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## Timelike Compton Scattering : calculation of observables and experimental perspectives at Jefferson Lab at 12 GeV

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Hard exclusive processes such as photoproduction or electroproduction of photon or meson off the nucleon provide access to the Generalized Parton Distributions (GPDs), in the regime where the scattering amplitude is factorized into a hard and a soft part. GPDs contain the correlation between the longitudinal momentum fraction and the transverse spatial densities of quarks and gluons in the nucleon.

Timelike Compton Scattering (TCS) correspond to the reaction  $\gamma N \rightarrow \gamma^* N \rightarrow e+e-N$ , where the photon is scattered off a quark. It is measured through its interference with the associated Bethe-Heitler process, which has the same final state. TCS allows to access the GPDs and test their universality by comparison to the results obtained with the DVCS process ( $eN \rightarrow e\gamma N$ ). Also, results obtained with TCS provide additional independent constrains to the GPDs parameterization.

We will present the physical motivations for TCS, with our theoretical predictions for TCS observables and their dependencies. We calculated for JLab 12 GeV energies all the single and double beam and/or target polarization observables off the proton and off the neutron. We will also present the experimental perspectives for the next years at JLab. Two proposals were already accepted at JLab : in Hall B, with the CLAS12 spectrometer, in order to measure the unpolarized cross section and in Hall A, with the SoLID spectrometer, in order to measure the unpolarized cross section and the beam spin asymmetry at high intensity. A Letter Of Intent was also submitted in order to measure the transverse target spin asymmetries in Hall C. We will discuss the merits of this different experiments and present some of the expected results.

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