

\* symmetry operation

Table 1: Symmetry operations for 3d polar vector.

| No. | tag                | matrix (polar)  | det | TR |
|-----|--------------------|---|-----|----|
| 1   | $\{1 0\}$          | $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$   | 1   | 1  |
| 2   | $\{2_{100} 0\}$    | $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$ | 1   | 1  |
| 3   | $\{2_{010} 0\}$    | $\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$ | 1   | 1  |
| 4   | $\{2_{001} 0\}$    | $\begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ | 1   | 1  |
| 5   | $\{-4_{001}^+ 0\}$ | $\begin{bmatrix} 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$ | -1  | -1 |
| 6   | $\{-4_{001}^- 0\}$ | $\begin{bmatrix} 0 & -1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \end{bmatrix}$ | -1  | -1 |
| 7   | $\{m_{110}' 0\}$   | $\begin{bmatrix} 0 & -1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ | -1  | -1 |
| 8   | $\{m_{1-10}' 0\}$  | $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$   | -1  | -1 |