LARGE ANGLE STEADY STATE PRECESSIONS INDUCED BY A PERPENDICULAR POLARIZER

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The spin transfer torque effect can induce periodic steady state oscillations of the magnetization in a magnetic nanostructure. These oscillations in combination with the magneto-resistance can lead to an oscillating output voltage, whose frequency lies in the GHz range and that can be tuned via the spin polarized current amplitude. Many experiments have been performed to study such steady state oscillations for planar structures, where the free layer and the polarizing layer are in-plane magnetized. In this lecture, a different configuration will be addressed, for which the polarizer is out of plane magnetized [1]. This leads to substantially different properties of the oscillator that are of interest for applications and that will be discussed in detail. For this I will first present a macrospin description that reveals the basic properties of this 'perpendicular' spin torque oscillator. Then an experimental realization will be described and the results will be analyzed in context of macrospin and micromagnetics simulations.

[1] D. Houssameddine et al, Nature Materials **6**, 447 (2007)