Contribution ID: **47** Type: **not specified**

Quark and Gluon Helicity Evolution at Small x

Thursday 3 November 2022 18:00 (15 minutes)

Resolution of the proton spin puzzle, which is inability of the constituent quark model to explain discrepancy between the spin-$1/2$ of the proton and the amount of spin carried by its quarks and gluons, as measured in experiment, is an outstanding problem in modern hadronic physics. One possibility is that "missing"spin of the proton may be found at small values of Bjorken-x. As a result, in recent years the small-x asymptotics of helicity distributions for quarks and gluons have been the subject of intense studies. In this talk we will discuss the small-x evolution of the gluon and flavour-singlet quark helicity distributions calculated in the shock-wave formalism. For the first time we will show that the evolution contains mixing not only between the gluon field-strength F_{12} and quark axial current $\bar{\psi}\gamma^+\gamma_5\psi$ operators, but also a sub-eikonal operator $D^i - \overleftarrow{D}^i$ which is related to the Jaffe-Manohar polarized gluon distribution. To do this, we will employ the powerful background field method which allows to unambiguously determine the form of the operators and their mixing in the helicity evolution. By solving the evolution equations in the limit of large N_c we find that the small-x asymptotics of the quark and gluon helicity distributions is in complete agreement with the earlier work by Bartels, Ermolaev and Ryskin.

Primary authors: TARASOV, Andrey (The Ohio State University); Dr COUGOULIC, Florian (Universidade de Santiago de Compostela); Dr TAWABUTR, Yossathorn (University of Jyväskylä); Prof. KOVCHEGOV, Yuri (The Ohio State University)

Presenter: TARASOV, Andrey (The Ohio State University)

Session Classification: Parallel Session B: TMD theory: small x