

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Spin Torque Generated by the Spin Hall Effect in Ferromagnets JONATHAN GIBBONS, Department of Physics, Cornell University, ROBERT BUHRMAN, School of Applied and Engineering Physics, Cornell University, DANIEL RALPH, Department of Physics, Cornell University — Ferromagnetic materials exhibit the anomalous Hall effect, the generation of a transverse charge current due to spin-orbit coupling. The anomalous Hall effect is closely related to the spin Hall effect, and hence this transverse charge current is expected to be accompanied by a strong transverse spin current, whose direction can be manipulated by rotating the magnetic moment. We measure the torque from this spin current generated by Gd-doped Fe and acting on an in-plane magnetized free layer. We use the harmonic measurement technique, applying a current to an in-plane pinned ferromagnet/spacer/in-plane free ferromagnet stack and measuring the second harmonic Hall voltage. We report the angular dependence of the spin torque for a variety of initial exchange bias directions, and as the spin torque changes with an external magnetic field.

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Date submitted: 06 Nov 2015

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