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Analysis of Phenomenological and Hybrid Optical Models for Deuterium Scattering at 100 MeV/u KEVIN HOWARD, DARSHANA PATEL, UMESH GARG, University of Notre Dame — The elastic and inelastic cross-section measurements, taken at the Research Center for Nuclear Physics, Osaka University, Japan, have been analyzed for a range of nuclei to the end of developing optical models for deuterium scattering. For the first time, formulations of optical models which explicitly account for nucleon-nucleon pairing interactions viz. a double folding formalism have been employed for elastic fitting and DWBA calculations for low lying discrete states. The validities of these models in the range of masses $24 < A < 116$ were assessed. Preliminary results indicate that the double folding optical model has success in the low-mass region wherein the phenomenological model is unable to produce calculations which agree with experiment. In particular, accounting for nucleon-nucleon pairing interactions is able to reproduce inelastic angular distributions in DWBA calculations while simultaneously verifying adopted $B(E2)$ and $B(E3)$ values from the literature. Results of both models will be presented and compared.

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