

Contribution submission to the conference Berlin 2018

Tuning of the Ni:Fe ratio of flexible thin-film giant magnetoimpedance sensors — ●GREGOR BÜTTEL and UWE HARTMANN
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Permalloy-based giant magnetoimpedance (GMI) sensors have been integrated onto Si cantilevers to investigate their potential for the detection of strain and as flexible sensors. The devices allow to apply compressive and tensile strain and to record images of the corresponding magnetic domains by magneto-optical Kerr wide-field microscopy. By tuning the Ni:Fe ratio to a negative magnetostriction constant a strain-gauge factor of nearly 200 is reached in the ferromagnetic resonance regime of the GMI effect [1].

In case of nearly zero magnetostriction the effective anisotropy field remains stable under large applied tensile/compressive strain and no broadening/narrowing of the hysteresis and impedance curve occurs. However, in the low-field and MHz regime a significant modification of the impedance curve was found, which is attributed to domain-wall resonance and a corresponding change of permeability/impedance.

[1] Buettel, G. et al., APL, in press

Part: MA
Type: Poster
Topic: Micro- and Nanostructured Magnetic Materials
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