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**Effective interactions for sd-shell space from *ab-initio* approach**

A.F. LISETSKIY, M.K.G. KRUSE, B.R. BARRETT, U. Arizona, P. NAVRATIL, LLNL, I. STETCU, LANL, J.P. VARY, Iowa State U. — Insight gained from projected No Core Shell Model calculations in the p-shell [1] can now be utilized to obtain information about and to derive effective Standard Shell Model (SSM) single particle energies (SPEs) and two-body matrix elements (TBMEs) for heavier nuclei. Here we report on a NCSM investigation in  $2\hbar\Omega$ ,  $4\hbar\Omega$  and  $6\hbar\Omega$  model spaces for  $A = 17, 18$  in order to determine effective interactions for the sd-shell employing valence cluster expansion method. The validity range of the two-body valence cluster truncation is demonstrated by SSM results for binding energies and spectra of  $A \geq 19$  nuclei. [1] A. F. Lisetskiy, B. R. Barrett, M. K. G. Kruse, P. Navrátil, I. Stetcu, and J. P. Vary, Phys. Rev. C 78, 044302 (2008). <sup>†</sup>Supported in part by NSF grant PHY-0555396; <sup>‡</sup> Prepared by LLNL under contract No. DE-AC52-07NA27344; \* Supported in part by DOE No. DE-AC52-06NA25396; \*\* Supported in part by DOE grant DE-FG02-87ER40371.

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