ESRF	**Experiment title:** XMCD study of the anisotropy and high field susceptibility in U_2Fe_3Ge	**Experiment number**: HC783
Beamline: ID24	**Date of experiment**: from: 17/07/2013 to: 23/07/2013	**Date of report**: 01/09/2013
Shifts: 18	**Local contact(s)**: Cornelius Strohm	*Received at ESRF:*

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Preliminary report:

The experiment HC783 could not be carried out due to a failure of the current inverting relay in the pulsed magnet power supply (provided by the LNCMI Toulouse) at the beginning of the experiment. After detection of the fault by the safety system a repair of this relay, which is carrying high voltage and current, was not possible at the ESRF during the beamtime. We were however able to accomplish several important steps for the success of the proposal:

1) XMCD at high energies:

As the new Laue polychromator for experiments at high energies planned within the upgrade of ID24 is not yet available, we have commissioned a Si 422 quarter wave plate in a quasi non dispersive setting with a Si 311 polychromator in Bragg geometry for XMCD at the U L-edges. Fig. 1 a) shows the transmitted and forward diffracted intensity as a function of phase plate angle for four different energy regions on the detector. The reflection occurs at the same angles for all energies demonstrating the non-dispersivity between the Si 422 phase plate and the Si 311 polychromator. Fig. 1 b) shows the vertically scattered intensity from a Kapton foil to determine the width of the reflection and the working positions for use a s a quarter wave plate. A sample of UMn_2Ge_2 was used to test and commission the Si 422 quarter wave plate at the U L3 edge. Fig. 2 a) shows the absorption (open dots) and a reference spectrum

(line) obtained at BM29 that was used for the energy calibration. Fig. 2 b) shows the XMCD signal obtained using a standard iron core electromagnet.

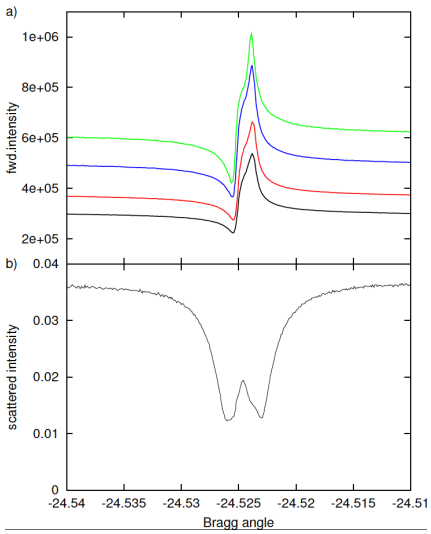

Figure 1: a) phase plate reflection. b) Scattered intensity from Kapton foil in the transmitted beam.

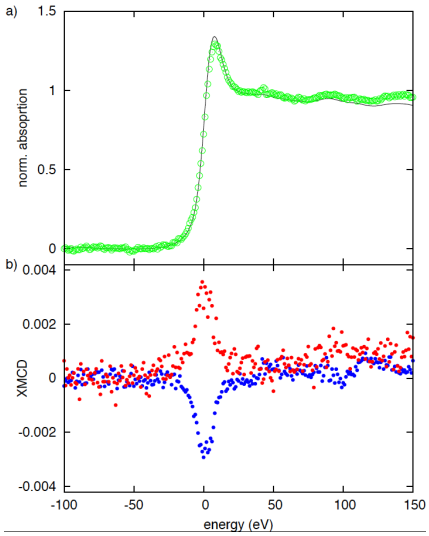

Figure 2: a) Absorption of UMn2Ge2. b) XMCD at the U L3 edge from a sample of UMn_2Ge_2.

2) Preparation of thin single crystalline samples of U2Fe3Ge:

Fig. 3 shows an absorption spectrum (not normalized) obtained on a single crystalline sample of U_2Fe_3Ge prepared for this experiment. The sample has an absorption step of 1. Diffraction glitches could be moved out of the region relevant for XMCD.

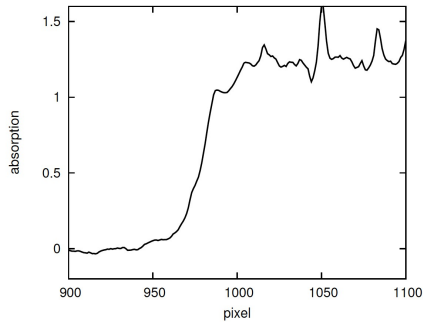

Figure 3: Absorption spectrum from a single crystalline sample of U_2Fe_3Ge.

3) Upgrade project for XMCD in pulsed high magnetic fields with the LNCMI coil:

We were able to show, that the new air bearing table to accommodate the LNCMI Toulouse coil (previously used in standard absorption experiments in high field HE3934) and the goniometer for the quarter wave plate, provides sufficient stability during the pulse to perform XMCD at high energies where very narrow reflections of the QWP need to be exploited. The software integration of the coil and power supply (current reversal) worked flawlessly.