

Abstract Submitted
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Measuring Quasi-Elastic e-n and e-p Scattering from Deuterium¹

ALEXANDER BALSAMO, KEEGAN SHERMAN, GERARD GILFOYLE, Univ of Richmond — The main physics goal of Jefferson Lab is to understand how quarks and gluons form nuclei. We are developing algorithms to extract the relative amounts of electron-neutron (e-n) to electron-proton (e-p) scattering events from deuterium in quasi-elastic (QE) kinematics for an approved experiment with the CLAS12 detector. Our analysis focuses on neutrons detected in the CLAS12 calorimeters and protons measured with the CLAS12 toroidal magnetic field. Events were generated with the Quasi-Elastic Event Generator (QUEEG) and passed through the Monte Carlo code *gemc* to simulate the CLAS12 response. These simulated events were then reconstructed using CLAS12 Common Tools. We first match the solid angle for e-n and e-p events. The electron information is used to predict the trajectory of both a neutron and proton through CLAS12. If both particles would interact in the CLAS12 volume, we know the sample has the same solid angle for e-n and e-p events. We then select QE events by searching for a nucleon near the predicted position. The angle between the predicted 3-momentum of the nucleon and the measured value, θ_{pq} , reaches a peak near zero for QE events, but not for other inelastic events. A cut on θ_{pq} separates QE events from inelastic ones.

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