IMEP-LAHC

SEMINAIRE

(de 13 h à 14 h, salle Belledonne, IMEP, MINATEC,
ouvert aux chercheurs des autres laboratoires)

Jeudi 17 février 2011

"Simulation of electronic transport in graphene nanoribbons"

par Alessandro CRESTI

Abstract: According to Moore's law, the progressive miniaturization of electronic components has led to the fabrication of transistors with nanometer size. At this scale, quantum physics effects play a significant role and determine important limitations that the current architectures will experience in the next few years. In this panorama, new challenging issues are looming ahead: the development of innovative architectures and the use of new materials to complement silicon and take advantage of the typical quantum phenomena present at the nanoscale.

In this context, graphene represents an extremely promising and innovative material. Graphene exhibits extraordinary physical and electronic properties that promote it as one of the best candidate to supplement silicon-based technology: a high carrier mobility, an extreme thinness, the possibility to produce it on the wafer scale and to pattern it with conventional lithography techniques.

In the first part of the talk, I will briefly introduce graphene, with a special focus on the importance of graphene nanoribbons for future carbon-based nanoelectronics. Then, I will give an overview of my activity on the simulation of electronic transport in disordered graphene nanoribbons. A short discussion on the adopted methodology will also be presented in order to illustrate the advantages (and limitations) of Green's function approach and tight-binding parameterization in the specific area of graphene.

Alessandro Cresti *gained his PhD in 2006 at Pisa University with a thesis on theory and simulation of electronic transport in nanostructures, with application to two-dimensional electron gas-based devices. In 2008, after a two years period at Scuola Normale Superiore di Pisa, he moved to LETI/CEA and finally, in 2010, to IMEP-LAHC. Here, he works in the Composants Micro Nano Electroniques group, under the supervision of M. Pala. His interests concentrate on basic and applied aspects of quantum electronic transport in low-dimensional systems, with a particular focus on graphene.*

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