Gluon Condensates at finite Temperature

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Abstract

We consider various special cases of gluon condensates at finite temperature. The gluon condensate for an ideal gas of gluons with a given vacuum expectation value is introduced for the sake of comparison with that calculated using recent finite temperature lattice gauge simulations for a pure Yang-Mills SU(3) gauge theory at the known critical temperature. We extend this comparison using the high precision lattice data for two light dynamical quarks. The investigation of these three cases show some interesting differences arising from the strong interaction alone and in the presence of dynamical quarks. In this context we discuss some newer simulations for heavier quarks as well as other properties related to gluon condensation.