

PhD position available in experimental Nanoelectronics/-spintronics



TRINITY COLLEGE DUBLIN
COLÁISTE NA TRÍONOÍDE, BAILE ÁTHA CLIATH

THE
UNIVERSITY
OF DUBLIN



School of Physics



Topic: Magneto-/spintransport in doped carbon nanotubes (experimental physics)

The magnetotransport and specifically the spintransport properties of and spin-injection into boron-, nitrogen-, boron/nitrogen- and phosphorous-doped single-walled and multi-walled carbon nanotubes are to be investigated.

Keywords: spin-valve-effect, Coulomb-Blockade, Kondo effect, spin-injection, low temperature, magnetic field, spintronics, nanoelectronics, doped carbon nanotubes

Funding: available

Starting date: to earliest possible date

Interested graduate students, please, contact:

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The magnetotransport and specifically the spintransport properties of B-, N-, BN- and P-doped single-walled and multi-walled carbon nanotubes are to be investigated, addressing also the spin-polarised charge injection into these structures.

Doped tubes are expected to show due to the dopants enhanced magnetic-/spin-coupling of charge-carriers and recent experimental work of the group (ACS nano 2010) has demonstrated the existence of a long-range magnetic interaction between isolated phosphorous-dopant sites (substitutional doping) in single-walled carbon nanotubes. Generally, substitutional dopants are expected to enhanced magnetic-/spin-coupling of charge-carriers within the carbon nanotubes.

The spin-polarised charge and spin-current transport is to be investigated within the frameworks of the spin-valve-effect, Coulomb-blockade, and Kondo-effect. Spin-polarised-charge injection into the doped tubes is to be addressed within these frameworks by variation of the electrode material (ferromagnetic, non-ferromagnetic) used for the electrical contacting of individual tubes.

This implies experimental work in nano-device fabrication (lithography) using individual tubes, structural characterisation (scanning-force and -electron microscopy), and electrical measurements in magnetic fields and within the temperature range from 300 K down to a few ten mK.