Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Temperature dependence of the non-local resistance and spin diffusion length in metallic lateral spin valves MICHAEL J. ERICKSON, School of Physics and Astronomy, University of Minnesota, CHRIS LEIGHTON, Department of Chemical Engineering and Materials Science, University of Minnesota, PAUL A. CROWELL, School of Physics and Astronomy, University of Minnesota
— We report measurements of the T dependence of the non-local spin signal in lateral metallic spin valves with transparent ferromagnet (FM) / normal metal (N) interfaces. We have employed complementary spin valve and Hanle effect measurements to systematically study spin injection and relaxation. Devices were deposited in UHV from high purity sources of all four combinations of $Ni_{0.8}Fe_{0.2}$ or Co FM's and Cu or Al N channels. Devices of width 250 nm, thicknesses 200 - 400 nm, and FM contact separations (d = 250 to 2000 nm) were fabricated on a single substrate using an *in-situ* shadow masking technique. ΔR_{NL} measurements show a very different T dependence for NiFe and Co devices while showing similar behavior for both Al and Cu. This is generally consistent with the measured resistivities and modeling based on the assumption of transparent interfaces. Fitting ΔR_{NL} vs. d yields a spin diffusion length with weak T dependence for both Al and Cu and is independent of FM. Hanle effect measurements confirm a consistent picture of spin relaxation. Work supported by the University of Minnesota NSF MRSEC.

Michael Erickson
University of Minnesota

Date submitted: 15 Dec 2009 Electronic form version 1.4