Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Phenomenological model for size-dependent switching behavior in spin transfer torque devices VENKATESH CHEMBROLU, Department of Applied Physics, Stanford University, Stanford, California 94305, USA, YVES ACREMANN, PULSE Centre, Stanford Linear Accelerator Centre, Menlo Park, California 94025, USA, JOHN PAUL STRACHAN, XIAOWEI YU, Department of Applied Physics, Stanford University, Stanford, California 94305, USA, ASHWIN TULAPURKAR, Stanford Synchrotron Radiation Laboratory, Menlo Park, California, 94025, USA, JORDAN KATINE, MATHEW CAREY, Hitachi Global Storage Technologies San Jose Research Center, San Jose, California 95120, USA, TOLEK TYLISZCZAK, Advanced Light Source, Berkeley, California, 94720, JOACHIM STOHR, Stanford Synchrotron Radiation Laboratory, Menlo Park, California 94025, USA — Recent results based on time resolved x-ray imaging of magnetization dynamics in nano-magnetic devices have shown size dependent trends in the switching behavior. Samples with a lateral dimension of 100x180nm show a vortex-driven switching mechanism, whereas smaller samples with a lateral dimension of 110x150nm do not switch by a vortex. Further studies have shown that when a non-zero angle in introduced between the fixed and the free layers, vortex-driven switching becomes manifest in samples with smaller dimensions also. Here, we would like to present a phenomenological model based on linearlized LLG equations to explain the various regimes of observed switching behaviors.

Venkatesh Chembrolu
Department of Applied Physics, Stanford University, Stanford, California 94305, USA

Date submitted: 14 Dec 2007 Electronic form version 1.4