The proposed shell structure

\[ h = 0 \]
\[ h = 1 \]
\[ h = 2 \]
\[ h = 3 \quad j = \frac{3}{2} \]
\[ h = 5 \quad j = \frac{3}{2}, \frac{5}{2}, \frac{7}{2} \]

This solves the magic numbers

Maria Goeppert Mayer, J. Jensen, 1949

8.1) Realistic Shell Model Calculation

\[ H = \sum_a \epsilon_a \hat{c}^+_a \hat{c}_a + \sum_{\alpha \beta} \hbar \omega_{\alpha \beta} a_{\alpha}^{\dagger} a_{\beta} + \text{terms describing excitation energies of single particles} \]