Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Extracting ANCs in neutron transfer reactions to determine proton capture reaction rates TARIQ AL-ALBDULLAH, X. CHEN, C.A. GAGLIARDI, Y.-W. LUI, G. TABACARU, Y. TOKIMOTO, L. TRACHE, R.E. TRIBBLE, Texas A&M University, F. CARSTOIU, Institute of Physics and Nuclear Engineering, Romanai — The high temperatures ($>10^8$ K) in novae outbursts enable unstable nuclei to leak out from the hot CNO cycle to the rp-process, where heavier nuclei such as ^{18}F and ^{22}Na are synthesized and might be ejected. Their abundances can be influenced by the ^{17}F(p,γ)^{18}Ne and ^{22}Mg(p,γ)^{23}Al reactions respectively. The first reaction connects the CNO and NeNa cycles, while the second may explain the unobserved γ-ray emission from ^{22}Ne due to the β decay in ^{22}Na. We have applied an indirect technique to determine the above reaction rates at stellar energies. We have measured the neutron transfer reactions ^{13}C(^{17}O,^{18}O)^{12}C and ^{13}C(^{22}Ne,^{23}Ne)^{12}C to determine the asymptotic normalization coefficients (ANCs) for the ground and first excited states in ^{18}O and ^{23}Ne. These ANCs can be transposed to the corresponding states in the mirror nuclei ^{18}Ne and ^{23}Al respectively. As a part of these experiments, we have measured the elastic scattering data to obtain the optical model parameters that are used in DWBA calculations, and hence to extract the ANCs.

Tariq Al-Albdullah
Texas A&M University

Date submitted: 25 May 2005 Electronic form version 1.4