

Timelike Compton scattering off the nucleon

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We present our studies of the Timelike Compton Scattering (TCS) process off the nucleon ($\gamma N \rightarrow N \gamma^* \rightarrow e^+e^-$). At sufficiently large virtuality of the final state photon, this reaction provides access, via a QCD factorization theorem, to the Generalized Parton Distributions (GPDs) of the nucleon. GPDs contain, in particular, information about the correlations between the longitudinal momentum and the transverse spatial distributions of the partons inside the nucleon, which are currently largely unknown. Using several modellings of GPDs, we have calculated all single and double beam and target polarization observables, for proton and neutron targets. This is of particular interest in view of the coming 12 GeV JLab upgrade where a complete experimental TCS program can be envisaged, in complement of the currently approved DVCS (Deep Virtual Compton Scattering: $eN \rightarrow eN\gamma$) program aiming at extracting GPDs.

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