

Abstract Submitted  
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**Spin Hall angle in Pd below the spin diffusion length**<sup>1</sup> V. VLAMINCK, H. SCHULTHEISS, J. PEARSON, F. FRADIN, S. BADER, A. HOFFMANN, Argonne National Laboratory, O. MOSENDZ, Hitachi San Jose Research Center — The spin-orbit coupling gives rise to an inter-conversion of spin and charge currents. A pure spin current is accompanied by a charge accumulation perpendicular to both the spin polarization and spin current, so-called inverse spin Hall effect (ISHE). We report measurements of the ISHE in a permalloy/palladium (Py/Pd) bilayer integrated with a coplanar wave-guide by pumping a pure spin current via ferromagnetic resonance (FMR) [1]. The magnetization precession creates a spin accumulation at the Py/Pd interface that diffuses into the normal metal and partially scatters back into the permalloy when the Pd thickness is smaller than the spin diffusion length. We observe an increasing broadening of the FMR linewidth with increasing thickness of Pd from which we extract the spin diffusion length in Pd and an average spin mixing conductance. The resultant pure spin current induces, in turn, a spin Hall voltage that is measured across the metallic layer. The spin Hall angle obtained from fitting the dc voltage [1] remains fairly constant even for thickness smaller than the spin diffusion length.

[1] O. Mosendz et al., Phys. Rev. B (in press). arXiv: 1009.5089

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