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# Quantifying uncertainties due to irreducible three-body forces in deuteron-nucleus reactions

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Deuteron-induced nuclear reactions are typically described within a Faddeev three-body model consisting of a neutron, proton, and the nucleus interacting through pairwise forces. While Faddeev techniques enable the exact description of the three-body dynamics, their predictive power is limited in part by the omission of irreducible three-body nucleon-nucleon-nucleus forces. An alternative approach for describing deuteron-nucleus reactions is ab initio theory, where the system is described from first principles, starting from individual nucleons and the interactions amongst them. We adopt the ab initio no-core shell model (NCSM) coupled with the resonating group method (RGM) to compute microscopic nucleon-nucleus interactions and use them to describe deuteron-induced reactions by means of momentum space Faddeev calculations, beginning with $^{2}$H+$^{4}$He scattering. Simultaneously, we also carry out ab initio calculations of the same deuteron- induced scattering process within the NCSM/RGM approach. I will show that the effects of irreducible three-body forces arising from antisymmetrizing the six-nucleon system are significant and impact bound state energies as well as cross sections. This observation paves the way for improved calculations of deuteron-nucleus reactions based on three-body Faddeev models.

## Attendance Type

In-person

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