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Baryon number fluctuations and QCD phase structure

Summary

In this talk, we will discuss the relation between net-baryon number fluctuations and QCD phase structure. We will focus on the fluctuations resulted from the metastable and unstable phases associated with a non-equilibrium first-order chiral transition. Compared with the idealized first-order transition in equilibrium, the calculation indicates that the density fluctuations in the metastable and unstable regions are more violent, which probably amplify the fluctuations in a rapidly expanding system. Besides, we will discuss the QCD phase structure in the presence of an external magnetic field. We will analyze that how the filling of multiple Landau levels by light quarks deforms the QCD phase structure and the entropy oscillation due to Landau quantization. The corresponding phenomena are very interesting and possibly relevant to the non-central heavy-ion collision experiments.

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