

## **SPIN-POLARISED ELECTRON TRANSPORT IN ORGANIC MOLECULES AND CARBON NANOTUBES.**

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Theoretical results for spin-polarised transport in single molecules and carbon nanotubes in contact with ferromagnetic electrodes will be presented.<sup>1,2</sup> For single-wall carbon nanotubes (CNT) in contact with nickel electrodes, we show that Ni atoms located on the surface or axis of the CNT s can induce a significant magnetic moment on the carbon atoms. For non-gated, undoped CNTs, this produces room-temperature Giant Magnetoresistance (GMR) ratios of between 45% and 100% of the anti-aligned conductance.

Results are also presented for [n]-alkane-dithiolate and 1,4-[n]-phenyl-dithiolate, contacted to Ni electrides. The first molecule shows tunneling behavior with the spin-polarization of the current mainly given by surface states at the interface between the Ni and the molecule and a GMR ratio of order 100%. In contrast transport through 1,4-[n]-phenyl-dithiolate is through states extending across the whole molecule, with a GMR ratio of order 600%.

<sup>1</sup>Magnetoresistance of nickel-contacted carbon nanotubes, S. Athanasopoulos, S. W. Bailey, J. Ferrer, V. M. García Suarez, C.J. Lambert, A.R. Rocha and S. Sanvito, submitted Phys. Rev. Lett. (2005)

<sup>2</sup>Towards molecular spintronics, A. Reily Rocha, V.M. García-Suárez, S.W. Bailey, C.J. Lambert, J.Ferrer and S. Sanvito, to appear Nature April (2005)