Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Experimental evidence of a natural parity state in ^{26}Mg at astrophysically relevant energies via the $^{22}Ne(^{6}Li,d)^{26}Mg$ reaction. C. UGALDE, A. CHAMPAGNE, S. DAIGLE, C. ILIADIS, J. NEWTON, E. OSENBAUGH, University of North Carolina, J. CLARK, C. DEIBEL, A. PARIKH, P. PARKER, C. WREDE, Yale University — The $^{22}Ne(\alpha,n)^{25}Mg$ reaction has been regarded as the main neutron source for the s-process in core He-burning massive stars and of relevance in He-shell burning in AGB stars. Its present rate is one of the most important sources of uncertainty in the nucleosynthesis of heavy elements. We have studied natural parity states in ^{26}Mg via the $^{22}Ne(^{6}Li,d)^{26}Mg$ direct process with Yale University's Enge split-pole spectrograph. Our method significantly improves the energy resolution of previous experiments and as a result we report the observation of a natural parity state in ^{26}Mg at an energy where the stellar rate of the $^{22}Ne(\alpha,\gamma)^{26}Mg$ reaction may be reduced. This fact gives place to an increase in the production of weak component s-process neutrons via the $^{22}Ne(\alpha,n)^{25}Mg$ reaction. Possible spin-parity assignments are suggested as well.

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Date submitted: 09 Jan 2007 Electronic form version 1.4