SAMB for "Mn3Sn"

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- Group: No. 194 D_{6h}^4 $P6_3/mmc$ [hexagonal]
- Associated point group: No. 27 D_{6h} $6/mmm$ [hexagonal]

- Generation condition
  - model type: `tight_binding`
  - time-reversal type: `electric`
  - irrep: `[A1g]`
  - `spinless`

- 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 = 40

Table 2: Hilbert space for full matrix.

No.	ket	No.	ket	No.	ket	No.	ket	No.	ket
1	d_u@Mn_1	2	d_v@Mn_1	3	d_{yz}@Mn_1	4	d_{zx}@Mn_1	5	d_{xy}@Mn_1
6	d_u@Mn_2	7	d_v@Mn_2	8	d_{yz}@Mn_2	9	d_{zx}@Mn_2	10	d_{xy}@Mn_2
11	d_u@Mn_3	12	d_v@Mn_3	13	d_{yz}@Mn_3	14	d_{zx}@Mn_3	15	d_{xy}@Mn_3
16	d_u@Mn_4	17	d_v@Mn_4	18	d_{yz}@Mn_4	19	d_{zx}@Mn_4	20	d_{xy}@Mn_4
21	d_u@Mn_5	22	d_v@Mn_5	23	d_{yz}@Mn_5	24	d_{zx}@Mn_5	25	d_{xy}@Mn_5
26	d_u@Mn_6	27	d_v@Mn_6	28	d_{yz}@Mn_6	29	d_{zx}@Mn_6	30	d_{xy}@Mn_6
31	d_u@Sn_1	32	d_v@Sn_1	33	d_{yz}@Sn_1	34	d_{zx}@Sn_1	35	d_{xy}@Sn_1
36	d_u@Sn_2	37	d_v@Sn_2	38	d_{yz}@Sn_2	39	d_{zx}@Sn_2	40	d_{xy}@Sn_2

- Sites in (primitive) unit cell:

Table 3: Site-clusters.

	site	position	mapping
S_1 [6h: mm2]	Mn_1	$\left(0.8388 \quad 0.6776 \quad \frac{1}{4}\right)$	[1,6,14,17]
	Mn_2	$\left(0.1612 \quad 0.3224 \quad \frac{3}{4}\right)$	[2,3,13,18]
	Mn_3	$\left(0.1612 \quad 0.8388 \quad \frac{3}{4}\right)$	[4,11,19,22]
	Mn_4	$\left(0.6776 \quad 0.8388 \quad \frac{3}{4}\right)$	[5,12,20,21]
	Mn_5	$\left(0.8388 \quad 0.1612 \quad \frac{1}{4}\right)$	[7,10,15,23]
	Mn_6	$\left(0.3224 \quad 0.1612 \quad \frac{1}{4}\right)$	[8,9,16,24]
S_2 [2c: -6m2]	Sn_1	$\left(\frac{1}{3} \quad \frac{2}{3} \quad \frac{1}{4}\right)$	[1,6,7,8,9,10,14,15,16,17,23,24]
	Sn_2	$\left(\frac{2}{3} \quad \frac{1}{3} \quad \frac{3}{4}\right)$	[2,3,4,5,11,12,13,18,19,20,21,22]

- Bonds in (primitive) unit cell:

Table 4: Bond-clusters.

	bond	tail	head	n	#	$\boldsymbol{b}$@$\boldsymbol{c}$	mapping
B_1 [6h: mm2]	b_1	Mn_5	Mn_1	1	1	$\left(0 \quad 0.4836 \quad 0\right)$ @ $\left(0.8388 \quad 0.9194 \quad \frac{1}{4}\right)$	[1,-7,-15,17]
	b_2	Mn_3	Mn_2	1	1	$\left(0 \quad -0.4836 \quad 0\right)$ @ $\left(0.1612 \quad 0.0806 \quad \frac{3}{4}\right)$	[2,-4,13,-19]
	b_3	Mn_4	Mn_2	1	1	$\left(-0.4836 \quad -0.4836 \quad 0\right)$ @ $\left(0.9194 \quad 0.0806 \quad \frac{3}{4}\right)$	[3,-12,18,-21]
	b_4	Mn_4	Mn_3	1	1	$\left(-0.4836 \quad 0 \quad 0\right)$ @ $\left(0.9194 \quad 0.8388 \quad \frac{3}{4}\right)$	[-5,11,-20,22]
	b_5	Mn_6	Mn_1	1	1	$\left(0.4836 \quad 0.4836 \quad 0\right)$ @ $\left(0.0806 \quad 0.9194 \quad \frac{1}{4}\right)$	[6,-9,14,-24]
	b_6	Mn_6	Mn_5	1	1	$\left(0.4836 \quad 0 \quad 0\right)$ @ $\left(0.0806 \quad 0.1612 \quad \frac{1}{4}\right)$	[-8,10,-16,23]
B_2 [6g: .2/m.]	b_7	Sn_2	Sn_1	1	1	$\left(\frac{1}{3} \quad \frac{2}{3} \quad -\frac{1}{2}\right)$ @ $\left(\frac{1}{2} \quad 0 \quad 0\right)$	[1,-3,-13,14]
	b_8	Sn_2	Sn_1	1	1	$\left(\frac{1}{3} \quad \frac{2}{3} \quad \frac{1}{2}\right)$ @ $\left(\frac{1}{2} \quad 0 \quad \frac{1}{2}\right)$	[-2,6,17,-18]
	b_9	Sn_2	Sn_1	1	1	$\left(\frac{1}{3} \quad -\frac{1}{3} \quad -\frac{1}{2}\right)$ @ $\left(\frac{1}{2} \quad \frac{1}{2} \quad 0\right)$	[-4,10,15,-22]
	b_{10}	Sn_2	Sn_1	1	1	$\left(-\frac{2}{3} \quad -\frac{1}{3} \quad -\frac{1}{2}\right)$ @ $\left(0 \quad \frac{1}{2} \quad 0\right)$	[-5,9,16,-21]
	b_{11}	Sn_2	Sn_1	1	1	$\left(\frac{1}{3} \quad -\frac{1}{3} \quad \frac{1}{2}\right)$ @ $\left(\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}\right)$	[7,-11,-19,23]
	b_{12}	Sn_2	Sn_1	1	1	$\left(-\frac{2}{3} \quad -\frac{1}{3} \quad \frac{1}{2}\right)$ @ $\left(0 \quad \frac{1}{2} \quad \frac{1}{2}\right)$	[8,-12,-20,24]
B_3 [12j: m..]	b_{13}	Sn_1	Mn_1	1	1	$\left(0.494533333333333 \quad -0.0109333333333333 \quad 0\right)$ @ $\left(0.0860666666666667 \quad 0.672133333333333 \quad \frac{1}{4}\right)$	[1,17]
	b_{14}	Sn_2	Mn_2	1	1	$\left(-0.494533333333333 \quad 0.0109333333333333 \quad 0\right)$ @ $\left(0.913933333333333 \quad 0.327866666666667 \quad \frac{3}{4}\right)$	[2,13]
	b_{15}	Sn_2	Mn_2	1	1	$\left(0.505466666666667 \quad 0.0109333333333333 \quad 0\right)$ @ $\left(0.413933333333333 \quad 0.327866666666667 \quad \frac{3}{4}\right)$	[3,18]
	b_{16}	Sn_2	Mn_3	1	1	$\left(-0.494533333333333 \quad -0.505466666666667 \quad 0\right)$ @ $\left(0.913933333333333 \quad 0.586066666666667 \quad \frac{3}{4}\right)$	[4,19]
	b_{17}	Sn_2	Mn_4	1	1	$\left(-0.0109333333333333 \quad 0.494533333333333 \quad 0\right)$ @ $\left(0.672133333333333 \quad 0.0860666666666667 \quad \frac{3}{4}\right)$	[5,20]
	b_{18}	Sn_1	Mn_1	1	1	$\left(-0.505466666666667 \quad -0.0109333333333333 \quad 0\right)$ @ $\left(0.586066666666667 \quad 0.672133333333333 \quad \frac{1}{4}\right)$	[6,14]
	b_{19}	Sn_1	Mn_5	1	1	$\left(0.494533333333333 \quad 0.505466666666667 \quad 0\right)$ @ $\left(0.0860666666666667 \quad 0.413933333333333 \quad \frac{1}{4}\right)$	[7,15]
	b_{20}	Sn_1	Mn_6	1	1	$\left(0.0109333333333333 \quad -0.494533333333333 \quad 0\right)$ @ $\left(0.327866666666667 \quad 0.913933333333333 \quad \frac{1}{4}\right)$	[8,16]
	b_{21}	Sn_1	Mn_6	1	1	$\left(0.0109333333333333 \quad 0.505466666666667 \quad 0\right)$ @ $\left(0.327866666666667 \quad 0.413933333333333 \quad \frac{1}{4}\right)$	[9,24]
	b_{22}	Sn_1	Mn_5	1	1	$\left(-0.505466666666667 \quad -0.494533333333333 \quad 0\right)$ @ $\left(0.586066666666667 \quad 0.913933333333333 \quad \frac{1}{4}\right)$	[10,23]
	b_{23}	Sn_2	Mn_3	1	1	$\left(0.505466666666667 \quad 0.494533333333333 \quad 0\right)$ @ $\left(0.413933333333333 \quad 0.0860666666666667 \quad \frac{3}{4}\right)$	[11,22]
	b_{24}	Sn_2	Mn_4	1	1	$\left(-0.0109333333333333 \quad -0.505466666666667 \quad 0\right)$ @ $\left(0.672133333333333 \quad 0.586066666666667 \quad \frac{3}{4}\right)$	[12,21]

- SAMB:

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

$$\hat{\mathbb{Z}}_1 = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_{1g})}]$$

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

No. 2 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_2 = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_{1g})}]$$

$$\hat{\mathbb{Z}}_2(\boldsymbol{k}) = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_{1g})}]$$

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

$$\hat{\mathbb{Z}}_3 = \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_3(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

No. 4 $\hat{\mathbb{Q}}_4^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_4 = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_{1g})}]$$

$$\hat{\mathbb{Z}}_4(\boldsymbol{k}) = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_{1g})}]$$

No. 5 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_5 = \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_5(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

No. 6 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{S}_1]$

$$\hat{\mathbb{Z}}_6 = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_6(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E_{2g})}]}{2}$$

No. 7 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_2]$

$$\hat{\mathbb{Z}}_7 = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

$$\hat{\mathbb{Z}}_7(\boldsymbol{k}) = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

No. 8 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_2]$

$$\hat{\mathbb{Z}}_8 = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

$$\hat{\mathbb{Z}}_8(\boldsymbol{k}) = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

No. 9 $\hat{\mathbb{Q}}_4^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{S}_2]$

$$\hat{\mathbb{Z}}_9 = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

$$\hat{\mathbb{Z}}_9(\boldsymbol{k}) = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_{1g})}]$$

No. 10 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{10} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{Y}_5[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\begin{aligned}\hat{\mathbb{Z}}_{10}(\boldsymbol{k}) = &-\frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{15}[\mathbb{T}_3^{(u,B_{2u})}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} \\ &+ \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_5[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}\end{aligned}$$

No. 11 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{11} = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{Y}_5[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\hat{\mathbb{Z}}_{11}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_{15}[\mathbb{T}_3^{(u,B_{2u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_5[\mathbb{Q}_0^{(u,A_{1g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}]\otimes\mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$

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

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

$$\hat{\mathbb{Z}}_{12}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{15}[\mathbb{T}_3^{(u,B_{2u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_5[\mathbb{Q}_0^{(u,A_{1g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12}$$
$$- \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{15}[\mathbb{T}_3^{(u,B_{2u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_5[\mathbb{Q}_0^{(u,A_{1g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12}$$

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

$$\hat{\mathbb{Z}}_{13} = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{Y}_5[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\hat{\mathbb{Z}}_{13}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{15}[\mathbb{T}_3^{(u,B_{2u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_5[\mathbb{Q}_0^{(u,A_{1g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_8[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_9[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$

No. 14 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{14} = \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{Y}_6[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{Y}_7[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{14}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_{3}^{(k,B_{2u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{15}[\mathbb{T}_{3}^{(u,B_{2u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{5}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_{0}^{(k,A_{1g})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_{3}^{(k,B_{2u})}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{15}[\mathbb{T}_{3}^{(u,B_{2u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{5}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_{0}^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12}$$

No. 15 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{15} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{Y}_{6}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{Y}_{7}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{15}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_{3}^{(k,B_{2u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{15}[\mathbb{T}_{3}^{(u,B_{2u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{5}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_{0}^{(k,A_{1g})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{11}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{12}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_{3}^{(k,B_{2u})}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{15}[\mathbb{T}_{3}^{(u,B_{2u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{5}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{8}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_{0}^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{9}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12}$$

No. 16 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1,\mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{16} = -\mathbb{X}_{15}[\mathbb{M}_{1}^{(a,A_{2g})}]\otimes\mathbb{Y}_{10}[\mathbb{T}_{6}^{(b,A_{2g})}]$$

$$\hat{\mathbb{Z}}_{16}(\boldsymbol{k}) = -\frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_{10}[\mathbb{Q}_3^{(u,B_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_{13}[\mathbb{T}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_{14}[\mathbb{T}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_{16}[\mathbb{T}_6^{(u,A_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_6[\mathbb{Q}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}]\otimes\mathbb{U}_7[\mathbb{Q}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6}$$

No. 17 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{17} = -\frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{Y}_8[\mathbb{T}_{2,0}^{(b,E_{2g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{Y}_9[\mathbb{T}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{17}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{10}[\mathbb{Q}_3^{(u,B_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{13}[\mathbb{T}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{13}[\mathbb{T}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{14}[\mathbb{T}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{16}[\mathbb{T}_6^{(u,A_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_6[\mathbb{Q}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_6[\mathbb{Q}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}]\otimes\mathbb{U}_7[\mathbb{Q}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{10}[\mathbb{Q}_3^{(u,B_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{13}[\mathbb{T}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{14}[\mathbb{T}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{14}[\mathbb{T}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{16}[\mathbb{T}_6^{(u,A_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_6[\mathbb{Q}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_7[\mathbb{Q}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]\otimes\mathbb{U}_7[\mathbb{Q}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6}$$

No. 18 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_1]$

$$\hat{\mathbb{Z}}_{18} = \mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{Y}_{10}[\mathbb{T}_6^{(b,A_{2g})}]$$

$$\hat{\mathbb{Z}}_{18}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_{10}[\mathbb{Q}_3^{(u,B_{1u})}]\otimes\mathbb{F}_6[\mathbb{T}_3^{(k,B_{2u})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_{13}[\mathbb{T}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_3[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_{14}[\mathbb{T}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_2[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_{16}[\mathbb{T}_6^{(u,A_{2g})}]\otimes\mathbb{F}_1[\mathbb{Q}_0^{(k,A_{1g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_6[\mathbb{Q}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}]\otimes\mathbb{U}_7[\mathbb{Q}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6}$$

No. 19 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{19} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}]\otimes\mathbb{Y}_{11}[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\hat{\mathbb{Z}}_{19}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_7[\mathbb{Q}_0^{(k,A_{1g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{16}[\mathbb{T}_3^{(k,B_{1u})}]}{2}$$

No. 20 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{20} = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{Y}_{11}[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\hat{\mathbb{Z}}_{20}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_7[\mathbb{Q}_0^{(k,A_{1g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{16}[\mathbb{T}_3^{(k,B_{1u})}]}{2}$$

No. 21 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{21} = \frac{\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,0}^{(b,E_{1g})}]}{2} + \frac{\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,1}^{(b,E_{1g})}]}{2} + \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{21}(\boldsymbol{k}) = {} & \frac{\sqrt{2}\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_8[\mathbb{Q}_{2,0}^{(k,E_{1g})}]}{4} + \frac{\sqrt{2}\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{18}[\mathbb{T}_{3,1}^{(k,E_{2u})}]}{4} + \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_9[\mathbb{Q}_{2,1}^{(k,E_{1g})}]}{4} \\ & - \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{17}[\mathbb{T}_{3,0}^{(k,E_{2u})}]}{4} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{10}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{4} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{15}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{4} \\ & + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{11}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{4} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{14}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{4}\end{aligned}$$

No. 22 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{22} = \frac{\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,0}^{(b,E_{1g})}]}{2} + \frac{\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,1}^{(b,E_{1g})}]}{2} - \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} - \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{22}(\boldsymbol{k}) = {} & \frac{\sqrt{2}\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_8[\mathbb{Q}_{2,0}^{(k,E_{1g})}]}{4} + \frac{\sqrt{2}\mathbb{X}_4[\mathbb{Q}_{2,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{18}[\mathbb{T}_{3,1}^{(k,E_{2u})}]}{4} + \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_9[\mathbb{Q}_{2,1}^{(k,E_{1g})}]}{4} \\ & - \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{17}[\mathbb{T}_{3,0}^{(k,E_{2u})}]}{4} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{10}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{4} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{15}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{4} \\ & - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{11}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{4} - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{14}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{4}\end{aligned}$$

No. 23 $\hat{\mathbb{Q}}_4^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{23} = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{Y}_{11}[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\hat{\mathbb{Z}}_{23}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_7[\mathbb{Q}_0^{(k,A_{1g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{16}[\mathbb{T}_3^{(k,B_{1u})}]}{2}$$

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

$$\hat{\mathbb{Z}}_{24} = \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{6} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,0}^{(b,E_{1g})}]}{3} + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,1}^{(b,E_{1g})}]}{3}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{24}(\boldsymbol{k}) = {} & \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{10}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{15}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} \\ & + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{11}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{14}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_8[\mathbb{Q}_{2,0}^{(k,E_{1g})}]}{6} \\ & + \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{18}[\mathbb{T}_{3,1}^{(k,E_{2u})}]}{6} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_9[\mathbb{Q}_{2,1}^{(k,E_{1g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{17}[\mathbb{T}_{3,0}^{(k,E_{2u})}]}{6}\end{aligned}$$

No. 25 $\hat{\mathbb{Q}}_4^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{25} = -\frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{3} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{3} + \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{2,0}^{(b,E_{1g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,1}^{(b,E_{1g})}]}{6}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{25}(\boldsymbol{k}) = {} & -\frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{10}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{15}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{6} \\ & - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{11}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{14}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_8[\mathbb{Q}_{2,0}^{(k,E_{1g})}]}{6} \\ & + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{4,0}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{18}[\mathbb{T}_{3,1}^{(k,E_{2u})}]}{6} + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_9[\mathbb{Q}_{2,1}^{(k,E_{1g})}]}{6} - \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{4,1}^{(a,E_{1g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{17}[\mathbb{T}_{3,0}^{(k,E_{2u})}]}{6}\end{aligned}$$

No. 26 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{26} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_{15}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\begin{aligned}\hat{\mathbb{Z}}_{26}(\boldsymbol{k}) = {} & \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{10}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{2} - \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{15}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{2} \\ & + \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{11}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{2} + \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{14}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{2}\end{aligned}$$

No. 27 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_2]$

$$\hat{\mathbb{Z}}_{27} = \mathbb{X}_{14}[\mathbb{Q}_4^{(a,B_{2g})}] \otimes \mathbb{Y}_{16}[\mathbb{Q}_4^{(b,B_{2g})}]$$

$$\hat{\mathbb{Z}}_{27}(\boldsymbol{k}) = \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{Q}_4^{(a,B_{2g})}] \otimes \mathbb{U}_{17}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{12}[\mathbb{Q}_4^{(k,B_{2g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{Q}_4^{(a,B_{2g})}] \otimes \mathbb{U}_{18}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{13}[\mathbb{T}_1^{(k,A_{2u})}]}{2}$$

No. 28 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{28} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{Y}_{17}[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{28}(\boldsymbol{k}) = {} & \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{19}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{12} + \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) + \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) + \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) + \mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_{1g})}] \otimes \mathbb{U}_{30}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_3^{(k,B_{1u})}]}{6}
\end{aligned}$$

No. 29 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{29} = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{Y}_{17}[\mathbb{Q}_0^{(b,A_{1g})}]$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{29}(\boldsymbol{k}) = {} & \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{19}[\mathbb{Q}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{12} + \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) + \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) + \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) + \mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_{1g})}] \otimes \mathbb{U}_{30}[\mathbb{T}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_3^{(k,B_{1u})}]}{6}
\end{aligned}$$

No. 30 $\hat{\mathbb{Q}}_0^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{30} = \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_{18}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_{19}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{30}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24}$$
$$+ \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8}$$
$$+ \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right)$$
$$+ \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]$$
$$\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right)$$
$$- \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12}$$
$$+ \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} - \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8}$$
$$+ \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]$$
$$\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}$$

No. 31 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1,\mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{31} = \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{Y}_{20}[\mathbb{Q}_{4,0}^{(b,E_{2g},1)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{Y}_{21}[\mathbb{Q}_{4,1}^{(b,E_{2g},1)}]}{2}$$

$$\hat{\mathbb{Z}}_{31}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{6} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8}$$
$$- \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24}$$
$$- \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4} + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) - \frac{\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4}$$
$$+ \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right)$$
$$- \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right)$$
$$+ \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,0}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{6}$$
$$- \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} + \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4}$$
$$+ \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12} - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24}$$
$$+ \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]$$
$$\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,1}^{(a,E_{2g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}$$

No. 32 $\hat{\mathbb{Q}}_4^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$\hat{\mathbb{Z}}_{32} = \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{Y}_{17}[\mathbb{Q}_0^{(b,A_{1g})}]$

$$\hat{\mathbb{Z}}_{32}(\boldsymbol{k}) = \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{19}[\mathbb{Q}_0^{(u,A_{1g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_0^{(k,A_{1g})}]}{6} + \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{12}$$
$$+ \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{12} + \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{4}+\frac{\sqrt{3}}{12}\right) + \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{12}+\frac{1}{4}\right) + \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(-\frac{1}{4}+\frac{\sqrt{3}}{12}\right) + \mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{12}+\frac{1}{4}\right) - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_4^{(a,A_{1g})}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{6}$$

No. 33 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{33} = \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{18}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{Y}_{19}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{33}(\boldsymbol{k}) = {} & \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{8} + \frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(-\frac{1}{8} - \frac{\sqrt{3}}{24}\right) \\
& + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24} + \frac{1}{8}\right) - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \frac{\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) + \frac{\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24} + \frac{1}{8}\right) \\
& + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}] \\
& \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24} + \frac{1}{8}\right) + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}] \otimes \mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}
\end{aligned}$$

No. 34 $\hat{\mathbb{Q}}_6^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{34} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_{18}[\mathbb{Q}_{2,0}^{(b,E_{2g})}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}] \otimes \mathbb{Y}_{19}[\mathbb{Q}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{34}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} + \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24}$$
$$- \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right)$$
$$+ \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24}$$
$$- \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4}$$
$$- \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right)$$
$$+ \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}$$

No. 35 $\hat{\mathbb{Q}}_{0}^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{35} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{Y}_{20}[\mathbb{Q}_{4,0}^{(b,E_{2g},1)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{Y}_{21}[\mathbb{Q}_{4,1}^{(b,E_{2g},1)}]}{2}$$

$$\hat{\mathbb{Z}}_{35}(\boldsymbol{k}) = \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24}$$
$$- \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24}$$
$$- \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right)$$
$$- \frac{\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]$$
$$\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{4,0}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12}$$
$$+ \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} + \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12}$$
$$- \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right)$$
$$+ \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{4,1}^{(a,E_{2g},1)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}$$

No. 36 $\quad \hat{\mathbb{Q}}_{6}^{(A_{1g},2)}\ [\mathrm{M}_1,\mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{36} = -\frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{Y}_{20}[\mathbb{Q}_{4,0}^{(b,E_{2g},1)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{Y}_{21}[\mathbb{Q}_{4,1}^{(b,E_{2g},1)}]}{2}$$

$$\hat{\mathbb{Z}}_{36}(\boldsymbol{k}) = -\frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{6} - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12}$$
$$- \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} + \frac{\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4}$$
$$+ \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]$$
$$\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{4,0}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12}$$
$$- \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{19}[\mathbb{Q}_{0}^{(u,A_{1g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8}$$
$$- \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} - \frac{\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{22}[\mathbb{Q}_{2,0}^{(u,E_{2g})}]\otimes\mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{23}[\mathbb{Q}_{2,1}^{(u,E_{2g})}]\otimes\mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{26}[\mathbb{T}_{1,0}^{(u,E_{1u})}]\otimes\mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right)$$
$$+ \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]\left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \frac{\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]\otimes\mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{27}[\mathbb{T}_{1,1}^{(u,E_{1u})}]$$
$$\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]\left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{Q}_{4,1}^{(a,E_{2g},2)}]\otimes\mathbb{U}_{30}[\mathbb{T}_{3}^{(u,B_{1u})}]\otimes\mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12}$$

No. 37 $\hat{\mathbb{Q}}_{6}^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{37} = -\mathbb{X}_{15}[\mathbb{M}_{1}^{(a,A_{2g})}]\otimes\mathbb{Y}_{26}[\mathbb{T}_{6}^{(b,A_{2g})}]$$

$$\hat{\mathbb{Z}}_{37}(\boldsymbol{k}) = \mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) + \mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{1}{4} - \frac{\sqrt{3}}{12}\right) + \mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{4} - \frac{\sqrt{3}}{12}\right) + \mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_3^{(k,B_{2u})}]}{6}$$
$$- \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_6^{(k,A_{2g})}]}{6} + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} - \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{4}$$
$$- \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} + \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{4}$$

No. 38 $\hat{\mathbb{Q}}_2^{(A_{1g})}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{38} = -\frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_{22}[\mathbb{T}_{2,0}^{(b,E_{2g})}]}{2} - \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_{23}[\mathbb{T}_{2,1}^{(b,E_{2g})}]}{2}$$

$$\hat{\mathbb{Z}}_{38}(\boldsymbol{k}) = \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{8}+\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(-\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4}$$
$$+ \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{6} - \frac{\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{I}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4}$$
$$- \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12} + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{4} + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right) + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}]$$
$$\otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(\frac{1}{8}-\frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{12} + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{\sqrt{3}}{24}+\frac{1}{8}\right)$$
$$+ \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12} - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{24} + \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{12}$$
$$- \frac{\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{I}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{4} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{24} + \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{8}$$

No. 39 $\quad \hat{\mathbb{Q}}_{6}^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{39} = -\frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{Y}_{24}[\mathbb{T}_{4,0}^{(b,E_{2g},1)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{Y}_{25}[\mathbb{T}_{4,1}^{(b,E_{2g},1)}]}{2}$$

$$\hat{\mathbb{Z}}_{39}(\boldsymbol{k}) = \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(\frac{\sqrt{3}}{24} + \frac{1}{8}\right) - \frac{\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4} + \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(-\frac{1}{8} + \frac{\sqrt{3}}{24}\right) + \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(-\frac{1}{8} - \frac{\sqrt{3}}{24}\right) - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12}$$
$$+ \mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}]}{12}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{6}$$
$$- \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12} - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} + \frac{\mathbb{X}_{17}[\mathbb{M}_{3,0}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4}$$
$$+ \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(-\frac{1}{8} - \frac{\sqrt{3}}{24}\right) + \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{27}[\mathbb{T}_{3}^{(k,B_{1u})}]}{12} + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) + \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(-\frac{1}{8} - \frac{\sqrt{3}}{24}\right) - \frac{\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_{3}^{(k,B_{2u})}]}{4}$$
$$+ \mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{1}{8} - \frac{\sqrt{3}}{24}\right) - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}]}{12}$$
$$- \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_{3}^{(u,B_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_{0}^{(u,A_{1g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{6}$$
$$+ \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{24} - \frac{\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_{6}^{(k,A_{2g})}]}{4}$$
$$- \frac{\sqrt{3}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{19}[\mathbb{Q}_{0}^{(k,A_{1g})}]}{12} + \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{8} - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_{3,1}^{(a,E_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{24}$$

No. 40 $\hat{\mathbb{Q}}_{6}^{(A_{1g},2)}$ $[\mathrm{M}_1, \mathrm{B}_3]$

$$\hat{\mathbb{Z}}_{40} = \mathbb{X}_{16}[\mathbb{M}_{3}^{(a,A_{2g})}] \otimes \mathbb{Y}_{26}[\mathbb{T}_{6}^{(b,A_{2g})}]$$

$$\hat{\mathbb{Z}}_{40}(\boldsymbol{k}) = \mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{26}[\mathbb{T}_{1,1}^{(k,E_{1u})}] \left(-\frac{1}{4} - \frac{\sqrt{3}}{12}\right) + \mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{20}[\mathbb{Q}_{1,0}^{(u,E_{1u})}] \otimes \mathbb{F}_{30}[\mathbb{T}_{5,1}^{(k,E_{1u},1)}] \left(-\frac{1}{4} + \frac{\sqrt{3}}{12}\right) + \mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}]$$
$$\otimes \mathbb{F}_{25}[\mathbb{T}_{1,0}^{(k,E_{1u})}] \left(\frac{\sqrt{3}}{12} + \frac{1}{4}\right) + \mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{21}[\mathbb{Q}_{1,1}^{(u,E_{1u})}] \otimes \mathbb{F}_{29}[\mathbb{T}_{5,0}^{(k,E_{1u},1)}] \left(\frac{1}{4} - \frac{\sqrt{3}}{12}\right) + \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{24}[\mathbb{Q}_3^{(u,B_{1u})}] \otimes \mathbb{F}_{28}[\mathbb{T}_3^{(k,B_{2u})}]}{6}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{25}[\mathbb{T}_0^{(u,A_{1g})}] \otimes \mathbb{F}_{24}[\mathbb{Q}_6^{(k,A_{2g})}]}{6} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{21}[\mathbb{Q}_{2,1}^{(k,E_{2g})}]}{12} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{28}[\mathbb{T}_{2,0}^{(u,E_{2g})}] \otimes \mathbb{F}_{23}[\mathbb{Q}_{4,1}^{(k,E_{2g},1)}]}{4}$$
$$+ \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{20}[\mathbb{Q}_{2,0}^{(k,E_{2g})}]}{12} - \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_3^{(a,A_{2g})}] \otimes \mathbb{U}_{29}[\mathbb{T}_{2,1}^{(u,E_{2g})}] \otimes \mathbb{F}_{22}[\mathbb{Q}_{4,0}^{(k,E_{2g},1)}]}{4}$$

Table 5: Atomic SAMB group.

group	bra	ket
M_1	$d_u, d_v, d_{yz}, d_{zx}, d_{xy}$	$d_u, d_v, d_{yz}, d_{zx}, d_{xy}$

Table 6: Atomic SAMB.

symbol	type	group	form
$\mathbb{X}_1$	$\mathbb{Q}_0^{(a,A_{1g})}$	M_1	$\begin{pmatrix} \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{5} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{5} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{5} \end{pmatrix}$
$\mathbb{X}_2$	$\mathbb{Q}_2^{(a,A_{1g})}$	M_1	$\begin{pmatrix} \frac{\sqrt{14}}{7} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{7} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{7} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_3$	$\mathbb{Q}_4^{(a,A_{1g})}$	M_1	$\begin{pmatrix} \frac{3\sqrt{70}}{35} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{2\sqrt{70}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{2\sqrt{70}}{35} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} \end{pmatrix}$
$\mathbb{X}_4$	$\mathbb{Q}_{2,0}^{(a,E_{1g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} \\ \frac{\sqrt{14}}{14} & \frac{\sqrt{42}}{14} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_5$	$\mathbb{Q}_{2,1}^{(a,E_{1g})}$	M_1	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ \frac{\sqrt{14}}{14} & -\frac{\sqrt{42}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 \end{pmatrix}$
$\mathbb{X}_6$	$\mathbb{Q}_{4,0}^{(a,E_{1g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{21}}{7} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ \frac{\sqrt{21}}{7} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_7$	$\mathbb{Q}_{4,1}^{(a,E_{1g})}$	M_1	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{21}}{7} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ \frac{\sqrt{21}}{7} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{pmatrix}$
$\mathbb{X}_8$	$\mathbb{Q}_{2,0}^{(a,E_{2g})}$	M_1	$\begin{pmatrix} 0 & -\frac{\sqrt{14}}{7} & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_9$	$\mathbb{Q}_{2,1}^{(a,E_{2g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{7} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 \\ -\frac{\sqrt{14}}{7} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{10}$	$\mathbb{Q}_{4,0}^{(a,E_{2g},1)}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{X}_{11}$	$\mathbb{Q}_{4,1}^{(a,E_{2g},1)}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{2} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{12}$	$\mathbb{Q}_{4,0}^{(a,E_{2g},2)}$	M_1	$\begin{pmatrix} 0 & \frac{\sqrt{42}}{14} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{7} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{13}$	$\mathbb{Q}_{4,1}^{(a,E_{2g},2)}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{14} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{7} & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{7} & 0 & 0 \\ \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{14}$	$\mathbb{Q}_{4}^{(a,B_{2g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & -\frac{1}{2} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{15}$	$\mathbb{M}_1^{(a,A_{2g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{5} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{5} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{16}$	$\mathbb{M}_3^{(a,A_{2g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{5} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{5} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{17}$	$\mathbb{M}_{3,0}^{(a,E_{2g})}$	M_1	$\begin{pmatrix} 0 & -\frac{\sqrt{2}i}{2} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{18}$	$\mathbb{M}_{3,1}^{(a,E_{2g})}$	M_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$

Table 7: Cluster SAMB.

symbol	type	cluster	form
$\mathbb{Y}_1$	$\mathbb{Q}_0^{(s,A_{1g})}$	S_1	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_2$	$\mathbb{Q}_{2,0}^{(s,E_{2g})}$	S_1	$\begin{pmatrix} \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_3$	$\mathbb{Q}_{2,1}^{(s,E_{2g})}$	S_1	$\begin{pmatrix} 0 & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_4$	$\mathbb{Q}_0^{(s,A_{1g})}$	S_2	$\begin{pmatrix} \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{Y}_5$	$\mathbb{Q}_0^{(b,A_{1g})}$	B_1	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \end{pmatrix}$

continued ...

Table 7

symbol	type	cluster	form
$\mathbb{Y}_6$	$\mathbb{Q}_{2,0}^{(b,E_{2g})}$	B_1	$\left(\frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{3} \quad \frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{3}\right)$
$\mathbb{Y}_7$	$\mathbb{Q}_{2,1}^{(b,E_{2g})}$	B_1	$\left(-\frac{1}{2} \quad -\frac{1}{2} \quad \frac{1}{2} \quad 0 \quad \frac{1}{2} \quad 0\right)$
$\mathbb{Y}_8$	$\mathbb{T}_{2,0}^{(b,E_{2g})}$	B_1	$\left(\frac{i}{2} \quad \frac{i}{2} \quad \frac{i}{2} \quad 0 \quad \frac{i}{2} \quad 0\right)$
$\mathbb{Y}_9$	$\mathbb{T}_{2,1}^{(b,E_{2g})}$	B_1	$\left(\frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{3} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{3}\right)$
$\mathbb{Y}_{10}$	$\mathbb{T}_{6}^{(b,A_{2g})}$	B_1	$\left(\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{6} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{6} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{6}\right)$
$\mathbb{Y}_{11}$	$\mathbb{Q}_{0}^{(b,A_{1g})}$	B_2	$\left(\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6}\right)$
$\mathbb{Y}_{12}$	$\mathbb{Q}_{2,0}^{(b,E_{1g})}$	B_2	$\left(0 \quad 0 \quad \frac{1}{2} \quad -\frac{1}{2} \quad -\frac{1}{2} \quad \frac{1}{2}\right)$
$\mathbb{Y}_{13}$	$\mathbb{Q}_{2,1}^{(b,E_{1g})}$	B_2	$\left(\frac{\sqrt{3}}{3} \quad -\frac{\sqrt{3}}{3} \quad -\frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6}\right)$
$\mathbb{Y}_{14}$	$\mathbb{Q}_{2,0}^{(b,E_{2g})}$	B_2	$\left(\frac{\sqrt{3}}{3} \quad \frac{\sqrt{3}}{3} \quad -\frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{6} \quad -\frac{\sqrt{3}}{6}\right)$
$\mathbb{Y}_{15}$	$\mathbb{Q}_{2,1}^{(b,E_{2g})}$	B_2	$\left(0 \quad 0 \quad -\frac{1}{2} \quad \frac{1}{2} \quad -\frac{1}{2} \quad \frac{1}{2}\right)$
$\mathbb{Y}_{16}$	$\mathbb{Q}_{4}^{(b,B_{2g})}$	B_2	$\left(\frac{\sqrt{6}}{6} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{6} \quad -\frac{\sqrt{6}}{6} \quad -\frac{\sqrt{6}}{6}\right)$
$\mathbb{Y}_{17}$	$\mathbb{Q}_{0}^{(b,A_{1g})}$	B_3	$\left(\frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6} \quad \frac{\sqrt{3}}{6}\right)$
$\mathbb{Y}_{18}$	$\mathbb{Q}_{2,0}^{(b,E_{2g})}$	B_3	$\left(\frac{\sqrt{2}}{4} \quad \frac{\sqrt{2}}{4} \quad \frac{\sqrt{2}}{4} \quad 0 \quad -\frac{\sqrt{2}}{4} \quad \frac{\sqrt{2}}{4} \quad 0 \quad -\frac{\sqrt{2}}{4} \quad 0 \quad -\frac{\sqrt{2}}{4} \quad -\frac{\sqrt{2}}{4} \quad 0\right)$
$\mathbb{Y}_{19}$	$\mathbb{Q}_{2,1}^{(b,E_{2g})}$	B_3	$\left(-\frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{6} \quad -\frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{6}\right)$
$\mathbb{Y}_{20}$	$\mathbb{Q}_{4,0}^{(b,E_{2g},1)}$	B_3	$\left(\frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6} \quad \frac{\sqrt{6}}{12} \quad \frac{\sqrt{6}}{12} \quad -\frac{\sqrt{6}}{6}\right)$
$\mathbb{Y}_{21}$	$\mathbb{Q}_{4,1}^{(b,E_{2g},1)}$	B_3	$\left(\frac{\sqrt{2}}{4} \quad \frac{\sqrt{2}}{4} \quad -\frac{\sqrt{2}}{4} \quad 0 \quad \frac{\sqrt{2}}{4} \quad -\frac{\sqrt{2}}{4} \quad 0 \quad \frac{\sqrt{2}}{4} \quad 0 \quad -\frac{\sqrt{2}}{4} \quad -\frac{\sqrt{2}}{4} \quad 0\right)$
$\mathbb{Y}_{22}$	$\mathbb{T}_{2,0}^{(b,E_{2g})}$	B_3	$\left(\frac{\sqrt{2}i}{4} \quad \frac{\sqrt{2}i}{4} \quad \frac{\sqrt{2}i}{4} \quad 0 \quad -\frac{\sqrt{2}i}{4} \quad \frac{\sqrt{2}i}{4} \quad 0 \quad -\frac{\sqrt{2}i}{4} \quad 0 \quad -\frac{\sqrt{2}i}{4} \quad -\frac{\sqrt{2}i}{4} \quad 0\right)$
$\mathbb{Y}_{23}$	$\mathbb{T}_{2,1}^{(b,E_{2g})}$	B_3	$\left(-\frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{6} \quad -\frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{6}\right)$
$\mathbb{Y}_{24}$	$\mathbb{T}_{4,0}^{(b,E_{2g},1)}$	B_3	$\left(\frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6} \quad \frac{\sqrt{6}i}{12} \quad \frac{\sqrt{6}i}{12} \quad -\frac{\sqrt{6}i}{6}\right)$
$\mathbb{Y}_{25}$	$\mathbb{T}_{4,1}^{(b,E_{2g},1)}$	B_3	$\left(\frac{\sqrt{2}i}{4} \quad \frac{\sqrt{2}i}{4} \quad -\frac{\sqrt{2}i}{4} \quad 0 \quad \frac{\sqrt{2}i}{4} \quad -\frac{\sqrt{2}i}{4} \quad 0 \quad \frac{\sqrt{2}i}{4} \quad 0 \quad -\frac{\sqrt{2}i}{4} \quad -\frac{\sqrt{2}i}{4} \quad 0\right)$
$\mathbb{Y}_{26}$	$\mathbb{T}_{6}^{(b,A_{2g})}$	B_3	$\left(\frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad -\frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6} \quad \frac{\sqrt{3}i}{6}\right)$

Table 8: Uniform SAMB.

symbol	type	cluster	form
$\mathbb{U}_1$	$\mathbb{Q}_0^{(s,A_{1g})}$	S_1	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_2$	$\mathbb{Q}_{2,0}^{(s,E_{2g})}$	S_1	$\begin{pmatrix} \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_3$	$\mathbb{Q}_{2,1}^{(s,E_{2g})}$	S_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_4$	$\mathbb{Q}_0^{(s,A_{1g})}$	S_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_5$	$\mathbb{Q}_0^{(u,A_{1g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_6$	$\mathbb{Q}_{1,0}^{(u,E_{1u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & -\frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_7$	$\mathbb{Q}_{1,1}^{(u,E_{1u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_8$	$\mathbb{Q}_{2,0}^{(u,E_{2g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_9$	$\mathbb{Q}_{2,1}^{(u,E_{2g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{10}$	$\mathbb{Q}_3^{(u,B_{1u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{11}$	$\mathbb{T}_{1,0}^{(u,E_{1u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{12}$	$\mathbb{T}_{1,1}^{(u,E_{1u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{13}$	$\mathbb{T}_{2,0}^{(u,E_{2g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{14}$	$\mathbb{T}_{2,1}^{(u,E_{2g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{15}$	$\mathbb{T}_{3}^{(u,B_{2u})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{16}$	$\mathbb{T}_{6}^{(u,A_{2g})}$	B_1	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{17}$	$\mathbb{Q}_0^{(u,A_{1g})}$	B_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{2} & 0 \end{pmatrix}$
$\mathbb{U}_{18}$	$\mathbb{T}_3^{(u,B_{1u})}$	B_2	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{2} & 0 \end{pmatrix}$
$\mathbb{U}_{19}$	$\mathbb{Q}_0^{(u,A_{1g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{20}$	$\mathbb{Q}_{1,0}^{(u,E_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & -\frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{21}$	$\mathbb{Q}_{1,1}^{(u,E_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{22}$	$\mathbb{Q}_{2,0}^{(u,E_{2g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{23}$	$\mathbb{Q}_{2,1}^{(u,E_{2g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{24}$	$\mathbb{Q}_{3}^{(u,B_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{25}$	$\mathbb{T}_{0}^{(u,A_{1g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{26}$	$\mathbb{T}_{1,0}^{(u,E_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{27}$	$\mathbb{T}_{1,1}^{(u,E_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{28}$	$\mathbb{T}_{2,0}^{(u,E_{2g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{12} & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{29}$	$\mathbb{T}_{2,1}^{(u,E_{2g})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{30}$	$\mathbb{T}_{3}^{(u,B_{1u})}$	B_3	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \end{pmatrix}$

Table 9: Structure SAMB.

symbol	type	cluster	form
$\mathbb{F}_1$	$\mathbb{Q}_{0}^{(k,A_{1g})}$	B_1	$\frac{\sqrt{6}c_{001}}{3} + \frac{\sqrt{6}c_{003}}{3} + \frac{\sqrt{6}c_{004}}{3}$
$\mathbb{F}_2$	$\mathbb{Q}_{2,0}^{(k,E_{2g})}$	B_1	$\frac{\sqrt{3}c_{001}}{3} + \frac{\sqrt{3}c_{003}}{3} - \frac{2\sqrt{3}c_{004}}{3}$
$\mathbb{F}_3$	$\mathbb{Q}_{2,1}^{(k,E_{2g})}$	B_1	$-c_{001} + c_{003}$
$\mathbb{F}_4$	$\mathbb{T}_{1,0}^{(k,E_{1u})}$	B_1	$\frac{\sqrt{3}s_{001}}{3} + \frac{\sqrt{3}s_{003}}{3} + \frac{2\sqrt{3}s_{004}}{3}$
$\mathbb{F}_5$	$\mathbb{T}_{1,1}^{(k,E_{1u})}$	B_1	$-s_{001} + s_{003}$
$\mathbb{F}_6$	$\mathbb{T}_{3}^{(k,B_{2u})}$	B_1	$\frac{\sqrt{6}s_{001}}{3} + \frac{\sqrt{6}s_{003}}{3} - \frac{\sqrt{6}s_{004}}{3}$
$\mathbb{F}_7$	$\mathbb{Q}_{0}^{(k,A_{1g})}$	B_2	$\frac{\sqrt{3}c_{007}}{3} + \frac{\sqrt{3}c_{008}}{3} + \frac{\sqrt{3}c_{009}}{3} + \frac{\sqrt{3}c_{010}}{3} + \frac{\sqrt{3}c_{011}}{3} + \frac{\sqrt{3}c_{012}}{3}$
$\mathbb{F}_8$	$\mathbb{Q}_{2,0}^{(k,E_{1g})}$	B_2	$\frac{\sqrt{2}c_{009}}{2} - \frac{\sqrt{2}c_{010}}{2} - \frac{\sqrt{2}c_{011}}{2} + \frac{\sqrt{2}c_{012}}{2}$
$\mathbb{F}_9$	$\mathbb{Q}_{2,1}^{(k,E_{1g})}$	B_2	$\frac{\sqrt{6}c_{007}}{3} - \frac{\sqrt{6}c_{008}}{3} - \frac{\sqrt{6}c_{009}}{6} - \frac{\sqrt{6}c_{010}}{6} + \frac{\sqrt{6}c_{011}}{6} + \frac{\sqrt{6}c_{012}}{6}$

continued ...

Table 9

symbol	type	cluster	form
$\mathbb{F}_{10}$	$\mathbb{Q}_{2,0}^{(k,E_{2g})}$	B_2	$\frac{\sqrt{6}c_{007}}{3}+\frac{\sqrt{6}c_{008}}{3}-\frac{\sqrt{6}c_{009}}{6}-\frac{\sqrt{6}c_{010}}{6}-\frac{\sqrt{6}c_{011}}{6}-\frac{\sqrt{6}c_{012}}{6}$
$\mathbb{F}_{11}$	$\mathbb{Q}_{2,1}^{(k,E_{2g})}$	B_2	$-\frac{\sqrt{2}c_{009}}{2}+\frac{\sqrt{2}c_{010}}{2}-\frac{\sqrt{2}c_{011}}{2}+\frac{\sqrt{2}c_{012}}{2}$
$\mathbb{F}_{12}$	$\mathbb{Q}_{4}^{(k,B_{2g})}$	B_2	$\frac{\sqrt{3}c_{007}}{3}-\frac{\sqrt{3}c_{008}}{3}+\frac{\sqrt{3}c_{009}}{3}+\frac{\sqrt{3}c_{010}}{3}-\frac{\sqrt{3}c_{011}}{3}-\frac{\sqrt{3}c_{012}}{3}$
$\mathbb{F}_{13}$	$\mathbb{T}_{1}^{(k,A_{2u})}$	B_2	$\frac{\sqrt{3}s_{007}}{3}-\frac{\sqrt{3}s_{008}}{3}+\frac{\sqrt{3}s_{009}}{3}+\frac{\sqrt{3}s_{010}}{3}-\frac{\sqrt{3}s_{011}}{3}-\frac{\sqrt{3}s_{012}}{3}$
$\mathbb{F}_{14}$	$\mathbb{T}_{1,0}^{(k,E_{1u})}$	B_2	$\frac{\sqrt{2}s_{009}}{2}-\frac{\sqrt{2}s_{010}}{2}+\frac{\sqrt{2}s_{011}}{2}-\frac{\sqrt{2}s_{012}}{2}$
$\mathbb{F}_{15}$	$\mathbb{T}_{1,1}^{(k,E_{1u})}$	B_2	$\frac{\sqrt{6}s_{007}}{3}+\frac{\sqrt{6}s_{008}}{3}-\frac{\sqrt{6}s_{009}}{6}-\frac{\sqrt{6}s_{010}}{6}-\frac{\sqrt{6}s_{011}}{6}-\frac{\sqrt{6}s_{012}}{6}$
$\mathbb{F}_{16}$	$\mathbb{T}_{3}^{(k,B_{1u})}$	B_2	$\frac{\sqrt{3}s_{007}}{3}+\frac{\sqrt{3}s_{008}}{3}+\frac{\sqrt{3}s_{009}}{3}+\frac{\sqrt{3}s_{010}}{3}+\frac{\sqrt{3}s_{011}}{3}+\frac{\sqrt{3}s_{012}}{3}$
$\mathbb{F}_{17}$	$\mathbb{T}_{3,0}^{(k,E_{2u})}$	B_2	$\frac{\sqrt{6}s_{007}}{3}-\frac{\sqrt{6}s_{008}}{3}-\frac{\sqrt{6}s_{009}}{6}-\frac{\sqrt{6}s_{010}}{6}+\frac{\sqrt{6}s_{011}}{6}+\frac{\sqrt{6}s_{012}}{6}$
$\mathbb{F}_{18}$	$\mathbb{T}_{3,1}^{(k,E_{2u})}$	B_2	$-\frac{\sqrt{2}s_{009}}{2}+\frac{\sqrt{2}s_{010}}{2}+\frac{\sqrt{2}s_{011}}{2}-\frac{\sqrt{2}s_{012}}{2}$
$\mathbb{F}_{19}$	$\mathbb{Q}_{0}^{(k,A_{1g})}$	B_3	$\frac{\sqrt{3}c_{013}}{3}+\frac{\sqrt{3}c_{015}}{3}+\frac{\sqrt{3}c_{016}}{3}+\frac{\sqrt{3}c_{017}}{3}+\frac{\sqrt{3}c_{021}}{3}+\frac{\sqrt{3}c_{022}}{3}$
$\mathbb{F}_{20}$	$\mathbb{Q}_{2,0}^{(k,E_{2g})}$	B_3	$\frac{\sqrt{2}c_{013}}{2}+\frac{\sqrt{2}c_{015}}{2}-\frac{\sqrt{2}c_{017}}{2}-\frac{\sqrt{2}c_{022}}{2}$
$\mathbb{F}_{21}$	$\mathbb{Q}_{2,1}^{(k,E_{2g})}$	B_3	$-\frac{\sqrt{6}c_{013}}{6}+\frac{\sqrt{6}c_{015}}{6}-\frac{\sqrt{6}c_{016}}{3}+\frac{\sqrt{6}c_{017}}{6}+\frac{\sqrt{6}c_{021}}{3}-\frac{\sqrt{6}c_{022}}{6}$
$\mathbb{F}_{22}$	$\mathbb{Q}_{4,0}^{(k,E_{2g},1)}$	B_3	$\frac{\sqrt{6}c_{013}}{6}+\frac{\sqrt{6}c_{015}}{6}-\frac{\sqrt{6}c_{016}}{3}+\frac{\sqrt{6}c_{017}}{6}-\frac{\sqrt{6}c_{021}}{3}+\frac{\sqrt{6}c_{022}}{6}$
$\mathbb{F}_{23}$	$\mathbb{Q}_{4,1}^{(k,E_{2g},1)}$	B_3	$\frac{\sqrt{2}c_{013}}{2}-\frac{\sqrt{2}c_{015}}{2}+\frac{\sqrt{2}c_{017}}{2}-\frac{\sqrt{2}c_{022}}{2}$
$\mathbb{F}_{24}$	$\mathbb{Q}_{6}^{(k,A_{2g})}$	B_3	$\frac{\sqrt{3}c_{013}}{3}-\frac{\sqrt{3}c_{015}}{3}-\frac{\sqrt{3}c_{016}}{3}-\frac{\sqrt{3}c_{017}}{3}+\frac{\sqrt{3}c_{021}}{3}+\frac{\sqrt{3}c_{022}}{3}$
$\mathbb{F}_{25}$	$\mathbb{T}_{1,0}^{(k,E_{1u})}$	B_3	$\frac{\sqrt{3}s_{013}}{6}+\frac{s_{013}}{2}+\frac{\sqrt{3}s_{015}}{6}+\frac{s_{015}}{2}-\frac{\sqrt{3}s_{016}}{3}-\frac{s_{017}}{2}+\frac{\sqrt{3}s_{017}}{6}-\frac{\sqrt{3}s_{021}}{3}-\frac{s_{022}}{2}+\frac{\sqrt{3}s_{022}}{6}$
$\mathbb{F}_{26}$	$\mathbb{T}_{1,1}^{(k,E_{1u})}$	B_3	$-\frac{\sqrt{3}s_{013}}{6}+\frac{s_{013}}{2}-\frac{s_{015}}{2}+\frac{\sqrt{3}s_{015}}{6}-\frac{\sqrt{3}s_{016}}{3}+\frac{\sqrt{3}s_{017}}{6}+\frac{s_{017}}{2}+\frac{\sqrt{3}s_{021}}{3}-\frac{s_{022}}{2}-\frac{\sqrt{3}s_{022}}{6}$
$\mathbb{F}_{27}$	$\mathbb{T}_{3}^{(k,B_{1u})}$	B_3	$\frac{\sqrt{3}s_{013}}{3}-\frac{\sqrt{3}s_{015}}{3}-\frac{\sqrt{3}s_{016}}{3}-\frac{\sqrt{3}s_{017}}{3}+\frac{\sqrt{3}s_{021}}{3}+\frac{\sqrt{3}s_{022}}{3}$
$\mathbb{F}_{28}$	$\mathbb{T}_{3}^{(k,B_{2u})}$	B_3	$\frac{\sqrt{3}s_{013}}{3}+\frac{\sqrt{3}s_{015}}{3}+\frac{\sqrt{3}s_{016}}{3}+\frac{\sqrt{3}s_{017}}{3}+\frac{\sqrt{3}s_{021}}{3}+\frac{\sqrt{3}s_{022}}{3}$
$\mathbb{F}_{29}$	$\mathbb{T}_{5,0}^{(k,E_{1u},1)}$	B_3	$-\frac{\sqrt{3}s_{013}}{6}+\frac{s_{013}}{2}-\frac{\sqrt{3}s_{015}}{6}+\frac{s_{015}}{2}+\frac{\sqrt{3}s_{016}}{3}-\frac{s_{017}}{2}-\frac{\sqrt{3}s_{017}}{6}+\frac{\sqrt{3}s_{021}}{3}-\frac{s_{022}}{2}-\frac{\sqrt{3}s_{022}}{6}$
$\mathbb{F}_{30}$	$\mathbb{T}_{5,1}^{(k,E_{1u},1)}$	B_3	$-\frac{s_{013}}{2}-\frac{\sqrt{3}s_{013}}{6}+\frac{\sqrt{3}s_{015}}{6}+\frac{s_{015}}{2}-\frac{\sqrt{3}s_{016}}{3}-\frac{s_{017}}{2}+\frac{\sqrt{3}s_{017}}{6}+\frac{\sqrt{3}s_{021}}{3}-\frac{\sqrt{3}s_{022}}{6}+\frac{s_{022}}{2}$

Table 10: Polar harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{Q}_{0}^{(A_{1g})}$	0	A_{1g}	–	–	1
2	$\mathbb{Q}_{1}^{(A_{2u})}$	1	A_{2u}	–	–	z

continued ...

Table 10

No.	symbol	rank	irrep.	mul.	comp.	form
3	$\mathbb{Q}_{1,0}^{(E_{1u})}$	1	E_{1u}	–	0	x
4	$\mathbb{Q}_{1,1}^{(E_{1u})}$	1	E_{1u}	–	1	y
5	$\mathbb{Q}_{2}^{(A_{1g})}$	2	A_{1g}	–	–	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
6	$\mathbb{Q}_{2,0}^{(E_{1g})}$	2	E_{1g}	–	0	$\sqrt{3}xz$
7	$\mathbb{Q}_{2,1}^{(E_{1g})}$	2	E_{1g}	–	1	$\sqrt{3}yz$
8	$\mathbb{Q}_{2,0}^{(E_{2g})}$	2	E_{2g}	–	0	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
9	$\mathbb{Q}_{2,1}^{(E_{2g})}$	2	E_{2g}	–	1	$-\sqrt{3}xy$
10	$\mathbb{Q}_{3}^{(B_{1u})}$	3	B_{1u}	–	–	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
11	$\mathbb{Q}_{3}^{(B_{2u})}$	3	B_{2u}	–	–	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
12	$\mathbb{Q}_{3,0}^{(E_{2u})}$	3	E_{2u}	–	0	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
13	$\mathbb{Q}_{3,1}^{(E_{2u})}$	3	E_{2u}	–	1	$-\sqrt{15}xyz$
14	$\mathbb{Q}_{4}^{(A_{1g})}$	4	A_{1g}	–	–	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
15	$\mathbb{Q}_{4}^{(B_{2g})}$	4	B_{2g}	–	–	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
16	$\mathbb{Q}_{4,0}^{(E_{1g})}$	4	E_{1g}	–	0	$-\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
17	$\mathbb{Q}_{4,1}^{(E_{1g})}$	4	E_{1g}	–	1	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
18	$\mathbb{Q}_{4,0}^{(E_{2g},1)}$	4	E_{2g}	1	0	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
19	$\mathbb{Q}_{4,1}^{(E_{2g},1)}$	4	E_{2g}	1	1	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
20	$\mathbb{Q}_{4,0}^{(E_{2g},2)}$	4	E_{2g}	2	0	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
21	$\mathbb{Q}_{4,1}^{(E_{2g},2)}$	4	E_{2g}	2	1	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
22	$\mathbb{Q}_{5,0}^{(E_{1u},1)}$	5	E_{1u}	1	0	$\frac{3\sqrt{14}x\left(x^4-10x^2y^2+5y^4\right)}{16}$
23	$\mathbb{Q}_{5,1}^{(E_{1u},1)}$	5	E_{1u}	1	1	$-\frac{3\sqrt{14}y\left(5x^4-10x^2y^2+y^4\right)}{16}$
24	$\mathbb{Q}_{6}^{(A_{2g})}$	6	A_{2g}	–	–	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

Table 11: Axial harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{G}_1^{(A_{2g})}$	1	A_{2g}	–	–	Z
2	$\mathbb{G}_3^{(A_{2g})}$	3	A_{2g}	–	–	$-\frac{Z\left(3X^2+3Y^2-2Z^2\right)}{2}$
3	$\mathbb{G}_{3,0}^{(E_{2g})}$	3	E_{2g}	–	0	$\sqrt{15}XYZ$
4	$\mathbb{G}_{3,1}^{(E_{2g})}$	3	E_{2g}	–	1	$\frac{\sqrt{15}Z(X-Y)(X+Y)}{2}$

- Group info.: Generator = $\{3^+_{001}|0\},\ \{2_{001}|00\frac{1}{2}\},\ \{2_{110}|0\},\ \{-1|0\}$

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

rep. SO	symmetry operations
$\{1\|0\}$	$\{1\|0\}$
$\{2_{001}\|00\frac{1}{2}\}$	$\{2_{001}\|00\frac{1}{2}\}$
$\{2_{100}\|0\}$	$\{2_{100}\|0\},\ \{2_{010}\|0\},\ \{2_{110}\|0\}$
$\{2_{120}\|00\frac{1}{2}\}$	$\{2_{120}\|00\frac{1}{2}\},\ \{2_{210}\|00\frac{1}{2}\},\ \{2_{1-10}\|00\frac{1}{2}\}$
$\{3^+_{001}\|0\}$	$\{3^+_{001}\|0\},\ \{3^-_{001}\|0\}$
$\{6^+_{001}\|00\frac{1}{2}\}$	$\{6^+_{001}\|00\frac{1}{2}\},\ \{6^-_{001}\|00\frac{1}{2}\}$
$\{-1\|0\}$	$\{-1\|0\}$
$\{\mathrm{m}_{100}\|0\}$	$\{\mathrm{m}_{100}\|0\},\ \{\mathrm{m}_{010}\|0\},\ \{\mathrm{m}_{110}\|0\}$
$\{\mathrm{m}_{001}\|00\frac{1}{2}\}$	$\{\mathrm{m}_{001}\|00\frac{1}{2}\}$
$\{\mathrm{m}_{120}\|00\frac{1}{2}\}$	$\{\mathrm{m}_{120}\|00\frac{1}{2}\},\ \{\mathrm{m}_{210}\|00\frac{1}{2}\},\ \{\mathrm{m}_{1-10}\|00\frac{1}{2}\}$
$\{-3^+_{001}\|0\}$	$\{-3^+_{001}\|0\},\ \{-3^-_{001}\|0\}$
$\{-6^+_{001}\|00\frac{1}{2}\}$	$\{-6^+_{001}\|00\frac{1}{2}\},\ \{-6^-_{001}\|00\frac{1}{2}\}$

Table 13: Symmetry operations.

No.	SO	No.	SO	No.	SO	No.	SO	No.	SO
1	$\{1\|0\}$	2	$\{2_{001}\|00\frac{1}{2}\}$	3	$\{2_{100}\|0\}$	4	$\{2_{010}\|0\}$	5	$\{2_{110}\|0\}$
6	$\{2_{120}\|00\frac{1}{2}\}$	7	$\{2_{210}\|00\frac{1}{2}\}$	8	$\{2_{1-10}\|00\frac{1}{2}\}$	9	$\{3^{+}_{001}\|0\}$	10	$\{3^{-}_{001}\|0\}$
11	$\{6^{+}_{001}\|00\frac{1}{2}\}$	12	$\{6^{-}_{001}\|00\frac{1}{2}\}$	13	$\{-1\|0\}$	14	$\{\mathrm{m}_{100}\|0\}$	15	$\{\mathrm{m}_{010}\|0\}$
16	$\{\mathrm{m}_{110}\|0\}$	17	$\{\mathrm{m}_{001}\|00\frac{1}{2}\}$	18	$\{\mathrm{m}_{120}\|00\frac{1}{2}\}$	19	$\{\mathrm{m}_{210}\|00\frac{1}{2}\}$	20	$\{\mathrm{m}_{1-10}\|00\frac{1}{2}\}$
21	$\{-3^{+}_{001}\|0\}$	22	$\{-3^{-}_{001}\|0\}$	23	$\{-6^{+}_{001}\|00\frac{1}{2}\}$	24	$\{-6^{-}_{001}\|00\frac{1}{2}\}$		

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

	1	2_{001}	2_{100}	2_{120}	3^{+}_{001}	6^{+}_{001}	-1	m_{100}	m_{001}	m_{120}	-3^{+}_{001}	-6^{+}_{001}
A_{1g}	1	1	1	1	1	1	1	1	1	1	1	1
A_{2g}	1	1	−1	−1	1	1	1	−1	1	−1	1	1
B_{1g}	1	−1	−1	1	1	−1	1	−1	−1	1	1	−1
B_{2g}	1	−1	1	−1	1	−1	1	1	−1	−1	1	−1
E_{1g}	2	−2	0	0	−1	1	2	0	−2	0	−1	1
E_{2g}	2	2	0	0	−1	−1	2	0	2	0	−1	−1
A_{1u}	1	1	1	1	1	1	−1	−1	−1	−1	−1	−1
A_{2u}	1	1	−1	−1	1	1	−1	1	−1	1	−1	−1
B_{1u}	1	−1	−1	1	1	−1	−1	1	1	−1	−1	1
B_{2u}	1	−1	1	−1	1	−1	−1	−1	1	1	−1	1
E_{1u}	2	−2	0	0	−1	1	−2	0	2	0	1	−1
E_{2u}	2	2	0	0	−1	−1	−2	0	−2	0	1	1

Table 15: Parity conversion.

$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$
A_{1g} (A_{1u})	A_{2g} (A_{2u})	B_{1g} (B_{1u})	B_{2g} (B_{2u})	E_{1g} (E_{1u})
E_{2g} (E_{2u})	A_{1u} (A_{1g})	A_{2u} (A_{2g})	B_{1u} (B_{1g})	B_{2u} (B_{2g})
E_{1u} (E_{1g})	E_{2u} (E_{2g})			

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

	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
A_{1g}	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
A_{2g}		A_{1g}	B_{2g}	B_{1g}	E_{1g}	E_{2g}	A_{2u}	A_{1u}	B_{2u}	B_{1u}	E_{1u}	E_{2u}
B_{1g}			A_{1g}	A_{2g}	E_{2g}	E_{1g}	B_{1u}	B_{2u}	A_{1u}	A_{2u}	E_{2u}	E_{1u}
B_{2g}				A_{1g}	E_{2g}	E_{1g}	B_{2u}	B_{1u}	A_{2u}	A_{1u}	E_{2u}	E_{1u}
E_{1g}					$A_{1g} + E_{2g}$	$B_{1g} + B_{2g} + E_{1g}$	E_{1u}	E_{1u}	E_{2u}	E_{2u}	$A_{1u} + A_{2u} + E_{2u}$	$B_{1u} + B_{2u} + E_{1u}$
E_{2g}						$A_{1g} + E_{2g}$	E_{2u}	E_{2u}	E_{1u}	E_{1u}	$B_{1u} + B_{2u} + E_{1u}$	$A_{1u} + A_{2u} + E_{2u}$
A_{1u}							A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}
A_{2u}								A_{1g}	B_{2g}	B_{1g}	E_{1g}	E_{2g}
B_{1u}									A_{1g}	A_{2g}	E_{2g}	E_{1g}
B_{2u}										A_{1g}	E_{2g}	E_{1g}
E_{1u}											$A_{1g} + E_{2g}$	$B_{1g} + B_{2g} + E_{1g}$
E_{2u}												$A_{1g} + E_{2g}$

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

A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
–	–	–	–	A_{2g}	A_{2g}	–	–	–	–	A_{2g}	A_{2g}

Table 18: Virtual-cluster sites.

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

Table 19: Virtual-cluster basis.

symbol	1	2	3	4	5	6	7	8	9	10
$\mathbb{Q}_0^{(A_{1g})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_1^{(A_{2u})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{1,0}^{(E_{1u})}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{1,1}^{(E_{1u})}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$
	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{2,0}^{(E_{1g})}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{2,1}^{(E_{1g})}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{2,0}^{(E_{2g})}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	0	$-\frac{1}{4}$
	$-\frac{1}{4}$	0	$\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$
	0	$-\frac{1}{4}$	$-\frac{1}{4}$	0						
$\mathbb{Q}_{2,1}^{(E_{2g})}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$
	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$						
$\mathbb{Q}_3^{(B_{1u})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_3^{(B_{2u})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$

continued ...

Table 19

symbol	1	2	3	4	5	6	7	8	9	10
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{3,0}^{(E_{2u})}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	0	$-\frac{1}{4}$
	$-\frac{1}{4}$	0	$-\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$
	0	$\frac{1}{4}$	$\frac{1}{4}$	0						
$\mathbb{Q}_{3,1}^{(E_{2u})}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$
	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$						
$\mathbb{Q}_{4}^{(B_{1g})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{4}^{(B_{2g})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{4,0}^{(E_{2g},1)}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$						
$\mathbb{Q}_{4,1}^{(E_{2g},1)}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	0	$-\frac{1}{4}$
	$-\frac{1}{4}$	0	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$
	0	$-\frac{1}{4}$	$-\frac{1}{4}$	0						
$\mathbb{Q}_{5,0}^{(E_{1u},1)}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{5,1}^{(E_{1u},1)}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$
	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{5,0}^{(E_{2u},1)}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{12}$	$-\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{6}$						
$\mathbb{Q}_{5,1}^{(E_{2u},1)}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	$\frac{1}{4}$	0	$-\frac{1}{4}$	0	$-\frac{1}{4}$

continued ...

Table 19

symbol	1	2	3	4	5	6	7	8	9	10
	$-\frac{1}{4}$	0	$-\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	0	$\frac{1}{4}$
	0	$\frac{1}{4}$	$\frac{1}{4}$	0						
$\mathbb{Q}_6^{(A_{2g})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{6,0}^{(E_{1g},1)}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_{6,1}^{(E_{1g},1)}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$
	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{2}}{8}-\frac{\sqrt{6}}{24}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$
	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{24}+\frac{\sqrt{2}}{8}$	$-\frac{\sqrt{2}}{8}+\frac{\sqrt{6}}{24}$	$-\frac{\sqrt{6}}{12}$						
$\mathbb{Q}_7^{(A_{1u})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						