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Spin current generation in graphene by dynamical spin pumping SIMRANJEET SINGH, Department of Physics, University of Central Florida, DANIEL MARKÓ, BARBAROS ÖZYILMAZ, Department of Physics, National University of Singapore, ENRIQUE DEL BARCO, Department of Physics, University of Central Florida — Graphene is a promising material for spintronics applications given its unique properties. However, an efficient method to generate pure spin currents into this two-dimensional material is required to understand the spin dynamics and mechanisms associated to spin transport in graphene. Recently, we reported the first evidence of spin pumping in ferromagnet/graphene interfaces by studying the damping of the ferromagnet due to presence of graphene. We have extended the original studies towards different device configurations. Here we discuss the effect of the interface on the dynamical damping by studying different stacking orders of graphene and Permalloy layers. Our results confirm that the observed damping is indeed a signature of dynamical spin pumping wherein spin polarized currents are pumped into the graphene from the precessing magnetization of the ferromagnet. In addition, we performed comparative FMR studies of ferromagnet/Graphene strips buried underneath the central line of a coplanar waveguide. A larger FMR linewidth broadening is observed when the graphene layer protrudes away from the ferromagnet strip, indicating that the spin relaxation in graphene occurs away from the area directly underneath the ferromagnet being excited.

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