

PR12-18-005: *Timelike Compton Scattering off a transversely polarized proton*

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The proposed experiment aims at the measurement of various GPDs of the proton using time-like Compton scattering off the transversely polarized target. In particular, the experiment should give us the information about GPD E which is poorly constrained up to now. This GPD together with GPD H determines quark orbital momentum in the proton via Ji's sum rule. The proposed experiment will access the imaginary part of E for the first time. In addition, comparison of GPDs extracted from DVCS and from TCS will give a clear test of the leading-twist approximation at JLab energies since DVCS and TCS amplitudes are complex conjugate at leading order and leading twist (and there is no reason to believe that this property survives at higher twists).

One goal of the measurement is to test the universality of GPDs in TCS as compared with DVCS, using the observation that these processes are related via complex conjugation at $O(\alpha_s)$. One comment is that, since this relation does not hold beyond lowest order, it is important to estimate the error induced by higher order corrections.

Summarizing, the proposed experiment contributes significantly to the GPD program at JLab and, in our opinion, should be pursued.