Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Kondo effect in graphene with Rashba spin-orbit interaction[1]
NANCY SANDLER, DIEGO MASTROGIUSEPPE, Ohio University, ARTURO WONG, KEVIN INGERSENT, University of Florida, SERGIO ULLOA, Ohio University — We study the Kondo screening of a magnetic impurity in monolayer graphene in the presence of Rashba spin-orbit interaction. The host density of states (DOS), with two split bands and particle-hole symmetry, results in a complex hybridization function that suggests interesting phenomena as a function of the chemical potential and the Rashba strenght. Although the Rashba coupling produced by depositing graphene in a conventional substrate is weak, a strong increase of this interaction was shown to occur by intercalation of Au on a Ni substrate [1] or by hydrogenation of the sample [2]. An effective single channel Anderson model sets the ground to analyze the properties of the system, which are obtained by numerical renormalization group calculations. We find a Kosterlitz-Thouless quantum phase transition (QPT) separating free moment and strong-coupling phases at half-filling, whenever the Rashba coupling is present. Tuning the chemical potential close to sharp features of the hybridization function results in an interesting interference of the Kondo peak and a virtual bound state resonance that appears due to a jump in the DOS. All these features would be visible in STM experiments, providing a realistic system in which to study QPTs. [1] Nat. Commun. 3, 1232; [2] Nat. Phys 9, 284.

[1]Supported by NSF-MWN/CIAM and NSF-PIRE.

Diego Mastrogiuseppe
Ohio University

Date submitted: 15 Nov 2013 Electronic form version 1.4