

Astrophysical reaction rate for $^{17}\text{F}(p,\gamma)^{18}\text{Ne}$ from the transfer reaction $^{13}\text{C}(^{17}\text{O}, ^{18}\text{O})^{12}\text{C}$

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The asymptotic normalization coefficients of the bound states $J^\pi = (0_1^+, 2_1^+, 4_1^+, 2_2^+)$ in ^{18}O are extracted from the peripheral neutron transfer reaction $^{13}\text{C}(^{17}\text{O}, ^{18}\text{O})^{12}\text{C}$. They are then converted to their mirror states in ^{18}Ne , which are further used to evaluate the astrophysical S factor for the proton capture reaction $^{17}\text{F}(p,\gamma)^{18}\text{Ne}$. The elastic-scattering cross sections have been measured in both incoming and outgoing channels in order to extract the optical potentials needed for distorted-wave-Born-approximation calculations. The S -factor is found to be $S_{1-17}(0) = 2.17 \pm 0.35$ keVb. The contribution of the direct capture rate to this reaction is estimated, and its consequences on the production of ^{18}F at stellar energies in ONe novae are discussed. The work has been published in Phys. Rev. C **89**, 025809 (2014).