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Quark-gluon correlations in the twist-3 TMDs using light-front wave functions

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Higher-twist transverse-momentum dependent parton distributions (TMDs) go beyond the parton model description of a proton as they describe correlations between quarks and gluons. In general, twist-3 distributions can be decomposed into different contributions: lower-twist (i.e. twist-2) contributions and pure twist-3 contributions. Most of the phenomenological parametrizations and models rely on the so called Wandzura-Wilczeck (WW) approximation, that set to zero the pure twist-3 contributions. However, the WW approximation removes the richness of the twist-3 distributions.
I will show how the quark-gluon correlations (pure twist-3 contributions) entering the T-even chiral-odd distribution e(x,k⊥) and in the T-even chiral-even distribution f⊥(x,k⊥) can be calculated using the formalism of light-front wave functions (LFWFs). We consider LFWFs with non-vanishing parton's orbital angular momentum and an intrinsic, non-perturbative gluon contribution.
The LFWFs are modeled in terms of the nucleon distribution amplitudes, with parameters fitted to the MMHT2014 parametrization for both the valence-quark and gluon unpolarized parton distribution f1(x). With these fit parameters, I will show predictions of the pure twist-3 contributions, and I will compare the results for e(x) to a recent extraction, obtained from the analysis of preliminary data of the beam asymmetry for di-hadron semi-inclusive deep inelastic scattering at CLAS 6 GeV.

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