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Astrophysical factor for the CNO cycle radiative capture reaction^{15}N$(p,\gamma)^{16}$O ADELE PLUNKETT, Cyclotron Institute Texas A&M University; Middlebury College — The reaction ^{15}N$(p,\gamma)^{16}$O leaks from CN cycle and determines the oxygen isotopes generated in CNO tri-cycle. Direct measurements of the astrophysical S(E) factor for this reaction were reported [1]. The analysis [1] assumes that the reaction is dominated by resonances at $E_{cm} = 312$ and 964 keV, and direct capture to the ground state of ^{16}O. The ANCs for bound states of ^{16}O have been measured in reaction ^{15}N$(^3He,d)^{16}$O [2]. Using these ANCs, the astrophysical factor for ^{15}N$(p,\gamma)^{16}$O has been calculated by the R-matrix approach. The proton and α widths of two resonances were determined from the fit to the direct data for ^{15}N$(p,\alpha)^{12}$C [3] and used to calculate the S(E) factor for^{15}N$(p,\gamma)^{16}$O. Radiative were varied within experimental uncertainty to fit to the direct data for ^{15}N$(p,\gamma)^{16}$O. The calculated S(E) factor is $S(0) = 38\,$keVb if we fit the S(E) factor at the resonance peaks; this is significantly smaller than the value $S(0) = 64 \pm 6$ keVb reported in [1]. Hence, one reaction ^{15}N$(p,\gamma)^{16}$O occurs for almost 1500 CN cycles, rather than 880 cycles as estimated in [1]. The problem with fitting the data from [1] at resonance peaks and small energies necessitates re-measurement at lower energies of this reaction. [1] Rolfs, C., and Rodney, W.S., *Nucl. Phys.* A235 (1974) 450. [2] A. M. Mukhamedzhanov, P. Bem, V. Burjan et al., Phys. Rev. C (will be submitted). [3] A. Redder et al., Z. Phys. A305, 325 (1982).

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