

Co based multilayer systems for controllable domain wall positioning

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The possibility to actively control position of magnetic domain walls (DWs) in thin film is important for prospective applications in sensors and devices making use of magnetic fields originating from DWs. The positioning of the walls may in general involve the use any constraint to expansion of domains: geometric, like notches in patterned wires, or the ones due to a gradient of the properties of material. I will show how lateral gradients of magnetization switching field (H_S) introduced to the samples by tailoring thicknesses of the constituent layers or using the He^+ ions bombardment can be employed to DW positioning in cobalt based perpendicular magnetic anisotropy (PAM) layers. For Au/Co/Au type films with artificial H_S gradient, both for extended and patterned samples, the external perpendicular magnetic field was capable of setting the DW position with with precision of tens of micrometers over the rang of tenths of millimeter. For PMA films with wedge-shaped platinum spacer layer it will be show that the gradient of interlayer coupling can be used for DW positioning too. The influence of the coupling on the magnetization reversal will be discussed as well.

The work was financed by the National Science Centre Poland under HARMONIA funding scheme for international research projects – decision No. DEC-2013/08/M/ST3/00960 and was done in collaboration of Prof. F. Stobiecki group (Institute of Molecular Physics) in Poznań with University of Kassel group: A. Ehresmann, A. Gaul.