gravitational wave detectors reducing their thermal noise level within the detection band. Therefore, a deeper understanding of the loss mechanisms is necessary which depend on different parameters like the crystal orientation or the concentration of impurities. We present a detailed investigation of crystalline quartz samples (⌀ 45 mm × 50 mm) at temperatures between 5 and 300 K. Two different crystal orientations (x-cut and z-cut) are compared. The influence of the impurities on the mechanical losses is discussed.

This work is supported by the German science foundation under contract SFB Transregio 7.

TT 7.5 Mon 14:00 Poster B

Energy Fluctuations in Glasses at very low Temperatures — •Lena Maerten, Loredana Fleischmann, Andreas Fleischmann und Christian Enss — Kirchhoff-Institut für Physik Heidelberg

Coupling a system thermally to a heat reservoir, its energy content fluctuates according to statistical mechanics. In glasses these fluctuations are mainly caused by energy absorbing and releasing tunnelling systems. Measuring the energy content and investigating its variation should give information about relaxation times and whether or not the tunnelling processes are correlated. In our experiment we use a paramagnetic temperature sensor sputtered onto the quartz glass sample to be measured. The paramagnetic material changes its magnetization with temperature according to the Curie-Law. This change in magnetization is read out by a low noise double stage SQUID-magnetometer. In addition to the energy fluctuations described above, the time resolved heat release can be measured with this setup. Rapidly cooling the heat bath to a constant temperature, one can observe the energy dripping out of excited tunnelling systems while the sample gradually thermalizes. A detailed description of the experimental setup and first results will be presented.

TT 7.6 Mon 14:00 Poster B

New information on the microscopics of tunneling systems from mixtures of glycerol and deuterated glycerol. — •Celine Rüdiger, Masoomeh Bazrafshan, Gudrun Fickenscher, Andreas Fleischmann, and Christian Enss — Kirchhoff-Institut Für Physik,Universität Heidelberg

The properties of amorphous materials at temperatures below 1K are genrally described by localized groups of atoms or molecules, cooperatively moving between two configurations with comparable energy (Tunneling Systems).However, barely anything is known about the microscopic nature of these TS. Recently we have shown, that the microscopic nature of TS can be probed by the 2-pulse polarisation echo experiments, since the coupling of nuclear electric qudrupole moment to the tunneling motion leads to a quantum beating of the echo amplitude, as well as a dependence of the echo amplitude on magnetic field. Our investigations on partially deuterated amorphous glycerol revealed that the tunneling motion has a rotational component. The observed effects can e.g. be described by the rotation of one molecule by an average angle of 15°. However, also the assumption of a coherent tunneling of a large group of molecules by a fraction of this angle would explain the observed behavior. We started a series of measurements on mixtures of glycerol and partially deuterated glycerol in order to study the cooperative nature of TS and determine the average number of molecules that are involved in a TS as well as the typical angle by which they rotate. We show the first experimental results and discuss microscopic models that are able to describe the observed behavior.

TT 7.7 Mon 14:00 Poster B

Magnetic Field Dependence of Dielectric Polarization Echoes in — •Florian Klotz[1], Andreas Fleischmann[1], Manfred v. Schickfus[1], Peter Nagel[2], and Christian Enss[1] — [1]University of Heidelberg, Kirchhoff- Institute für Physik, Im Neuenheimer Feld 227, 69210 Heidelberg; Germany — [2]IFP, Forschungszentrum Karlsruhe, PO Box 3640, 76021 Karlsruhe, Germany

Since long certain point defects in alkali halides crystals have been regarded as a model system for the tunnelling of atoms in solids. In recent measurements of the dielectric properties of non-magnetic structural glasses strong magnetic field effects have been observed. These effects are caused by atoms that are involved in tunnelling processes and carry a nuclear magnetic or quadrupolar moment. We have studied the phenomenon in dielectric two pulse polarization echo experiments on KCl crystals doped with Li. In this material the fine structure of the energy levels of the tunneling systems introduced by the nuclear moments leads to a quantum beating in echo decay measurements and to a non-monotonic dependence of the echo amplitude on magnetic fields. Since the microscopic nature of Li tunnelling centres in KCl is well known, this system can be used to compare experimental results with calculations based on a detailed microscopic model. We present the experimental data and discuss the role of nuclear magnetic moments of the KCl host material in the vicinity of tunnelling Li ions on the observed magnetic field effects.

TT 7.8 Mon 14:00 Poster B

High resolution X-ray diffraction and surface/interface scattering beamline NANO coming up in 2009 at ANKA — •Thorsten Schwarz[1], Sondes Bauer[1], and Tilo Baumbach[1,2] — [1]Institut für Synchrotronstrahlung / ANKA, Forschungszentrum Karlsruhe, 76021 Karlsruhe — [2]Laboratorium für Applikationen der Synchrotronstrahlung, Universität Karlsruhe, 76128 Karlsruhe

NANO at ANKA is a future synchrotron beamline on a superconducting undulator source, specialized on high-resolution x-ray diffraction, surface and interface X-ray scattering investigations. The beamline optic has been optimized to deliver a monochromatic and highly collimated beam with sufficient flux to investigate the structure changes and the strain evolution during the growth of epitaxial films and superlattices. In order to carry out real time measurements, different types of environmental chambers, e.g., for molecular beam epitaxy, will be mounted on a heavy duty diffractometer which could support up to 500 kg. It rotates the sample and the environmental parts in all directions in space. With two different detection systems on the diffractometer, it is possible to perform two measurements simultaneously: like Grazing Incidence Small Angle X-ray Scattering (GISAXS) to determine the shape, size, position and correlation in nanostructures and Grazing Incidence Diffraction (GID) to characterize the surface-patterned structure. One of the main issues of the beamline is to study the interface properties like roughness and correlation even for less scattered materials like organic semi-conductors. For that reason, it will be possible to use a multilayer monochromator to get two orders of magnitude more flux with an energy resolution of 1

TT 7.9 Mon 14:00 Poster B

Development of a very low temperature scanning tunneling microscope — •Michael Marz[1,2], Gernot Goll[1], and Hilbert v. Löhneysen[1,2,3] — [1]Physikalisches Institut Universität Karlsruhe (TH), 76128 Karlsruhe — [2]DFG-Centrum für Funktionelle Nanostrukturen der Universität Karlsruhe (TH), 76128 Karlsruhe — [3]Institut für Festkörperphysik Forschungszentrum Karlsruhe, 76021 Karlsruhe

Scanning tunneling microscopy (STM) and spectroscopy (STS) are well known techniques. STM allows to study topological surface properties of conductive materials. With STS one can measure the energy dependence of the local density of states (LDOS), as the tunneling current is a function of the LDOS and energy. In order to use the technique at very low temperatures and high magnetic fields, we installed a home-built scanning tunneling microscope into a dilution refrigerator, where we can reach temperatures down to 30 mK and apply magnetic fields up to 13 T. In order to improve both spatial and energy resolution, considerable efforts were taken to electrical filtering and mechanical damping of our system. First test measurements were done with a commercially available AuPd grid with a lattice constant of 160 nm. We also achieved atomic resolution on HOPG and $NbSe_2$ at room temperature and on $NbSe_2$ at 50 mK.

TT 7.10 Mon 14:00 Poster B

Design of a 300 mK UHV 9 T scanning tunnelling microscope — •Danny Baumann[1], Paul Sass[1], Torben Hänke[1], Grzegorz Urbanik[1], Christian Hess[1], Marko Kaiser[2], Ralf Voigtländer[2], Dirk Lindackers[2], and Bernd Büchner[1] — [1]Institut für Festkörperforschung, IFW Dresden — [2]Bereich Forschungstechnik, IFW Dresden

We present our progress in assembling an ultra high vacuum (UHV) Scanning Tunneling Microscope (STM) for operating temperatures down to 300 mK and magnetic fields up to 9 T. The microscope will be mounted in a UHV ^{3}He cryostate which is connected with a three-chamber UHV system. The system will comprise in-situ tip exchange, a coarse xy-sample positioning system and five electrical leads on the sample holder for combining STM with transport measurements. In this work we will present the characterization of the actual STM unit.

TT 7.11 Mon 14:00 Poster B

Dynamics of liquid ^{3}He-^{4}He-mixtures studied with Neutron Radiography — •Mark Faist[1], Hartmut Abele[2], Roland Gähler[3], and Andreas Van Overberghe[3] — [1]Physikalisches Institut, Universität Heidelberg — [2]E18, Technische Universität München