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Nuclear Reactions – a Challenge for Few- and Many-Body Theory[1]

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It is a particular exciting time for rare isotope science. As the engineering and construction issues for the new facility for rare isotopes (FRIB) are tackled, the physics community prepares to address the challenging science. A large fraction of the FRIB program will involve direct reactions with rare isotope beams, reactions, which leave a good part of the beam nuclei intact. Thus, the theory of nuclear reactions is central to understanding experiments at FRIB. The reliable prediction of reactions with rare isotopes will be major piece in the theory effort for FRIB. Over the last decade tremendous progress has been in made in exact descriptions of nuclear few-body systems as well as in nuclear structure calculations. The expertise gained in both of these areas will be essential to face the challenge in describing nuclear reactions with rare isotopes. This presentation will use a few examples to illustrate, where the synergy of few- and many-body theory will be able to address the challenges nuclear reactions with rare isotopes faces.

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