

ABSTRACT

Charged Particle Reaction Modeling via Proton Bombardment on
Natural Antimony - Applications and Implications for Nuclear Level
Densities and Optical Model Development

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Cross sections for Sn-117m and Te-119m have been measured via proton bombardment on Sb to determine the viability of this production route for medical applications. In addition to these measurements, several other cross sections were calculated to be used in improving predictive modeling with nuclear data simulations, in this case TALYS. Previous work conducted by (Fox et al., 2021) informed changes to optical model parameters for pre-equilibrium reactions. In addition to these modifications, changes to residual interaction parameters based on nucleon-nucleon interactions were explored. The nuclei studied in these experiments contain several isomers due to population of the $h_{11/2}$ orbital, leading to significant spin-parity differences relative to the ground state. This informed adjustments to the spin cut-off parameter, which required considerable adjustment. This work also indicates that changes are needed in the imaginary component of the neutron optical potential to best reproduce neutron emission over this experimental energy range.