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Effective Shell-Model interactions from the No-Core Shell-Model¹ MICHAEL KRUSE, ALEXANDER LISETSKIY, BRUCE BARRETT, University of Arizona, PETR NAVRÁTIL, Lawrence Livermore National Laboratory, JAMES VARY, Iowa State University — No-Core shell model calculations (NCSM) for heavier nuclei, partially filling the sd-shell is a challenging problem. This is due to the exponential growth in the dimension of the Hilbert space. It is desirable to find an effective interaction, which utilizes a much smaller model space, that accurately reproduces NCSM results. Core shell-model calculations employ either empirical or theoretical effective 2-body matrix elements (TBME) that neglect the many body-correlations present. We show how a NCSM investigation in a $4\hbar\Omega$ model space can yield effective TBME specific for the sd-shell, which accurately reproduce the many-body correlations present in the original calculation. TBME for ¹⁸F are obtained by direct projection, and their capability to reproduce large scale NCSM calculations is demonstrated for F, Ne and Na isotopes.

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