Abstract Submitted
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Studying the (α,p) process in X-ray bursts using rare isotope ion beams[1] DANIEL VOTAW, ADRIANA BANU, James Madison University, Harrisonburg, VA 22807, B.T. ROEDER, G.G. RAPISARDA, M. MCCLESKEY, A. SAASTAMOINEN, E. SIMMONS, A. SPIRIDON, L. TRACHE, R.E. TRIBBLE, C.A. GAGLIARDI, Cyclotron Institute, Texas A&M University, College Station, TX 77843 — Type I X-Ray bursts are the most frequent thermonuclear explosions observed in the galaxy with about 100 sources known so far. It is thought that XRBs occur in binary star systems where a neutron star accretes matter from its companion, a main sequence star. As the accreted hydrogen-and helium-rich matter builds up on the surface of the neutron star the temperature and the pressure increase and a thermonuclear runaway occurs reaching peak temperatures of T = 1-2 GK, which is observed as an X-ray burst. The fact that the bursts do not destroy the binary star system makes X-ray binaries useful to study matter under extreme temperature and density conditions. Current sensitivity studies on XRB nucleosynthesis have identified the nuclear reaction, ^{22}Mg(α,p)^{25}Al, among the influential reactions affecting the XRB total energy output. This reaction implies the interaction of the radioactive ^{22}Mg isotope with a ^{4}He nucleus (aka α particle) to produce the radioactive ^{25}Al isotope and a proton. In fall last year, a feasibility test for the experimental investigation of the probability of this nuclear reaction to occur was performed at Texas A&M University (TAMU) Cyclotron Institute. Measurements were performed in reversed time and inverse-kinematics for the reaction, ^{25}Al + p $\rightarrow$ ^{22}Mg $+\alpha$. Data analysis results will be reported.

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