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Equation of State at finite density in external magnetic fields aiming for an experimental setup

Equation of State at finite density in external magnetic fields aiming for an experimental setup

Probing the QCD phase diagram is a challenging task both from a theoretical and an experimental standpoint. Moreover heavy ion collision experiments have shown, that strong magnetic fields arise, which may have a sizeable impact on the phase diagram. From the lattice QCD perspective the finite-magnetic-field case is unproblematic, while simulations at finite chemical potential suffer from the infamous sign problem. In this work, we investigate the QCD equation of state via lattice simulations at external magnetic field and non-zero chemical potential using analytic continuation from imaginary chemical potential. The computations were done on a 32^3 x 8 lattice using the tree-level-improved Symanzik gauge action and 4-stout-improved staggered fermions with physical quark masses. Moreover, we tune the simulation parameters to an isospin-asymmetric and strangeness-neutral point using various expansion schemes to match experimental conditions.

Category

Theory

Collaboration (if applicable)

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