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Effect of stout smearing on the phase diagram from multiparameter reweighting in lattice QCD

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The phase diagram and the location of the critical endpoint of lattice QCD was determined earlier with unimproved staggered fermions on a Nt=4 lattice with the multiparameter reweighting method by studying Fisher zeros. In our recent work, as an extension of the old analysis we introduced stout smearing in the fermion action in order to reduce the finite lattice spacing effects. In this talk we will show that increasing the smearing parameter ρ the crossover at $\mu=0$ gets weaker, i.e., the leading Fisher zero gets farther away from the real axis. Furthermore as the chemical potential is increased the overlap problem gets severe sooner than in the unimproved case, therefore shrinking the range of applicability of the method. Nevertheless, even after introducing the smearing certain qualitative features remain, which will be discussed in this talk.

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