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The chiral magnetic effect in condensed matter

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A decade ago, it was proposed that, in the quark gluon plasma resulting from heavy ion collisions, a non-dissipative electric current should emerge as a result of a chiral imbalance and a strong magnetic field. This is the chiral magnetic effect (CME). Despite all the effort, to define unambiguous observables in heavy ion collisions proved to be a hard task. On the other hand, with the discovery of Dirac and Weyl semi-metals, where the charge carriers behave relativistic-like, a link between relativistic systems and condensed matter was traced and an analog of the CME was observed in a few types of Weyl materials. In this talk I review the CME and its analog in condensed matter and propose that under certain conditions it may be also observed in graphene, a planar material with interesting applicability for this mechanism.