

**Resolution Endorsing Sesame (Synchrotron-light for Experimental Science and Applications in the Middle East)**

**by the  
International Union of Pure and Applied Physics**

**(Presented by the United States Liaison Committee to IUPAP)**

**RESOLUTION:**

- Recognizing the importance of science and technology for modern society and for improving the human condition
- Recognizing that frontier scientific facilities provide training of regional scientists without their having to leave their region, and enable them to address biomedical, environmental, and other regional issues
- Recognizing the value of international scientific cooperation to promote peace & understanding
- Recognizing that SESAME addresses all of the above in a regional, frontier research facility

The IUPAP strongly endorses SESAME and urges its national committees and Commissions to identify opportunities for continued and expanded assistance to the project, including identifying opportunities for broadening participation by scientists from the region, and raising the visibility of its “science for peace” objectives throughout scientific and policy-making communities.

## Background

At present there are about 60 synchrotron light sources in operation around the world used by about 30,000 scientists in many disciplines. In addition to many facilities in technologically developed countries, facilities were started in developing countries starting about 20 years ago, for example in Brazil, Korea, and Taiwan. In about 10 years of operation in these countries, hundreds of graduate students have completed PhDs without having to go abroad to conduct frontier research, often not returning to their home countries. Dozens of senior scientists working abroad have returned to their roots in these countries now that they can carry out their science.

**Developed under the auspices of UNESCO, SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) is becoming a major international research centre in the Middle East/Mediterranean region, promoting peace and understanding through scientific cooperation. It has as its centerpiece a synchrotron light source originating from BESSY I, given as a gift by Germany. The upgraded machine, a 2.5 GeV 3<sup>rd</sup> Generation Light Source with an emittance of 26 nmrad and 12 places for insertion devices, will provide light from the far infrared to hard X-rays for a wide range of studies, including those addressing environmental and biomedical issues of relevance to the region. SESAME will offer excellent opportunities for the training of Middle East scientists and attract those working abroad to consider returning.**

**As of June 2007, Members of the SESAME Council are Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, Palestinian Authority, and Turkey. More are expected to join. Members provide the annual operating budget. The facility is located in Allaan, Jordan, 30 km North-West of Amman. Jordan has provided the site & funds for the new building, which is being completed in the summer of 2007. Plans for initial beam lines include MAD Protein Crystallography, SAXS & WAXS for Polymers and Proteins, Powder Diffraction for Material science, UV/VUV/SXR Photoelectron Spectroscopy and Photoabsorption Spectroscopy, IR Spectroscopy, and X-ray Absorption Spectroscopy. Some beamlines will be built by Member countries. Funds to purchase components of the new ring and beamlines are beginning to come from the EU. Additional capital funds are being sought from the US, and other sources. A Director, Scientific Director, Technical Director, and Administrative Director are on board and an accelerator group, made up of Middle East scientists and engineers, has finalized the design of the facility. Four committees advise the Council and assist in developing the technical design, beam lines, user community, and scientific Program. For more details see: [www.sesame.org.jo](http://www.sesame.org.jo)**

## **SESAME – Science for Peace**

Herwig Schopper, President of SESAME Council

An international research centre SESAME (Synchrotron light for Experimental Science and Applications in the Middle East) is being set up in Amman (Jordan) about 30 km from Amman. Following the model of CERN it has been created under the auspices of UNESCO. The UNESCO Executive Board qualified it as a “quintessential UNESCO project combining capacity building with vital peace-building through science” and described it as a “.. model project for other regions”. SESAME has the objective to promote science and technology in the Middle-East and, at the same time, to offer invaluable opportunities to develop mutual confidence and tolerance among people from different traditions, religions and races through scientific cooperation.

SESAME has currently the following Members: Bahrain, Egypt, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey. The ratification process for Iran and Morocco is still not finished and Iraq has recently requested to become a Member. Germany, Greece, Italy, Kuwait, Russia, Sweden, UAE, the U.K. and the U.S.A. are Observers. France and Japan are also shortly expected to become Observers. All other countries in the region are welcome and several have expressed interest.

The reasons for choosing Jordan as Host State was the assurance by the Government that all scientists of the world would have free access to the Centre, and the commitment to provide the land, the existing buildings and funds for the construction of the building to house the facility. The construction of the building started in August 2003 and it is expected to be ready in summer 2006. H.M. Abdullah II, King of Jordan, strongly supports the project.

The SESAME synchrotron with a final energy of 2.5 GeV has been designed using components, donated by the German government, of the shutdown BESSY I storage ring. These components have been already shipped from Germany to Jordan. Funds for the upgrading of the machine are being sought from the European Commission. It is expected that the SESAME machine will become operational in 2009.

Beamlines for the first phase of exploitation have been identified in close cooperation with potential users. Contacts with the users community are assured by four advisory committees (Beamlines, Scientific, Technical, and Training Committees). SLAC, U.S. and former Lure, in France will donate parts of beamlines from decommissioned machines. Funds for beamline equipment are being sought from sponsors and other organisations like IAEA.

The governing body of the centre is an international Council with each Member having one vote. The Directorate consists of a Director (Minister K.H. Toukan, Jordan), an Administrative Director (H.Helal, Egypt), a Scientific Director (A. Baig, Pakistan), and a Technical Director (G. Vignola, Italy). Working on the design of the machine is a core staff from the region that has been trained in synchrotron radiation laboratories in Europe and the United States.

Training is one of the major objectives of SESAME. Several workshops in different fields have been organized, users meetings take place regularly and individual scientists and technicians are trained in synchrotron labs in Europe, the USA and other countries. These programs are carried out with assistance from IAEA, Vienna and ICT, Trieste and with contributions from observers like Japan and USA.