DNP06-2006-000202

Abstract for an Invited Paper
for the DNP06 Meeting of
the American Physical Society

Measurement of the ^{17}F + p ANC to Inform the ^{17}F(p,γ)^{18}Ne Cross Section

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The decay of ^{17}F, which is produced in novae by proton capture on ^{16}O, is possibly the dominant Galactic source of ^{17}O. However, ^{17}F is destroyed by the ^{17}F(p,γ)^{18}Ne reaction. This reaction rate is unknown in novae environments, and is important for understanding the production of ^{17}O and ^{18}F. At typical novae temperatures, the ^{17}F(p,γ)^{18}Ne rate is dominated by direct capture (DC) to bound states in ^{18}Ne, which is currently unmeasured due to the significant experimental challenges in performing the direct measurement. However, DC cross sections can be reliably calculated from Asymptotic Normalization Coefficients (ANCs) determined by, for example, a peripheral transfer reaction. We have measured the ^{14}N(^{17}F,^{18}Ne)^{13}C reaction, in order to determine ^{17}F + p ANCs, utilizing a 170 MeV beam of ^{17}F incident on a melamine ($C_3N_6H_6$) target at the Holified Radioactive Ion Beam Facility at ORNL. Charged particles were detected in a pair of resistive strip silicon detector telescopes. Due to insufficient resolution to separate states in ^{18}Ne by charged particle detection alone, coincident de-excitation γ rays were measured in coincidence using the CLARION array. Details of the motivation, experiment, analysis and preliminary results will be presented.