

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Electric field response on hybrid C/BN nanostructures** MIGUEL ALONSO-PRUNEDA, CIN2 (CSIC) — Synthesis of hybrid C/BN nanotubes [1] and nanosheets [2] offer a unique route for material engineering, by combination of the exciting properties of graphene with those of insulating polar BN. First principles (DFT) calculations of the zigzag-terminated edges between C and BN nanodomains will be presented, proving that unconventional physical effects similar to those observed at insulating oxide interfaces [3], can also exist in lower dimensions, opening alternative routes for tuning electronic properties at nanointerfaces. In particular, it will be shown that the magnetic character of the edge states in zigzag shaped graphene nanoribbons, and the polar BN edge, team up to give a spin asymmetric screening that induces half-semimetallicity at the interface [4]. This property is also observed in tubular geometries, where potential magnetoelectric effects will be discussed.

[1] Suenaga et. al. *Science* **278** 5338 (1997); Enouz et. al. *Nano Lett.* **7**, 1856 (2007).

[2] Ci et. al. *Nat. Materials* **9**, 430 (2010).

[3] Ohtomo & Hwang *Nature* **427**, 423 (2004); Brinkman et. al. *Nat. Mater.* **6**, 493 (2007); Reyren et. al. *Science* **317**, 5842 (2007).

[4] Pruneda *Phys. Rev. B* **81**, 161409(R) (2010).

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Date submitted: 27 Dec 2010

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