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A study of the 12C(p,2p)11 B reaction at 200 MeV

The interest in recent years in quasi-free scattering (QFS) originates from its utility as a tool to investigate single particle properties of unstable nuclei. However, the difference in quenched spectroscopic behaviour as a function of proton-neutron asymmetry observed between nucleon removal reactions on light nuclei e.g. 9Be(28S,27P), transfer reactions, and (p,pN) reactions in inverse kinematics would seem to imply that structure information depends strongly on the description of the reaction dynamics. For a better understanding of the reaction dynamics of QFS it is best to return to the experimentally less complicated direct kinematics meaurements. Especially now that theoretical tools are available that can overcome limitations of the Distorted Wave Impulse Approximation (DWIA) traditionally used to describe QFS. Substantial deviations are observed between experimental and state of the art theoretical cross-sections for the 12C(p,2p)11B reaction at 400 MeV, as performed at RCNP. In order to disentangle the nuclear structure and reaction dynamics contribution to these deviations, it would be interesting to determine what happens at a lower beam energy of 200 MeV. In the near future an experiment will be performed at iThemba LABS to investigate quasi-free scattering to individual states in the residual 11B nucleus through the 12C(p,2p)11B reaction at 200 MeV. Coincident proton detection with the K600 magnetic spectrometer and a detector telescope is envisaged. Also, possible developments of a new coincident detector telescope system using LaBr detectors will be briefly explored.

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