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Resistivity tensor in Permalloy films by modified van der Pauw method SNORRI INGVARSSON, MOVAFFAQ KATEB KATESHAMSHIR, CLEMENS SCHEUNER, Science Institute, Univ. of Iceland — We have applied a modified van der Pauw four point measurement method to measure the resistivity in thin ferromagnetic films of sputter deposited Permalloy ($\text{Ni}_{80}\text{Fe}_{20}$). Adding a fifth contact point allows determination of the full 2×2 in-plane resistivity tensor. We did a series of measurements, at zero field, with a saturation field applied along the easy axis and saturation along the hard axis of films in the range between 10 and 250 nm thick. From the results we can confirm that the principle resistivity axes are aligned with the magnetic easy and hard axes, that were set by the growth conditions (affected both by the deposition angle and in situ applied magnetic field). We also extract the anisotropic magnetoresistance, that starts dropping significantly for films thinner than about 50 nm, in reasonable agreement with other studies. We also investigated magnetic anisotropy and coercivity for these films. The coercivity remains relatively stable around 1 Gauss, while the anisotropy field is stable for the thicker films in the range between 50-250 nm, but rises to almost double the value in the range from 50 nm down to 10 nm.

Snorri Ingvarsson
Science Institute, Univ. of Iceland

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