Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Magnetoresistance in hydrogen-doped graphene nanoribbons. F. MUNOZ-ROJAS, Universidad de Alicante, D. SORIANO, J. FERNANDEZ-ROSSIER, J. J. PALACIOS — Recent works have focused on hydrogen-doped graphene, both in the diluted and highly doped concentrations. It is known that a single hydrogen atom on top of a carbon atom in graphene has a magnetic moment. In the case of a low concentration of hydrogen dopants, it is believed that the ground state features local moments with zero total spin. Application of a strong enough magnetic field can spin polarize the system, in analogy with diluted magnetic semiconductors. In this work we study whether this spin order changes the resistance of the system. We study the relation between conductance and spin order for hydrogen-doped graphene armchair nanoribbons. We use both mean field Hubbard model and density functional theory calculations and compare results from both approaches. For the latter one, B3LYP hybrid functional is used. The conductance is calculated for the diluted limit. We use the Landauer formalism with the Green's Function Approach for the conductance calculation. We find that the conductance in these systems is significantly affected by spin order. Thus, we predict magnetoresistance in graphene ribbons doped with Hydrogen.

Joaquin Fernandez-Rossier
University of Alicante

Date submitted: 21 Nov 2008 Electronic form version 1.4