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Proton Orbital Angular Momentum at Small x

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We determine the small Bjorken x asymptotics of the quark and gluon orbital angular momentum (OAM) distributions in the proton in the double-logarithmic approximation (DLA), which resums powers of $\alpha_s \ln^2(1/x)$ with α_s the strong coupling constant. Starting with the operator definitions for the quark and gluon OAM, we simplify them at small x , relating them, respectively, to the polarized dipole amplitudes for the quark and gluon helicities defined in our earlier works. Using the small- x evolution equations derived for these polarized dipole amplitudes earlier we arrive at the following small- x asymptotics of the quark and gluon OAM distributions in the large- N_c limit:

$$L_{q+\bar{q}}(x, Q^2) = -\Delta\Sigma(x, Q^2) \sim \left(\frac{1}{x}\right)^{\frac{4}{\sqrt{3}}} \sqrt{\frac{\alpha_s N_c}{2\pi}},$$
$$L_G(x, Q^2) \sim \Delta G(x, Q^2) \sim \left(\frac{1}{x}\right)^{\frac{13}{4\sqrt{3}}} \sqrt{\frac{\alpha_s N_c}{2\pi}}.$$

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