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Planar Spin-Transfer Device with a Dynamic Polarizer. YAROSLAW BAZALIY, Instituut Lorentz, Leiden University, The Netherlands and Dept. of Physics and Astronomy, University of South Carolina, DEBO OLAOSEBIKAN, Dept. of Physics, Cornell University, BARBARA JONES, IBM Almaden Research Center — In planar nano-magnetic devices magnetization direction is kept close to a given plane by the large easy-plane magnetic anisotropy (e.g. by shape anisotropy in a thin film). In conventional micromagnetics it is known that in this case the magnetization motion is effectively in-plane with only one angle required for its description, and can become overdamped even for small values of the Gilbert damping. We extend the equations of the effective in-plane dynamics to include the spin-transfer torques. The simplifications achieved in the overdamped regime allow us to study systems with several dynamic magnetic pieces ("free layers"). A transition from a spin-transfer device with a static polarizer to a device with two equivalent magnets is observed: when the size difference between the magnets is less than critical, the device does not exhibit switching, but goes directly into the "windmill" precession state.

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