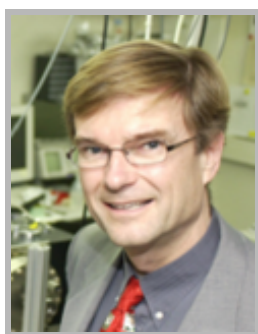




No. IV/10 - 23 December 2010

PSI photon, neutron and muon user facilities newsletter

Editorial



Jens Gobrecht

Dear colleagues,
Advanced micro- and nanofabrication processes under clean room conditions have become indispensable for providing high quality large scale facilities to their users. Examples at the SLS are: High resolution Bragg-Fresnel zone plates as focusing elements for X-rays at several beamlines, X-ray pixel detectors such as the well known "Pilatus" or diamond membrane detectors for beam position and beam profile measurements. Also progress has been made with microfabricated diffraction gratings for neutron optics. Last but not least the SwissFEL will profit not only from nanofabricated diffractive optical elements made from diamond, as recent results obtained by us at SLAC have shown but it may be further improved by nanoscale field emitter arrays which have the potential to deliver electron beams with unprecedented brilliance. The Laboratory for Micro- and Nanotechnology of PSI (LMN) is working intensively on all these topics to the benefit of many users of the PSI facilities today and even more so in the future. We do intensive research and development in advanced micro- and nanofabrication technologies in several European and nationally funded projects involving many PhD students and post-docs. The most recent addition to LMN's capabilities is a special beamline at the SLS, the "XIL-II beamline". There, soft X-ray interferences are used to fabricate periodic line and dot patterns in photoresists with ultra high resolution in the range of 10 nm

New calls for proposals

SLS: PX-beamlines

deadline: February 15, 2011

non-PX beamlines

deadline: March 15, 2011

more information

<<http://www.psi.ch/sls/calls>>

SINQ/all instruments

deadline: May 15, 2011.

more information

<http://sinq.web.psi.ch/sinq/sinq_call.html>

SμS/instruments GPS, LTF, and GPD

deadline: June 2011

More information

<http://lmu.web.psi.ch/facilities/next_call.html>

An **overview** about all proposal submission deadlines of the PSI facilities can be obtained **here** <<http://www.psi.ch/useroffice/proposal-deadlines>> .

Upcoming events

feature size. For more information on LMN see:

<http://lmn.web.psi.ch> <<http://lmn.web.psi.ch>>

Merry Christmas and a happy and successful New Year!

Jens Gobrecht on behalf of PSI

Research highlights

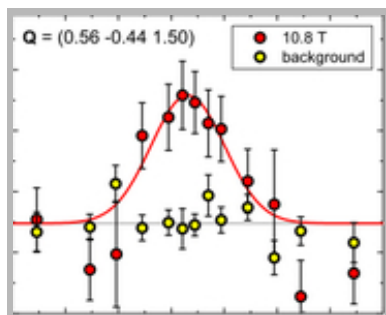


SLS/LMN: Moving Monopoles Caught on Camera - Researchers make visible the movement of monopoles in an assembly of nanomagnets

Elena Mengotti, Laura J. Heyderman, Arantxa Fraile Rodriguez, Frithjof Nolting, Remo V. Hügli, and Hans-Benjamin Braun, Nature Physics Advance Online Publication 2010 - DOI: 10.1038/NPHYS1794

For decades researchers have searched for magnetic monopoles – isolated magnetic charges that can move freely like electric charges. Now a team of researchers from the Paul Scherrer Institute and University College Dublin have been able to produce monopoles in the form of quasiparticles in an assembly of nanoscale magnets and have directly observed how they move.

Read the full story <<http://www.psi.ch/media/moving-monopoles-caught-on-camera>>



SINQ: Exploring the Fragile Antiferromagnetic Superconducting Phase in CeCoIn₅
E. Blackburn et al, Physical Review Letters 105, 187001 (2010)

CeCoIn₅ is a heavy fermion type-II superconductor showing clear signs of Pauli-limited superconductivity. A vari-

Next Joint Users' Meeting

Please note **September 15-16, 2011** as the dates for the next joint user meeting **JUM@P11** <<http://indico.psi.ch/event/jump11>> of the PSI facilities. Suggestions for keynote speakers may be sent to us per **email**.

10th PSI summer school on condensed matter research: phase transitions **August 13-22, 2011** in Zug, Switzerland. Registration will be open beginning of February 2011.

Please have a look at the full conference calendar

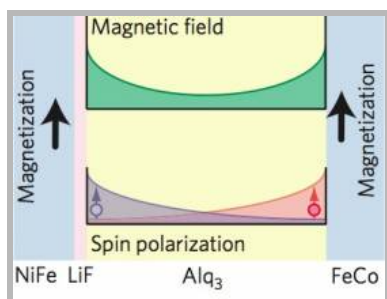
<<http://www.psi.ch/useroffice/conference-calendar>>

Facility news

SLS: November 5, 2010 - Inauguration of the XIL-II beamline Owing to the great success of XIL-I, which has been operating as a branch of the SIS beamline, PSI has decided to make a significant upgrade of this beamline. XIL-II is now an independent beamline with its own light source and on-site clean-room facility and with more beam-time availability and better performance, ready to serve in-

ety of measurements give evidence for a transition at high magnetic fields inside the superconducting state, when the field is applied either parallel to or perpendicular to the *c* axis. When the field is perpendicular to the *c* axis, antiferromagnetic order develops on the high-field side of the transition. This order remains as the field is rotated out of the basal plane, but the associated moment eventually disappears above 17°, indicating that anomalies seen with the field parallel to the *c* axis are not related to this magnetic order. We discuss the implications of this finding.

Read the full story <<http://www.psi.ch/num/2010#blackburn>>



SμS: Engineering spin propagation across a hybrid organic/inorganic interface using a polar layer

L. Schulz et al, Nature Materials,

DOI:10.1038/nmat2912

(2010)

Here we show that we can control the spin polarization of extracted charge carriers from an OSC by the inclusion of a thin interfacial layer of polar material. The electric dipole moment brought about by this layer shifts the OSC highest occupied molecular orbital with respect to the Fermi energy of the ferromagnetic contact. This approach allows us full control of the spin band appropriate for charge-carrier extraction, opening up new spintronic device concepts for future exploitation.

Read the full story <<http://www.psi.ch/num/2010#schulz>>

News

Röntgen Prize for X-Ray research goes to Christian David

dustrial and academic research. **XIL-II Website**

<<http://www.psi.ch/sls/xil/xil>>

SLS: Materials science

beamline upgrade The MS beamline actually undergoes a comprehensive upgrade. In addition to providing fundamental improvements to both powder and SXR experiments, the upgrade should allow new experimental setups previously excluded to the beamline. **Read the MS upgrade newsletter**

SINQ: At the recent submission deadline more than 200 new proposals were submitted for the SINQ instruments. Together with the spring deadline this sums up to a total of more than 350 proposals that were submitted in 2010, which is a new record high since the beginning of SINQ user operation. The users will be informed mid February about the results of the proposal evaluation.

SμS: The Top Paper of the Year Award of the International Society for μSR Spectroscopy has been given to a μSR work carried out at the PSI μSR user facilities.

H. Luetkens from PSI and his

Error: (1) can't find 20101123_Christian_David_0018_teaser.jpg at AUTHOR_WWW/SLS.ScienceResearch_HighlightsEN On 26th November 2010, Christian David, scientist at the Laboratory for Micro and Nanotechnology, received the Röntgen Prize for research in radiation science. David pioneered a method to enhance the quality of X-ray images. He received the award jointly with Franz Pfeiffer from Technische Universität München who worked closely together with him. **Read the full story**

coworkers obtained the price for the investigation of the structural and electronic phase diagram of the recently discovered $\text{LaO}_{1-x}\text{F}_x\text{FeAs}$ superconductor.

More information

<<http://www.psi.ch/num/2009#luetkens>>

SwissFEL: First Experiments with Third LCLS Instrument Go to the Source / 'Source: SLAC'

The third round of experiments at the Linac Coherent Light Source began in October at a whole new level of capability.

"This is the only place to get hard X-ray laser pulses," said Christian David, a researcher at the Paul Scherrer Institute in Switzerland and principal investigator on the first XPP user run. "That's why we waited for XPP instead of submitting a proposal to any of the other instruments."

Read the full story <<http://today.slac.stanford.edu/feature/2010/lcls-xpp-first-users.asp>>

Announcements

Erasmus Mundus Master Program MaMaSELF

PSI is a partner institution of the MaMaSELF Master's course in Materials Science, which aims to promote international collaborations between universities, large scale facilities and industry. The 2-years

course covers 120 ECTS credit points, successful candidates obtain a double or multiple diploma.

More information <http://sinq.web.psi.ch/sinq/personal/32514_mamasefdef.pdf> .

Facility publications

Ultrafast phenomena at the nanoscale: Novel science opportunities at the swissfel X-ray laser

B.D. Patterson, R. Abela, H-H. Braun, R. Ganter, B. Pedrini, M. Pedrozzi, S. Reiche, M. van Daalen

Europhysics News 41 5 (2010) 28-32 <http://www.europhysicsnews.org/index.php?option=com_intuition&task=output&Itemid=271&lang=en_GB.utf8%2C+en_GB.UT>

Update available for iPhone App PSI user facilities

Since December 9, 2010 an update for the iPhone App is available from the iTunes **App Store**

<<http://itunes.apple.com/ch/app/psi-duo/id375328818?mt=8>> . The updated version contains a couple of new features like online views of the beamline schedules and the integration of reminders on proposal deadlines into your iCal calendars.

Proprietary research

A certain fraction of the beamtime at PSI research facilities is reserved for proprietary use. This is handled by **Technology Transfer PSI** <<http://www.psi.ch/industry/technology-transfer>> .

The following **directory** <<http://www.psi.ch/industry/randd-services>> lists services on offer by these facilities.

Imprint

PSI Facility News addresses the users of the PSI large facilities and appears quarterly in English. Any feedback is highly welcome! **More information.** <<http://www.psi.ch/imprint>>

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