

Present Status of SESAME

Sami M. Mahmood¹ and Mahmoud M. Al-Kofahi²

1) Yarmouk University, Irbid 21163, Jordan

2) Al-Balqa Applied University, Al-Salt 19117, Jordan
science@yu.edu.jo, Tel: ++962-2-7211111, Fax: ++962-2-7247983

The **S**ynchrotron –Light for **E**xperimental **S**cience and **A**pplication in the **M**iddle **E**ast (**SESAME**) was established in 2001 under the auspices of UNESCO as an international scientific project to enhance science and its technological applications, and to promote peace in the Middle East region. The idea of the project was suggested by Gustaf-Adolf Voss of the German Synchrotron (Deutsches Elektronen Synchrotron) to Mahmoud Al-Kofahi and Sami Mahmood of the Physics Department of Yarmouk University (JORDAN) in 1997 during a workshop organized by the CERN-based Middle East Scientific Co-operation group headed by Sergio Fubini. Gustaf-Adolf Voss communicated this idea to Herman Winick of the Stanford Linear Accelerator Center (Stanford University, USA), who supported the idea strongly and followed its materialization to the current project continuously.

The idea was based on Germany's decision to decommission its facility, the 800 MeV BESSY I Synchrotron Facility in Berlin, to be replaced by its newly developed project at that time, BESSY II. At the request of Sergio Fubini and Herwig Schopper, the German government agreed to donate the components to SESAME. The plan was brought to the attention of Federico Mayor, then Director-General of UNESCO, who called a meeting at the Organization's Headquarters in Paris in July 1999 of delegates from the Middle East and other regions to sponsor the project formally as a regional UNESCO project for the Middle East. Jordan, which was involved in the project since its inception through M. Al-Kofahi and S. Mahmood, donated the land and the building for the project. The groundbreaking ceremony for SESAME building was held in January 2003 and construction work began the following July.

The component parts of BESSY I have been shipped from Germany to Jordan. In May 2002, the Executive Board of UNESCO unanimously approved the establishment of the center under the auspices of the Organization. UNESCO is the depository of the SESAME Statutes. In January 2003, the Center's creation was formally sealed following an exchange of correspondence between Koïchiro Matsuura, Director-General of UNESCO, and UNESCO's Member States. Immediately after the groundbreaking ceremony in January 2003, the first meeting of the Council of SESAME took place. At this first meeting, the center's statutes were approved and the President (Herwig Schopper from Germany) and two Vice-Presidents (Khaled Toukan from Jordan and Dincer -lkü from Turkey) of SESEAME were elected.

At the present time, the project involves 9 member states: Bahrain, Egypt, Iran, Israel, Jordan, Pakistan, Palestinian Authority, Turkey and the United Arab Emirates. It also involves 2 states with observer status: Kuwait and the United States of America. Other states, like Japan, Germany and France are expected to join the project as observers in the near future. Also the whole Middle Eastern Countries are expected to join the project as full members in the near

future. In this document, we provide an overview of the present status of the project, both from the technical and the development of the building and human resources point of view.

The site for SESAME is located at Allan, 20 km to the west of Amman, the capital of JORDAN. This location is in a beautiful mountainous area covered with trees and has a pleasant weather year around. Allan region is a lightly populated area centered between three member states Jordan, Palestine and Israel, and close to Amman International airport for easy access. Figure 1 and 2 show a map of the Middle East and Allan site, respectively.



Figure 1: Map of the Middle East region, showing the Member States of SESAME.

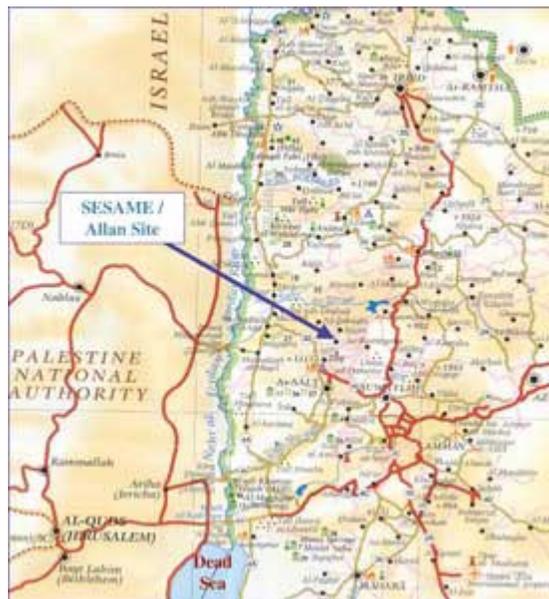


Figure 2: A part of Jordan's map showing the SESAME at Allan. Shown in the figure are also parts of Jordan's river and the Dead Sea.

Construction work is currently going on in the main building for SESAME project (Figure 3 below).



Figure 3: Construction works in SESAME Main Building

Three specialized committees were assigned to help the SESAME Council in following up the development of the project at the present stage. These are: (1) the Scientific Committee, (2) the Beam Line Committee and (3) the Training Committee. Members of these committees were selected from the member states and the international scientific community. The most important task for these committees currently is the selection and design of the first few beam lines and building the human capacity for the project. The criteria for selecting a specific beam line and giving it a priority is based on the interest of the scientific community in the region. The Scientific and Beam Line Committees held a joint meeting recently to discuss these priorities and to select the proper beam lines for SESAME. As a result of this meeting, the Beam Lines shown in Table 1 below were proposed:

Table 1. Phase One Beamlines at SESAME

No.	Beamline	Energy Range	Source type	Champions
1.	MAD Protein Crystallography	5 - 15 keV	MPW (In-vacuum undulator in phase 2)	Vlassi, Shoham, Salman, Rizkallah, Hasnain & Wakatsuki
2.	PES and Photoabsorption spectroscopy	5-1000 eV	Undulator	Hamdan, Baig, Mansouri & Hussain
3.	SAX/WAXS	10 keV	Undulator	Sayers
4.	XAFS/XRF	3-30 keV	2.5 Tesla MPW	Sagi, Mahmood, Hamdan & Hasnain
5.	Powder Diffraction	3-25 keV	2.5 Tesla MPW	Ozdas & Pantos
6.	IR Spectromicroscopy	0.01-1 eV	Large Aperture	Mahmood & Sagi

		Bending magnet	
--	--	----------------	--

The layout of the accelerator ring is shown in Figure 4 below. A booster synchrotron accelerates the electrons from 22 to 800 MeV and transfers the beam to the storage ring. The planned storage ring should be capable of storing an electron beam of 400 mA with an energy of 2.5 GeV.

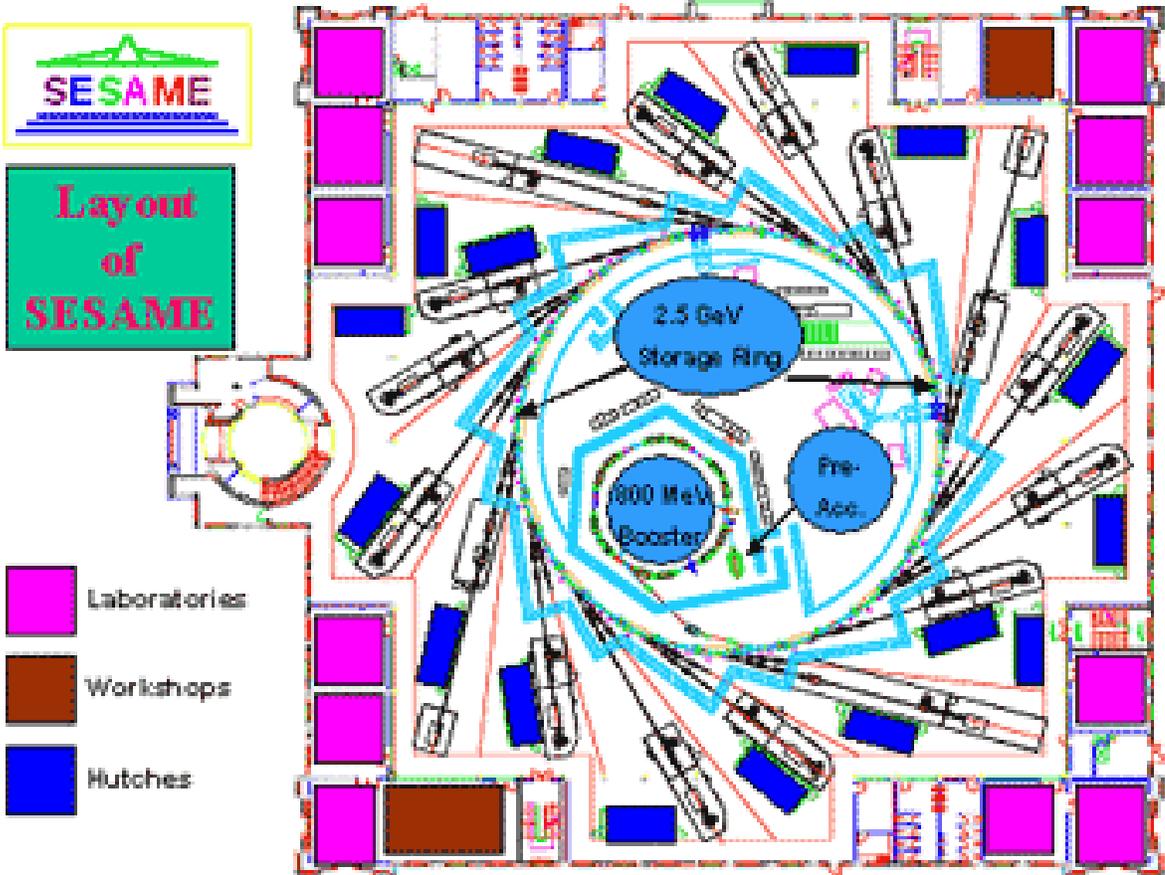


Figure 4: Layout of the accelerator storage ring and Experimental Setup for SESAME.