

DVCS off the Neutron with Spectator Proton Tagging in Hall A at Jefferson Laboratory

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Generalized Parton Distributions (GPDs) provide a three-dimensional parametrization of the quarks and gluons inside the nucleon, and give a particularly valuable insight on the nucleon spin content and on the orbital angular momentum of quarks and gluons in particular. Knowledge on GPDs may be acquired performing measurements on exclusive electroproduction channels off the nucleon in the deep inelastic regime such as Deeply Virtual Compton Scattering (DVCS) $eN \rightarrow eN\gamma$.

Of these, neutron DVCS measurements are of particular importance, since combined with results from proton DVCS measurements, they provide a very important combination of GPDs observables which gives a strong constraint on quark angular momentum.

We propose to measure the Deeply Virtual Compton Scattering (DVCS) on the neutron, using a deuterium target, and with spectator proton tagging. The identification and measurement of the spectator proton not only allows to unambiguously identify the neutron-DVCS events from proton and coherent deuterium DVCS events, but also to apply corrections to the nuclear effect of the neutron in the deuteron. This setup would use the Super BigBite Spectrometer (SBS) in Hall A at Jefferson Laboratory to measure the scattered electron, combined with a high resolution electromagnetic calorimeter to detect the outgoing real photon, and with the multiple Time Projection Chamber (mTPC) developed for the Tagged Deep Inelastic Scattering experiment in Hall A (with which this experiment would run), for the identification and measurement of the spectator proton. This time projection chamber will be able to operate at fairly high luminosity, which will allow us to obtain significant statistics in a relatively short amount of time.

In this talk, an overview of the experimental setup will be provided, along with its main assets to perform this specific measurement. The expected results from this measurement will be presented, and will be put in context with other similar measurements.

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