

## Quark Scattering and Confinement Effects

The work aims to investigate possible non-perturbative effects of gluon confinement in the infrared regime on cross-section calculations.

As a result of net simulations, we know that the gluon propagator in the Landau gauge reaches nonzero and finite values at low momentum, which suggests that the gluon generates mass dynamically in the IR. Therefore, it is used in this work an effective theory with a mass term added through Proca lagrangian to describe this massive gluon.

Another important result from studies of the Landau propagator is that the coupling constant remains finite and even decreases at deep IR. Such result is gotten from numerical calculations of pure Yang-Mills theories. Thus, this allows us to use perturbative methods in the IR regime.

Therefore, it is used a Landau gauge propagator with a mass term to describe the gluon in the calculation of the cross-section of a quark-antiquark scattering. All that is achieved using perturbative method. The main goal is to compare the results with experiments and establish limits to the values of the gluon mass at high energies.

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