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Local CP-violation in quark gluon plasma: a holographic study.

We study the local CP-violation in a sQGP-like plasma due to the presence of strong magnetic fields and/or due to the spatial rotation of the medium. We consider the STU model as a gravity dual of the plasma with multiple anomalous U(1) currents. In the bulk we add additional background gauge fields to include the effects of external electric and magnetic fields on the plasma. Reducing the number of chemical potentials in the STU model to two and interpreting them as quark and chiral chemical potential, we obtain a holographic description of the chiral magnetic and chiral vortical effects (CME and CVE) in relativistic heavy ion collisions. These effects formally appear as first-order transport coefficients in the electromagnetic current. We compute these coefficients from our model using fluid-gravity duality. We also find analogous effects in the axial current. Finally, I'll briefly discuss a variant of our model, in which the CME/CVE is realized in the late-time dynamics of an expanding plasma.

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