Cross Section Measurements of the Reaction $^{23}$Na(p,γ)$^{24}$Mg

AXEL BOELTZIG, RICHARD JAMES DEBOER, KEVIN MACON, MICHAEL WIESCHER, Univ., of Notre Dame and Joint Inst., for Nuclear Astrophysics, ANDREAS BEST, GIANLUCA IMBRIANI, Univ., of Naples and INFN Section of Naples, GYÖRGY GYÜRKY, Inst., for Nuclear Research (MTA ATOMKI), FRANK STRIEDER, South Dakota School of Mines & Technology — The reaction $^{23}$Na(p,γ)$^{24}$Mg can provide a link from the NeNa to the MgAl cycle in stellar burning and is therefore of interest in nuclear astrophysics. To determine the reaction rates at stellar temperatures, new cross section measurements at low proton energies have been performed recently [1], and further experiments are underway [2]. The current cross section data implies that the reaction rate up to temperatures of 1 GK is determined by a few narrow resonances and direct capture. Complementary to these experimental efforts at low proton energies, cross section measurements at higher energies can help to constrain the direct capture and broad resonance contributions to the cross section and reduce the uncertainty of the extrapolation towards stellar energies. In this paper we report an experiment to measure the $^{23}$Na(p,γ)$^{24}$Mg cross section with a solid target setup at the St. ANA 5U accelerator at the University of Notre Dame. The experiment and the current status of data analysis will be described.


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