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Magnetic order in graphene with broken inversion symmetry J. FERNANDEZ-ROSSIER, International Iberian Nanotechnology Laboratory, Braga, Portugal, D. SORIANO, Institut Català de Nanotecnologia (ICN), Barcelona, Spain — We study the effect of sublattice symmetry breaking on the magnetic and transport properties of two dimensional graphene as well as zigzag terminated one dimensional graphene nanostructures. The systems are described with the Hubbard model within the collinear mean field approximation. In the case of 2D and zigzag ribbons we compute the phase diagram, at half-filling, defined by the normalized interaction strength U/t and the sublattice potential V/t, where t is the first neighbor hopping. In the case of 2D graphene we find that the system is always insulating, except at the transition between the antiferromagnetic (AF) and the non-magnetic (NM) phase where the system is half-metallic. In the case of zigzag ribbons, at finite V we find that the system undergoes a phase transition from non-magnetic insulator for U<Uc (V) to a phase with ferromagnetic order in the edges and antiferromagnetic inter-edge coupling. The conduction properties of the magnetic phase depend on V and can be insulating, conducting and even half-metallic, yet the total magnetic moment in the system is zero. In the latter case, we find a strong spin filter effect.

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