No. II/10 - 30 June 2010

PSI photon, neutron and muon user facilities newsletter

Editorial

Friso van der Veen

Dear SLS user

The SLS machine started in 2010 with a slightly lower performance than in the previous year: user beam was available for 92% of the time, to be compared with 98% in 2009. We lost 100 user hours due to contamination of the He-liquefier cooling the third-harmonic cavity. An additional 35 hours were lost because of a helium compressor trip and another 12 hours due to a magnet water leak. These problems have been fixed. On the other hand, the mean time between failures has remained constant at a high level of ca 70 hours. We believe therefore that the reduced availability is incidental and not related to aging of the machine.

In the last round of proposals, the SLS beam lines were oversubscribed by on average a factor of two as in previous rounds. The demand for beam time at the FEMTO and ADRESS beam lines was particularly high (oversubscription factor > 3.5). Many excellent proposals could therefore not receive beam time, and there is no remedy for this unfortunate situation.

In 2010, the beam lines NanoXAS, X-Treme and Phoenix will receive their first pilot users, while PEARL is in the construction phase. Starting October 2010 the MS beam line will undergo a major upgrade, involving the replacement of the wiggler by a small-gap in-vacuum undulator with nitrogen-cooled magnets. The MS beam line is ex-

New calls for proposals

SLS/non-PX-beamlines
deadline: September 15, 2010
more information
<http://www.psi.ch/sls/other-beamlines-call-for-proposals>

SINQ/all instruments
deadline: November 15, 2010
more information <http://sinq.web.psi.ch/sinq/sinq_call.html>

SμS/all instruments
deadline: December 2010
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://user.web.psi.ch/user/deadlines.html> **.**

Upcoming events

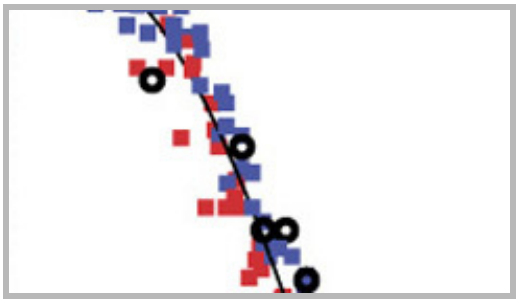
August 7-13, 2010

pected to reopen for general use in July 2011. The users of the MS beam line will be informed about the upgrade by a separate newsletter.

The SLS continues to be a jewel among the synchrotron radiation sources. The year 2009 has seen a record number of 414 peer-reviewed publications that are based on use of the SLS. Of these, 104 are high-profile publication in journals having an impact factor above 7.1 (PRL). We hope, and expect, that 2010 will be an equally good year!

J. Friso van der Veen
On behalf of the scientific and technical staff of the SYN department

Research highlights



<http://sls.web.psi.ch/view.php/science/lsy/highlights/index.html#mozTocId504258>

SLS: Observation of a d-wave nodal liquid in highly underdoped $Bi_2Sr_2CaCu_2O_{8+\delta}$
U. Chatterjee et al, Nature Physics 6, 99-103 (22 November 2009)

A key question in condensed-matter physics is to understand how high-temperature superconductivity emerges on adding mobile charged carriers to an antiferromagnetic Mott insulator. We address this question using angle-resolved photoemission spectroscopy to probe the electronic excitations of the non-superconducting state that exists between the Mott insulator and the d-wave super-

9th PSI Summer School on condensed matter research with practicals, Zuoz, Switzerland.
more information <http://school.web.psi.ch>

Next Joint User 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.

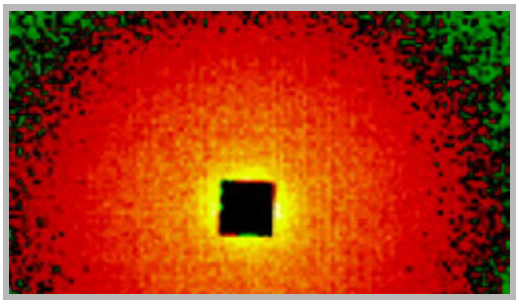
Please have a look at the full conference calendar <http://sinq.web.psi.ch/sinq/links.html>

Facility news

SLS: SLS spin-off company wins Swiss Economic Award
The SLS spin-off company DECTRIS Ltd founded in 2006 has recently won the prestigeous Swiss Economic Award for start-up companies. The DECTRIS company develops and manufactures X-ray detectors.
More information <http://dectris.com/> .

SINQ/SμS: After the annual shutdown of the PSI proton accelerator SINQ and SμS

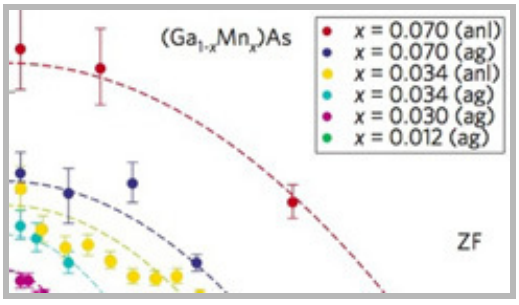
conductor in $Bi_2Sr_2CaCu_2O_{8+\delta}$. **Read the full story**



<http://num.web.psi.ch/highlights.html#beck>

SINQ: Novel Type of Bicellar Disks from a Mixture of DMPC and DMPE-DTPA with Complexed Lanthanides
P. Beck et al, Langmuir 26, 5382 (2010)

We report on the formation of bicelles from a mixture of dimyristoylphosphatidylcholine (DMPC) and the chelator-lipid dimyristoylphosphatidylethanolamine-diethylenetriaminepentaacetate (DMPE-DTPA) with complexed lanthanides, either thulium (Tm3+) or lanthanum (La3+). The two phospholipids used have the same acyl-chain length but differ in headgroup size and chemical structure. The total lipid concentration was 15 mM, and the molar ratio of DMPC to DMPE-DTPA was 4:1. The system was studied with small angle neutron scattering (SANS) in a magnetic field, cryo- transmission electron microscopy (cryo-TEM), and 31P NMR spectroscopy. **Read the full story here**
<http://num.web.psi.ch/highlights.html#beck>



<http://num.web.psi.ch/highlights.html#dunsiger>

SμS: Spatially homogeneous ferromagnetism of (Ga, Mn)As
S. Dunsiger et al, Nature Materials 9, 299 (2010)

are back in operation since end of April.

SINQ: Since the beginning of 2010 the former FUNSPIN instrument is completely re-designed into **BOA (Beam-line for neutron Optics and other Approaches)**. Its future designation is to enable the development of new optical devices as well as the investigation of new neutron scattering instrument concepts. BOA will be a 12 m long instrument located at beam-channel 51 looking on the SINQ cold source. The existing primary polarization of the former FUNSPIN will not be changed. The position of BOA close to the cold source is important for the performance of the instrument. The measured polarized neutron flux is $2x10^8$ $n/cm^2/s/mA$, which is highly competitive on an international level.

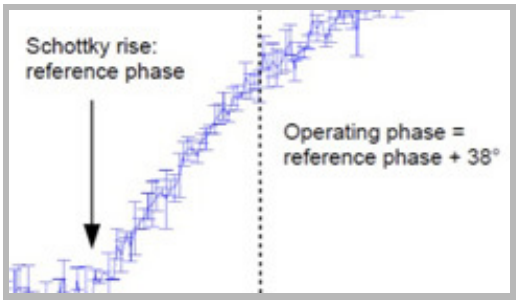
SμS: A new **low energy muon spectrometer** based on Geiger-mode Avalanche Photodiodes (G-APD) coupled to plastic scintillators successfully started user operation in May 2010. With its increased detector granularity in the forward-backward direction it constitutes an important milestone to-

Mn-doped GaAs is a ferromagnetic semiconductor, widely studied because of its possible application for spin-sensitive 'spintronics' devices. The high sensitivity of its physical properties to preparation conditions and heat treatments and the strong doping and temperature dependencies of the magnetic anisotropy have generated a view in the research community that ferromagnetism in (Ga, Mn)As may be associated with unavoidable and intrinsic strong spatial inhomogeneity. Using low energy muon spin relaxation (μSR) it is demonstrated that (Ga, Mn)As shows a sharp onset of ferromagnetic order, developing homogeneously in the full volume fraction. **Read the full story here** <http://num.web.psi.ch/highlights.html#dunsiger>

wards longitudinal field μSR measurements using low energy muons. Once available it will allow for the study of dynamic magnetic properties in thin films and multilayer structures.

SwissFEL: Since the end of May 2010 the new SwissFEL web page is online: **http://www.swissfel.ch** <http://www.swissfel.ch> . The new web page gives a lot of information on different aspects of the future facility.

News from the SwissFEL project



First results at the SwissFEL injector

The technical development of the project has reached another milestone with the first beam, as reported in the last facility newsletter. Between March and May 2010 the first characterization of the electron source started. Measurements show that the assembly can deliver a high quality beam very near to the simulated values. The normalized projected emittance after the RF electron gun ranges between 0.45 mm mrad at 60pC to 0.7 mm mrad at 220pC. The phase and amplitude stability have been measured for the RF amplifier supplying the RF electron gun. With 20fs (0.02 degree S-band) rms phase jitter and 0.02% rms amplitude jitter, the SwissFEL specifications have been demonstrated. The RF electron gun is presently being connected to the rest of the facili-

ty. The official inauguration of the SwissFEL injector will take place on the 24th of August 2010.

Announcements

PSI annual report 2009

The 2009 annual scientific report of PSI is available now. **Download report** <http://www.psi.ch/info/info> .

Facility publications

Obtain a comprehensive list of publications sorted by different criteria:

- **SLS publications**
- **SINQ & SμS publications** <http://num.web.psi.ch/publ_all.htm>

New SwissFEL publication

Coherent Science at the SwissFEL X-Ray Laser. Special Issue on x-ray beams with high coherence. Read the full story here: **Patterson et al, New Journal of Physics 12, 035012 (2010)** <http://iop-science.iop.org/1367-2630/12/3/035012/pdf/1367-2630_12_3_035012.pdf>

Experts find no evidence for a mammoth-killer impact

A set of microscopic studies, including using the SLS X-ray Tomographic Microscopy (SRXTM), have shown that carbon spherules (used as evidence for the comet impact-theories) have morphologies and internal structures identical to fungal sclerotia (such as Sclerotium and Cenococcum), **more information** <http://www.rhul.ac.uk/Resources/Helper_apps/Message.asp?ref_no=2234> .

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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