Abstract Submitted
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Polarizer angular dependence of spin transfer oscillation in magnetic tunnel junction YISONG ZHANG, HUI ZHAO, XUAN LI, ANDREW LYLE, JIAN-PING WANG, Department of Electrical and Computer Engineering, the Center for Micromagnetics and Information Technologies (MINT), University of Minnesota — MgO based magnetic tunnel junction (MTJ) spin transfer oscillators (STO) are characterized using spin-transfer ferromagnetic resonance (ST-FMR)[1] and spectrum analysis [2]. The spin transfer torque vector angular dependence has been measured by ST-FMR with an external field[3]. However, the angular dependence has not been measured with spectrum analysis. In this report, the angular dependence of spin torque oscillation behavior is systematically investigated in the frequency and time domain without an external field. The angle ϕ between the free-layer easy axis and the polarizer is geometrically controlled using e-beam lithography patterning of MgO based MTJ with about 120% MR ratio, 8$\Omega\mu$m2 resistance-area product and 1 MA/cm2 critical switching current density. By analyzing the power spectrum density at different currents and ϕ, we found that the range of the oscillation onset current increased by a factor of four with ϕ from 10° to 70° which agrees with numerical analysis. Additionally, the oscillation onset behavior is investigated by real time analysis. [1]J.C.Sanky, et al, Nat. Phys. 4, 67 (2008). [2] A.M.Deac, et al, Nat, Phys. 4, 803 (2008). [3]C.Wang, et al, Phys. Rev. B 79, 224416 (2009).

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