Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Conductance gaps modulation by periodic perturbations in graphene nanoribbons M. PACHECO, L. ROSALES, Z. BARTICEVIC, U. Santa Maria, A. LEON, U. Diego Portales, A. LATGE, U. Federal Fluminense, P. ORELLANA, U. Catolica del Norte — Recently we have shown that the quantum conductance of a single molecule absorbed to the GNR shows the presence of Fano antiresonances at the energy levels of the molecule, suggesting that the GNR can be used as a spectrometer sensor [1]. When groups of molecules are attached, forming a periodic-like structure the conductance of the system presents forbidden minibands. Here we present a theoretical study of the electronic and transport properties of periodic perturbations on graphene nanoribbons. We study super-lattices formed by linear organic molecules side-attached at the ribbon edges and also by periodic structures of antidots in the GNR. The electronic properties of the systems are studied by using first principle calculations (LSDA), and tight binding Hamiltonian models. The quantum conductance is calculated in the Landauer formalism, with real-space renormalization techniques to obtain the Green functions. A series of well defined gaps on the conductance as a function of the Fermi energy are observed. This behavior depends on the period and topology of the perturbations and on the aspect ratio of the system. Conductance gap modulations can be obtained, suggesting new applications in graphene based nano-devices. [1] L.Rosales et al.,Nanotechnology 19,0665402 (2008).

Monica Pacheco
Universidad Santa Maria

Date submitted: 15 Dec 2008 Electronic form version 1.4