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Study of nuclear clustering and cluster decay using the modern shell model approach

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Multi-particle correlations are important in nuclear clustering, alpha decays, multi-particle transfer reactions and in other aspects of nuclear dynamics. In this presentation we use the modern configuration-interaction approach to study these questions. Using algebraic models and some of the most advanced realistic shell model Hamiltonians, we explore the alpha spectroscopic factors for low-lying states, study the distribution of clustering strength, and discuss the structure of an effective 4-body operator describing the in-medium alpha dynamics in the multi-shell valence configuration space. Sensitivity of alpha clustering to the components of an effective Hamiltonian, which includes its collective and many-body components, will be discussed. We compare our results with the experimentally available data on alpha decay and cluster-transfer reactions.

Notes

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