Measurement of the DVCS cross section with the Neutral Particle Spectrometer in Hall C at Jefferson Lab

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Abstract

Physicists have worked for decades to uncover the fundamental properties of nucleons since they are the building blocks of our visible universe. However, essential questions, such as how quarks and gluons contribute to the mass and spin of nucleons, still remain unresolved. Generalized Parton Distributions (GPDs), introduced in the 1990s, aim to address these questions by probing the three-dimensional inner structure of nucleons. Among various experimental approaches, Deeply Virtual Compton Scattering (DVCS) provides the cleanest way to access the GPDs through Compton Form Factors (CFFs).

The most recent DVCS experiment at Jefferson Lab began in Hall C in 2023, starting by installing and commissioning our newly developed Neutron Particle Spectrometer (NPS) for the detection of emitted photons from DVCS reactions. The experiment ended in summer 2024, and the collaboration is now focusing on detector calibration and refined data analysis. This presentation will provide an overview of the current status and preliminary results of our analysis.