

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 GeV², 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 other channels at Jefferson Lab, and linkage to the $\bar{\text{P}}\text{ANDA}$ nucleon structure program, will also be presented.