Lightspeed

Australian Synchrotron Update
March 2007

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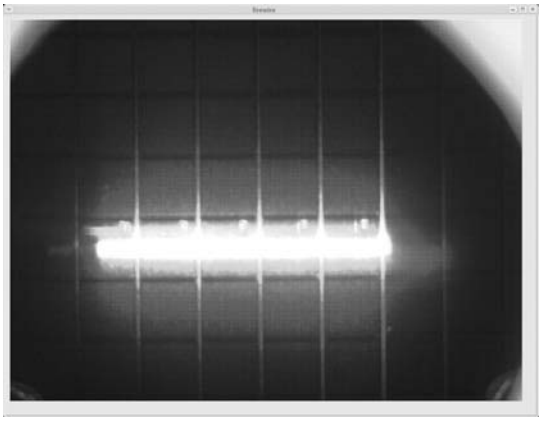
1. BEAMLINE PROGRESS

"Hot commissioning" of the beamlines has now begun! On 1 March, the shutters on the Protein Crystallography (PX) Beamline were opened and x-rays emerged into the beamline for the first time, marking the beginning of commissioning with beam, or so-called "hot commissioning". A great effort by the delivery team.



Computer screen capture of synchrotron light at a point halfway along the PX beamline, in front of the double-crystal monochromator.

Storage ring operations started up again in mid-February, achieving stored beam at 100 mA with a beam lifetime of about 10 hours.

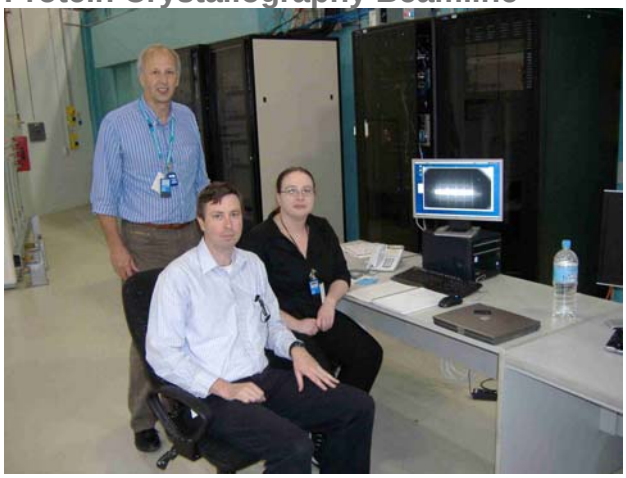
Technical Director Alan Jackson says: *"The next few weeks will see the last lap of the marathon that was started just four years and one month ago, when Minister Brumby announced funding for the 'bigger, brighter, better' machine at the first Australian Synchrotron users workshop.*

"Just as amazing is the fact that it was only two years ago (almost to the day) that the site team moved into their new, but largely empty, building that now houses the complex infrastructure, accelerators and beamlines that will soon be delivering powerful synchrotron light to the Australian science community.

"That this has been accomplished in such an unprecedentedly short period is testament to the continued strong support of the Victorian Government and national beamline partners, and to the skills and endurance of the synchrotron staff and the many contractors, with their local tradespeople, who have put together this world-class facility."

Alan Jackson, Technical Director

Protein Crystallography Beamline



The successful Protein Crystallography Beamline team: (standing) Nigel Boulding, Managing Director, Oxford-Danfysik Beamlines Ltd, (seated L-R) Julian Adams (PX Beamline Scientist) and Ruth Plethe (Beamline Associate) in front of the operating beamline with computer screen capture, 1 March.

SAXS/WAXS Beamline

Following placement of the SAXS/WAXS photon delivery system contract with Oxford Danfysik, beamline procurement is proceeding as planned. The longest lead-time items (mirror substrates) have now been ordered.

Current work is focussing on detailed design of the end-station, SAXS/WAXS camera, detectors and electronics, and hutches for the beamline.

Nigel Kirby, SAXS/WAXS Beamline Scientist

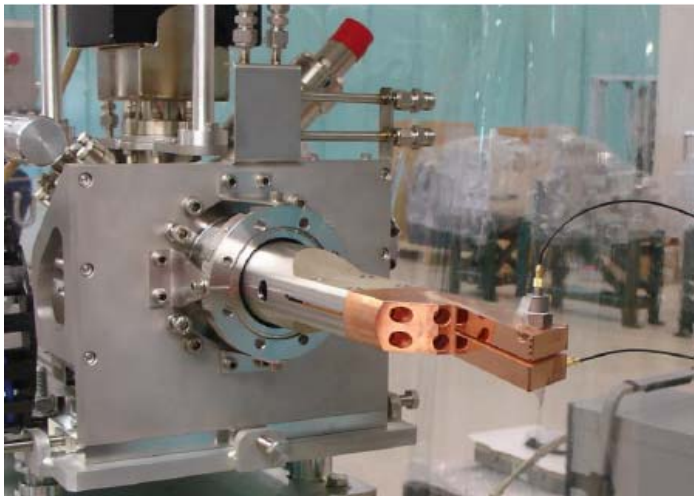
Infrared Beamline

Installation of the Infrared (IR) Beamline by the contractor, FMB, is almost complete and delivery of the IR microscope and spectrometer is due in early March.

Infrared High Resolution beamline branch. (Photo: Mark Tobin)

The IR beamline passed a progress milestone in early February with the successful insertion of the beam extraction mirror into the dipole chamber. This was a delicate procedure, effectively working blind with only 1mm clearance above and below the mirror inside the dipole over 300mm of travel! The mirror went in first time under manual control with no misalignment, and has subsequently been driven in and out successfully using the dedicated motor.

This excellent result has only been possible because of the planning and team work of the FMB and Australian Synchrotron staff working closely together on the installation.



Using accelerometers to monitor mirror vibrations of Mirror 1 during cooling water flow. No vibration above background was detected. (Photo: Mark Tobin)

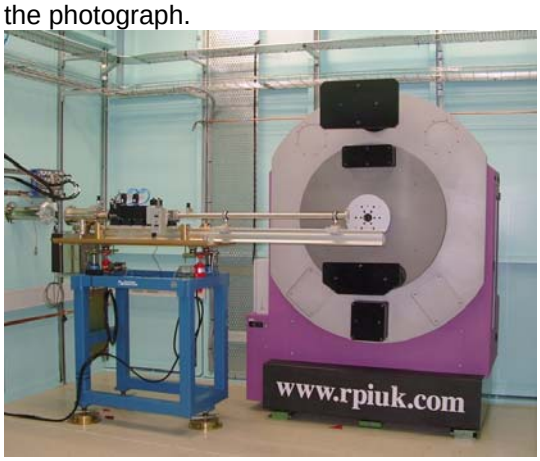
Mark Tobin, Infrared Beamline Scientist

Powder Diffraction Beamline

Installation of the diffractometer supplied by Rotary Precision Instruments and base is complete, as is the site acceptance testing which went well.

The photon delivery system and beamline safety systems are being tested in anticipation of 'first light on sample'.

The diffractometer and granite base are shown in the accompanying photograph in Powder Diffraction Beamline hutch B, with dummy detector weights and counter weights attached to the 2-theta circles. The downstream components of the beamline are visible on the left side of the photograph.



Powder Diffraction Beamline Hutch B showing new components (Photo: Kia Wallwork)

Kia Wallwork, Powder Diffraction Beamline Scientist

Soft X-ray Beamline

Simon Deuchler, FMB Chief Engineer, checks the newly mounted Soft X-ray Beamline Mirror 4. (Photo: Bruce Cowie)

Bruce Cowie, Soft X-ray Beamline Scientist

Microspectroscopy Beamline

The contract for the Microspectroscopy Beamline photon delivery system has been awarded to Instrument Design Technology Ltd based in Daresbury, UK. The beamline optical design incorporates an innovative horizontal monochromator diffraction scheme coupled with horizontal compound focussing to small KB mirrors. The beamline

will be very versatile with a number of configurations available to the user to achieve, for example, extremely high sensitivity with a 1-10 micron x-ray focal spot or, a contrasting example, the ultimate spatial resolution of 100 nm.

The layout of the radiation enclosures has been finalised and currently tenders are being evaluated. The endstation instrumentation design is progressing well with the major challenge being the 10 nm stability, precision and accuracy required of the sample stages and interface to the beamline.

David Paterson, Microspectroscopy Beamline Scientist

In-vacuum undulators for the PX2, SAXS/WAXS and microspectroscopy beamlines being assembled at Neomax in Japan (Photo: Koichi Numajiri, Neomax)

2. SYNCHROTRON COMMUNITY NEWS

Council of Members

The Council of Members, comprising beamline funding partners and Victoria, met in February to discuss governance issues.

Beamline Advisory Group Meeting

The Beamline Advisory Group met at the Australian Synchrotron during February to inspect and review progress on the beamlines and meet with the Beamline Scientists and other staff of the facility.

(L–R) Beamline Scientist Mark Tobin discusses features of the Infrared Beamline with Beamline Advisory Group members Prof. Rob Lewis and Dr Richard Garrett. (Photo: David Cohen)

Visitors to the Australian Synchrotron

The Victorian Minister for Major Projects, the Hon. Theo Theophanous MLC, received a detailed briefing at the Australian Synchrotron on 6 February.

HE the High Commissioner for New Zealand, Dr John Larkindale, visited the Australian Synchrotron on 6 March and met New Zealand expatriate Julian Adams, Protein Crystallography Beamline Scientist.

Also visiting during February for briefings were the Commonwealth Government's Co-ordinating Committee on Science and Technology, and the President of the Australian Academy of Science, Prof. Kurt Lambeck. The Victorian Parliamentary Secretary for Industry and Innovation Tony Lupton MP led a site visit by State Government Members of Parliament.

Panoramic view from the mezzanine, February 2007, courtesy of David Cohen (ANSTO), Beamline Advisory Group member

Remote Synchrotron Access Workshop

A remote synchrotron access data collection workshop was held on 9 February in the new 'state-of-the-art' Learning Laboratory at the University of Melbourne. The workshop was organised by staff of the Stanford Synchrotron Radiation Laboratory (SSRL) and the University of Sydney, with support from the University of Melbourne and the Australian Synchrotron Project, and funding from the SSRL and the ARC Molecular and Materials Structure Network. It was attended by 29 participants from 13 universities and research institutions in Australia and New Zealand.

A feature of the workshop was a 'live' demonstration of remote data collection and processing as participants in Melbourne watched while crystals in Stanford were mounted, fluorescence scans recorded and data collected. Participants also had a 'hands-on' experience working with crystals sent from Australia to SSRL in advance of the workshop.

Comments afterwards included:

- *"…vastly better than the 15-hour flight across the Pacific!"*
- *"It was great to see the system that will be available at the Australian Synchrotron"*
- *"It was fascinating to see how idiot-proof Blu-ice was."*
- *"Subsequent to the workshop I managed to collect a full data set to a resolution of ~1.2Å remotely using the SSRL macromolecular crystallography facility. This is by far the best data ever collected from this system."*
- *"It will likely save many potentially very valuable samples from being ruined."*
- *"The demonstration of the software that will be used at the Australian Synchrotron means that we are more or less ready to go using it."*

More details and an illustrated report at:
http://mmsn.net.au/SSRL_workshop_2007_Feb9.htm

Prof. Eddie Snell, Hauptman-Woodward Medical Research Institute, USA, provides practical tips on remote data collection—avoiding winter trips—in the Learning Lab, Melbourne University (Photo: Peter Turner)

Job opportunities

ASRP Beamline Scientist, Japan

The Australian Synchrotron Research Program is calling for expressions of interest in a 3 month vacancy from early April for a beamline scientist at the Australian National Beamline Facility in Tsukuba, Japan.

The position is open to post-graduate students or early career researchers with an interest and/or experience in synchrotron radiation instrumentation and experimental techniques. The position could either be a secondment from your current employment (funded by the ASRP) or a temporary position with ANSTO. Travel, accommodation and living allowance will be paid.
If you are interested in this opportunity please contact Richard Garrett: (02) 9717 3657 or garrett@ansto.gov.au

Synchrotron Beamline Research Fellows and Robotics Research Fellow

Monash University's Centre for Synchrotron Science recently advertised for four Synchrotron Beamline Research Fellows, and also for a Robotics Research Fellow for the Protein Crystallography Unit and the Centre for Synchrotron Science. All are 3 year appointments at Level A/B.
Applications close 16 March 2007.

Researchers with an interest in the application of synchrotron light to research projects are required. You should have postgraduate qualifications and experience relevant to the application of specific beamlines at the Australian Synchrotron to research programs at Monash University (see www.monash.edu.au/research/strengths/).
Enquiries: Professor Rob Lewis, tel. 03 9905 3622
or email rob.lewis@sync.monash.edu.au

An established researcher at postdoctoral level with a track record in robotics technology for protein crystallography is required to develop new platform technology and manage a high throughput protein crystallography facility.
Enquiries: Professor Jamie Rossjohn, tel.03 9905 2352
or email susan.reynolds@med.monash.edu.au
More at: www.monash.edu.au/opportunities

Applications: By mail addressed to Dr John McDougall, Associate Director, Monash Centre for Synchrotron Science, Monash University, Building 26, Clayton Vic 3800, or email john.mcdougall@sync.monash.edu.au by 16/03/2007.

Synchrotron Summer School, SPring-8, Japan

10–20 September 2007

This is a preliminary announcement for the 1st Asia Oceania Forum for Synchrotron Radiation Research Summer School—the Cheiron School—which will be held over ten days from 10–20 September at SPring8 in Japan. The aim of the school is to provide useful and basic knowledge as well as perspectives on synchrotron radiation science and technology for graduate students, postdoctoral fellows, young scientists and engineers from

the Asia Oceania region. The school is being jointly organised by the AOFSRR, RIKEN/SPring-8, JASRI and KEK-PF. The curriculum is under development but will include:

1) Lectures by leading scientists and engineers in the various fields of SR science and technology; accelerator science, control system, optics science, insertion device science, detector science, and application science using XAFS, x-ray analytical techniques, diffraction and scattering, protein crystallography, x-ray spectroscopy, imaging, etc.

2) Laboratory courses (practical training) of the application sciences using SPring-8 beamline facilities.

3) Round table discussion (tutorial) course with the lecturers and SR engineers about the practical specific activities at the home facilities (5-10 members at each course)

There is a good likelihood of travel support for attendees. Further announcements will be made as details firm up.

Victoria Prize and Victoria Fellowships

The Victoria Prize of $50,000 is awarded annually by the Victorian Government for a scientific discovery or technological innovation, or a series of such achievements that significantly advances knowledge and has produced, or has the clear potential to produce, a commercial outcome or other benefit to the community.

2007 marks the 10th year of the Victoria Prize, created in 1998 to recognise exceptional achievement in science, engineering or technology. The Victoria Prize celebrates leadership, determination and creativity and highlights the many ways in which research and development of international significance is conducted locally.

In association with the Victoria Prize, the Jack & Robert Smorgon Families Foundation award the Anne & Eric Smorgon Memorial Award. This award acknowledges the important contribution made by scientific research institutes in Victoria. The $100,000 award will be presented to an institute supporting the Victoria Prize recipient in the research work for which he/she is awarded the Victoria Prize.

There are six $18,000 Victoria Fellowships available to assist promising early career researchers in undertaking international study missions. Victoria Fellows will also be invited to apply for the $5,000 AFAS FEAST–France Fellowships, a joint initiative of the Australian–French Association for Science and Technology (Vic) and the Embassy of France.

Information Sessions on the Victoria Fellowships are being held at:
Monash University, Tues 13 March 1pm Theatre H5
Melbourne Uni, Wed 14 March 1pm MultiFunction Room
RMIT, Thur 15 March 12.30pm Research Lounge, Level 5, Building 28, La Trobe Street
Victoria University, Fri 16 March 10am Office for Postgraduate Research
Swinburne University, Tues 20 March 11am Room BA912, Hawthorn Campus
La Trobe University, Tues 20 Mar 5pm SEMS Meeting Room 221, Level 2, Physical Sciences 1

The closing date for applications is **5pm, 10 April 2007**.

More at: http://www.business.vic.gov.au/vicprize and http://www.business.vic.gov.au/BUSVIC.7864574/STANDARD/500103686/PC_60157.html

Contact: Project Officer – Victoria Prize,
Tel: (03) 9651 8029
Email: vicprize.fellows@iird.vic.gov.au

Synchrotron users in/from Victoria are urged to apply!

Victorian Premier's Award for Medical Research—for young researchers

Applications close 5pm, 13 March 2007

The Victorian Premier's Award for Medical Research is awarded annually to recognise the exceptional contributions made by young health and medical researchers.

The $16,000 prize will be awarded to a Victorian PhD student or recent PhD graduate who has made an exceptional contribution to any field of health, basic, applied or clinical research and health-related technologies. Prizes of $8,000 will be awarded to highly commended applicants.

More at: http://www.business.vic.gov.au/premiersaward

We urge early-career synchrotron users in the field of medical research to apply!

3. FORTHCOMING EVENTS

AUSTRALIAN EVENTS

South Australia: Engineering Presentation—The Australian Synchrotron

Wednesday 14 March 2007
5:15pm for refreshments, 6pm start
Engineering House, Chapman Hall
11 Bagot Street, North Adelaide

Hosted by the Electrical Energy Society of Australia (EESA), on behalf of the Electrical Joint Technical Program 2007.

*All E.A. members **and visitors** are invited to attend.*

This presentation will cover technical aspects of the construction, commissioning and operation of the Australian Synchrotron and its expected applications, presented by Richard Farnsworth, Lead Control Systems Engineer at the Australian Synchrotron.

RSVP: Lisa Cuculowskyj at Engineers Australia 08:8267 1783, LCuculowskyj@engineersaustralia.org.au fax:08 8239 0932

CRYSTAL XXV
SCANZ 2007 Conference
10-13 April 2007
Sebel Kirkton Park, Pokolbin, Hunter Valley, NSW

Announcing the 25th Meeting of the Society of Crystallographers in Australia and New Zealand (SCANZ). Formalities will commence from Tuesday afternoon 10 April and conclude with lunch on Friday 13 April.
http://www.sca.asn.au/crystal25/

ARC Centre of Excellence for Coherent X-Ray Science 2nd Annual Workshop 2007
Physicists and Biologists Working Together
'Facilitating X-Ray Biophotonics'
BIO21 Institute, Melbourne, Australia
11 – 13 April 2007
The workshop focuses on the high resolution diffractive imaging of biological samples using synchrotron, high harmonic generation laser and x-ray free electron laser sources.
Registration costs are very reasonable ($200 full / $150 student) and day registration is also available ($100 full / $75 student).
Register at: www.coecxs.org

12th International COMS Conference 2007
2–6 September 2007, Melbourne, Vic
Conference on the Commercialisation of Micro and Nano Systems, bringing together world leaders within the field and showcases Australia's dynamic nanotechnology community, facilities and partnering opportunities.
http://www.mancef-coms2007.org
Email: mancefcoms2007aust@iird.vic.gov.au

INTERNATIONAL EVENTS

For additional information and listings, see:
http://www.lightsources.org/cms/?pid=1000068

2007 National Synchrotron Radiation Instrumentation (SRI) Conference
25–27 April 2007, Baton Rouge, Louisiana, USA
http://www.camd.lsu.edu/SRI/sri07home.htm

ICMAT 2007
International Conference on Materials for Advanced Technologies
1–6 July 2007, Singapore
Receipt of Abstracts: 31 January 2007
http://www.mrs.org.sg/conference/icmat2007/
http://www.mrs.org.sg/conference/icmat2007
Prof Herbert Moser, Director of the Singapore Synchrotron Light Source (SSLS) and ICMAT 2007 Symposium 'N' Chair, has written a personal message encouraging Australian users to attend ICMAT 2007.

ICMAT is a bi-annual International Conference on Materials for Advanced Technologies which started in 2001 and has drawn more than 2500 registered participants in 2005. Traditionally, it includes public and plenary talks by Nobel Laureates and is structured in a number of individual symposia—there will be 18 in 2007. This is a major event in materials science which reaches a worldwide audience.

SSLS is organising the Symposium N on "Synchrotron Radiation for Making and Measuring Materials" which offers a forum for virtually any synchrotron-related work. It offers an excellent opportunity for Australian synchrotron users to attend, well-timed with the opening of the Australian Synchrotron facility.

VUV 15TH International Conference on Vacuum Ultraviolet Radiation Physics
July 29 – August 3, 2007, Konzerthaus Berlin, Germany
http://www.bessy.de/VUVXV

World Biomaterials Congress—2008
28 May–1 June **2008**, Amsterdam, The Netherlands
http://www.wbc2008.com/

MORE INFORMATION

A list of Australian Synchrotron Project personnel can be found at http://www.synchrotron.vic.gov.au/content.asp?Document_ID=129.
Email: contact.us@synchrotron.vic.gov.au
Telephone:

City office
Level 17, 80 Collins Street, Melbourne, Vic 3000
Within Australia, 03 9655 3315
International: +61 3 9655 3315

Site office
800 Blackburn Road, Clayton, Vic 3168
Within Australia: 03 8540 4100
International +61 3 8540 4100
[Please note that the facility is in commissioning phase and is not open to the public]

HOW TO SUBSCRIBE OR UNSUBSCRIBE

TO SUBSCRIBE
http://www.synchrotron.vic.gov.au/content.asp?Document_ID=196&FirstName=&Email=&x=16&y=9

TO UNSUBSCRIBE
Send an email with UNSUBSCRIBE Synchrotron in the Subject line to contact.us@synchrotron.vic.gov.au