} 0 & -\frac{i}{2} \\ -\frac{i}{2} & 0 \\ 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$
$\mathbb{X}_{64}$	$\mathbb{G}_{2,1}^{(a,E_u,2)}(1,-1)$	M_4	$\begin{pmatrix} 0 & \frac{1}{2} \\ -\frac{1}{2} & 0 \\ 0 & \frac{i}{2} \\ \frac{i}{2} & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$

Table 7: Cluster SAMB.

symbol	type	cluster	form
$\mathbb{Y}_1$	$\mathbb{Q}_0^{(s,A_g)}$	S_1	$\begin{pmatrix} \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{Y}_2$	$\mathbb{Q}_{2,0}^{(s,E_g,2)}$	S_1	$\begin{pmatrix} -\frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{3} & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_3$	$\mathbb{Q}_{2,1}^{(s,E_g,2)}$	S_1	$\begin{pmatrix} -\frac{\sqrt{2}}{2} & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{Y}_4$	$\mathbb{Q}_0^{(b,A_g)}$	B_1	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_5$	$\mathbb{Q}_{1,0}^{(b,E_u)}$	B_1	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_6$	$\mathbb{Q}_{1,1}^{(b,E_u)}$	B_1	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & \frac{1}{2} & 0 & -\frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_7$	$\mathbb{Q}_{2,0}^{(b,E_g,2)}$	B_1	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_8$	$\mathbb{Q}_{2,1}^{(b,E_g,2)}$	B_1	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & -\frac{1}{2} & 0 & \frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_9$	$\mathbb{Q}_3^{(b,A_u,3)}$	B_1	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_{10}$	$\mathbb{T}_0^{(b,A_g)}$	B_1	$\begin{pmatrix} \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} \end{pmatrix}$
$\mathbb{Y}_{11}$	$\mathbb{T}_{2,0}^{(b,E_g,2)}$	B_1	$\begin{pmatrix} -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{3} & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{3} & \frac{\sqrt{3}i}{6} \end{pmatrix}$
$\mathbb{Y}_{12}$	$\mathbb{T}_{2,1}^{(b,E_g,2)}$	B_1	$\begin{pmatrix} -\frac{i}{2} & 0 & -\frac{i}{2} & -\frac{i}{2} & 0 & -\frac{i}{2} \end{pmatrix}$

Table 8: Uniform SAMB.

symbol	type	cluster	form
$\mathbb{U}_1$	$\mathbb{Q}_0^{(s,A_g)}$	S_1	$\begin{pmatrix} \frac{\sqrt{3}}{3} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{U}_2$	$\mathbb{Q}_{2,0}^{(s,E_g,2)}$	S_1	$\begin{pmatrix} -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{3} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{U}_3$	$\mathbb{Q}_{2,1}^{(s,E_g,2)}$	S_1	$\begin{pmatrix} -\frac{\sqrt{2}}{2} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{U}_4$	$\mathbb{Q}_0^{(u,A_g)}$	B_1	$\begin{pmatrix} 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \\ \frac{\sqrt{6}}{6} & 0 & \frac{\sqrt{6}}{6} \\ \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{U}_5$	$\mathbb{Q}_{2,0}^{(u,E_g,2)}$	B_1	$\begin{pmatrix} 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} \\ -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}}{3} \\ -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & 0 \end{pmatrix}$
$\mathbb{U}_6$	$\mathbb{Q}_{2,1}^{(u,E_g,2)}$	B_1	$\begin{pmatrix} 0 & -\frac{1}{2} & \frac{1}{2} \\ -\frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{U}_7$	$\mathbb{T}_0^{(u,A_g)}$	B_1	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}i}{6} \\ \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$
$\mathbb{U}_8$	$\mathbb{T}_{2,0}^{(u,E_g,2)}$	B_1	$\begin{pmatrix} 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}i}{3} \\ -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{3} & 0 \end{pmatrix}$
$\mathbb{U}_9$	$\mathbb{T}_{2,1}^{(u,E_g,2)}$	B_1	$\begin{pmatrix} 0 & -\frac{i}{2} & -\frac{i}{2} \\ \frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 \end{pmatrix}$

Table 9: Structure SAMB.

symbol	type	cluster	form
$\mathbb{F}_1$	$\mathbb{Q}_0^{(k,A_g)}$	B_1	$\frac{\sqrt{6}c_{001}}{3}+\frac{\sqrt{6}c_{002}}{3}+\frac{\sqrt{6}c_{003}}{3}$
$\mathbb{F}_2$	$\mathbb{Q}_{2,0}^{(k,E_g,2)}$	B_1	$-\frac{\sqrt{3}c_{001}}{3}+\frac{2\sqrt{3}c_{002}}{3}-\frac{\sqrt{3}c_{003}}{3}$
$\mathbb{F}_3$	$\mathbb{Q}_{2,1}^{(k,E_g,2)}$	B_1	$-c_{001}+c_{003}$
$\mathbb{F}_4$	$\mathbb{T}_{1,0}^{(k,E_u)}$	B_1	$-\frac{\sqrt{3}s_{001}}{3}+\frac{2\sqrt{3}s_{002}}{3}+\frac{\sqrt{3}s_{003}}{3}$
$\mathbb{F}_5$	$\mathbb{T}_{1,1}^{(k,E_u)}$	B_1	$-s_{001}-s_{003}$
$\mathbb{F}_6$	$\mathbb{T}_3^{(k,A_u,3)}$	B_1	$\frac{\sqrt{6}s_{001}}{3}+\frac{\sqrt{6}s_{002}}{3}-\frac{\sqrt{6}s_{003}}{3}$

Table 10: Polar harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{Q}_0^{(A_g)}$	0	A_g	–	–	1
2	$\mathbb{Q}_1^{(A_u)}$	1	A_u	–	–	z
3	$\mathbb{Q}_{1,0}^{(E_u)}$	1	E_u	–	0	x
4	$\mathbb{Q}_{1,1}^{(E_u)}$	1	E_u	–	1	y
5	$\mathbb{Q}_2^{(A_g)}$	2	A_g	–	–	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
6	$\mathbb{Q}_{2,0}^{(E_g,1)}$	2	E_g	1	0	$\sqrt{3}xz$
7	$\mathbb{Q}_{2,1}^{(E_g,1)}$	2	E_g	1	1	$\sqrt{3}yz$
8	$\mathbb{Q}_{2,0}^{(E_g,2)}$	2	E_g	2	0	$\frac{\sqrt{3}\left(x^2-y^2\right)}{2}$
9	$\mathbb{Q}_{2,1}^{(E_g,2)}$	2	E_g	2	1	$-\sqrt{3}xy$
10	$\mathbb{Q}_3^{(A_u,3)}$	3	A_u	3	–	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$

Table 11: Axial harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{G}_0^{(A_u)}$	0	A_u	–	–	1
2	$\mathbb{G}_1^{(A_g)}$	1	A_g	–	–	Z
3	$\mathbb{G}_{1,0}^{(E_g)}$	1	E_g	–	0	X
4	$\mathbb{G}_{1,1}^{(E_g)}$	1	E_g	–	1	Y
5	$\mathbb{G}_2^{(A_u)}$	2	A_u	–	–	$-\frac{X^2}{2}-\frac{Y^2}{2}+Z^2$
6	$\mathbb{G}_{2,0}^{(E_u,1)}$	2	E_u	1	0	$\sqrt{3}XZ$
7	$\mathbb{G}_{2,1}^{(E_u,1)}$	2	E_u	1	1	$\sqrt{3}YZ$
8	$\mathbb{G}_{2,0}^{(E_u,2)}$	2	E_u	2	0	$\frac{\sqrt{3}\left(X^2-Y^2\right)}{2}$
9	$\mathbb{G}_{2,1}^{(E_u,2)}$	2	E_u	2	1	$-\sqrt{3}XY$
10	$\mathbb{G}_3^{(A_g,1)}$	3	A_g	1	–	$-\frac{Z\left(3X^2+3Y^2-2Z^2\right)}{2}$
11	$\mathbb{G}_3^{(A_g,2)}$	3	A_g	2	–	$\frac{\sqrt{10}Y\left(3X^2-Y^2\right)}{4}$
12	$\mathbb{G}_3^{(A_g,3)}$	3	A_g	3	–	$\frac{\sqrt{10}X\left(X^2-3Y^2\right)}{4}$
13	$\mathbb{G}_{3,0}^{(E_g,1)}$	3	E_g	1	0	$\frac{\sqrt{6}X\left(-X^2-Y^2+4Z^2\right)}{4}$
14	$\mathbb{G}_{3,1}^{(E_g,1)}$	3	E_g	1	1	$\frac{\sqrt{6}Y\left(-X^2-Y^2+4Z^2\right)}{4}$
15	$\mathbb{G}_{3,0}^{(E_g,2)}$	3	E_g	2	0	$\frac{\sqrt{15}Z\left(X^2-Y^2\right)}{2}$
16	$\mathbb{G}_{3,1}^{(E_g,2)}$	3	E_g	2	1	$-\sqrt{15}XYZ$

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

Table 12: Conjugacy class (point-group part).

rep. SO	symmetry operations
$\{1\|0\}$	$\{1\|0\}$
$\{3^+_{001}\|0\}$	$\{3^+_{001}\|0\}$
$\{3^-_{001}\|0\}$	$\{3^-_{001}\|0\}$
$\{-1\|0\}$	$\{-1\|0\}$

continued ...

Table 12

rep. SO	symmetry operations
$\{-3^{+}_{001}\|0\}$	$\{-3^{+}_{001}\|0\}$
$\{-3^{-}_{001}\|0\}$	$\{-3^{-}_{001}\|0\}$

Table 13: Symmetry operations.

No.	SO	No.	SO	No.	SO	No.	SO	No.	SO
1	$\{1\|0\}$	2	$\{3^{+}_{001}\|0\}$	3	$\{3^{-}_{001}\|0\}$	4	$\{-1\|0\}$	5	$\{-3^{+}_{001}\|0\}$
6	$\{-3^{-}_{001}\|0\}$								

Table 14: Character table (point-group part).

	1	3^{+}_{001}	3^{-}_{001}	-1	-3^{+}_{001}	-3^{-}_{001}
A_g	1	1	1	1	1	1
$E_g^{(a)}$	1	ω^*	ω	1	ω^*	ω
$E_g^{(b)}$	1	ω	ω^*	1	ω	ω^*
A_u	1	1	1	-1	-1	-1
$E_u^{(a)}$	1	ω^*	ω	-1	$-\omega^*$	$-\omega$
$E_u^{(b)}$	1	ω	ω^*	-1	$-\omega$	$-\omega^*$

Table 15: Parity conversion.

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

Table 16: Symmetric product, $[\Gamma \otimes \Gamma']_+$.

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

Table 17: Anti-symmetric product, $[\Gamma \otimes \Gamma]_-$.

A_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	$E_u^{(a)}$	$E_u^{(b)}$
–	–	–	–	–	–

Table 18: Virtual-cluster sites.

No.	position	No.	position	No.	position	No.	position
1	$\begin{pmatrix} -1 & -1 & 0 \end{pmatrix}$	2	$\begin{pmatrix} 1 & 0 & 0 \end{pmatrix}$	3	$\begin{pmatrix} 0 & 1 & 0 \end{pmatrix}$	4	$\begin{pmatrix} 1 & 1 & 0 \end{pmatrix}$
5	$\begin{pmatrix} -1 & 0 & 0 \end{pmatrix}$	6	$\begin{pmatrix} 0 & -1 & 0 \end{pmatrix}$				

Table 19: Virtual-cluster basis.

symbol	1	2	3	4	5	6
$\mathbb{Q}_0^{(A_g)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$
$\mathbb{Q}_{1,0}^{(E_u)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$
$\mathbb{Q}_{1,1}^{(E_u)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$
$\mathbb{Q}_{2,0}^{(E_g,2)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$
$\mathbb{Q}_{2,1}^{(E_g,2)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$
$\mathbb{Q}_3^{(A_u,3)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$