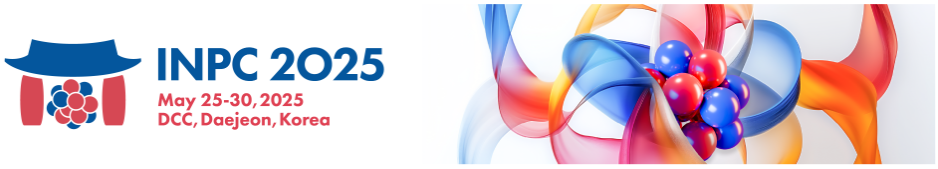

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Double Deeply Virtual Compton Scattering as a probe for Generalized Parton Distribution studies

Generalized Parton Distributions (GPD) are multidimensional structure functions parameterizing the interaction of a particle with the constituent partons of hadrons, encoding information like the spatial distribution of partons or the mechanical and spin properties of hadrons through the correlation between the longitudinal momentum and transverse position of partons inside the hadron. While privileged channels such as Deeply Virtual Compton Scattering (DVCS) or Timelike Compton Scattering (TCS) access GPDs in a constrained kinematical domain, Double Deeply Virtual Compton Scattering (DDVCS) is a not yet measured promising channel accessing GPDs over the whole physics phase space. In both cases, GPDs are extracted from Compton Form Factors (CFFs) which arise naturally in experimental observables built from different combinations of beam and target configurations. In the context of the Continuous Electron Beam Accelerator Facility (CEBAF) and the Electron-Ion Collider (EIC), we report the results of an exhaustive study of the DDVCS observables built from polarized electron and positron beams directed to a polarized proton target. This study focuses on the sensitivity of the observables to the parton helicity conserving proton GPDs and the consequences for CFF extraction. Moreover, we provide experimental projections supporting the feasibility of the measurements at both experimental facilities.

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