Seminar Fizičkog odsjeka

Vrijeme (s.t.)   Mjesto

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Exact analysis of electric transport in Dirac fermion systems

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Charge and spin transport in topologically protected electronic bands are one of the main interests of modern condensed matter physics. In electric transport, the protected bands result in an conduction involving extremely high-mobility carriers [1]. Its transport properties have been discussed based on the two-carrier Drude model, because of an inevitable involvement of additional trivial conduction. The two-carrier model is also known to exhibit huge errors originating from multiple open parameters, which occasionally lead us to arbitrary interpretations. Those fundamental issues confuse the essence of protected bands.

Recently, a new scheme of magnetotransport analysis is proposed, which overcomes existing difficulties and determines the two-carrier transport properties explicitly [2,3]. Here we present the full scheme of analysis that allows to draw robust conclusions. This reproduces transport behavior observed in three-dimensional topological insulators, and in addition, reveals the Fermi level and the behavior expected for realistic conditions [4].

[1] T. Liand et al., Nature Mat. 14, 280 (2015), etc.
[2] G. Eguchi et al., Phys. Rev. B 91, 235117 (2015).
[3] H. Emoto, G. Eguchi et al., Phys. Rev. B 93, 174428 (2016).
[4] G. Eguchi and S. Paschen, arXiv:1609.04134v1 (2016).

Voditelji seminara FO

Damir Pajić i Ivica Smolić