PR12-13-010: *Exclusive Deeply Virtual Compton and Neutral Pion Cross-Section Measurements in Hall C*

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The GPDs program is one of the main goals of scientific program of the 12 GeV upgrade of JLab. The deeply virtual Compton scattering (DVCS) is the most straightforward channel for this program. The main goal of this experiment is to isolate DVCS and Bethe-Heitler contributions and study the Q^2 dependence of imaginary and real parts of the DVCS amplitude. The previous experiment shows leading-twist dominance in the imaginary part and the proposed experiment will check this assumption for the real part as well. On the other hand, as shown in recent paper by X. Ji, X. Xiong and F. Yuan, study of various twist-3 effects gives access to sum rule for proton helicity and to proton orbital momentum in the light-cone gauge. The kinematical twist-3 corrections are calculated recently by Braun et al but at the moment there are no reliable theoretical estimates of the size of dynamical twist-3 quark-quark-gluon correlations in the proton so the experimental analysis appears to be very timely.

Another goal of this experiment is to detect π^0 events and measure cross section of exclusive π^0 electroproduction. The result of previous experiment indicates that the handbag approximation which predicts dominance of longitudinal photons appears to be violated so it would be of great interest to determine the relative longitudinal and transverse contributions to the π^0 cross section and investigate transverse GPDs.