

Magnetic Force Microscopy

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In this practical we will conduct a magnetic force microscopy imaging on different samples at various conditions (pressure, field, temperature). In the 4-hour-practical, two groups of students (3 per group, 6 in total) will have a chance to experience 2 different microscopes: the Bruker Dimension Icon and the NanoScan VLS-80.

Tentative dates: Tuesday 3rd, Wednesday 4th, and Thursday 6th September.

Practical topics:

1. Atomic and magnetic force microscopy
 - a. Basics
 - b. Probes, exercise: mounting of probes
2. Bruker Dimension Icon microscope
 - a. Basic demonstration on a (older) hard-disk drive (HDD), or NiFe microstructures (patterned thin film)
 - b. MFM vs temperature on FeRh (metamagnet), or GdCo (ferrimagnet)
3. NanoScan VLS-80 microscope (measurement under high vacuum)
 - a. (Electrical) contact potential difference measurement + compensation
 - b. In-field measurement on NiFe structures
 - c. (if problems with field): High-resolution measurement on HDD / bit patterned media

Further/ Recommended reading:

- [1] P. Eaton & P. West, *Atomic Force Microscopy*, Oxford, 2010.
- [2] H. Hopster & H.P. Oepen (Eds.), *Magnetic microscopy of nanostructures*, Springer, 2005; Chapters 9-13.
- [3] Kazakova et al., [Frontiers of magnetic force microscopy](#), *JAP* **125**, 060901, 2019.