

Imaging Magnetic Nanostructures using Soft X-ray Photoemission Electron Microscopy (PEEM)

The goal of this experiment is to study the magnetic domain configuration in laterally confined bilayers of two exchange coupled ferromagnetic materials. The sample consists of circles, rectangles, and squares, with variable azimuthal orientation and dimensions ranging from the μm scale to several hundreds of nm. The experiment consists of the following steps:

- Mounting a sample on a PEEM sample holder.
- Transferring the sample into the vacuum and then to the PEEM instrument.
- Finding X-rays on the sample.
- Adjusting the sample tilt.
- Aligning the microscope optics column.
- Getting the first image of the sample.
- Recording X-ray absorption spectra at relevant energy levels.
- Determining photon energies for magnetic imaging.
- Study magnetic configurations in elements of different sizes and shapes in an element-specific manner (cf. Figure 1).

All experimental steps are supported by the beam line scientist. The participants will get an introduction to the instrument as well as detailed information on the samples at the beam line.

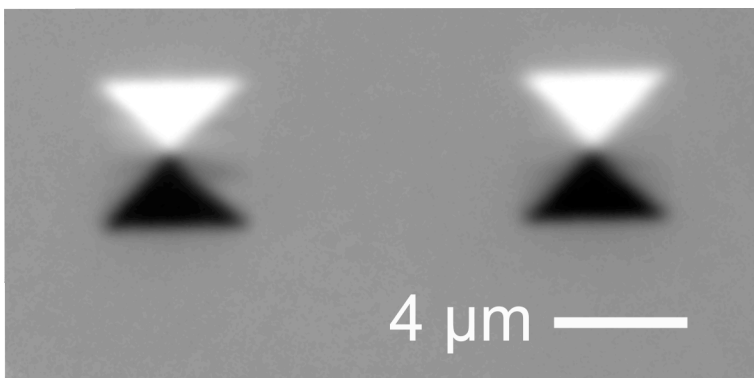


Figure 1: Magnetic contrast map of lithographically patterned permalloy islands obtained by combining PEEM with the X-ray magnetic circular dichroism (XMCD) effect at the Fe L_3 absorption edge.

Literature:

Studying nanomagnets and magnetic heterostructures with X-ray PEEM at the Swiss Light Source, L. Le Guyader, A. Kleibert, A. Fraile Rodríguez, S. El Moussaoui, A. Balan, M. Buzzi, J. Raabe, and F. Nolting, *J. Elec. Spectr. Rel. Phen.* **185**, 371 (2012).