SPIN TRANSPORT IN DISORDERED SINGLE-WALL CARBON NANOTUBES CONTACTED TO FERROMAGNETIC LEADS

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Recent conductance measurements on multi-wall carbon nanotubes (CNTs) show that they effectively behave similar to disordered single-wall CNTs [1]. This is due to the fact that electric current flows essentially through the outermost shell and is strongly influenced by inhomogeneous electrostatic potential coming from the inner tubes. Here we present theoretical studies of spin-dependent transport through disorder-free double-wall CNTs as well as single-wall CNTs with Anderson-type disorder. The CNTs are end-contacted to ferromagnetic electrodes modelled as fcc (111) surfaces [2]. Our results shed additional light on the giant magnetoresistance effect in CNTs. Some reported results concern realistically long CNTs, up to several hundred nanometers.

9.7 cm

[1] R. Egger and A. O. Gogolin, Phys. Rev. Lett. 87, 066401 (2001); B. Stojetz et al., cond-mat/0410764, (2004).
[2] S. Krompiewski et al., Phys. Rev. B 69, 155423 (2004), phys. stat. solidi (b) 242, 226 (2005)

13.4 cm

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