

# Correlated Dirac eigenvalues and axial anomaly in chiral symmetric QCD

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摘要: The phenomenon of anomaly plays an important role in quantum field theory. In QCD how axial anomaly manifests itself in the two-point correlation functions of iso-triplet scalar and pseudo-scalar mesons affects the nature of chiral phase transition. In this talk I first review current studies of the fate of UA(1) anomaly in the finite temperature lattice QCD, and then propose novel relations between the quark mass derivatives of Dirac eigenvalue spectrum  $\lambda$  and correlation functions among eigenvalues in order to study the microscopic origin of the axial anomaly. We finally show our results in the chiral and continuum limit in (2+1)-flavor lattice QCD at  $1.6T_c$ . Our results suggest that the axial anomaly is driven by the weakly interacting (quasi-)instanton gas motivated  $\lambda$  above  $1.6T_c$  and the chiral phase transition is of 2nd order and belongs to 3-d O(4) universality class. The talk is based on <https://arxiv.org/abs/2010.14836>.

报告人介绍: 丁亨通, 教授, 华中师范大学“夸克与轻子物理”教育部重点实验室副主任。2010 年于德国比勒费尔德大学获得博士学位, 随后在美国布鲁克海汶国家实验室和哥伦比亚大学从事博士后研究工作。2013 年回国加入华中师大聘为教授。主要方向为利用格点量子色动力学的大型高性能数值计算方法研究强相互作用核物质在极端温度、密度和外场条件下的性质。目前共发表学术论文 70 余篇, 总被引次数为 6200 余次, 篇均被引 80 余次。

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