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Critical endline of the finite temperature phase transition for 2+1 flavor QCD around the SU(3)-flavor symmetric point

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We investigate the critical endline of the finite temperature phase transition of QCD around the SU(3)-flavor symmetric point at zero chemical potential.

We employ the renormalization-group improved Iwasaki gauge action and non-perturbatively $O(a)$ -improved Wilson-clover fermion action.

The critical endline is determined by using the intersection point of kurtosis, employing the multi-parameter, multi-ensemble reweighting method to calculate observables off the SU(3)-symmetric point, at the temporal size $N_T=6$ and lattice spacing as low as $a \approx 0.19$ fm.

We confirm that the slope of the critical endline takes the value of -2 , and find that the second derivative is positive, at the SU(3)-flavor symmetric point on the Columbia plot parametrized with the strange quark mass m_s and degenerated up-down quark mass m_l .

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