

# Anomalous transport: massive gravity theories and Weyl semi-metals

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Quantum anomalies give rise to new transport phenomena. In particular a magnetic field can induce an anomalous current via the chiral magnetic effect [1] and a vortex in the relativistic fluid can also induce a current via the chiral vortical effect [2]. The related transport coefficients can be calculated via Kubo formulae [3]. In this work we derive the Kubo formulae relevant for anomalous transport [4,5], and perform a computation in AdS/CFT of the transport coefficients in a massive gravity model including vorticity and external electromagnetic fields [6]. We find an interesting phase in which the electric DC conductivity is negligible, while the anomalous coefficients turns out to be nonvanishing. A similar study is performed in Weyl semi-metals [7].

References. [1] K. Fukushima, D. Kharzeev, H.J. Warringa, Phys. Rev. D78 (2008) 074003. [2] D.T. Son and P. Surowka, Phys. Rev. Lett. 103 (2009) 191601. [3] I. Amado, K. Landsteiner, F. Pena-Benitez, JHEP 1105:081 (2011). [4] K. Landsteiner, E. Megias, F. Pena-Benitez, Phys. Rev. Lett. 107 (2011) 021601. [5] K. Landsteiner, E. Megias, L. Melgar, F. Pena-Benitez, JHEP 1109:121 (2011). [6] B. Gouteraux, E. Kiritsis, W-J Li, JHEP 1604 (2016) 122. [7] K. Landsteiner, Y. Liu, Phys. Lett. B 753 (2016) 453-457.