



No. II/09 - 30 June 2010

PSI photon, neutron and muon user facilities newsletter

Editorial



Dear reader

I cordially invite you to attend the first Joint Users' Meeting at PSI (**JUM@P'09**

[<http://user.web.psi.ch/jump09/html/index.shtml>](http://user.web.psi.ch/jump09/html/index.shtml)),

which will be held on October 12 and 13,

2009. For the first time we will bring together

the users of our three facilities: the Swiss Light Source

SLS, the Swiss Spallation Neutron Source SINQ and the

Swiss Muon Source μ S. In recent years we have witnessed

an increasing number of scientists using both

neutrons and X-rays or both neutrons and muons (or other

combinations) for the atomic-scale characterization of

matter in the broadest possible sense. It is our expectation

that JUM@P'09 will stimulate new ideas and new

scientific collaborations. We also hope that it helps young

scientists to look over the borders of their own discipline.

The meeting is a users-for-users meeting, i.e. the Users

Association SUSA has selected topics and speakers.

We hope to see you and your colleagues at JUM@P'09!

J. Friso van der Veen

on behalf of the Organizing Committee

Research highlights

New calls for proposals

SLS: Next call for non-PX beamlines on August 8, 2009; deadline on September 15, 2009.

See our call schedule

[<http://sls.web.psi.ch/view.php/users/experiments/proposals/opencalls/index.html>](http://sls.web.psi.ch/view.php/users/experiments/proposals/opencalls/index.html)

SINQ: Next deadline for SINQ beamtime proposals: November 15, 2009.

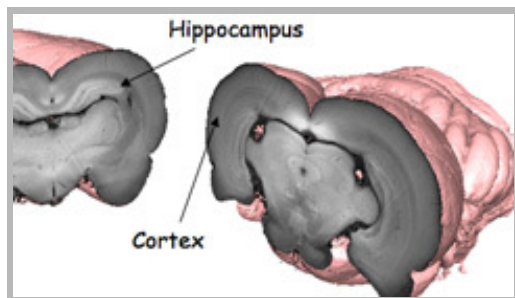
More information [<http://sinq.web.psi.ch/sinq/sinq_call.html>](http://sinq.web.psi.ch/sinq/sinq_call.html)

μ S: Approximately 40 new proposals were submitted for GPD, GPS and LTF by June 1. Next regular deadline: December 1, 2009.

More information

[<http://lmu.web.psi.ch/facilities/next_call.html>](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/jump09/html/index.shtml>](http://user.web.psi.ch/jump09/html/index.shtml)



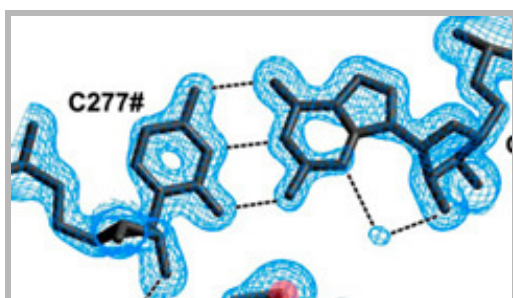
<<http://sfs.web.psi.ch/view.php/science/lsy/highlights/index.html#mozToclid504255>>

SLS: Advanced phase contrast imaging using a grating interferometer

S.A. McDonald et al, Synchrotron Rad. 16, 562-572 (2009).

Conventional absorption based X-ray microtomography can become limited for objects showing only very weak attenuation contrast at high energies. However, a wide range of samples studied in biology and materials science can produce significant phase shifts of the X-ray beam and thus phase contrast X-ray imaging can provide substantially increased contrast sensitivity. A Differential Phase Contrast (DPC) imaging facility, based on grating interferometry, has been installed at the TOMCAT beamline, with the aim of having a high-throughput of samples in terms of fast data acquisition and post-processing.

Read the full story here <<http://sfs.web.psi.ch/view.php/science/lsy/highlights/index.html#mozToclid504255>>



<<http://sfs.web.psi.ch/view.php/science/lsy/highlights/index.html#mozToclid504254>>

SLS: A fast selenium derivatization strategy for crystallization and phasing of nucleic acid structures

V. Olieric et al, RNA 15(4), 707 (2009)

b.psi.ch/user/deadlines.html > .

Upcoming events

July 19-24: CORPES09, ETH Zurich, Switzerland

International workshop on strong correlations and angle-resolved photoemission spectroscopy.

Registration deadline: July 8, 2009

Information and registration <<http://corpes09.web.psi.ch/>>

October 12-13: Joint User Meeting JUM@P 09

This initiative will bring together the users of the three major facilities at PSI: SINQ, SLS, SμS. JUM@P '09 is a «by users, for users» meeting.

Registration deadline: September 15

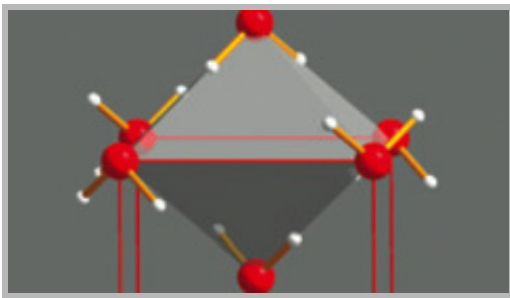
Web-information & Registration <http://user.web.psi.ch/jump09/html/registration_form.shtml>

JUM@P-Poster 

Facility news

SLS: Installation of a higher order suppression at the PolLux scanning transmission x-ray microscope: re-

The growing number of biologically important nucleic acid sequences (DNA and RNA) demands a fast and reliable method for their de novo three-dimensional structure determination. In this work, we describe a fast and inexpensive strategy for the crystallization and phasing of structures of nucleic acid and nucleic acid/protein complexes. **Read the full story here** <<http://sls.web.psi.ch/view.php/science/lsy/highlights/index.html#mozToCId504254>>



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

SINQ: The preparation and structure of salty ice VII under pressure

S. Klotz et al, Nature Materials 8, 405 (2009)

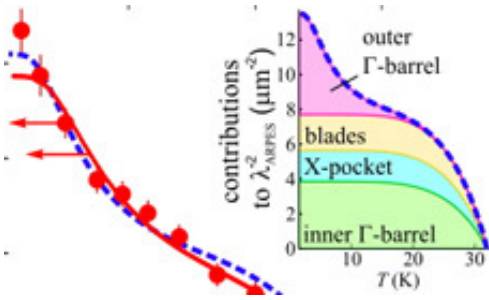
It is widely accepted that ice, no matter what phase, is unable to incorporate large amounts of salt into its structure. This conclusion is based on the observation that on freezing of salt water, ice expels the salt almost entirely as brine. Here, we show that this behaviour is not an intrinsic physico-chemical property of ice phases. We demonstrate by neutron diffraction that substantial amounts of dissolved LiCl can be built homogeneously into the ice VII structure if it is produced by recrystallization of its glassy (amorphous) state under pressure. **Read the full story here** <<http://num.web.psi.ch/highlights.html#klotz>>

cently, a higher order suppression (HOS) mirror system has been installed that utilizes MgF₂ coated mirrors to suppress photon energies above 600 eV. This improved the spectroscopy capabilities of the beamline, giving access to highest quality carbon, nitrogen, and oxygen spectra even from samples with a high optical density.

SINQ: New improved SINQ target: By various design improvements like a closer rod packing it was possible to increase the neutron flux of the new generation of SINQ target by approximately 40% compared to the previous target. The new target has been in operation since April 15, 2009!

SμS: The experiment control software of the LTF instrument has been migrated to the MIDAS DAQ software developed at PSI running under LINUX. Therefore the SμS user facility now provides a unified user interface for all instruments.

SwissFEL: PSI is presently constructing a flexible 250 MeV injector test facility. For this purpose a 77 m long building dedicated to this



μSR: Two-gap superconductivity in Ba_{1-x}K_xFe₂As₂: a complementary study of the magnetic penetration depth by muon-

spin rotation and angle-resolved photoemission

R. Khasanov et al, Physical Review Letters 102, 187005 (2009)

We investigate the magnetic penetration depth λ in superconducting Ba_{1-x}K_xFe₂As₂ (T_c approx 32 K) with muon-spin rotation (μ SR) and angle-resolved photoemission (ARPES). The complementarity of μ SR and ARPES allows us to pinpoint the values of the two gaps and to arrive at a remarkable agreement between the two techniques concerning the full T evolution of λ . This provides further support for the described scenario and establishes ARPES as a tool to assess macroscopic properties of the superconducting condensate. **Read the full story here**

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

machine has been built and delivered to PSI in the beginning of June. The commissioning of the electron source is foreseen by the end of 2009, while the entire 250 MeV injector test facility will be fully operational in autumn 2010. Considering the importance of the electron source for the electron beam quality at high energy, a gun test facility (LEG) is currently in operation at PSI. After observation of first 4 MeV electrons out of the new Diode-RF Gun at LEG in January 2009, the beam quality has been continuously improved. The electron beam brightness has been increased from 0.001 A.mm⁻².mrad⁻² to 10 A.mm⁻².mrad⁻² currently (for a few pC charges).

News from the SwissFEL-Project

SwissFEL industrial day: On May 4, 2009 the first industry day relating to the new Swiss Free Electron Laser (SwissFEL) was organized. In collaboration with Economiesuisse, Swissmem, and the WTT consortium W6. Representatives of 140 companies from various high-tech disciplines got a first impression about the requirements for the different machine components for the new SwissFEL project, and were able to see, which kind of future cooperative technical developments related to the new PSI project are possible. See images from the first SwissFEL industry day on:

<http://user.web.psi.ch/swissfel/index.html> <<http://user.we>

b.psi.ch/swissfel/index.html>

Announcements

PSI-Scientific Report 2008

Please download the online version of PSI's annual scientific report **here** <http://www.psi.ch/jahresberichte_pdf_htm/PSI_Scientific_Report_2008_web.pdf>

Facility publications

Obtain a comprehensive list of publications sorted by different criteria:

- **SLS publications** <http://sls.web.psi.ch/view.php/science/lsy/publications/lsy_publications.html>
- **SINQ & S μ S publications** <http://num.web.psi.ch/publ_all.htm>

PSI-XFEL project renamed

April 1, 2009 SwissFEL became official member of the European FEL consortium EuroFEL. The consortium is a distributed FEL facility that links complementary national FEL facilities into a unique European Research Infrastructure.

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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