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4*d* polarisation in YFe_2 Laves phase studied by XMCD

We have tested, on the ID12A beam line, the **feasibility of XMCD experiments** at low energy, around 2 keV, using the new electromagnetic undulator for an alternative polarisation measurement.

The observation of a magnetic dichroism signal (about 7% of the white line amplitude) at the $L_{2,3}$ edges of Y in the YFe_2 compound (ferromagnetic with T_C=528K) is a direct evidence of the existence of a 4*d* polarization on the Y sites.

Note that, as already observed in Rh-$L_{2,3}$ absorption edges, the white line presents three well resolved structures [1] and that the XMCD signal is essentially related to the lower energy structure, only a weak contribution is relative to the higher energy structures. Moreover, the asymmetric shape of the XMCD resembles to that we have already observed in 3*d*-Pt systems [2].

Using the sum rules, the analysis of the dichroism signal leads to a magnetic moment about $M_{4d} = -0.2\mu_B$/at (with a value of L_z almost equal zero, see Fig. 1) coupled ferrimagnetically to the Fe-3*d* moment. This is *very far* from the polarized neutron results due to Ritter [3]: M_Y=-0.67μ_B, with 20% of orbital contribution. However, our results concern the sole 4*d* contribution, while the polarized neutron study gives the total moment carry by the Y atoms; but we cannot believe to so huge *s* and *p* electrons contributions. New experiments are needed.

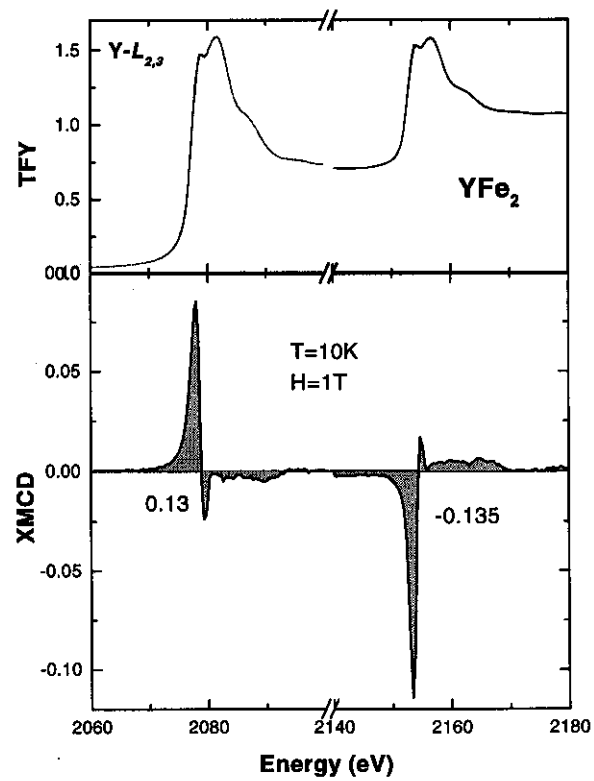

Fig. 1 TFY and XMCD at the Y-$L_{2,3}$ edges in YFe_2. Note the high quality of the spectra.

[1] W. Grange *et al.*, Physica, 259, 1142 (1999)
[2] W. Grange *et al.*, J. applied Phys., 83, 6617 (1999)
[3] C. Ritter, J. Phys. : Condens. Matter 1, 16,; 2765 (1989)