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ST-FMR Study of Spin Transfer Effects in Antiferromagnet/Ferromagnet Spin Valves YONG-TAO CUI, A. R. MELLNIK, K. V. THADANI, R. A. BUHRMAN, D. C. RALPH, Cornell University — Spin transfer effects due to current passing between magnetic layers are of interest as a way to control the orientation of nano-scale ferromagnets. Recent theoretical studies [1] suggest that current-induced torques can also occur when electrons pass between antiferromagnets and ferromagnets. Here we report measurements on nanopillar spin valve devices containing the layer structure: antiferromagnet / normal metal / free ferromagnet / normal metal / pinned ferromagnet. By using spin-transfer-induced ferromagnetic resonance (ST-FMR) [2,3] to detect current-driven oscillations of the free ferromagnetic layer, and comparing to simple free ferromagnet / normal metal / pinned ferromagnet devices, we determine the spin torque applied on the free ferromagnet by current passing through the antiferromagnet. We will discuss the magnitude and direction of the spin torque, its angular dependence relative to the antiferromagnetic director (direction of the antiferromagnet order parameter), and its bias dependence. [1] P. M. Haney and A. H. MacDonald, Phys. Rev. Lett. 100, 196801 (2008). [2] A. A. Tulapurkar et al., Nature 438, 339 (2005). [3] J. C. Sankey et al., Phys. Rev. Lett. 96, 227601 (2006).

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