Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Giant Tunneling Magnetoresistance (TMR) in Graphene Patches**[1] LUIS AGAPITO, NICHOLAS KIOUSSIS, California State University Northridge — Graphene-based field effect devices based on graphene flakes and nanoislands have attracted a great deal of attention due to their unique physical properties and potential for nanoelectronic applications. The emergence of magnetism[1,2] in nanometer graphene patches terminated by zigzag edges along with the low intrinsic spin-orbit interaction opens a new research venue for spintronics, such as tunneling magnetoresistance, spin filter, and quantum computing. We have employed density functional theory and the nonequilibrium Green's functions approach to study the charge and spin transport in tunnel junctions comprising of one and two zigzag-terminated graphene triangular flakes connected to reconstructed zigzag-terminated graphene ribbons. We will present results of (1) the interplay between gate voltage and its incidence on the selection of the filtered spin channel and (2) the effect of the relative orientation of the magnetizations of the two graphene nanoflakes on the transport of the tunnel junctions. The calculations demonstrate the possibility of engineering such graphene patches as magnetic tunneling junctions that exhibit giant TMR. [1] J. Fernandez-Rossier et al., Physical Review Letters **99** (2007). [2] W. L. Wang et al., Nano Letters **8**, 241 (2008).

[1]This research was supported by NSF-PREM under Grant No. DMR-00116566.

Luis Agapito
California State University Northridge

Date submitted: 27 Nov 2009 Electronic form version 1.4