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Spin Hall Effect induced Anisotropic Magnetoresistance PRISCILA GONZALEZ BARBA, King Abdullah University of Science and Technology, SEE-HUN YAN, LUC THOMAS, KWANG-SU RYU, STUART PARKIN, IBM Almaden Research Center, AURELIEN MANCHON, King Abdullah University of Science and Technology — Spin-orbit-induced anisotropic transport in magnetic materials, studied for more than a century, has recently experienced a renewed interest thanks to the formulation of anisotropic spin scattering in terms of Berry's curvature. Anisotropic magnetoresistance (AMR) is related to the scattering of the transport electrons on the orbitals of localized electrons, depending on the magnetization direction. The contributions of the interfaces on AMR has been scarcely studied. We consider a trilayer composed of one ferromagnetic layer sandwiched between two normal metals. The normal metals display spin Hall effect (SHE), whereas the ferromagnetic layer polarize the flowing current. We propose that SHE present in the top and bottom layers might contribute to the AMR. The charge and spin currents are analyzed by drift-diffusion equations including the role of inverse SHE as well as anomalous Hall effect. Longitudinal and transverse spin accumulations at the interfaces are captured through spin dependent conductance and the mixing conductance. It is shown that the presence of a spin accumulation in the normal metal close to the interface is transformed into a charge current through inverse SHE hence altering the conductivity of the normal metal. The obtained total resistivity calculation indicates its own spin accumulation profile dependance.

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