Abstract Submitted
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Astrophysics Unearthed: Measuring the Beam-Induced ^{13}C(d,n) Background in Underground Nuclear Astrophysics Experiments[1] C.C. UMMEL, D. WALTER, F. CORRADO, J.A. CIZEWSKI, Rutgers University, M. FEBBRARO, S.D. PAIN, M.E. BANNISTER, C.C. HAVENER, K.A. CHIPPS, Oak Ridge National Laboratory, E. TEMANSON, University of Wisconsin-La Crosse, W.A. PETERS, University of Tennessee — The slow neutron capture process (s-process) is a series of nuclear reactions responsible for the synthesis of approximately half the atomic nuclei heavier than iron. The s-process proceeds via a series of neutron capture and beta decay reactions in the low neutron flux environment of AGB stars. The primary source of neutrons for the s-process is the ^{13}C(α,n)^{16}O reaction. Extrapolation of the ^{13}C(α,n) S-factor into the Gamow window is complicated by the unknown influence of a $\frac{1}{2}^+$ resonance in ^{17}O near the alpha capture threshold, prompting an international effort to directly measure the cross section at low energies. Measurement of the ^{13}C(α,n) cross section is made difficult by beam-induced background, such as deuterium contamination in the alpha particle beams of most accelerators. At astrophysically relevant energies, the ^{13}C(d,n) cross section is many orders of magnitude higher than that of ^{13}C(α,n). Accordingly, the ^{13}C(d,n) cross section was measured at laboratory energies below 250 keV (corresponding to alpha beam energies of 500 keV and below) at Oak Ridge National Laboratory's Multicharged Ion Research Facility. Preliminary results and the implications of this work are discussed.

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