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Topological susceptibility of two-color QCD at low temperature and high density

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We study the chemical potential (μ) dependence of the topological susceptibility with two-color two-flavor QCD. We find that at temperature $T \sim T_c/2$, where Tc denotes the critical temperature at zero chemical potential, the topological susceptibility is almost constant until $\mu/m_{PS} = 1.6$, while at $T \sim T_c$, it decreases significantly from the $\mu = 0$ value in a high μ regime. In this work, we perform the simulation for $\mu/T \leq 16$, which covers even the low temperature and the high chemical potential regime. In this regime, we introduce a diquark source term, which is characterized by j, into the action. We also show our results for the phase diagram in a low temperature regime ($T \sim T_c/2$), which is obtained after taking the $j \to 0$ limit of physical observable.

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