



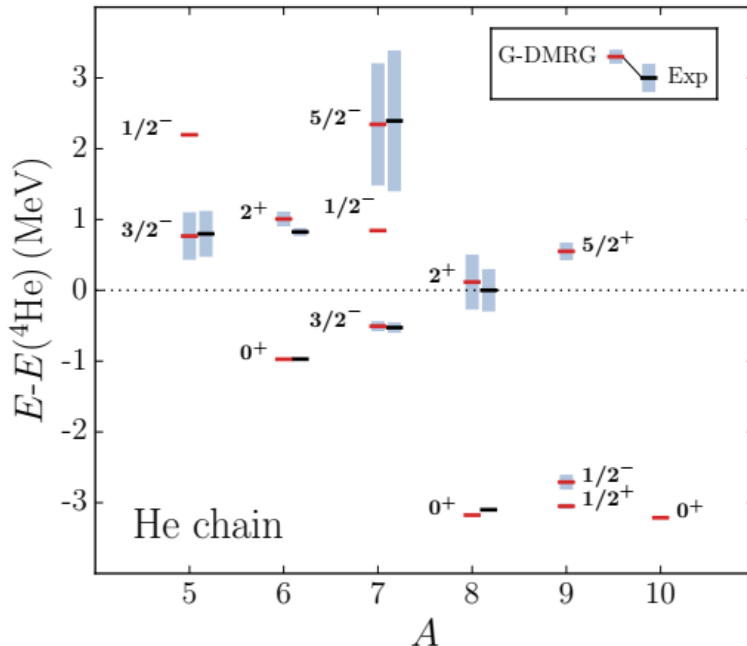
Neutron-Rich Helium Isotopes: Complex Made Simple

Objectives

- Exotic drip-line nuclei are strongly impacted by continuum effects and exhibit generic features of open quantum systems.
- Currently, both theory and experiment are inconclusive about the possible parity inversion in ^9He and the nature of the ^{10}He ground state.
- Provide reliable predictions for in ^{5-10}He using effective scale arguments and complex-energy configuration interaction method.

Impact

- Largest continuum space ever considered for the computation of the $^{9,10}\text{He}$ energy spectra.
- Parameter reduction consistent with halo EFT strategy.
- Energy spectra of ^{5-8}He computed with superb precision.
- Predicted parity inversion in ^9He , $^8\text{He}+2n$ picture for ^{10}He .
- Stimulated new experimental studies using $^8\text{He}(d,p)^9\text{He}$ and $^8\text{He}(t,p)^{10}\text{He}$ reactions.



Accomplishments

- Publication: K. Fossez, J. Rotureau, and W. Nazarewicz, [Phys. Rev. C 98, 061302\(R\) \(2018\)](https://doi.org/10.1103/PhysRevC.98.061302).
- Rapid Communication.

Figure: Energy spectra of ^{5-10}He with respect to the ^4He core. Experimental data are compared to the Gamow-DMRG calculations. Decay widths are shown as shaded bars.