Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

Photoexcitation of Astrophysically Important States in ^{26}Mg RICHARD LONGLAND, UNC-Chapel Hill, RICHARD DEBOER, University of Notre Dame, CHRISTIAN ILIADIS, UNC-Chapel Hill, GENCHO RUSEV, ANTON TONCHEV, Duke University, MICHAEL WIESCHER, University of Notre Dame — The ^{22}Ne(α,n)^{25}Mg reaction is an important source of neutrons for the s-process in massive stars and Asymptotic Giant Branch (AGB) stars. Spin-parity ambiguities of levels in the ^{26}Mg compound nucleus result in large uncertainties in the reaction rates at temperatures relevant to these environments. We report the results of a nuclear resonance fluorescence experiment at the High Intensity γ-ray Source (HIγS) that used a linearly polarised photon beam to populate levels in ^{26}Mg at astrophysically important excitation energies. High precision excitation energies, branching ratios, and unambiguous spin-parities were assigned to five levels between E_x = 10.5 and 11.2 MeV. We will discuss the E_r = 630 keV resonance, which, contrary to previous findings, has been found to have unnatural parity, and thus does not contribute to the ^{22}Ne+α rates. In addition, two natural parity states, located below the neutron threshold, are expected to reduce rate uncertainties for the competing ^{22}Ne(α,γ)^{26}Mg reaction significantly.

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Date submitted: 26 Jun 2009 Electronic form version 1.4