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Exclusive Backward-Angle Meson Electroproduction – Unique access to u-channel physics

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Exclusive meson electroproduction at different squared four-momenta of the exchanged virtual photon, Q^2, and at different four-momentum transfers, t and u, can be used to probe QCD's transition from hadronic degrees of freedom at long distance scale to quark-gluon degrees of freedom at short distance scale. Backward-angle meson electroproduction was previously ignored, but is anticipated to offer complimentary information to conventional forward-angle meson electroproduction studies on nucleon structure. The results of our pioneering study of backward-angle ω cross sections through the exclusive $p(e,e'p)\omega$ reaction will be presented. The experiment was performed as part of E01-004 in Jefferson Lab Hall C, with central Q^2 values of 1.60 and 2.45 GeV^2, and W=2.21 GeV. The extracted cross sections were separated into transverse (T), longitudinal (L), and LT, TT interference terms. The data set has a unique coverage of $u \sim 0$, opening up a new means to study the transition of the nucleon wave function through backward-angle experimental observables. Plans to extend these studies to the π^0 and ϕ channels will also be presented.

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