

Insights into the Gluon Propagator: Theory and Phenomenology

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Content

The gluon propagator encodes key nonperturbative features of QCD, such as confinement and the dynamical generation of a gluon mass. We present recent results connecting the theoretical structure of the propagator with phenomenological applications. Using QCD effective charges extracted from nonperturbative inputs, we evaluate higher-twist contributions to the proton structure function F_2 and analyze elastic scattering within the two-gluon exchange model. These results highlight the interplay between the infrared dynamics of QCD and hadronic phenomenology across different energy scales.

Primary author(s) : Dr. LUNA, Emerson (Federal University of Rio Grande do Sul)

Presenter(s) : Dr. LUNA, Emerson (Federal University of Rio Grande do Sul)