Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

X-Ray Imaging of Spin Transfer Induced Magnetization Reversal YVES ACREMANN, Stanford Synchrotron Radiation Laboratory, J.P. STRACHAN, V. CHEMBROLU, Department of Applied Physics, Stanford University, S.D. ANDREWS, Department of Materials Science and Engineering, Stanford University, T. TYLISZCZAK, Advanced Light Source, J.A. KATINE, M.J. CAREY, Hitachi Global Storage Technologies San Jose Research Center, B.M. CLEMENS, Department of Materials Science and Engineering, Stanford University, H.C. SIEGMANN, J. STÖHR, Stanford Synchrotron Radiation Laboratory — Magnetization switching by spin injection has been observed in giant magneto-resistance measurements, giving an insight into the temporal evolution of the magnetization. So far, however, the nanoscale magnetization distribution during the switching process has remained hidden. Here we report, for the first time, imaging the magnetic switching process using advanced pump-probe x-ray microscopy. We observe that the switching process is initiated and determined by the lateral motion of a magnetic vortex driven by the spin current. Motion pictures with 200 picosecond time resolution show that the switching process is based on the motion of a magnetic vortex, leading to C-like patterns which may decay later into a uniform magnetic state. Our measurements show the fundamental role played by the curled Oersted field which necessarily accompanies the spin injection current.

Yves Acremann
Stanford Synchrotron Radiation Laboratory, Stanford, California 94309, USA

Date submitted: 19 Jan 2006 Electronic form version 1.4