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Names and affiliations of applicants **(* indicates experimentalists):**
Jan Vogel*, Alain Fontaine*: Laboratoire Louis Néel (CNRS), B.P.166,38042 Grenoble.
Vincent Cros*, Frédéric Petroff*: CNRS-Thomson, Domaine de Corbeville, 91404 Orsay.
Wilfried Grange*, Jean-Paul Kappler*: IPCMS-GEMME, 23 rue du Loess, 67034 Strasbourg.
Gérard Krill*: LURE, Bât.209D, Centre Universitaire Paris-Sud, 91405 Orsay.
Andrei Rogalev*, José Goulon*: ESRF, B.P.220, 38043 Grenoble

Report:

Recent measurements [l] indicate that Pd might play a role in the magnetic anisotropy of Pd.&e and Pd/Co multilayers by a reinforcement of the Fe (or Co) orbital moment at the interface. There might also be an anisotropy in the Pd *4d* orbital moment itself. In order to clarity the role of the Pd orbital moment in the macroscopic magnetic anisotropy, we have performed XMCD measurements on the $L_{2,3}$ absorption edges of Pd in Pd/Co and Pd/Fe multilayers, at beamline ID12a. The Pd/Fe(OOl) multilayer contained 2 ML of Pd and 8 ML of Fe (200 periods), and the Pd/Co(l 11) multilayer 2 ML of Pd and 1 ML of Co (30 periods).

Macroscopic magnetic measurements revealed that the Pd/Fe multilayer had an in-plane easy axis, while the Pd/Co multilayer showed a strong perpendicular anisotropy. For both samples, spectra were recorded at normal incidence of the X-rays and at about 25" grazing incidence, with the direction of the applied magnetic field (of 5 Tesla) parallel or anti-parallel to the light propagation direction.

In Figure la), the Pd $L_{2,3}$ XMCD curves of the Pd/Fe multilayer for normal and 2.5" grazing incidence are compared, while in Figure 1 b) the corresponding curves for Pd/Co are shown. Calculating the orbital moment with the sumrules [2], for Pd/Fe we find $0.051 \pm 0.01 \mu_B$ and $0.043 \pm 0.01 \mu_B$ for the normal and grazing incidence directions, respectively. For the Pd/Co multilayer, the total Pd thickness (≈100Å) was very small, and the noise on the XMCD curves did not allow an accurate determination of the orbital moments. However, a difference between the two curves is clearly visible, and a tentative application of the orbital sumrule gave values of $L_\perp \approx 0.08\ \mu_B$ and $L_{//} \approx 0.01\ \mu_B$. For comparison, Weller et *al* [3] found about 0.20 and 0.10 μ_B for the perpendicular and parallel directions for 4 ML of Co between Au. The difference for the Pd/Fe case is thus relatively small, while for Pd/Co it is comparable to the Co anisotropy in Au/Co/Au. This indicates that in Pd/Co multilayers the orbital moment of Pd might play an important role in the perpendicular anisotropy, a role which until now had not been considered.

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