

# SAMB for “C3v5”

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- Group: No. 160  $C_{3v}^5$   $R3m$  [ trigonal ]
  - Associated point group: No. 19  $C_{3v}$   $3m1$  (3m1 setting) [ trigonal ]
  - Generation condition
    - model type: **tight\_binding**
    - time-reversal type: **electric**
    - irrep: [A1]
    - **spinful**
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- Unit cell:
    - $a = 1.0$ ,  $b = 1.0$ ,  $c = 1.0$ ,  $\alpha = 90.0$ ,  $\beta = 90.0$ ,  $\gamma = 120.0$
  - Lattice vectors:
    - $\mathbf{a}_1 = (1.0 \ 0 \ 0)$
    - $\mathbf{a}_2 = (-0.5 \ 0.86602540378444 \ 0)$
    - $\mathbf{a}_3 = (0 \ 0 \ 1.0)$
  - Plus sets:
    - $+(0 \ 0 \ 0)$
    - $+\begin{pmatrix} 2 \\ 3 \end{pmatrix} \begin{pmatrix} 1 \\ 3 \end{pmatrix} \begin{pmatrix} 1 \\ 3 \end{pmatrix}$
    - $+\begin{pmatrix} 1 \\ 3 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix}$
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Table 1: High-symmetry line:  $\Gamma$ -X.

	symbol	position		symbol	position
	$\Gamma$	$(0 \ 0 \ 0)$		X	$(\frac{1}{2} \ 0 \ 0)$

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- Kets: dimension = 54

Table 2: Hilbert space for full matrix.

No.	ket	No.	ket	No.	ket	No.	ket	No.	ket
1	$(p_x, \uparrow)@A_1$	2	$(p_x, \downarrow)@A_1$	3	$(p_y, \uparrow)@A_1$	4	$(p_y, \downarrow)@A_1$	5	$(p_z, \uparrow)@A_1$
6	$(p_z, \downarrow)@A_1$								

- Sites in (primitive) unit cell:

Table 3: Site-clusters.

	site	position	mapping
S <sub>1</sub>	A <sub>1</sub>	$\begin{pmatrix} \frac{1}{6} & \frac{5}{6} & \frac{1}{3} \end{pmatrix}$	[1,6]
	A <sub>2</sub>	$\begin{pmatrix} \frac{1}{6} & \frac{1}{3} & \frac{1}{3} \end{pmatrix}$	[2,5]
	A <sub>3</sub>	$\begin{pmatrix} \frac{2}{3} & \frac{5}{6} & \frac{1}{3} \end{pmatrix}$	[3,4]
S <sub>2</sub>	B <sub>1</sub>	$\begin{pmatrix} \frac{5}{6} & 0 & \frac{2}{3} \end{pmatrix}$	[1]
	B <sub>2</sub>	$\begin{pmatrix} 0 & \frac{5}{6} & \frac{2}{3} \end{pmatrix}$	[2]
	B <sub>3</sub>	$\begin{pmatrix} \frac{1}{6} & \frac{1}{6} & \frac{2}{3} \end{pmatrix}$	[3]
	B <sub>4</sub>	$\begin{pmatrix} \frac{1}{6} & 0 & \frac{2}{3} \end{pmatrix}$	[4]
	B <sub>5</sub>	$\begin{pmatrix} \frac{5}{6} & \frac{5}{6} & \frac{2}{3} \end{pmatrix}$	[5]
	B <sub>6</sub>	$\begin{pmatrix} 0 & \frac{1}{6} & \frac{2}{3} \end{pmatrix}$	[6]

- Bonds in (primitive) unit cell:

Table 4: Bond-clusters.

bond	tail	head	$n$	#	$\mathbf{b@c}$	mapping	
B <sub>1</sub>	b <sub>1</sub>	A <sub>1</sub>	B <sub>1</sub>	1	1	$\begin{pmatrix} 0 & -\frac{1}{6} & 0 \end{pmatrix} @ \begin{pmatrix} \frac{5}{6} & \frac{1}{12} & \frac{2}{3} \end{pmatrix}$	[1]

*continued ...*

Table 4

bond	tail	head	$n$	#	$\mathbf{b}@\mathbf{c}$	mapping
b <sub>2</sub>	A <sub>2</sub>	B <sub>2</sub>	1	1	$\begin{pmatrix} \frac{1}{6} & \frac{1}{6} & 0 \end{pmatrix} @ \begin{pmatrix} \frac{11}{12} & \frac{3}{4} & \frac{2}{3} \end{pmatrix}$	[2]
b <sub>3</sub>	A <sub>3</sub>	B <sub>3</sub>	1	1	$\begin{pmatrix} -\frac{1}{6} & 0 & 0 \end{pmatrix} @ \begin{pmatrix} \frac{1}{4} & \frac{1}{6} & \frac{2}{3} \end{pmatrix}$	[3]
b <sub>4</sub>	A <sub>3</sub>	B <sub>4</sub>	1	1	$\begin{pmatrix} -\frac{1}{6} & -\frac{1}{6} & 0 \end{pmatrix} @ \begin{pmatrix} \frac{1}{4} & \frac{1}{12} & \frac{2}{3} \end{pmatrix}$	[4]
b <sub>5</sub>	A <sub>2</sub>	B <sub>5</sub>	1	1	$\begin{pmatrix} 0 & \frac{1}{6} & 0 \end{pmatrix} @ \begin{pmatrix} \frac{5}{6} & \frac{3}{4} & \frac{2}{3} \end{pmatrix}$	[5]
b <sub>6</sub>	A <sub>1</sub>	B <sub>6</sub>	1	1	$\begin{pmatrix} \frac{1}{6} & 0 & 0 \end{pmatrix} @ \begin{pmatrix} \frac{11}{12} & \frac{1}{6} & \frac{2}{3} \end{pmatrix}$	[6]

- SAMB:

$$\boxed{\text{No. 1}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbf{M}_1, \mathbf{S}_1]$$

$$\hat{\mathbb{Z}}_1 = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbb{Z}}_1(\mathbf{k}) = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 2}} \quad \hat{\mathbb{Q}}_2^{(A_1)} [\mathbf{M}_1, \mathbf{S}_1]$$

$$\hat{\mathbb{Z}}_2 = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbb{Z}}_2(\mathbf{k}) = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 3}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbf{M}_1, \mathbf{S}_1]$$

$$\hat{\mathbb{Z}}_3 = \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{\mathbb{Z}}_3(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 4}} \quad \hat{\mathbb{G}}_3^{(A_1)} [\mathbf{M}_1, \mathbf{S}_1]$$

$$\hat{\mathbb{Z}}_4 = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{\mathbb{Z}}_4(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 5}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1, 1) \text{ [M}_1, \text{S}_1]$$

$$\hat{\mathbb{Z}}_5 = \mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbb{Z}}_5(\mathbf{k}) = \mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 6}} \quad \hat{\mathbb{Q}}_2^{(A_1)}(1, -1) \text{ [M}_1, \text{S}_1]$$

$$\hat{\mathbb{Z}}_6 = \mathbb{X}_4[\mathbb{Q}_2^{(a,A_1)}(1, -1)] \otimes \mathbb{Y}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbb{Z}}_6(\mathbf{k}) = \mathbb{X}_4[\mathbb{Q}_2^{(a,A_1)}(1, -1)] \otimes \mathbb{U}_1[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 7}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1, -1) \text{ [M}_1, \text{S}_1]$$

$$\hat{\mathbb{Z}}_7 = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{\mathbb{Z}}_7(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 8}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1, -1) \text{ [M}_1, \text{S}_1]$$

$$\hat{\mathbb{Z}}_8 = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1, -1)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1, -1)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2}$$

$$\hat{\mathbb{Z}}_8(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1, -1)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1, -1)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 9}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1, 0) \text{ [M}_1, \text{S}_1]$$

$$\hat{\mathbb{Z}}_9 = -\frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1, 0)] \otimes \mathbb{Y}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1, 0)] \otimes \mathbb{Y}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{Z}_9(\mathbf{k}) = -\frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_2[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_3[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 10}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbb{M}_1, \mathbb{S}_2]$$

$$\hat{Z}_{10} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{Z}_{10}(\mathbf{k}) = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 11}} \quad \hat{\mathbb{Q}}_2^{(A_1)} [\mathbb{M}_1, \mathbb{S}_2]$$

$$\hat{Z}_{11} = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{Z}_{11}(\mathbf{k}) = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 12}} \quad \hat{\mathbb{Q}}_1^{(A_1)} [\mathbb{M}_1, \mathbb{S}_2]$$

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

$$\hat{Z}_{12}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\boxed{\text{No. 13}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)} [\mathbb{M}_1, \mathbb{S}_2]$$

$$\hat{Z}_{13} = -\frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\hat{Z}_{13}(\mathbf{k}) = -\frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\boxed{\text{No. 14}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbb{M}_1, \mathbb{S}_2]$$

$$\hat{Z}_{14} = \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{\mathbf{Z}}_{14}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 15}} \quad \hat{\mathbb{G}}_3^{(A_1)} [\mathbf{M}_1, \mathbf{S}_2]$$

$$\hat{\mathbf{Z}}_{15} = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{\mathbf{Z}}_{15}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 16}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1, 1) [\mathbf{M}_1, \mathbf{S}_2]$$

$$\hat{\mathbf{Z}}_{16} = \mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbf{Z}}_{16}(\mathbf{k}) = \mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 17}} \quad \hat{\mathbb{Q}}_2^{(A_1)}(1, -1) [\mathbf{M}_1, \mathbf{S}_2]$$

$$\hat{\mathbf{Z}}_{17} = \mathbb{X}_4[\mathbb{Q}_2^{(a,A_1)}(1, -1)] \otimes \mathbb{Y}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\hat{\mathbf{Z}}_{17}(\mathbf{k}) = \mathbb{X}_4[\mathbb{Q}_2^{(a,A_1)}(1, -1)] \otimes \mathbb{U}_4[\mathbb{Q}_0^{(s,A_1)}]$$

$$\boxed{\text{No. 18}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1, -1) [\mathbf{M}_1, \mathbf{S}_2]$$

$$\hat{\mathbf{Z}}_{18} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1, -1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1, -1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2}$$

$$\hat{\mathbf{Z}}_{18}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1, -1)] \otimes \mathbb{U}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1, -1)] \otimes \mathbb{U}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2}$$

$$\boxed{\text{No. 19}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1, -1) [\mathbf{M}_1, \mathbf{S}_2]$$

$$\hat{\mathbf{Z}}_{19} = -\frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\hat{Z}_{19}(\mathbf{k}) = -\frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\boxed{\text{No. 20}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1,-1) \text{ [M}_1, \text{S}_2]$$

$$\hat{Z}_{20} = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{Z}_{20}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 21}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,-1) \text{ [M}_1, \text{S}_2]$$

$$\hat{Z}_{21} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2}$$

$$\hat{Z}_{21}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 22}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1,0) \text{ [M}_1, \text{S}_2]$$

$$\hat{Z}_{22} = \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{Y}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{Y}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\hat{Z}_{22}(\mathbf{k}) = \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_5[\mathbb{Q}_{1,0}^{(s,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_6[\mathbb{Q}_{1,1}^{(s,E)}]}{2}$$

$$\boxed{\text{No. 23}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,0) \text{ [M}_1, \text{S}_2]$$

$$\hat{Z}_{23} = -\frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{Y}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{Y}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\hat{Z}_{23}(\mathbf{k}) = -\frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_7[\mathbb{Q}_{2,0}^{(s,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_8[\mathbb{Q}_{2,1}^{(s,E,2)}]}{2}$$

$$\boxed{\text{No. 24}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,0) \text{ [M}_1, \text{S}_2]$$

$$\hat{Z}_{24} = \mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{Y}_9[\mathbb{Q}_3^{(s,A_2)}]$$

$$\hat{\mathbb{Z}}_{24}(\mathbf{k}) = \mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_9[\mathbb{Q}_3^{(s,A_2)}]$$

$$\boxed{\text{No. 25}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{25} = \mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{Y}_{10}[\mathbb{Q}_0^{(b,A_1)}]$$

$$\begin{aligned} \hat{\mathbb{Z}}_{25}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\ & + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\ & - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\ & + \frac{\sqrt{2}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_1[\mathbb{Q}_0^{(a,A_1)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \end{aligned}$$

$$\boxed{\text{No. 26}} \quad \hat{\mathbb{Q}}_2^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{26} = \mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{Y}_{10}[\mathbb{Q}_0^{(b,A_1)}]$$

$$\begin{aligned} \hat{\mathbb{Z}}_{26}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\ & + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\ & - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\ & + \frac{\sqrt{2}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_2[\mathbb{Q}_2^{(a,A_1)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \end{aligned}$$

$$\boxed{\text{No. 27}} \quad \hat{\mathbb{Q}}_1^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{27} = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{1,1}^{(b,E)}]}{2}$$



$$\begin{aligned}
\hat{Z}_{27}(\mathbf{k}) = & \frac{\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{10}[Q_0^{(u,A_1)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{3}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{11}[Q_{1,0}^{(u,E)}] \otimes F_1[Q_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{11}[Q_{1,0}^{(u,E)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{12}[Q_{1,1}^{(u,E)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{13}[Q_{2,0}^{(u,E,2)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{14}[Q_{2,1}^{(u,E,2)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{15}[Q_3^{(u,A_2)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{16}[T_0^{(u,A_1)}] \otimes F_4[T_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{17}[T_{1,0}^{(u,E)}] \otimes F_5[T_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{18}[T_{1,1}^{(u,E)}] \otimes F_4[T_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{6}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{19}[T_{2,0}^{(u,E,2)}] \otimes F_5[T_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{20}[T_{2,1}^{(u,E,2)}] \otimes F_4[T_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{20}[T_{2,1}^{(u,E,2)}] \otimes F_6[T_3^{(k,A_2)}]}{6} - \frac{\mathbb{X}_5[Q_{2,0}^{(a,E,1)}] \otimes U_{21}[T_3^{(u,A_2)}] \otimes F_5[T_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{10}[Q_0^{(u,A_1)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{11}[Q_{1,0}^{(u,E)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{12}[Q_{1,1}^{(u,E)}] \otimes F_1[Q_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{12}[Q_{1,1}^{(u,E)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{13}[Q_{2,0}^{(u,E,2)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{14}[Q_{2,1}^{(u,E,2)}] \otimes F_3[Q_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{15}[Q_3^{(u,A_2)}] \otimes F_2[Q_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{16}[T_0^{(u,A_1)}] \otimes F_5[T_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{17}[T_{1,0}^{(u,E)}] \otimes F_4[T_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{18}[T_{1,1}^{(u,E)}] \otimes F_5[T_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{6}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{19}[T_{2,0}^{(u,E,2)}] \otimes F_4[T_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{19}[T_{2,0}^{(u,E,2)}] \otimes F_6[T_3^{(k,A_2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{20}[T_{2,1}^{(u,E,2)}] \otimes F_5[T_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_6[Q_{2,1}^{(a,E,1)}] \otimes U_{21}[T_3^{(u,A_2)}] \otimes F_4[T_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 28}} \quad \hat{Q}_3^{(A_1,2)} [M_1, B_1]$$

$$\hat{Z}_{28} = -\frac{\sqrt{2}\mathbb{X}_7[Q_{2,0}^{(a,E,2)}] \otimes Y_{11}[Q_{1,0}^{(b,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_8[Q_{2,1}^{(a,E,2)}] \otimes Y_{12}[Q_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{28}(\mathbf{k}) = & -\frac{\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 29}} \quad \hat{\mathbb{Q}}_0^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{29} = \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{29}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_7[\mathbb{Q}_{2,0}^{(a,E,2)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_8[\mathbb{Q}_{2,1}^{(a,E,2)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 30}} \quad \hat{\mathbb{G}}_3^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{30} = \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{30}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_5[\mathbb{Q}_{2,0}^{(a,E,1)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_6[\mathbb{Q}_{2,1}^{(a,E,1)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 31}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1, 1) \text{ } [M_1, B_1]$$

$$\hat{Z}_{31} = \mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{Y}_{10}[\mathbb{Q}_0^{(b,A_1)}]$$

$$\begin{aligned}
\hat{Z}_{31}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\sqrt{2}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_3[\mathbb{Q}_0^{(a,A_1)}(1, 1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6}
\end{aligned}$$

$$\boxed{\text{No. 32}} \quad \hat{\mathbb{Q}}_2^{(A_1)}(1, -1) \text{ } [M_1, B_1]$$

$$\hat{Z}_{32} = \mathbb{X}_4[\mathbb{Q}_2^{(a,A_1)}(1, -1)] \otimes \mathbb{Y}_{10}[\mathbb{Q}_0^{(b,A_1)}]$$



$$\boxed{\text{No. 34}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1, -1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{34} = -\frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{1,0}^{(b,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned} \hat{\mathbb{Z}}_{34}(\mathbf{k}) = & -\frac{\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\ & + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\ & + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\ & + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\ & + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\ & - \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\ & + \frac{\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\ & - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\ & + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\ & - \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\ & + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\ & - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\ & + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \end{aligned}$$

$$\boxed{\text{No. 35}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1, -1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{35} = \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1, -1)] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{35}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{11}[\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{6} \\
& - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{12}[\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 36}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{36} = \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,1}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,0}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{36}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{10}[\mathbb{Q}_{2,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{4} + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_9[\mathbb{Q}_{2,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 37}} \quad \hat{\mathbb{Q}}_i^{(A_1)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{37} = \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{Y}_{11}[\mathbb{Q}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{Y}_{12}[\mathbb{Q}_{1,1}^{(b,E)}]}{2}$$



$$\begin{aligned}
\hat{Z}_{37}(\mathbf{k}) = & \frac{\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{8} - \frac{\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{6} + \frac{\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24}
\end{aligned}$$

$$\boxed{\text{No. 38}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{38} = -\frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{Y}_{13}[\mathbb{Q}_{2,0}^{(b,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{Y}_{14}[\mathbb{Q}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{38}(\mathbf{k}) = & -\frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{13}[\mathbb{G}_{1,0}^{(a,E)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} - \frac{\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{14}[\mathbb{G}_{1,1}^{(a,E)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 39}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{39} = \mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{Y}_{15}[\mathbb{Q}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{39}(\mathbf{k}) = & -\frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{36}[\mathbb{G}_1^{(a,A_2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 40}} \quad \hat{\mathbb{Q}}_1^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{40} = \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{40}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{24} + \frac{\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{24} \\
& + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 41}} \quad \hat{\mathbb{G}}_3^{(A_1)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{41} = -\frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{41}(\mathbf{k}) = & \frac{\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\mathbb{X}_{16}[\mathbb{M}_{1,0}^{(a,E)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{17}[\mathbb{M}_{1,1}^{(a,E)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 42}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)} [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{42} = \mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{Y}_{21}[\mathbb{T}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{42}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{15}[\mathbb{M}_1^{(a,A_2)}] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6}
\end{aligned}$$

$$\boxed{\text{No. 43}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1,1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{43} = \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{43}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{6} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 44}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{44} = -\frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{44}(\mathbf{k}) = & \frac{\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\mathbb{X}_{22}[\mathbb{M}_{1,0}^{(a,E)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& - \frac{\sqrt{3}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{8} + \frac{\sqrt{6}\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{23}[\mathbb{M}_{1,1}^{(a,E)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 45}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{45} = \mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{Y}_{21}[\mathbb{T}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{45}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} \\
& - \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{18}[\mathbb{M}_1^{(a,A_2)}(1,1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6}
\end{aligned}$$

$$\boxed{\text{No. 46}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{46} = \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{46}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& + \frac{\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 47}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{47} = -\frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{47}(\mathbf{k}) = & \frac{\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\mathbb{X}_{24}[\mathbb{M}_{1,0}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{25}[\mathbb{M}_{1,1}^{(a,E)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 48}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{48} = \mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{Y}_{21}[\mathbb{T}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{48}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{19}[\mathbb{M}_1^{(a,A_2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6}
\end{aligned}$$



$$\boxed{\text{No. 49}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1, -1) [\mathbf{M}_1, \mathbf{B}_1]$$

$$\hat{\mathbb{Z}}_{49} = \mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{Y}_{16}[\mathbb{T}_0^{(b, A_1)}]$$

$$\begin{aligned} \hat{\mathbb{Z}}_{49}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u, E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k, E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u, E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k, E)}]}{12} \\ & - \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u, E, 2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k, E)}]}{4} - \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u, E, 2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k, E)}]}{4} \\ & + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u, A_2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k, A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u, A_1)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k, A_1)}]}{6} \\ & + \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u, E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k, E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u, E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k, E)}]}{4} \\ & + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u, E, 2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k, E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{34}[\mathbb{M}_3^{(a, A_1)}(1, -1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u, E, 2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k, E)}]}{12} \end{aligned}$$

$$\boxed{\text{No. 50}} \quad \hat{\mathbb{Q}}_3^{(A_1, 1)}(1, -1) [\mathbf{M}_1, \mathbf{B}_1]$$

$$\hat{\mathbb{Z}}_{50} = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a, E, 1)}(1, -1)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b, E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a, E, 1)}(1, -1)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b, E)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{50}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 51}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{51} = \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{51}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& - \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 52}} \quad \hat{\mathbb{Q}}_2^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{52} = -\frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{\mathbb{Z}}_{52}(\mathbf{k}) = & \frac{\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\mathbb{X}_{28}[\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{29}[\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 53}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{\mathbb{Z}}_{53} = \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{53}(\mathbf{k}) = & -\frac{\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_{26}[\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} \\
& - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{27}[\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

$$\boxed{\text{No. 54}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{54} = -\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{Y}_{21}[\mathbb{T}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{54}(\mathbf{k}) = & -\frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{2}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{2}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{21}[\mathbb{M}_3^{(a,A_2,2)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6}
\end{aligned}$$

$$\boxed{\text{No. 55}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,-1) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{55} = -\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{Y}_{21}[\mathbb{T}_3^{(b,A_2)}]$$

$$\begin{aligned}
\hat{Z}_{55}(\mathbf{k}) = & -\frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{2}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} \\
& + \frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{2}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{20}[\mathbb{M}_3^{(a,A_2,1)}(1,-1)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6}
\end{aligned}$$

$$\boxed{\text{No. 56}} \quad \hat{\mathbb{Q}}_2^{(A_1)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{56} = \mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{Y}_{16}[\mathbb{T}_0^{(b,A_1)}]$$

$$\begin{aligned}
\hat{Z}_{56}(\mathbf{k}) = & \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} \\
& - \frac{\sqrt{2}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{2}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} + \frac{\sqrt{2}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{35}[\mathbb{T}_2^{(a,A_1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 57}} \quad \hat{\mathbb{Q}}_1^{(A_1)}(1,0) [M_1, B_1]$$

$$\hat{Z}_{57} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned} \hat{Z}_{57}(\mathbf{k}) = & \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\ & - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\ & - \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} + \frac{\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\ & + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\ & - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\ & + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\ & - \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\ & + \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} + \frac{\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\ & - \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\ & - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \end{aligned}$$

$$\boxed{\text{No. 58}} \quad \hat{\mathbb{Q}}_3^{(A_1,2)}(1,0) [M_1, B_1]$$

$$\hat{Z}_{58} = -\frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{Y}_{17}[\mathbb{T}_{1,0}^{(b,E)}]}{2} - \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{Y}_{18}[\mathbb{T}_{1,1}^{(b,E)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{58}(\mathbf{k}) = & -\frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4} \\
& - \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} \\
& + \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} \\
& - \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} + \frac{\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} \\
& + \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} - \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} \\
& + \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12}
\end{aligned}$$

$$\boxed{\text{No. 59}} \quad \hat{\mathbb{Q}}_0^{(A_1)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{59} = \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$



$$\begin{aligned}
\hat{Z}_{59}(\mathbf{k}) = & -\frac{\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_{32}[\mathbb{T}_{2,0}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} - \frac{\mathbb{X}_{33}[\mathbb{T}_{2,1}^{(a,E,2)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24}
\end{aligned}$$

$$\boxed{\text{No. 60}} \quad \hat{\mathbb{G}}_3^{(A_1)}(1,0) [\mathbb{M}_1, \mathbb{B}_1]$$

$$\hat{Z}_{60} = \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{Y}_{19}[\mathbb{T}_{2,0}^{(b,E,2)}]}{2} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{Y}_{20}[\mathbb{T}_{2,1}^{(b,E,2)}]}{2}$$

$$\begin{aligned}
\hat{Z}_{60}(\mathbf{k}) = & -\frac{\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{8} \\
& - \frac{\sqrt{2}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{3}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{6} \\
& + \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} + \frac{\sqrt{6}\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{24} \\
& + \frac{\mathbb{X}_{30}[\mathbb{T}_{2,0}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{4} - \frac{\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{10}[\mathbb{Q}_0^{(u,A_1)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{4} - \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{24} \\
& - \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{11}[\mathbb{Q}_{1,0}^{(u,E)}] \otimes \mathbb{F}_6[\mathbb{T}_3^{(k,A_2)}]}{6} + \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{12}[\mathbb{Q}_{1,1}^{(u,E)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{24} - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{13}[\mathbb{Q}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{8} \\
& + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{14}[\mathbb{Q}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_5[\mathbb{T}_{1,1}^{(k,E)}]}{8} - \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{15}[\mathbb{Q}_3^{(u,A_2)}] \otimes \mathbb{F}_4[\mathbb{T}_{1,0}^{(k,E)}]}{12} + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{16}[\mathbb{T}_0^{(u,A_1)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} \\
& - \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{17}[\mathbb{T}_{1,0}^{(u,E)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{8} + \frac{\sqrt{2}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{18}[\mathbb{T}_{1,1}^{(u,E)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{12} + \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{19}[\mathbb{T}_{2,0}^{(u,E,2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{12} \\
& + \frac{\sqrt{3}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_1[\mathbb{Q}_0^{(k,A_1)}]}{8} - \frac{\sqrt{6}\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{20}[\mathbb{T}_{2,1}^{(u,E,2)}] \otimes \mathbb{F}_3[\mathbb{Q}_{1,1}^{(k,E)}]}{24} - \frac{\mathbb{X}_{31}[\mathbb{T}_{2,1}^{(a,E,1)}(1,0)] \otimes \mathbb{U}_{21}[\mathbb{T}_3^{(u,A_2)}] \otimes \mathbb{F}_2[\mathbb{Q}_{1,0}^{(k,E)}]}{4}
\end{aligned}$$

Table 5: Atomic SAMB group.

group	bra	ket
M <sub>1</sub>	$(p_x, \uparrow), (p_x, \downarrow), (p_y, \uparrow), (p_y, \downarrow), (p_z, \uparrow), (p_z, \downarrow)$	$(p_x, \uparrow), (p_x, \downarrow), (p_y, \uparrow), (p_y, \downarrow), (p_z, \uparrow), (p_z, \downarrow)$

Table 6: Atomic SAMB.

symbol	type	group	form
$\mathbb{X}_1$	$\mathbb{Q}_0^{(a,A_1)}$	$M_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{X}_2$	$\mathbb{Q}_2^{(a,A_1)}$	$M_1$	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{X}_3$	$\mathbb{Q}_0^{(a,A_1)}(1,1)$	$M_1$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_4$	$\mathbb{Q}_2^{(a,A_1)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_5$	$\mathbb{Q}_{2,0}^{(a,E,1)}$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_6$	$\mathbb{Q}_{2,1}^{(a,E,1)}$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_7$	$\mathbb{Q}_{2,0}^{(a,E,2)}$	$M_1$	$\begin{pmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_8$	$\mathbb{Q}_{2,1}^{(a,E,2)}$	$M_1$	$\begin{pmatrix} -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_9$	$\mathbb{Q}_{2,0}^{(a,E,1)}(1, -1)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{10}$	$\mathbb{Q}_{2,1}^{(a,E,1)}(1, -1)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{11}$	$\mathbb{Q}_{2,0}^{(a,E,2)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{12}$	$\mathbb{Q}_{2,1}^{(a,E,2)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & -\frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{13}$	$\mathbb{G}_{1,0}^{(a,E)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{14}$	$\mathbb{G}_{1,1}^{(a,E)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{15}$	$M_1^{(a,A_2)}$	$M_1$	$\begin{pmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{16}$	$\mathbb{M}_{1,0}^{(a,E)}$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{17}$	$\mathbb{M}_{1,1}^{(a,E)}$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{18}$	$\mathbb{M}_1^{(a,A_2)}(1,1)$	$M_1$	$\begin{pmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{pmatrix}$
$\mathbb{X}_{19}$	$\mathbb{M}_1^{(a,A_2)}(1,-1)$	$M_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{X}_{20}$	$\mathbb{M}_3^{(a,A_2,1)}(1,-1)$	$M_1$	$\begin{pmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{21}$	$\mathbb{M}_3^{(a, A_2, 2)}(1, -1)$	$M_1$	$\begin{pmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{22}$	$\mathbb{M}_{1,0}^{(a, E)}(1, 1)$	$M_1$	$\begin{pmatrix} 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & -\frac{\sqrt{30}}{20} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{30} & 0 \end{pmatrix}$
$\mathbb{X}_{23}$	$\mathbb{M}_{1,1}^{(a, E)}(1, 1)$	$M_1$	$\begin{pmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{pmatrix}$
$\mathbb{X}_{24}$	$\mathbb{M}_{1,0}^{(a, E)}(1, -1)$	$M_1$	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{25}$	$\mathbb{M}_{1,1}^{(a, E)}(1, -1)$	$M_1$	$\begin{pmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{26}$	$\mathbb{M}_{3,0}^{(a,E,1)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \\ \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & -\frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}}{15} \\ 0 & 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & \frac{\sqrt{30}i}{15} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{15} & -\frac{\sqrt{30}i}{15} & 0 \end{pmatrix}$
$\mathbb{X}_{27}$	$\mathbb{M}_{3,1}^{(a,E,1)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{15} \\ 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & \frac{\sqrt{30}i}{15} & 0 \end{pmatrix}$
$\mathbb{X}_{28}$	$\mathbb{M}_{3,0}^{(a,E,2)}(1,-1)$	$M_1$	$\begin{pmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{29}$	$\mathbb{M}_{3,1}^{(a,E,2)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{30}$	$\mathbb{T}_{2,0}^{(a,E,1)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{pmatrix}$

continued ...



Table 6

symbol	type	group	form
$\mathbb{X}_{31}$	$\mathbb{T}_{2,1}^{(a,E,1)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{X}_{32}$	$\mathbb{T}_{2,0}^{(a,E,2)}(1,0)$	$M_1$	$\begin{pmatrix} -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{33}$	$\mathbb{T}_{2,1}^{(a,E,2)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}i}{12} & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{34}$	$\mathbb{M}_3^{(a,A_1)}(1,-1)$	$M_1$	$\begin{pmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{X}_{35}$	$\mathbb{T}_2^{(a,A_1)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 6

symbol	type	group	form
$\mathbb{X}_{36}$	$\mathbb{G}_1^{(a,A_2)}(1,0)$	$M_1$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{pmatrix}$

Table 7: Cluster SAMB.

symbol	type	cluster	form
$\mathbb{Y}_1$	$\mathbb{Q}_0^{(s,A_1)}$	$S_1$	$\begin{pmatrix} \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{3} \end{pmatrix}$
$\mathbb{Y}_2$	$\mathbb{Q}_{2,0}^{(s,E,2)}$	$S_1$	$\begin{pmatrix} -\frac{\sqrt{2}}{2} & 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$
$\mathbb{Y}_3$	$\mathbb{Q}_{2,1}^{(s,E,2)}$	$S_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{3} & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_4$	$\mathbb{Q}_0^{(s,A_1)}$	$S_2$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_5$	$\mathbb{Q}_{1,0}^{(s,E)}$	$S_2$	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_6$	$\mathbb{Q}_{1,1}^{(s,E)}$	$S_2$	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & -\frac{1}{2} & 0 & \frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_7$	$\mathbb{Q}_{2,0}^{(s,E,2)}$	$S_2$	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & \frac{1}{2} & 0 & -\frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_8$	$\mathbb{Q}_{2,1}^{(s,E,2)}$	$S_2$	$\begin{pmatrix} \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_9$	$\mathbb{Q}_3^{(s,A_2)}$	$S_2$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_{10}$	$\mathbb{Q}_0^{(b,A_1)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_{11}$	$\mathbb{Q}_{1,0}^{(b,E)}$	$B_1$	$\begin{pmatrix} -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{3} & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_{12}$	$\mathbb{Q}_{1,1}^{(b,E)}$	$B_1$	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & -\frac{1}{2} & 0 & \frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_{13}$	$\mathbb{Q}_{2,0}^{(b,E,2)}$	$B_1$	$\begin{pmatrix} -\frac{1}{2} & 0 & \frac{1}{2} & \frac{1}{2} & 0 & -\frac{1}{2} \end{pmatrix}$
$\mathbb{Y}_{14}$	$\mathbb{Q}_{2,1}^{(b,E,2)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{3} & \frac{\sqrt{3}}{6} \end{pmatrix}$
$\mathbb{Y}_{15}$	$\mathbb{Q}_3^{(b,A_2)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{Y}_{16}$	$\mathbb{T}_0^{(b,A_1)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} \end{pmatrix}$
$\mathbb{Y}_{17}$	$\mathbb{T}_{1,0}^{(b,E)}$	$B_1$	$\begin{pmatrix} -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{3} & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{3} & \frac{\sqrt{3}i}{6} \end{pmatrix}$

continued ...

Table 7

symbol	type	cluster	form
$\mathbb{Y}_{18}$	$\mathbb{T}_{1,1}^{(b,E)}$	$B_1$	$\begin{pmatrix} -\frac{i}{2} & 0 & \frac{i}{2} & -\frac{i}{2} & 0 & \frac{i}{2} \end{pmatrix}$
$\mathbb{Y}_{19}$	$\mathbb{T}_{2,0}^{(b,E,2)}$	$B_1$	$\begin{pmatrix} -\frac{i}{2} & 0 & \frac{i}{2} & \frac{i}{2} & 0 & -\frac{i}{2} \end{pmatrix}$
$\mathbb{Y}_{20}$	$\mathbb{T}_{2,1}^{(b,E,2)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{3} & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{3} & \frac{\sqrt{3}i}{6} \end{pmatrix}$
$\mathbb{Y}_{21}$	$\mathbb{T}_3^{(b,A_2)}$	$B_1$	$\begin{pmatrix} \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}i}{6} \end{pmatrix}$

Table 8: Uniform SAMB.

symbol	type	cluster	form
$\mathbb{U}_1$	$\mathbb{Q}_0^{(s,A_1)}$	$S_1$	$\begin{pmatrix} \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_2$	$\mathbb{Q}_{2,0}^{(s,E,2)}$	$S_1$	$\begin{pmatrix} -\frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_3$	$\mathbb{Q}_{2,1}^{(s,E,2)}$	$S_1$	$\begin{pmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_4$	$\mathbb{Q}_0^{(s,A_1)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{pmatrix}$
$\mathbb{U}_5$	$\mathbb{Q}_{1,0}^{(s,E)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{3} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \end{pmatrix}$

*continued ...*

Table 8

symbol	type	cluster	form
$\mathbb{U}_6$	$\mathbb{Q}_{1,1}^{(s,E)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{pmatrix}$
$\mathbb{U}_7$	$\mathbb{Q}_{2,0}^{(s,E,2)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \end{pmatrix}$
$\mathbb{U}_8$	$\mathbb{Q}_{2,1}^{(s,E,2)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{3} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \end{pmatrix}$

*continued ...*

Table 8

symbol	type	cluster	form
$\mathbb{U}_9$	$\mathbb{Q}_3^{(s,A_2)}$	$S_2$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{pmatrix}$
$\mathbb{U}_{10}$	$\mathbb{Q}_0^{(u,A_1)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{11}$	$\mathbb{Q}_{1,0}^{(u,E)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{12}$	$\mathbb{Q}_{1,1}^{(u,E)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{13}$	$\mathbb{Q}_{2,0}^{(u,E,2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 &; \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{14}$	$\mathbb{Q}_{2,1}^{(u,E,2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{15}$	$\mathbb{Q}_3^{(u, A_2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{16}$	$\mathbb{T}_0^{(u, A_1)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & \frac{\sqrt{3}i}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{17}$	$\mathbb{T}_{1,0}^{(u, E)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...



Table 8

symbol	type	cluster	form
$\mathbb{U}_{18}$	$\mathbb{T}_{1,1}^{(u,E)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{19}$	$\mathbb{T}_{2,0}^{(u,E,2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
$\mathbb{U}_{20}$	$\mathbb{T}_{2,1}^{(u,E,2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 8

symbol	type	cluster	form
$\mathbb{U}_{21}$	$\mathbb{T}_3^{(u, A_2)}$	$B_1$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$

Table 9: Structure SAMB.

symbol	type	cluster	form
$\mathbb{F}_1$	$\mathbb{Q}_0^{(k, A_1)}$	$B_1$	$\frac{\sqrt{6}c_{001}}{3} + \frac{\sqrt{6}c_{002}}{3} + \frac{\sqrt{6}c_{003}}{3}$
$\mathbb{F}_2$	$\mathbb{Q}_{1,0}^{(k, E)}$	$B_1$	$-c_{001} + c_{002}$
$\mathbb{F}_3$	$\mathbb{Q}_{1,1}^{(k, E)}$	$B_1$	$-\frac{\sqrt{3}c_{001}}{3} - \frac{\sqrt{3}c_{002}}{3} + \frac{2\sqrt{3}c_{003}}{3}$
$\mathbb{F}_4$	$\mathbb{T}_{1,0}^{(k, E)}$	$B_1$	$\frac{\sqrt{3}s_{001}}{3} + \frac{\sqrt{3}s_{002}}{3} - \frac{2\sqrt{3}s_{003}}{3}$
$\mathbb{F}_5$	$\mathbb{T}_{1,1}^{(k, E)}$	$B_1$	$-s_{001} + s_{002}$
$\mathbb{F}_6$	$\mathbb{T}_3^{(k, A_2)}$	$B_1$	$\frac{\sqrt{6}s_{001}}{3} + \frac{\sqrt{6}s_{002}}{3} + \frac{\sqrt{6}s_{003}}{3}$

Table 10: Polar harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{Q}_0^{(A_1)}$	0	$A_1$	—	—	1

continued ...

Table 10

No.	symbol	rank	irrep.	mul.	comp.	form
2	$\mathbb{Q}_{1,0}^{(E)}$	1	$E$	—	0	$x$
3	$\mathbb{Q}_{1,1}^{(E)}$	1	$E$	—	1	$y$
4	$\mathbb{Q}_2^{(A_1)}$	2	$A_1$	—	—	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
5	$\mathbb{Q}_{2,0}^{(E,1)}$	2	$E$	1	0	$\sqrt{3}xz$
6	$\mathbb{Q}_{2,1}^{(E,1)}$	2	$E$	1	1	$\sqrt{3}yz$
7	$\mathbb{Q}_{2,0}^{(E,2)}$	2	$E$	2	0	$-\sqrt{3}xy$
8	$\mathbb{Q}_{2,1}^{(E,2)}$	2	$E$	2	1	$-\frac{\sqrt{3}(x-y)(x+y)}{2}$
9	$\mathbb{Q}_3^{(A_2)}$	3	$A_2$	—	—	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$

Table 11: Axial harmonics.

No.	symbol	rank	irrep.	mul.	comp.	form
1	$\mathbb{G}_1^{(A_2)}$	1	$A_2$	—	—	$Z$
2	$\mathbb{G}_{1,0}^{(E)}$	1	$E$	—	0	$-Y$
3	$\mathbb{G}_{1,1}^{(E)}$	1	$E$	—	1	$X$
4	$\mathbb{G}_3^{(A_1)}$	3	$A_1$	—	—	$\frac{\sqrt{10}X(X^2-3Y^2)}{4}$
5	$\mathbb{G}_3^{(A_2,1)}$	3	$A_2$	1	—	$-\frac{Z(3X^2+3Y^2-2Z^2)}{2}$
6	$\mathbb{G}_3^{(A_2,2)}$	3	$A_2$	2	—	$\frac{\sqrt{10}Y(3X^2-Y^2)}{4}$
7	$\mathbb{G}_{3,0}^{(E,1)}$	3	$E$	1	0	$\frac{\sqrt{6}Y(X^2+Y^2-4Z^2)}{4}$
8	$\mathbb{G}_{3,1}^{(E,1)}$	3	$E$	1	1	$-\frac{\sqrt{6}X(X^2+Y^2-4Z^2)}{4}$
9	$\mathbb{G}_{3,0}^{(E,2)}$	3	$E$	2	0	$\frac{\sqrt{15}Z(X-Y)(X+Y)}{2}$
10	$\mathbb{G}_{3,1}^{(E,2)}$	3	$E$	2	1	$-\sqrt{15}XYZ$

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

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

rep. SO	symmetry operations
$\{1 0\}$	$\{1 0\}$
$\{3_{001}^+ 0\}$	$\{3_{001}^+ 0\}, \{3_{001}^- 0\}$
$\{m_{100} 0\}$	$\{m_{100} 0\}, \{m_{010} 0\}, \{m_{110} 0\}$

Table 13: Symmetry operations.

No.	SO	No.	SO	No.	SO	No.	SO	No.	SO
1	$\{1 0\}$	2	$\{3_{001}^+ 0\}$	3	$\{3_{001}^- 0\}$	4	$\{m_{100} 0\}$	5	$\{m_{010} 0\}$
6	$\{m_{110} 0\}$								

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

	1	$3_{001}^+$	$m_{100}$
$A_1$	1	1	1
$A_2$	1	1	-1
$E$	2	-1	0

Table 15: Parity conversion.

$\leftrightarrow$	$\leftrightarrow$	$\leftrightarrow$
$A_1 (A_2)$	$A_2 (A_1)$	$E (E)$

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

	$A_1$	$A_2$	$E$
$A_1$	$A_1$	$A_2$	$E$
$A_2$		$A_1$	$E$
$E$			$A_1 + E$

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

$A_1$	$A_2$	$E$
$-$	$-$	$A_2$

Table 18: Virtual-cluster sites.

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

Table 19: Virtual-cluster basis.

symbol	1	2	3	4	5	6
$\mathbb{Q}_0^{(A_1)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$
$\mathbb{Q}_{1,0}^{(E)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$
$\mathbb{Q}_{1,1}^{(E)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$
$\mathbb{Q}_{2,0}^{(E,2)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$

*continued ...*

Table 19

symbol	1	2	3	4	5	6
$\mathbb{Q}_{2,1}^{(E,2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$
$\mathbb{Q}_3^{(A_2)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$