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Impact of the Double-Logarithmic contribution to Pomeron on the small- x behaviour of the DIS Structure Function F_1

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Pomeron was introduced in the framework of the phenomenological Regge theory.

It governs the high-energy asymptotics of various hadronic processes and the small- x behavior of F_1 in particular.

The best-known contribution to the QCD Pomeron comes from the BFKL equation which sums Leading Logarithmic (LL) contributions i.e. the single-logarithmic (SL) contributions $\sim (\alpha_s \ln(1/x))^n$ multiplied by the overall factor $1/x$.

The high-energy asymptotics of this resummation is known as the BFKL Pomeron. It predicts that small- x $F_1 \sim x^{-(1+\Delta)}$, where Δ is the intercept of the BFKL Pomeron.

In contrast, we calculate F_1 in the Double-Logarithmic approximation (DLA), accounting for contributions $\sim (\alpha_s \ln^2(1/x))^n$ as well as double-logs of Q^2 . Such terms are not accompanied by the overall factor

s , so their contribution to asymptotics of F_1 is $\sim x^{-\Delta_{DL}}$ without the factor x^{-1} . It looks negligibly small compared to the

BFKL exponent $1 + \Delta$. By this reason the DL contribution to Pomeron was offhandedly ignored by the HEP community. However, we demonstrate that the intercept Δ_{DL} proves to be so large that its value compensates for the lack of x^{-1} , which makes the DL Pomeron and BFKL Pomeron be equally important.

It means that DL Pomeron should participate in theoretical analysis of all HEP results where the BFKL Pomeron has been involved.

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