

Abstract Submitted
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Investigation of spin torque driven magnetization reversal in elliptical elements¹ ANGELIQUE MONTGOMERY, CLAUDIA K.A. MEWES, TIM MEWES, The University of Alabama — Spin transfer torque [1, 2] can be utilized to switch the magnetization in small ferromagnetic elements, which can be used to implement a magnetic random access memory [3]. One crucial parameter for spin torque switching is the critical current required to achieve switching. To investigate spin transfer torque we simulate the magnetization dynamics using our Matlab based micromagnetic code (M³), which uses a fast Fourier transform method to evaluate the longrange magnetostatic field, exchange interaction is implemented using 6, 12 or 26 neighbor methods [4] and also includes adiabatic and non-adiabatic spin torque terms. We have performed simulations using different mesh sizes to examine the influence of the cell size on the micromagnetic results. We have investigated the influence of the current density and pinned layer orientation on the magnetization dynamics and in particular on the switching time.

- [1] J. Slonczewski, J. Mag. Mag. Mat. **159**, 1 (1996).
- [2] L. Berger, Phys. Rev. B **54**, 9353 (1996).
- [3] E. Chen et al., IEEE Trans. Mag. **46**, 1873-1878 (2010).
- [4] M.J. Donahue, D.G. Porter, Physica B **343**, 177 (2004).

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