Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

$\beta-$delayed p-decay of proton-rich nuclei ^{23}Al and ^{31}Cl and explosive H-burning in novae[1] L. TRACHE, A. BANU, J.C. HARDY, M. MCCLESKEY, E. SIMMONS, G. TABACARU, R.E. TRIBBLE, Texas A&M University, J. AYSTO, A. JOKINEN, A. SAASTAMOINEN, Univ. of Jyvaskyla, Finland, T. DAVINSON, P.J. WOODS, Univ. of Edinburgh, UK, L. ACHOURI, B. ROEDER, LPC Caen, France — We developed a technique to measure β-delayed proton-decay of proton-rich nuclei produced and separated with MARS at TAMU. In particular, we studied the decay of ^{23}Al and ^{31}Cl, both important for understanding explosive H-burning in novae. We have pulsed the beam, implanting the source nuclei moving at about 40 MeV/u in a thin Si strip detector, and then measured $\beta-$p and $\beta-\gamma$ coincidences simultaneously. The states populated above the proton threshold in ^{23}Mg and ^{31}S, respectively, may proton decay. They are resonances in the reaction ^{22}Na(p,γ)^{23}Mg (crucial for the depletion of ^{22}Na in ONe novae) and in ^{30}P(p,γ)^{31}S (critical point in explosive H-burning in novae), but the protons emitted have very low energies, starting at about 200 keV, an experimental challenge. The setup and the results are described. The β-decay schemes were established for both nuclei, and IAS identified. The technique has shown a remarkable selectivity to β-delayed charged particle emission and shown to work even at radioactive beam rates of a few pps, for rare isotopes with lifetimes as low as 10s msec.

[1]Supported by US DOE.

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Date submitted: 30 May 2008 Electronic form version 1.4