Application of $\pi/2$ domain walls in cubic-crystalline films to domain-wall racetracks and spin-transfer oscillators

Andrzej Janutka[1] and Przemysław Gawroński[2]

[1] *Faculty of Fundamental Problems of Technology, Wrocław University of Science and Technology, 50-370 Wrocław, Poland*

[2] *Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, 30-059 Krakow, Poland*

We outline our micromagnetic simulations and analytical studies of the current-driven dynamics of the $\pi/2$ domain walls (DWs) in cubic-crystalline magnetic nanostripes and of the rotation of $\pi/2$-DW-containing and vortex-centered texture (of four closure domains) in a circular cubic-crystalline magnetic dot [1], [2]. Ultra-thin films of Fe_3Pt and Fe_3O_4 are of our especial interest. Several topic make the cubic-crystalline films an attractive alternative to the soft-magnetic films or PMA films for designing the DW- or vortex-based spintronic devices. These are: a small width od the $\pi/2$ DWs (a dense packing), their large maximum velocity, a stability of the current-driven vortex-state oscillations (a cyclic motion of the vortex-surrounding $\pi/2$ DWs). We present simulation data on the DW dynamics in Fe_3Pt nanostripes and on the current-driven fast generation of the $\pi/2$ DWs in series using the confined vortex texture.

References:

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