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Color charge correlations in the proton at moderately small x

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Color charge correlations in the proton at moderately small x are extracted from its light-cone wave function. $calO(g^2)$ corrections to the leading order correlations due to perturbative emission of a gluon, which is not required to be soft, have been accounted for. This analysis provides initial conditions for Balitsky-Kovchegov high-energy evolution of the dipole scattering amplitude which include impact parameter and $\hat{r} \cdot \hat{b}$ dependence, dependence on x_0 , and with non-zero C-odd component due to three-gluon exchange.

The color charge correlators are found to exhibit non-trivial dependence on impact parameter as well as on the relative transverse momentum (or distance) of the gluon probes. We present selected numerical results for the dependence of the dipole scattering amplitude at $x \sim 0.01 - 0.1$ on x, \vec{b}, \vec{r} , and the azimuthal angle. The color charge correlators constitute the basis for a variety of exclusive and semi-inclusive processes in DIS.

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