Ab initio no-core shell model (NCSM) & resonating-group method (RGM)
S. Quaglioni and P. Navrátil, PRL101, 092501 (2008); PRC79, 044606 (2009)

- NCSM/RGM – dynamic & static properties of light nuclei
  - Ab initio calculations for reactions and clustering in nuclei
  - Unified description of bound, resonant and continuum states
  - Understanding of reactions for fusion-energy generation

Matrix diagonalization and eigenvector analysis
Dimensions of ~ $10^9$

The $n^{-4}$He differential cross section for 17 MeV neutrons (left) and $^{11}$Be bound spectrum (right) obtained within the NCSM/RGM compared to experimental data.