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Diffractional vector meson production in ultraperipheral heavy ion collisions from the Color Glass Condensate

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Deep inelastic scattering is a powerful tool to study the structure of hadrons and test our understanding of the strong interaction. The precise proton structure function measurements done at HERA have been a crucial test for the Color Glass Condensate effective field theory description of the high energy hadronic interactions. Ideally one would want to continue the analysis with nuclear targets where gluon saturation effects are expected to be even stronger.

Because the role of the electron in DIS events is to only act as a source of virtual photons, one can study the same physics in ultraperipheral (large impact parameter) heavy ion collisions. In these events the dominant process is the one where one nucleus acts as a photon source, and one is left with a similar photon-nucleus scattering as in DIS.

Recently diffractional vector meson production in ultraperipheral collisions has gained a lot of theoretical and experimental attention, because the cross section is especially sensitive to the saturation effects and also probes the spatial distribution of gluons. For example the ALICE collaboration has measured the diffractional J/Psi cross sections in lead-lead collisions [1].

We calculate coherent and incoherent diffractional vector meson production from the Color Glass Condensate framework and compare our results and predictions with the ALICE data. We discuss the dependence on the vector meson properties and the modelling uncertainties. We also present predictions for proton-nucleus collisions. [2]

[1] ALICE collaboration, Phys. Lett. B718 (2013) 1273,
Eur.Phys.J. C73 (2013) 2617

[2] T. Lappi, H. Mäntysäari, Phys.Rev. C87 (2013) 032201,
Phys.Rev. C83 (2011) 065202

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