

## 72<sup>nd</sup> Eigenvector

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

Irred. Representation :  $\Gamma_{4,1}$

$$E_{72} = \frac{1}{3} \left( -J + 3t + 2U + 14W - 2 \cos(\theta_4) \sqrt{A_5} \right)$$

$$\begin{aligned} |\Psi_{72}\rangle &= \left| 3, \frac{1}{2}, \frac{1}{2}, \Gamma_{4,1} \right\rangle \\ &= C_{72,1} (|002u\rangle + |00u2\rangle - |2u00\rangle - |u200\rangle) \\ &+ C_{72,2} (|020u\rangle + |02u0\rangle - |0u02\rangle - |0u20\rangle + |200u\rangle + |20u0\rangle - |u002\rangle - |u020\rangle) \\ &+ C_{72,3} (|0udu\rangle - |0uud\rangle - |du0u\rangle - |duu0\rangle + |u0du\rangle - |u0ud\rangle + |ud0u\rangle + |udu0\rangle) \end{aligned}$$

$$C_{72-1} = -\frac{t(J + 12t + U - 2W + 2 \cos(\theta_4) \sqrt{A_5})}{3\sqrt{2}}$$

$$C_{72-2} = \frac{t(-J + 4t - U + 2W - 2 \cos(\theta_4) \sqrt{A_5})}{2\sqrt{2}}$$

$$C_{72-3} = \frac{-15t^2 - 5Ut - U^2 + J(t + 2U + 8W)}{6\sqrt{2}}$$

$$+ \left( \frac{A_{19}^2 + 6(4J - 13t - 10U - 32W)W + 6(t + 2U + 8W) \cos(\theta_4) \sqrt{A_5}}{18\sqrt{2}} \right)$$

$$N_{72} = 2\sqrt{C_{72,1}^2 + 2(C_{72,2}^2 + C_{72,3}^2)}$$