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Spectroscopic study of the 38Kg,m(d,p) reaction at ReA3 for nova nucleosynthesis[1] S.D. PAIN, K.A. CHIPPS, ORNL, R.L. KOZUB, Tennessee Technological University, A. LAPIERRE, C. SUMUTHRARACHCHI, A. VILLARI, NSCL, ORRUBA COLLABORATION, REA TEAM — In ONe nova, the 38K(p,γ) bottleneck reaction impacts the nucleosynthetic flow to the Ca region, thereby affecting the final abundances around the endpoint of nova nucleosynthesis. Observations suggest that, in contrast to calculations, isotopic abundances of Ar and Ca appear to be enhanced with respect to solar abundances. Though many levels have been identified within the Gamow window, there is limited constraint on most of the resonance strengths, with only a single resonance with a well-constrained resonance strength from direct measurement. Thus far, experiments have focused on ℓ=0 resonances, but as low-lying resonances lie at 6 MeV excitation in 39Ca, ℓ=1 states from the fp shell could also potentially contribute to the reaction rate. The situation is further compounded by a long-lived 38K isomer; potentially both this and the ground state play a role in the nucleosynthetic network. We utilized a beam containing both ground-state and isomeric components, to measure the 38K(d,p) reaction at the ReA3 facility. By constraining spin assignments and spectroscopic strengths of single neutron states in 39K, proton resonance strengths in 39Ca can be informed via mirror symmetry. Details of the experiment, the beam, and online results will be presented.

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