Manipulations of inverse spin Hall effect in a FM/Pt/FM trilayer structure via RKKY interlayer interaction

HAOLIANG LIU, DALI SUN, CHUANG ZHANG, MATTHEW GROESBECK, RYAN MCLAUGHLIN, VALY VARDENY, Department of Physics and Astronomy, University of Utah — We studied the inverse spin Hall effect (ISHE), ferromagnetic resonance and MOKE response in FM/NM/FM trilayer (NiFe/Pt/Co) as a function of the Pt layer thickness, d. We found evidence that non-local magnon drag influences the ISHE response in the Pt layer via the RKKY interaction, where the exchange coupling constant oscillates between parallel and antiparallel FM magnetization configuration as a function of d. In particular the ISHE response in the parallel FM configuration was found to be four times larger than that in the conventional Co/Pt or NiFe/Pt bilayer structures.

Work supported by the MURI-AFOSR grant FA9550-14-1-0037, and the MRSEC facility center supported by NSF-MRSEC grant DMR-1121252.