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Exclusive photoproduction of a photon-pion pair in a saturation framework

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The Large Hadron Collider (LHC) has paved the way for an increasingly deeper understanding of hadronic structure. Particularly exciting is the potential to exploit the high center-of-mass energies to investigate gluon saturation in nuclei and nucleons through Ultra Peripheral Collisions (UPC).

We consider the exclusive photoproduction of a photon-pion pair, $\gamma + P \rightarrow \gamma + \pi^0 + P$, as a promising channel to study gluon saturation. Furthermore, it has recently been demonstrated that this process does not admit a collinear factorization in terms of generalised parton distributions (GPDs) at the leading twist. In such a situation, a (generalized) k_T -dependent factorization, reliable at small-x, is a valid option, since the end-point singularities are naturally regularized by the transverse momenta of the t-channel gluons. The numerics from our analysis indicate that this process could be measured in UPCs at the LHC.

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