Notre Dame Science
Department of Physics

Nuclear Seminar

STUDY OF ^{9}C VIA THE $d(^{10}C,t)^{9}C$ REACTION

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4:00 P.M. NSH 124

The structure of ^{9}C is poorly known. Only a few excited states have been observed and little information exists on their single-particle proper-ties. These data are vital to test ab initio nuclear theories which have ex-celled in modeling light nuclear systems in the p-and sd-shells. To probe the structure of ^{9}C the $^{10}C(d,t)^{9}C$ reaction was performed in inverse kinematics at the ATLAS facility at Argonne National Laboratory. An “in-flight” radioactive 10C beam was developed at ATLAS through the $p(^{10}B,^{10}C)n$ reaction using a 185-MeV ^{10}B beam incident on a cryogenic hydrogen gas cell. The resulting 171-MeV ^{10}C beam had an average intensity of $2.2x10^{4}$ pps and bombarded a 660 $\mu g/cm^{2}$ deuterated polyethylene $(CD^{2})n$ target. Tritons were detected and identified in an array of annular double-sided silicon detectors covering θ_{lab} between 8 and 42 degrees. Heavy beam-like recoils were detected in a set of forward-angle silicon detectors in a ΔE-E configuration. The results from the Distorted Wave Born Approximation (DWBA) analysis performed for the ground state transition are compared to those from ab initio (GFMC/VMC) calculations. Results on transfer to the proton-unbound excited states of ^{9}C will also be presented.

All interested persons are cordially invited to attend.