Two color QCD phase diagram with clover improved Wilson fermion

Y. Sakai, A. Nakamura

Nishina Center, RIKEN, Wako 351-0198, Japan

aHiroshima University, Higashi-Hiroshima 739-8527 Japan

E-mail: ysakai@riken.jp

The study of QCD at nonzero baryon chemical potential $\mu$ is plagued by the sign problem. One of the possibilities to circumvent this problem is to make analytic continuations from imaginary $\mu$, where the sign problem is absent, to real $\mu$ [1]. Numerical results obtained at imaginary $\mu$ can be used to fit the behavior of physical observables with suitable functions, which can then be continued to real $\mu$. The choice of interpolating functions includes systematic errors and we have to check the reliability of the analytic continuation. Two color QCD is the ideal test ground to study such systematic effects and reliabilities, where numerical simulations are possible both at imaginary and real $\mu$ [2].

We study the two color QCD phase diagram with clover improved Wilson fermions at finite temperature and real and imaginary $\mu$. In this talk, we discuss the reliability of the analytic continuation for several quantities such as the critical line, the Polyakov loop and the quark number density.
