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Study of the coupling of vortices in magnetic nanodisks ALBERTO GUIMARAES, Brazilian Center for Physical Research (CBPF), Rio de Janeiro, Brazil, GABRIEL FIOR, FLAVIO GARCIA, LNLS, Campinas, Brazil — There is a marked interest nowadays in the dynamic behavior of magnetic nanodisks that present magnetic vortices [1]. The tailoring of vortex features, including their gyrotropic frequency, critical vortex core switching velocity and strength of the coupling between nanodisks, is very desirable for future applications, such as vortex magnetic memories (VRAMs) and spin transfer nanooscillators (STNOs) [2]. An original way to tune some of the static vortex properties (specially the vortex core diameter) is simply to introduce a uniaxial perpendicular magnetic anisotropy, as has been recently shown [3]. Here we have studied the coupling between vortices as a function of the magnetic properties of the disks and their separation, using micromagnetic simulations. We analyzed the motion of a vortex core caused by the motion of the second one, excited by static or rotating magnetic fields. A splitting of the gyrotropic frequency is also observed. Exciting one of the disks, it is possible to switch the core polarity of the other. These results open new possibilities for applications of magnetic vortices.

[1] Ruotolo et al. Nat Nano, 4(8):528-532, (2009);
[2] Jung et al. Sci. Rep. 1 ,59;DOI:10.1038/ srep00059 (2011);
[3] Garcia et al. APL. 97, 022501 (2010).

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