DNP16-2016-000072

Abstract for an Invited Paper
for the DNP16 Meeting of
the American Physical Society

An Introduction to the Theory of the Chiral Magnetic Effect[1]

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Anomalous chiral transport processes, with the notable example of the Chiral Magnetic Effect (CME), are remarkable phenomena that manifest microscopic quantum anomaly of chiral fermions in a macroscopic many-body setting. Significant progress has been achieved both in their theoretical understanding and in their experimental search. In this talk, an elementary introduction will be given for the CME as well as other anomalous chiral effects such as the Chiral Magnetic Wave (CMW) and the vorticity-driven effects. The theoretical foundation for describing them is rapidly emerging, including the anomalous hydrodynamics framework for (nearly) equilibrated systems while the chiral kinetic theory for out-of-equilibrium systems. The most recent results along these lines will be highlighted, with an emphasis on their applications to heavy ion collision experiments. Finally the currently pressing issues and anticipated future developments, in the context of recently formed Beam Energy Scan Theory (BEST) Collaboration, will be envisioned. Ref: Kharzeev, Liao, Voloshin, Wang, Prog. Part. Nucl. Phys. 88(2016)1, [arXiv:1511.04050[hep-ph]].

[1]The speaker acknowledges partial support from NSF, DOE, and RIKEN BNL Research Center.