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Measurement of unbound states in 17C using the Active Target Time Projection Chamber

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Unbound states in the neutron-rich ^{17}C nucleus were probed via the ^{16}C(d,p) transfer reaction in inverse kinematics using the Active Target Time Projection Chamber (AT-TPC) placed in the HELIOS solenoid at the ATLAS facility in Argonne National Laboratory. A wide range of excitation energies from the ground state to approximately 10 MeV were measured using a ^{16}C radioactive beam at 12 MeV/u and a pure deuterium gas active target. Using the large angular coverage and high luminosity of the AT-TPC , the angular distributions of these ^{17}C resonances were observed, with an aim to make preliminary spin-parity assignments and determine spectroscopic factors. These findings are compared to recent results obtained from invariant mass spectroscopy and shell model calculations. Their study, in particular the p-shell hole negative parity resonances, are especially interesting in probing cross-shell monopole-based interactions.

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