Contribution ID : **21** Type : **not specified**

Perturbative dynamics of massive gluons and chiral symmetry breaking

Friday, 29 June 2018 15:30 (30)

Lattice simulations of Yang-Mills theories and QCD in the Landau gauge demonstrate that the gluon propagator saturates at vanishing momentum. This can be modelled by a massive deformation of the corresponding Faddeev-Popov Lagrangian known as the Curci-Ferrari model. The latter does not modify the known ultraviolet regime of the theory and provides a successful perturbative description of essential aspects of the non-Abelian dynamics in the infrared regime, where, in particular, the coupling remains finite, as also seen in lattice simulations. This opens the possibility of a controlled (semi)perturbative description of various aspects of the infrared QCD dynamics, including correlation functions and the deconfinement phase transition at finite temperature and density. I present recent progress concerning the description of chiral symmetry breaking in this context.

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Session Classification : Parallel