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# Correlations functions of QCD from the functional renormalization group

*Thursday, 2 August 2018 14:30 (30 minutes)*

We present non-perturbative first-principle results for quark-, gluon- and meson 1PI correlation functions of two-flavour Landau-gauge QCD in the vacuum [1] and Yang-Mills theory at finite temperature [2]. These correlation functions carry the full information about the theory and their connection to physical observables is discussed. We confront our results for the correlation functions with lattice simulations and compare our result for the Debye mass to hard thermal loop perturbation theory.

The presented correlation functions and derived quantities are obtained by solving their Functional Renormalisation Group equations in a systematic vertex expansion, aiming at apparent convergence within a self-consistent approximation scheme. The presented calculations represent a crucial prerequisite for the ultimate goal of quantitative first-principle studies of QCD and its phase diagram within this framework. In particular, they constitute an important step towards achieving control over quantitative uncertainties. Our results stress the outstanding importance of the consistent running of different vertices in the semi-perturbative regime for describing the phenomena and scales of confinement and spontaneous chiral symmetry breaking without phenomenological input.

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