

# Pionic and thermodynamic properties of hot QCD with two flavours from an effective field theory approach

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We construct an Euclidean effective field theory (EFT) for thermal Quantum Chromodynamics (QCD) with  $N_f = 2$  for physics near crossover temperature using the global symmetries of QCD. A cut-off scale is used along with the  $\overline{\text{MS}}$  regularization scheme and all dimension six operators including current-current interactions and a gradient cubed term are utilized. The gradient cubed term contributes to the free energy in the mean field theory (MFT) and modifies the gap equation, as a result of which its coefficient is constrained. Pion fluctuations around the MFT is treated to one-loop in fermions and used to match the theory to lattice computations. Matching the EFT at two temperature allows prediction of the temperature dependence of pion properties and thermodynamic quantities near the cross over.

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