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Determination of the ^{12}N$\rightarrow^{11}$C+p asymptotic normalization coefficient from the indirect ^{11}C(d,n)^{12}N transfer reaction.[1] DONGWON LEE, JAMES POWELL, KARI PERAJARVI, FANQING GUO, DENNIS MOLTZ, JIM O'NEIL, JOSEPH CERNY, LAWRENCE BERKELEY NATIONAL LABORATORY TEAM — The ^{11}C(p,γ)^{12}N reaction has been known to be an important branch point in supermassive low-metallicity stars because it could produce CNO seed nuclei before the traditional triple-alpha process turns on. In the present work, the ^{11}C(d,n)^{12}N transfer reaction was employed with a radioactive ion beam of 150 MeV ^{11}C with 6×10^5 ions/s on target from the BEARS project at the 88" cyclotron at LBNL. Excellent agreement was obtained between the experimental cross sections (θ_{cm}=10.9 $^\circ$ to 71.5 $^\circ$) and DWBA calculations. The asymptotic normalization coefficient (ANC) was deduced to be $(C_{eff}^{12N})^2 = (C_{p1/2}^{12N})^2 + (C_{p3/2}^{12N})^2 = 1.85 \pm 0.27 fm^{-1}$, which is in good agreement with the published result from ^{14}N(^{11}C,^{12}N)^{13}C. The astrophysical S-factor at zero-energy,$S(0) = 0.099 \pm 0.020$ keV b, was also calculated based on the extracted ANC value. These results confirm that the ^{11}C(p,γ)^{12}N reaction occurs at lower temperatures and densities than previously believed.

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