for valence shell calculations

Dominant interaction effects as fn of N (or Z) discussed in terms of

monopole interaction = $\sum V^{\text{mono}}_{j,j';\,m_t,m_t'} \; n_j^{m_t} \, n_{j'}^{m_t'}$ + interactions depending on angle / J / m

m_t for O, Ca chains

multipole components → quadrupole etc.

$$V^{\text{mono}}_{jj'm_tm_t'} = \frac{\sum_{m,m'} \langle jm\, m_t\; j'm'\, m_t' | V_{\text{2-body}} | jm\, m_t\; j'm'\, m_t' \rangle}{\sum_{m,m'} 1}$$

← includes core polarization and normal ordering

V^{mono} dominates the evolution of single-particle e.v.'s with N

Oxygen chain