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Locating the QCD critical point using holographic black holes

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We use the gauge/gravity duality to map thermodynamic fluctuations of black holes onto fluctuations of baryon charge in a hot and baryon dense Quark-Gluon Plasma (QGP). Our approach gives results that are in quantitative agreement with state-of-the-art lattice simulations for the QCD equation of state at finite baryon density and the moments of fluctuations of baryon charge, while simultaneously encompassing nearly-perfect fluidity. This framework provides a definite prediction for the QCD critical point, which is found to be within the reach of low collision energy experiments at RHIC and also the CBM experiment at FAIR. We also determine the temperature and baryon chemical potential dependence of the bulk viscosity and the coefficients that characterize the transport of baryon charge, electric charge, and strangeness in the QGP.

Content type

Theory

Collaboration

Centralised submission by Collaboration

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