Contribution ID: **580** Type: **Parallel Talk**

Quantitative Predictions for the Chiral Magnetic Effect with Event-By-Event Anomalous Viscous Fluid Dynamics from AuAu to Isobaric Collisions at RHIC

Wednesday, 16 May 2018 10:00 (20 minutes)

Chiral Magnetic Effect (CME) is the macroscopic manifestation of the fundamental chiral anomaly in a many-body system of chiral fermions, and emerges as a generic anomalous transport current in the hydrodynamic framework. The study of CME has attracted significant recent interest across many disciplines from condensed matter to nuclear physics. ***An experimental observation of CME in heavy ion collisions would further provide the tantalizing evidence for the chiral symmetry restoration as well as QCD topological fluctuations.*** Currently the most pressing theoretical challenge is the quantitative modeling of CME while also accounting for background contamination. We report a significant step forward toward this goal, by ***the development of the full-fledged Event-By-Event Anomalous Viscous Fluid Dynamics (EBE-AVFD) framework***. The EBE-AVFD starts with event-wise initial conditions for the bulk+axial charge+magnetic fields, simulates the evolution of fermion currents in QGP on top of the bulk fluid evolution from either VISHNU or MUSIC (both being validated with extensive soft observable data) on an event-by-event basis, to be followed by an event-wise URQMD hadron cascade stage. The millions of simulation events would then be analyzed with ***the same observables and methods as the experimental analysis***. We show systematic computation results for charge-dependent azimuthal correlations in **CuCu, AuAu and UU collisions at RHIC**, to be compared with available experimental data. After such verification step, we finally present the state-of-the-art **quantitative predictions for the CME signals in isobaric collisions (RuRu v.s. ZrZr)**, which will provide the most critical test of the CME in heavy ion collisions.
[Refs: arXiv:1711.02496; arXiv:1712.01386; CPC42(2018)011001 (arXiv:1611.04586); NPA967(2017)748 (arXiv:1704.05531); Shi and Liao, in preparation]

Content type

Theory

Collaboration

BEST

Centralised submission by Collaboration

Presenter name already specified

Primary authors: SHI, Shuzhe (Indiana University); LIAO, Jinfeng (Indiana University)

Presenter: LIAO, Jinfeng (Indiana University)

Session Classification: Chirality, vorticity and polarisation effects

Track Classification: Chirality, vorticity and polarisation effects