

Abstract Submitted
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Topological defects and misfit strain in magnetic stripe domains of lateral multilayers with perpendicular magnetic anisotropy¹ MARIA VELEZ, A. HIERRO-RODRIGUEZ, R. CID, G. RODRIGUEZ-RODRIGUEZ, J.I. MARTIN, L.M. ALVAREZ-PRADO, J.M. ALAMEDA, Dpto. Fisica, Universidad de Oviedo and CINN (CSIC-U. Oviedo-P. Asturias), Spain — Stripe domain patterns are characteristic of magnetic films with perpendicular magnetic anisotropy (PMA). In this work, PMA amorphous Nd-Co films have been nanostructured with a periodic thickness modulation that induces the lateral modulation of magnetic stripe periods and in-plane magnetization. Confinement effects of stripe domains within the nanostructured regions are combined with coupling effects between nearby elements through elastic interactions within the magnetic stripe pattern. The resulting “lateral” magnetic superlattice is the 2D equivalent of a strained superlattice controlled by interfacial misfit strain within the magnetic stripe structure and shape anisotropy: misfit dislocations appear in the stripe pattern at the boundaries between nanostructured regions and, during magnetization reversal, a 2D variable angle grain boundary is observed within the magnetic stripe pattern. Beautiful patterns appear at the point of maximum misfit strain due to the decay of dislocations in the magnetic stripe pattern into 1/2 disclination pairs. The link between topological defects in the magnetic stripe patterns and domain walls for the in-plane magnetization component allow us to tailor the whole magnetization reversal process. [1] A.Hierro-Rodriguez et al, PRL 109(2012)117202

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