

27th Eigenvector

$$N_e = 3 \quad s = \frac{1}{2} \quad m_s = -\frac{1}{2}$$

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

$$E_{27} = \frac{1}{3} \left(-J + 2U + 7W - 2 \cos(\theta_1) \sqrt{A_2} \right)$$

$$\begin{aligned} |\Psi_{27}\rangle &= \left| 3, \frac{1}{2}, -\frac{1}{2}, \Gamma_{3,1} \right\rangle \\ &= C_{27,1} (|02d\rangle - |0d2\rangle) \\ &+ C_{27,2} (|20d\rangle - |2d0\rangle) \\ &+ C_{27,3} (|d02\rangle - |d20\rangle) \\ &+ C_{27,4} (|ddu\rangle + |dud\rangle) \\ &+ C_{27,5} (|udd\rangle) \end{aligned}$$

$$C_{27-1} = \frac{t(-J + 3t - U + W - 2 \cos(\theta_1) \sqrt{A_2})}{\sqrt{6}}$$

$$C_{27-2} = -\frac{t(J + 3t + U - W + 2 \cos(\theta_1) \sqrt{A_2})}{\sqrt{6}}$$

$$C_{27-3} = -\sqrt{6}t^2$$

$$C_{27-4} = \frac{9t^2 + U^2 - 2J(U + 2W)}{3\sqrt{6}}$$

$$+ \left(\frac{-A_6^2 + 6W(-2J + 5U + 8W) - 12(U + 2W) \cos(\theta_1) \sqrt{A_2}}{9\sqrt{6}} \right)$$

$$C_{27-5} = -\frac{1}{3} \sqrt{\frac{2}{3}} (9t^2 + U^2 - 2J(U + 2W))$$

$$+ \left(\frac{1}{9} \sqrt{\frac{2}{3}} (A_6^2 + 6(2J - 5U - 8W)W + 12(U + 2W) \cos(\theta_1) \sqrt{A_2}) \right)$$

$$N_{27} = \sqrt{2C_{27,1}^2 + 2C_{27,2}^2 + 2C_{27,3}^2 + 2C_{27,4}^2 + C_{27,5}^2}$$