ESRF	**Experiment title:** High resolution *K*-edge XMCD using the deconvolution technique	**Experiment number**: HC-953
Beamline: ID12	**Date of experiment**: from: 06-11-2013 to: 09-11-2013	**Date of report**: 06-03-2018
Shifts: 9	**Local contact(s)**: Katharina Ollefs	*Received at ESRF:*

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Report:

The proposed experiments were performed on ID12 beamline in November 2013 and were successful. Results have been published in December 2016 :

A. Juhin, Ph. Sainctavit, K. Ollefs, M. Sikora, A. Filipponi, P. Glatzel, F. Wilhelm and A. Rogalev. *X-ray Magnetic Circular Dichroism measured at the Fe K-edge with a reduced intrinsic broadening: X-ray Absorption Spectroscopy versus Resonant Inelastic X-ray Scattering measurements*, Journal of Physics Condensed Matter **28**, 505202 (2016).

Abstract of the paper :

X-ray Magnetic Circular Dichroism is measured at the Fe *K* pre-edge in Yttrium Iron Garnet using two different procedures that allow reducing the intrinsic broadening due to the *1s* corehole lifetime. First, deconvolution of XMCD data measured in Total Fluorescence Yield (TFY) with an extremely high signal-to-noise ratio enables to gain a factor of 2.4 in the XMCD intensity. Ligand Field Multiplet calculations performed with different values of intrinsic broadening show that deconvolving such high quality XMCD data is similar to reducing the lifetime broadening from a *1s* corehole to a *2p* corehole. Second, MCD is measured by Resonant Inelastic X-ray Scattering spectroscopy as a function of incident energy and emission energy. Selection of a fixed emission energy, instead of using the TFY, allows enhancing the MCD intensity up to a factor of ~4.7. However, this significantly changes the spectral shape of the XMCD signal, which cannot be interpreted any more as an absorption spectrum.