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Temperature dependence of topological susceptibility using gradient flow

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Topological susceptibility brings important information of the QCD vacuum and
contributes to a production of the axion. The temperature dependence of the topological susceptibility plays a crucial role in its production rate in the early universe.
It is a test whether the axion can be an appropriate candidate of the dark matter.
In this talk we report our recent study on the topological susceptibility in the finite temperature QCD with Nf=2+1 flavors.
The topological susceptibility is given by applying the gradient flow to the finite temperature system. We cover a wide range of temperature region $174 \leq T \leq 697$ MeV.
The ud quark mass is rather heavy $m_\pi/m_\rho = 0.63$ and s quark mass is
set to almost the physical value.

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