in-situ and *real-time* observation of film growth. The key element in achieving high frame rates is a rigid mechanical structure, but the objective of imaging the surface during deposition poses severe restrictions on the geometry of the STM.

To achieve an optimal design we used finite element analysis (FEA) to model the complete STM. By including damping and piezoelectric properties, we obtained not only the eigenfrequencies and eigenmodes but also the real amplitudes of the vibrations. Finally we compare our calculated predictions with the measured characteristics of the microscope.

O 17.60 Mon 17:30 Poster C

Erste Experimente mit einem EBIT-basierten Edelgas-FIB — Falk Ullmann[1], •Frank Grossmann[1], Vladimir Ovsyannikov[1], Jacques Gierak[2], Erik Bourhis[2] und Günter Zschornack[3] — [1]DREEBIT GmbH, Dresden — [2]Technische Universität Dresden, Dresden — [3]LPN/CNRS Marcoussis, Frankreich

In FIB formierte hochfokussierte Ionenstrahlen sind von speziellen Interesse für Anwendungen in der Materialforschung, der Halbleiterindustrie und anderen Applikationsfeldern. Beschrieben wird hier die Formierung von Edelgasionenstrahlen in einer am LPN/CNRS Marcoussis entwickelten Nano-FIB-Säule, wobei als Quelle für die verwendeten Edelgasionen eine Dresden EBIT diente.

Die Dresden EBIT zeichnet sich durch eine gute Strahlemittanz, ihre Kompaktheit und ihre robuste Betriebsweise aus. In ersten Experimenten wurde das Funktionsprinzip eines Edelgas-FIB mit einem He^{1+}-Ionenstrahl demonstriert. Dabei wurde gezeigt, dass die Ionenstrahlen bis in den Submikrometerbereich fokussiert werden können.

An verschiedenen Beispielen wird vermittels von Sekundärelektronenspektroskopie die Leistungsfähigkeit der Anlage als Ionenmikroskop demonstriert und über den Einsatz von Helium- Argon- und Xenonstrahlen wird berichtet.

Prinzipiell können mit der Kopplung einer FIB-Säule mit einer Dresden EBIT auch Strahlen hochgeladener Ionen erzeugt werden. Mögliche Parameter einer solchen Anlage werden diskutiert.

O 17.61 Mon 17:30 Poster C

Design of a UHV/300 mK/9 T scanning tunneling microscope (STM) system — •Torben Hänke, Grzegorz Urbanik, Christian Hess, Marko Kaiser, Steffen Lessny, Ralf Voigtländer, Dirk Lindackers, and Bernd Büchner — IFW Dresden, Institute for Solid State Research, P.O. Box 270116, D-01171 Dresden, Germany

To study electronic and spin structures of high temperature superconductor (HTS) and related transition metal oxide materials (TMO) with high resolution scanning tunneling spectroscopy (STS) we are designing an ultra high vacuum (UHV) low temperature STM for temperatures down to 300 mK and magnetic fields up to 9 T. The microscope will be placed inside a UHV compatible ^3He cryostat which is integrated into a three-chamber UHV system for *in situ* tip and sample preparation including LEED/Auger analysis and molecular beam epitaxy (MBE). The STM is equipped with a tip-exchange mechanism, x, y-sample positioner and five additional leads to the sample to combine STM with transport measurements. For vibration isolation the entire system is mounted on a rigid supporting frame on air damping stages.

O 17.62 Mon 17:30 Poster C

Calibration of a thermal profiler in a scanning tunneling microscope in terms of measuring the near-field heat transfer — •Andreas Knübel, Uli Wischnath, and Achim Kittel — University of Oldenburg, Institute of Physics, Department of Energy and Semiconductor Research, D-26111 Oldenburg

The fabrication of a novel thermocouple sensor as a thermal profiler has enabled us to set up a very sensible scanning thermal microscope (SThM) based on a scanning tunnelling microscope (STM) under ultrahigh vacuum conditions with high spatial resolution. This provides the possibility to an improved analysis of the frequently discussed near-field heat transfer on a nanometer scale. Because theory already provides a statement for the distance dependence of the heat transfer this quantity has to be determined experimentally for comparison. Therefore, it is essential to characterize the thermal resistance. By means of the thermal resistance of the microscope tip its possible to quantify the heat transfer through the vacuum gap between the thermocouple tip and a cooled planar material surface from the measured temperatures. We developed a specially designed set-up to evaluate the thermal resistance of the thermocouple tip under ultra-high vacuum conditions. Current experimental results are presented.

O 17.63 Mon 17:30 Poster C

Conductivity of Thin Films and Nanostructures Analysed by EFM — •Thomas Koch[1,2], Patrick Dupeyrat[1,2], Roland Gröger[1,2], Sheng Zhong[1,2], Norman Mechau[2], Gabi Schierning[2], Roland Schmechel[2], and Thomas Schimmel[1,2] — [1]Institute of Applied Physics, University of Karlsruhe, D-76128 Karlsruhe, Germany — [2]Institute of Nanotechnology (INT), Forschungszentrum Karlsruhe, D-76021 Karlsruhe, Germany

ITO (Indium Tin Oxide), Si or Ge nano-particles and small micron and submicron metal structures, mixed together with polymers and other carrier systems, are promising materials in the field of micro electronics and especially printable electronics to build thin conducting or dielectric films. Independently pure nano-particle systems or metals are also of interest for these applications.[1] For the exploration of these topics AFM is a powerful tool which can give information to identify the electric properties of materials at surfaces with local contrast on the nanometer scale. In this work we demonstrate the use of Electrostatic Atomic Force Microscopy (EFM) to map the conductive properties of nano-particle based sintered thin ITO films, of ITO/Baytron composite systems and of metal based ribbon cable nano structures. References 1. J. R. Sheats, J. Mater Res. 19 (7), 1974, (2004)

O 17.64 Mon 17:30 Poster C

Homoepitaxy under the influence of step edge barriers in the presence of screw dislocations — •Oliver Ricken[1], Alex Redinger[1], Joachim Krug[2], and Thomas Michely[1] — [1]II. Physikalisches Institut, Universität zu Köln — [2]Institut für Theoretische Physik, Universität zu Köln

The presence of screw dislocations solves the nucleation problem in crystal growth and allows growth even for supersaturation too small for nucleation. Growth spirals are also frequently observed in thin film deposition. In classical models for spiral growth a fixed slope of the resulting cone is predicted. Motivated by the observation of growth spirals in organic thin film growth with shapes similar to those of mounds in homoepitaxy with step edge barriers, we performed a set of model experiments. The growth of Pt on Pt(111) is studied by STM after creation of screw dislocations on the surface in a temperature range from 250 K to 450 K. The screw dislocations are produced by the mechanism of “dislocation loop punching” through He^+ bombardment. Growth spirals and normal mounds are observed after deposition and can be directly compared in the STM images. Both mound types show the typical 3D-growth mound forms with a plateau on top and deep crevices between them. However, growth spirals show much smaller plateaus and average base areas than normal mounds, but are, on average, taller. The smaller plateaus of growth spirals compared to mounds result, because the dislocation obviates the nucleation problem on the top terrace, which is analogous to an increase in the effective step edge barrier energy.

O 17.65 Mon 17:30 Poster C

Preparation of two-dimensional Fe-Cr-Fe multistripes on W(110) — •Torsten Methfessel and Hans Joachim Elmers — Johannes Gutenberg-Universität Mainz, Institut für Physik, Staudingerweg 7, D-55099 Mainz

Multilayers consisting of alternating layers of Fe an Cr are interesting because of the discovery of the giant magnetoresistance effect (GMR). In analogy to these multilayersystems we were interested in the possibility to prepare two dimensional multistripes on W(110) by sequential epitaxy and self organized growth of pseudomorphic Fe and Cr. These multistripes have been investigated using scanning tunneling microscopy (STM) and scanning tunneling spectroscopy (STS). With these methods we were able to distinguish between different materials along the edges of the W-substrate. Comparing the STS spectra of the multistripes with those of pseudomorphic pure element monolayers we could show that multistripes of alternating pure Fe and Cr stripes grow at appropriate substrate temperatures. Interdiffusion occurs for temperatures larger than 500 K, while deposition at room temperature leads to island growth.

O 17.66 Mon 17:30 Poster C

Effective interaction energies for the description of two dimensional alloys: calculation from experimental and density functional theory data — •Andreas Bergbreiter[1], Harry E. Hoster[1], Yoshihiro Gohda[2], Axel Gross[2], and R. Jürgen Behm[1] — [1]Institut für Oberflächenchemie und Katalyse, Universität Ulm,