Equation of State of Gluon Plasma from Fundamental Modular Region

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Abstract: Despite considerable practical success in dealing with the gluon plasma, finite-temperature perturbation theory suffers at the fundamental level from infrared divergences discovered by Linde. However if gauge or Gribov copies are properly eliminated from the physical state space, infrared modes are strongly suppressed. We describe the gluon plasma in zeroth order as a gas of free quasiparticles with a temperature-independent dispersion relation of Gribov type, $E(k) = \sqrt{k^2 + \frac{M^4}{k^2}}$, that results from the reduction of the physical state space. The effective mass $\frac{M^2}{k}$ controls infrared divergences and allows finite calculable corrections. The equation of state of this gas is calculated and compared with numerical lattice data.