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Time-resolved X-ray Imaging of Spin-Torque-Induced Vortex Oscillation XIAOWEI YU, Stanford University, VLAD PRIBIAG, Cornell University, YVES ACREMANN, Stanford Synchrotron Radiation Laboratory, VENKATESH CHEMBROLU, Stanford University, ASHWIN TULAPURKAR, Stanford Synchrotron Radiation Laboratory, TOLEK TYLISZCZAK, Advanced Light Source, ZHIPAN LI, ROBERT BUHRMAN , Cornell University, JOACHIM STOHR, Stanford Synchrotron Radiation Laboratory, HANS SIEGMANN, PULSE Center, Stanford Linear Accelerator Center — Recent transport measurements demonstrated a persistent oscillation of a magnetic vortex isolated in a nanoscale spin valve structure driven by a d. c. spin-polarized current [1]. The magnetic information is inferred from the giant magnetoresistance (GMR) signal, which depends on the relative average magnetization of the two magnetic layers. Here, we report spatially resolved measurements of the vortex oscillation driven by spin-transfer torque by using advanced x-ray imaging technique. The microwave-frequency vortex oscillation is synchronized to the fast x-ray pulses. Motion images with 70ps time resolution and 30nm spatial resolution reveal the complicated dynamics underlying the previously observed oscillating GMR signal. [1] V. S. Pribiag, I. N. Krivorotov, G. D. Fuchs, P. M. Braganca, O. Ozatay, J. C. Sankey, D. C. Ralph, and R. A. Buhrman, Nature Physics 3, 498 (2007)

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