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Faddeev approach to deuteron-induced nuclear reactions[1] LINDA HLOPHE, SOFIA QUAGLIONI, Lawrence Livermore National Laboratory — Deuteron-induced nuclear reactions are an essential tool for probing the structure of stable and rare isotopes as well as extracting quantities of astrophysical interest such as (n, γ) cross sections on unstable targets. While Faddeev techniques enable the exact description of the dynamics within a three-body model, their application to deuteron-induced reactions on rare isotopes is complicated by the unavailability of nucleon scattering data needed to constrain the corresponding effective nucleon-target interactions. Moreover, the use of phenomenological potentials with ambiguous off-shell properties introduces further uncertainties. In order to understand and quantify the uncertainties, we apply the Faddeev theory to light deuteron-nucleus systems that are within the reach of state-of-the-art ab initio reaction theories. We present Alt-Grassberger-Sandhas (AGS) momentum space calculations of observables for deuteron-induced reactions on ^{4}He using phenomenologically constrained effective 3-body Hamiltonians. In addition, we explore the use of microscopic interactions derived from the no-core shell model (NCSM) coupled with the resonating group method (RGM).

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Linda Hlophe
Lawrence Livermore National Laboratory

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