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Optimal field sweep rate in magnetic switching of a single-domain particle SHU YAN, YAROSLAW BAZALIY, University of South Carolina, ANDRZEJ STANKIEWICZ, NVE Corporation — The speed of magnetic switching is an important parameter of memory cells. We consider a magnetic moment with an easy axis anisotropy switched by an external field applied at a small angle to the axis. By solving the Landau-Lifshitz-Gilbert(LLG) equation numerically, it is found that the switching time of the magnet is not monotonically increasing with the field sweep rate of the applied field. The dependence has a minimum, i.e., there exists an optimal field sweep time. Analytic approximations are derived for the dependence of the switching time on the field sweep rate and for the value of the optimal field sweep time. Our results have important implications for the optimization of magnetic memory devices.

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