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Improving Inelastic Scattering Descriptions: Reaction Theory for Deformed Targets with the QRPA[1] EMANUEL CHIMANSKI, Lawrence Livermore National Laboratory, WALID YOUNES, Lawrence Berkeley National Laboratory, JUTTA ESCHER, Lawrence Livermore National Laboratory — Inelastic scattering is widely used to determine nuclear structure properties, but also provide indirect information on nuclear reaction cross sections. To understand the origin of heavy elements one requires knowledge of neutron capture cross sections for many exotic isotopes. These data are difficult to be obtained experimentally, requiring theoretical supplementation to the existing measurements, or even provide them if necessary. However, current inelastic scattering calculations rely on simplified models that are limited in precision and predictability. Standard approaches assume spherical targets and make statistical assumptions that are often difficult to justify. Many nuclei of interest are deformed and the associated degrees of freedom increase the complexity of the calculations. To improve the predictive power of nuclear reaction calculations, we are combining a state-of-the-art nuclear structure approach with a modern reaction description. Specifically, we are extending the transition density formalism to reactions with deformed targets. The excited states are taken in the deformed QRPA and angular momentum is restored. We will present preliminary results for representative deformed system. Our objective is to obtain transition potentials between different states.

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