Contribution ID: **3** Type: **not specified**

Saturation in the impact-parameter plane through vector meson photoproduction

Thursday, 21 November 2019 11:30 (25 minutes)

Up to now, searches for saturation have concentrated in the the small-x behaviour of QCD. Here we add the transverse dimension to this type of studies. We present a model of hadrons with an energy-dependent structure in the transverse plane made of hot spot, regions of high gluonic density. Using this model and the colour-dipole formalism we compute the diffractive photoproduction of vector mesons off protons and show that the dissociative cross section offers a new signature of saturation in the impact-parameter plane. We compare our results to HERA and LHC data and predict that future electron-ion colliders, like JLEIC, eRHIC and LHeC, will be able to map the scale dependece of the associated saturation scale using real and virtual photons as well as different vector mesons.
This work is based on results published in Phys.Lett. B766 (2017) 186-191, Nucl.Phys. B934 (2018) 330-340, and Phys. Rev. D 99, 034025 (2019).

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Session Classification: MPI & Small-x & diffraction

Track Classification: MPI & Small-x & diffraction