Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Effect of Asymmetric Leads on Switching Currents in Magnetic Nanopillars[1] JACK BASS, HUSEYIN KURT, WILLIAM PRATT JR., Physics Department and Center for Sensor Materials, Michigan State University, East Lansing, MI 48824, ALBERT FERT, Unite Mixte de Physics, CNRS/THALES, Orsay, France 91404 — Manschot et al.[1] predicted that the critical current for switching from parallel (P) to antiparallel (AP) magnetic states in ferromagnetic/nonmagnetic/ferromagnetic (F/N/F) nanopillars could be reduced by as much as an order of magnitude via asymmetric nonmagnetic leads with different effective resistances (resistivity times spin diffusion length). They proposed sandwiching the nanopillar between high effective resistance Cu (next to the free layer) and low effective resistance Pt (next to the fixed layer). Combining Pt with $Ag_{0.95}Sn_{0.05}$ (which has a higher effective resistance than Cu), we found a much more modest reduction in switching current between average data for AgSn/Co/Cu/Co/Pt and Pt/Co/Cu/Co/AgSn nanopillars. We'll compare our relative switching currents with calculations using a diffusive transport model based upon the Valet-Fert theory of current-perpendicular-to-plane magnetoresistance. [1] Jan Manschot et. al. Appl. Phys. Lett. 85, 3250 (2004).

[1]Supported by MSU CSM, Keck Microfabrication Facility, NSF grants DMR02-02476, 98-09688, NSF-EU Collaborative grant 00-98803, and Seagate Technology

Jack Bass
Department of Physics and Center for Sensor Materials, Michigan State University, East Lansing, MI 48824

Date submitted: 02 Dec 2004 Electronic form version 1.4