

Magnetization switching and microwave oscillations in magnetic heterostructures with spin-orbit Rashba effect induced by in-plane current injection

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In this work we make analysis of the influence of non-equilibrium spin accumulation induced by the in-plane current due to the Rashba effect on the stability of the magnetization of the ferromagnetic ultra-thin film in a heavy metal/ferromagnetic heterostructure and find both components of the current-induced spin-orbit torque acting on it [1]. We calculate the state diagrams of ferromagnetic layer for the effective Rashba field oriented parallel or perpendicular to the easy magnetization axis. It is shown that in addition to hysteresis effects of spin state switching the conditions needed for continuous generation of microwave oscillations also can be predicted.

References:

[1] I. M. Miron, G. Gaudin, S. Auffret, B. Rodmacq, A. Schuhl et al., *Nature Materials* **9**, Current-driven spin-torque induced by the Rashba effect in a ferromagnetic metal layer (2010)

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