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Momentum space dipole amplitude for DIS and inclusive hadron production

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We show how the AGBS model, originally developed for deep inelastic scattering applied to HERA data on the proton structure function, can also describe the RHIC data on single inclusive hadron yield for $d + Au$ and $p + p$ collisions through a new simultaneous fit. The single inclusive hadron production is modeled through the color glass condensate, which uses the quark (and gluon)-condensate amplitudes in momentum space. The AGBS model is also a momentum space model based on the asymptotic solutions of the BK equation, although a different definition of the Fourier transform is used. This description entirely in transverse momentum of both processes arises for the first time. The small difference between the simultaneous fit and the one for HERA data alone suggests that the AGBS model describes very well both kind of processes and thus emerges as a good tool to investigate the inclusive hadron production data. We use this model for predictions at LHC energies, which agree quite well with available experimental data.

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