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Running coupling corrections and nonlinear QCD evolution at small-x

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Content

In this talk, we discuss the impact of including running coupling corrections in nonlinear QCD evolution at small-x. The analysis is performed within the dipole picture of high-energy QCD, where the evolution of color dipoles is governed by the Balitsky–Kovchegov (BK) equation. We examine how the inclusion of a running QCD coupling modifies the BK kernel, the energy dependence of the saturation scale, and the geometric scaling behavior of the solutions. Using the homotopy approach, we obtain analytic solutions for a model twist BFKL kernel and deep inside the saturation region. We find that the zeroth-order approximation already captures the main features of the solution, while higher-order corrections are shown to be small.

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