PG No. 45 $C_{6\mathrm{h}}(c)$ $6/m$ [hexagonal]

Table 1: Representation matrices

Irrep.						
A_g	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}1\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}1\end{bmatrix}$
B_g	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$
$E_{1g}^{(a)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{1g}^{(b)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{2g}^{(a)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{2g}^{(b)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
A_u	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}1\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$
B_u	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}1\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}1\end{bmatrix}$
$E_{1u}^{(a)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{1u}^{(b)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}-1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{2u}^{(a)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
$E_{2u}^{(b)}$	$1:\begin{bmatrix}1\end{bmatrix}$	${3^+}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${3^-}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	${2}_{001}:\begin{bmatrix}1\end{bmatrix}$	${6^-}_{001}:\begin{bmatrix}-\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${6^+}_{001}:\begin{bmatrix}-\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$
	$-1:\begin{bmatrix}-1\end{bmatrix}$	$-{3^+}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{3^-}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$	${\mathrm{m}}_{001}:\begin{bmatrix}-1\end{bmatrix}$	$-{6^-}_{001}:\begin{bmatrix}\frac{1}{2}-\frac{\sqrt{3}i}{2}\end{bmatrix}$	$-{6^+}_{001}:\begin{bmatrix}\frac{1}{2}+\frac{\sqrt{3}i}{2}\end{bmatrix}$