BFKL dynamics in high-energy QCD

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BFKL resummation

- The Balitsky-Fadin-Kuraev-Lipatov (BFKL) approach is the general framework for the resummation of energy-type logarithms
  - Leading-Logarithm-Approximation (LLA): $(\alpha_s \ln s)^n$
  - Next-to-Leading-Logarithm-Approximation (NLLA): $\alpha_s(\alpha_s \ln s)^n$

In which contexts can BFKL approach be applied?

- Semi-hard collision processes in the Regge-Gribov limit

$$s \gg Q^2 \gg \Lambda^2_{\rm QCD}, \qquad Q^2 \text{ a hard scale,}$$

$$\alpha_s(Q^2)\ \ln\left(\tfrac{s}{Q^2}\right) \sim 1 \implies \text{all-order resummation needed}$$

- The evolution of the Unintegrated gluon density,

$$\mathcal{F}(x,\vec{k}) \quad \text{t.c.} \quad f^g(x,Q^2) = \int \frac{d^2\vec{k}}{\pi\vec{k}^2}\mathcal{F}(x,\vec{k})\theta(Q^2-\vec{k}^2)$$

  as a function of $\ln(1/x) = \ln(s/Q^2)$, is governed by BFKL.

- Other remarkable connections
  Formulation in $\mathcal{N}=4$ MSYM (maximally extended supersymmetric Yang–Mills), BFKL/integrable systems duality, BFKL and gravity ...

My research interests

BFKL in NLLA

- Computation of new impact factors ($gR \to Q\bar{Q}$ at LO and $gR \to H$ at NLO)
- Phenomenological studies for revealing BFKL dynamics at modern colliders
- Using BFKL to compute the remainder function of the Bern-Dixon-Smirnov (BDS) ansatz

Saturation regime of QCD

- Trying to understand when nonlinear dynamics of QCD becomes important in the exclusive production of a vector meson

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Thanks for your attention!