Abstract Submitted
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The structure of ^{23}Al and consequences on the depletion of ^{22}Na from ONe novae[1] Y. ZHAI, L. TRACHE, V.E. IACOB, J.C. HARDY, C. FU, T. AL-ABDULLAH, N. NICA, M. MCCLESKEY, V.V. GOLOVKO, H.I. PARK, G. TABACARU, A. BANU, R.E. TRIBBLE, Texas A&M University — There is interest in the structure of ^{23}Al due to the contribution of the ^{22}Mg(p, γ)^{23}Al and ^{22}Na(p, γ)^{23}Mg reactions in the depletion of ^{22}Na from ONe novae. Using MARS we produced and separated pure ^{23}Al samples with a 48 MeV/u ^{24}Mg beam from the K500 cyclotron at Texas A&M University. New β and $\beta - \gamma$ coincidence measurements were made with a thin scintillator, an HPGe detector and a fast tape transport system. Addition of a BGO Compton shield improved very much the quality of the γ spectra around the transitions from the IAS state at 7803 keV. From the measured β singles and $\beta - \gamma$ coincidence decay spectra we obtained the ^{23}Al β-decay scheme, branching ratios and absolute log*ft* values for several transitions. We clearly determined that the ^{23}Al ground state spin and parity is J^{π}=$5/2^{+}$, not $1/2^{+}$, and also found spectroscopic information for the states that are resonances in the ^{22}Na(p, γ)^{23}Mg reaction. It follows that the larger capture rate implied by the now-rejected lower spin value for ^{23}Al can not explain the missing 1275 keV cosmic γ -ray from the decay of long-lived ^{22}Na, the last step in the hot NeNa cycle.

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