

QSIT LECTURE

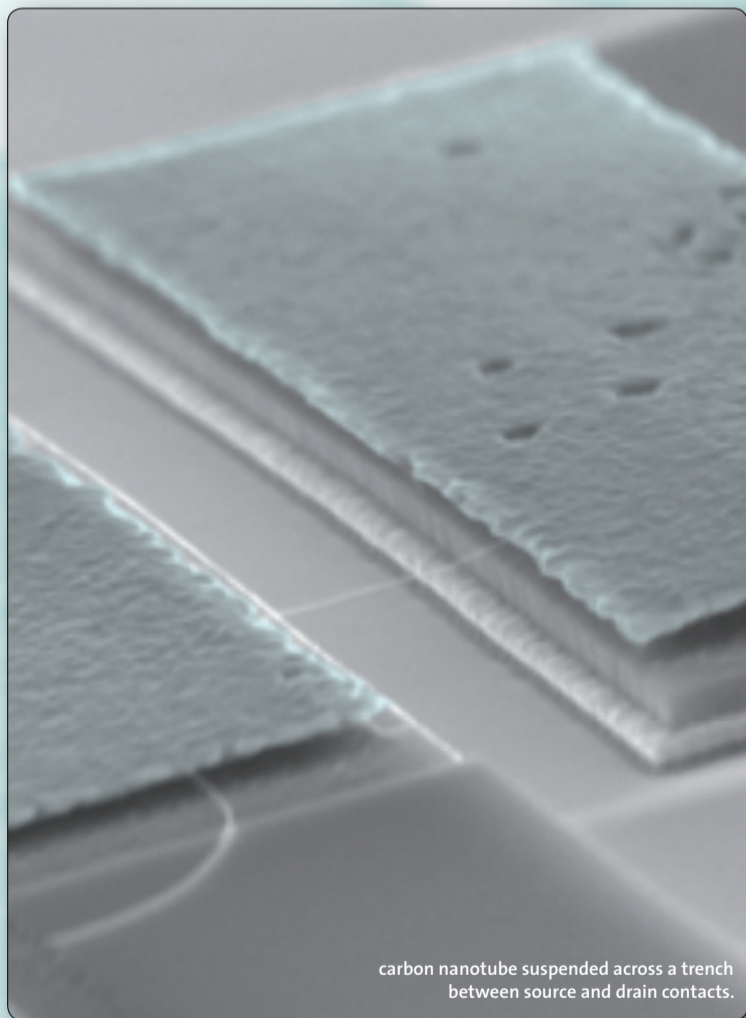
Quantum Science and Technology
National Centre of Competence in Research

Special lecture for master and PhD students

Wednesday November 2, 2011, 12:45 h – 14:30 h, HPV G 5

Leo Kouwenhoven, Delft University of Technology, The Netherlands

Quantum Physics in Nanowires and Nanotubes



carbon nanotube suspended across a trench
between source and drain contacts.

Our nanowires (diameter~50nm, length~5micron) consist of semiconducting material such as InAs, InP or InSb. We choose these materials for their specific advantages with respect to optical properties (e.g. single photon sources), induced-superconductivity and strong spin-orbit interaction. We define small, nanoscale devices such as quantum dots and superconducting rings. The phenomena that we study are qubits and funny Josephson junctions. The funniest of all would be one with Majorana Fermions in the junction. Our carbon nanotubes are fabricated in a special way such they remain ultra-clean. The consequence of this cleanliness is that the mechanical vibration of a freely suspended nanotube can undergo about a million (!) oscillations before it is damped.

Things to read: S. Nadj-Perge, S.M. Frolov, E.P.A.M. Bakkers and L.P. Kouwenhoven Spin-orbit qubit in a semiconductor nanowire, Nature 468, 1084-1087 (2010)

Host: Klaus Ensslin

Tea and Coffee at 13:30 h
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