Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Spin-transfer-induced magnetization reversal in bilayer magnetic nanopillars at high fields: dependence on free layer thickness[1] WENYU CHEN, ANDREW D. KENT, Department of Physics, New York University, M.J. ROOKS, N. RUIZ, JONATHAN Z. SUN, IBM T. J. Watson Research Center — Spin transfer in asymmetric Co/Cu/Co bilayer magnetic nanopillar junctions has been studied as a function of free (thin) Co layer thickness from 1.8 to 5.3 nm. In particular, the critical current for magnetization reversal in large magnetic fields applied perpendicular to junction surface has been measured. Junctions with submicron lateral size were fabricated using a nano-stencil process. Junctions resistances scale with lateral area and their in-plane magnetoresistance was found to be independent of free layer thickness. The critical current decreases linearly with decreasing free layer thickness and extrapolates to a finite critical current in the limit of zero thickness. This can be understood as either a decrease in efficiency of the spin-transfer torque and/or an interfacial contribution to the damping of the free magnetic layer.

[1]The research is supported by NSF-DMR-0405620.

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Date submitted: 05 Dec 2005 Electronic form version 1.4