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Approaching the Continuum Limit of the Deconfinement Critical Point for Nf=2 Staggered Fermions

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Quenched QCD at zero baryonic chemical potential undergoes a first-order deconfinement phase transition at a critical temperature Tc, which is related to the spontaneous breaking of the global center symmetry. The center symmetry is broken explicitly by including dynamical quarks, which weaken the first-order phase transition for decreasing quark masses. At a certain critical quark mass, which corresponds to the Z2-critical point, the first-order phase transition turns into a smooth crossover. We investigate the Z2-critical quark mass for Nf=2 staggered fermions on Nt=8, 10 lattices, where larger Nt correspond to finer lattices. Monte-Carlo simulations are performed for several quark mass values and aspect ratios in order to extrapolate to the thermodynamic limit. We present final results for Nt=8 and preliminary results for Nt=10 for the critical mass, which are obtained from fitting to a kurtosis finite size scaling formula of the absolute value of the Polyakov loop. Similar to studies with Wilson fermions, our preliminary analysis shows a decrease of the critical quark mass with decreasing lattice spacing. Investigating QCD for heavy quark masses offers the opportunity to study the interplay between dynamical screening, which happens in vaccuum as well as in medium, and Debye screening, which only happens at finite temperature.

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