

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Deeply Virtual Compton Scattering Cross-Sections with CLAS

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The exclusive electroproduction of a photon off a nucleon provides three-dimensional information on the nucleon structure. This reaction proceeds via the Bethe-Heitler (BH) process (photon emitted by electron), and the Deeply Virtual Compton Scattering (DVCS) process (photon emitted by proton). BH and DVCS interfere at the amplitude level. In the Bjorken regime of large Q^2 at fixed x_B , and for $-t/Q^2 < 1$, the amplitude factorizes, the non-perturbative part described by Generalized Parton Distributions (GPDs). GPDs are the Fourier transform of the spatial distributions of partons in the transverse plane at fixed longitudinal momentum fraction x_B . The BH and DVCS contributions create harmonic dependencies of observables as functions of the angle between the leptonic and hadronic planes, which are then used to extract GPDs. The BH/DVCS cross-sections on unpolarized hydrogen target have been measured with the CEBAF Large Acceptance Spectrometer (CLAS) in a dedicated experiment, at a polarized beam of energy 5.75 GeV, in the valence region $0.1 < x_B < 0.6$, $1 < Q^2 < 5$, and for $0.09 < -t < 2 \text{ GeV}^2$. We will present results for the unpolarized cross-sections as well as the beam-polarized cross-section differences, and discuss their impact on the GPD extraction strategies.

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Date submitted: 30 Jun 2013

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