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C5: QCD topology and axion's properties from Wilson twisted mass lattice simulations

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We present the results on topological susceptibility and chiral observables in $N_f = 2 + 1 + 1$ QCD for temperature range $120 < T < 600$ MeV. The lattice simulations are performed with Wilson twisted mass fermions at physical pion, strange and charm masses. In high- T region the chiral observables are shown to follow leading order Griffith analyticity regardless the critical behaviour, and the decay exponent of topological susceptibility agrees with instanton dilute gas models. The measured topological susceptibility is used to estimate the mass of QCD axion. The resulting axion mass constraints are in agreement with our previous studies at higher pion masses.

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