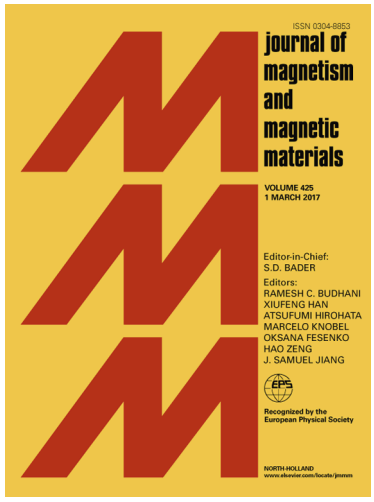

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Study of Magnetization Reversal in Layered Heterostructures by Vector Magnetometry

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Abstract

Multilayered films consisting of layer stacks with different anisotropies are studied by vector magnetometry i.e. simultaneous measurement of the components M_x, M_y along and perpendicular to the applied field respectively. The quantity $\sqrt{M_x^2 + M_y^2}$ is used as measure of the homogeneity of the reversal. For the $[Co(6Å)/Pt(15Å)]_4/(Pt(s))/[Co(10Å)/Pt(15Å)]_4$ with s=0-45Å series consisting of a perpendicular anisotropy bottom four-bilayer-stack coupled to a planar anisotropy top four-bilayer-stack a peak of the M_y component is clearly observed at the M_x coercivity. This is a sign of homogeneous reversal but it can be shown that similar effects can arise by decoupling of two layers with different (in-plane/perpendicular) anisotropies which is the case for s>15Å. In order to study the latter effect, a $[Co(6Å)/Pt(15Å)]_4/W(15Å)/Co(24Å)$ sample is used as a reference as it consists of a perpendicular anisotropy bottom four-bilayer-stack coupled to a vanishing anisotropy top Co layer through a W layer (which creates a magnetically inactive interface permitting only dipolar coupling). In contrast for $[Co(5Å)/Pt(10Å)]_6/Pt(s)/[Ni(15Å)/Pt(5Å)]_6$ series consisting of two different coercivity stacks which both have perpendicular anisotropy the decoupling does not manifest by appearance of peaks in the M_y component.