111^{st} Eigenvector

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

Irred. Representation : $\boldsymbol{\Gamma_1}$

$$E_{111} \;=\; \frac{1}{2}\left(-J + 3(U + 6W) - \sqrt{A_3}\right)$$

$$\begin{aligned}
|\Psi_{111}\rangle &= |4,0,0,\Gamma_1\rangle \\
&= C_{111,1}\left(|0022\rangle + |0202\rangle + |0220\rangle + |2002\rangle + |2020\rangle + |2200\rangle\right) \\
&+ C_{111,2}\left(|02du\rangle - |02ud\rangle + |0d2u\rangle + |0du2\rangle - |0u2d\rangle - |0ud2\rangle + |20du\rangle - |20ud\rangle\right. \\
&\qquad + |2d0u\rangle + |2du0\rangle - |2u0d\rangle - |2ud0\rangle + |d02u\rangle + |d0u2\rangle + |d20u\rangle + |d2u0\rangle \\
&\qquad \left. + |du02\rangle + |du20\rangle - |u02d\rangle - |u0d2\rangle - |u20d\rangle - |u2d0\rangle - |ud02\rangle - |ud20\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{111-1} &= 2\sqrt{\frac{2}{3}}t \\
C_{111-2} &= \frac{J + U - 2W + \sqrt{A_3}}{4\sqrt{6}} \\
N_{111} &= \sqrt{6C_{111,1}^2 + 24C_{111,2}^2}
\end{aligned}$$