

# Renormalization group improved QCD thermodynamics

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We use the renormalization group optimized perturbation theory (RGOPT) to evaluate the quark contribution,  $P_q$ , to the QCD pressure at NLO (two loop level). In this seminal application the complete QCD pressure is then obtained simply by adding the perturbative NLO contribution from massless gluons to the resummed  $P_q$ . At the central scale  $M \sim 2\pi T$  our complete QCD pressure,  $P = P_q + P_g$ , shows a remarkable agreement with lattice predictions for  $0.25 \leq T \leq 1$  GeV. As expected, the RG properties native to the RGOPT resummation significantly reduce the embarrassing scale dependence that plagues popular analytical methods such as standard thermal perturbative QCD and hard thermal loop perturbation theory (HTLpt).

**Auteurs principaux:** Prof. BENGHI PINTO, Marcus (Universidade Federal de Santa Catarina); Dr KNEUR, Jean-Loic (Université de Montpellier); Dr RESTREPO, Tulio Eduardo (UFRJ)

**Orateur:** Prof. BENGHI PINTO, Marcus (Universidade Federal de Santa Catarina)

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