

Timelike Compton Scattering on a polarised target with CLAS12 at Jefferson Lab

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Time-Like Compton Scattering (TCS) is a hard, exclusive scattering process, in which a real photon scatters from a target nucleon, producing a virtual (timelike) photon, which couples to a lepton pair in the final state [1].

TCS, via cross section and asymmetry observables, gives access to Generalised Parton Distributions (GPDs), through which we can develop a tomographic mapping of nucleon structure, and access information pertaining to the mechanical properties of hadrons, such as shear forces and pressure distributions. The first published result of TCS in 2021 [2] was measured on an unpolarised hydrogen target. This work seeks to present another first measurement by performing the analysis on a longitudinally polarised target, from which Target Spin Asymmetries (TSA) and Double Spin Asymmetries (DSA) can be measured, allowing access to the GPDs H and \tilde{H} .

To this end, I present a preliminary extraction of a TCS signal from recent data taking at Jefferson Lab during Run Group C, using quasi-real photons from the 10.6 GeV electron beam and the CLAS12 detector.

References

- [1] E.R. Berger, M. Diehl, and B. Pire. Timelike compton scattering: exclusive photoproduction of lepton pairs. *The European Physical Journal C*, 23(4):675–689, apr 2002.
- [2] P. Chatagnon et al. First measurement of timelike compton scattering. *Phys. Rev. Lett.*, 127:262501, Dec 2021.

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