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Particle-gamma measurements for nuclear astrophysics[1] S.D. PAIN, Oak Ridge National Laboratory, A. RATKIEWICZ, Rutgers University, D.W. BARDAYAN, University of Notre Dame, T. BAUGHER, Rutgers University, J.C. BLACKMON, Louisiana State University, S. BURCHER, Rutgers University, K.A. CHIPPS, Oak Ridge National Laboratory/University of Tennessee, J.A. CIZEWSKI, S. HARDY, Rutgers University, K.L. JONES, University of Tennessee, R.L. KOZUB, Tennessee Technological University, I. MARSH, Oak Ridge National Laboratory, B. MANNING, Rutgers University, W.A. PETERS, Oak Ridge National Laboratory/University of Tennessee, D. SEWERYNIAK, Argonne National Laboratory, C. SHAND, Rutgers University, M.S. SMITH, Oak Ridge National Laboratory, S. ZHU, Argonne National Laboratory — Transfer reactions in inverse kinematics are one of the few probes available to study in detail the single-particle structure of neutron-rich nuclei involved in r-process nucleosynthesis. Measurement of de-excitation gamma rays in coincidence with the charged reaction products can aid significantly in resolving the states populated. In addition, the measurement of gamma rays can provide constraints on numerous other properties, such as spin-parities, branching ratios and lifetimes of levels, and is critical to the surrogate technique for determining statistical neutron-capture cross sections. The Gammasphere ORRUBA Dual Detectors for Experimental Structure Studies (GODDESS) is a system designed for such measurements with beams from the ATLAS facility at Argonne National Laboratory. Details of the system and the first planned measurements will be presented.

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