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Quantifying Chiral Magnetic Effect from Anomalous Viscous Fluid Dynamics

Tuesday, February 7, 2017 3:20 PM (20 minutes)

Abstract:

Chiral Magnetic Effect (CME) is the macroscopic manifestation of the fundamental chiral anomaly in a many-body system of chiral fermions, and emerges as anomalous transport current in hydrodynamic framework. Experimental observation of CME is of great interest and significant efforts have been made to look for signals of CME in heavy ion collisions. Encouraging evidence of CME-induced charge separation has been reported from both RHIC and LHC, albeit with ambiguity due to potential background contributions. Crucial for addressing such issue, is need of quantitative predictions of CME signal with sophisticated modeling tool.

In this talk we report a recently developed Anomalous Viscous Fluid Dynamics (AVFD) framework, which simulates the evolution of fermion currents in QGP on top of the data-validated VISHNew bulk hydro evolution. With realistic initial conditions and magnetic field lifetime, the predicted CME signal is quantitatively consistent with measured change separation data in 200GeV AuAu collisions. We further develop the event-by-event AVFD simulations that directly compute CME-induced two-particle correlations as well as the non-CME background. Finally we report predictions for the upcoming isobaric (RuRu v.s. ZrZr) collisions that could provide the critical test of the CME in heavy ion collisions.

Preferred Track

Collective Dynamics

Collaboration

BEST

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