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Chiral vortical wave and induced flavor charge transport in a rotating quark-gluon plasma

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In this talk we report our recent finding of a new gapless collective excitation in a rotating fluid system with chiral fermions, named as the Chiral Vortical Wave (CVW). The CVW has its microscopic origin at the quantum anomaly and macroscopically arises from interplay between vector and axial charge fluctuations induced by chiral vortical effects. An intuitive picture for the underlying mechanism of CVW will be provided, and the CVW wave equation will be derived both from anomalous hydrodynamic current equations and from chiral kinetic theory framework. The solutions of such wave equation show nontrivial CVW-induced charge transport from various initial conditions, which could give rise to observable signals. Using the rotating quark-gluon plasma in heavy ion collisions as a concrete example, we demonstrate the formation of induced flavor quadrupole in QGP and estimate the elliptic flow splitting effect for Lambda baryons that may be experimentally measured.

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On behalf of collaboration:

NONE

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