Contribution submission to the conference Dresden 2017

Influence of domain wall substructures on magnetic energies of patterned Permalloy films — •Sukhvinder Singh, Haibin Gao, and Uwe Hartmann — Institute of Experimental Physics, Saarland University, Germany

Substructures of domain walls (such as Bloch points, Bloch lines, Neel lines and vortex-antivortex pairs) significantly affect the magnetic characteristics of patterned magnetic materials [1, 2]. We have investigated the influence of domain wall substructures on magnetic energies of Permalloy (Ni80Fe20) patterned thin films. The microstructured patterned films in the thickness range of 20 nm to 150 nm were investigated. The single-vortex state was observed as the lowest energy state for square patterns, while various lowest energy states for rectangular patterns were observed for different film thicknesses. Energy density for the lowest energy configuration decreases with an increase of the patterned structure thickness.

[1] A. Hubert and R. Schäfer, Magnetic domains, Springer (1998)
[2] V.V. Zverev et al., Phys. Solid State, 56, 1785 (2014)

Part:	**MA**
Type:	**Vortrag;Talk**
Topic:	**Micro- and Nanostructured Magnetic Materials**
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