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Combining State-of-Art Nuclear Structure Theory with Modern Reaction Descriptions: Nucleon-Induced Reactions[1] EMANUEL CHIMANSKI, JUTTA ESCHER, Lawrence Livermore National Laboratory, WALID YOUNES, Lawrence Berkeley National Laboratory — Nucleon-induced reactions have been used to determine nuclear structure properties and indirect information on nuclear reaction cross sections. Nucleosynthesis as well as modern medical applications rely on capture and inelastic-scattering cross section information that are difficult and sometimes impossible to obtain experimentally. Therefore, theoretical models are required to supplement or directly provide the necessary information. Current reactions calculations rely on simplified models, commonly developed for spherical targets, with limited precision and predictability. In reality, most nuclei of interest are deformed and the complexity of such systems challenges the standard models available. 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 include reactions with deformed targets. Nuclear excitations are described within a deformed QRPA framework and angular momentum restoration techniques are applied. Our objective is to obtain transition potentials for different exited states and we will present the preliminary results for representative cases.

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