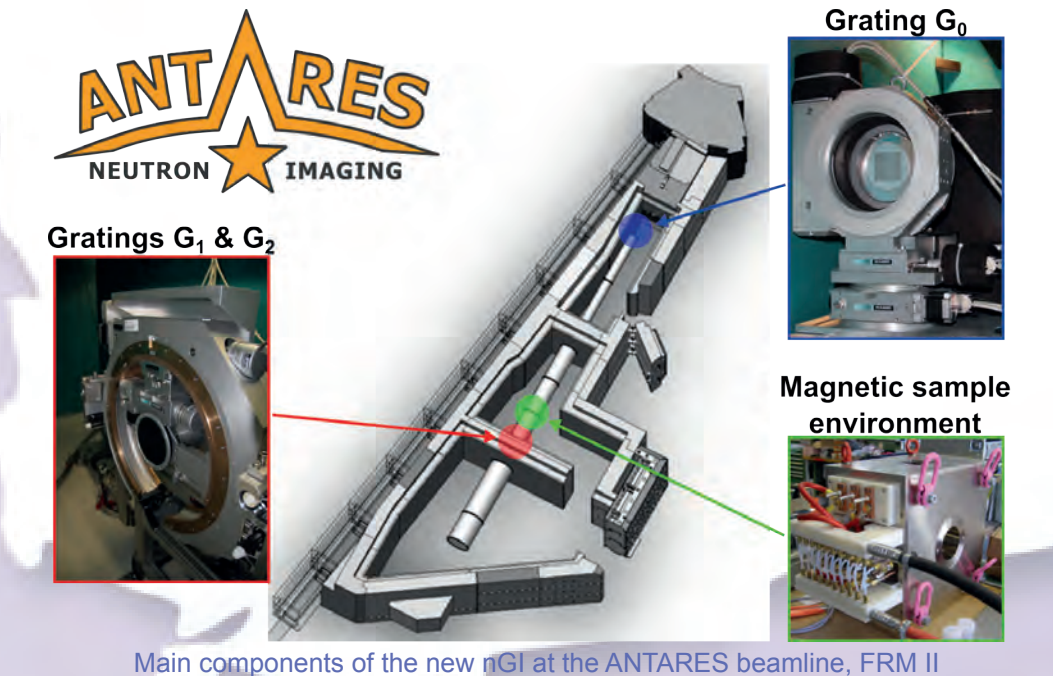


## Objectives

1. Provide a suite of experimental tools for detection of strain and stress fields with spatial resolutions down to 0.1mm
2. Visualise distributions of microstructures 10  $\mu\text{m}$  - 100 nm
3. 3D vectorial imaging of magnetic nanostructures on length-scales down to 1nm

### Nano- and micro structures resolved dark-field neutron imaging with grating interferometers

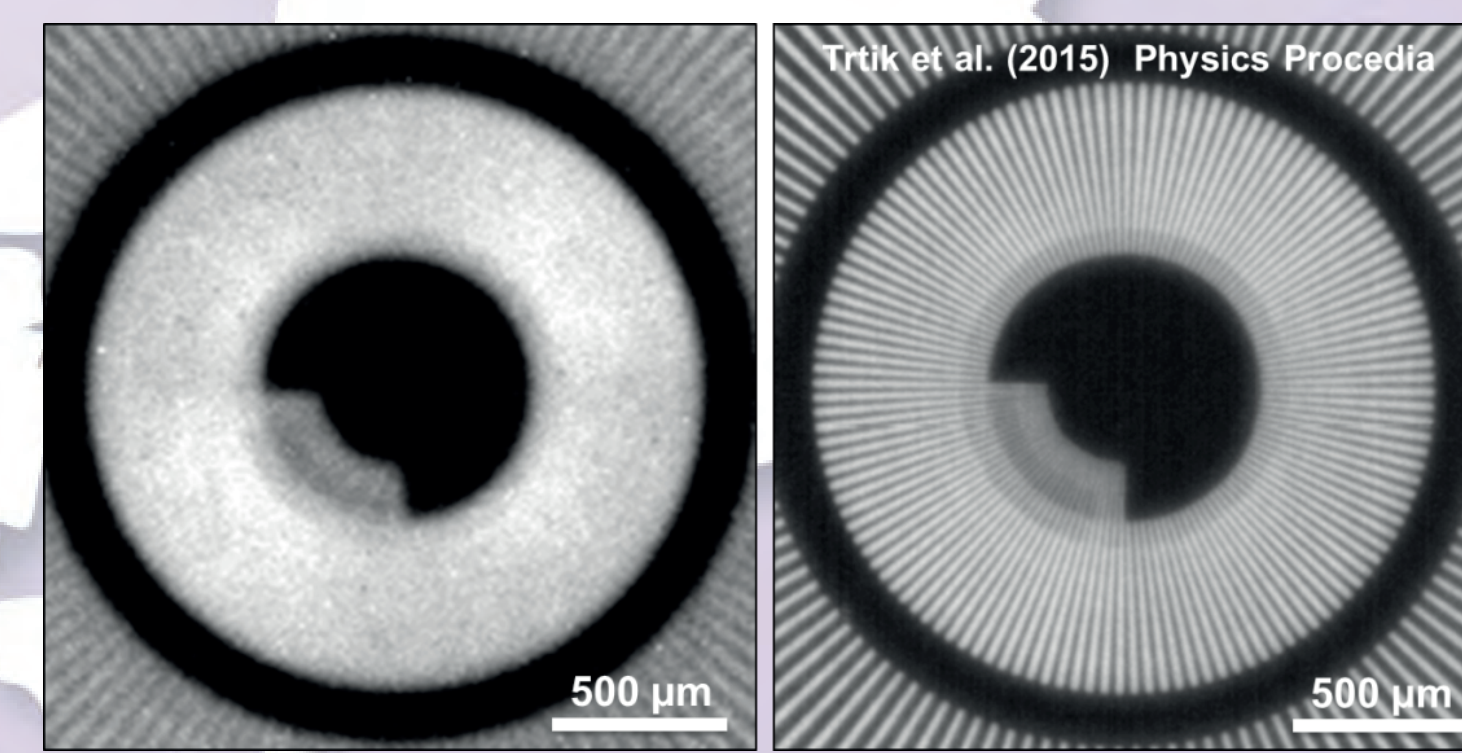
- Improved visibility contrast of interferential gratings setup
- Magnet setup for neutron Grating Interferometry (nGI) measurements of magnetic samples
- Homogenous magnetic field up to 0.5 T for nGI investigations



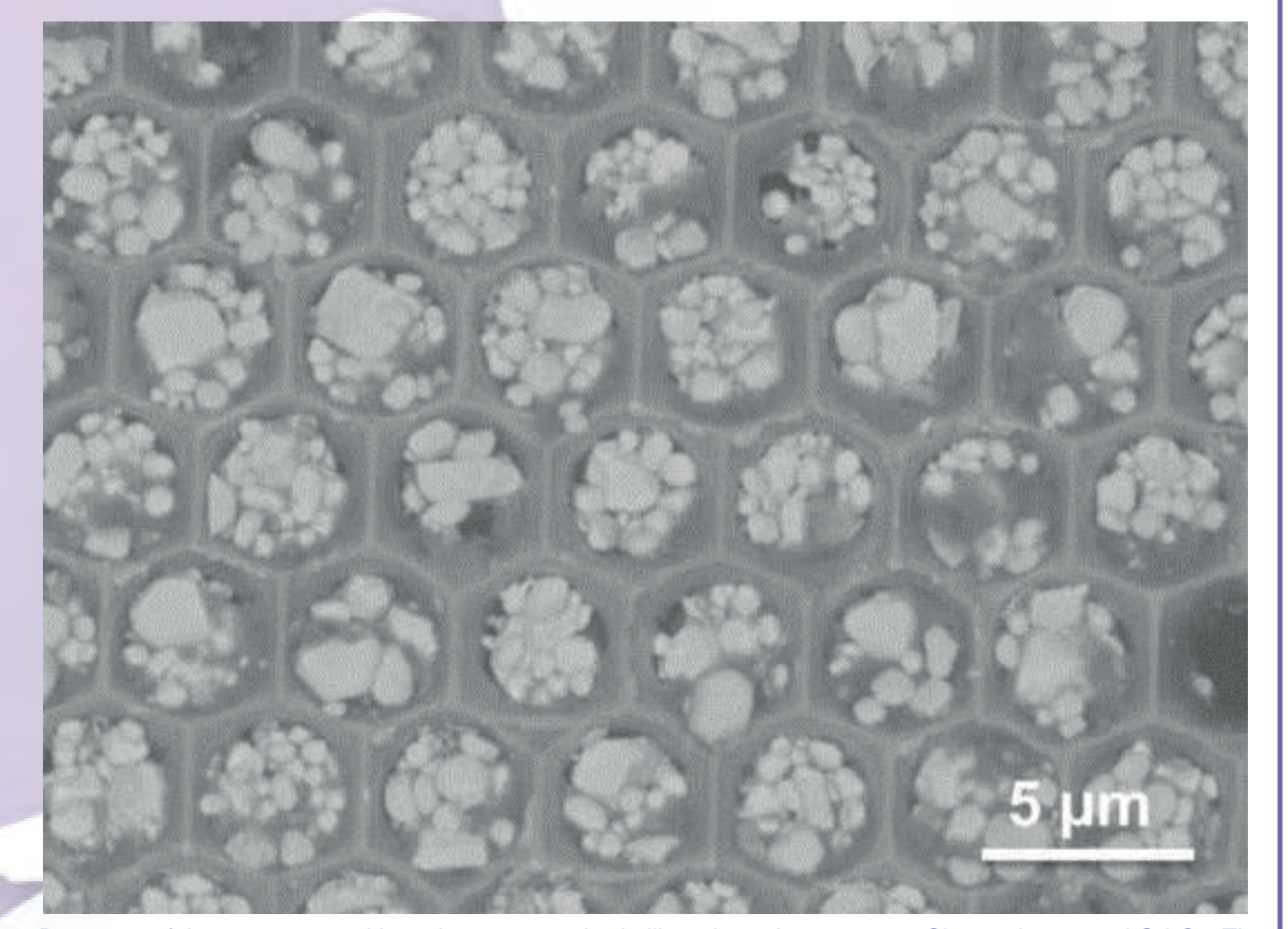
Main components of the new set at the ANTARES beamline, FRM II

### Direct high-resolution imaging

- Improved neutron tomography detector with pixel size of 6.5  $\mu\text{m}$



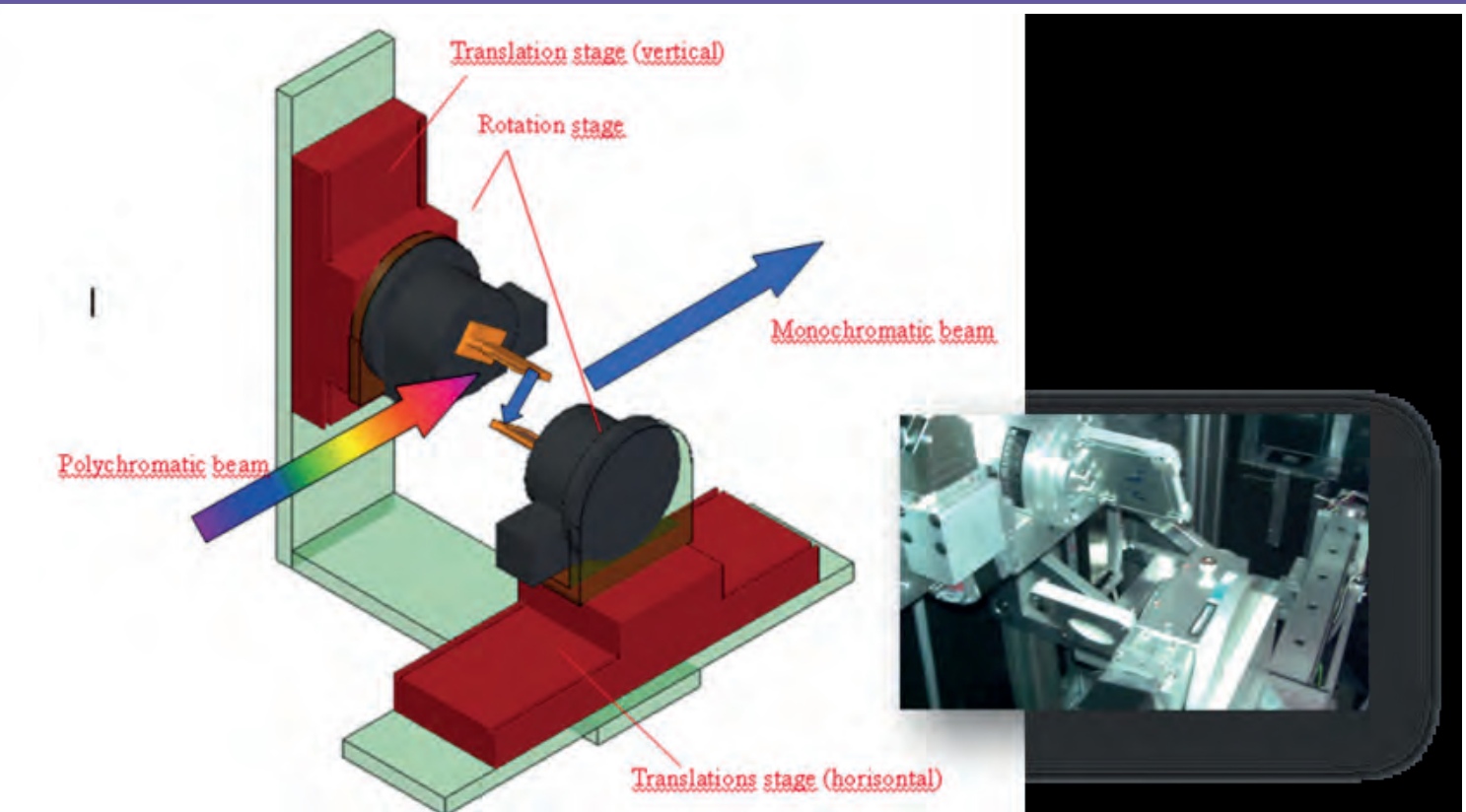
Gadolinium Siemens star test object using (left) standard MICRO-setup, (right) neutron microscope.



Prototype of the neutron-sensitive microstructured scintillator based on a porous Si-membrane and  $\text{Gd}_2\text{O}_3$ - $\text{Ti}$  powder phosphor

### Strain and stress mapping

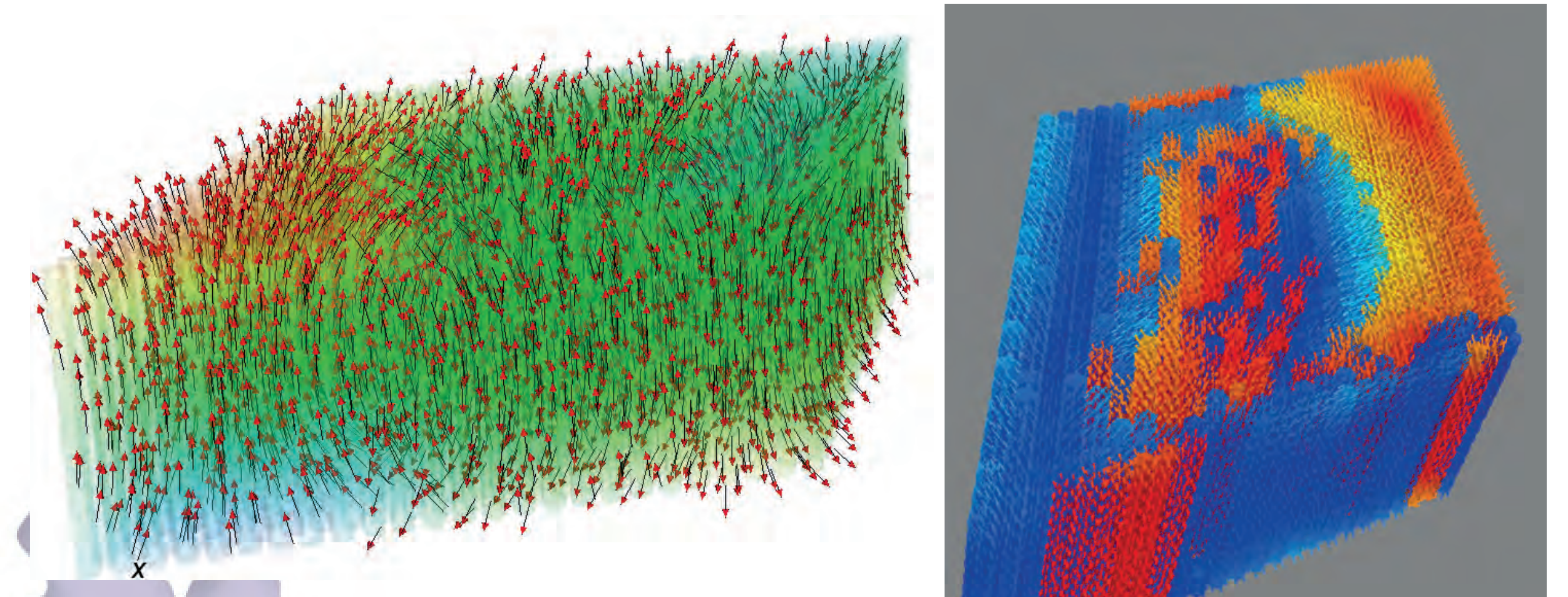
- Double crystal monochromator for energy-selective imaging and Bragg-edge mapping experiments



Double crystal monochromator for energy-selective imaging and Bragg-edge mapping at HZB

### SANS 3D: vectorial magnetic imaging of nano-particles

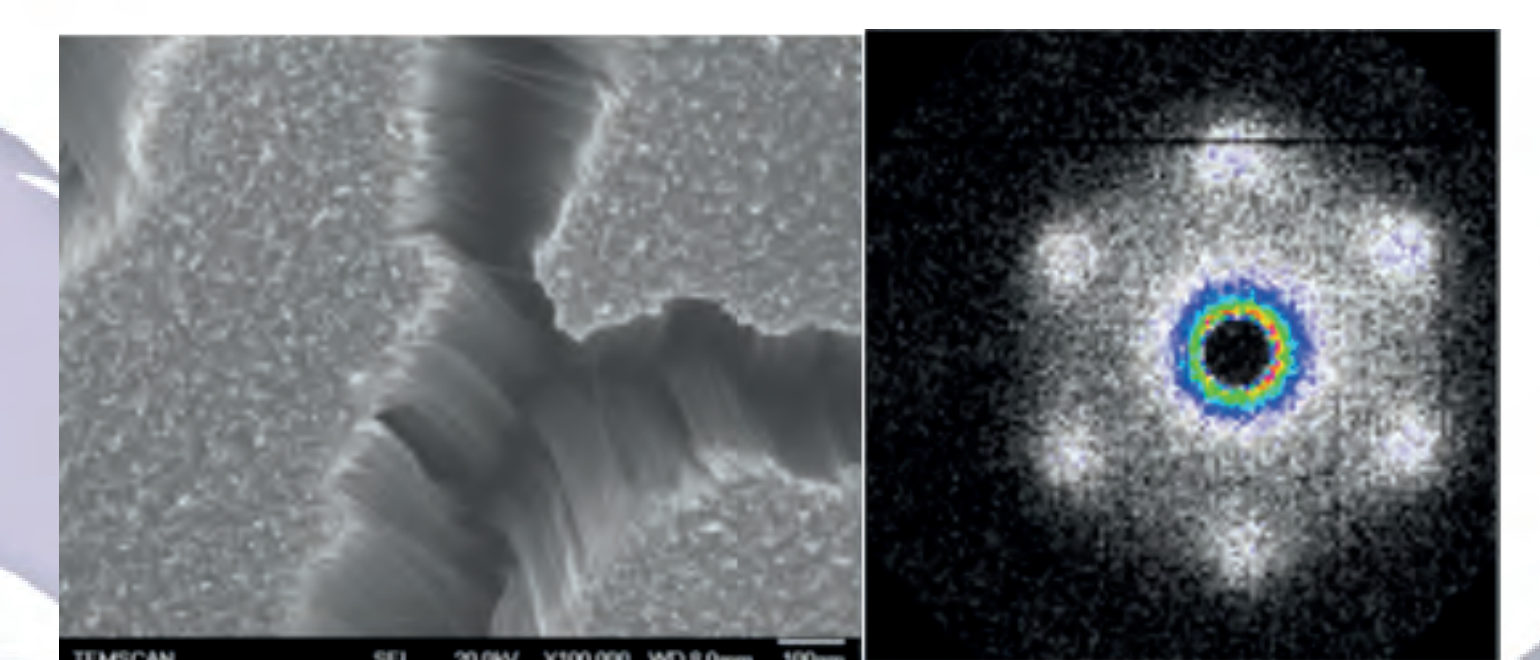
- Polarized SANS (PSANS) measurements
- 'Nmag' software for micromagnetic simulations
- 3D configuration of large arrays of nanowires
- New polarimeter for SANS



Micromagnetic simulations of large arrays of nanowires

### Precession spectroscopy: vectorial magnetic imaging of planar structures

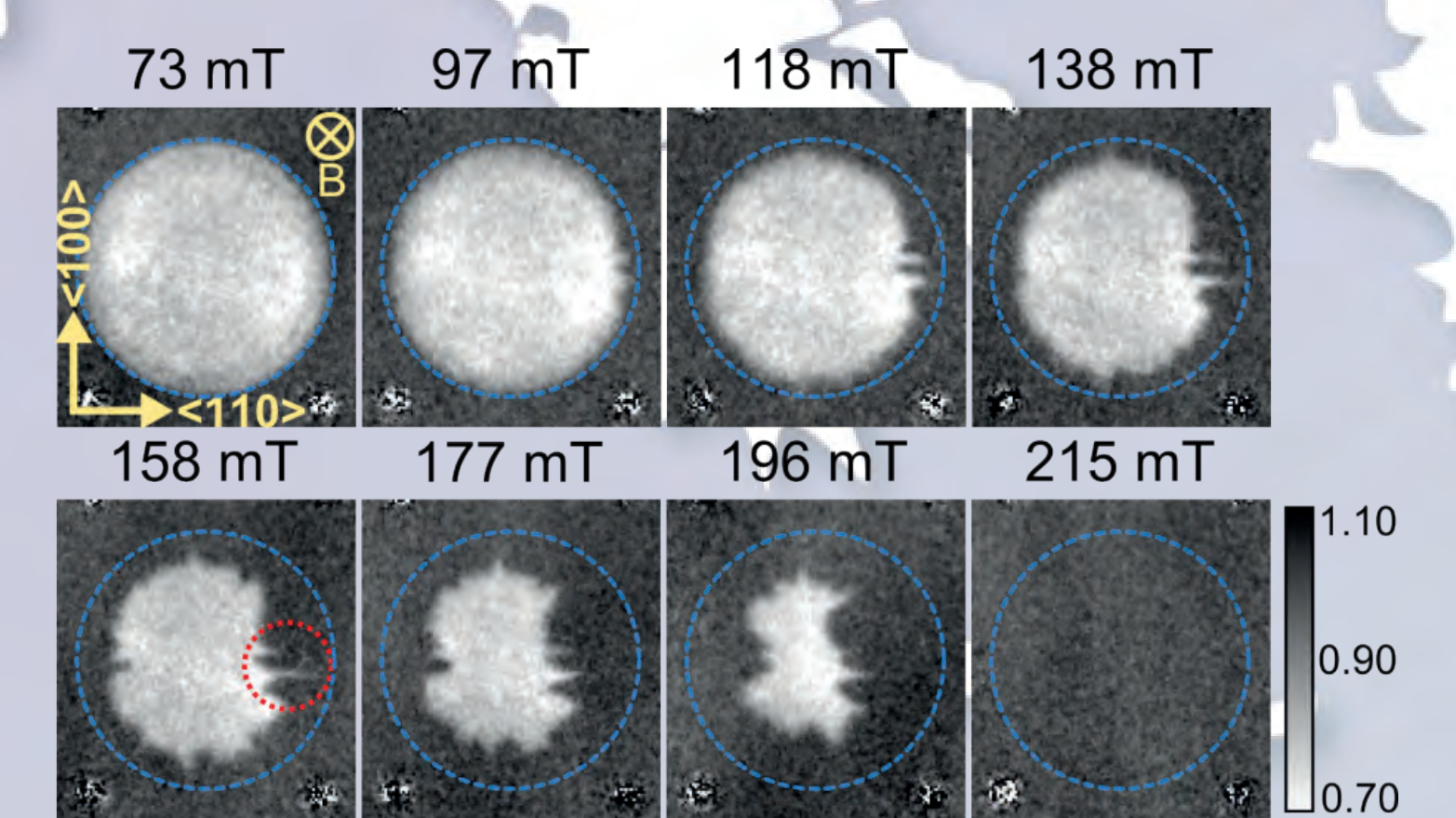
- Magnetic scanning technique for high spatial resolution
- Experimental study of magnetic micro wires



Carpet of Co nanowires and SANS scattering

### Direct magnetic neutron imaging

- Direct magnetic imaging of magnetic flux penetration in a Niobium superconductor
- New method for the investigation of superconducting phenomena



Domain expansion in the IMS of superconducting Nb in increasing field after FC to 4 K observed by means of nGI