Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Spin pumping at Permalloy/graphene interfaces SIMRANJEET SINGH, BRETT BARIN, Department of Physics, University of Central Florida, Orlando, Fl, AJIT KUMAR PATRA, BARBAROS ÖZYILMAZ, Department of Physics, National University of Singapore, Singapore, ENRIQUE DELBARCO, Department of Physics, University of Central Florida, Orlando, Fl — We present evidence of large spin relaxation effects in CVD graphene observed by means of ferromagnetic resonance (FMR) measurements of Permalloy/graphene (Py/Gr) bilayers. A substantial increase of the FMR linewidth in the Py/Gr bilayer, as compared to the Py layer, is interpreted in terms of an enhancement of the Gilbert damping in the ferromagnetic layer as a consequence of spin pumping at the Py/Gr interface, which is driven by the Py magnetization dynamics (i.e. precession of the magnetization induced by the microwave stimulus at resonance). The remarkable increase in the FMR linewidth compares with observations in other bilayer systems in where thick layers (thicker than the spin diffusion length) of heavy metals with strong spin-orbit interaction are employed as the non-magnetic layer. Our results indicate that spin relaxation in CVD graphene must be greatly enhanced in order to account for the losses of angular momentum by the ferromagnet. We will also present a comparative study of the Gilbert damping in Py/NM films employing highly ordered pyrolitic graphene as the non-magnetic layer, for which a more moderate broadening of the FMR linewidth is observed.

Enrique delBarco
Department of Physics, University of Central Florida, Orlando, Fl

Date submitted: 18 Dec 2012 Electronic form version 1.4