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Particle-γ Coincidence Measurements of Neutron Transfer Reactions on Neutron-rich Nuclei[1] MICAH JOHNSON, A. KRONENBERG, ORAU, D.W. BARDAYAN, J.C. BLACKMON, C.D. NESARAJA, D.C. RADFORD, M.S. SMITH, ORNL, J.A. CIZEWSKI, K.L. JONES, S.D. PAIN, J.S. THOMAS, Rutgers University, J.A. HOWARD, R.L. KOZUB, B.A. SCHWER, Tennessee Tech., R.J. LIVESAY, Colorado School of Mines — Neutron-transfer measurements with (d,p) reactions provide important nuclear structure information such as excitation energies, angular momenta and spectroscopic strengths for neutron single-particle states. Such information can also be used to inform neutron-capture rates for nuclei far from stability, where direct measurements of the (n,γ) reaction are not possible because of the short life-times. In particular, neutron-capture measurements on neutron-rich nuclei are important for understanding astrophysical phenomena such as r-process nucleosynthesis. Using inverse kinematics for (d,p) reactions enables neutron-transfer measurements to be made using beams of neutron-rich nuclei, which cannot be made into targets. Measurements of γ-rays using high-resolution γ-ray detectors in coincidence with (d,p) reaction protons enables more accurate energy determination of excitations and provides further information on γ-ray strengths, which are important when extracting direct contributions to neutron-capture rates. Prospects for (d,pγ) measurements in inverse kinematics with neutron-rich beams at the HRIBF at ORNL will be discussed.

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