

Abstract Submitted  
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**Developing a surrogate for neutron capture reactions with rare isotope beams**<sup>1</sup> J.A. CIZEWSKI, P.D. O'MALLEY, W.A. PETERS, Rutgers, R. HATARIK, UC Berkeley, J. ESCHER, LLNL — Neutron capture reactions on unstable nuclei have important implications for nuclear astrophysics and applications of nuclear science, e.g., nuclear energy and national security. Given the limited capabilities to measure such reactions directly (because of intense background from targets with half-lives shorter than 100 days), it is important to determine if a surrogate reaction is effective and, if so, develop the techniques for these reactions with beams of rare isotopes. The neutron-transfer reaction, (d,p), in which the final nucleus is populated at excitations above the neutron separation energy and the gamma-ray de-excitation is measured, is a promising candidate. Not only does this reaction transfer relatively little angular momentum, in inverse kinematics the reaction protons are preferentially emitted at back angles in the laboratory. This talk will summarize the efforts to benchmark the (d,p $\gamma$ ) reaction as a surrogate for neutron capture and the experimental techniques that are being developed to measure the (d,p $\gamma$ ) reaction with beams of rare isotopes.

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