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Testing formalisms for deuteron breakup and transfer reactions[1]
NEELAM UPADHYAY, NSCL, Michigan State University, USA, ARNOLDAS DELTUVA, Centro de Fisica Nuclear, Universidade de Lisboa, Portugal, FILOMENA NUNES, NSCL, Michigan State University, USA — The Continuum Discretized Coupled Channels (CDCC) [1] method is a well established theory for the direct nuclear reactions which includes breakup to all orders. In CDCC, the 3-body problem is solved by expanding the full wave function in terms of a complete basis of the projectile's bound and continuum states. Alternatively, the 3-body problem can be solved exactly within the Faddeev formalism [2,3] which explicitly includes breakup and transfer channels to all orders. Thus with the aim to understand how the CDCC compares with the exact 3-body Faddeev formulation, we study scattering of deuterons on ^{10}Be, ^{12}C, and ^{48}Ca at low and intermediate energies. We calculate elastic, breakup and transfer observables. Results indicate that for transfer cross section at low energy, CDCC is in better agreement with the Faddeev formalism. The discrepancy in two methods increases with beam energy. [1] N. Austern *et al.*, Phys. Rep. **154**, 125 (1987). [2] L. D. Faddeev, Zh. Eksp. Theor. Fiz. **39**, 1459 (1960). [3] E. O. Alt, P. Grassberger, and W. Sandhas, Nucl. Phys. **B2**, 167 (1967).

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