Abstract Submitted
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Helicity at Small x: Oscillations, Cross-Checks and LLA Corrections[1] YOSSATHORN TAWABUTR, YURI KOVCHEGOV, Ohio State Univ - Columbus — A numerical solution is constructed for the recently-derived large-N_c&N_f small-x helicity evolution equations with the aim to establish the small-x asymptotics of the quark helicity distribution. (Here N_c and N_f are the numbers of quark colors and flavors.) We find that adding quarks to the evolution makes quark helicity distribution oscillate as a function of $\ln(1/x)$. The typical oscillation period depends on N_f and spans many units of rapidity. This result may relate to the sign variation with x seen in the strange quark data. In addition, we perform a cross check on this recently-derived helicity evolution equations by analytically solving the equations with a substantially different initial condition, obtaining the same asymptotics at large N_c. The fact that two large-N_c evolution equations resulting from two different initial conditions give the same small-x asymptotics provides a validity cross-check of the calculation. Finally, we derive the single-logarithmic corrections to the double-logarithmic equations derived previously. The more complete equations, once solved, will provide a more precise estimate of the quark helicity distribution at small x, contributing to the resolution of the proton spin puzzle.

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