

# Low-energy Phase Shifts using NCSM with Three NN Interactions

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A SS HORSE (Single State Harmonic Oscillator Representation of Scattering Equation) method has been proposed [1] to calculate phase shifts of scattering as well as energies and widths of resonances. This method can produce a phase shift directly from no-core shell model results without additional complexities. The applicability of the present approach has been tested and the low-energy phase shifts of scattering of nucleons by  $\alpha$  particles with JISP16 NN interaction have been calculated [1] by I. A. Mazur, A. M. Shirokov, A. I. Mazur and J. P. Vary using this method. Therefore, as part of this ongoing research, we have calculated low-energy phase shifts of  $n\alpha$  scatterings, which use the results of No-Core Shell Model (NCSM) [2] calculations for  ${}^5\text{He}$  with three NN interactions; JISP16 [3], NNLO<sub>OPT</sub> [4] and Daejeon16 [5]. The results are compared with  $n\alpha$  experimental phase shifts.

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