

Abstract Submitted
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Macroscopic Anomalous Effects in Hot QCD Fluid: A Status Report¹ JINFENG LIAO, BNL & Rice University & RBRC — Two fundamental features of QCD, the nontrivial topological nature of gauge fields together with the anomaly of light fermions, have been recently shown to lead to macroscopic anomalous effects in the hot QCD fluid created in relativistic heavy ion collisions. A number of recent exciting progresses will be reported here: (1) the Chiral Magnetic Effect (as a local P- and CP-odd phenomenon) predicts charge asymmetry fluctuations and particular patterns of charged hadron correlations, and progresses toward an accurate interpretation of the full data set, from most recent RHIC Beam Energy Scan all the way to LHC results, will be critically evaluated; (2) for fireballs with nonzero vector densities (e.g. in low-beam energy collisions), the Chiral Magnetic Wave induces an electric quadrupole of quark-gluon plasma and we predict the charge-dependent elliptic flow with $v_2(\pi^-) > v_2(\pi^+)$; (3) for rotating hot fluid (i.e. QGP with angular momentum) in non-central collisions, a new category of anomalous hydrodynamic phenomena (Anomalous Magneto-Hydrodynamics) will also be presented, including the helical sound and the acoustic analog of the Faraday rotation in optics. Reference: PRC81:031901, PRC82:054902, PRC83:014905 (with Bzdak, Koch); In preparation (with Kharzeev); arXiv:1103.1307 to appear in PRL (with Burnier, Kharzeev, Yee).

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