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Exclusive vector meson production at high energies and gluon saturation

Tuesday 29 April 2014 15:00 (20 minutes)

We investigate exclusive diffractive photoproduction of vector mesons (J/ψ , ϕ and ρ) off protons in high-energy collisions. We confront saturation-based results for diffractive J/ψ photoproduction with all available data including recent ones from HERA and LHCb. We show that while the total J/ψ cross-section is affected by uncertainties related to the charm mass, the t -distribution of differential cross-section offers a unique opportunity to unambiguously discriminate among saturation and non-saturation models. This is due to emergence of a pronounced dip (or multiple dips) in the t -distribution of diffractive photoproduction of vector mesons at relatively large $|t|$ that can be traced back to the unitarity features of colour dipole amplitude in the saturation regime. We show that in saturation models the dip in the t -distribution recedes towards lower $|t|$ with decreasing mass of the vector meson, increasing energy or decreasing Bjorken- x , and decreasing virtuality Q^2 . We provide predictions for exclusive photoproduction of various vector mesons at the LHC and at future electron-proton colliders.

This talk is mainly based on: arXiv:1402.4831.

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