Abstract Submitted
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Mass Measurements of ^{22}Mg and ^{26}Si A. PARIKH, J. A. CAGGIANO, C. DEIBEL, R. LEWIS, P. D. PARKER, C. WREDE, Wright Nuclear Structure Laboratory, Yale University, J. P. GREENE, Physics Division, Argonne National Laboratory — The detection of characteristic γ-ray lines of astrophysical origin allows important nuclear physics constraints to be set on nucleosynthesis models of astrophysical phenomena. The 1.809 MeV and 1.275 MeV β-delayed γ-rays from $^{26}\mathrm{Al}_{(g.s.)}$ ($t_{1/2} = 7.2 \times 10^5$y) and ^{22}Na ($t_{1/2} = 2.6$y) respectively, constitute two of these production signatures. Much recent experimental work[1,2,3]has been concentrated on determining the rates of the reactions ^{21}Na(p,γ)^{22}Mg and ^{25}Al(p,γ)^{26}Si to better establish the contribution of novae to the overall abundances of these two species. For indirect determinations of these reaction rates, it is important to have precise mass values of the nuclei involved[4,5]. Using a 33 MeV proton beam in conjunction with our Enge Split-Pole spectrograph, we measured the Q_0 values of the ^{24}Mg(p,t)^{22}Mg and ^{28}Si(p,t)^{26}Si reactions relative to that of the ^{16}O(p,t)^{14}O reaction. We find the mass excesses $\Delta(^{22}\mathrm{Mg})$ = -400.5(1.0) keV and $\Delta(^{26}\mathrm{Si})$ = -7139.5(1.0) keV. This work was supported by the US DOE, Grant No. DE-FG02-91ER-40609 and Contract No. W-31-109-ENG-38. [1] S. Bishop et al., Phys. Rev. Lett. **90**, 162501 (2003). [2] J. A. Caggiano et al., Phys. Rev. C **65**, 055801 (2002). [3] D. W. Bardayan et al., Phys. Rev. C **65**, 032801(R) (2002). [4] G. Savard et al., Phys. Rev. C **70**, 042501 (2004). [5] M. Mukherjee et al., Phys. Rev. Lett. **93**, 150801 (2004).

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