GRAPHENE SPINTRONICS

J. J. Palacios[1], J. Fernández-Rossier[1], F. Muñoz-Rojas[1], and L. Brey[2]

[1]*Departamento de Física Aplicada, Universidad de Alicante, San Vicente del Raspeig, Alicante 03690, Spain*
[2]*Departamento de Teoría de la Materia Condensada, Instituto de Ciencia de Materiales de Madrid (CSIC), Campus de Cantoblanco, Madrid 28049, Spain*

Over the past few years graphene has become one the most studied systems in the field of nanoelectronics. The fact that nanostructured graphene (graphene ribbons, graphene dots, voids in graphene, etc.) can present magnetic order also makes it of interest for spintronics applications. I will discuss how the associated imbalance in the number of atoms belonging to the two graphene sublattices, the existence of zero-energy states, and the total and local magnetic moments are intimately related. We consider electron-electron interactions both in a mean-field approximation to the one-orbital Hubbard model and within density functional theory. The magnetic properties of nanometer-sized graphene structures (also known as polycyclic aromatic hydrocarbons) strongly depend on their shape and type of edges (zig-zag or armchair) [1]. The magnetism associated to zig-zag edges, vacancies, and various defects and the magnetic interactions developed in graphene ribbons open interesting possibilities in spintronics for these systems [2,3].

[1] *J. Fernández-Rossier and J. J. Palacios*, Phys. Rev. Lett. **99,** 177204 (2007).

[2] *J. J. Palacios, J. Fernández-Rossier, and L. Brey*, Phys. Rev B **77**, 195428 (2008).

[3] *F. Muñoz-Rojas, J. Fernández-Rossier, and J. J. Palacios,* (in preparation).

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Name1[1], Name2[2], Name3[3]…

[1]*Address 1*
[2]*Address 2*
[3]*Address 3*

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[1] Reference 1
[2] Reference 2
[3] Reference 3