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Antisymmetrized molecular dynamics for exotic nuclear structures

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Antisymmetrized Molecular Dynamics (AMD) has emerged as a powerful microscopic framework for investigating exotic structures in unstable nuclei, especially those near the drip lines. Unlike traditional mean-field models, AMD treats each nucleon as a Gaussian wave packet, allowing the emergence of deformation, clustering, and halo phenomena from first principles without assuming predefined symmetries. This work presents a comprehensive study of exotic nuclear structures—including α clustering, neutron and proton halos, skin effects, and shape coexistence—within the AMD framework. We want to explore the structural evolution in light to medium-mass nuclei, analyze the impact of weak binding and continuum coupling, and highlight the role of isospin asymmetry and shell evolution. Our results will compared with experimental observables such as radii, energy spectra, and transition strengths, demonstrating the versatility of AMD in capturing the complex dynamics of exotic nuclei. This study underscores the importance of microscopic approaches in advancing our understanding of nuclear structure at the limits of stability.

Research field of your presentation

Theoretical Low-energy nuclear physics

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