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One-loop matching for Coulomb-gauge quasi generalized parton distributions

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We present a one-loop matching calculation for flavor-nonsinglet Coulomb-gauge quasi generalized parton distributions within large-momentum effective theory. Using nonforward quark matrix elements at large hadron momentum, we derive the perturbative kernel relating the Coulomb-gauge equal-time correlator to the corresponding light-cone nonsinglet GPD. We show that the infrared singularities of the quasi and light-cone distributions agree, so that their difference defines a short-distance matching coefficient. The resulting kernel depends on the momentum fraction and skewness, reduces to the known Coulomb-gauge quasi-PDF matching coefficient in the forward limit, and yields the corresponding Coulomb-gauge quasi-DA matching coefficient in the distribution-amplitude limit. We also discuss a distinctive feature of the coordinate-space result: the Coulomb-gauge no-link correlator can retain nontrivial dependence on the partonic longitudinal momentum through combinations such as \(z p_z\), making its connection to the conventional local moment OPE less direct.

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