

SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) on track for first experiments in 2015

The SESAME Council met on 30 and 31 May at the El Hassan Science City (EHSC) in Amman (Jordan), courtesy of Her Royal Highness Princess Sumaya Bint El Hassan, President of the EHSC. Welcoming Delegates, Her Royal Highness stated that: *“There is a great deal to celebrate at this meeting as we record that the SESAME project is making real and meaningful progress. We are all aware that SESAME’s location in Jordan places it at a crossroads for regional peace-building and development. This has never been more relevant as the region shifts towards a new dynamic of opportunity. As the region’s first major international research centre, SESAME will contribute to regional scientific, technical and economic development at a crucial stage in the history of the Middle East. You will be a focal point for regional scientific collaboration and for cross-border networking.”*

The Council was impressed by progress in the construction of SESAME which was presented by the Director of SESAME, Dr Khaled Toukan (who is also Minister of Energy of Jordan), and the Technical Director, Dr Amor Nadji. The radiation shielding wall is complete and the tunnels are ready for installation of the accelerators. The booster synchrotron will be commissioned with beam early next year. Construction of the new 2.5 GeV main storage ring is ready to begin, and the third generation SESAME light-source is technically on track for experiments to begin in 2015 with three ‘day-one’ beamlines, *provided* the necessary funding is secured. Some \$20 million that is still required in manpower and operational costs will be provided by the Members of SESAME, in addition to which some \$35 million is needed in capital funding (the full cost of SESAME and the day-one beamlines will be some \$110 million, including the value of the land and building, which have been provided by Jordan, and equipment donated by various synchrotron laboratories around the world).

Commitments and offers confirmed and announced during the meeting look set to provide most of the capital funding needed to complete construction and allow experiments to begin in 2015 with three beamlines. Specifically the Council was very pleased that during the meeting:

Iran, Israel and Jordan confirmed commitments to provide US\$1 million each this year and in each of the subsequent four years *provided* i) at least one other Member joins this initiative this year, and ii) another also joins in subsequent years.

The Turkish Atomic Energy Authority announced a decision to join this initiative, although certain formal steps must be taken before payment can be made.

Egypt reported that the Egyptian Minister of Higher Education, Scientific Research and Technology has requested \$5 million from the Ministry of Finance, starting with a budget allocation of US\$1 million for the financial year that begins on 1 July.

The Palestinian Authority confirmed an offer to make an in-kind contribution of up to US\$2 million.

Pakistan announced its readiness to make an in-kind contribution of up to US\$5 million.

The remaining capital funding that will still be needed before 2015, and that subsequently required to construct four more phase 1 beamlines and other facilities and equipment, is being sought from external sources (governments – the EU has so far contributed €3.2 million – Foundations and other donors) and from other SESAME Members.

The Council noted with gratitude that SESAME has benefitted enormously from help and advice that has been provided by some of the world's synchrotron laboratories (especially SOLEIL in France, but also ALBA in Spain, ELETTRA in Italy, the Swiss Light Source, Diamond in the UK and the Canadian Light Source). It also thanked UNESCO and the International Atomic Energy Agency (IAEA) for their continuing support, and the many laboratories and other organisations that have provided and funded training opportunities for SESAME staff and future SESAME users. The Council specifically thanked the Lounsbery Foundation (the first private foundation to provide substantial support) for a recently-announced training grant of US\$100,970 which will help build a regional scientific community that is well prepared to carry out the first experiments and hone the skills needed to complete the construction of SESAME.

During the meeting, Professor Salman M. Salman (Palestinian Authority) was re-elected for a second two-year term as Chair of the SESAME Finance Committee.

Closing the meeting, the President of the Council, Professor Sir Chris Llewellyn Smith FRS (Director of Energy Research, Oxford University) said: *“I am now confident that SESAME is on track technically, and will soon also be positioned financially, for experiments to begin in 2015. It is a remarkable tribute to the spirit of cooperation in pursuit of a common goal which underwrites the project, that SESAME is progressing so well during a time of external turbulence”*.

Notes

SESAME (Synchrotron-light for **Experimental Science and Applications in the Middle East**) is a major science facility under construction near Amman (Jordan), modelled institutionally on CERN. SESAME will both:

- Foster scientific and technological excellence in the Middle East and neighbouring countries (and prevent or reverse the brain drain) by enabling world-class research in subjects ranging from biology and medical sciences through materials science, physics and chemistry to archaeology, and
- Build scientific and cultural bridges between neighbouring countries and foster mutual understanding and tolerance through international cooperation.

The Members of SESAME are currently Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey. SESAME, with the help of UNESCO, is actively seeking additional Members from across the Middle East and neighbouring countries. France, Germany, Greece, Italy, Japan, Kuwait, Portugal, Russia, Sweden, Switzerland, the UK and the USA are Observers. SESAME was created under the auspices of UNESCO, which is the depository of the Statutes of the Centre and is represented on the Council of SESAME. The IAEA (International Atomic Energy Agency) also sends a representative to Council meetings.

The heart of SESAME is a 2.5 GeV electron storage ring (133m in circumference), which can accommodate up to 12 wigglers and undulators, making SESAME a third generation light-source. There are some 60 synchrotron light-sources in the world, including a few in developing countries, but none in the Middle East, although a need for this was recognized by the Nobel Laureate Professor Abdus Salam (Pakistan), founder of the Abdus Salam International Centre for Theoretical Physics in Trieste (which fosters advanced studies and research, especially in developing countries), and other eminent scientists more than 25 years ago.

Jordan has provided the land and building that will house the accelerator complex and associated infrastructure (e.g. the dedicated new power line). The Members, which have always covered the annual recurrent budget, are committed to providing the operating cost, which will rise to some \$(6-8) million pa when SESAME comes into operation. Germany generously donated components of a decommissioned light source (BESSY1), which are being upgraded to form the booster that will inject electrons into a completely new 133m main storage ring. Components that have become surplus to requirements have been donated by various synchrotron laboratories in the USA and Europe, including in particular the UK, which has donated five 'beamlines'. The value of the investments made so far (by Jordan, the other Members, and the European Union) plus the donated equipment that will be used from the beginning of operation is some \$55 million.

The users of SESAME will be based in universities and research institutes in the region. They will visit the laboratory periodically to carry out experiments, generally in collaboration, where they will be exposed to the highest scientific standards. The potential user community, which already numbers some 300, has been fostered by a series of Users' Meetings and by excellent training opportunities supported by the IAEA, national agencies (such as the US Department of Energy) and many of the world's synchrotron laboratories in Europe, North America, Asia and Latin America, which have created special training fellowships for SESAME. The training programme (whose monetary value is set to increase to nearly \$1M pa) is already bringing significant benefits to the Members of SESAME (e.g. through capacity building, the creation of collaborations both within the region and with countries beyond it, etc.), and will ensure that SESAME will be fully exploited by scientists from across the region.

Resolutions/endorsements in support of SESAME have been issued by the Executive Board of UNESCO, IUPAP (International Union for Pure and Applied Physics), IUBMB (International Union of Biochemistry and Molecular Biology), the US National Commission for UNESCO and 45 Nobel laureates in a joint statement.

Further information about SESAME and potential SESAME Users can be found at

<http://mag.digitalpc.co.uk/fvx/iop/esrf/sesamebrochure/>

and

<http://mag.digitalpc.co.uk/fvx/iop/esrf/sesamepeople/>

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