Abstract Submitted
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Enhanced magnetization drift velocity and current polarization in $(CoFe)_{1-x}Ge_x$ alloys[1] ROBERT MCMICHAEL, NIST, MENG ZHU[2], NIST and Maryland Nanocenter, BRIAN SOE, NIST and Harvey Mudd College, MATT CAREY, STEFAN MAAT, JEFF CHILDRESS, Hitachi Global Storage Technologies — We present measurements of current spin polarization and magnetization drift velocity in $(CoFe)_{1-x}Ge_x$ alloys ($x \leq 0 \leq 0.3$), using a spin wave Doppler technique where spin wave transmission is measured between fixed-wavevector antennas coupled to current-carrying wires [1,2]. In a current density J, the transmission resonance frequency is shifted by $\Delta f = kv/2\pi$, where $v = Jg\mu_B P/(2eM_s)$ is a magnetization drift velocity. Measurement of Δf allows calculation of v and current spin polarization P. With increasing Ge concentration, v increases dramatically from (3.1 ± 0.2) m/s for CoFe to (8.2 ± 0.6) m/s for $(CoFe)_{0.7}Ge_{0.3}$ ($J = 10^{11}$ A/m^2). We attribute this increase in drift velocity primarily to decreased magnetization. The current polarization increases from 0.84 ± 0.04 for CoFe and reaches a maximum of 0.95 ± 0.05 at approximately 25% Ge.

[1] V. Vlaminck and M. Bailleul, Science, 322, 410 (2008)
[2] M. Zhu, C. L. Dennis and R. D. McMichael, Phys. Rev. B. 81, 140407R (2010).

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[2]Current affiliation: Seagate Technology

Robert McMichael
Nat'l Inst of Stds & Tech.

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