Abstract Submitted
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Study of the Neutron Detection Efficiency for the CLAS12 Detector[1] KEEGAN SHERMAN, GERARD GILFOYLE, University of Richmond, CLAS COLLABORATION — One of the central physics goals of Jefferson Lab is to understand how quarks and gluons form nuclei. The 12 GeV upgrade is nearing completion and a new detector, CLAS12, is being built in Hall B. One of the approved experiments will measure the magnetic form factor of the neutron. To make this measurement, we will extract the ratio of electron-neutron (e-n) to electron-proton (e-p) scattering events from deuterium in quasi-elastic kinematics. A major source of systematic uncertainty is the neutron detection efficiency (NDE) of CLAS12. To better understand the NDE we used the Monte Carlo code *gemc* to simulate quasi-elastic e-n events like those expected in the experiment. We then analyzed the simulated e-n events by using the measured, scattered electron information to predict the neutron's path. The neutron is detected in CLAS12's electromagnetic calorimeter (EC). If the predicted neutron path intersected the fiducial volume of the EC, then we searched for a hit near that point. The NDE is the ratio of the number of neutrons found in the EC to the number of neutrons predicted to hit the EC. The analysis was done using the newly released CLAS12 reconstruction tools. We observe a rapid rise in the NDE at low neutron momentum and a plateau above 60%.

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