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Thermal Effects on Precessional States in Nanomagnets Driven by DC Spin-Transfer Torques JACK SANKEY, SERGEY KISELEV, ILYA KRIVOROTOV, NATHAN EMLEY, PATRICK BRAGANCA, KIRAN THADANI, ROBERT BUHRMAN, DANIEL RALPH, Cornell University — A DC current passing through a nanoscale magnetic multilayer can excite steady-state microwave-frequency magnetization precession by transferring spin angular momentum from one layer to the other [1-3]. In frequency-domain measurements, the spectra generated by such excitations consist of peaks with a non-zero width in frequency, Δf, indicating that the oscillatory signal produced by the precessing magnet is not perfectly periodic. Here we measure the temperature (T) dependence of Δf. We argue that at least two mechanisms contribute to Δf: thermal deflections of the magnetic moment within a precessional orbit (for which $\Delta f \sim T^{1/2}$) and thermally-activated transitions between different dynamical states (for which $\ln(\Delta f) \sim 1/T$).
[1] S. I. Kiselev, J. C. Sankey et al., Nature **425**, 380 (2003).
[2] W. H. Rippard et al., Phys. Rev. Lett. **92**, 027201 (2004).
[3] I. N. Krivorotov et al., in press, Science.

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