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The transverse nucleon single-spin asymmetry for the semi-inclusive production of photons in lepton-nucleon scattering

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We study the semi-inclusive production of hard, isolated photons in unpolarized and polarized lepton-proton collisions, i.e., $\ell p \rightarrow \ell \gamma X$. We analyze the transverse nucleon single-spin asymmetry within the collinear twist-3 formalism in perturbative QCD to leading order accuracy (LO). We find that this spin asymmetry is generated by twist-3 dynamical quark-gluon-quark (qqg) correlations in the nucleon through so-called soft-fermion pole and hard pole contributions. In particular, the latter are of interest as they -in principle- allow for a point-by-point scan of the support of the dynamical qqg twist-3 matrix elements $F_{FT}(x, x')$ and $G_{FT}(x, x')$ in lepton-nucleon scattering experiments.

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