Abstract Submitted
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Studying the Energy Levels of ^{39}Ca for the ^{38}K(p,γ)^{39}Ca Reaction Rate[1] MATTHEW HALL, Oak Ridge National Laboratory, DANIEL BARDAYAN, University of Notre Dame, TRAVIS BAUGHER, ALEX LEPAILLEUR, Rutgers University, STEVEN PAIN, Oak Ridge National Laboratory, ANDREW RATKIEWICZ, Lawrence Livermore National Laboratory, GODDESS COLLABORATION — It has been established that nuclei up to $A = 40$ are produced in nova explosions, but there exist discrepancies between theory and observation regarding their abundances. The ^{38}K(p,γ)^{39}Ca reaction rate has been identified as a large source of uncertainty at the endpoint of nova nucleosynthesis and could be key in understanding this discrepancy. To reduce its uncertainty, the ^{40}Ca(^{3}He,α) ^{39}Ca reaction was measured at Argonne National Laboratory using GODDESS (Gammasphere ORRUBA Dual Detectors for Experimental Structure Studies) to study the energy levels in ^{39}Ca. γ rays from the decay of excited states in ^{39}Ca were measured in coincidence with alpha particles from the reaction. In total, 23 new γ-ray transitions were found in ^{39}Ca, including new γ-decay information for three $J^{\pi} = 5/2^{+}$ excited states that are important in the calculation of the reaction rate. These decay results, as well as how these results affect the reaction rate, will be presented.

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