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Holographic QCD versus QCD diagram

Locating the critical endpoint of QCD and the region of a first-order phase transition at finite baryon chemical potential is an active research area for QCD matter. We provide a gravitational dual description of QCD matter at finite baryon chemical potential μB and finite temperature using the nonperturbative approach from gauge/gravity duality. After fixing all model parameters using state-of-the-art lattice QCD data at zero chemical potential, the predicted equations of state and QCD trace anomaly relation are in quantitative agreement with the latest lattice results. We then give the exact location of the critical endpoint as well as the first-order transition line, which is within the coverage of many upcoming experimental measurements. Moreover, we would like to construct the holographic QCD models for pure gluon, 2-flavor QCD, 2+1-flavor QCD with rotation and magnetic field.

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