

Analysis of Elastic Scattering Observables Calculated with Different NN Interactions

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Nuclear scattering experiments have been used to provide detailed information about the structure of nuclei for decades. Scattering experiments help in understanding the behavior of neutrons and protons within the nucleus. They provide insights into the energy levels, spin states, and magnetic moments of nucleons, which are important for nuclear physics and applications in reactor design and nuclear medicine. Understanding nucleon-nucleus interactions is vital for interpreting processes in stellar environments and supernovae.

We calculated and present nucleon-nucleus effective interactions and elastic scattering observables in the leading-order spectator expansion for closed and open shell nuclei, like He4, C12, and O16, at projectile energies between 65 and 160 MeV, using three different nucleon-nucleon (NN) interactions (up to next-to-next-to-leading order). The one-body density matrix used in the effective interaction, has been constructed within the framework of the no-core shell model