

STUDIES OF NEUTRON-RICH NUCLEI WITH (d,p) REACTIONS IN INVERSE KINEMATICS AT THE HRIBF*

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Spectroscopic information about nuclei around the closed shells at $N=50$ and $N=82$ is important for constraining the nuclear shell model and understanding the production of heavy nuclei in supernovae. At ORNL's Holifield Radioactive Ion Beam Facility (HRIBF), beams of neutron-rich radioactive nuclei are now being produced via proton induced fission of a uranium carbide target. These beams are being used to study the (d,p) reaction in inverse kinematics to extract spectroscopic information about the ground state and low-lying excited states of neutron-rich nuclei.

Results from our recent measurements using radioactive beams of ^{82}Ge and ^{84}Se which probe the structure at the $N=50$ shell gap will be shown. Prior to our measurement, the only available data on ^{83}Ge was the half-life[1]. Data will be presented that determine the ground state Q -value, energy of the first excited state and spectroscopic information on these low-lying states in ^{83}Ge .

Results from our recent test experiment using a stable beam of ^{124}Sn to develop techniques for measuring the ^{132}Sn (d,p) reaction will also be presented. Results will be shown in comparison to data from the same reaction performed in normal kinematics on a stable ^{124}Sn target in the 1970's [2,3] and to DWBA calculations. The sensitivity of the technique to the ℓ -value of the state in the final nucleus will be demonstrated.

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