Asymmetry Measurement of the Electric Form Factor of the Neutron

RICHARD OBRECHT, Univ of Connecticut - Storrs — The spacelike electric form factor of the neutron has been extracted at $Q^2 = 1.16 \text{ GeV}^2$ via a beam-target helicity asymmetry measurement using the semi-exclusive reaction $^3\text{He}(e, e'n)pp$. The Jefferson Lab Hall A experiment E02-013 ran in 2006 utilizing the 6 GeV CEBAF for its high-duty, longitudinally polarized electron beam. The double-arm coincidence experiment detected the quasielastically scattered electrons in a large angular and momentum acceptance spectrometer referred to as BigBite. The recoiling nucleons were detected in a large neutron detector, built out of planes of scintillator arrays interlaced with iron and lead plates to increase the probability of inducing a hadronic shower. The polarized $^3\text{He}$ target used the novel technique of hybrid spin-exchange optical pumping, resulting in a 10 atm target that could sustain polarizations greater than 50% at a beam current of 8 $\mu$A. Presented will be the current analysis and a preliminary result for $G^n_E$ at $Q^2 = 1.16 \text{ GeV}^2$.

This work is supported by the US Department of Energy Office of Science, Award ID No. DE-SC0014230.