Abstract Submitted
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Effect of spin diffusion in the polarizer on current-induced magnetic switching[1] SCOTT BUTTON, SERGEI URAZHDIN, West Virginia University — Current-induced magnetic switching of a nanomagnet occurs due to the spin transfer torque exerted by current spin-polarized by another ferromagnet. Efficient switching is generally achieved by enhancing the polarizing properties of the latter. However, calculations show that switching is affected not only by the polarizing properties of the polarizer, but also by the electron diffusion in this layer [1,2]. To test the effects of spin diffusion in the polarizer on current-induced switching, we performed measurements of magnetic multilayer nanopillars with three different structures of the polarizing magnetic layer: a thick Co layer, a thin Co layer, and a bilayer consisting of a thin Co layer and a strongly spin-flipping FeMn alloy. In the pillars with a thick Co polarizer, the switching currents dramatically increase below 130 K, while the magnetoresistance exhibits a nonmonotonic dependence on temperature with a peak at 130 K. In contrast, the samples with a thin Co polarizer exhibit weak monotonic dependencies of switching and magnetoresistance on temperature. We discuss the implications of our results for our understanding of spin-dependent diffusion in magnetic multilayers. [1] A.A. Kovalev, A. Brataas, and G.E.W. Bauer, Phys. Rev. B 66, 224424 (2002). [2] Zhang, P.M. Levy, and A. Fert, Phys. Rev. Lett. 88, 236601 (2002).

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