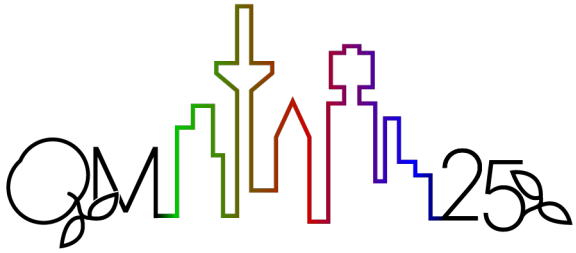

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A new 4D lattice QCD equation of state: extended density coverage from a generalized T'-expansion

Although calculations of QCD thermodynamics from first-principle lattice simulations are limited to zero net-density due to the fermion sign problem, it is possible to extend the equation of state (EoS) to finite values of the B, Q, S chemical potentials via expansions around zero chemical potentials. Taylor expansion around $_i = 0$ with $i = B, Q, S$ enables to cover with confidence the region up to $\frac{i}{T} < 2.5$, and is usually limited at 450 MeV in any chemical potential. Thanks to a new method based on a T'-expansion scheme, it was however possible to extend the reach of the extrapolation in the $(T, _B)$ plane, up to a baryo-chemical potential around $\frac{B}{T} = 3.5$. We present here a generalization of this scheme in which all three chemical potentials can be varied independently. We base our construction on continuum-estimated susceptibilities, obtained with the 4stout action on lattices with up to Nτ = 16, 20 and 24 time slices, depending on the quantity considered. As a result, we are able to offer a substantially larger coverage of the four dimensional QCD phase diagram compared to extrapolations based on the Taylor expansion.

Category

Theory

Collaboration (if applicable)

MUSES

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