Contribution ID : **21** Type : **Oral Presentation**

Quark-gluon vertex from the Curci-Ferrari model: two-loop corrections

Wednesday, 3 December 2025 09:30 (0:30)

Content

The Curci-Ferrari (CF) model is a gluon mass extension of the standard Faddeev-Popov action. It is motivated by the lattice QCD results for the gluon propagator, which saturate to a finite value at vanishing momentum, similarly to a massive field.
With this minimal modeling, over the past 15 years, the CF model has successfully been employed to study the infrared dynamics of QCD. More specifically, it has described correlation functions, some aspects of the phase structure of QCD and, more recently, even experimental observables.
A major advantage of the CF model is that its approximations are well justified and remain under control. Moreover, several correlation functions have been evaluated by using perturbation theory with very good results already at one-loop order. Two-loop results in the pure gauge theory have shown, in general terms, an improvement compared to one-loop results, in consistency with the perturbative approach.
In the presence of quarks, however, only the two-point functions have been evaluated at two-loop order. The results show that, in the case of light quarks, the perturbative description holds for some quantities but fails for others. In this scenario, evaluating three-point correlation functions, such as the quark-gluon vertex, becomes a crucial test for the perturbative approach in the presence of quarks.
In this talk, I will present the preliminary results of the form factors of the quark-gluon vertex at two-loop accuracy, in the soft gluon configuration. These results are a pure prediction of the model, since its parameters have already been determined in the computation of the propagators. In general terms, our results show that two-loop results are in very good agreement with lattice simulations, displaying an improvement over the one-loop evaluation.

Primary author(s) : Dr. BARRIOS, Nahuel (Facultad de Ingeniería, Universidad de la República)

Presenter(s) : Dr. BARRIOS, Nahuel (Facultad de Ingeniería, Universidad de la República)