Contribution ID: **25** Type: **not specified**

Towards 3-loop Balitsky–Kovchegov: the non-conformal part

Tuesday 24 June 2025 09:25 (25 minutes)

The Balitsky–Kovchegov (BK) equation offers a tractable description of the high-energy growth of gauge-theory scattering amplitudes and the nonlinear saturation effects that eventually tame this growth. Motivated by the upcoming precision era at the Electron–Ion Collider (EIC)—whose extended kinematic reach promises decisive tests of saturation—we present a framework based on the timelike-spacelike correspondence that streamlines the computation of multiloop corrections to the BK equation. We predict the full nonconformal part of the NNLO BK Hamiltonian in the planar limit of a generic gauge theory, treating the numbers of fermions and scalars as free parameters. As a byproduct of this three-loop computation, we introduce novel Feynman-calculus techniques for the explicit evaluation of dimensionally regulated Fourier transforms.

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Session Classification: Tuesday Session