Abstract Submitted
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Analysis of the spin Hall magnetoresistance in ferromagnetic insulator/normal metal hybrids[1] MATTHIAS ALTHAMMER, University of Alabama, SIBYLLE MEYER, MICHAEL SCHREIER, MATHIAS WEILER, STEPHAN GEPRÄGS, MATTHIAS OPEL, HANS HUEBL, RUDOLF GROSS, Walther-Meissner-Institut, TIMO KUSCHEL, CHRISTOPH KLEWE, JAN-MICHAEL SCHMALHORST, GÜNTER REISS, Universität Bielefeld, ARUNAVA GUPTA, University of Alabama, YAN-TING CHEN, Delft University of Technology, GERRIT E.W. BAUER, HIROYASU NAKAYAMA, EIJI SAITOH, Tohoku University, SEBASTIAN T.B. GOENNENWEIN, Walther-Meissner-Institut — Pure spin currents, i.e. the net flow of spin angular momentum without an accompanying charge current, represent a new paradigm for spin transport and spintronics. We have experimentally studied a new type of magnetoresistance effect, which arises from the interaction of charge and spin current flows in ferromagnetic insulator/normal metal hybrid structures. In more detail, we measured the resistance of yttrium iron garnet(YIG)/Pt, YIG/nonferromagnet/Pt, nickel ferrite/Pt, and magnetite/Pt hybrid structures as a function of the magnitude and the orientation of an external magnetic field. The resistance changes observed can be quantitatively traced back to the combined action of spin Hall and inverse spin Hall effect in the Pt metal layer, and are thus termed spin Hall magnetoresistance (SMR). We show that the SMR is qualitatively different from the conventional anisotropic magnetoresistance effect arising in magnetic metals. Furthermore, the SMR enables us to quantify the spin Hall angle in our Pt layers.

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