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Saturation effects in exclusive heavy vector meson photoproduction

The gluon density inside nucleons has been observed to increase rapidly with energy, which would eventually violate unitarity. At high energies, however, nonlinear effects start to become important, slowing down the evolution of the gluon density and giving rise to gluon saturation. While there have already been strong hints of saturation effects in the currently available data, definite evidence of saturation is still lacking. As exclusive vector meson production is a process that is very sensitive to the gluon density, it offers one possible channel for measuring gluon saturation.

The purpose of this talk is to study the magnitude of saturation effects in exclusive heavy vector meson photoproduction. This is done by comparing predictions from linear and nonlinear models for the evolution of the gluon density, described using the color-glass condensate effective field theory. The difference in these models is the high-energy evolution of the dipole amplitude which is done according to the BFKL and BK equations. We find that saturation effects are negligible for proton targets, but Pb targets show a strong indication for gluon saturation already in the currently available data.

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