Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Temperature dependence of current polarization in $Ni_{80}Fe_{20}$ by spin wave Doppler measurements[1] MENG ZHU, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD, USA; Maryland NanoCenter, University of Maryland, College Park MD, USA, CINDI DENNIS, Metallurgy Division, NIST, Gaithersburg, MD, USA, ROBERT MCMICHAEL, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD, USA — The temperature dependence of current polarization in ferromagnetic metals will be important for operation of spin-torque switched memories and domain wall devices in a wide temperature range. Here, we use the spin wave Doppler technique[1] to measure the temperature dependence of both the magnetization drift velocity $v(T)$ and the current polarization $P(T)$ in $Ni_{80}Fe_{20}$. We obtain these values from current-dependent shifts of the spin wave transmission resonance frequency for fixed-wavelength spin waves in current-carrying wires. For current densities of 10^{11} A/m^2, we obtain $v(T)$ decreasing from 4.8 ± 0.3 m/s to 4.1 ± 0.1 m/s and $P(T)$ dropping from 0.75±0.05 to 0.58±0.02 over a temperature range from 80 K to 340 K. [1] V. Vlaminck et al. Science 322, 410 (2008);

[1]This work has been supported in part by the NIST-CNST/UMD-NanoCenter Cooperative Agreement.

Meng Zhu
Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD;
Maryland NanoCenter, University of Maryland, College Park MD, USA

Date submitted: 30 Nov 2009 Electronic form version 1.4