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Thermodynamics in the fixed scale approach with the shifted boundary conditions

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The fixed scale approach has various advantages to calculate the QCD equation of state on lattices. In this approach a series of temperatures are realized with single coupling parameters. Therefore zero temperature subtractions are common, and conditions for the line of constant physics are automatically satisfied. We test the fixed scale approach to study thermodynamics of SU(3) gauge theory using the shifted boundary conditions, which can largely increase the number of possible temperatures while keeping the advantages of the fixed scale approach. The simulations are performed with 32^3 x Nt lattices at beta=6.0. Calculations at 80 temperature are investigated with the single coupling parameter by using various boundary shifts at Nt=4,5,6,7,8 lattices. We present the results of the trace anomaly, and the transition temperature determined by the plaquette susceptibility. We also found that the boundary condition reduces lattice artifacts in the equation of state numerically.

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