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Gluon TMD modeling & proton 3D imaging

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We present exploratory studies of the 3D gluon content of the proton, as a result of analyses on leading-twist transverse-momentum-dependent (TMD) gluon distribution functions, calculated in a spectator model for the parent proton. Our formalism embodies a fit-based parameterization for the spectator-mass density, suited to describe both the small-x and the moderate-x regime. Particular attention is paid to the T-odd gluon TMDs, which represent a key ingredient in the description of relevant spin asymmetries emerging when the nucleon is polarized, as the gluon Sivers effect. All these analyses are helpful to shed light on the gluon dynamics inside nucleons and nuclei, which is one of the primary goals of new-generation colliders, as the Electron-Ion Collider, the High-Luminosity LHC, and its fixed-target program.

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