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Numerical calculation of the lowest order pomeron loop

Content

We perform a numerical calculation of the lowest-order Pomeron loop contribution to high-energy elastic scattering in Quantum Chromodynamics (QCD). While the BFKL equation captures leading-order Pomeron exchange, loop corrections are essential to account for unitarity effects and non-linear QCD dynamics. Using advanced numerical integration techniques, we evaluate the loop contribution and analyze its behavior as a function of rapidity and transverse momentum. These corrections are particularly relevant in the regime where saturation effects become important. Our results provide insight into the structure of Reggeon interactions and serve as a step toward more complete and realistic descriptions of high-energy QCD processes, with potential implications for future phenomenological studies.

Summary

We numerically compute the lowest-order Pomeron loop contribution to high-energy elastic scattering in QCD. While the BFKL equation accounts for leading-order Pomeron exchange, loop corrections are necessary to address unitarity and non-linear effects. Our results, based on numerical integration techniques, provide insight into Reggeon interactions and the dynamics of high-energy QCD.

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