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Studies of Time-Like Compton Scattering with CLAS12 at Jefferson Lab and at the EIC with the Detector-1 Reference Detector

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Time-Like Compton Scattering (TCS) is a hard, exclusive process, involving the elastic scattering of a real photon from a nucleon, and the production of a virtual photon that decays to a heavy lepton pair in the final state. Studies of TCS observables are used to broaden our understanding of Generalised Parton Distributions (GPD's) which can offer insights into the internal structure of the nucleon.

TCS is currently being studied at Jefferson Laboratory (JLab) and is planned for the upcoming Electron Ion Collider (EIC).

The EIC will be built on the Brookhaven National Laboratory site, and will collide polarised electrons with polarised protons, polarised light ions, and a range of unpolarised ions, with a projected collision luminosity of up to $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$. The EIC is therefore the ideal next-generation facility to probe nucleon structure.

In this presentation, I show a feasibility study for measuring Time-like Compton Scattering (TCS) on the proton at the EIC, via a full Geant4 simulation of the Detector-1 reference design. Data is also currently being taken with CLAS12, Run Group C at Jefferson Laboratory, on a polarised proton target, and I will also present some preliminary work on the measurement of TCS with this data.

On behalf of collaboration?

CLAS12 + EIC/ECCE

Attending in-person?

Yes

Subfield

Nuclear experiment

Preferred track

Hadron Structure

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