

title: The $^{150}\text{Sm}(t, {}^3\text{He})$ and $^{150}\text{Nd}({}^3\text{He}, t)$ reactions and applications for the 2ν - and $0\nu\beta\beta$ double beta decay of ^{150}Nd

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abstract: The NSCL charge-exchange group has ongoing programs to measure the spin-isospin response of nuclei. This talk will focus on measurements of the $^{150}\text{Sm}(t, {}^3\text{He})^{150}\text{Pm}^*$ and $^{150}\text{Nd}({}^3\text{He}, t)^{150}\text{Pm}^*$ reactions, which are essential for studies of the two-neutrino and zero-neutrino double beta ($0\nu\beta\beta$) decay of ^{150}Nd . ^{150}Nd is one of the main candidates for $0\nu\beta\beta$ decay detection experiments. Accurate nuclear matrix elements are needed to design detectors for $0\nu\beta\beta$ decay and to extract information about the neutrino mass scale and hierarchy from resulting experimental data. Nuclear charge-exchange experiments play an important role in constraining the theories used to predict these matrix elements by providing Gamow-Teller and higher order multipole transition strengths to the virtual intermediate nucleus. In addition to its applications for $0\nu\beta\beta$ decay, investigation of the spin-isospin response of heavy, deformed nuclei is important for future work on rare isotopes.