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Spin Transport in Carbon Nanotubes

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We report on spin transport in carbon nanotubes. First, spin injection in arc-discharge grown multi-walled carbon nanotubes (MWNTs) is achieved by using a ferromagnetic PdNi alloy as contact material. The two contacts, i.e. source and drain, have different shape rendering different magnetic switching fields. Typical two-terminal resistances are in the range of 5-100 kOhm. We find a tunneling magneto resistance (TMR) signal amounting to 2.5-3%. Secondly, we explore the TMR signal as a function of temperature T, source-drain voltage Vsd, and gate voltage Vg. As expected the TMR signal decays with T and Vsd. Remarkably, however, we find a sign change in the spin signal (the TMR signal) as a function of both Vsd and Vg. This work has been done in collaboration with: S. Sahoo and T. Kontos (Univ. of Basel), C. Sürgers (Univ. of Karlsruhe), and L. Forro (EPFL Lausanne).