tems. The techniques for tip conditioning which have been investigated include direct annealing, electron beam heating and self-sputtering with light ions such as neon. Differently treated tips have been characterized by means of electron microscopy, field emission and STM experiments.

O 29.39 Wed 14:30 P2

Design of an UHV-STM with a Split Coil Magnet for Low Temperature Applications — •Mike Gyamfi, Oswald Pietzsch, Julian C. Chen, and Roland Wiesendanger — Institute of Applied Physics, University of Hamburg, Jungiusstrasse 11, 20355 Hamburg

To study the spin dependent local electronic structure of single magnetic nanowires and nanoislands a new STM will be installed in a three chamber ultra high vacuum system. The STM will be operated in a liquid helium bath cryostat (expected base temperature 6 K) with a split-coil-magnet which assures good access for sample and tip exchange. A magnetic field of 5 T in z-direction will be available. A new feature of the system is a mechanism which will enable the controlled rotation of the magnetic tunnelling tip. It will provide the unique opportunity to tune the azimuth angle of an in-plane magnetised tip to a collinear configuration with the sample magnetisation in order to maximise the magnetic contrast. A further feature is the possibility to rotate the sample about the x-axis. This will allow evaporation onto the cold substrate and immediate STM measurements without loss of the microscopic position on the sample. We will discuss the design concept of the system.

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Digital Pulsed Force Mode in Ambient and Liquid Environment - Indentation of Soft Condensed Matter — •Alexander Gigler, Claudia Gnahm, Michael Holzwarth, Katrin Hübner, and Othmar Marti — Department of Experimental Physics, Ulm University, D-89069 Ulm, Germany

AFM measurements can be conducted in every kind of environment, which makes it very suitable for material science investigations. The Digital Pulsed Force Mode (DPFM) allows the detailed investigation of the elastic and viscoelastic material parameters of samples. Thus, it is also a possible candidate for the determination of the mechanical properties of more difficult and complex structures such as biopolymers or even living cells. In this contribution the capability of the DPFM to investigate very delicate samples is demonstrated.

Due to the high volume of information acquired during the experiments, automated evaluation has been developed recently to allow a thorough physical testing of the sample materials. The possibilities of data evaluation of the force traces collected during these measurements will also be shown.

O 29.41 Wed 14:30 P2

Work function differences of C_{60} on oriented metal surfaces — •Ulrich Zerweck, Christian Loppacher, and Lukas M. Eng — Institute of Applied Photophysics, University of Technology Dresden, 01062 Dresden

Organic semiconductors have gained increased interest with respect to their use in organic light emitting diodes. For the efficient injection of charge carriers from the metal electrodes into the organic semiconductor, a low dipole barrier height is required. Similar to most organic molecules, C_{60} also shows a linear dependence between the workfunction of the metal substrate and the dipole barrier formed between molecule and substrate. Such evidence stems from macroscopically measurements using UPS [1]. In this work, we compare these findings to microscopic inspections of local barrier heights investigating individual C_{60} molecules by the use of Kelvin probe force microscopy.

In a previous publication [2] we showed the agreement beween dipole barrier heights aquired with macroscopic UPS on one hand and, on the other hand, quantitative Kelvin probe force microscopy on the nanometer scale. Recently, we were able to push the lateral resolution forward down to ≈10 nm, still beeing quantitative.

[1] I. G. Hill et al., *Appl. Phys. Lett* ***73****, 662(1998)*
[2] U. Zerweck et al., *Phys. Rev. B* ***71****, 125424 (2005)*

O 29.42 Wed 14:30 P2

Near-field-optical investigation of surface plasmons in metal-insulator-semiconductor tunnel junctions — •Tino Göhler[1], Jan Seidel[1], Stefan Grafström[1], Lukas Eng[1], Boris Chichkov[2], and Alain Dereux[3] — [1]Institut für Angewandte Photophysik, TU Dresden, George-Bähr-Str. 1, 01069 Dresden, Germany — [2]Laser Zentrum Hannover e.V., Hollerithallee 8, 30419 Hannover, Germany — [3]Laboratoire de Physique de l'Université de Bourgogne, UMR CNRS 5027, 9 avenue Alain Savary, Boîte Postale 47870, F-21078 Dijon, France

In layered metal-insulator-semiconductor (MIS) structures electrons can excite surface plasmon (SP) oscillations in the metal layer via inelastic tunnelling [1]. In our experiments these structures consist of a silicon substrate covered by a thin oxide layer onto which a top metal electrode is deposited. This type of structure supports different SP modes for which the electromagnetic field is concentrated to different interfaces, namely the top metal-air interface and the bottom metal-oxide interface. SP excitation in the gap is supposed to be quite efficient with the inelastic tunnelling rate reaching ∼ 10% of the elastic rate. Therefore, such MIS structures appear highly attractive as electrically pumped plasmon sources for integrated optoelectronic devices. We report here on SP emission directly investigated by scanning near-field optical microscopy (SNOM). Emphasis is placed on spectral characteristics of SPs in defined structures and at metal electrode edges.

[1] McCarthy, S. L., Lambe, J., Appl. Phys. Lett. 33, 858 (1978)

O 29.43 Wed 14:30 P2

Dynamic Force Microscopy - Manifestations of Rare Atomic Jumps: Experiment and Simulation — •B. Ittermann[1], R. Hoffmann[1], A. Baratoff[2], L. Kantorovich[3], T. Trevethan[3], and H. v. Löhneysen[1,4] — [1]Physikalisches Institut and DFG-Center for Functional Nanostructures (CFN), Universität Karlsruhe, D-76128 Karlsruhe — [2]NCCR on Nanoscale Science, Institute of Physics, University of Basel — [3]Department of Physics, Kings College London — [4]Institut für Festkörperphysik, Forschungszentrum Karlsruhe, D-76021 Karlsruhe

In recent non-contact scanning force microscopy experiments, jumps of the resonance frequency shift were observed below a critical tip-sample distance above specific atomic sites on a KBr (001) surface [1]. At the same distance additional energy dissipation related to the jumps sets in. The two branches of the frequency vs. distance curves between which the jumps occur are interpreted as the interaction of the surface with the tip being in two different configurational states. We proposed a model of the tip where an atom can hop from position A to position B in a double well potential. This proposal is checked with atomistic simulations for a small KBr cluster representing the tip and a KBr slab with a planar surface as sample [2]. The force as a function of distance obtained from the simulations is compatible with a double minimum potential for the different states A and B of the tip. Molecular dynamics simulations are planned in order to study the process at finite temperatures. [1] R. Hoffmann et al., to be published [2] R. Hoffmann et al., Phys. Rev. Lett. 92, 146103 (2004)

O 29.44 Wed 14:30 P2

Imaging local potentials and thermovoltages with the STM — •J. Homoth, M. Wenderoth, L. Winking, T. Druga, and R. G. Ulbrich — IV. Physikalisches Institut der Universität Göttingen, Friedrich-Hund Platz 1, 37077 Göttingen

If tip and sample of an STM are at different temperatures, a thermovoltage arises which is correlated with the derivative of the sample's and tip's density of electronic states at the fermi level.

If the temperature difference between tip and sample is caused by a current parallel to the sample surface an additional potential component can be measured. The resulting tip-sample voltage is the sum of the local potential and the local thermovoltage.

This voltage is measured by a second interlaced feedback loop, which brings the average current from tip to sample to zero, while the tip height is kept constant. We show results for three different sample systems (semiconducting, semi-metallic and metallic) and distinguish between potential components caused by thermovoltage and the local potential.

In the case of a Si(111) surface the local thermovoltage represents the atomic corrugation in the Si(111)-7x7 reconstruction. Local potentials connected to the macroscopic field applied to the sample were measured in the case of thin metallic films. Potential components caused by ther-