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Exploring Axial $U(1)$ symmetry via Meson Screening mass in $(2+1)$ -Flavor QCD with Chiral Fermions

In this study, we investigate the effective restoration of axial $U(1)$ symmetry by calculating the scalar and pseudo-scalar meson screening masses using Möbius domain wall fermions with physical quark masses. Unlike the widely used staggered fermions, which suffer from taste violations that lead to unphysical behavior—such as scalar screening masses failing to reach their physical values at low temperatures—Möbius domain wall fermions preserve near-exact chiral symmetry. We compare our results with those obtained using staggered fermions to offer new insights into the role of axial $U(1)$ symmetry in the QCD phase transition.

Category

Theory

Collaboration (if applicable)

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