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Static Magnetic Properties of Films Measured by Means of Angular Perturbative Magnetoresistance ALEXANDRE OLIVEIRA, ABNER MELO, RICARDO DA COSTA, CARLOS CHESMAN, Universidade Federal do Rio Grande do Norte — In this work we introduced a new technique to measure magnetic anisotropies and magnetoelectrical properties, such as Anisotropic Magnetoresistance (AMR) and Giant Magnetoresistance (GMR) amplitudes. The Perturbative Magnetoresistance (PMR) consist of a regular collinear four probe magnetoresistance set up with an AC magnetic field (h_{ac}) applied perpendicular to the DC (H_{dc}) one. h_{ac} amplitude is about 1.0 Oe and oscillate at 270 Hz. We successfully interpreted the signal response from the voltage measured by lock-in amplifier and proposed a model based on energy minimization to extract magnetic anisotropies, AMR and GMR amplitudes. Measuring the in-plane angular dependency of PMR signal we were able to identify the usual magnetic anisotropy, such as uniaxial, unidirectional and cubic. Taking into account the perturbative nature of this technique (small h_{ac} amplitude and low frequency), we argue that angular PMR can be used to investigate some dynamic magnetic effects where static technique can not provide such information. A distinct feature of angular PMR is the capability to be used in saturated and non-saturated regime, so revealing magnetic properties dependency on applied field strength. We addressed the Rotatable Anisotropy as an example in this work.

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