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Spin-Torque Stimulated Barkhausen Jumps in a Thin-Film Permalloy Microstructure[1] SHUQIANG YANG, JAMES ERSKINE, Dept. of Physics, Univ. of Texas at Austin — Barkhausen Jumps (BJs) are studied in a 60μm x 50μm x 30nm thick permalloy microstructure as a function of the bipolar current pulse amplitude applied during field-driven magnetization reversal. Magnetic force microscopy is used to characterize the quasi-static domain structure and the magneto-optic Kerr effect is used to measure BJs. Above a threshold current density $J_T \sim 10^{10}$ A/m^2, the BJs become correlated with the current pulses. The observed behavior is consistent with models of spin-torque transfer domain wall motion and compatible with recent experiments after accounting for difference in sample static coercivity. The threshold current density for current-stimulated domain wall motion in the (low coercivity) micron-scale structures is about two orders of magnitude lower than the threshold reported for sub-micron wire structure [1] (10^{12} A/m^2), which is near the damage threshold. The effect can be used to control dynamic coercivity and offers opportunities for studying current-driven domain dynamics near the depinning threshold, and under conditions permitting a wide dynamic range below the damage threshold. [1] A. Yamaguchi et al. Phys. Rev. Lett. 92, 077205-1 (2004).

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James Erskine
Dept. of Physics, Univ. of Texas at Austin

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