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Spin Assignments of excited states in ^{23}Mg through a ^{24}Mg(p,d)^{23}Mg reaction SABRINA STRAUSS, Rutgers, D.W. BARDAYAN, J.C. BLACKMON, ORNL, K.Y. CHAE, ORNL, U of TN, K.A. CHIPPS, CO School of Mines, J.A. CIZEWSKI, R. HATARIK, Rutgers, K.L. JONES, U of TN, R.L. KOZUB, TTU, J.F. LIANG, ORNL, C.D. NESARAJA, ORNL, U of TN, P.D. O'MALLEY, Rutgers, C. MATEI, ORAU, B.H. MOAZEN, U of TN, S.D. PAIN, Rutgers, S.T. PITTMAN, U of TN, M.S. SMITH, ORNL — The ^{22}Na(p,γ)^{23}Mg reaction is part of the hot NeNa cycle, which is important for the nucleosynthesis of Ne and Na isotopes in stellar explosions such as novae. Observation of the characteristic γ-ray line at 1275 keV from the decay of ^{22}Na is a promising mechanism to constrain nova models. As the reaction proceeds through resonances in ^{23}Mg, the properties of ^{23}Mg levels above the proton threshold are important. We measured the ^{24}Mg(p,d)^{23}Mg reaction using 41 and 41.5 MeV proton beams and a 500 μg/cm^2 ^{24}Mg target at the Holifield Radioactive Ion Beam Facility to better constrain the spins of important levels. Reaction deuterons were detected and identified in the segmented 16-strip silicon detector array SIDAR. By comparing the angular distributions and DWBA calculations, we are able to constrain the spins and parities of levels in ^{23}Mg. Experimental details and a status report on the analysis will be presented. *This work is supported in part by the US DOE and the NSF.

Sabrina Strauss
Rutgers

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