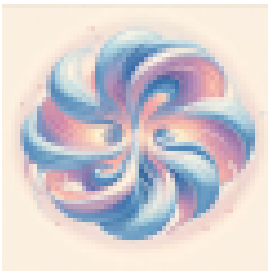

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Gauge invariance and thermodynamic stability of rotating magnetized systems

jeudi 25 juillet 2024 11:00 (30 minutes)

In this presentation, I revisit the Dirac theory under an external magnetic field and rotation. Motivated by experimental observations of significant vorticities in heavy ion collisions, there has been active exploration into the thermodynamics of rotating QCD matter. While the pure rotational effect has received attention, the interplay between rotation and magnetic fields remains insufficiently elucidated. In this talk, I address two significant issues present in previous formulations of rotating magnetized systems: gauge invariance and thermodynamic stability. I demonstrate that resolving both issues necessitates considering the kinetic angular momentum coupled with angular momentum. The reformulated Dirac theory presented here reproduces a well-known charged density first discovered by Hattori and Yin. Moreover, it indicates that higher-order contributions of angular velocity do not affect the charge density, providing evidence of its anomalous nature. Lastly, I offer insights into the rotational response of QCD vacuum from the perspective of the Savvidy vacuum.

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Classification de Session: Magnetic field and Rotation