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Axial $U(1)$ symmetry at finite temperature with Mobius domain-wall fermions

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Possible (effective) restoration of the axial $U(1)$ symmetry at finite temperature has attracted a lot of attention in the last few years thanks to the development of the chiral lattice actions and algorithmic improvements. In our previous work we utilized the overlap fermion formulation to show an evidence for a restoration of the axial symmetry above the phase transition. In this work we address the systematics of the previous study by using the Mobius domain-wall fermions that allow for larger-scale simulations while maintaining excellent chiral properties. Different volumes and L_s , the fifth dimension controlling the chirality of the action, and lattice spacings are considered. We study the susceptibilities related to the axial $U(1)$ symmetry, the screening masses, and the spectrum of the Dirac operator (see also A. Tomiya talk).

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