Publikationen 1992

U. Hartmann, R. Berthe, T. Göddenhenrich, H. Lemke, and C. Heiden
IMAGING OF MAGNETIC DOMAINS IN FERROMAGNETS AND SUPERCONDUCTORS BY FORCE AND TUNNELING MICROSCOPY
Proc. IMO Symposium Fall'90, Wetzlar, 1990; Esprit Basic Res. Series, Springer, Berlin, (1992)

U. Hartmann, R. Berthe, T. Göddenhenrich, H. Lemke, and C. Heiden
ANALYSIS OF MAGNETIC DOMAINS IN FERROMAGNETS AND SUPERCONDUCTORS BY FORCE AND TUNNELING MICROSCOPY
Proc. "SPM: STM and Beyond", Santa Barbara, USA, 1991; AIP Conf. Proc. ***241****, 511 (1992)*

R. Berthe, U. Hartmann, and C. Heiden
INFLUENCE OF A TRANSPORT CURRENT ON THE ABRIKOSOV FLUX LATTICE OBSERVED WITH A LOW-TEMPERATURE SCANNING TUNNELING MICROSCOPE

Using a low-temperature scanning tunneling microscope (LTSTM) we were able to image complete Abrikosov flux lattices on NbSe2 at 4.2 K. During tunneling a transport current was applied in the sample plane which affects the vortex lattice due to Lorentz forces. After increasing the current above the macroscopically determined critical current and then decreasing it to zero, the vortices largely rearrange at their original positions. At transport currents well below the macroscopic critical current the vortex lattice seems to remain undistorted. The critical current was determined microscopically by direct STM observation of the lattice motion and turns out to be the same as derived from macroscopic four-probe measurements. The examinations are considered as a first step towards the observation of the pinning behavior of individual vortices by STM.

Proc. STM'91 Conference, Interlaken, Switzerland, 1991; Ultramicrosc. ***42-44****, 696 (1992)*

T. Göddenhenrich, U. Hartmann, and C. Heiden
GENERATING AND IMAGING OF MAGNETIC DOMAINS WITH THE MAGNETIC FORCE MICROSCOPE

In magnetic force microscopy one has to avoid the destructive influence of the magnetic probe stray field. On the other hand, one can use this stray field to create at will magnetic patterns in recording media. Nickel tips with a parabolic shape show a strong stray field localized around the apex region. We used such probes to write patterns in magneto-optic thin films with a perpendicular magnetization. Our investigation shows a domain generation at a certain probe-sample distance depending on the strength of the probe field. Increasing the probe-sample distance allows us to image the created bit domain.

Proc. STM'91 Conference, Interlaken, Switzerland, 1991; Ultramicrosc. ***42-44****, 256 (1992)*

U. Hartmann

INTERMOLECULAR AND SURFACE FORCES IN NONCONTACT SCANNING FORCE MICROSCOPY

Different forces which may, in general, be present in noncontact scanning force microscopy are theoretically analyzed with respect to their typical magnitude and range. It is shown that van der Waals forces provide an ever-present contribution to long-range probe-sample interactions. If a liquid is present in the intervening gap between probe and sample, it is found that ionic double-layer forces may play an important role. If the probe is in very close proximity to the substrate, the discrete structure of intervening liquids leads to characteristic solvation forces. For liquids present as thin adsorbed films on top of the substrate, capillary forces turn out to be the source of very strong long-range probe-sample interactions.

Proc. STM'91 Conference, Interlaken, Switzerland, 1991; Ultramicrosc. ***42-44****, 59 (1992)*