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### A CENTRE OF EXCELLENCE FOR RESEARCH AND COOPERATION IN THE MIDDLE EAST

*Interview with Giorgio Paolucci, Scientific Director of the SESAME project, for the construction of an infrastructure for research and advanced technology in Jordan.*

SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) has a history spanning more than 25 years.

The international scientific project involves the construction in Allan, near Amman, Jordan, of a research infrastructure based on a third-generation synchrotron light source, a supermicroscope for applications in various fields: the first in the Middle East.

SESAME will soon constitute an international centre of excellence for research and advanced technology, able to attract scientists from very different fields: from archaeology to biology, from chemistry to physics and medicine. It will work under the auspices of UNESCO that is also the custodian institution of the statutes of SESAME, which establishment was unanimously approved by the Executive Council of UNESCO, in May 2002. Today, a few months from becoming operational, thanks to the support of the worldwide community, SESAME is a shining example of global commitment, which sees countries that have never sat at the same table for a scientific project working together: Palestinian National Authority, Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan and Turkey. In addition, Italy, France, Spain, Brazil, China, Germany, Greece, Japan, Kuwait, Russia, Sweden, Switzerland, United States and Great Britain are also collaborating. Italy is participating with INFN, Sapienza University of Rome and the City of Science.

The importance of an international laboratory with a synchrotron light source in this region of the world was first recognised in the 1990s by eminent scientists, including Pakistani Nobel laureate, Abdus Salam. This need was later underlined by CERN and by MESC (Middle East Scientific Cooperation), under the leadership of Sergio Fubini. The efforts of MESC to promote not only regional cooperation in science, but also solidarity and peace, began to take shape in 1995, with the organisation in Dahab, Egypt, of a meeting, during which the Egyptian Minister of Higher Education, Venice Gouda, and Eliezer Rabinovici, a MESC member and professor at the Hebrew University of Israel, took an official position in support of Arab-Israeli cooperation. The favourable

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opportunity to start the project presented itself in 1997, when Herman Winick of the SLAC National Accelerator Laboratory in the US, and Gustav-Adolf Voss of DESY, Deutsches Elektronen Synchrotron, in Germany, suggested the construction of a synchrotron light source in the Middle East, using the components of the BESSY structure which was soon to be closed down in Berlin.

After the project was approved by UNESCO, Jordan was chosen to host the centre, competing with five other countries in the region. The Jordanian state provided the land, as well as funds for construction of the building. The user community, consisting of over 300 scientists in the region, is therefore getting ready for the first studies in the new laboratory, which is about to launch its research programme. During a meeting organised at the Sapienza University of Rome we met Giorgio Paolucci, Scientific Director of SESAME.

### **What are the scientific and other objectives of SESAME?**

They are to carry out cutting-edge research in the field of materials science, where by material we mean anything from an isolated atom to a living being, including nanoscience, chemistry, archaeometry and analysis of ancient and modern artefacts. SESAME aims to offer scientists in the Middle East the possibility of growth and knowledge. In some way, SESAME aims to contribute to the reversal of the brain drain, a common and widespread phenomenon in many countries, as we well know, but which is particularly significant in the Middle East. But SESAME also aims to contribute to inter-cultural dialogue.

### **What does it mean to have managed to undertake and bring to fruition a complex project with global reach such as SESAME in a difficult and delicate region such as the Middle East?**

I have only relatively recently started working on this project, since about a year and a half, but my predecessor was certainly very committed to and worked extremely hard on its implementation. SESAME is not yet operational, but we can say that we have achieved significant results which, in the light of what happens every day in that region of the world, would seem unthinkable. Yet SESAME will soon be operational, there is really not long to go. What has been carried out is an operation that presented very serious difficulties: it is the first time that a project of this type has been implemented in the Middle East. But what we are seeing, day after day, its progress, which to us certainly appears slower than we would like, is a source of great satisfaction for us, as scientists and as men.

### **What are the next steps that await SESAME?**

At the moment, the main components of the accelerator are partly under construction in various laboratories around the world and are partly being assembled at CERN in Geneva, while others are under construction in Italy, including INFN laboratories and divisions. All these components will arrive in Jordan between the end of 2015 and the beginning of 2016. There their final assembly will take place in what will be their operational position, and we expect to achieve the final configuration of the accelerator by the middle of 2016. Then we will start putting

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the machine into service and, finally, when we have checked the operation and efficiency of the new synchrotron light source, we will finally start the first experiments with X-ray beams, toward the end of next year and the beginning of 2017.

### **What do you expect to be the impact of a project like this on the region?**

Projects of this scope that have been implemented in other parts of the world have always had a major impact. It is rather difficult to define a priori what will happen, but certainly in France, in Italy and in the United States a constellation of research laboratories has been created around centres of this type, not necessarily directly related to the research that is done in the original laboratory. Moreover, also small and medium enterprises developing technologies and applications, both in the same field of research and in other areas, have sprung up. And frankly I expect this to happen here too. We do not have a business plan, as they say, yet, but surely this great scientific research centre, the only one of its kind in this region of the world, will attract people. There is a phrase that I like very much, it's a line from a film, pronounced by Kevin Costner when he has to build a baseball field in an area where no one had ever thought of doing so, and he says: "I'll build it and then they will come". And I am sure that it will be so in our case, also the SESAME synchrotron laboratory will make the most brilliant scientists, from all over the world, come to us here in Jordan.