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Lensing function relation in hadrons

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The parton structure is studied using mainly two types of hard scattering processes: exclusive processes, which give access to Generalized Parton Distributions (GPDs), and semi-inclusive processes, described in terms of Transverse Momentum Dependent parton distributions (TMDs). In full QCD, no relations exist between GPDs and TMDs. However, a connection between T-odd effects related to TMDs and GPDs was found in simple models. This relation is commonly referred to as lensing relation. With the tools provided by light-front quantization, I will discuss the features of the models that allow to establish the lensing relation. I will also specify the general discussion to two relevant examples: the pion, viewed as a prototype of a two-body bound system in the Fock-state representation, and the proton, as the preferential three-body hadron. I will show how, under specific conditions, the pion GPDs and TMDs present a non-trivial relation, and I will emphasize how these conditions are broken in a many-body system.

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