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Scale invariant resummed perturbation at finite temperature

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We will illustrate how our recently developed
renormalization group optimized perturbation (RGOPT) efficiently resums perturbative expansions in thermal field theories. The resulting convergence and scale dependence of optimized thermodynamical quantities are drastically improved as compared to standard perturbative expansions, as well as compared to other related methods such as the screened perturbation or (resummed) hard-thermal-loop perturbation. Our general method will be illustrated for the nonlinear sigma model, as a toy model for thermal QCD, and we will also discuss application of RGOPT to hard thermal loop resummation for QCD thermodynamical quantities.

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