

Abstract Submitted
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Improved Inelastic Scattering Descriptions for Nuclear Data Evaluations, Nuclear Structure and Reaction Studies¹ EMANUEL CHIMANSKI, JUTTA ESCHER, LLNL, BRETT CARLSON, ITA, ROBERTO CAPOTE, ARJAN KONING, IAEA — Inelastic scattering reactions play a crucial role for data evaluations. Also, they can potentially be used in surrogate reaction applications, which aim at indirectly determining cross sections for reactions on unstable nuclei, e.g. for nuclear astrophysics simulations. This work aims at improving quantum models for pre-equilibrium reactions. Standard descriptions are based on projectile-target interactions with the reaction inducing a wide energy range of target excitations. The quantum models developed so far are limited to a single particle emission process. We studied various properties of RPA excited states of nuclei. We find the strength functions to be dominated by well-localized particle-hole states. This allows us to determine the proper weight for the p-h transition amplitudes for cross section calculations. We obtained expressions for up to two particles in the continuum for one-step amplitudes, and up to three particles in the continuum for two-step amplitudes. We find simple expressions that allow for a systematic implementation of multiple-particle emission. We present results and discuss the limits of one-step amplitudes. Planned extensions using QRPA structure information for both spherical and deformed nuclei will be considered.

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