The Chiral Phase Transition in Lattice QCD with Domain-Wall Fermions

Content :

Chiral symmetry plays an important role in determining the nature of the strong interactions. It is spontaneously broken at $T=0$ but restored above a certain temperature T_c. To study this transition on the lattice, it is crucial to use a discretization scheme that preserves chiral symmetry.

In this talk, we shall present preliminary results of a detailed study of the chiral phase transition with Domain Wall Fermions (DWF). Our simulations are 2+1-flavor simulations on lattices of size $16^3 \times 8$ with a fifth dimension of $L_s=32$ and 48. The strange quark mass is tuned to its physical value and light quark masses are choosen such that the pion mass is fixed at $m_\pi=200$ MeV.

We present results in the temperature range $140\leq T\leq 190$ MeV for the disconnected light quark chiral susceptibility (χ_disc) as well as the light pseudoscalar, vector and axial-vector screening lengths. We analyze signatures for the QCD transition temperature arising from a peak in the susceptibility, a rise in the pseudoscalar screening length and the degeneracy of vector and axial-vector screening lengths.

Collaboration :

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