



Tsinghua University

Department of physics

Physics Colloquium 2019

Autumn

Study QCD Phase Diagram in High-Energy Nuclear Collisions

Abstract

Exploring the QCD phase structure of hot and dense nuclear matter is one of the main goals of the ultra-relativistic heavy-ion collisions. Started in 2010, the first RHIC BES program covered the center of mass collision energy of $\sqrt{s_{NN}} = 7.7 - 200$ GeV corresponding to the chemical potential range $\mu_B \approx 420 - 20$ MeV.

In this talk I will first summarize the properties of the medium created in ultra-relativistic heavy-ion collisions into three Cs: (i) **Collectivity** that represents the collective motion of the system including anisotropic flows; (ii) **Chirality** describes the results that are connected to Chiral properties, such as the recently hotly debated CME, CVE results; and (iii) **Criticality** covers the observations that may be linked to the illusive QCD critical point. For example, the end point of the first-order phase boundary. In this talk, I will focus on the results from the first phase BES at RHIC, especially on results that are related to Collectivity and Criticality. In addition, I will discuss future experiments CBM at FAIR (Germany) and CEE at HIRFL (China) and their potential impacts on the studying of the QCD phase structure.

Speaker

许怒：研究员，教授，英国物理学会会士(2005)，美国物理学会会士（2009），欧洲科学院院士（2018），全球华人物理和天文学会主席(2017)。1990年毕业于纽约州立大学石溪分校，获得博士学位。2001年任美国劳伦斯伯克利国家实验室高级研究员，2008年至2014年担任RHIC-STAR合作组发言人。2004年获得国家杰出青年基金（B类）资助，2010年入选中组部千人计划，任华中师范大学物理学院院长，教授。2017年起任中科院近代物理研究所研究员。



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