## $127^{\text{th}}$ Eigenvector

$\boldsymbol{N_e = 4 \qquad s = 0 \qquad m_s = 0}$

**Irred. Representation :** $\boldsymbol{\Gamma_{4,2}}$

$$E_{127} = -\frac{2A_{10}}{3}$$

$$\begin{aligned}
|\Psi_{127}\rangle &= |4,0,0,\Gamma_{4,2}\rangle \\
&= C_{127,1}\left(|0220\rangle - |2002\rangle\right) \\
&+ C_{127,2}\left(|02du\rangle - |02ud\rangle + |0d2u\rangle - |0u2d\rangle - |20du\rangle + |20ud\rangle - |2d0u\rangle + |2u0d\rangle \right.\\
&\qquad \left. - |d0u2\rangle + |d2u0\rangle - |du02\rangle + |du20\rangle + |u0d2\rangle - |u2d0\rangle + |ud02\rangle - |ud20\rangle\right) \\
&+ C_{127,3}\left(|0du2\rangle - |0ud2\rangle + |2du0\rangle - |2ud0\rangle - |d02u\rangle - |d20u\rangle + |u02d\rangle + |u20d\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{127-1} &= -\frac{J^2 - 2(U+10W)J - 8t^2 + U^2}{\sqrt{2}} \\
&+ \left(\frac{2}{9}\sqrt{2}\left(3(J-U-5W) - A_{10}\right)\left(15W + A_{10}\right)\right) \\
C_{127-2} &= \frac{t\left(J + U - 2W - 2\cos\left(\theta_2\right)\sqrt{A_2}\right)}{3\sqrt{2}} \\
C_{127-3} &= -2\sqrt{2}t^2 \\
N_{127} &= \sqrt{2C_{127,1}^2 + 16C_{127,2}^2 + 8C_{127,3}^2}
\end{aligned}$$