

Temperature Dependence of Viscosity of Pure-gluon QCD Using Gradient Flow

Friday, 28 November 2025 14:20 (20 minutes)

In this talk, we present lattice results for the shear and bulk viscosities of gluon plasma, calculated in SU(3) Yang-Mills theory over the temperature range $0.76T_c \leq T \leq 2.25T_c$, where T_c denotes the confinement/deconfinement transition temperature. Shear viscosity and bulk viscosity quantify the response of the energy-momentum tensor to shear flow and divergent flow, respectively. These viscosities serve as critical input parameters for phenomenological and transport models used to interpret the experimental data, e.g. the elliptic flow v_2 . Using gradient flow, we achieve unprecedented precision for the temporal Euclidean two-point correlation functions of the energy-momentum tensor, from which the viscosities are extracted. We focus particularly on how the viscosities vary around T_c , with the goal of understanding the critical behavior of the pure-gluon system. The methodology developed in this work also paves the way for extending the study to full QCD.

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