

Exploring the U(1) axial anomaly in extreme QCD environments: model analysis of topological susceptibility and comparison with lattice QCD observations

Thursday, April 3, 2025 2:15 PM (25 minutes)

The U(1) axial anomaly is a fundamental aspect of QCD, and its properties can be examined through topological susceptibility. Recent first-principle calculations, such as lattice QCD studies with two or three colors, have investigated the topological susceptibility at finite temperature and finite quark chemical potential. While these results are expected to provide valuable insights into the role of the U(1) axial anomaly in extreme environments, the lattice results have not been fully interpreted yet. In this talk, I will discuss the role of the U(1) axial anomaly at finite temperature in three-color QCD and finite quark chemical potential in two-color QCD by analyzing topological susceptibility within effective model approaches, guided by the Ward-Takahashi identities of QCD. I will then compare our results with lattice QCD observations and discuss which contributions play a significant role in the temperature and density dependence of the topological susceptibility.

Presenter: KAWAGUCHI, Mamiya (Anhui University of Science and Technology)

Session Classification: Parallel Session (B)