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Exclusive vector-quarkonium photoproduction at NLO in collinear factorisation with evolution of the generalised parton distributions and high-energy resummation

Tuesday 10 June 2025 17:00 (20 minutes)

I will report on our recent complete one-loop study of exclusive photoproduction of vector quarkonia off protons in Collinear Factorisation (CF) including the scale evolution of the Generalised Parton Distributions (GPDs). We have confirmed the perturbative instability of the cross section at high photon-proton-collision energies (W) at Next-to-Leading Order (NLO) in α_s and solved this issue by resumming higher-order QCD corrections, which are enhanced by a logarithm of the parton energies, using High-Energy Factorisation (HEF) in the Doubly-Logarithmic Approximation (DLA) matched to CF. Our NLO CF + DLA HEF results are in agreement with the latest HERA data and show a smaller sensitivity to the factorisation and renormalisation scales compared to Born-order results. Quark-induced channels via interference with gluon ones are found to contribute at most 20% of the cross section for $W_{\gamma p} > 100$ GeV. I will discuss implications for the interpretation of present and future experimental data collected at HERA, the EIC, the LHC via UPCs and future experiments and present an outlook toward extension of our study.

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