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The Spin Hall Effect in Rare Earth Thin Films NEAL REYNOLDS, JONATHAN GIBBONS, JOHN HERON, Cornell University Physics Department, DARRELL SCHLOM, Cornell University Materials Science and Engineering, DANIEL RALPH, Cornell University Physics Department — The spin Hall effect results in a spin current which flows transverse to an applied electric field in heavy metals, and which can be used to apply an efficient spin transfer torque to the ferromagnetic layer in heavy metal/ferromagnet bilayer structures. We report experimental investigations of the strength of the spin Hall effect in lanthanide rare earth materials. To ensure trustworthy results, we compare the results of several complementary measurement techniques: off-resonant second harmonic detection of current-induced magnetic tilting, spin-torque ferromagnetic resonance, and spin pumping. We report on both the anti-damping and effective-field components of the spin torque generated by the spin Hall effect.

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