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Thermally-assisted magnetization reversal in nanomagnets with spin-transfer torque: a GPU approach DANIELE PINNA, ANDREW KENT, ADITI MITRA, DANIEL STEIN, New York University — Spin transfer magnetization reversal has a direct impact on magnetic information storage technologies. The probability that a nanomagnet switches under an applied magnetic field is expected to follow a simple thermally activated LLG model[1]. However, a direct current applied to a nanomagnet produces a spin-transfer torque that drives the magnetization out of equilibrium[2]. Such dynamics have been studied in limits where both the low and high current regimes allow analytical treatment[3]. Nonetheless, the inability to study numerically the long time behavior has tampered with theoretical verification and comparison to current experimental data[4]. In this talk, we present results obtained by employing modern GPU computational techniques to massively parallelize the Langevin equations of the model. We test the numerics by considering a simplified uniaxial case. The full current spectrum is reviewed, verified and compared to the present literature. We then proceed to break the symmetries in the problem and explore the general macrospin model.

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