115^{th} Eigenvector

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

Irred. Representation : $\boldsymbol{\Gamma_{3,1}}$

$$E_{115} = -J + U + 10W - \frac{2\cos(\theta_1)\sqrt{A_1}}{\sqrt{3}}$$

$$\begin{aligned}
|\Psi_{115}\rangle &= |4, 0, 0, \Gamma_{3,1}\rangle \\
&= C_{115,1}\left(|0022\rangle + |0220\rangle + |2002\rangle + |2200\rangle\right) \\
&+ C_{115,2}\left(|0202\rangle + |2020\rangle\right) \\
&+ C_{115,3}\left(|02du\rangle - |02ud\rangle + |0du2\rangle - |0ud2\rangle + |20du\rangle - |20ud\rangle + |2du0\rangle - |2ud0\rangle\right. \\
&\qquad \left. + |d02u\rangle + |d20u\rangle + |du02\rangle + |du20\rangle - |u02d\rangle - |u20d\rangle - |ud02\rangle - |ud20\rangle\right) \\
&+ C_{115,4}\left(|0d2u\rangle - |0u2d\rangle + |2d0u\rangle - |2u0d\rangle + |d0u2\rangle + |d2u0\rangle - |u0d2\rangle - |u2d0\rangle\right) \\
&+ C_{115,5}\left(|dduu\rangle - |duud\rangle - |uddu\rangle + |uudd\rangle\right)
\end{aligned}$$

$$\begin{aligned}
C_{115-1} &= \frac{t\left(3(J+U-2W) - 2\sqrt{3}\cos(\theta_1)\sqrt{A_1}\right)}{3\sqrt{3}} \\
C_{115-2} &= \frac{2t\left(2\sqrt{3}\cos(\theta_1)\sqrt{A_1} - 3(J+U-2W)\right)}{3\sqrt{3}} \\
C_{115-3} &= \frac{4\cos^2(\theta_1)A_1 - 3(J+U-2W)^2}{12\sqrt{3}} \\
C_{115-4} &= \frac{3(J+U-2W)^2 - 4\cos^2(\theta_1)A_1}{6\sqrt{3}} \\
C_{115-5} &= \frac{t\left(3(J+U-2W) + 2\sqrt{3}\cos(\theta_1)\sqrt{A_1}\right)}{\sqrt{3}} \\
N_{115} &= \sqrt{4C_{115,1}^2 + 2C_{115,2}^2 + 16C_{115,3}^2 + 8C_{115,4}^2 + 4C_{115,5}^2}
\end{aligned}$$