Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Study of the ^{18}Ne(α,p)^{21}Na reaction with ANASEN and its importance in the breakout from the hot CNO cycle[1] MARIA ANASTASIOU, INGO WIEDENHOEVER, L.T. BABY, N. RIJAL, J.J. PARKER, Florida State Univ, J.C. BLACKMON, K.T. MACON, D.S. GONZALEZ, Louisiana State Univ, Y. KOSHCHIY, G. ROGACHEV, Texas AM Univ, J. BELARGE, A. KUCHERA, National Superconducting Cyclotron Laboratory — The ^{18}Ne(α,p)^{21}Na reaction provides a pathway for breakout from the hot CNO cycles to the rp-process in x-ray bursts and other astrophysical scenarios. However, the actual conditions under which the breakout occurs depend critically on the thermonuclear reaction rate. This rate has not been sufficiently determined yet over stellar temperatures on x-ray bursts and previous studies contradict each other in a significant way. We study the direct ^{18}Ne(α,p)^{21}Na reaction with the Array for Nuclear Astrophysics Studies with Exotic Nuclei (ANASEN), using a helium gas target and an ^{18}Ne radioactive beam. ANASEN is an active gas target detection system with the ability to measure excitation function using a single beam energy while the beam slows down in the target gas. Utilizing also the particle tracking capability of the experimental array the center of mass energy can be reconstructed at the reaction point. Preliminary results will be presented for the experiment performed in reaction energies relevant to those in the breakout leading to an x-ray burst.

[1]Supported by the US NSF MRI program Grant no. PHY-0821308, NSF Grant no. PHY-1401574 and by the US DOE Grant no. DE-FG02-02ER41220.

Maria Anastasiou
Florida State Univ

Date submitted: 27 Jun 2016 Electronic form version 1.4