

First diffraction pattern on strain scanner KOWARI.

OPAL news

On 20 April 2007, the Prime Minister of Australia, The Hon. John Howard MP, formally opened the new OPAL research reactor.



OPAL is now running its fifth cycle which started on 15 June 2007 and will end on 16 July. After a five-day shutdown the reactor will restart on 21 July and operate until 16 August. The repair against seepage of light water into heavy water is planned for the August shutdown. After the repair, there will be a few cycles to monitor the quality of the heavy water, before purification. The reactor operation schedule until the end of the year will be fixed following the repair of the seepage.



The cold-neutron source is running well, and first flux measurements and spectra have been taken on the cold guide which feeds the reflectometer Platypus. Total neutron-capture flux is $1.7 \cdot 10^{10} \text{ ncm}^{-2}\text{s}^{-1}$, which compares favourably with expectation. Initial measurement of the cold-neutron spectrum peaks at around 3 Ångströms.

Around the instruments

KOWARI, the strain scanner, has successfully collected its first pattern.

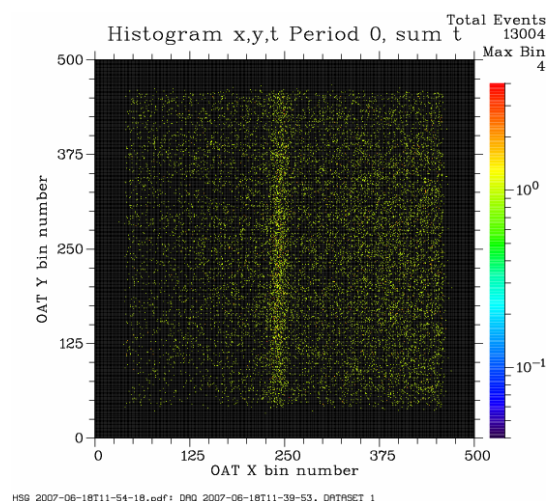
Kowari (strain scanner)

On 18 June, Kowari obtained its first real signal from the detector during the radiation surveys at 5 MW. During the last couple of weeks a lot of effort was put into the mechanical assembly of

this strain scanner. Work included for example polishing of the granite dance-floor, assembling components, installing the detector or running cables; a great team effort.



On Friday, June 15th 2007, a simple steel pin was put on the aligned instrument to act as a sample and on the following Monday, 18 June 2007, a first detector spectrum was obtained.



The spectrum was taken during some low-power radiation surveys at 5 MW. Some 13,000 events were recorded. Since then further alignments and additional tests were carried out at 20 MW resulting in the latest spectrum taken on 26 June 2007. During the scan some 40,000 events were recorded in 60 seconds. Over the next months the instrument will be further tested before applying for its license. Once the licensing process is finished the instrument will be available to the user community.

Echidna (high-resolution powder diffractometer)

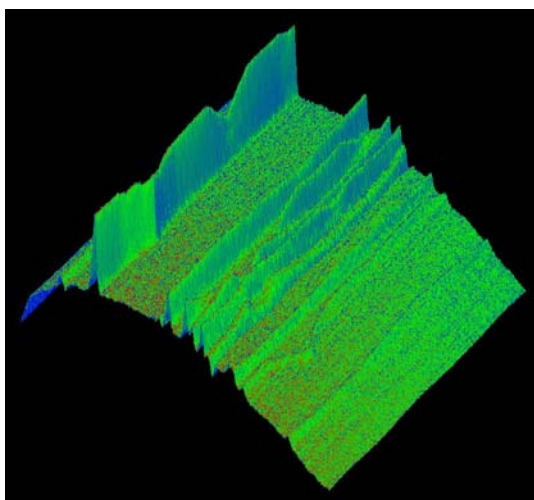
New flight-path shielding has been installed (see below). This new design optimised for the beam

geometry resulted in an increase of the neutron flux by 2.5 at the sample position.



Wombat (*high-intensity powder diffractometer*)

One of the most important uses envisaged for Wombat is to measure how materials change structure in real time. As part of the instrument commissioning a standard lithium-ion battery, initially charged, was slowly discharged and



recharged over a 60 hour period. Diffraction patterns were acquired every five minutes; this 3D image shows the full time history. The image shows the contraction and expansion of the carbon anode as the lithium moves in and out of the structure.

Koala (*quasi-Laue diffractometer*)

Koala has had a safe journey back to France and is presently undergoing a refit and repair operation which appears to be proceeding well. We hope that Koala will be



back with us in October ready for commissioning to proceed.

Taipan (*thermal three-axis spectrometer*)

The installation of the three-axis spectrometer, Taipan, is progressing apace.



The monochromator drum is installed and wedge motions have been optimised. The dance floor has been polished and awaits a survey before the installation of the secondary spectrometer. Wiring of the spectrometer motors and associated encoders will commence shortly.

Sika (*cold three-axis spectrometer*)

Two hundred researchers went to the beautiful mountain village of Sun-Moon Lake in Central Taiwan on 9-10 June, for an International Workshop on Neutron Scattering. The context was the investment by the National Science Council of Taiwan in the new high-performance cold-neutron three-axis spectrometer Sika at our neutron-beam facility, and the National Science Council's support for a strong user program across all the instruments at OPAL.



The main meeting was followed by a smaller, more focussed workshop on 11-12 June to determine the nature of the secondary

spectrometer for Sika, which is scheduled to commence operation in 2009.

Sample environment

Testing of a 5-position liquid-sample trough for the PLATYPUS neutron reflectometer has commenced.



The liquid sample trough based, on a design of the ISIS Rutherford-Appleton Laboratories, Oxford UK, commenced testing in June 2007. Up to 5 liquid samples, heated and cooled via Peltier thermoelectric cells, can be loaded into the trough and measured sample by sample. The maximum and minimum operating temperatures are yet to be established. The liquid sample trough should be ready for the user programme on Platypus later in the year.

Announcements

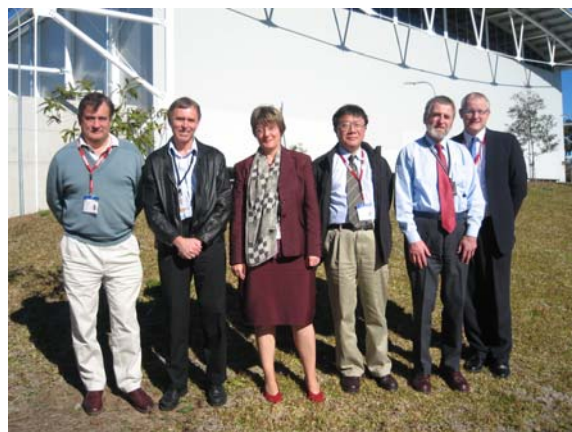
Commissioning of instruments

| Instrument | Commissioning |
|------------|--------------------------------|
| Echidna | commenced |
| Wombat | commenced |
| Kowari | commenced |
| Koala | commenced, but repair required |
| Platypus | start in July |
| Quokka | start in July |
| Taipan | start in August |

After the commissioning phase all instruments will have friendly-user experiments before being officially scheduled. However, an operating license (for each instrument) is required for scheduling any user experiments.

Results of first proposal round

On 30-31 May 2007 the Bragg Institute's Program Advisory Committee met for the first time assessing the proposals submitted for the powder diffractometers Echidna and Wombat.



The Program Advisory Committee in the coffee break (from left): Hugh O'Neill, Craig Buckley, Herma Büttner, Huan-Chiu Ku, Stewart Campbell and Calum Drummond.

A total of 81 proposals were submitted requesting 357 beam days, spread over the 2 instruments (about 180 days requested per instrument). We have chosen to allocate 60 days of beam time per instrument. This corresponds to an oversubscription rate of a factor 3.

Letters to applicants on decision of beam-time allocations were sent out to the principal investigator. However, beam-time scheduling cannot take place until: (1) there is a published operating schedule for the OPAL reactor itself; and (2) we have operating licenses for Echidna and Wombat, from our regulator ARPANSA (Australian Radiation Protection and Nuclear Safety Agency).

Please keep in mind that all scheduled experiments will need to provide *Material Safety Data Sheets* prior to the experiment for all samples and chemicals that will be brought to ANSTO.

Successful applications from researchers from AINSE member institutions were automatically forwarded to *AINSE for consideration of travel/accommodation support*.

Please do not hesitate to contact us if you have any questions concerning your beam time.

Some statistics on proposals

57 proposals received beam time (including 12 block allocations): 31 on Echidna and 26 on Wombat covering scientific areas from bimolecular sciences to strongly correlated electron systems. The beam-time distribution is as follows:

| | Beam-time days requested | Beam-time days allocated |
|-------------|--------------------------|--------------------------|
| Australia | 243 | 92 |
| China | 6 | 2 |
| Europe | 20.5 | 9.5 |
| New Zealand | 0.5 | 0.5 |
| Other Asia | 13 | 1.5 |
| Singapore | 28 | 2 |
| Taiwan | 18 | 6 |
| USA | 28 | 6.5 |
| Total | 357 | 120 |

The attribution is based on the location of the laboratory of the proposer and not their individual nationality. The majority of the non-Australian beam-time requests are in collaboration with researchers from Australian laboratories. Beam time per proposal was split in these cases and therefore we have half days in the table.

IAEA Collaborating Centre



At the official opening of OPAL, Prof. Werner Burkart, Deputy Director-General of the International Atomic Energy Agency (IAEA), announced that ANSTO has been made an IAEA Collaborating Centre for Neutron Scattering Applications.

ANSTO-AINSE Neutron School on Diffraction 29 Nov – 3 Dec 2007

This school will provide *training for newcomers to neutron scattering* with a focus on diffraction: its use and its applications. We will have lectures but also practical sessions with hands-on experiments and data analysis. The School is aimed at PhD students and post docs – novice users and will be limited to 30 people.

Participants affiliated with AINSE member institutions will only pay a participation fee of AUS\$150. For these participants AINSE will cover travel and shared accommodation costs, including meals. Participants from other institutions will be asked for a course fee of AUS\$520 (incl. 5 nights and meals). Participants are encouraged to register for the ANBUG symposium that follows the school (4-6 Dec 07). Participants will be *selected* based on:

- (a) an abstract outlining an aspect of their scientific project to be presented as a poster at the School and
- (b) a letter of recommendation from their supervisor (including the potential role of neutron scattering for the project).

Deadline for Registration: 26 August 2007.

For a preliminary programme and more details please see:

http://www.ansto.gov.au/bragg/science/conferences_and_workshops/workshops/neutron_school.html

Faces

In the last months, the Bragg Institute welcomed:



James Hester (left) joined us on the high-resolution powder diffractometer Echidna (formerly a Bragg Institute employee at the Australian Synchrotron Research Program's beamline at the Photon Factory in Japan). *Anna Sokolova* (centre) works as post-doctoral researcher within our food-science project. *Rachel White* (right) is our new lab manager.

Contact us

Bragg Institute – User Office, Building 87
ANSTO
PMB 1, Menai, NSW 2234, Australia
T +61 2 9717 7232, F +61 2 9717 3606
E bragg_user_office@ansto.gov.au
www.ansto.gov.au/bragg