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First measurement with GADGET: ^{23}Al β decay and ^{22}Na production in novae[1] CHRISTOPHER WREDE, Michigan State Univ, M. FRIEDMAN, Michigan State Univ and Hebrew Univ of Jerusalem, T. BUDNER, Michigan State Univ, D. PEREZ-LOUREIRO, Michigan State Univ, Univ of Tennessee, E. POLLACCO, IRFU, CEA, Universite Paris-Saclay, J. JOSE, Universitat Politecnica de Catalunya, Institut d'Estudis Espacials de Catalunya, B. A. BROWN, M. CORTESI, C. FRY, Michigan State Univ, B. GLASSMAN, J. HEIDEMAN, Univ of Tennessee, M. JANASIK, M. ROOSA, J. STOMPS, J. SURBROOK, P. TIWARI, Michigan State Univ — Novae are expected to produce the radionuclide ^{22}Na, leading to the emission of a 1.275-MeV γ ray. Next generation γ-ray space telescopes will likely provide unique constrains on nova models by observing this γ-ray line. An important input to models of ^{22}Na production in novae is the rate of the destructive ^{22}Na(p,γ)^{23}Mg reaction. The rate is dominated by one resonance, whose strength can be measured directly or constructed from measurements of its branching ratio and lifetime. We have determined the proton branching ratio to be 5 times lower than the most precise literature value by measuring the β delayed proton decay of ^{23}Al using the Gaseous Detector with Germanium Tagging (GADGET) at NSCL. Considering this new measurement along with two discrepant direct measurements we argue that the lifetime of this resonance should be re-measured. A 1D hydrodynamic code has been used to model a series of nova explosions on oxygen-neon white dwarfs, from which different ^{22}Na yields have been obtained for several nuclear-data inputs for the ^{22}Na(p, γ)^{23}Mg reaction rate.

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