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## Critical point in heavy-quark region of QCD on fine lattices

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We perform a finite-size scaling analysis of the critical point in the heavy-quark region of QCD at nonzero temperature. Our previous analysis at  $N_t = 4$  is extended to a finer lattice with  $N_t = 6$  and 8. The aspect ratio is also extended up to 18 to suppress the non-singular contribution. High-precision analysis of the Binder cumulant is realized by an efficient Monte-Carlo simulation with the hopping parameter expansion (HPE). Effects of higher order terms in the HPE are incorporated by the reweighting method.

From the analysis of the Binder cumulant of the Polyakov loop, we show that the behavior of this quantity has a small but statistically-significant inconsistency with the scaling of the magnetic observable in the  $Z(2)$  universality class. We then try to construct the order parameter corresponding to the magnetic observable from the conditions between relevant observables at the critical point. It is shown that the scaling of the order parameter thus constructed reproduces the  $Z(2)$  scaling.

### Topical area

QCD at Non-zero Temperature

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