

Abstract Submitted
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Effective three-body monopole interaction in the valence cluster approximation for the p-shell SYBIL DE CLARK, ALEXANDER LISETSKIY, BRUCE BARRETT, MICHAEL KRUSE, University of Arizona — No-core shell model calculations of binding energies using the two-body cluster approximation can omit higher-body correlations in small model spaces. To try and remedy this, we include higher-body correlations up to six nucleons in a two-body effective hamiltonian suitable for standard shell model (SSM) calculations, by performing two successive unitary transformations. The obtained effective hamiltonian contains a core, one-body and two-body pieces (due respectively to interactions among the core nucleons, between a valence and core nucleons and between two valence nucleons). We investigated the size of these interactions as a function of isospin for nuclei with $A = 8$ to 16 and compared the ab-initio results with the SSM results. The differences grow larger with A , indicating the need for three- and higher-body terms in the effective hamiltonian with increasing A . Taking the effective three-body monopole interaction into account for $A > 7$, we found greatly improved results.

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