Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Correlated zero-bias transport in graphene and 2D topological insulators nanostructures[1] ANDREA DROGHETTI, IVAN RUNGGER, AWADHESH NARAYAN, STEFANO SANVITO, Trinity College Dublin — In recent years, the Kondo effect in graphene [1] and 2D topological insulators (TI) [2] has attracted considerable interest. While an impurity spin in graphene interacts with the Dirac fermions of the lattice, an impurity on the edge of a 2D-TI interacts with the helical edge liquid. Here we first describe the electronic structure of several graphene and 2D-TI model nanostructures, which incorporate a correlated impurity. Then, by combining continuous time quantum Monte Carlo with the Green function transport theory, we discuss how the transport properties are affected by the Kondo effect. Finally, we highlight how the employed method can be combined with density functional theory in the Smeagol code [3] in order to include material specific properties.

[1] V.N. Kotov *et al.*, Rev. Mod. Phys. **84**, 1067 (2012).
[2] F. Goth *et al.*, Phys. Rev. B **88**, 075110 (2013).
[3] A.R. Rocha *et al.*, Phys. Rev. B. **73**, 085414 (2006).

[1]European Union FP7

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Date submitted: 15 Nov 2013 Electronic form version 1.4