Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Determination of the Reaction Rate for ^{17}F(p,γ)^{18}Ne using the Neutron Transfer Reaction ^{13}C(^{17}O,^{18}O)^{12}C. T. AL-ABDULLAH, X. CHEN, C.A. GAGLIARDI, Y.-W. LUI, G. TABACARU, Y. TOKIMOTO, L. TRACHE, R.E. TRIBBLE, Y. ZHAI, Texas A&M University, F. CARSTOIU, IFIN-HH, Bucharest, Romania — The electron-positron annihilation during the expansion of nova envelope leads to the emission of a γ-ray line at 511 keV and a continuum below it. To estimate the production rate of these γ-rays, it is proposed to study the nuclear reactions that create and destroy the long-lived isotope ^{18}F (τ=158 min). Its abundance may be influenced by the reaction rate for ^{17}F(p,γ)^{18}Ne. Since direct measurements have not been performed, the ANC method is applied to determine this rate at astrophysical energies. The ANCs for the 2^+ excited states at 1.98 MeV and 3.92 MeV in ^{18}O are sought through measuring the peripheral reaction ^{13}C(^{17}O,^{18}O)^{12}C, and then transposed to the mirror states in ^{18}Ne. The elastic scatterings were measured separately with ^{17}O and ^{18}O beams at 12 MeV/A to obtain the optical model parameters of the incoming and outgoing channels, which are used in the DWBA calculation to predict the angular distribution for the transfer reaction. Results will be presented and discussed.

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Date submitted: 27 Jun 2006 Electronic form version 1.4