

Investigation of spin torque driven magnetization reversal in elliptical elements

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We investigate spin transfer torque (STT) [1, 2], which can be used to switch the magnetization in small ferromagnetic elements. STT is of high technological importance, as it can be used to implement a magnetic random access memory [3]. One important parameter for spin torque switching is the critical current required to achieve switching. To investigate spin transfer torque we have simulated the magnetization dynamics using our Matlab based micromagnetic code (M^3). This code 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 carried out simulations using different mesh sizes to examine the influence of the cell size on the micromagnetic results. We also report on the influence of the current density and pinned layer orientation on the magnetization dynamics and in particular on the switching time.

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