

## 180<sup>th</sup> Eigenvector

$$N_e = 5 \quad s = \frac{1}{2} \quad m_s = -\frac{1}{2}$$

Irred. Representation :  $\Gamma_{4,3}$

$$E_{180} = \frac{1}{3} \left( -J - 3t + 5U + 50W - 2 \cos(\theta_5) \sqrt{A_6} \right)$$

$$\begin{aligned} |\Psi_{180}\rangle &= \left| 5, \frac{1}{2}, -\frac{1}{2}, \Gamma_{4,3} \right\rangle \\ &= C_{180,1} (|022d\rangle + |0d22\rangle - |20d2\rangle + |220d\rangle - |22d0\rangle + |2d02\rangle - |d022\rangle - |d220\rangle) \\ &+ C_{180,2} (|02d2\rangle - |202d\rangle - |2d20\rangle + |d202\rangle) \\ &+ C_{180,3} (|2ddu\rangle - |2udd\rangle + |d2ud\rangle - |dd2u\rangle - |ddu2\rangle + |du2d\rangle - |u2dd\rangle + |udd2\rangle) \end{aligned}$$

$$C_{180-1} = \frac{1}{3} t \left( J + 6t + U - 2W - \cos(\theta_5) \sqrt{A_6} \right)$$

$$\begin{aligned} C_{180-2} &= \frac{5t^2}{2} + 3Ut + 34Wt - U^2 + J(-t + U + 8W) \\ &+ \left( \frac{1}{18} \left( -A_{22}^2 + 3(J + 4t - 3U - 34W)A_{22} + 36(17t - 13U - 72W)W \right) \right) \end{aligned}$$

$$C_{180-3} = -\frac{1}{6} t \left( -J + 12t - U + 2W - 2 \cos(\theta_5) \sqrt{A_6} \right)$$

$$N_{180} = 2\sqrt{2C_{180,1}^2 + C_{180,2}^2 + 2C_{180,3}^2}$$