

Deeply Virtual Compton Scattering off ^4He

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The tomography of partons can be obtained by measuring the Generalized Parton Distributions (GPDs) using hard exclusive reactions, such as Deeply Virtual Compton Scattering (DVCS). The GPDs correlate the partons' longitudinal momenta with their transverse spatial distributions giving a 3D picture of the target hadron. The DVCS reaction is the exclusive leptonproduction of a photon, where the photon is emitted by the hadron target. It interferes with the Bethe-Heitler (BH) process where the photon is emitted by the incoming or the scattered lepton. When the lepton beam is polarized, this interference produces a beam spin-asymmetry, $(\sigma^{+-}\sigma^{-})/(\sigma^{++}\sigma^{-})$. Several DVCS experiments have been performed at Jefferson Laboratory (Virginia, USA) in Halls A and B. The Hall B houses the CEBAF Large Acceptance Spectrometer (CLAS), where we studied the DVCS off ^4He with a longitudinally polarized electron beam of 6 GeV. ^4He is of particular interest because of its spin zero, which implies that the number of GPDs is reduced to one. Our study of nuclear GPDs is aimed at studying further the nuclear medium modifications of parton distributions. This fact was firstly observed by the European Muon Collaboration (EMC) at CERN in 1983. In our experiment, the basic setup of CLAS was upgraded with a Radial Time Projection Chamber (RTPC) to detect the recoiled low-momentum nuclei, and an Inner Calorimeter (IC) to detect forward energetic photons. In this talk, I will present the performance of our detectors and the preliminary measured DVCS asymmetries in the coherent ($e^{-}^4\text{He} \rightarrow e^{-}^4\text{He}\gamma$) and the incoherent ($e^{-}^4\text{He} \rightarrow e^{-}\gamma pX$) channels.