Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Measure of magnetization anisotropy by AMR in electrodes of Co/Pd multilayers[1] AMOS SHARONI, YANIV KACHLON, NOA KURZWEIL, Department of Physics and Institute of Nanotechnology, Bar Ilan University, Ramat Gan, Israel — We studied the anisotropic magnetoresistance (AMR) properties of multilayered Co/Pd thin film electrodes as function of magnetic field. The perpendicular magnetization anisotropy (PMA) in these films is found to modify the AMR. The magnetoresistance (MR) for fields out-of-plane (ρ_{op}) is considerably different than for in-plane fields transverse to current direction (ρ_{ip}), although in both cases current is perpendicular to the magnetic field. Moreover, opposed to other thin films, where ρ_{op} is smaller than ρ_{ip}, our films show an opposite effect, the origin of which is not clear. We can understand the AMR properties of the electrodes by an expanded Stoner-Wolfarth model, where we introduce an additional energy scale related to the PMA. Through a numerical refinement process, we can extract anisotropic energy constants of the films. This is done by reconstructing the MR behavior of the electrodes, using the linear terms in the dependence of resistivity on magnetization orientation. Our anisotropic constants coincide remarkably with other bulk measurements. Thus, our refinement process is an excellent method to extract anisotropic constants also in nano-scale systems, which cannot be measured otherwise.

[1]Work supported by EU-FP7 People IRG #268357.

Amos Sharoni
Department of Physics and Institute of Nanotechnology,
Bar Ilan University, Ramat Gan, Israel

Date submitted: 18 Nov 2011 Electronic form version 1.4