

Abstract Submitted
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Helicity at Small x : Oscillations and LLA Corrections¹ YOS-SATHORN TAWABUTR, YURI KOVCHEGOV, The Ohio State University — Proton spin puzzle is a longstanding problem in high-energy and nuclear physics: how is the proton spin distributed between quarks and gluons in the proton? A missing piece of the puzzle is the amount of spin coming from the quarks inside the proton at small Bjorken- x . Integral equations which predict quark helicity distributions at small x were derived only recently. In this work, we construct a numerical solution of these equations at large- N_c & N_f , 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.) Our main result is the following: we find that the quark helicity distribution should oscillate as a function of $\ln(1/x)$. The oscillation period depends on N_f and spans many units of rapidity. This result may relate to the sign variation of the strange quark helicity distribution with x seen in phenomenology. Our solution provides a better constraint on the quark's helicity distribution at small x , contributing to the resolution of the proton spin puzzle.

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