THEORY & MODELLING of CHARGE TRANSPORT in SEMICONDUCTING NANOWIRES

A postdoctoral position (2 years) is opened at CEA/DRFMC (Grenoble, France) starting from January 2006 to work on the theory and simulation of charge transport in semiconducting nanowires (SC-NWs).

Chemically grown semiconducting nanowires are showing unprecedented structural quality which make them ideal systems to explore transport physics in low dimensionality, as well as to engineer novel nano-devices and architectures for nanoelectronics and optoelectronics applications. In this context, theoretical modeling and computational simulations are needed to deepen the understanding of the fundamental transport mechanisms in these systems.

The theory group of the CEA is presently developing several computational approaches to tackle the problem of charge transport in realistic models of SC-NWs, including device simulation. Sophisticated tight-binding order N methods are developed to investigate charge transport in different frameworks (Kubo, Landauer-Büttiker, and Non Equilibrium Green's Function formalism (NEGF)). Ab-initio approaches are also used for detailed understanding of atomic-scale features (doping, defects...). These methodologies will enable to address the intrinsic (quantum)-transport properties of ideal and doped/disordered nanowires, as well as SC-NWs-based device characteristics.

This work will be driven within the context of the newly launched European Integrated Project "NODE" (Nanowire-based One-Dimensional Electronics). The candidate will be in charge to investigate the transport properties of various semiconducting nanowire systems, in conjunction with transport experiments.

The candidate should have demonstrated some experience in state of the art semi-empirical or/and ab-initio methods, and preference will be given to people already familiar with transport physics, and/or electronic structure of semiconducting materials in confined geometries.

The candidate should send her/his CV to Yann-Michel Niquet (yniquet@cea.fr) and Stephan Roche (sroche@cea.fr) together with a list of publications, and contact details of two persons for references.

The deadline for submitting applications is September 30, 2005.

Additional informations about the Theory group:
http://www-drfmc.cea.fr/SP2M/L_Sim/QUI/YMNiquet
http://www-drfmc.cea.fr/Images/Pisp/sroche/sroche_fr.html

More about Grenoble and its surroundings:
http://www.isere-tourisme.com/pages/index/id/1356