Abstract Submitted
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Spin-Hall Non-Local Transport Mediated by a Magnetic Insulator[1] MASSOUD RAMEZANI MASIR, HUA CHEN, Departement of physics, University of Texas at Austin, Texas 78712, USA, INTI SODEMANN, Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA, ALLAN. H. MACDONALD, Departement of physics, University of Texas at Austin, Texas 78712, USA — Magnetic systems with easy-plane order support dissipationless spin supercurrents that can lead to non-local coupling between electrically separated conductors. Recently the electrical properties of a system containing two magnetic multilayer stacks with perpendicular magnetic anisotropy electrodes and a shared easy-plane magnetic layer have been discussed. In this research we discuss a closely related system in which the two conducting channels that are coupled by the easy-plane magnetic layer are co-planar thin film metals with large spin Hall effects. We theoretically explained the non-local relationship between the current-voltage relationships of two thin film metallic conductors. Coupling occurs because both conductors inject spins into the magnetic insulator and because this information is communicated between conductors via exchange interactions within the magnetic system. We investigate the non-local transport properties of the system in the macrospin and long thin nanomagnet limits, deriving conditions for the critical currents and using solutions to the Landau-Liftshitz-Gilbert equation to characterize the dynamic steady state case.

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