Effects of spin-orbit coupling on quantum transport

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Stellingen

behorende bij het proefschrift

Effects of Spin-Orbit Coupling on Quantum Transport

- Spin-orbit coupling splits the trajectory of an electron reflected by a hard wall, thereby producing shot noise.

  Chapter 3

- The degree of entanglement of a conductor with an isotropic spin density matrix can be obtained from the power spectrum of spin currents.

  Chapter 4

- The sample-to-sample fluctuations of spin currents in mesoscopic systems are universal.

  Chapter 5

- Smooth disorder increases the conductivity of graphene.

  Chapter 6

- A zigzag graphene ribbon in an electric field is metallic or insulating for an even or odd number of atomic rows, respectively.

  A. R. Akhmerov, J. H. Bardarson, A. Rycerz, and C. W. J. Beenakker, arXiv:0712.3233

- Kramers degeneracy does not forbid the splitting of Andreev doublets in a Josephson junction.

  B. Béri, J. H. Bardarson, and C. W. J. Beenakker, Phys. Rev. B **77**, 045311 (2008).

- The mapping of the single-valley Dirac equation to the Chalker-Coddington network model breaks symplectic symmetry.

  I. Snyman, J. Tworzydlo, C. W. J. Beenakker,
  arXiv:0803.2197

- The antisymmetry of the scattering matrix of a disordered photonic crystal with a Dirac spectrum implies that a plane wave incident near the Dirac point has a dark spot in its angular reflection profile.

- Humanity currently faces two serious problems: Climate change and a growth based economy that is over-exploiting the worlds resources. The sets of solutions to the two problems intersect and therefore it is most natural for the international community to focus only on their intersection.

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