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Thermodynamics of QCD at physical point with (2+1)-flavors of improved Wilson quarks using gradient flow

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The energy-momentum tensor and the chiral condensate are studied in (2+1)-flavor QCD with improved Wilson quarks at the physical point, applying the method of Makino and Suzuki based on the gradient flow. Following a strategy of our previous study at a heavier quark mass, we adopt a nonperturbatively $O(a)$ -improved Wilson quark action and the renormalization group-improved Iwasaki gauge action and perform finite-temperature simulations in the range $T \simeq 155\text{-}544$ MeV ($N_t = 4\text{-}14$ including odd numbers) at $a \simeq 0.09$ fm based on the fixed-scale approach using zero-temperature physical point configurations generated by the PACS-CS Collaboration. We present preliminary results on the equation of state and the chiral condensate obtained so far.

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