Contribution ID: **41** Type: **Poster**

First measurement of the DVCS beam spin asymmetry in the Sullivan process

Deeply Virtual Compton Scattering (DVCS) is a powerful tool to investigate the internal structure of hadrons in terms of Generalized Parton Distributions (GPDs). The Sullivan process, involving the exchange of a virtual pion from the proton's meson cloud, offers a unique opportunity to access the three-dimensional structure of the pion at high energies. Since the pion plays a central role in QCD dynamics, being the lightest hadron and the Goldstone boson associated with chiral symmetry breaking, unraveling its structure is of fundamental importance for our understanding of hadronic matter.

This work aims at measuring, for the first time, the DVCS beam spin asymmetry (BSA) in the Sullivan process, using data collected with the CLAS12 experiment at Jefferson Lab with a 10.6 GeV electron beam on a proton target. These preliminary results demonstrate the feasibility of this novel measurement, thereby improving our understanding of the Sullivan process and validating this approach as a tool to probe the pion's internal dynamics. This first measurement paves the way for an exploration of the pion structure through its GPDs, and sets the stage for future studies at Jefferson Lab and at the upcoming Electron-Ion Collider.

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