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Shear viscosity from quenched to full lattice QCD

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The shear viscosity of the quark-gluon plasma (QGP) plays a crucial role in interpreting current measurements from heavy-ion collisions and are key inputs to hydro-dynamical models. The interest in shear viscosity also lies in the fact that QGP is the most ideal fluid ever observed and has the shear viscosity to entropy ratio (η/s) close to the theoretical bound $\eta/s \geq 1/4\pi$ in the strong coupling region within AdS/CFT formalism. We utilize the gradient flow method to renormalize the Energy-Momentum Tensor (EMT) and to suppress UV fluctuations in correlators on a lattice SU(3) gauge theory. After taking the continuum and zero flow-time limits, we extract shear viscosity in the pure-gauge theory by modeling the spectral function with a combination of the perturbative UV part and the hydro-motivated infrared part. We also present the extension of quenched findings to full QCD, specifically the renormalization of EMT and progress update on determining the relevant coefficients for shear viscosity with $m_s/m_l = 20$ on the lattice.

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