

# XVth Quark Confinement and the Hadron Spectrum



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## Polyakov loop and QCD equation of state

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The color/quark deconfinement is one of the remarkable features of QCD phase transitions, with the observation of (strongly coupled) quark-gluon plasma in the heavy-ion collision experiments. In phenomenology, the deconfinement phase transition corresponds to the Polyakov loop which symbols the glue dynamics.

In this talk, I will discuss the relevance of the Polyakov loop for the QCD thermodynamic functions. Firstly, I'll show the impact of the Polyakov loop on the quark sector and on the evolution trajectories of the QCD system, in a combined study with the hydrodynamic simulation, and also in a cosmological study. Moreover, I will discuss the nonperturbative determination of the Polyakov loop potential via the Dyson-Schwinger equations (DSEs), and introduce some new progress about the DSEs study on the baryon number fluctuations and the finite-density QCD equation of state.

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