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Magnetic Dynamics of Single-Domain Planar Spin-Transfer Devices YA. B. BAZALIY, University of South Carolina, Columbia SC, USA; Institute of Magnetism, National Academy of Science, Kyiv, Ukraine. — We study spin-transfer devices with dynamic magnets characterized by large easy-plane anisotropy. This situation is standard for planar devices where it arises due to the shape anisotropy. Dominating easy-plane anisotropy keeps the motion of the magnetic moment close to the easy plane, with small out-of-plane deviations. As a result, it is possible to approximately describe magnetization vector by the in-plane angle and derive an effective one dimensional equation for that angle in the absence [1] and in the presence [2] of spin-transfer torques. Effective description maps a spin-transfer device problem onto a problem of an "effective particle" moving in external potential with variable friction coefficient. The advantage of such a description is that the motion of the effective particle can be qualitatively understood by applying the usual energy conservation and dissipation arguments. We show how the effective description produces analytic results for current induced precession states [3] and predicts unconventional "stabilization by repulsion" of static states [2]. // [1] C. J. Garcia-Cervera, Weinan E, J. Appl. Phys. 90, 370 (2001). [2] Ya. B. Bazaliy, Phys. Rev. B 76, 140402(R) (2007). [3] Ya. B. Bazaliy, arXiv:0705.0508, to be published in Appl. Phys. Lett. (2007).

Yaroslaw Bazaliy
University of South Carolina, Columbias SC 29208 and Institute of Magnetism, Kyiv, Ukraine.

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