ID de Contribution: **6**   Type: **Non spécifié**

Extracting infrared properties of QCD from the Curci-Ferrari model (45)

mercredi 8 novembre 2017 16:30 (45 minutes)

It is often believed that the infrared regime of QCD is nonperturbative. This is partly based on the fact that standard perturbation theory predicts a coupling constant which diverges at a finite (infrared) momentum scale. However lattice simmulations show no clue of such a behavior. Instead, the coupling constant is found to be bounded by a constant of order 1, which could be dealt with in perturbation theory. We review on a phenomenological approach which consists in adding to the standard Faddeev-Popov action a gluon mass (this model was introduced by Curci and Ferrari in the 70's). The model has good properties in the infrared regim and the coupling constant remains finite down to arbitrary small momentum scale, as seen in lattice simulations. We review on the systematic comparison that was performed between the 1-loop calculation in this model and lattice simulation. We finally discuss on possible origins for the gluon mass

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