Abstract Submitted
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Temperaturedependent spin Hall magnetoresistance in ferromagnetic insulator/normal metal hybrids[1] MATTHIAS ALTHAMMER, SIBYLLE MEYER, STEFAN GEPRÄGS, MATTHIAS OPEL, RUDOLF GROSS, SEBASTIAN T.B. GOENNENWEIN, Walther-Meissner-Institut, Bayerische Akademie der Wissenschaften, Walther-Meissner-Strasse 8, 85748 Garching, Germany — 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. The resistance changes observed can be quantitatively traced back to the combined action of spin Hall and inverse spin Hall effect in the normal metal layer, and are thus termed spin Hall magnetoresistance (SMR) [1,2]. In more detail, we studied the temperature dependence of the SMR in yttrium iron garnet / platinum hybrid structures via magnetization orientation dependent magnetoresistance measurements. Our experiments show that the SMR amplitude decreases with decreasing temperature, which can be quantitatively modeled in terms of a spin Hall angle in platinum decreasing from 0.11 at 300K to 0.075 at 10K [3], while the spin diffusion length and the spin mixing conductance of the ferrimagnetic insulator / normal metal interface remain almost constant.
[1] Nakayama et al., PRL, **110**, 206601 (2013)
[2] Althammer et al., PRB, **87**, 224401 (2013)
[3] Meyer et al., APL, **104**, 242411 (2014)

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