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Study of three-body force via 12C + 12C scattering at 100A MeV

The angular distribution of 12C + 12C scattering at an incident energy of 100A MeV has been measured. The elastic and inelastic scatterings in 12C to the excitation energies of up to ~15 MeV were measured simultaneously for the first time with the high-resolution Grand Raiden spectrometer at the Research Center for Nuclear Physics (RCNP). The angular distributions of the elastic scattering to the ground state and inelastic scattering to the 4.44MeV excited state were precisely obtained in the angular range of 1.0–7.5 degrees with a step of 0.1 degree. Additionally, the angular distribution was obtained for the sum of the cross sections for excitation energies above the 4.44MeV state up to 11MeV. Those combined data provide a means to study the effects of channel coupling on the elastic cross section. The observed angular distributions are compared with theoretical calculations based on three double-folding models with complex G-matrix interactions, the CEG07b, MPa, and ESC models. The importance of three-body repulsive forces included in the CEG07b and MPa models is discussed.

Summary

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