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Effective Interactions for pf Shell from the No Core Shell Model[1]

ERDAL DIKMEN, Suleyman Demirel University, The University of Arizona, ALEXANDER LISETSKY, BRUCE BARRETT, The University of Arizona, PETR NAVRÁTIL, Lawrence Livermore National Laboratory, JAMES VARY, Iowa State University — Following the ideas of the Tucson nuclear theory group for the extension of the No-Core Shell Model (NCSM) approach to sd-shell nuclei [1], we show how a NCSM calculation for ^{42}Ca in a $2\hbar\Omega$ model space can yield two-body effective interactions for the pf-shell. We demonstrate how the effective Hamiltonian derived in the $2\hbar\Omega$ NCSM at the 2-body cluster level should be modified to properly account for the many-body correlations produced by truncating to a single major shell. The pf-shell two-body effective interactions for ^{42}Ca, obtained by direct projection, are used to reproduce the results of large scale NCSM for other Ca isotopes.
1. B.R. Barrett et al, DNP 2007 abstract.

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