Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Advancing Few-Body Methods for Nuclear Reactions SIMON SUNDBERG[1], FRIB at Michigan State University —

Nuclear Physics was established with Rutherford's scattering experiment which used an alpha-beam to study nuclei. Today similar scattering reactions are used to study unstable nuclei structure. Given the wide range of applications of nuclear physics across the scientific landscape including energy, medicine, agriculture, astrophysics and more, it is important to have a robust theoretical framework for reactions.

Some important reactions beyond elastic scattering include breakup (where the incoming projectile nucleus breaks up in two or more fragments) and transfer (where a nucleon or nucleon cluster is transferred between the projectile and the target). If the degrees of freedom of a system allow it, an effective few-body model can be used. Our group is interested in deuteron induced reactions which can be mapped onto a three-body problem with neutron+proton+nucleus.

We introduce several few-body techniques used to study reactions and their connection to nuclear structure. Specific applications will be shown using the Faddeev approach, since this framework offers exact solutions to the nuclear scattering problem. An accessible discussion of this method will be provided, as well as an overview of new developments in the pipeline.

[1]I have a second email that is used for my research, sundberg@frib.msu.edu, I would prefer to be contacted here if possible. The other account was set up before my employment at the FRIB, and is used as a multiple purpose school email.

Simon Sundberg
FRIB at Michigan State University

Date submitted: 29 Jul 2020 Electronic form version 1.4