

## 32<sup>nd</sup> Eigenvector

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

Irred. Representation :  $\Gamma_{3,2}$

$$E_{32} = \frac{A_7}{3}$$

$$\begin{aligned} |\Psi_{32}\rangle &= |3, \frac{1}{2}, -\frac{1}{2}, \Gamma_{3,2}\rangle \\ &= C_{32,1} (|02d\rangle + |0d2\rangle) \\ &+ C_{32,2} (|20d\rangle + |2d0\rangle) \\ &+ C_{32,3} (|d02\rangle + |d20\rangle) \\ &+ C_{32,4} (|ddu\rangle - |dud\rangle) \end{aligned}$$

$$\begin{aligned} C_{32-1} &= \frac{1}{6}t(2J - 9t + 2U) \\ &+ \left( \frac{1}{6}t \left( 2(U - W) + (\cos(\theta_1) - \sqrt{3}\sin(\theta_1))\sqrt{A_2} \right) \right) \end{aligned}$$

$$\begin{aligned} C_{32-2} &= \frac{1}{12} \left( 2J^2 + (-11t + 2U - 2W)J + 18t^2 - 2tU + 29tW - 18UW \right) \\ &+ \left( \frac{1}{36} \left( -2A_7^2 + (-9t + 6U + 30W)A_7 - 54W(U + 2W) + 3(2J + t) \left( \sqrt{3}\sin(\theta_1) - \cos(\theta_1) \right) \sqrt{A_2} \right) \right) \end{aligned}$$

$$\begin{aligned} C_{32-3} &= \frac{1}{12} \left( -2J^2 + (7t - 2U + 2W)J + 18W(U + 2W) - t(2U + 25W) \right) \\ &+ \left( \frac{1}{36} \left( 108W^2 + 2A_7^2 + (9t - 6(U + 5W))A_7 + 3(2J - t) \left( \cos(\theta_1) - \sqrt{3}\sin(\theta_1) \right) \sqrt{A_2} \right) \right) \end{aligned}$$

$$\begin{aligned} C_{32-4} &= \frac{1}{2}t(J - 3t + U) \\ &+ \left( \frac{1}{2}t \left( U - W + \left( \sqrt{3}\sin(\theta_1) - \cos(\theta_1) \right) \sqrt{A_2} \right) \right) \end{aligned}$$

$$N_{32} = \sqrt{2} \sqrt{C_{32,1}^2 + C_{32,2}^2 + C_{32,3}^2 + C_{32,4}^2}$$