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cal N=4 $supersymmetric Yang-Mills thermodynamics from effective field theory$

The free energy density of $calN = 4$ supersymmetric Yang-Mills theory in four space-time
dimensions is derived through second order in the 't Hooft coupling λ
at finite temperature using effective-field theory methods. The contributions to the free energy
density at this order come from the hard scale T and the soft scale $\sqrt{\lambda}T$.
The effects of the scale T are encoded in the coefficients of an effective three-dimensional
field theory that is obtained by dimensional reduction at finite temperature. The effects
of the electric scale $\sqrt{\lambda}T$ are taken into account by perturbative calculations in the effective theory.

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