Abstract Submitted
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Informing the level scheme of ^{95}Mo through ^{95}Mo(d,pγ)^{96}Mo with GODDESS[1] HEATHER GARLAND, J.A. CIZEWSKI, A. LEPAILLEUR, G. SEYMOUR, H. SIMS, Rutgers University, S.D. PAIN, ORNL, A. RATKIEWICZ, LLNL, GODDESS COLLABORATION — Nearly half of the heavy elements are created through the rapid neutron capture process. The Surrogate Reaction Method (SRM), in which (e.g.) a (d,p) reaction is measured, was designed to constrain important (n,γ) cross sections on short-lived isotopes, many of which are important to the r process. The use of SRM with deuteron-induced reactions requires a modern reaction model, which includes deuteron break-up, to account for the discrepancy in spins and parities populated via the surrogate reaction versus those populated via the neutron capture reaction. Last year, (d,p) reactions have been validated as a surrogate for (n, γ) reactions in normal kinematics [1]. To extend the benchmarking of the SRM to inverse kinematics, a (d,pγ) measurement with a ^{95}Mo beam was performed using GODDESS (Gammasphere ORRUBA: Dual Detectors for Experimental Structure Studies) at ATLAS. This is the first measurement of a (d,p) reaction to states below 4 MeV in ^{96}Mo. By combining the (d,p) measurement with coincident gamma-rays, additions to the level scheme of ^{96}Mo can be made. Preliminary results of particle-gamma coincidences from protons populating states below and above the neutron separation energy in ^{96}Mo will be presented. [1] A. Ratkiewicz et al. Phys. Rev. Let., **122** 052502 (2019).

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