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Quark Helicity at Small x

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Traditional small-x evolution, given by the BFKL / BK / JIMWLK evolution equations, describes the growth of unpolarized parton distributions with increasing energy or decreasing x. Polarized distributions, such as the quark helicity, are governed by very different evolution equations with much more intricate structure. Early work suggested that the double-logarithmic evolution of the quark helicity could result in a substantial growth of quark polarization at small x, leading to an important unmeasured contribution to the total proton spin. In recent work, we have formulated helicity evolution in the modern s-channel CGC formalism, deriving evolution equations which include nonlinear multiple scattering. Solving these equations remains challenging, but preliminary numerical work suggests a dependence on the borderline between marginal growth and marginal suppression at small x. We further comment on the differences between our work and prior results, and we discuss possible effects of the nonlinear terms.

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