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First Analysis of the World Polarized DIS Data in the Small-x Dipole Formalism[1] YURI KOVCHEGOV, DANIEL ADAMIAK, Ohio State Univ - Columbus, WALLY MELNITCHOUK, Jefferson Laboratory, DANIEL PITONYAK, Lebanon Valley College, NOBUO SATO, Jefferson Laboratory, MATTHEW SIEVERT, New Mexico State University — We present a Monte-Carlo-based analysis in the Jefferson Angular Momentum (JAM) collaboration framework of the combined world polarized deep inelastic scattering (DIS) data at moderately small values of the Bjorken x variable ($0.01 < x < 0.1$) using the small-x helicity evolution equations derived recently. We demonstrate that the world data on the double-spin asymmetries $A_{||}$ and A_1 at $x < 0.1$ can be successfully described in the small-x framework, using the Born-level initial conditions and, in this first attempt, the large-N_c evolution equations (with N_c the number of quark colors). This is the first-ever empirical demonstration of a global polarized DIS data analysis based solely on small-x helicity evolution equations. We present the extracted quark helicity parton distribution functions (hPDFs) extrapolated down to $x = 10^{-5}$ and evaluate their contribution to the net spin of the proton. We also make a prediction for the $g_1(x, Q^2)$ structure functions of the proton and neutron down to $x = 10^{-5}$. In addition, we assess the impact of the data to be collected at the Electron-Ion Collider (EIC) on our knowledge of these observables, including the potential contribution of the parity-violating DIS.

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Yuri Kovchegov
Ohio State Univ - Columbus

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