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Spin-Transfer Effect in Nanopillar Spin Valves With A Thick Polarizing Layer VLAD PRIBIAG, G.D. FUCHS, P.M. BRAGANCA, N.C. EMLEY, O. OZATAY, J. SANKEY, D.C. RALPH, R.A. BUHRMAN, Cornell University, I. KRIVOROTOV, U.C. Irvine — Current-induced magnetization switching has been the object of intensive study, motivated in part by possible applications for non-volatile magnetic storage. To date, the majority of studies have focused on structures where the moments of the magnetic layers lie in plane. Recently, however, it has been predicted that significantly faster switching times, as well as lower switching currents could be achieved in a device where the magnetization of the polarizing layer is perpendicular to the plane of the free layer [1, 2]. To study this effect we have fabricated Py 60nm / Cu 40nm / Py 5nm nanopillar spin valves patterned as 80 nm by 150 nm ellipses. The magnetization of the thick polarizing layer can be readily coerced to high out-of-plane angles by applying a weak field perpendicular to plane, while the much thinner free layer is only weakly affected. Here we present a phase diagram for our devices, obtained through DC and microwave-frequency measurements as function of current and applied out-of-plane field. We will discuss the results in the context of switching with an out-of-plane polarizer. [1] A. D. Kent et al., Appl. Phys. Lett. 84, 3897 (2004). [2] K. J. Lee et al., Appl. Phys. Lett. 86, 022505 (2005).

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