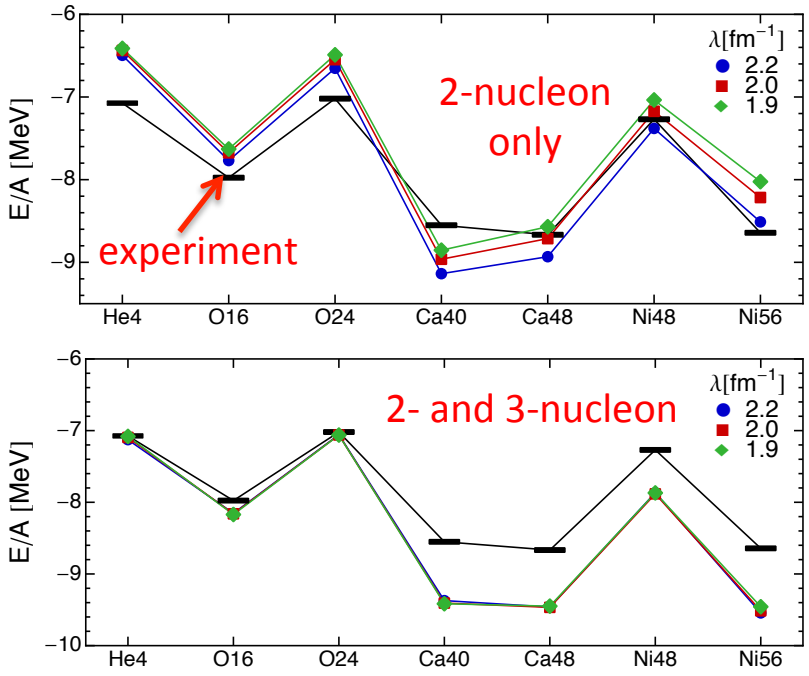
A powerful new ab-initio many-body method for nuclei: The In-Medium Similarity Renormalization Group (IM-SRG)

Objectives

- Develop the IM-SRG as an efficient, comprehensive ab initio framework
- Quantify statistical and systematic uncertainties of theoretical predictions
- Study and benchmark chiral 2- and 3-nucleon interaction effects in medium-mass nuclei

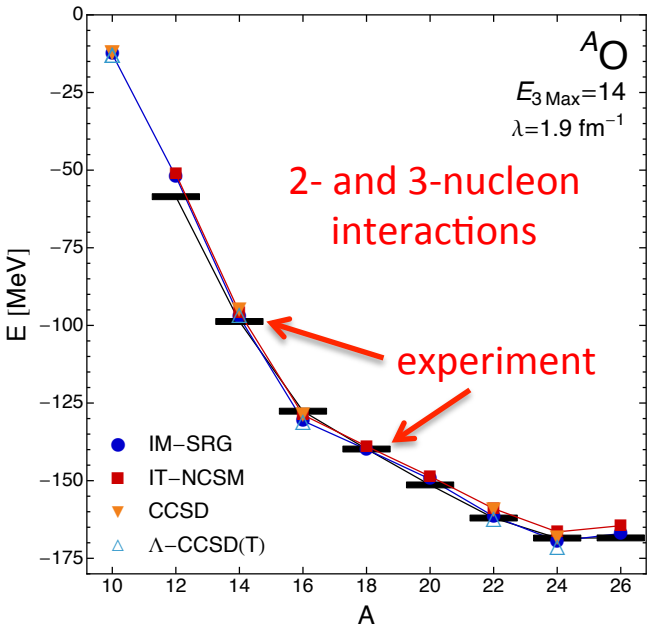
Impact

- Ab initio analysis and prediction of properties for isotopic and isotonic chains, including exotics, with quantifiable theoretical uncertainties
- Microscopic origin of Gamow-Teller quenching, effective charges, and other features
- Ab initio structure input for reaction theory and nuclear astrophysics



Accomplishments

- Complete study of closed-shell nuclei with 2- and 3-nucleon interactions
- Ab initio description of oxygen ground-state energies
- Showed 3-nucleon forces needed for correct systematics



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Reference: H. Hergert, S. Bogner et al., Phys. Rev. C 87, 034307 (2013)

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