

SESAME PRESS RELEASE

Pioneering SESAME light source officially opened

Allan, Jordan, 16 May 2017. The SESAME light source was today officially opened by His Majesty King Abdullah II. An intergovernmental organization, SESAME is the first regional laboratory for the Middle East and neighbouring regions. The laboratory's official opening ushers in a new era of research covering fields ranging from medicine and biology, through materials science, physics and chemistry to healthcare, the environment, agriculture and archaeology.

Speaking at the opening ceremony, the President of the SESAME Council, Professor Sir Chris Llewellyn Smith said: *"Today sees the fulfilment of many hopes and dreams. The hope that a group of initially inexperienced young people could build SESAME and make it work - they have: three weeks ago SESAME reached its full design energy. The hope that, nurtured by SESAME's training programme, large numbers of scientists in the region would become interested in using SESAME - they have: 55 proposals to use the first two beamlines have already been submitted. And the hope that the diverse Members could work together harmoniously. As well as being a day for celebration, the opening is an occasion to look forward to the science that SESAME will produce, using photons provided by what will soon be the world's first accelerator powered solely by renewable energy."*

SESAME, which stands for Synchrotron-light for Experimental Science and Applications in the Middle East, is a particle accelerator-based facility that uses electromagnetic radiation emitted by circulating electron beams to study a range of properties of matter. Its initial research programme is about to get underway: three beamlines will be operational this year, and a fourth in 2019. Among the subjects likely to be studied in early experiments are pollution in the Jordan River valley with a view to improving public health in the area, as well as studies aimed at identifying new drugs for cancer therapy, and cultural heritage studies ranging from bioarchaeology - the study of our ancestors - to investigations of ancient manuscripts. Professor Khaled Toukan the Director of SESAME, said *"In building SESAME we had to overcome major financial, technological and political challenges, but - with the help and encouragement of many supporters in Jordan and around the world - the staff, the Directors and the Council did a superb job. Today we are at the end of the beginning. Many challenges lie ahead - including building up the user community, and constructing additional beamlines and supporting facilities. However, I am confident that - with the help of all of you here today, including especially Rolf Heuer, who will take over from Chris Llewellyn Smith as President of the Council tomorrow (and like Chris and his predecessor Herwig Schopper is a former Director General of CERN) - these challenges will be met."*

The opening ceremony was an occasion for representatives of SESAME's Members and Observers to come together to celebrate the establishment of a competitive regional facility, building regional capacity in science and technology.

Photographs of the opening ceremony may be found at

<https://drive.sesame.org.jo/owncloud/index.php/s/ZaR3YvmkYTHTigg>

NOTES FOR EDITORS:

1. There are some 50 synchrotron light sources in the world, including a few in developing countries. SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) is the first light source in the Middle East, and also the region's first true international centre of excellence.
2. The Members of SESAME are currently Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey (others are being sought). Brazil, Canada, China, the European Union, France, Germany, Greece, Italy, Japan, Kuwait, Portugal, the Russian Federation, Spain, Sweden, Switzerland, the UK, and the USA are Observers. SESAME was set up under the auspices of UNESCO, but is now a completely independent intergovernmental organisation.
3. SESAME will both:
 - Foster scientific and technological capacities and excellence in the Middle East and neighbouring regions (and help 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 - much focussed on issues of regional importance, e.g. related to the environment, health, and agriculture, and
 - Build scientific links and foster better understanding and a culture of peace through collaboration between peoples with different creeds and political systems.
4. At the heart of SESAME is a 2.5 GeV electron storage ring. The first electron beam was circulated on 11 January. The design energy of 2.5 GeV was reached on 27 April. A beam of 30 mA has been stored, and steps are now in train to bring the current up to the ultimate design value of 400 mA.
5. Synchrotron light source are equipped with beamlines that focus the light on samples that scientists wish to study. Each beamline can support several experiments in series and in parallel. Two beamlines (an X-ray Absorption Fine Structure/X-ray Fluorescence Spectroscopy Beamline and an Infrared Beamline, which will support work in basic materials science, life sciences and environmental science, biochemistry, microanalysis, archaeology, geology, cell biology, biomedical diagnostics, environmental science, etc.) will be in operation initially. A third (Materials Science) beamline (which will support studies of disordered/amorphous material on the atomic scale and the evolution of nano-scale structures and materials in extreme conditions of pressure and temperature) will come into operation in late 2017. A Macromolecular Crystallography beamline and a protein expression/crystallization facility for structural molecular biology (aimed at elucidating the mechanisms of proteins at the atomic level and providing guidelines for developing new drugs) will come into operation in 2019. Three more beamlines

are being planned which will be added when funds permit.

6. 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 is growing rapidly and already numbers over 300, has been, and is being, fostered by a series of Users' Meetings and by training opportunities (supported by the IAEA, various governments and many of the world's synchrotron laboratories) which are already bringing significant benefits to the region.
7. Some \$90 million have so far been invested in SESAME (including the value of the land and building provided by Jordan and of donated equipment, and all operational costs). Staff costs, provision of power, and other operational costs are provided by the Members' annual contributions. Capital funding has been provided by the Governments of Jordan, Israel, and Turkey, the Royal Court of Jordan, and by the European Union (through CERN and directly) and Italy.
8. SESAME is coming into operation with minimal supporting infrastructure and only two beamlines. Challenges for the future include: fully equipping the protein expression, crystallization and characterization laboratory and the end station for the Materials Science beamline; funding the three more beamlines that are planned in phase 1 of SESAME; funding construction of a conference centre, which (when SESAME is not in use during maintenance work) will be used for regional meetings on other issues (water resources, agriculture, pollution, disease,..); building a new full energy injection system in order to produce much greater integrated fluxes of synchrotron light; and last but not least further building up the user community.
9. In common with all other accelerators, synchrotron light sources use large amounts of electrical power. Once SESAME is fully in operation, the bill for electricity (for which SESAME is currently paying \$375/MWh) would be beyond the means of the SESAME Members. SESAME's longstanding intention to build a solar power plant was recently turned into a reality when the Government of Jordan generously agreed to provide SESAME with JD5 Million (\$7.05 million) of EU funds that support deployment of renewable energy in neighbouring countries. A call for tender to build the plant was issued in April: the power that it sends to the grid will be provided to SESAME as/when needed (not just when the sun is shining). SESAME will be the first accelerator in the world powered entirely by renewable energy.

For further information see:

www.sesame.org.jo/sesame/images/News/SESAME-Opening/Souvenir_Booklet.pdf

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

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