

Abstract Submitted  
for the TSF11 Meeting of  
The American Physical Society

**The evaluation of a new method to extract spectroscopic factors using asymptotic normalization coefficients and the astrophysical  $^{14}\text{C}(n,\gamma)^{15}\text{C}$  reaction rate** M. MCCLESKEY, A.M. MUKHAMEDZHANOV, L. TRACHE, A. BANU<sup>1</sup>, V. GOLDBERG, B.T. ROEDER, E.N. SIMMONS, A. SPIRIDON, R.E. TRIBBLE, Texas A&M University Cyclotron Institute — A new method to determine spectroscopic factors (SFs) that utilizes asymptotic normalization coefficients (ANCs) has been tested at Texas A&M, using  $^{15}\text{C}$  as a test case. The method would use the ANC to fix the external contribution to a non-peripheral reaction which would otherwise be free to vary to unphysical values in a traditional approach. The investigation consisted of two parts. First, the ANC for the  $^{14}\text{C}+n$  configuration in  $^{15}\text{C}$  was determined from the heavy ion neutron transfer reaction  $^{13}\text{C}(^{14}\text{C},^{15}\text{C})^{12}\text{C}$  and the inverse kinematics reaction  $d(^{14}\text{C},p)^{15}\text{C}$ . Both of these reactions were measured at sufficiently low energy to be peripheral. Next, a non-peripheral reaction  $^{14}\text{C}(d,p)^{15}\text{C}$  was measured with an incident deuteron energy of 60 MeV, and this reaction was used along with the previously determined ANC to attempt to find the SF. The ANC was also used to calculate the astrophysical neutron direct capture rate for  $^{14}\text{C}(n,\gamma)^{15}\text{C}$ , which was compared with recent direct experimental results.

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Date submitted: 07 Sep 2011

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