FRM II news N° 3

Deadlines Proposal Rounds

FRM II (N° 11)
January 29th, 2010
user.frm2.tum.de

JCNS (N° 7)
January 29th, 2010
fzj.frm2.tum.de

Radioisotopes - Made in Garching

Radioactive isotopes play an important role in modern medical diagnostics and irradiation treatment. The supply is often unnoticed, unless a worldwide shortage limits the availability of medical treatments. Such a shortage occurred for the isotope ^{99}Mo, which is used for cancer diagnostics via its daughter isotope ^{99m}Tc, earlier this year. For experts in the field, this shortage was not unexpected, as there are only three reactors producing this medical isotope in Europe and they have all been operating for around forty years. Therefore already in 2008, a feasibility study in collaboration with the Insititut National de Radioéléments in Belgium has been started, looking into the possibility of building a new irradiation facility for ^{99}Mo at the FRM II.

The results of the study were presented on June 30th at the Technische Universität München. By extending a so far unused thimble, a place in the moderator tank was found to meet the technical requirements. The necessary man power for the start of this project was provided by the state of Bavaria and the TUM, however a major part of the 5.4 million Euro is still missing. Within five years the irradiation process could start at the FRM II, with the capability to provide 50% of the European needs. Taking into account the 3 000 000 treatments per year in Germany, the FRM II will meet our national responsibility for the provision of this nuclear material for public health care.

Ingo Neuhaus
Technical Director

December 2009

CONTENTS

Polarisation Analysis on PANDA

The triple-axis spectrometer PANDA is one of the work horse instruments at the FRM II, showing excellent performance in unpolarised operations since commissioning in 2005.

The reasons for the high user demand at PANDA include the high flux even at incident wavenumbers of 2.662 $Å^{-1}$ and flexible sample environment, with both 15 T magnetic field and 50 mK sample temperature routinely available. A polarised neutron option was foreseen from the very beginning of the instrument design. With the successful commissioning of the final component, a vector-guide field device, we are now happy to present this extension of measuring capabilities at PANDA to our users.

In addition to the standard configuration of pyrolytic graphite (PG) monochromator and analyser, a Heusler type monochromator (horizontal field, fixed horizontal and variable vertical focus) and analyser (vertical field, fixed vertical and flexible horizontal focus) was installed. Together with the static guide field elements, (some of which were already installed during the commissioning of the instrument) and one of the two spin flippers, the polarisation option is now realised.

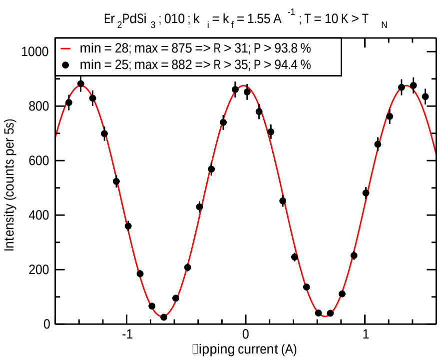


Fig. 1: Intensity of the (0 1 0) Bragg reflection of Er_2PdSi_3 versus flipping current at optimum compensation field (raw data: black, sine fit: red).

The very first experiments yielded a good performance: right from the start the overall flipping ratio was up to 40. A subsequent user experiment, looking at the inelastic excitations in Er_2PdSi_3 achieved reasonable flipping ratios of above 30. In this experiment a fixed vertical guide field at the sample position was used, subsequently we have improved the experimental setup by implementing a vector guide field around the sample space. This allows any guide field direction at the sample: for example polarisation in the scattering plane, parallel or perpendicular to the scattering vector can be achieved.

This setup was tested by measuring the magnon branches of a single crystal of $RbMnF_3$, at selected q-points. $RbMnF_3$ orders antiferromagnetically below ~83 K with a propagation vector of (½ ½ ½). Due to the formation of domains no polarisation dependence of the scattering should occur except for the configuration P // Q, where the whole magnetic signal should appear in the spin flip channel (SF). In the first instance some signal was also observed in the non spin flip channel (NSF), but this could be traced to a field offset introduced by the magnetic switching valve of the closed cycle fridge. Fortunately this could be corrected. Figure 3 shows the corrected, along with several other configurations, showing that the SF and NSF sum up to the same value, confirming the correct functioning of the setup.

Fig. 2: Picture of the vector guide field coil setup mounted on PANDA.

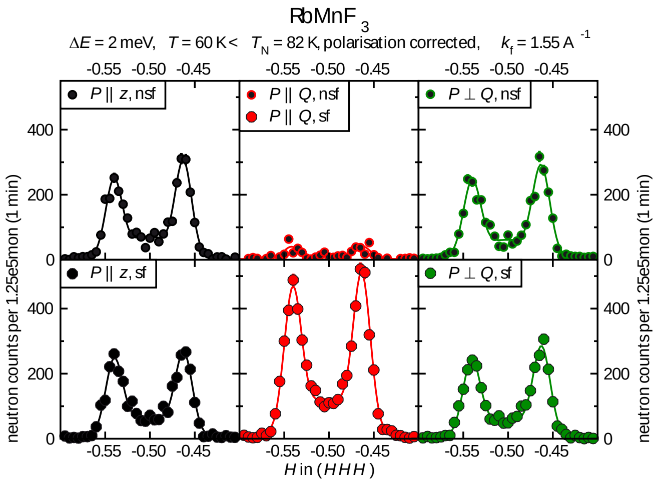


Fig. 3: $RbMnF_3$: Q-scans at 2 meV energy transfer for all accessible scattering channels. The antiferromagnetic Bragg reflection is observed at (-0.5 -0.5 -0.5). Intensities were corrected to account for reduced polarization.
We gratefully acknowledge the help of Peter Böni (TU München, E21) for lending us the $RbMnF_3$ sample.

In conclusion, the long awaited possibility for polarisation analysis at the cold triple axis spectrometer PANDA is now working and can be requested by users in their proposals. The ongoing optimisation of this setup will provide users with an improving polarisation grade. We would like to thank our first users for fruitful discussions and their suggestions for further improvements of the instrument.

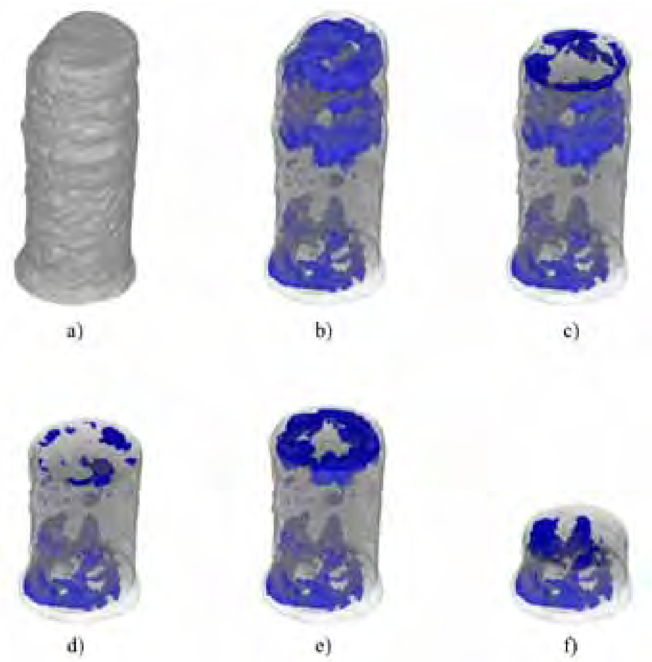
Michael Loewenhaupt
TU Dresden

Polarized Neutron Tomography Using ^{3}He Spin Filters

The 3D reconstruction of radiography images, taken at different transmission angles of an object, is a powerful tool for non-destructive testing. The contrast of such a tomography relies on different scattering or absorption properties inside the object under investigation. Using polarized neutrons the spin-flip on magnetically ordered regions inside a sample gives, in addition, a contrast that contains information on the spatial distribution of the magnetization of the sample. To maintain a spatial resolution of about 100 µm on the tomographic dataset the neutron polarizer and analyzer, however, should maintain the phase space of the neutrons, i.e. should neither change the direction of the neutron beam nor its divergence. ^{3}He neutron spin filters fulfill this requirement.

During a recent experiment at the instrument ANTARES, neutron spin filter cells filled with polarized ^{3}He gas from the HELIOS facility at FRM II have been utilized both as a polarizer and analyzer. The setup and the operation was supplied by Sergey Masalovich from the neutron optics group of the FRM II. The high degree of polarization of the ^{3}He gas in the quartz cells leads to a beam polarization above 90%, sufficient for this kind of experiment. The sample under investigation was a $Pd_{1-x}Ni_x$ alloy with a nominal Ni content of x = 2.67%. Adding nickel to palladium triggers the magnetic ordering, a hot topic in the research group of Peter Böni at the Physics Department E21 of the TUM. The interesting ordering effects strongly depend on the concentration of the nickel atoms, i.e. a homogeneous sample is a prerequisite for a detailed study of the ordering mechanisms, especially on approaching a possible quantum critical point. The ferromagnetic ordering temperature T_C is around 20 K, i.e. at the measuring temperature of 8 K a homogeneous distribution of magnetic domains was expected.

Experimental setup at the instrument ANTARES.



3D reconstruction of the neutron depolarization data measured at a sample temperature of 8 K. a) View of the sample without polarization analysis, b) tomographic reconstruction, c–f) cuts through the sample at different heights. Blue colored areas show the ferromagnetic ordering. The sample has a diameter of 11mm and a height of 26mm.

During the course of the experiment, the sample was kept in a cryostat with an applied magnetic guide field. The 3D image shown is a result of a reconstruction from 180 sample projections measured during one day. Clearly seen are the ferromagnetic regions displayed in blue and paramagnetic regions shown in light gray. The inhomogeneous structure in the image results from the variation of the atomic concentration of Ni, resulting in a significant variation of the Curie temperature over the sample volume. Hence, around 8 K, i.e. below TC, some parts of the sample are ordered ferromagnetically while other parts are still in the paramagnetic phase.

Further development of the instrumental setup, leading to a reduction of the sample - detector distance will improve the data quality of the tomography reconstruction. The magnetic tomography will be made routinely available not only for testing the homogeneity of samples, but to investigate magnetic ordering effects with high spatial resolution.

Financial support through the DFG Forschergruppe FOR 960 on Quantum Phase Transitions is gratefully acknowledged.

Michael Schulz
Technische Universität München
Physik Department E21 und FRM II

The Multianalyzer/ Multidetector Design of PUMA

The thermal triple-axis spectrometer PUMA has been developed in recent years by the University of Göttingen, receiving financial support from the Federal Ministry of Education and Research (BMBF), within the framework of the so-called “Verbundforschung”. The effective use of focusing techniques provides a high neutron flux at the sample, comparable to the best instruments in the world. Operating as a conventional triple-axis instrument, elementary excitations in crystalline solids (phonons and magnons) and weak superstructure and/or diffuse order phenomena can be measured. However PUMA also has several other options, such as time resolved and multiplexed data collections; together these make PUMA a truly unique and world leading spectrometer.

Fig. 1 (b): Multianalyzer with the 11 PG (002) analyzer blades. The translation range for each blade is 250 mm, the rotation movement for each crystal is 60°. All blades have a width of 25 mm and have a fixed focus for the vertical direction.

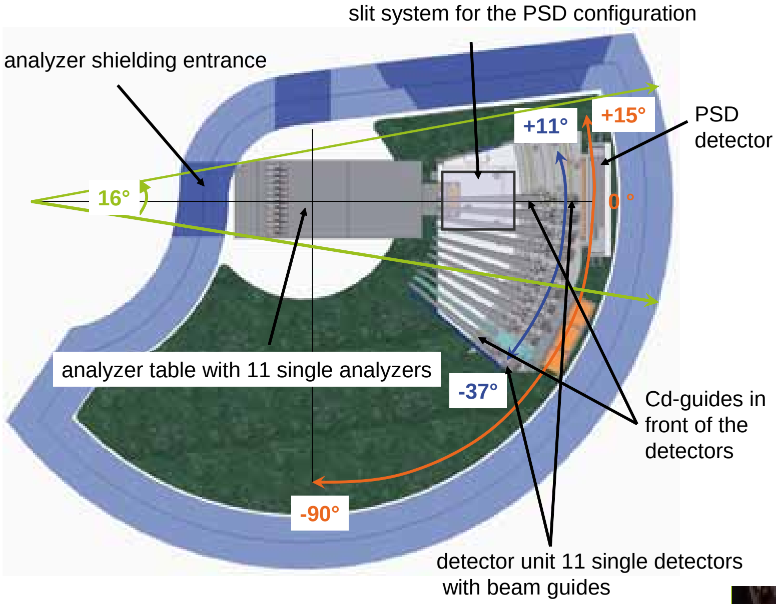


Fig. 1 (a): Design of the multidetector within the analyzer/detector shielding of PUMA.

Phonon dispersion curves are determined by interatomic interactions within a sample, as such they can be used as a method to gain insight into the mechanisms of solid state processes such as reactions or phase transitions. Because of this, special emphasis was made with the design and construction of PUMA so that time dependent phenomena can be studied. This was done by implementing a stroboscopic data acquisition mode, which allows to study the kinetic processes under a periodic external perturbation down to the microsecond time regime. Using this method, neutrons are not only registered as a function of momentum and energy, but also a function of time with respect to the external perturbation.

A technical limitation of stroboscopic techniques is the fact that they can only be applied to repeatable processes. Single shot experiments are desirable, however these are restricted to processes with timescales long enough to obtain good counting statistics. This limit can only be overcome by increasing the source flux or by using advanced multiplex techniques. Hence an innovative multianalyzer and detector system was recently commissioned allowing a unique type of multiplexing. The system allows eleven points with a scattering angle range of

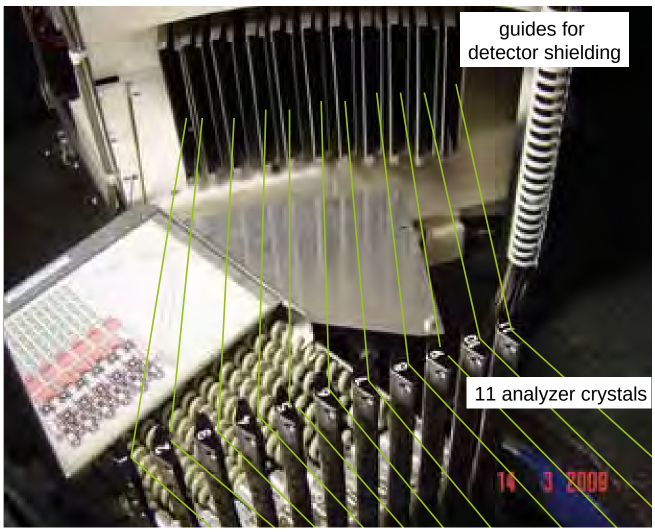


Fig. 1 (c): Multianalyzer/Multidetector set up for an inelastic scan. The green lines show the path for the individual rays through the analyzers in the detectors (not shown) via the Cd-shielded guides.

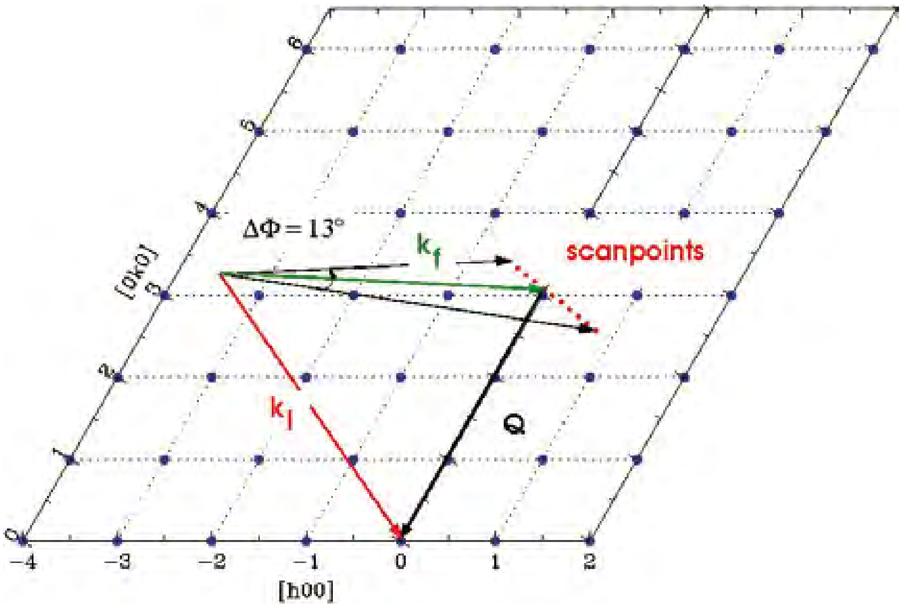


Fig. 2 (a): Pathway of the scan shown in (b) within reciprocal lattice (hk0) plane of quartz.

16° to be measured simultaneously, without the need for repositioning. This is possible due to the system of eleven analyzer blades and a sophisticated set of detectors, which allow flexible **Q**-ω pattern to be defined.

Figure 1 shows the multianalyzer and detector within the shielding of PUMA. The flexible operation of the multianalyzer is achieved by allowing each of the eleven analyzer blades to be rotated and translated independently from each other. Associated with each of these analyzers is a ^{3}He detector that can be independently positioned on a rail system. Cross talk and background scattering is efficiently suppressed using a series of beam guides that align with the respective analyzer crystal. This system is particularly suited for divergent beam configurations, yet there are however a good number of applications where the use of convergent beams is advantageous. A convergent configuration requires a much better spatial resolution at the detector position. To achieve this, a position sensitive detector with a variable slit system defining the focal point, is incorporated into the detector unit.

An example scan through an optical phonon in quartz, measured with both the multianalyzer option and in conventional mode, along with the path in **Q**-ω space, is shown in figure 2. The first encouraging observation is that the signal to noise ratio is comparable in both cases. However the most exciting result is that the time needed to obtain a whole phonon spectrum can be reduced to less than one minute. With planned design developments we believe that this can be reduced down to a few seconds.

The results of this first test experiment confirm the expected performance of the multianalyzer/ detector system. After completing the commissioning stage and developing a user friendly software package, the multiplex option will be provided for general user operation.

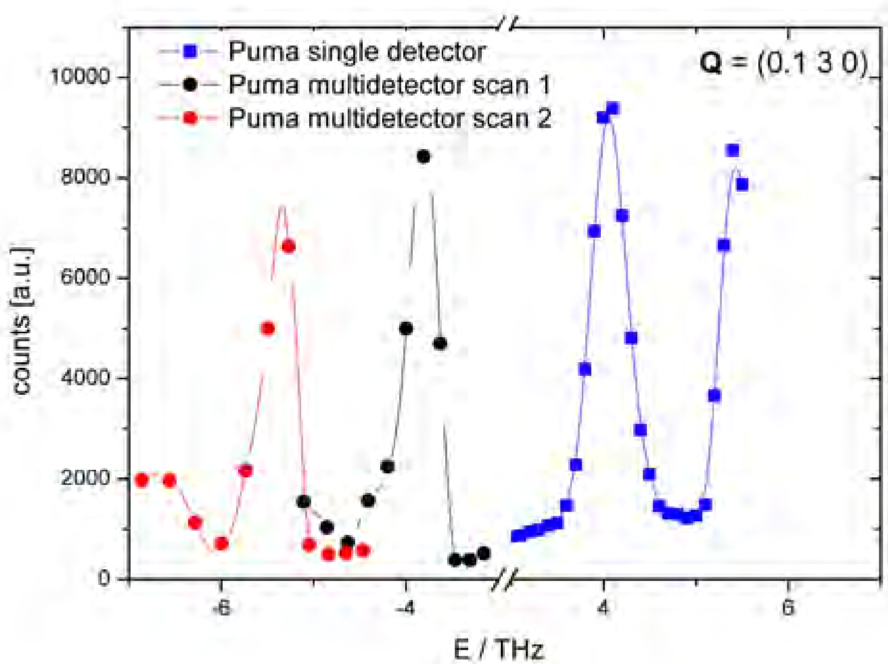


Fig. 2 (b): TO [100] phonons of a quartz single crystal (x=0.3°) measured with the dual multidetector (left side) and with the standard single detector of PUMA in constant k_i (2.662 Å^{-1}) for the multidetector and constant k_f, (2.662 Å^{-1}) for the standard detector, respectively.

Götz Eckold
Georg-August-Universität Göttingen

Hot Polarized Neutrons: POLI-HEiDi

Polarized neutron diffraction is a proven and invaluable tool for condensed matter physics to study complex magnetic structures. With the recent commissioning of the setup for spherical neutron polarimetry using a new third-generation Cryopad, POLI-HEiDi marks an important step for FRM II users in this research field.

Neutron polarization dependent measurements in general give access to the detailed magnetic properties of materials. Classical Polarized Neutron Diffraction (PND), also called "flipping ratio method", is one of the key techniques to study magnetic structures. It allows precise measurements of the magnetic structure factor of observed Bragg peaks and even yields a determination of the magnetization density distribution in the unit cell by Fourier transform. However this method is limited to centro-symmetrical structures and furthermore typically a rather strong external vertical magnetic field has to be applied to induce a uniform magnetization in the sample. Such an induced magnetization may not always reflect the ground state of the studied sample, especially for antiferromagnetic or other complex magnetic structures.

In the experimental hall of FRM II: Transporting the new POLI-HEiDi goniometer basis with mounted detector-analyzer.

More recently 3D polarization analysis, also called Spherical Neutron Polarimetry (SNP) was developed. Here the sample is studied in a zero external magnetic field and the full polarization tensor can be measured. Therefore new information about the chirality or the domain structure is accessible. Furthermore it is ideally suited to study antiferromagnetic structures, where magnetic and nuclear reflections overlay. Both principal techniques, the flipping ratio method and the spherical neutron polarimetry are planned for POLI-HEiDi.

Eddy Leliévre-Berna, ILL (on the top right), Martin Meven, TUM (left) and Vladimir Huţanu, RWTH Aachen (bottom right), during the preparation of the first Cryopad test

Currently POLI-HEiDi shares beamport and monochromator of the hot source diffractometer HEiDi. As a unique feature of POLI-HEiDi both polarization of the incident neutron beam and polarization analysis of the scattered beam are done with ^{3}He spin filters. Here we benefit from the excellent performance of the existing non-polarized monochromator of HEiDi in comparison with to polarizing monochromator crystals such as Heusler alloys.

The ^{3}He spin filter cells and magnetostatic cavities have been optimized for the use on POLI-HEiDi. A non-magnetic sample goniometer and spin manipulation devices (flippers, nutators) etc. have been built and successfully tested.

Two zero-field polarimeters: Cryopad (Cryogenic Polarization Analysis Device) and Mupad (Mu-metal Polarization Analysis Device) are available for SNP. In close collaboration with the developers of Mupad (TU München, E21) the first SNP test experiment using two ^{3}He spin filters was carried out. The results show the feasibility of SNP for POLI-HEiDi and good compatibility of the ^{3}He spin filters with the Mupad polarimeter. Data correction procedures to account for the time-dependence of the polarizer and analyzer polarization have been developed and sucessfully applied.

To overcome limitations of the Mupad polarimeter a new third-generation Cryopad polarimeter for POLI-HEiDi has been built in cooperation with ILL Grenoble. After successful preliminary tests it was commissioned on the instrument during the last reactor cycle of 2009. In the near future we plan to build a dedicated monochromator on beamport SR9a in order to become independent from the non-polarized instrument HEiDi. Also the acquisition of a dedicated high-field vertical magnet needed for the flipping ratio method is under way.

POLI-HEiDi is a project of the Institut für Kristallographie, RWTH Aachen funded by the BMBF.

Vladimir Hutanu
RWTH Aachen

STRESS-SPEC – Now Robotic

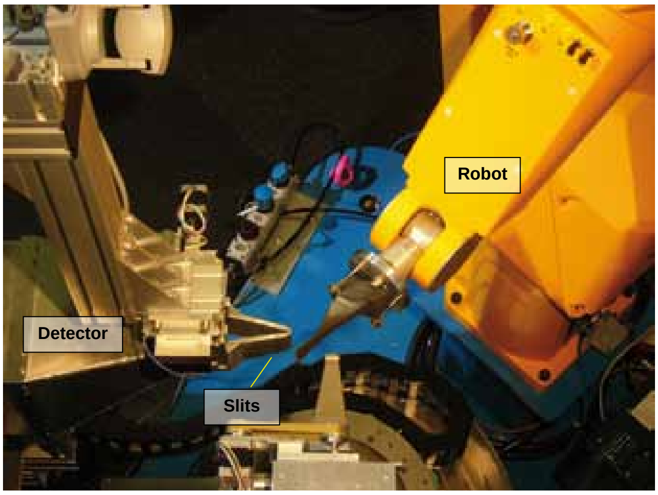


Fig. 1: The robot at STRESS-SPEC with turbine blade sample.

The materials science diffractometer STRESS-SPEC is well equipped for stress/texture measurements of engineering components consisting of a broad range of materials. There are, however, geometrical limitations for measurements within components with complex geometries, such as turbine blades, crank shafts, gears, etc. The desire for less restricted movement and automated sample change for texture samples has lead to an approved BMBF project (contract number 05KN7MCA) and acquisition of a “Staeubli” serial six axis robotic arm system. The intention of this project is to install a robot as flexible, accurate and fast sample stage for texture and strain analysis using neutron diffraction. The project is headed by H-G. Brokmeier, TU Clausthal-Zellerfeld, and is a joint venture between the TU Clausthal, FRM II and the Institut für Werkzeugmaschinen und Betriebswissenschaften (iwb), TU München.

The robot has a load capacity of 30 kg and offers full six degrees of freedom for sample movement within a positioning length of 50 cm. The spatial positioning accuracy is ±0.05 mm. This accurate sample alignment has been achieved by utilising a laser tracker, which allows the exact determination of the sample position relative to the neutron beam.

The first test experiments of this robot system at the instrument (figure 1) were carried out in late November this year. The robot control was integrated into the instrument control software used at STRESS-SPEC, so that fully automated scans were possible. Although the laser tracker was not used during that beam time, we still managed to achieve sufficient accuracy for global texture analysis and basic strain measurements. A textured Cu sample was used as a standardisation sample with a well known texture. Excellent qualitative and quantitative agreement was achieved by comparing these results to data obtained at the synchrotron beam line HARWI-II at Hasylab. At the time of the experiment the sample had to be changed manually but in future it is planned to use the automatic sample changing capabilities of the robotic system to allow serial texture measurements of a large number of samples.

In figure 2 a comparison of the first strain measurements using the robot and available literature values of a round robin welding sample is depicted. Qualitative agreement is excellent, though a small discrepancy in the residual strains in normal direction points to the as yet insufficient positional accuracy of the robot. However, high precision alignment will be possible by commissioning the laser tracking system within the next few months. The measurement clearly showed the flexibility and ease of the system. The sample had not to be remounted and realigned during the experiment, as it always has to be done using the classical sample tables.

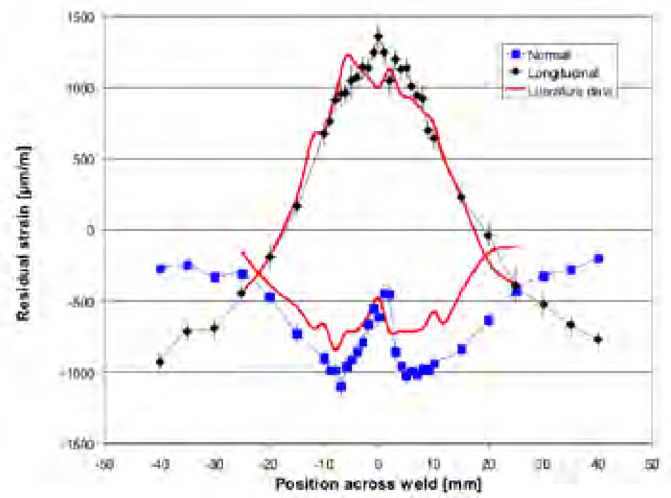


Fig. 2: Residual strains across the weld of a round robin welding sample in 2 mm depth from the surface (see special issue of Int. J. Pressure Vessels and Piping 86 (2009) 1-131). The red line represents literature data (for clarity only normal and longitudinal directions are shown).

In the next commissioning period in March 2010 it is planned, in addition to the mounting of the laser tracker system to control each robotic arm movement throughout the experiment with the software routines (based on the commercial tool EasyRob) developed by the iwb. This will then allow the robotic arm to know the position of any number of fixed objects in the working range, avoiding possible collisions with obstacles such as collision sensitive slits and the detector.

Michael Hofmann
FRM II

www.frm2.tum.de/stress-spec

KWS-3 Back to Work!

JCNS-Instrument for High Resolution Small Angle Neutron Scattering

Focusing mirror of KWS-3.

Small-Angle Scattering (SAS) is used for the analysis of structures with sizes just above the atomic scale between 1 and about 100 nm, which cannot be assessed or sufficiently characterized by microscopic techniques.

The new KWS-3 spectrometer is an important supplementary instrument, which extends the accessible scattering range to very small angles with a superior neutron flux compared to a conventional instrumental setup with pinhole geometry. Thus the length scale, which can be analyzed, is extended beyond 1 micro meter for numerous materials from physics, chemistry, materials and life science, like alloys, diluted chemical solutions and membrane systems.

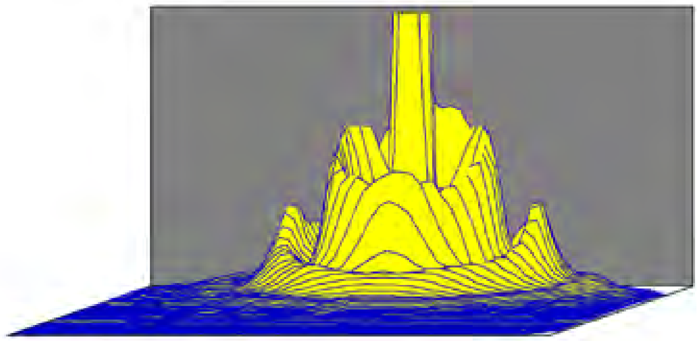
After the instrument's move from Jülich to Munich the instrument underwent a fundamental evaluation resulting in a major upgrade of the whole instrument. The main topic of the upgrade project was a general mirror refurbishment i.e. a new polishing and subsequently a new coating of the mirror surface with the isotope ^{65}Cu with the aim to improve the resolution properties of the whole instrument. The mirror refurbishment was performed by Carl Zeiss Laser Optics GmbH. Due to the minimization of the mirror's micro roughness the parasitic scattering contributions could be reduced by about a factor of three in comparison to the old mirror coating.

Simultanously to the mirror refurbishment comprehensive upgrade activities in the vacuum system, electronics and programming were performed with the following aims:

- protecting the new mirror coating from aging (degradation of the mirror's surface properties),
- transforming the instrument into a user-friendly state and
- introducing conceptual improvements.

Since the last reactor cycle (August 2009) the KWS-3 is undergoing commissioning. The success of the mirror refurbishment and the upgrade activities were confirmed by the test measurements. Numerous calibration measurements have been performed and it is now planned to implement KWS-3 into the regular scheduling system within the current reactor cycle (November 2009 until February 2010).

The plot below shows the V-SANS (Very Small-Angle Neutron Scattering) measurement of an ordered polymer (PMMA) with a radius of 776 nm. The spherically shaped polymer particles with a diameter of about 1.5 micro meter cause rings of scattered neutron intensity around the beam centre. The very high scattering intensity caused by the primary beam in the centre of the rings is not shown on the full scale.



Three-dimensional plot of the neutron intensity scattered by ordered PMMA-colloids with a diameter of 1.5 micro meter. The very high intensity contributions in the centre are caused by the primary beam.

With KWS-3 an additional instrument of Jülich Centre for Neutron Science (JCNS) becomes operative and a joint project of JCNS, IFF of Forschungszentrum Jülich and the central facilities ZEL, ZAT and B approaches completion.

Günter Goerigk
FZ Jülich

www.jcns.info/jcns_kws3

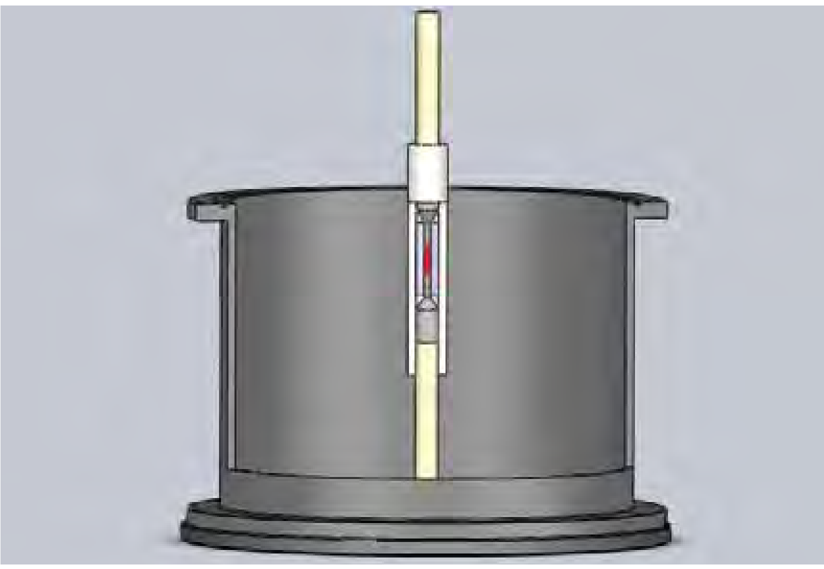
High Pressure at Low Temperatures

Extreme temperatures, high pressures and high magnetic fields are common requests to the sample environment group at the FRM II. In special cases several of the parameters have to be varied simultaneously.

A special challenge is to go to low temperatures at high pressures. In this case, cooling down is time consuming due to the high mass of the pressure cells. Conventional setups apply the high pressure to the cell before mounting it inside the cryostat. This procedure hinders the effective investigation of pressure dependent studies. To overcome this restriction, we have constructed a high-pressure cryostat where the pressure can be changed in situ, even at low temperature.

The sample cell is operated externally by a hydraulic press with 450 kN compressive force and 220 kN repulsive force. It can be mounted in a dewar and cooled down to below 20 K within four hours. With a piston-in-cylinder cell and a piston diameter of 14 mm a basic pressure of 2.6 GPa (26 kbar) can be achieved at a sample of up to 40 mm length and 14 mm diameter. Reducing the piston diameter and the sample volume the pressure can be increased up to 100 kbar. Using anvil cells the pressure range extends to 30 GPa (300 kbar) and above. In addition, a dynamic pressure can be superimposed on the static pressure with a frequency of up to 10 Hz. The amplitude depends on the elasticity of the sample and the indenters. At 10 Hz and without load the amplitude of the sinusoidal movement of the hydraulic piston amounts to 1.0 mm and is inversely proportional to the frequency. That is, at a frequency of 1.0 Hz the dynamic range approximates the static pressure range.

The dewar containing the pressure cell and the access.



Cross section of the dewar showing the pressure cell, the indenters, and the location of the sample (red).

This new low temperature, high pressure device enables, for instance, to investigate pressure dependent phase transitions in reasonable times. Moreover, the two-pillar construction of the press provides a broad access to the sample and a large scattering angle. The future development of the high-pressure equipment will include the extension to high temperatures.

Herbert Weiß
FRM II

Off-Spec 2009

JCNS Workshop; September 27th-29th, 2009 - Feldafing

The last two decades have seen a tremendous development in the science and applications of thin films, multilayers and laterally patterned heterostructures, with important contribution of reflectometry and grazing incidence diffuse scattering of (polarized) neutrons and (non-resonant, resonant magnetic and nuclear resonant) X-rays. With the advent of new neutron and X-ray sources data acquisition time has much shortened. One drawback of current capabilities in off-specular reflectometry and grazing incidence scattering is a certain lack in appropriate theory and evaluation of diffuse neutron and X-ray scattering. No generally accepted and internationally tested data fitting programs and simulations exist with proper account for beam and instrument properties. To discuss the current state of the art in data analysis and modeling for grazing incidence and off specular scattering a dedicated workshop was held on September 27th-29th at the InWent Education Centre in Feldafing, south of Munich.

The workshop was jointly organised by the Jülich Centre for Neutron Science of Forschungszentrum Jülich GmbH and the KFKI Research Institute for Particle and Nuclear Physics (RMKI) of the Hungarian Academy of Sciences in Budapest and was attended by more than 40 participants from Europe und the US with representatives of all major facilities offering neutron or X-ray off-specular scattering instruments.

The presentations during the workshop described current available theoretical approaches and were given by Boris Toperverg, Laszlo Deak, Frederic Ott and Peter Mueller-Buschbaum. Experimental examples of off-specular and grazing incidence scattering, encompassing both soft matter and magnetism were the topics of several talks. Current existing software and programs were presented and the status of running and new instruments reviewed. The workshop lead to lively and intensive discussions among the participants, which were also not interrupted by the workshop dinner: Bavarian specialities at the famous Klostergasthof Andechs.

The workshop showed the potential of off-specular and grazing incidence scattering and the increasing demand for software to simulate and fit the obtained data. As a result the participants agreed to offer information and programs to the interested audience via appropriate places on the net:

- at the neutron reflectometry internet page on **neutronreflectivity.neutron-eu.net**
- or the reflectometry web on **www.reflectometry.org/wiki**

Thomas Gutberlet
JCNS

Trends and Perspectives in Neutron Scattering on Soft Matter

JCNS Workshop; October 5th-8th, 2009 - Tutzing

The second JCNS workshop was held on October 5th-8th at the Evangelische Akadamie Tutzing, south of Munich. The workshop was dedicated to "*Trends and Perspectives in Neutron Scattering on Soft Matter*" and was jointly organised by the European Network of Excellence "SoftComp", the Donostia International Physics Center, San Sebastian, and JCNS. With the advent of new neutron sources world wide and the development of novel instrumentation, this seemed to be a good time to bring together researchers in both soft condensed matter and neutron research. The aim was to discuss the current status and future trends of using neutron scattering to study structure and dynamics of soft matter systems.

An impressive list of invited and contributed lecturers in the field from all over the world attracted nearly 70 scientists and students to the nice environment of the Evangelische Akademie. The presentations highlighted the use of neutrons to elucidate structure and physics of polymers, proteins, dynamic of membranes and of confined soft matter systems, nanocomposites, polymers at interfaces, adhesion and adsorption of macromolecules, polymers and macromolecules under shear as well as the novel instrumentation now available.

The participants enjoyed the warm and sunny autumn conditions in Bavaria and discussed intensively on the subject. A visit to the Forschungsneutronenquelle Heinz Maier-Leibnitz (FRM II) with JCNS on-site on October 7th was a special highlight of the four-day meeting.

Everyone expressed the confidence that the workshop will further help to develop the use of neutrons in soft matter and enhance fruitful collaborations in this field of research. Due to the successful meeting it was agreed to organise a comparable workshop by JCNS in this field in 2012.

Thomas Gutberlet
JCNS

Radiography for 9th Graders

Live video transmission; December 17th, 2009 – Garching and Munich

Burkhard Schillinger presents interesting samples to the audience in the Deutsche Museum.

How does the radiography station ANTARES give insight into the interiors of objects of art, a running engine or the lung of a rat? Hundreds of visitors get to know the answers every year at a guided tour of the FRM II. But there are limitations in group size and available time slots for the visitors.

Burkhard Schillinger explained his instrument ANTARES via a live video conference to 60 pupils in the Deutsche Museum in Munich on December 17th. The pupils of grade 9 took the chance to ask many questions regarding the neutron source and the everyday life of a scientist at the FRM II.

Andrea Voit
FRM II

Representatives of European Neutron Users and Providers

October 7th-9th, 2009 – Garching

A large number of European neutron facilities provide foreign users with access by the Neutron Muon Integrated Infrastructure Initiative NMI3. In addition common technical development programs are organised within the context of this initiative. Details can be found on the neutron portal

neutron-eu.net

Participants of the ENSA meeting in Garching. The national delegates are marked by their ensign. (Ana Claver, NMI3 information service manager)

The organisation meets in a general assembly every year together with the development groups. In between, business meetings ensure the close collaboration between the ten facilities and fruitful discussions support the ongoing developments. Traditionally these meetings take place in Garching profiting from the nearby Munich airport. Altogether three meetings were held at the FRM II from October 7th to 9th, 2009. Starting on Wednesday with a discussion meeting by access coordinators on future aspects of the user and proposal organisation. The board meeting of NMI3 took place on Thursday; as usual reports on the access activities and the joint research activities were given, demonstrating the strong demand for neutrons all over Europe.

On Friday, October 9th, the European user organisation ENSA got together at the FRM II. The representatives of the national neutron user societies elected Michael Steiner as the new chairman of ENSA. He succeeded Peter Allenspach in office. Javier Campo was elected as vice-chairman and Kenneth D. Knudsen took over the duty as secretary of ENSA. The discussion during the meeting covered news from the member organisations and neutron sources. Finally ENSA elected Edinburgh as host for the next International Conference on Neutron Scattering which will take place in 2013,

Jürgen Neuhaus
FRM II

Award for FRM II PhD-Student

Harald Breitkreutz at the medical irradiation facility MEDAPP at FRM II with a sample to analyze the neutron spectrum of the beam.

Harald Breitkreutz will receive the award for young academics of the German Association of Radiation Protection. The 28 year old PhD-student is honoured for his master thesis, in which he analyzed the neutron spectrum of the medical irradiaton facility MEDAPP at FRM II. “The Diploma thesis of Mr. Breitkreutz is the basis for the three-dimensional simulation of the dose rate for the tumour patients”, says Professor Dr. Winfried Petry, Scientific Director and PhD supervisor of Harald Breitkreutz.

The award from the German Association for Radiation Protection includes the travel costs to the international radiation protection conference in Helsinki. Harald Breitkreutz will also take part in the competition for the European award for young academics of the International Radiation Protection Association (IRPA).

Andrea Voit
FRM II

Open Doors: Long Line-Up for FRM II-Visits

October 24th, 2009 - Garching

Tours through the neutron source were again one of the highlights of the annual open day on October 24th at the research campus in Garching. After only 1.5 hours, the 29 guided tours were fully booked. At peak times, the line-up for FRM II filled the whole length of the entrance hall of the Physics Department of Technische Universität München. The booth of the FRM II radiation protection group right next to the waiting visitors showed how to measure radiation and sources of natural radioactivity.

In total 487 people were lucky to get one of the 1-hour-visits between 11 and 18h, where they could gaze into the reactor pool and take a closer look at the instruments both in the experimental hall and neutron guide hall.

Around 80 scientists, security service employees and staff of the FRM II ensured a successful day. The three talks about research at FRM II, given by Winfried Petry, Jürgen Neuhaus and Christoph Hugenschmidt, were among the best attended lectures of the day. Films about the neutron source in another lecture room also attracted several interested visitors. The next open day on the research campus in Garching are planned for May 15th, 2010 from 18 to 24h with the title "*Night of science*".

Andrea Voit
FRM II

13th JCNS Laboratory Course - Neutron Scattering

September 7th-18th, 2009 - Jülich and Garching

Once again, the 13th JCNS Laboratory Course on Neutron Scattering was fully booked. The course took place on September 7th-18th with a one week theory course at Forschungszentrum Jülich followed by a week of hand-on experiments and work at FRM II. The 53 participants from German and European universities very much enjoyed the intensive atmosphere of science at both places. For many of them it was the first experience both with neutrons and to work at instruments at a large scale facility. The combination of lectures in the first week and real experiments in the second week in Garching made a real impression on most of the students, who not only came from a physics background but also from chemistry and biology.

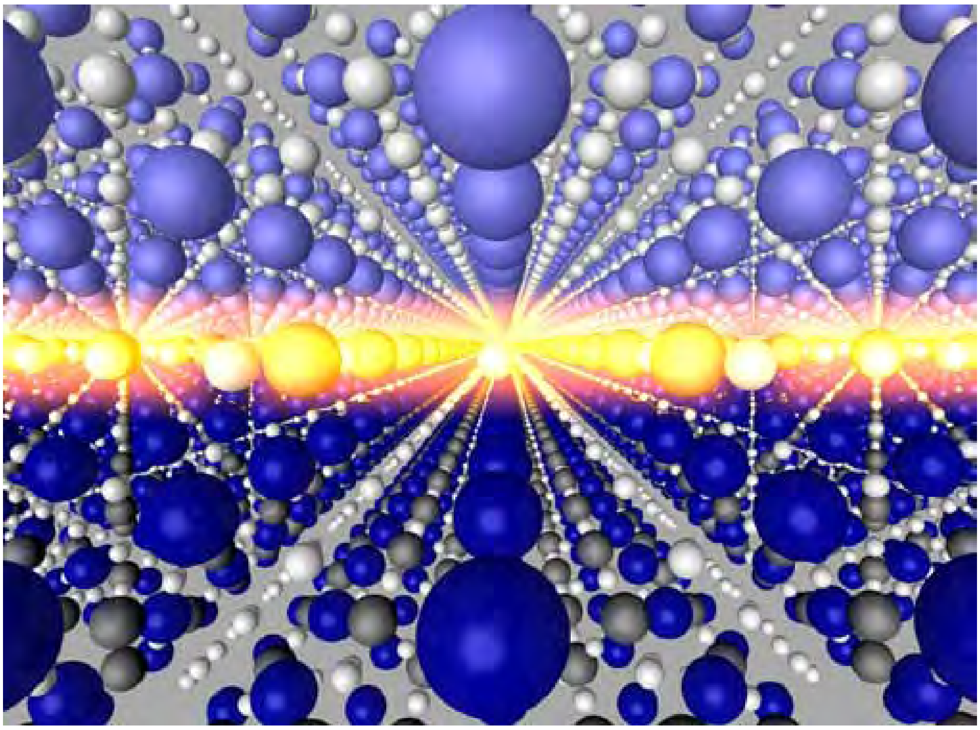
In addition to the scientific work there were also enjoyable evenings in Munich, the traditional soccer game between chemistry and physics students (which was stopped due to loss of the soccer ball in the green fields of Garching) and a long lasting farewell party on Thursday evening, made the 13th JCNS LabCourse an event to be repeated in 2010.

Thomas Gutberlet
JCNS

www.fz-juelich.de/iff/wns_lab_now

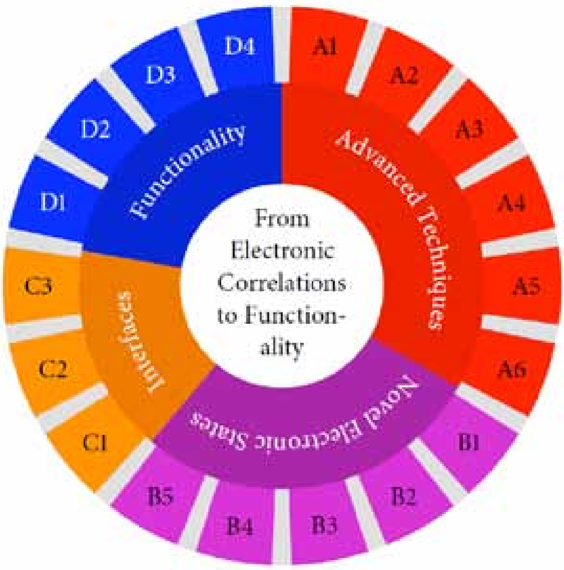
TRR80: From Electronic Correlations to Functionality

A new Transregional Collaborative Research Centre (TRR) has been established recently by the Deutsche Forschungsgemeinschaft DFG. In a close collaboration between the University of Augsburg and TUM, 18 scientific groups aim to investigate the physics and applications of electronic correlated materials. Out of these, seven groups will use the instruments at the FRM II considerably for their research.



Superconducting interface between isolating strontium-titanate and lanthanum-aluminate. (EKM/Universität Augsburg)

New materials with strongly correlated electrons will enable the development of future generations of electronic devices. Some fifty years ago silicon and germanium became the basic material for all kind of electronic components. Here, the electrons behave essentially as independent particles. By doping the materials, adding defects and interfaces it was possible to conceive and realise a large variety of devices. A similar development is possible using the far more challenging class of electronic correlated materials. These developments were enabled by the progress in designing well controlled spatial structures, interfaces and defects. With atomic precision, interfaces connecting different materials, such as complex oxides can be fabricated by heteroepitaxy.



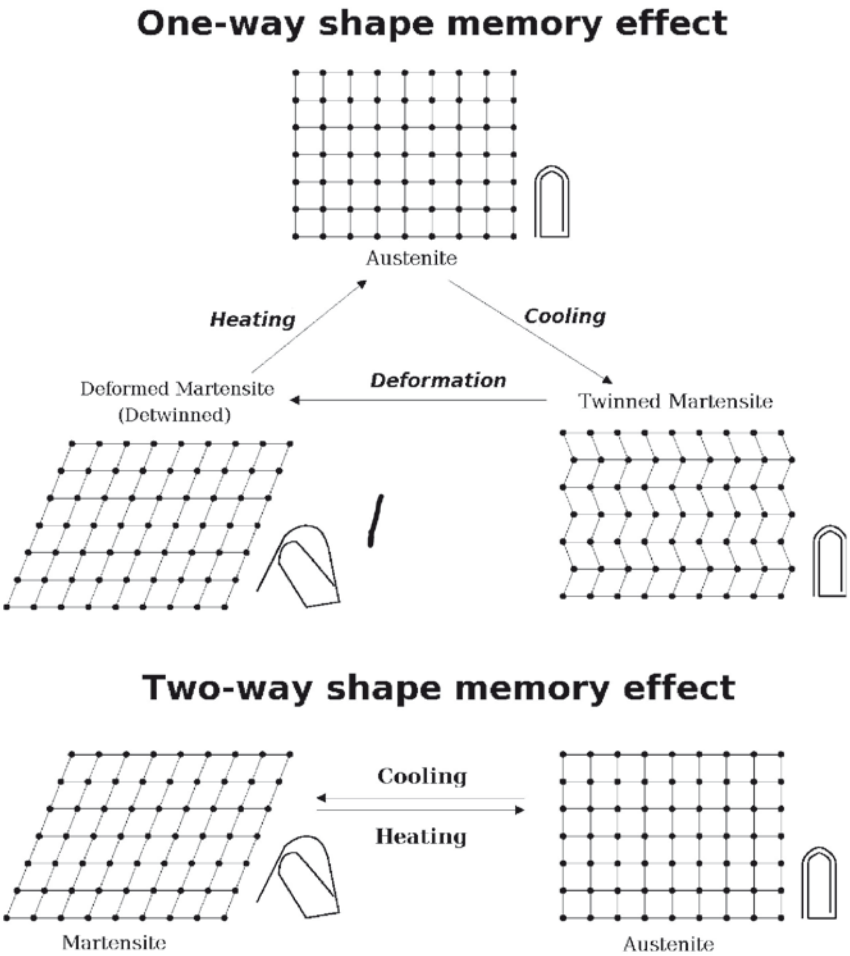
Collaborating research areas within the TRR 80. (EKM/Universität Augsburg)

The joint collaboration of University of Augsburg, TUM, LMU München, Max Planck Institute for Solid State Research Stuttgart and Walther-Meißner-Institute of the Bavarian Academy of Science is organised in four areas, covering advanced techniques, novel electronic states, interfaces and functionality. It brings together experimentalists and theoreticians all working on complex materials in the Munich-Augsburg region. The FRM II will serve a large number of these groups with neutron and positron beams. One dedicated instrument will be built to investigate the electronic Fermi surface using the angular correlation of the annihilation radiation (ACAR) of positrons. Furthermore, neutron diffraction, neutron reflectometry and high resolution spectroscopy on the three axis instrument TRISP will be used to carry out the research program.

The research collaboration will start at the beginning of 2010 and will be funded with 8 million Euros for the first 4 years. It is expected to be extended to 12 years in total covering 25 to 30 million Euros. The consortium is chaired by Jochen Mannhart (Augsburg) and Peter Böni (TUM). Besides the research program, the transregio includes high priority tasks such as an integrated graduate school, programs for gender equality, public outreach and industrial collaborations.

Jürgen Neuhaus
FRM II

Pulsating Single Crystals: the Magnetic Shape Memory Effect

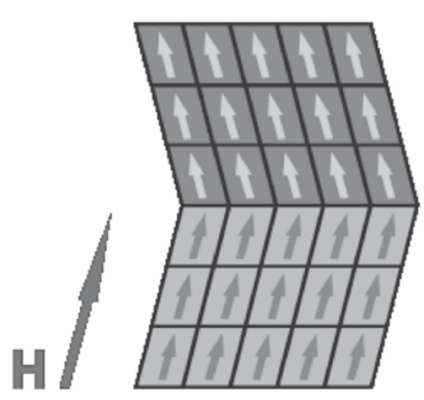


Thermal induced shape memory effect.

Moving things around without using an electrical motor is very advantageous, especially if the driving device needs to be very small. In this case adaptive materials can be used which change their shape under an applied electric or magnetic field. Using piezo-ceramics or magnetostrictive materials has a limitation of relative length changes that are restricted to 0.1 to 0.2%. Such piezo-ceramics have found use in fuel injection valves and specialized micro-positioning devices. A different type of adaptive materials are shape memory alloys which show a reversible shape change due to temperature cycling around a structural phase transition. The most widely used material is NiTi which has been used in medical applications;. The technical limitations of slow heat flow, however, hinders applications for fast movements. Consequently much work is still done developing and improving the properties of shape memory alloys.

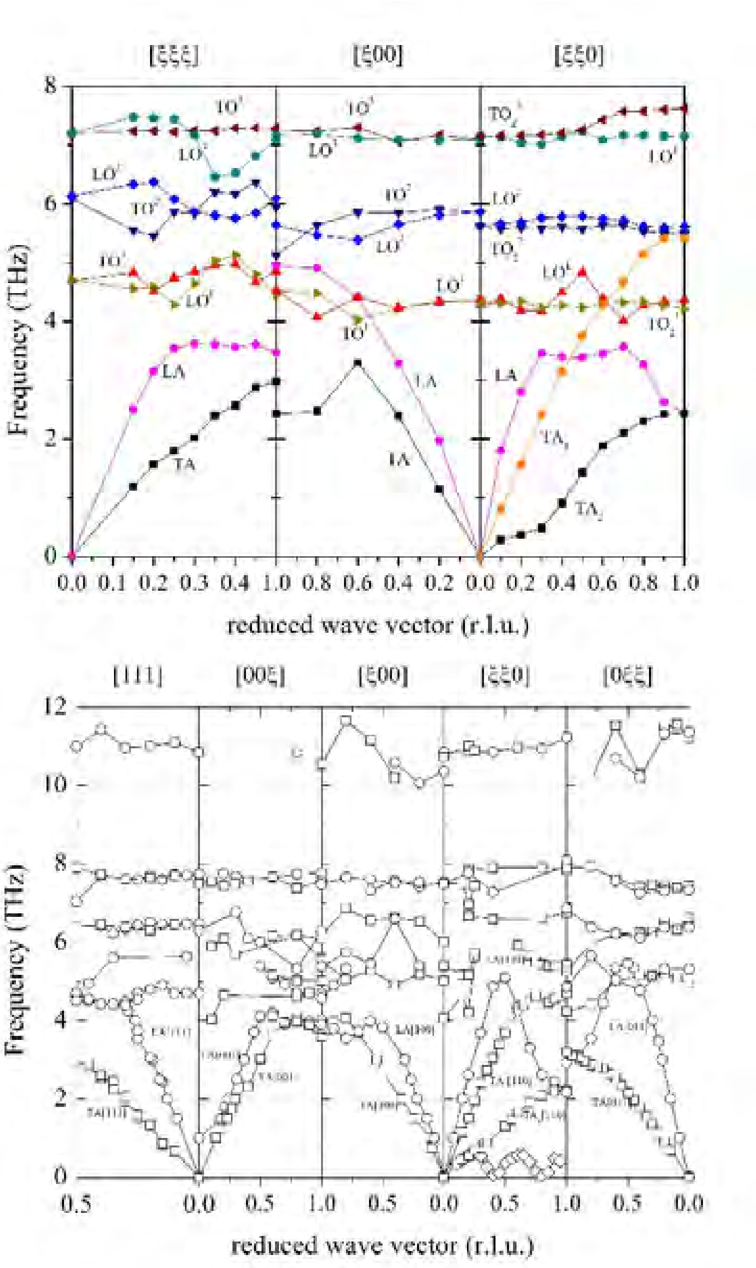
To understand the shape memory effect one must have a detailed look on the underlying mechanism of the martensitic phase transition. It transforms mainly a cubic high temperature phase (austenite) via a diffusionless, reconstructive phase transformation to the low temperature phase (martensite). These transformations are of first order and typically involve a small volume change. This phase transition introduces quite a reasonable amount of inner stress to the sample material which for example is used for steel hardening. Cooling down from high temperatures through the phase transition, the sample has several possibilities to maintain a crystallographic relationship to the parent phase. In order to minimize the inner stress different variants (areas of the same crystallographic order with different orientations) of the low temperature structure, connected by low energy twin boundaries, appear. If an external force is applied to such a material, a limited plastic deformation can be achieved by the movement of these twin boundaries instead of moving dislocations. This static deformation can be retrieved by heating the sample up to the high temperature phase. Recovering the overall shape of the material is called the shape memory effect.

Heating and cooling, however takes time and limits the technical application of the thermal induced shape memory effect. Another related phenomena requires a ferromagnetically ordered material in the martensite phase, which has an anisotropic magnetisation. Here an external magnetic field can switch between different variants in the martensitic phase. This magnetic induced reorientation can be quite fast up to the kHz region. In Ni_2MnGa alloys, for example, elongations of the sample of the order of 10% have been achieved on a single crystalline sample using moderate magnetic fields up to 1 Tesla. This large stroke is very suitable for technical applications.



Switching around variants by an external magnetic field.

Research on this magnetic shape memory effect is funded in a prior-



Phonon disperions in the austenitic (top, 373 K) and martensitic (bottom, 273 K) phase of $Ni_{49}Mn_{32}Ga_{19}$.

ity program of the Deutsche Forschungsgemeinschaft (DFG) SPP1239. Running since September 2006, the program is organised in three areas. In area A the fundamentals of these materials are examined. Models are developed which describe the coupling of microstructure and magnetism, from the atomistic dimensions to the device scale. Additionally, novel magnetic shape memory alloys are prepared and examined which promise better properties compared to today‘s materials. Within area B, new and efficient preparation routes for bulk materials are developed. These materials are integrated into novel actuator and damping systems. An additional focus is on the characterisation of these materials with high lateral and temporal resolution. Area C develops thin films with appropriate microstructure and texture. It is the aim to use the high miniaturization potential of the magnetic shape memory effect and to develop novel micro actuator and sensor systems. An overview of the research can be found on the internet pages of the priority program:

www.magneticshape.de

At the FRM II, we have performed experiments on the lattice dynamics of the MSM materials at the instruments PUMA and PANDA. Figure 3 shows the phonon dispersions of the high and low temperature phases of $Ni_{49}Mn_{32}Ga_{19}$ alloys. A pronounced phonon anomaly in the TA2-phonon branch indicates the weakness of the high temperature structure to undergo the phase transformation to the martensite. This phonon anomaly gets even more pronounced in the ferromagnetically ordered state and is inverted after passing to the low temperature phase.

Close collaborations with other groups in the SPP1239, who are calculating the lattice dynamics from first principles will lead to a better understanding of the interaction potentials involved in the MSM effect. Further measurements using neutrons at the FRM II were performed by the group of Mehmet Acet from Duisburg University on the structure of NiMnSn and NiMnIn-alloys as a function of temperature and applied magnetic field using the powder diffractometer SPODI.

Financial support is acknowledged to DFG, priority program SPP1239.

Jürgen Neuhaus
FRM II

MAGNETIC SHAPE MEMORY
A DFG PRIORITY PROGRAMME

How do Polymers Move?

The Richter Group at FRM II

From left to right: Klaus Nusser, Christine Gerstl, Andreas Zitzelsberger, Gerald J. Schneider, Michael Kerscher and Frederik Lipfert.

How polymer chains move, microemulsions self assemble or nanoparticles change the physical behaviour of polymers are questions studied by the group of Dieter Richter at the institute of solid state physics (IFF) at the Forschungszentrum Jülich. Neutron scattering is one of the main methods used in the group, with neutron spin echo spectroscopy (NSE) being the flagship technique. Due to this fact, the group operates NSE spectrometers at ILL, SNS and FRM II.

The former Jülich FRJ-2 NSE was relocated to the FRM-II and in the process underwent significant upgrades; this has allowed access to higher fourier times, making this technique indispensable for the exploration of polymer dynamics. The higher intensity available at Munich is directly exploited by Michael Kerscher, one of three PhD students in the Richter group, working at the JCNS in Munich. He uses the J-NSE spectrometer for studying the dynamics of micro-emulsions near interfaces. The work also includes use of the complimentary techniques of grazing incidence small angle neutrons scattering and reflectrometry.

Christine Gerstl joined the Richter group as a PhD student in December 2008, after studying physics at the University of Regensburg. Christine's research focuses on chain conformation and dynamics in polyalkyleneoxides. Also joining the group from Regensburg is Klaus Nusser; Klaus' PhD centres around polymer conformation and dynamics of poly(ethylene-alt-propylene) in the presence of silica based nano fillers. The work utilises a combination of small angle neutron scattering and NSE with the main aim being to correlate the microscopic results to the macroscopic response to an external stress field.

The fourth PhD student in the group is Thomas Glomann, who also completed his diploma at the JCNS. His PhD is a continuation of his diploma work, looking at the rheology and dynamics of polymer composites.

The group is completed by two diploma students. Andreas Zitzelsberger is studying polymer chain conformation in nano-composites, while Frederik Lipfert recently joined the group with the intention of studying aqueous surfactant model systems in fluids for enhanced oil recovery. All of the Richter group students at the FRM II receive day to day supervision from Heinrich Frielinghaus and Gerald J. Schneider.

The diploma and PhD students of Dieter Richter at JCNS at FRM II comprise an active and engaged young group of scientists doing their work with dedicated neutron methods, profiting from the unique possibilities for young scientists at FZJ and FRM II and the leading expertise in polymer physics of Dieter Richter and his group at IFF. The applications of interested master, diploma and PhD students are very welcome.

Thomas Gutberlet
JCNS

www.fz-juelich.de/iff/d_ins

Slowing Down to 25 K: the Cold Neutron Source

The cold neutron source (CNS) at the FRM II shifts the thermal neutron energy spectrum to lower energies and supplies three beam tubes with low energy neutrons. But how does it work, what are its particularities?

How does the cold source work?

The cold neutron source at FRM II uses liquid deuterium as a moderator. A helium regfrigerator, which has a maximum cooling power of 6kW at 18 K, cools down the liquid deuterium, which is heated to boiling point by gamma radiation and neutron moderation. The 2.4 kg of liquid deuterium are kept at boiling point at 25 K and 1.5 bar at full reactor power, such that the thermal neutrons from the nuclear fission are moderated.


A look into the reactor pool.

Where is the cold source located?

The vessel is located in the D_2O-moderator tank close to the position of maximum thermal neutron flux. The noses of three beam tubes point to the vessel of the cold neutron source: the beam tubes are no. 1, 2 and 4.

Which instruments use the cold neutrons?

Beam tube no. 1 provides the neutrons for the whole neutron guide hall, i.e. 13 instruments. Beam tube no. 2 supplies the three axis spectrometer PANDA in the experimental hall and beam tube no. 3 supplies the radiography and tomography station ANTARES in the experimental hall.

What are the components of the cold source?

The vessel with the liquid D_2-moderator is located in the moderator tank next to the fuel element. Its volume adds up to 25 litres and it contains about twelve litres of liquid deuterium at 25 K. The vessel is linked with the D_2-He heat exchanger in the reactor pool. The heat exchanger recondenses the vaporized deuterium and sends it back to the vessel. Natural convection drives the circuit of deuterium. The section placed in the reactor pool with the helium/deuterium heat exchanger and the moderator vessel is called the inpile section. It is a highly qualified part.
In case of a fault or damage of the inpile section most of the experiments using cold neutrons would be affected. So the management committee of the FRM II decided to order the complete inpile as a spare part - an investment of about 4.5 mio €.
The helium-deuterium heat exchanger is cooled by an outside helium-refrigerator. A buffer tank and a metal hydride storage tank, both also located outside the reactor pool, stores the deuterium gas and are linked to the heat exchanger.

Why does the preparation of the cold neutron source takes about one week?

The normal procedure to prepare the cold source for operation is as follows: In a first step all D_2 gas from the buffer tank is transferred to the metal-hydride storage tank. This is the most time consuming part taking several days. Once empty the buffer tank is disconnected. Heating the metal-hydride tank to about 120 centigrade during the next step sets the D_2 free and simultaneously this gas is liquefied at the D_2-He heat exchanger. It takes about 24 hours and finally the moderator vessel is filled with about 12 l of liquid D_2. Finally temperature and pressure of the moderator are increased to 25 K and 1.5 bar working conditions.
There is a faster way to prepare the CNS filling it directly from the D_2-buffer tank. Nevertheless this also takes 7 to 8 hours and we reach only a filling level of about 10 l of liquid deuterium in the moderator vessel. Because the yield of cold neutrons is almost proportional to the filling level in the moderator vessel, the first method is of course preferred, whenever the time is given.

Does the cold source need an operator?

It needs an operator while being prepared, it works automatically after being started. It follows every power step of the FRM II-reactor.

Dietmar Päthe
FRM II


The noses of three beam tubes point to the vessel of the cold source. It contains liquid deuterium.

Behind the Scenes: the Administration

Members of the administration group at FRM II.

The institute of the FRM II is organised in three directorates, namely the reactor operation, science and the administration. As the head of the administration department, Klaus Seebach, is also member of the board of directors at the FRM II. In total 13 employees take care for financial issues, human resources and the commercial applications of the FRM II.

One of the major works of the administration is the order processing from small quantities such as office equipment, up to the bigger ones like buying new fuel elements. In total they have to administer a 25-million-Euro-budget, including the man power costs. All commercial activities have to be organised as well. They cover the management of the industrial application centre for radioisotope treatment, the silicon doping and contract research using the neutron beams for industry. "Industrial applications represent about 30% of the usage of the FRM II", explains the administrative director, Klaus Seebach.

Not only leasing buildings to commercial companies and research facilities occupy the administration. The maintenance and refurbishment of the existing buildings as well as the construction of new ones, is organised by the FRM II administration, in collaboration with the Bavarian public construction authority. This year, for example, the outer shell of the Atomic Egg got restored, which was an expensive and time-consuming project.

The organisation of a user facility like the FRM II includes a large volume of daily work such as organising access to the institute, taking care of travel reimbursement, distribution of the post, keeping track of official correspondence and so on. In addition the entire visitor service for our 3000 non-scientific guests per year is managed by two part-time employees in the administration department. Pupils, students and associations visit the FRM II in groups of up to 24 people throughout the year in addition to the open day of the campus in October.

In total 230 employees are managed by the human resources group. They also prepare all work contracts for the numerous students which work for a short time period at the institute.

Even though we profit a lot and rely on numerous central cevices of our university administration, the easy and friendly service of our local administration makes the daily life much easier.

Andrea Voit
FRM II

The restoration of the Atomic Egg.

Student Trainees: Fresh Ideas for Exciting Projects

Markus Zollner spent his internship for his studies in micro system engineering at the FRM II. During the five months he designed a new cryostat for the sample environment group.

Markus Zollner designed a new cryostat during his internship.

How did you learn about the possibility of an internship at the neutron source?

Zollner: A colleague at my university Hochschule München spent his internship here and recommended the FRM II. He got the information at the "Hochschulkontaktmesse HoKo", where the FRM II had a booth.

What do you like about being a student trainee at FRM II?

Zollner: I really learnt a lot while at the FRM II and felt I was respected as an equal. I chose the project I worked on and enjoyed the possibility of working independently on a new design. The support of my supervising scientists was, however, always there if I needed it. This is unlike my previous experience with commercial internship where I was used as an employee, performing the same work every day.

You designed a new cryostat, which will enable the scientists to change the samples more quickly, without having to start and shut down the system every time. Did you build this cryostat?

Zollner: I just designed it with a CAD programme. The next step will be computer simulations to make sure, that it works well and to check, how warmth and cold expand within the cryostat.

Your internship has ended now. What are your plans?

Zollner: I want to finish my Master in micro system engineering at Hochschule München, but will stay here as a working student and perform the computer simulations. Afterwards, I would like to start my master thesis at FRM II.

Andrea Voit
FRM II

Staff of the FRM II (from right to left: Christian Piochacz, Kathrin Buchner, Dirk Etzdorf and Alexander Wolf) promote internships at the "Hochschulkontaktmesse" (HoKo) in Munich. 20 different projects were offered to the 5000 visitors of the HoKo. At the moment, four students spend their internship at the FRM II.

www.frm2.tum.de/jobs/praktika/index.html

Newly Arrived

Alexander Komarek

What are you doing at the FRM II?
Simulation, design and construction of the KOMPASS.

What have you done before?
Elastic and inelastic neutron scattering experiments at pulsed and reactor neutron sources; resonant and non-resonant synchrotron measurements; single crystal growth with floating zone technique.

What are your special scientific interests?
Study of transition metal oxides, oxyhalides and pnictides by means of X-ray and neutron scattering techniques; single crystal growth.

Contact:
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Email: **alexander.komarek@frm2.tum.de**

André Heinemann

What are you doing at the FRM II?
I am co-instrument scientist at the SANS-1.

What have you done before?
I spent 6 years in Berlin (HZB) as instrument scientist for the SANS (V4) and ASASX (7T-WLS) instruments. For the last 2 years I worked at the Australian Nuclear Science and Technology Organisation (ANSTO).

What are your special scientific interests?
Soft and condensed matter physics, magnetic materials, polarized neutron and small-angle neutron and x-ray scattering, mathematics of data analysis.

Contact:
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Email: **andre.heinemann@frm2.tum.de**

Uwe Reinecke

What are you doing at the FRM II?
I arrange external and internal interfaces and support the installation and modification of the instruments at FRM II.

What have you done before?
I come from private enterprise where I developed instruments and machines, too. For the last years I have concentrated on project coordination and worked as freelancer in R&D departments of companies and institutes (e.g. Fraunhofer-Institutes).

What are your special interests?
I am looking forward to taking up the challenge to moderate between scientific freedom which is essential for the innovative construction of high quality instruments and the necessity of financial and temporal optimization of such processes.

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Tobias Schrader

What are you doing at the FRM II?
I am instrument scientist at the BioDiffractometer which is being built in the neutron guide hall as a collaboration between JCNS and FRM II.

What have you done before?
My previous focus was on infrared spectroscopy (PhD) and x-ray scattering (Postdoc).

What are your special scientific interests?
Building the new instrument BioDiff my focus will shift from dynamics to structure of proteins. Exploring the precise binding interactions of ligands in proteins and especially determining the role of hydrogen-bonding in ligand binding will be one of my scientific interests in the future.

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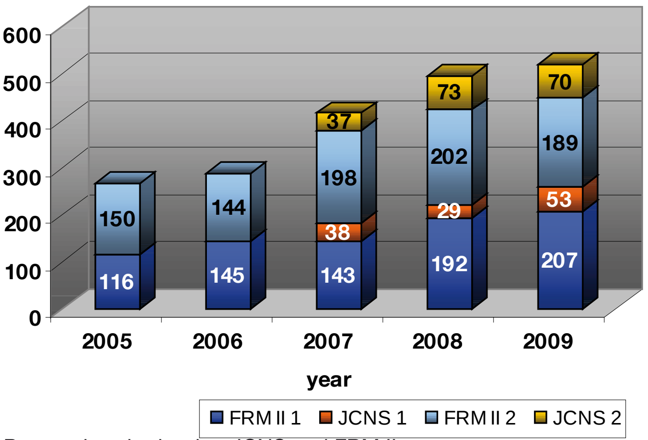
News from the User Office

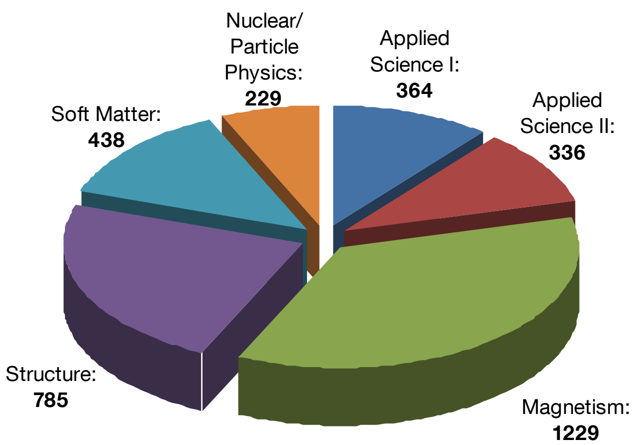
User Development

2009 has seen a further increase in request for beam time and users visiting the FRM II for experiments. Between the four proposal rounds of FRM II and JCNS more than 500 proposals in total were submitted, requesting nearly twice the amount of beam days deliverable at FRM II.

Most users are from German universities and research centres, but about 40 % of the proposals were from Europe or overseas as Japan, USA or India. Most of the European users visiting FRM II and JCNS received financial support by the newly evolved FP7 NMI3 program.



Proposals submitted to JCNS and FRM II.



Beam days requested at FRM II instruments in 2009.

Joint Proposal Rounds

The increasing options at FRM II and JCNS has led to the decision to unify the deadlines for proposal submission at FRM II and JCNS.

Hence in 2010 the next common deadline for proposal submission is **January 29th, 2010** for the instruments at FRM II as well as the spectrometers operated by JCNS.

Proposals can be submitted for all following instruments:

Diffraction:
HEIDI, RESI, SPODI, STRESS-SPEC, DNS
SANS/Reflectometry:
KWS-1, KWS-3, MIRA, N-REX+, REFSANS
Spectroscopy:
TRISP, PUMA, PANDA, TOFTOF, SPHERES, RESEDA, J-NSE
Imaging:
ANTARES, NECTAR, PGAA
Positrons:
NEPOMUC
Particle physics:
MEPHISTO
Irradiation:
MEDAPP

The reviews of the proposals will take place between March 19th and 22nd, 2010. Results of the reviews will be online about two weeks later. The experiments of the accepted proposals will cover the reactor cycle 24 (May to July 2010) and cycle 25 (August to October 2010).

Reduced Operation in 2010

Between October 2010 and February 2011 the FRM II reactor will have a longer shut down to install a new positron source after five years of successful operation. Unfortunately this will slightly reduce the possible beam days for experiments in 2010 by 15%.

Thomas Gutberlet
JCNS

Call for Proposals

Next deadline: January 29th, 2010

Submission of proposals to instruments at FRM II and JCNS can be done at the digital user offices

user.frm2.tum.de
fzj.frm2.tum.de

Details of the instruments and sample environment available can be obtained at

www.frm2.tum.de/en/science

Upcoming

January 26-30, 2010
Flipper 2010: International Workshop on Single-Crystal Diffraction with Polarised Neutrons (Grenoble, France)
www.ill.eu/news-events/workshops-events/flipper-2010

February 21-March 27, 2010
HERCULES 2010 (Grenoble, France)
hercules.grenoble.cnrs.fr

February 24-26, 2010
SNI 2010: German Meeting for Research with Synchrotron Radiation, Neutrons and Ions on Large Scale Facilities (Berlin, Germany)
www.sni2010.de

March 03-05, 2010
4th Int. Workshop on Dynamics in Confinement (Grenoble, France)
www.ill.eu/news-events/events/confit2010

March 08-19, 2010
41st IFF Spring School: Electronic Oxides (Jülich, Germany)
www.fz-juelich.de/iff/fs2010

March 08-12, 2010
ICANS-XIX: Int. Collaboration on Advanced Neutron Sources (Grindelwald, Switzerland)
icans.web.psi.ch

March 11-19, 2010
31st Berlin School on Neutron Scattering (Berlin, Germany)
www.helmholtz-berlin.de/neutronschool

March 21-26, 2010
DPG Spring Meeting (Regensburg, Germany)
regensburg10.dpg-tagungen.de

April 13, 2010
VDI Expertentreffen: Zerstörungsfreie Prüfung an Industriebauteilen - vom Ultraschall zu den Neutronen (Garching, Germany)
www.frm2.tum.de/veranstaltungen

April 28-29, 2010
JCNS School on Data Analysis for Quasielastic Neutron Scattering with FRIDA (Garching, Germany)
www.jcns.info/FRIDA

May 15, 2010
Lange Nacht der Wissenschaft (Garching, Germany)
www.frm2.tum.de/veranstaltungen

Reactor Cycles FRM II 2010

Cycle	Period
22b	January 12 - February 03
23	March 02 - April 30
24	May 18 – July 16
25	August 17 – October 15

Deadlines Proposal Rounds

FRM II (Nº 11)
January 29th, 2010
user.frm2.tum.de

JCNS (Nº 7)
January 29th, 2010
fzj.frm2.tum.de

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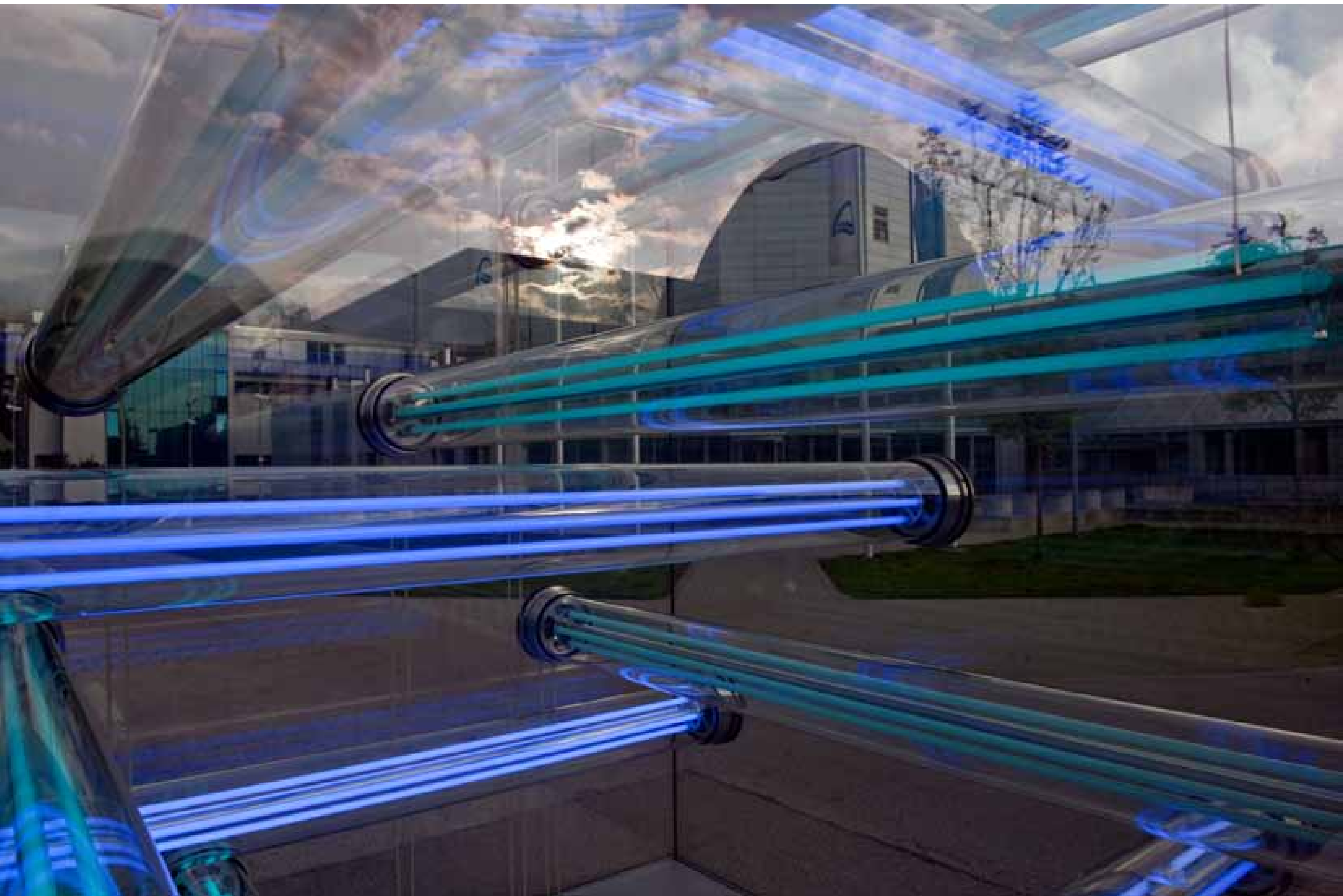
Nº 3



(Astrid Eckert/ Andreas Heddergott, TUM)

Something old,
something new,
nothing borrowed,
something blue.

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