Abstract Submitted
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Deriving the nuclear shell model from first principles[1] BRUCE R. BARRETT, U Arizona, ERDAL DIKMEN, Suleyman Demirel U, Isparta, Turkey, JAMES P. VARY, PIETER MARIS, Iowa State U, ANDREY M. SHIROKOV, Lomonosov Moscow State U, Russia, ALEXANDER F. LISETSKIY, Mintec Inc., Tucson, AZ — The results of an 18-nucleon No Core Shell Model calculation, performed in a large basis space using a bare, $soft$ NN interaction, can be projected into the $0\hbar\omega$ space, i.e., the *sd*-shell. Because the 16 nucleons in the ^{16}O *core* are $frozen$ in the $0\hbar\omega$ space, all the correlations of the 18-nucleon system are captured by the two valence, *sd*-shell nucleons. By the projection, we obtain microscopically the *sd*-shell 2-body effective interactions, the core energy and the *sd*-shell s.p. energies. Thus, the input for standard shell-model calculations can be determined microscopically by this approach. If the same procedure is then applied to 19-nucleon systems, the *sd*-shell 3-body effective interactions can also be obtained, indicating the importance of these 3-body effective interactions relative to the 2-body effective interactions. Applications to A=19 and heavier nuclei with different intrinsic NN interactions will be presented and discussed.

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