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Hadron structure measurements from CLAS12

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Quantum Chromodynamics (QCD) reveals its complexity at large distances and low energies. Understanding the internal structure of the nucleons is therefore essential for a complete understanding of QCD in this regime. Generalized Parton Distributions (GPDs) play a crucial role in this effort, as they provide a means to map both the spatial and the longitudinal momentum distributions of partons in the nucleons. Beyond offering a three-dimensional view of the proton's internal structure, GPDs are also closely linked to the nucleon's spin structure and its internal force distribution. As a result, GPDs have been the focus of intense global experimental efforts.
In Experimental Hall B of Jefferson Lab, extensive measurements have been conducted with the CLAS12 experiment to study GPDs, primarily through exclusive reactions such as Deeply Virtual Compton Scattering (DVCS)—the exclusive electroproduction of a real photon at the partonic level. In addition to DVCS, other exclusive processes, including Timelike Compton Scattering, and the exclusive electroproduction of mesons, have been investigated. These results provide a detailed picture of the valence structure of the nucleon. Looking ahead, future experiments with CLAS12 will further leverage the capabilities of the CEBAF accelerator.

Collaboration

Primary author: CHATAGNON, Pierre (CEA Saclay)

Presenter: CHATAGNON, Pierre (CEA Saclay)

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