current events

This section carries events of interest to the synchrotron radiation community. Works intended for this section should be sent direct to the Current-Events Editor (s.hasnain@dl.ac.uk).

Construction of SESAME's building makes rapid progress

The building work of SESAME, the 2.5 GeV synchrotron facility, began earlier in 2004 and is making rapid progress. The foundations of the 65 m × 65 m hall are finished with detailed iron work and base complete. This was witnessed recently by the Technical Committee during its meeting on 18–19 November 2004 and the Council on 13–14 December 2004. The rapid progress with the construction enthused both groups with a feeling that the realization of this 'dream' project was in sight.

The Third Meeting of the SESAME Technical Committee (TC) was held in Amman on 18–19 November 2004, chaired by the new chair, Albin Wrulich. The TC meeting was attended by, among others, Ernst Weihreter from BESSY and the head of SOLEIL's Accelerator Physics, Amor Nadji. The TC was impressed with the positive and stimulating atmosphere in the project team and the enthusiasm among all members. The committee noted with great satisfaction that SESAME in its present stage is strongly science driven. The SESAME machine concept has experienced an impressive development towards higher performance and enhanced operational reliability of the accelerator systems. In spite of the modest circumference of ~130 m, an energy of 2.5 GeV was reached for a lattice with 16 straight sections. With the latest version of the lattice, eight short (~2.4 m) and eight long (~4.4 m), presented to the committee, a very relaxed optics has been achieved that demonstrates an excellent dynamic behaviour by the use of only two families of sextupoles. With the utilization of permanent-magnet technology for insertion devices, the photon energy range could be extended far into the hard X-ray regime. Effects of insertion devices on beam dynamics are correspondingly reduced and only modest feed-forward actions are needed to stabilize the beam. The TC strongly recommended that 2.5 GeV electron beam energy should become the nominal operation mode and should be envisaged from the beginning. The TC took note of the basic recommendations and key requirements from the Science and Beamline Committees:

(i) The figure of merit for SESAME should be brilliance;
(ii) Stability is more important than current;
(iii) Two large openings for IR beamlines are requested from the beginning;

A view of the SESAME building on 14 December 2004.

The Technical Committee met at the UNESCO office in Amman on 18–19 November 2005, chaired by Albin Wrulich from SLS (centre). Fifth from the left is the Minister of Science, Khaled Toukon; third from the right is Aslam Baig (Science Director); and fourth from the right is Getano Vignola (Technical Director).

(iv) As a guideline for beamline design, a maximum field of 3 T will be considered in the initial phase;
(v) The shorter straight section should allow the implementation of an in-vacuum insertion device with a 1.5 m-long magnet array.

The TC concluded that in-vacuum insertion devices are considered for the initial phase. However, vacuum conditioning will be necessary before the undulator gap can be closed to 6 mm.

Australian synchrotron takes shape

Work on the building for the 3 GeV Australian synchrotron is progressing well. The building is expected to finish in 2005. The detailed designs for the beamlines are now underway. Recently the synchrotron facility received a boost when New Zealand agreed in principle to invest $5 million towards the cost of the beamlines. The investment in beamlines is urgently needed for this advanced

The latest view of the Australian synchrotron building.

synchrotron where, in contrast to Diamond and SOLEIL, the finances for beamlines have been slow in coming. One hopes that at least half a dozen state-of-the-art beamlines would be ready when this unique facility comes into operation in Australasia.

Consultation for X-FEL in the UK begins

On 23 November 2004 the first consultation meeting for the X-ray free-electron laser took place in the UK at the Royal Society. This meeting brought together the potential XFEL community (science leaders from the current synchrotron radiation and laser communities) with the champions of X-ray free-electron lasers from Europe including Janos Hajdu and Thomas Tschentscher. Thomas Tschentscher, from DESY, described the project as the European XFEL project, where the objective was to produce XFEL radiation in an energy range of 200 eV to 12.4 keV, with ultrashort pulses of 100 fs eventually reaching a shorter duration of 10–20 fs. 60% of the XFEL cost is to be covered by Germany, and the steering group has created two steering committees, namely the scientific and technology issues working group and the administrative and funding issues working group, who are charged with providing input aimed towards raising the remaining 40% from EU partners, with the UK being one of the potential partners.

The meeting generated a lot of discussion during the breakout sessions and the final reporting session reflected the general enthusiasm for the project. In general, it was felt that the UK should participate in the development of this new technology. The 4GLS project would already cater for the low-energy FEL community. The funding for 4GLS is expected by 2007/2008. It was clear that the low-energy community regarded 4GLS as their immediate priority. In contrast, the opening of the X-ray region through the X-FEL technology was seen as a paradigm shift by those involved in structural and plasma research, for which the UK has strong communities. The plasma community, for example, saw 100 fs time structure already to be major step. Structural biologists saw the availability of hard X-ray lasers to image biological molecules as a unique opportunity for structure and dynamics. The high brilliance would provide immediate benefit for structure determination from crystals of 1 µm size. There is a 0.3–3.0 µm window between what is currently feasible with the best of X-ray synchrotron radiation beamlines and electron microscopy. The group saw many challenges which need to be solved to fully realize the paradigm shift, and early R&D is essential.