

SESAME A PERSONAL VIEW FROM CERN

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VICE PRESIDENT SESAME

RACAH INSTITUTE OF PHYSICS

HEBREW UNIVERSITY, JERUSALEM

ISRAEL

Madrid 15th April 2015

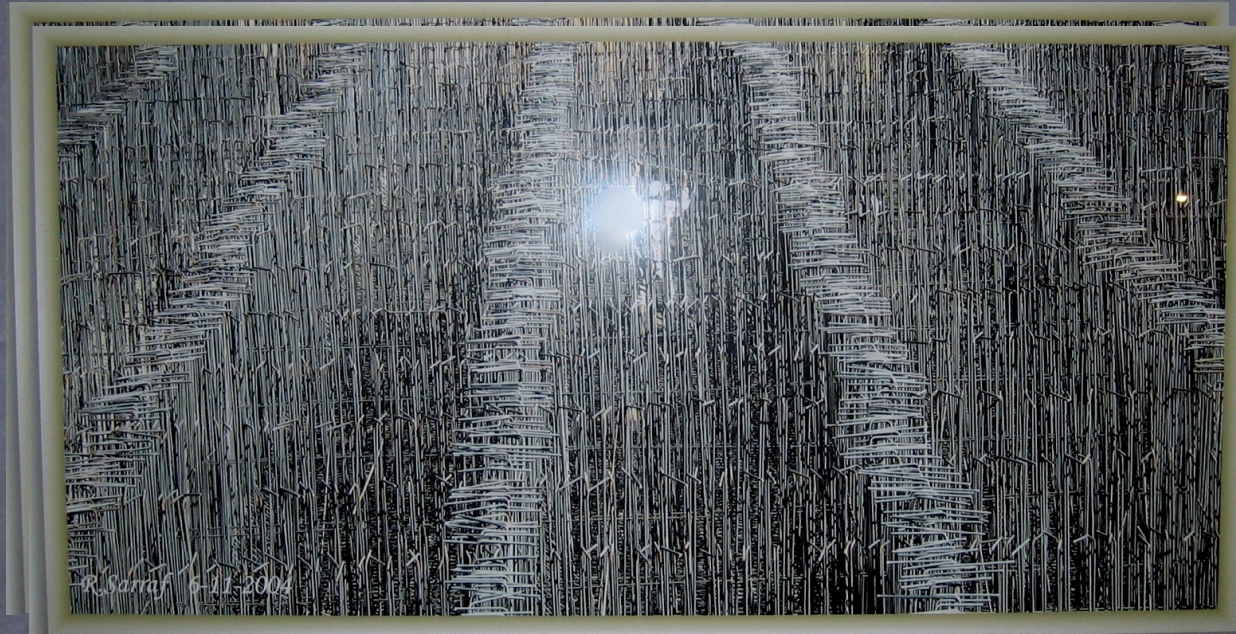
Paco Yndurain colloquium



BBC DAVID SHUCKMAN



SESAME



- Reality or a parallel Universe?
- A personal view

Unique

- Robust
- High quality scientists
- High quality science
- Dedication

Israeli scientists:

- Prof. M. Duetsch
 - Prof. Paz-Pasternak
 - Prof. E. Rabinovici
-

- Prof. Jacob Klein
- Dr. Uri Raviv
- Prof. I. Sagi
- Prof. Y. Sussman
- Prof. D. Tawfik
- Prof. A. Yonat





Hope
Index

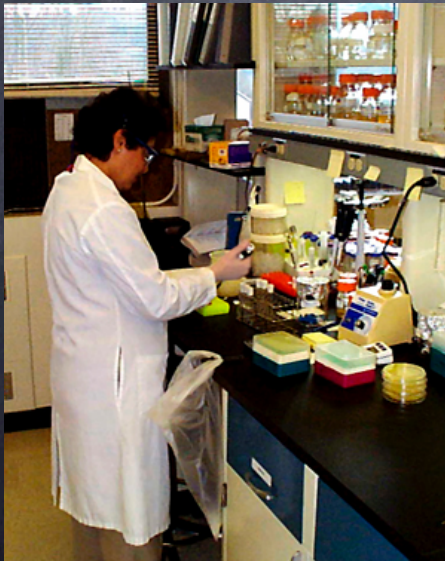
SESAME



Time

DAHAB

Top



Bottom

Small Science?
Good Science!
Compromise
Big Science?

SYMMETRY & SIMPLICITY IN PHYSICS

**A SYMPOSIUM
ON THE OCCASION
OF
SERGIO FUBINI'S 65th BIRTHDAY**

Editors
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 **World Scientific**
Singapore • New Jersey • London • Hong Kong

MINIREVIEW OF SEVERAL NEW ASPECTS OF STRING THEORY
UNCOVERED SINCE 1986

Eliezer RABINOVICI
Racah Institute of Physics
The Hebrew University of Jerusalem
Givat Ram, Jerusalem 91904, Israel

The first time I have seen Sergio Fubini was while listening to a seminar he gave at Cern in 1979. He was describing ideas on how to view the gravitational constant as a vacuum expectation value of some field. At the beginning of the talk he issued a warning to those he called "young people". He stated that any one of them who will start studying quantum gravity will continue to do it as long as he does research. As you see he had left an escape clause for himself. The others could not claim they were not forewarned and maybe the warning should be put in writing. My first actual meeting with Sergio was in a Cern corridor, I was, as I am now, willing to consider any idea which would teach us about the spontaneous breakdown of symmetry between "micro" and "macro" dimensions. I told him about a recent preprint by D'Hoker and Jackiw in which they describe a mechanism for the spontaneous breaking of translational invariance and of the ideas C. Bernard and B. Lautrup and myself had on the subject. He very gently suggested that ideas he had had in the past may be useful in setting the context of the particular problem at hand. Needless to say that his paper on the possibility of spontaneous breaking of Lorentz invariance in a conformal system made available a whole new set of his original ideas.

I would like to take advantage of Sergio's patience to listen to questions and include in this mini review a set of questions pertaining to our attitudes in string theory.

It is about ten years since a large part of the particle physics community has reexamined the possibility that the elementary constituents of matter are string like rather than particle like. An impressive amount of new information was obtained on string theory, many issues are yet to be understood. Below follows a partial list of such aspects.

WHY	WHAT, HOW
why string	what strings, what particles
	what stringy symmetries
why only strings	what else is possible
why a scale	
why four macroscopic dimensions	
why supersymmetry	how to break supersymmetry

ARAB-ISRAELI SCIENTIFIC COLLABORATION: FIRST BUDS

Eliezer RABINOVICI
Racah Institute of Physics
The Hebrew University of Jerusalem
Givat Ram, Jerusalem 91904, Israel

It is a great pleasure and honor to attend this Symposium on the Occasion of Sergio's Fubini 65th birthday, here at the Accademia della Scienze in Torino. I have been asked to give a survey on aspects of Arab-Israeli scientific collaboration. I have collected a few pieces of information which I will present to you; it should be realized, however, that I am not an expert on the subject and I do not know how complete the information is (Figure 1).

To set the perspective let us first consider the regional map* which includes many Arab states and Israel.

Next are presented some statistics concerning the number of students in some Arab states and Israel and the number of faculty members in the corresponding countries (the statistics on the Arab states are from "The Development of Higher Education In Seven Arab Countries, 1965-1988" by Prof. G. Gilbar).

The first Arab-Israeli scientific relations were established between Egypt and Israel. The Egypt-Israel peace accord contains among its many complex annexes a short one in which both sides take upon themselves to establish cultural relations. This serves as the basis for the Scientific Relations. The spirit in which both sides view such relations can be exemplified by the section in a memo of understanding regarding collaborative research in marine sciences presented below.

This is so evident and yet it took so long to state.

These noble principles cannot be implemented without funding. The main source of funding has been the USA; I have obtained an estimate that 7 million dollars have been directed to foster scientific collaboration through AID (Agency for International Development). There has also been available a much smaller amount of support from Egyptian and Israeli sources. The areas of research to which this funding has been directed include: Agriculture^(*), Marine Sciences^(*), Health^(*), Energy, Arab and Hebrew Literature and Languages. On a more applied science basis there have been contacts between Arab states and Israel regarding computer software, seeds for agriculture and irrigation methods. The output of such efforts consists of solutions of concrete scientific problems, the enrichment of knowledge of human relations and of course ...scientific papers. An example of a page of such a paper on a problem in agriculture is presented below.

* borders according to Oxford Atlas.

(*) In these projects it is planned the Palestinian scientists join as well.



Memorandum of Understanding
to establish a
Condensed Matter, Environmental and High Energy Physics
Collaborative Research
in the Middle East
=====

I. Introduction

Under the auspices of Prof. Dr. Venice K. Gouda, Minister of State for Scientific Research of the Arab Republic of Egypt, and as a continuation of the correspondence between representatives of: the National Research Centre (Cairo), the Racah Institute of Physics, Hebrew University of Jerusalem and the Physics Departments of the Universities of Cagliari and Torino, a working visit of Prof. Alberto Devoto (University of Cagliari), Prof. Sergio Fubini (University of Torino), and Prof. Eliezer Rabinovici (Hebrew University, Jerusalem) was held in Cairo on January 7 and 8, 1995. The Egyptian participants in these meetings were:

1. Prof. Dr. M.M. El Halwagi, First Under-Secretary, Ministry of State for Scientific Research of the Arab Republic of Egypt
2. Prof. Dr. Naiel Barakat, Professor of Experimental Physics, Ain Shams University
3. Prof. Dr. Sawsan Abdel Zaher, Head of Physics Division, NRC
4. Prof. Dr. Ahmed Fakhri, Research Professor, Atomic Spectroscopy, NRC
5. Prof. Dr. Mohamed Tag Eldin, Head, Theoretical Physics Dept., NRC
6. Mr. A.I. El-Ibiary, Legal Advisor for NIOF.

The purpose of the meetings was to outline practical ways for collaboration in the fields of Condensed Matter, Environmental and High Energy Physics within the context of the above-mentioned parties.

It was agreed that:

- i) It is of great importance to strengthen the scientific relationships between the above-mentioned parties in the various fields of Condensed Matter, Environmental and High Energy Physics for the benefit of common human knowledge.
- ii) The parties recognize that important scientific achievements in Condensed Matter, Environmental and High Energy Physics can only be achieved through meaningful and sincere collaboration between experts, independently of their nationalities.
- iii) Training of young scientists and researchers is of major importance and all the involved Institutions have the responsibility of contributing to their training in Condensed Matter, Environmental and High Energy Physics.

For these reasons the above-mentioned Institutions will take the initiative in developing a fruitful collaboration both in research and training.

IV. Finance

In order to develop a long-term collaboration, the parties agree to prepare joint research projects to be submitted in the near future to International funding agencies and World Organizations.

The parties agree not to delay the actual collaborative activities until the approval of the above-mentioned research projects and agree to start the collaborative work with the available funds.

To this end:

- a) Travel expenses, accommodation and per diem of Egyptian and Israeli scientists invited to courses and scientific activities in the Italian Institutions will be taken care of by the Italian Institutions.
- b) The Egyptian side will provide accommodation for Israeli and Italian Scientists invited to stay at Egyptian Institutions, within the scope of joint reserach collaboration (this does not include the International meeting mentioned under item III(c), for which special funding arrangements will be sought).
- c) Travel expenses, accommodation and per diem of Egyptian and Italian scientists and students invited to courses and scientific activities at the Racah Institute will be taken care of by the Israeli Institute.

In summary, the above-mentioned Institutions consider this agreement as a sound base for collaboration in both research and training.

Signed in Cairo on January 8, 1995, in three originals in English.

Prof. Dr. Mohamed Mokhtar El Halwagi

M. M. El Halwagi
First Under-Secretary of State
Ministry of Scientific Research
of the Arab Republic of Egypt
Cairo, Egypt

Sergio Fubini
Prof. Sergio Fubini

Representative of the
Scientific Committee
for the Middle East
Workshop
Torino, Italy

Eliezer Rabinovici
Prof. Eliezer Rabinovici

Chairman
Racah Institute of Physics
Jerusalem, Israel





INTERNATIONAL ATOMIC ENERGY AGENCY
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS
I.C.T.P., P.O. BOX 586, 34100 TRIESTE, ITALY, CABLE: CENTRATOM TRIESTE



Trieste, July 20, 1995

Prof. S. Fubini
Chairman of the
Scientific Committee for the Sinai School of Physics,
Universita di Torino
Torino, Italy

cc: Prof. G. Denardo
Prof. A. Devoto
Prof. E. Rabinovici

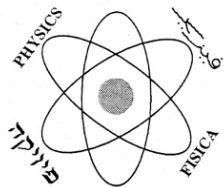
Dear Prof. Fubini,

I'm happy to let you know that the ICTP has decided to grant a special contribution of 22,000 \$ for the organization of the "Sinai Meeting on High Energy Physics, Condensed Matter and Environmental Physics" to be held in Dahab (Egypt) from 19 to 26 November 1995.

This contribution will be given to the Organizing Committee at its address in Israel.

Yours sincerely,

Miguel A. Virasoro
ICTP Director



SINAI MEETING ON HIGH ENERGY, CONDENSED MATTER AND ENVIRONMENTAL PHYSICS

19-26 November 1995
Dahab, Sinai Peninsula, Egypt

Under the auspices of:
ICTP
CERN, UNESCO
Egyptian Ministry of Scientific Research
The Israel Academy of Sciences and Humanities
Istituto Italiano per gli Studi Filosofici
Istituto Nazionale di Fisica Nucleare (INFN)
The Higher Council for Science and Technology, Amman
National Research Centre, Cairo
National Institute of Standards, Cairo
The Hebrew University, Jerusalem
Bethlehem University
International School for Advanced Studies (SISSA), Trieste
University of Cagliari, University of Napoli, University of Torino

This International Meeting has been planned with the aim of bringing together experts in these very active fields of research and putting them in contact with young researchers from the Middle East and from the whole Mediterranean area in a spirit of co-operation and friendship. The meeting is going to be a starting point for further similar encounters in this area. A limited number of young researchers from each country will be admitted. The participation of senior researchers is very important, so the only limitation on their number will be the available room at the meeting site.

The meeting will consist of a series of lectures, a set of seminars and demonstrations, and there will be ample time for discussions and for sessions of questions and answers.

Following is the list of the topics of the mini-courses and their organizers:

- 1) *Particle- and Astrophysics*, M. Jacob and G. Veneziano;
- 2) *Superconductivity (Physics and Applied Technology)*, A. Barone and F. Bonaudi;
- 3) *Spontaneous Symmetry Breaking*, R. Jackiw;
- 4) *Non-Abelian Gauge Theories*, E. Rabinovici;
- 5) *Environmental Physics*, G. Furlan.

There will be seminars by:

L. Alvarez-Gaumé, *Anomalies*; M. Assad Abdel-Rauf, *Theory of Four-body Systems: Rigorous and Variational Proofs of the Possible Coexistence of Atoms and Antiatoms*; M. Berry, *Geometric Phases*; E. Brézin, *1/N Expansion*; H.B. Ghassib, *Gauge Theoretic Description of Superconductivity*; R.B. Laughlin, *Particle Physics in Miniature: the Emulation of Quarks and Gluons by Quantum Antiferromagnets*; E. Rabinovici, *Dualities in Physics*; M. Virasoro, (to be announced); E. Witten, (to be announced).

International Scientific Advisory Committee

Abdus Salam and Victor F. Weisskopf (Honorary Chairmen)

L. Alvarez-Gaumé (CERN), M. Assad Abdel-Rauf (Ain Shams U., Cairo), J.J. Atick (Rockefeller U.), A. Barone (U. of Napoli), M. Berry (U. of Bristol), F. Bonaudi (INFN, Torino), E. Brézin (Ecole Normale Supérieure), N. Cabibbo (ENEA and U. of Roma), A. Devoto (U. of Cagliari), S. Pabini (Chairman - U. of Torino), G. Furlan (U. of Trieste), H.B. Ghassib (U. of Jordan, Amman), R. Jackiw (MIT), M. Jacob (CERN), R.B. Laughlin (Stanford U.), F. Nicodemi (U. of Napoli), E. Rabinovici (Hebrew U., Jerusalem), S. Scuto (U. of Torino), G. Veneziano (CERN), M. Virasoro (ICTP), E. Witten (IAS, Princeton).

Local Organising Committee

M.M. El Halwagi (Ministry of Scientific Research, Cairo), M. El-Fiki (NIS, Cairo), M. El-Raey (U. of Alexandria), M.S. Shalan (NIS, Cairo), M. Fakhri (NRC, Cairo), M.S. El-Wahab (Ain Shams U.), M.A. Sadky (NIS, Cairo), A.I. El-Ibary (Ministry of Scientific Research, Cairo), M. Tag El-Din Kamal (NRC, Cairo).

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August 1995

Under the auspices of:
CERN, UNESCO
Scientific Research
Academy of Sciences and Humanities
Istituto Italiano per gli Studi Filosofici
Istituto Nazionale di Fisica Nucleare (INFN)
The Higher Council for Science and Technology, Amman
National Research Centre, Cairo
National Institute of Standards, Cairo
The Hebrew University, Jerusalem
Bethlehem University
International School for Advanced Studies (SISSA), Trieste
University of Cagliari, University of Napoli, University of Torino







180 3'5

CERN COURIER

INTERNATIONAL JOURNAL OF HIGH ENERGY PHYSICS

3

VOLUME 36



JANUARY/FEBRUARY 1996



Action plan for a collaborative programme in physics in the Middle East.

As part of the implementation of the collaboration agreement signed in Cairo on January 8th, 1995 under the auspices of H.E. Prof. Dr. Venice K. Gouda, Minister of State for Scientific Research of the Arab Republic of Egypt;

In the spirit of the agreement to promote co-operative work in fields that have impact on peoples' lives and standards of living, facilitating the use of equipment and expertise to support and collaborate in the ongoing peace process;

As a consequence of fruitful discussions among scientists of the Middle East held during a successful meeting in Dahab, Sinai from November 19 to November 26, 1995 under the chairmanship of Professor Sergio Fubini, acting also as delegate of the Minister of University and Scientific and Technological Research of Italy, attended by 125 scientists: American, Argentinian, British, Egyptian, French, German, Israeli, Italian, Japanese, Jordanian, Moroccan, Palestinian, Spanish, and honoured by the presence of Prof. Dr. Venice K. Gouda, Minister of State for Scientific Research of the Arab Republic of Egypt, Prof. Jacob Ziv, President of the Israel Academy of Science and Humanities, Prof. Miguel A. Virasoro, Director of ICTP and Dr. Adnan Badran, Deputy Director-General of UNESCO;

It was decided:

-To create a "Steering Committee for International Collaboration in the Middle East on Basic and Applied Physics" under the auspices of UNESCO, ICTP and the Italian government.

The tasks of this committee will be:

1. To promote collaboration between scientists in Egypt, Israel, Italy and other scientists in the region; to identify research groups with common interests and to facilitate research collaboration and the exchange of scientists and students;
2. The committee will initiate, promote and support other meetings and regional Schools of Physics. The next School is planned to take place in Jerusalem and Bethlehem in May 1996, on the subject of the Physics of Detectors.
3. The establishment of a computerized data base of regional scientific and educational activities for the benefit of all students and researchers in the area, with a view to connecting the institutions and groups active in research and education.

A. Kellou
A.S.

H.B.
G.

M.A. Virasoro
S. Fubini
J. Ziv
A. Badran
E. Rabinovitch

First Bulletin

Seminar on Experimental Techniques in High-Energy and Synchrotron Radiation Physics

Villa Gualino, Torino, Italy
31 October - 5 November 1996

1. PURPOSE

The aim of the present Seminar is to review modern experimental techniques in accelerator-based physics research. Even though research objectives in the various fields of science that use accelerators can be very different, the problems encountered when employing and developing particle and radiation detectors for experimental work have many aspects in common. This condition leads to cross-fertilization in the area of instrumentation research between these fields. Furthermore, the development of new particle detection and accelerating methods is continuously leading to new technical applications outside the area of pure physics research, like in medicine, biology and industry, eventually having a positive impact on peoples' lives and standard of living.

Owing to their large size and cost, new accelerators tend to become unique facilities within large regions or even within the world. Utilization of these facilities by researchers from different parts of the world should be facilitated. Application to participate in the present seminar is open to Ph.D. students and researchers from any country. The procedure to apply for an invitation is indicated below. There is no fee for participation in the Seminar.

For Egyptian, Israeli, Jordanian and Palestinian participants a limited amount of financial support has been made available by the sponsors of this Seminar to cover travel and board costs in connection with the Seminar. It is hoped that this special support will stimulate further scientific collaboration with and between Middle East countries and, furthermore, that it will thereby also contribute to the promotion of the peace process in this part of the world.

2. PROGRAMME

A preliminary list of the different sessions and talks is given below. All talks will be plenary.

Base Facilities

Particle Colliders; Synchrotron Radiation Sources.

Research Programmes

High Energy Physics : Overview of High-Energy Physics; High-Energy Physics Phenomenology; Collider Experiments; Fixed-Target Experiments; Astroparticle Physics Experiments.

Synchrotron Radiation Physics : Diffraction in Materials; Diffraction in Macromolecules; Scattering; Spectroscopy; Imaging.

Instrumentation

Detectors for High-Energy Physics : Tracking; Calorimetry ; Particle Identification; Electronics and Calibration; Data Acquisition and Transmission.

Beam Lines and Detectors for Synchrotron Radiation : Insertion Devices; Beam Optics for X-Rays; Beam Optics for UV and Soft X-Rays; CCD and Solid State Detectors; Gaseous Detectors; Electron Detectors.

Particle Detector and Accelerator Applications

Medical and Biological Detectors; Medical Treatment; Energy Amplifier.

Participation and Impact in International Physics Collaboration

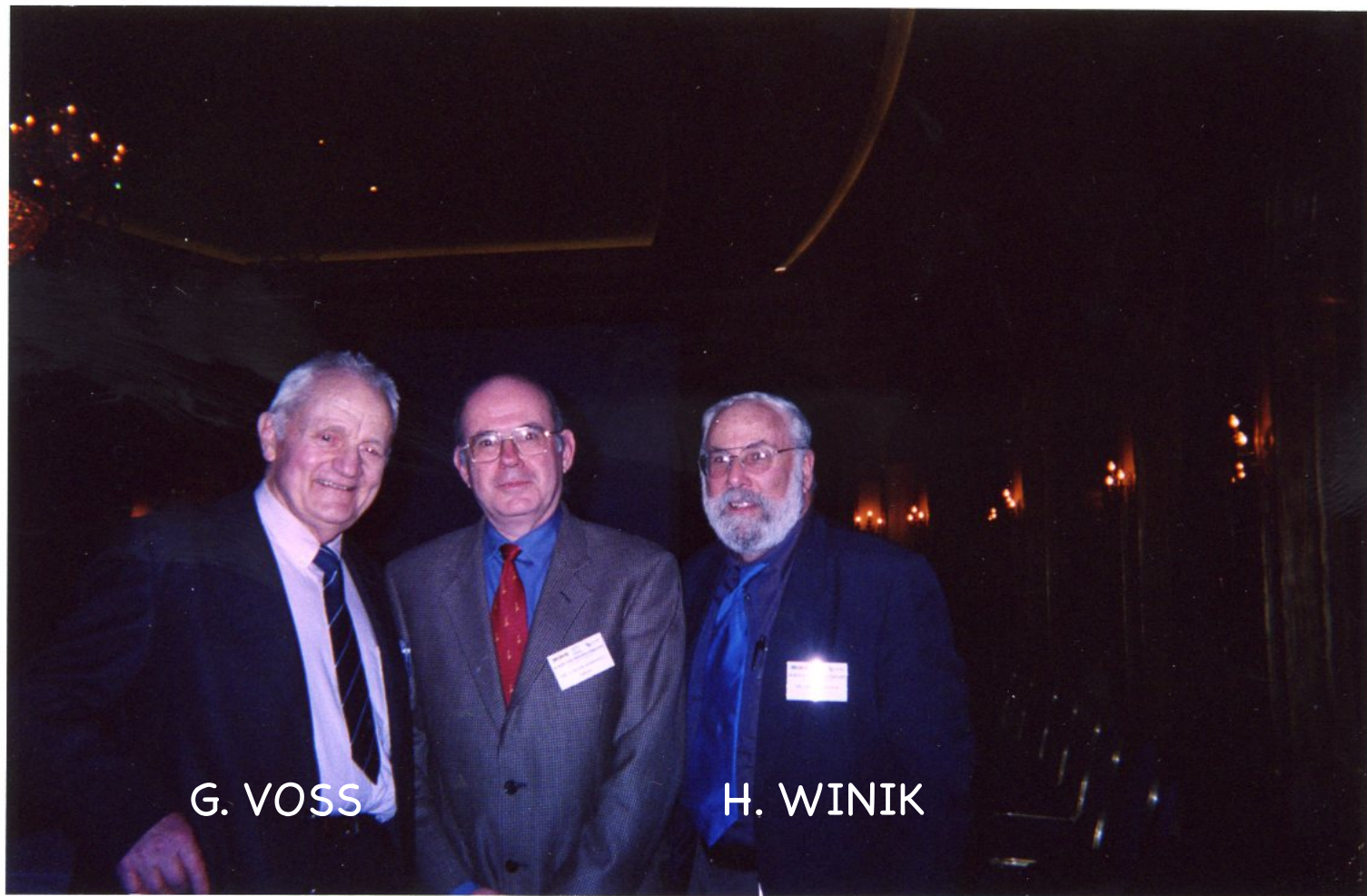
Overview of Middle East Activities

Panel Discussion : Participation and Impact in International Physics Collaboration.

There will be about seven 45-minute talks per day during five days. The lecture days are Thursday, Friday, Saturday, Monday and Tuesday, 31.10 - 5.11.1996, and the session hours are 9⁰⁰ - 12⁰⁰ and 14⁰⁰ - 18⁰⁰. There will be time for questions and discussions after each talk. One afternoon a special session will be organised with a panel discussion including representatives from the Middle East .

It is intended to offer participants the possibility to visit the CERN laboratory in Geneva or the ESRF laboratory in Grenoble. There are also plans to have one or two detector demonstration set-ups at the conference site to demonstrate some basic principles of radiation detectors.

3. SITE AND ACCOMMODATION

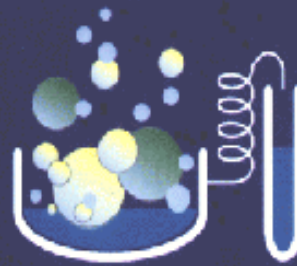


G. VOSS

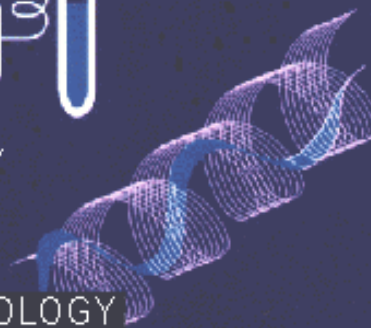
H. WINIK



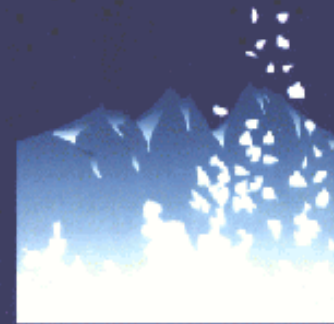
PHYSICS



CHEMISTRY



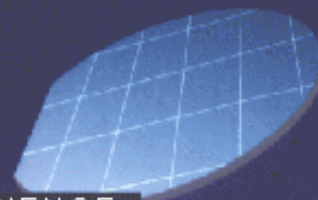
BIOLOGY



ENVIRONMENTAL SCIENCE



GEOPHYSICS



MATERIAL SCIENCE



MEDICINE

*To serve Fundamental,
Applied and Industrial
Research*

Uppsala



H. SCHOPPER K. TOUKAN



R. Sarraf 13-12-2004

1999

- SEARCHING FOR \$\$\$, STILL NEEDED
- DESIGN OF 1 GEV
- TO PARIS



1999



UNESCO -PARIS

DECEMBER 1999

- WHERE?
- FORMALISM- EMULATE CERN'S UP TO "DETAILS" SUCH AS STATUS OF NON-STATES.

Armenia

Bahrain

Cyprus

Egypt

France

Germany

Greece

Iran, Islamic Republic of

Israel

Italy

Japan

Jordan

Kuwait

Morocco

Oman

Pakistan

Palestinian Authority

Russian Federation

Sudan

Sweden

Turkey

United Arab Emirates

United Kingdom of Great Britain & Northern Ireland

United States of America

2000

- AMMAN: 15TH MARCH



Middle East



Egypt's antisemitic press

3/3/94

Today the Anti-Defamation League will present the Knesset with a just-released report documenting virulent antisemitism in the Egyptian press. When asked about this distressing phenomenon, President Hosni Mubarak is fond of (a) comparing press freedom in Egypt to that of the United States and (b) attacking this newspaper for what he perceives is an anti-Egyptian bias.

"Don't ask me to control the press here - I simply can't. Our media follows the example of the American media," Mubarak told the *Jerusalem Report*, adding that, "*The Jerusalem Post* frequently offends me with its awful and terrible cartoons and its most [im]polite articles." Not so fast, President Mubarak. We hate to be impolite, but as far as we know, the US government does not own stock in the major newspapers, and appoint their editors and the chairmen of their boards. Nor does the US government enjoy a monopoly on the printing and distribution of newspapers, or use that monopoly (according to the US State Department) "to limit output of opposition publications."

The prestigious international writers' association PEN reports that, "Although Egypt's press is one of the least restricted in the Arab world, serious problems exist, and they are worsening in the face of civil conflict." According to PEN, "In 1995, already restrictive press laws were amended to include what has been called the 'press assassination law,' supposedly enacted to help combat terrorism, but which in fact narrows the scope for freedom of expression."

This included a provision for "precautionary detentions" of journalists, in other words, detention of journalists without any charges. In any case, even if the press were as free as a bird, as Mubarak would have us believe, that would not absolve the Egyptian society as a whole from addressing the hatred that is being fomented on an almost daily basis against Jews, Judaism, and Israel.

Jews, according to the ADL study, are consistently portrayed as a "satanic force trying to undermine Islam," as "seeking domination of the Middle East and the world," and as equivalent to Nazis. The report continues, "The most common depiction [of Jews] is the stooped, bearded man wearing a black robe with a long, crooked nose - the same distorted stereotype of a European Jew used by the Nazis and later found in Communist Russia."

Prime Minister Binyamin Netanyahu, like other Israeli leaders before him, is routinely depicted as a Nazi, complete with swastikas on his uniform. Last October, Mustafa Amin wrote in *Al-Akbar*, "If he continues Hitler's policies,

he will end like Hitler." As if this were not enough, Jews are seen as "the origin of evil and corruption, spreading AIDS, prostitution, and the insidious destruction of Egyptian society," the ADL reports. Blood libels from the Middle Ages are alive and well in Egypt, where *Al-Ahram* published an article claiming that Jews sacrifice Christian and Moslem children.

Though the vitriol has been stepped up a notch since Netanyahu's election, the pattern is consistent, according to the ADL, since Israel's founding in 1948, through the peace with Egypt in 1979, and after the signing of the Oslo Accords in 1993.

To this, Mubarak says, "Don't ask us to 'educate' our people for peace with Israel - they'll tell me to go to hell." Is this what Mubarak really wants us to believe? That Egyptians are more anti-Israel than Jordanians, whose king is fervently calling for peace between "all of the children of Abraham?" Mubarak is saying, in effect, do not ask me to lead my people - they do not want peace with Israel and I understand them.

Egypt wants and expects to be treated as the leader of the Arab world, particularly with respect to the peace process. Yet it is impossible for Egypt to lead the Arab world toward a real, lasting peace with Israel if it does not also lead on the front of cultural acceptance and normalization.

The sad part about Egypt's backward form of leadership is that it permeates and suffocates the culture as a whole. Restrictions on press freedom, the epidemic of press antisemitism, and the spoiler role in the peace process are all symptoms of a larger, even more troubling phenomenon: the shift in Egyptian culture toward extremism.

As Egyptian author Karim Alrawi wrote in *Index on Censorship* in May 1994, "It is hard to describe what it is like to be living in a society whose culture is dying. It is not just a question of the persecution of writers and academics, nor of the tightening of restrictions on publications and the increased censorship of theaters and films... It is a little like watching a large and lumbering animal slowly being sucked into the mire; it is the knowledge that what was won by past generations so painstakingly is being lost, possibly forever."

Ultimately, it is Egypt that is the victim of its descent into a Nasserist pan-Arabism which thumbs its nose at modernity and modernity's representative in the Middle East, Israel. Antisemitism is an example of such backwardness in its raw form; it will take real leadership to begin the hard task of uprooting it.

Location of SESAME(I)

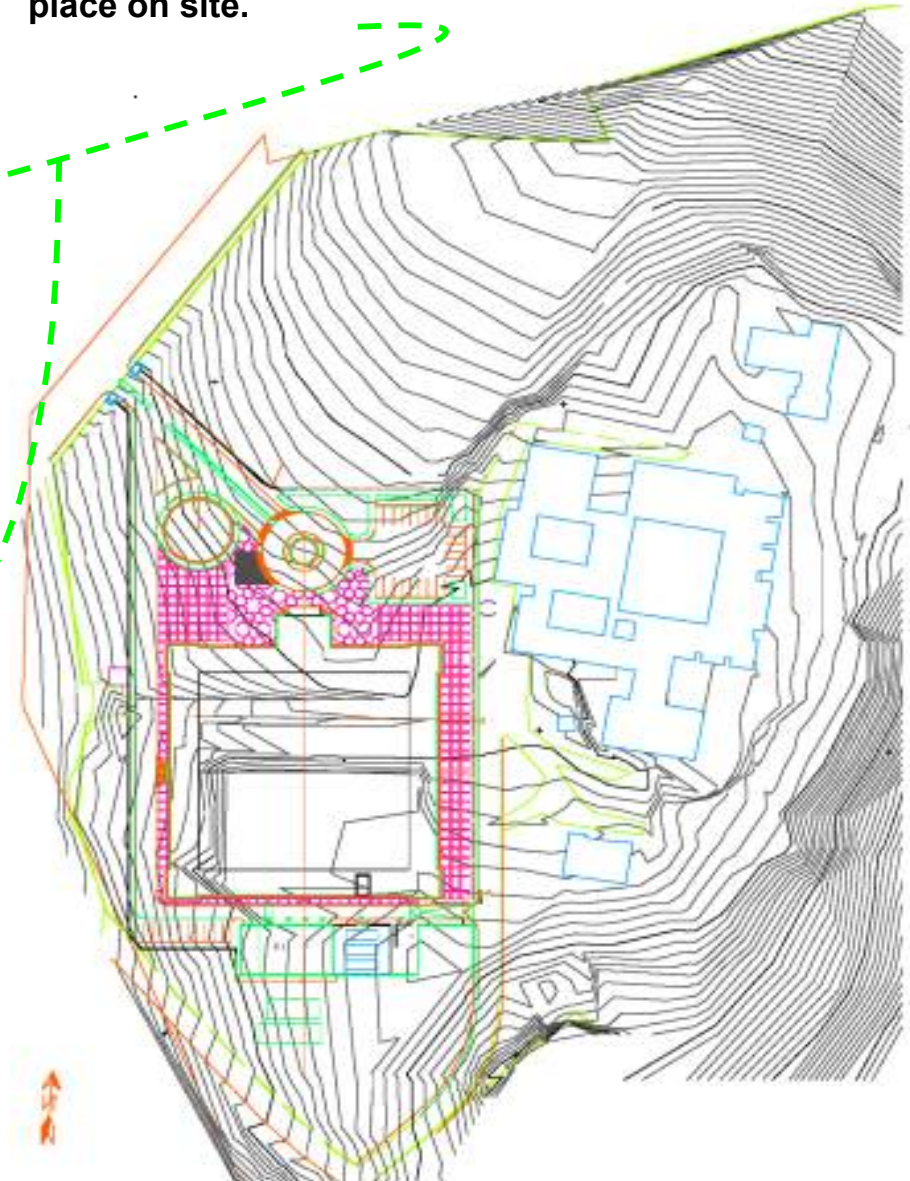


- Within easy reach of Jordan, Israel, Palestinian Authority.
- Samples/equipment/people can in principle be transported by car.

Location of SESAME(II): Allaan, north of A-Salt



- ❖ Currently a college of Al-Balqa University.
- ❖ SESAME to replace the olive grove, the only flat place on site.



Location of SESAME(III): The view is magnificent !



2000

- CERN: 11TH APRIL JORDAN CHOSEN AS A SITE.
- COUNCIL: JUNE, APPROVES JORDAN AS SITE.

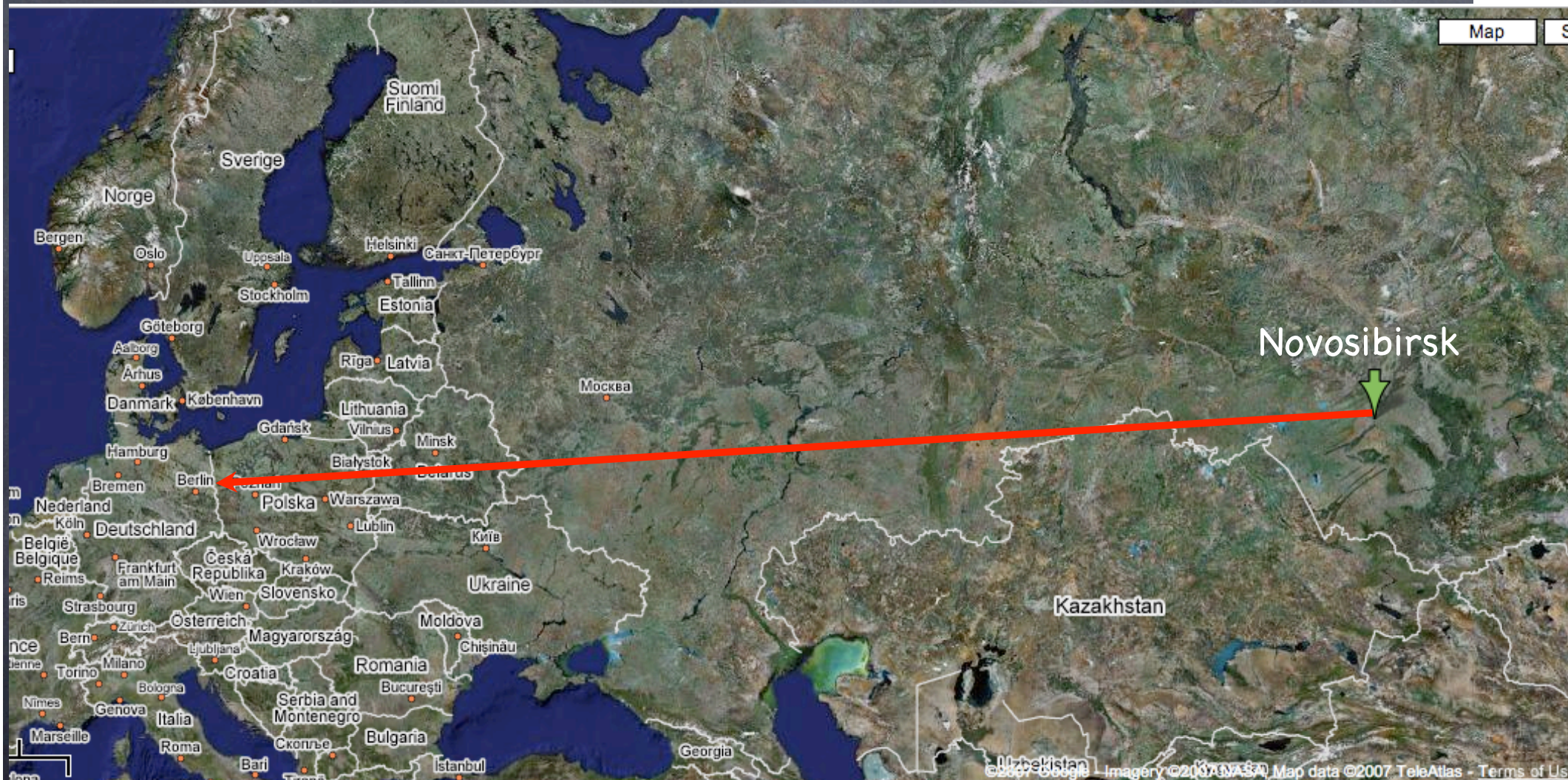


September 2000, 18 scientists selected to receive advanced training at ANKA, Daresbury, DESY, Elettra, ESRF, LURE, MAXLAB, and the SLS.

- March 2001, Jordan agrees to fund the construction.
- September 2001, Prof. Dieter Einfeld appointed Technical Director.
- October 2001, SESAME accepted officially by UNESCO as a fully autonomous entity.

April 2002, 2nd conceptual design (2 GeV) submitted to Council and the EU.

June 2002, Bessy I shipped to Jordan.



Novosibirsk

Kazakhstan

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Members

- **BAHRAIN ?**
- **CYPRUS**
- **EGYPT**
- **ISRAEL**
- **JORDAN**
- **PAKISTAN**
- **PALESTINIAN
AUTHORITY**
- **TURKEY**
- **IRAN**

Observers

France
Germany
Greece
Italy
Japan
Kuwait
Portugal
Russia
Sweden
Switerland
UK
USA

Governing Body

Council

Each Member one vote

Two delegates

SESAME is a 3rd generation light-source ('very powerful flash lamp → microscope') under construction near Amman

SESAME will foster:

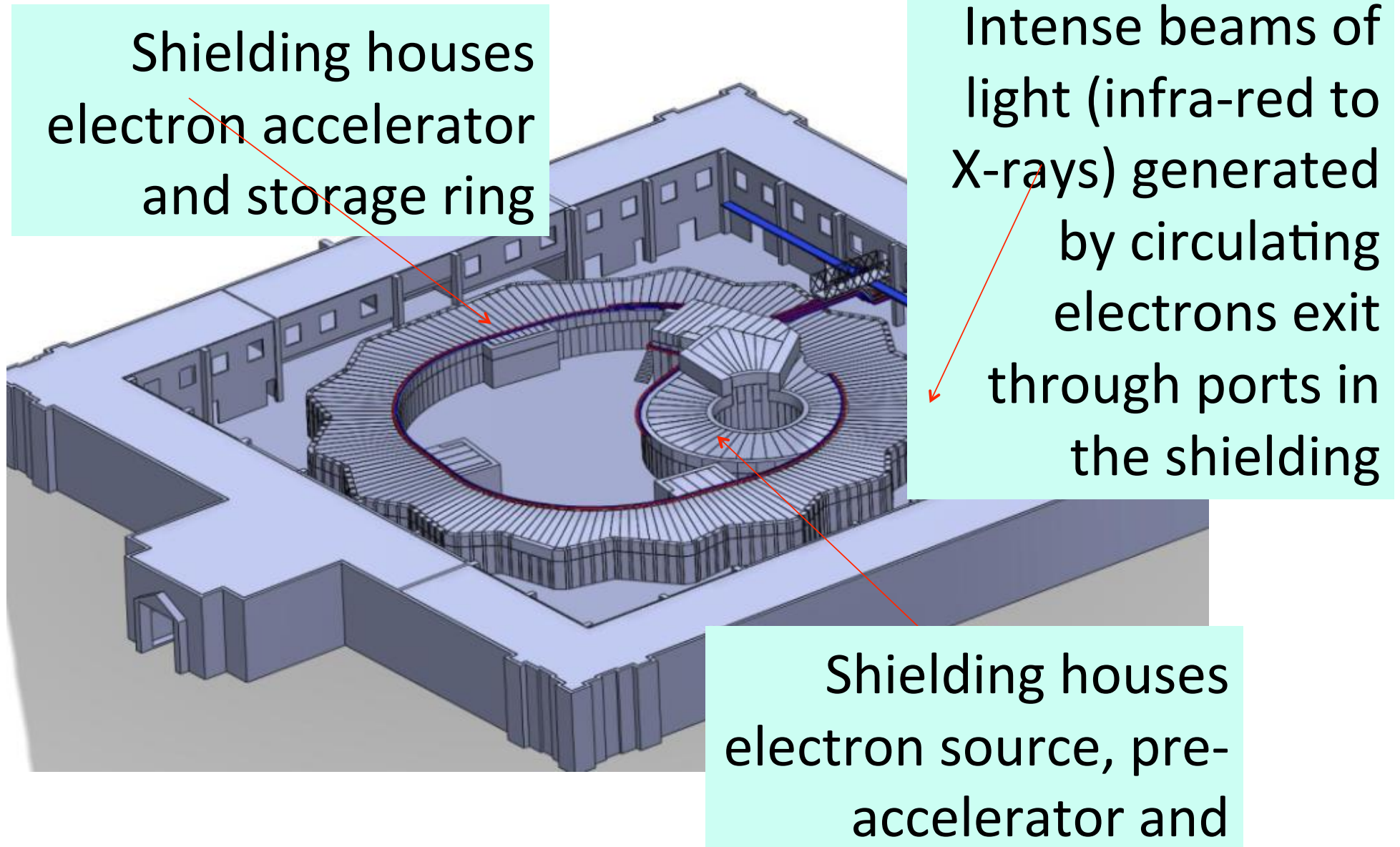
- science and technology in the Middle East and neighbouring countries (from biology and medical sciences through materials science and physics to archaeology)
- cooperation across political divides



H.Schopper, Committee Meetings, Cairo, 25 November 2006

Observers: Brazil,
China, **EU**,
France,
Germany,
Greece, Italy,
Japan, Kuwait,
Portugal,

Inside the SESAME Experimental Hall - Schematic

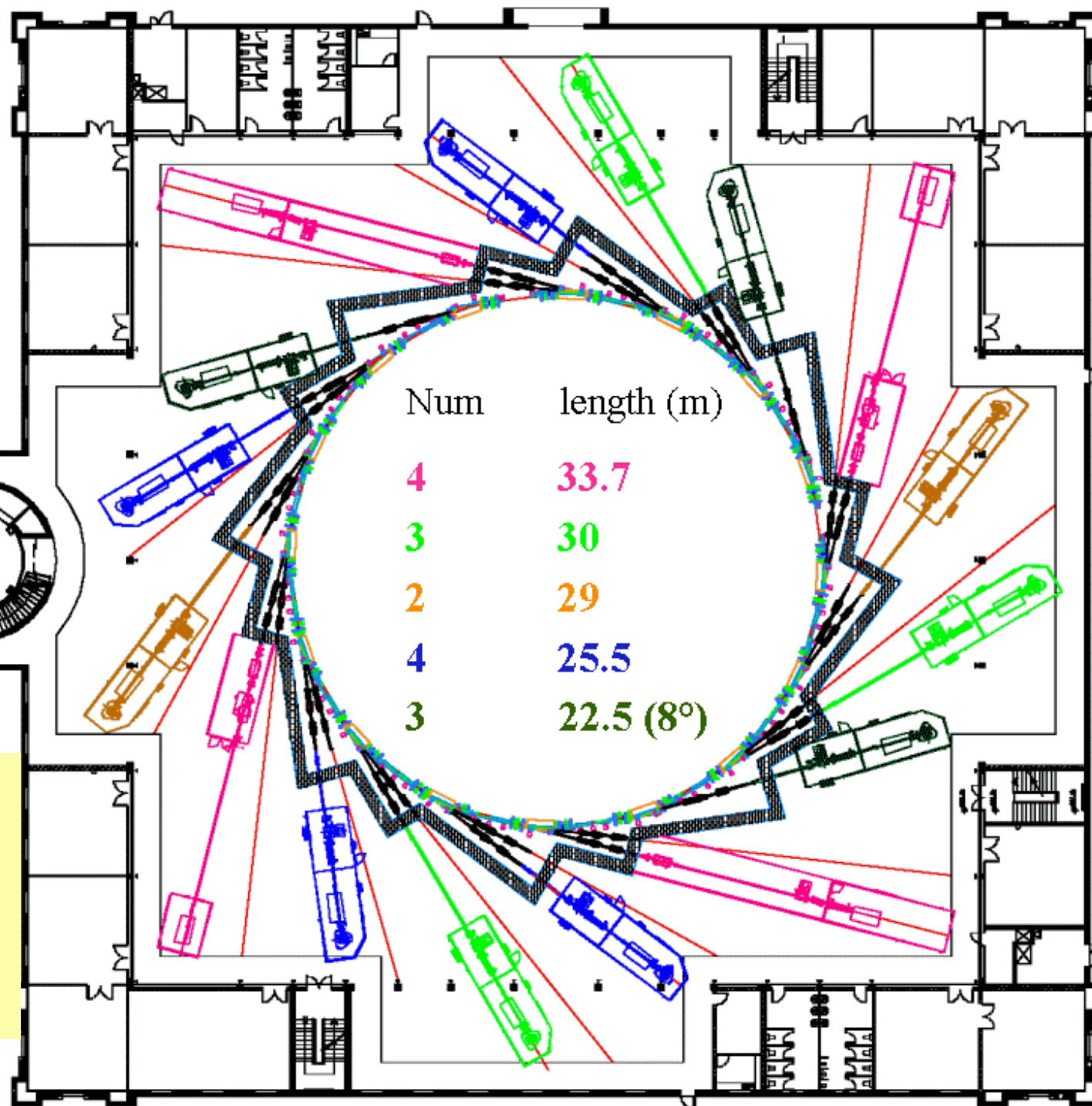




Beam Lines

First beamlines:

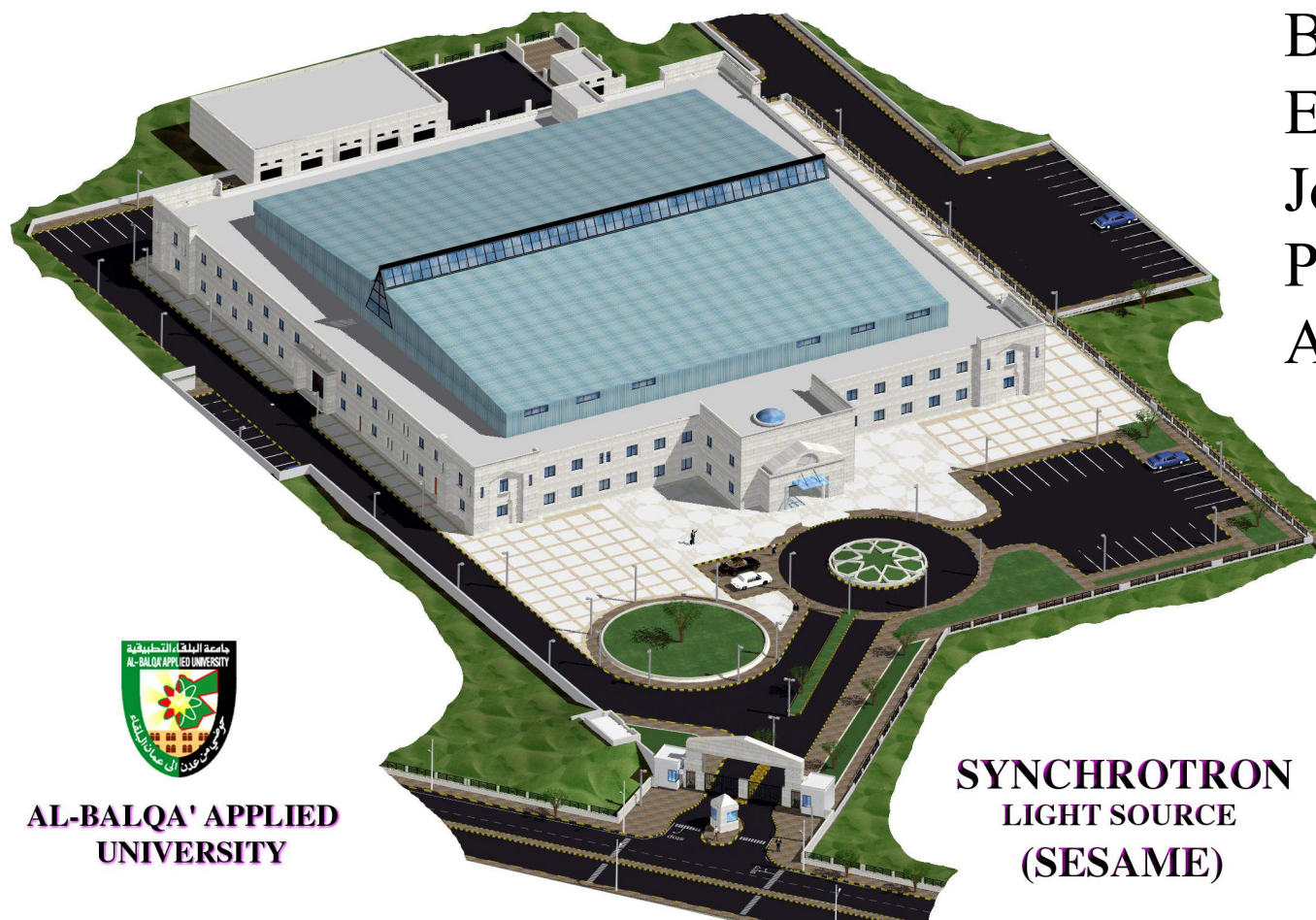
Protein Crystallography
Infra Red Spectroscopy
Powder Diffraction
Photoelectron spectroscopy
Small Angle X-ray scattering
EXAFS







*Synchrotron-Light for **E**xperimental **S**cience
and
Applications in the **M**iddle **E**ast*



Bahrain, Cyprus,
Egypt, Iran, Israel,
Jordan, Pakistan,
Palestinian
Authority, Turkey



**AL-BALQA' APPLIED
UNIVERSITY**

**SYNCHROTRON
LIGHT SOURCE
(SESAME)**

www.sesame.org.jo
















R. Sarraf



Sir Chris Llewellyn-Smith



A man with short dark hair, wearing a dark blue polo shirt, is sitting in a large, empty industrial hall. He is smiling and looking towards the camera. The hall has a high ceiling with exposed metal beams and several large windows on the right wall. The floor is a light-colored concrete.

האזור בקצה המנהרה?
-האזור בקצה המנהרה.







ועדה לתכנון ולתקצוב | Planning & Budgeting Committee

Prof. Manuel Trajtenberg
Chairman

פרופ' מנואל טראיטנברג
יושב-ראש ות"ת

February 22, 2010
00033510

Professor Khaled Toukan
SESAME Director
Jordan

Dear Professor Toukan,

It is a pleasure to inform you that the Planning and Budgeting Committee (PBC hereafter) of the Israeli Council for Higher Education, which I Chair, shares your view as to the importance of the SESAME project, and is ready to participate in financing it. In fact, the Israeli Ministry of Finance and us agree that the PBC will be in charge of overseeing the project and dealing with the authorities of Sesame regarding all aspects of Israeli involvement with the project.

As to the financial aspects, the Israeli Ministry of Finance and the PBC agreed that we will be ready to participate in funding SESAME at the rate of up to 1 million dollars per year for 5 years, provided that the following conditions are met:

1. That at least four out of the other major participating countries do as much (among them Egypt, Jordan, Turkey and Cyprus);
2. That the SESAME project is able to show a balanced budget, taking into account the financial participation of the above mentioned countries and other members and that of the international contributors and benefactors to the project.
3. That a resolution of the annual member fees will be achieved within the following year.

Hoping that the project will indeed come to fruition,

With Best Regards,

Professor Manuel Trajtenberg
Chair, Planning and Budgeting Committee
Council for Higher Education

Copies:

Mr. Yonatan Regev, Manager of Higher Education and R&D Sector, Ministry of Finance

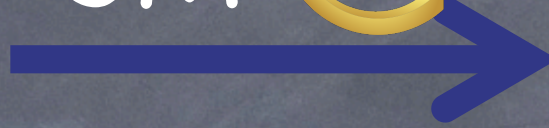






July 2012

5M €





CERN-EC support to SESAME

Report to SESAME Council

May 2014

J.-P. Koutchouk

Coordinator for CERN support to SESAME

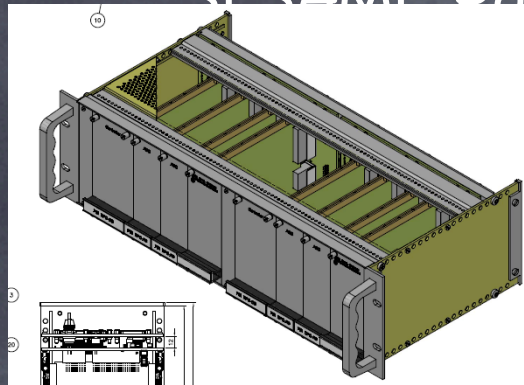


FP7 CONTRACT 338602

IN SUPPORT OF

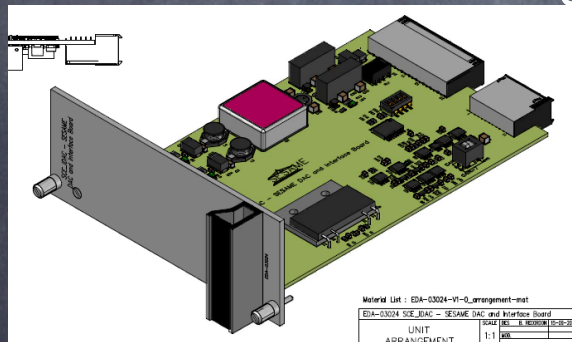
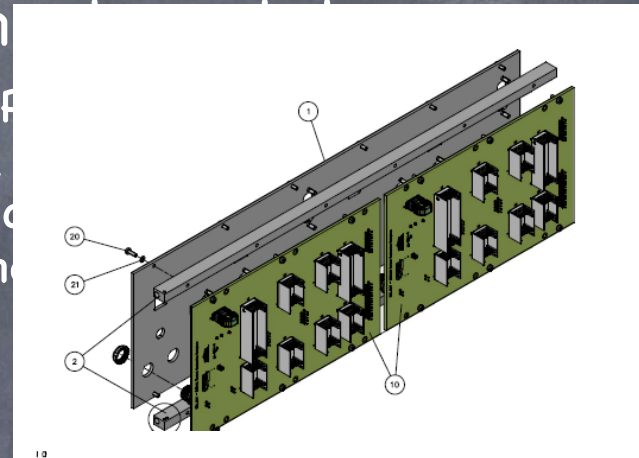


Sesame Power Supplies development



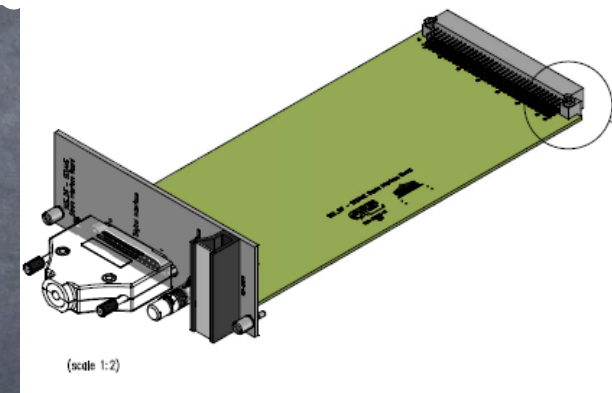
SESAME PS
control
electronics
chassis

SESAME PS
control
electronics
backplane



SESAME PS
DAC and
interface
board

SESAME PS
dipole
interface
board

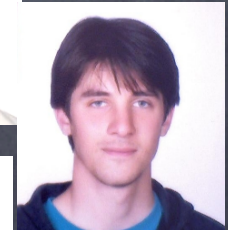
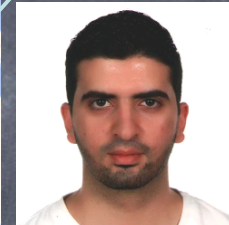
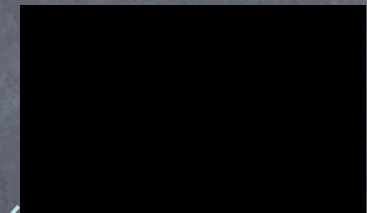
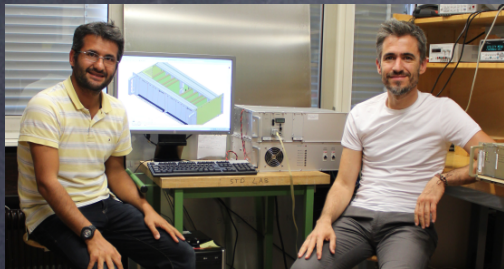
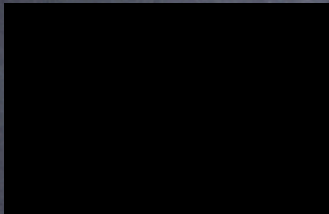


Work ongoing on...

- Controller firmware
- Quadrupole and Corrector rack design
- Development of test equipment

Miguel Bastos & Eyrim Ari

SESAME Power Supplies team



Miquel Bastos & Eyrim Ari

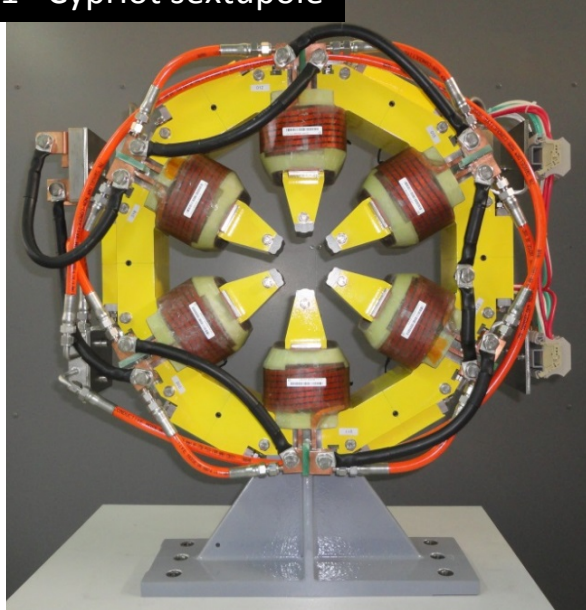
Conclusion

- *FP7 CESSAMag is on track; most of the EC funding is committed.*
- *The policy of involving industry and institutes of SESAME members (SOMNEZ, Turkey; CNE, Cyprus; HMC3, Pakistan; soon TDK, Israel) has been very positive: extra workload for CERN but rewarded by a strong motivation towards excellence.*
- *The training aspect, important per se and for the EC in the perspective of Euro-Mediterranean cooperation works very well by mostly informal but dense collaborative work between CERN and SESAME.*

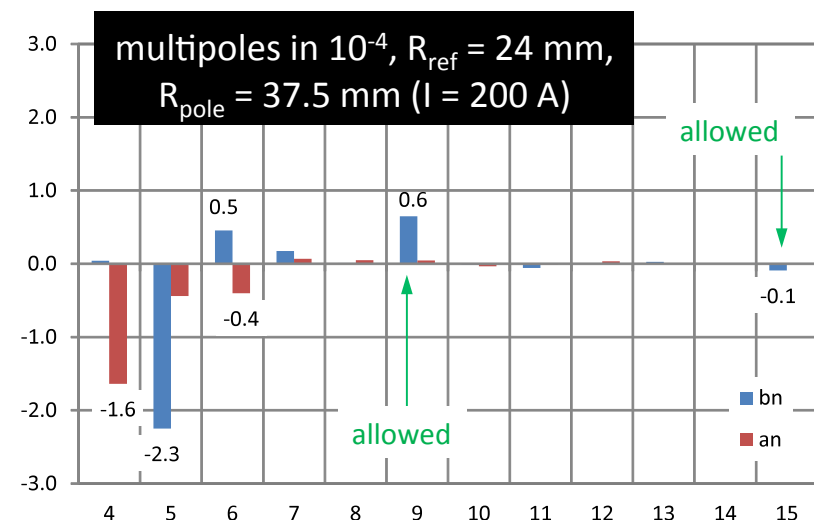
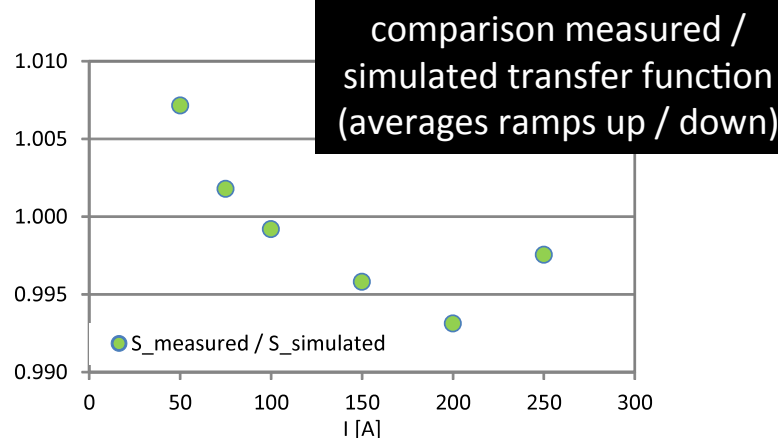
1st industry sextupole for SESAME at CERN



1st Cypriot sextupole



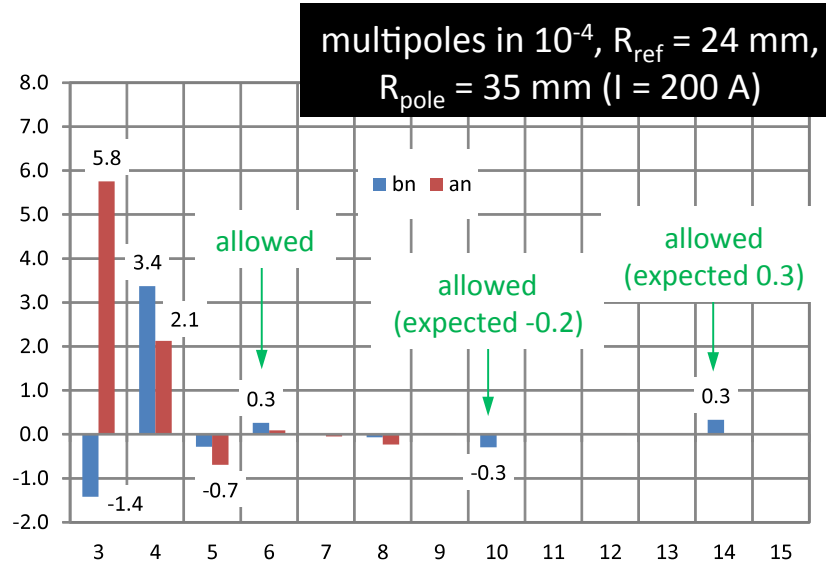
- Manufactured by CNE Technology Center (Cyprus), with coils produced by SEF (France)
- 1st accelerator magnet for this company & 1st made in Cyprus
- transfer function within 1% of OPERA 3D simulations
- excellent allowed harmonics
 - $\int b_9 < 1$ unit without end pole chamfers, with a 3D magnetic design that uses a biased b_9 in 2D (12.8 units) canceled off by the end effects
- very good not-allowed harmonics
 - good alignment of laminations within single sextants
 - good symmetric assembly of the six sextants



Pre-series QF quadrupole for SESAME at CERN



- manufactured by Elytt (Spain), with coils produced by Sönmez Transformatör (Turkey)
- transfer functions within 1% of OPERA 3D simulations
- allowed harmonics < 1 unit, as expected from 3D simulations
 - pole tip (circular arc instead of hyperbolic branch) confirmed, green light for lamination punching
 - values of end pole chamfers ok with no needs of iterations
- not-allowed harmonics to be improved
 - 5.9 units of sextupole
 - 4.0 units of octupole

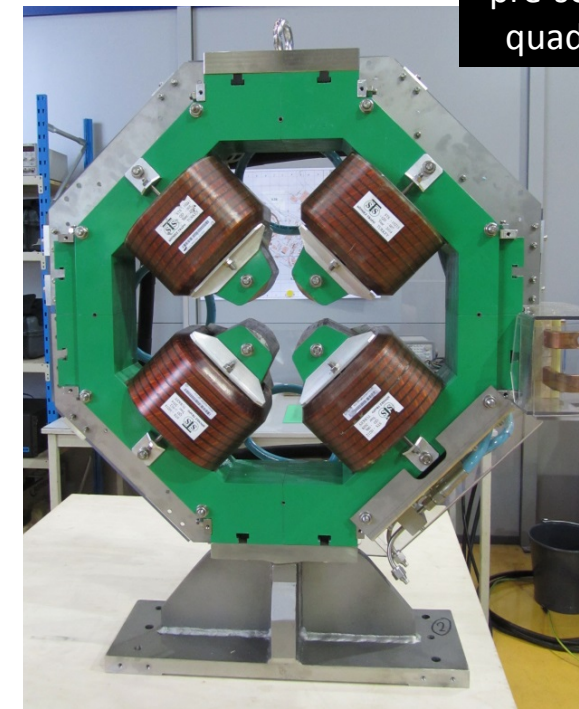
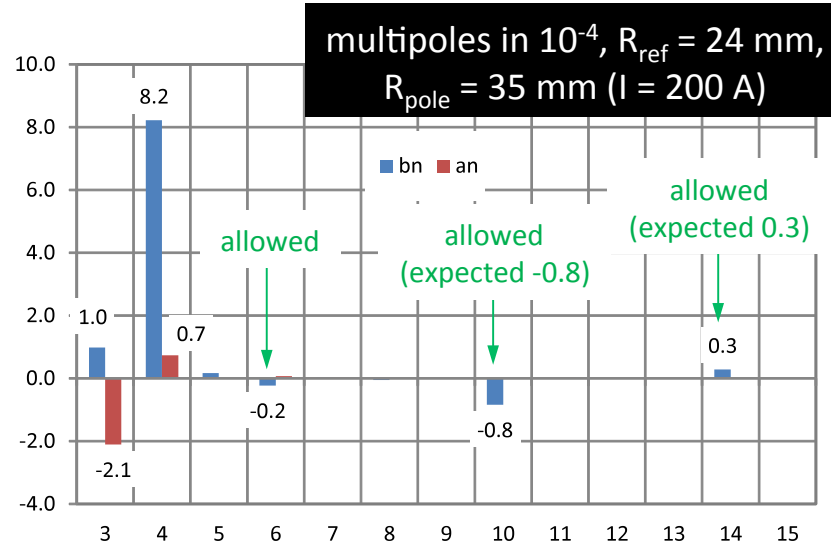


pre-series QF
quadrupole

Pre-series QD quadrupole for SESAME at CERN



- manufactured by Elytt (Spain), with coils produced by Sönmez Transformatör (Turkey)
- transfer functions within 1% of OPERA 3D simulations
- allowed harmonics < 1 unit, as expected from 3D simulations
 - pole tip (circular arc instead of hyperbolic branch) confirmed, green light for lamination punching
 - values of end pole chamfers ok with no needs of iterations
- not-allowed harmonics to be improved
 - 2.3 units of sextupole
 - 8.3 units of octupole

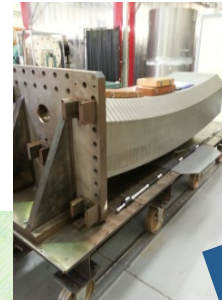


pre-series QD
quadrupole

SESAME magnets: made in ... a wide effort



FRANCE
420 sextupole coils



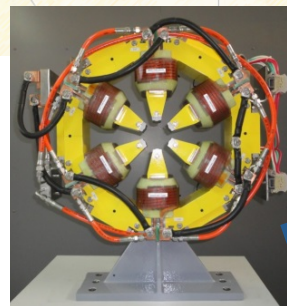
UK
17 dipoles



PAKISTAN
33 sextupoles



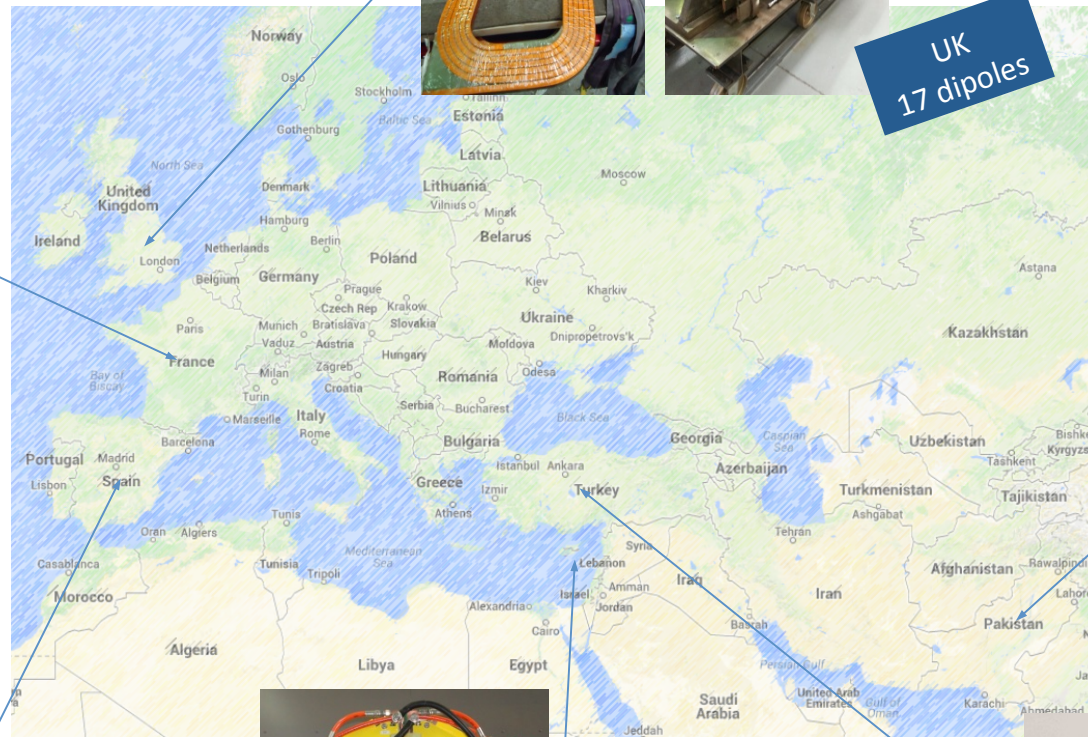
SPAIN
66 quadrupoles



CYPRUS
33 sextupoles

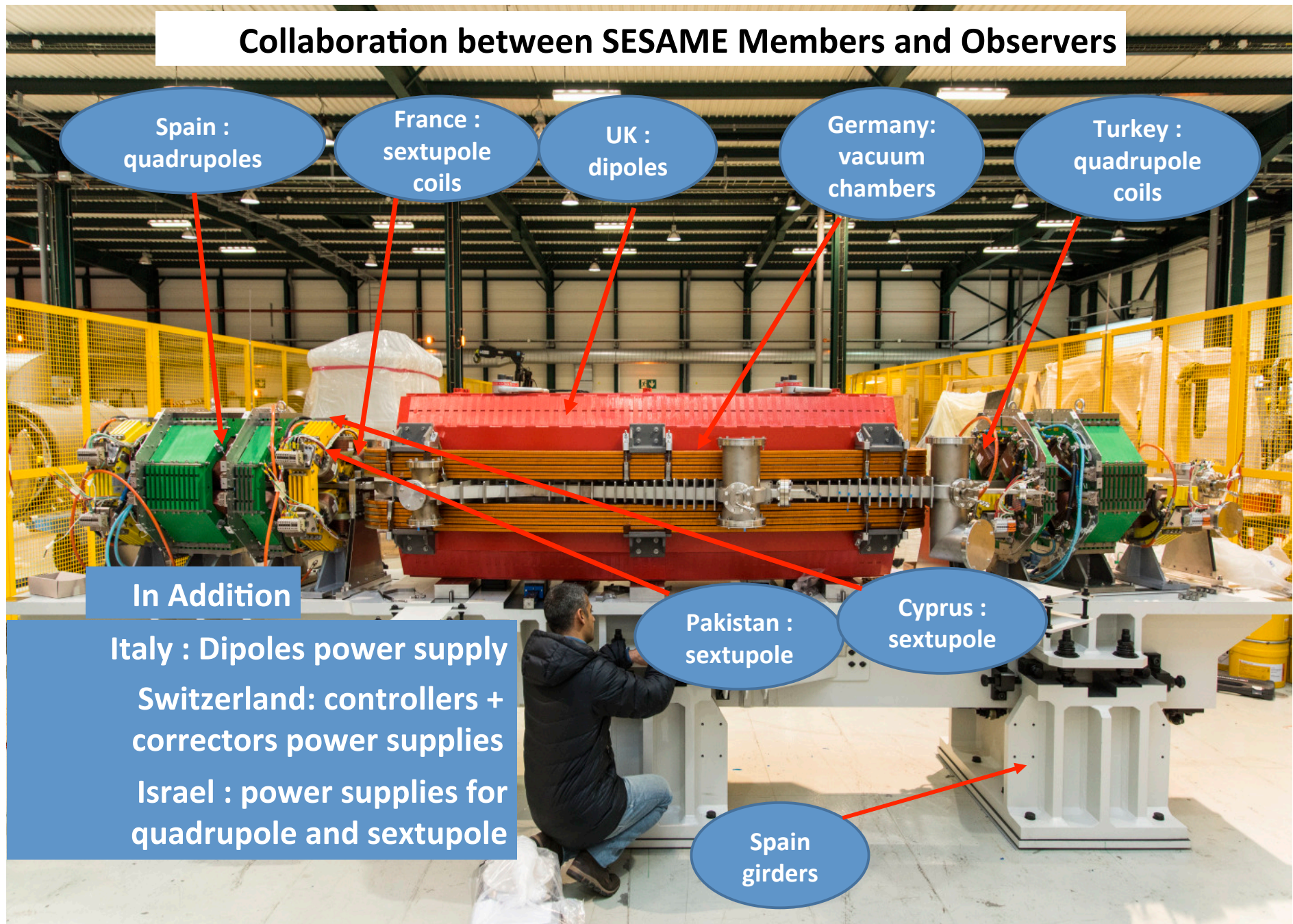


TURKEY
280 quadrupole coils



First of 16 sectors of the main storage ring at CERN 31 March 2015

Collaboration between SESAME Members and Observers





Italy Donates 2-5 Million Euro

Microtron Installed at SESAME



Components of BESSY 1 installed to form (part of) the SESAME Booster

November 2008



Shielding for the Booster and Main Ring under construction May 2010



Shielding under construction November 2010





SESAME Organization

Khaled Toukan (General Director)

Yasser Khalil (administrative)
(technical)

Giorgio Paolucci (scientific) Erhard Huttel

Beamlines

XABS: Messaoud Harfouche
IR: Ibraheem Yousef
PD: Rabia Kaneez

Left 2014

Machine-Physics

Maher Attal
Mohammad Ebeni
Koryun Maunkyan

Administration

Sonia Al-Faques
Majeda Salama
Ayman Al-Zoubi
Ibrahim Radwan
Abd Al Mawla Gnaimat
Khaled Al-Zoubi
Ibrahim Al-Zoubi
Mohammad Khlaileh
Basheer Amayreh
Radwan Ramadan

5/13/14

New 2014

RF/Diagnostics

Darweesh Foudeh
Nashat (RF)
Alaa Alkurdi (RF)
Hussain Al-Mohammad (D)

Computing

Salman MAtalgah
Mustafa Zoubi

Control

Ibrahim Saleh
Abdallah Ismail
Yazan Dabian (2014)

New 2014

Radiation-Safety

Adli Hamad
Morteza Mansouri

Electronics/Electric

Sofian Javar (Power supplies)
Ifikhar Abid (pulsed PS)
Osama Khader (Electric)

Yazeed Momani
Farouq Al-Omari

Design/Mechanics

Maher Shehab
Thaer Abu-Hanieh
Akrum Al-Homoud

Ahmad Ateieh

Cooling/Vacuum

Firas Mahahleh
Osama Nour
Mohammad Al-Nadjdawi
Adel Amro
Saed Budair

On leave

Up-Dated Status of SESAME Capital Funds 2011 to 6/5/2014



CONTRIBUTIONS

Jordan	2,030,725.00
Israel	2,500,000.00
Egypt	0.00
Iran	0.00
Turkey	2,500,000.00
Pakistan	0.00
Cyprus	0.00
Bahrain	0.00
Palestinian Authority	0.00

Total Contributions

7,030,725.00

Total Fund

7,030,725.00

Expenses

Expenses 2014

590,840.30

Expenses 2013

543,955.16

Expenses 2012

311,498.67

Expenses 2011

324,399.53

Advance Payment (CERN)

100,000.00

Total Expenses & Debts

1,870,693.66

Other Income

Net Book Balance

5,160,031.34

Actual Balance

5,162,227.61

2196.27

4/15/15

YK 24th CM

87

Proposed Budget Distribution for 2015		
\$ 4,425,188	Approved 2014 Budget	Proposed 2015 increase (29.67%)
Lower Limit	\$ 301,739.18	\$ 391,279.29
Upper limit	\$ 531,060.96	\$ 688,651.54
Member		
Bahrain	\$ 301,739.18	\$ 391,279.29
Cyprus	\$ 301,739.18	\$ 391,279.29
Egypt	\$ 311,032.75	\$ 403,330.68
Iran	\$ 531,060.96	\$ 688,651.54
Israel	\$ 531,060.96	\$ 688,651.54
Jordan	\$ 301,739.18	\$ 391,279.29
Pakistan	\$ 531,060.96	\$ 688,651.54
Palestinian Authority	\$ 72,081.99	\$ 93,472.09
Turkey	\$ 531,060.96	\$ 688,651.54
Total	\$ 3,412,576.12	\$ 4,425,246.80

SESAME roof on 15/12/2013



Aerial view of the roof ready for final stage of dismantling in 5 pieces each about 20 tons (using 250-ton crane)



Towards a new Roof

Dec. 2013:	Roof deflected by heavy snow load Equipment protected from water Roof supported by jacks and scaffolds
Jan.2014:	Jordanian and International Expert-Commission assigned to investigate the accident
Apr. 2014:	Agreement SESAME –Constructor to reconstruct the roof SESAME (Royal court) : 350 k JD fixed Constructor remaining: ~ 700 k JD Schedule: 6-8 months
August 2014	Design approved by two experts from Europe. Shop drawings are underway.
September 2014	Repair (or new construction) of concrete columns is completed. Installation of steel roof is expected to start .

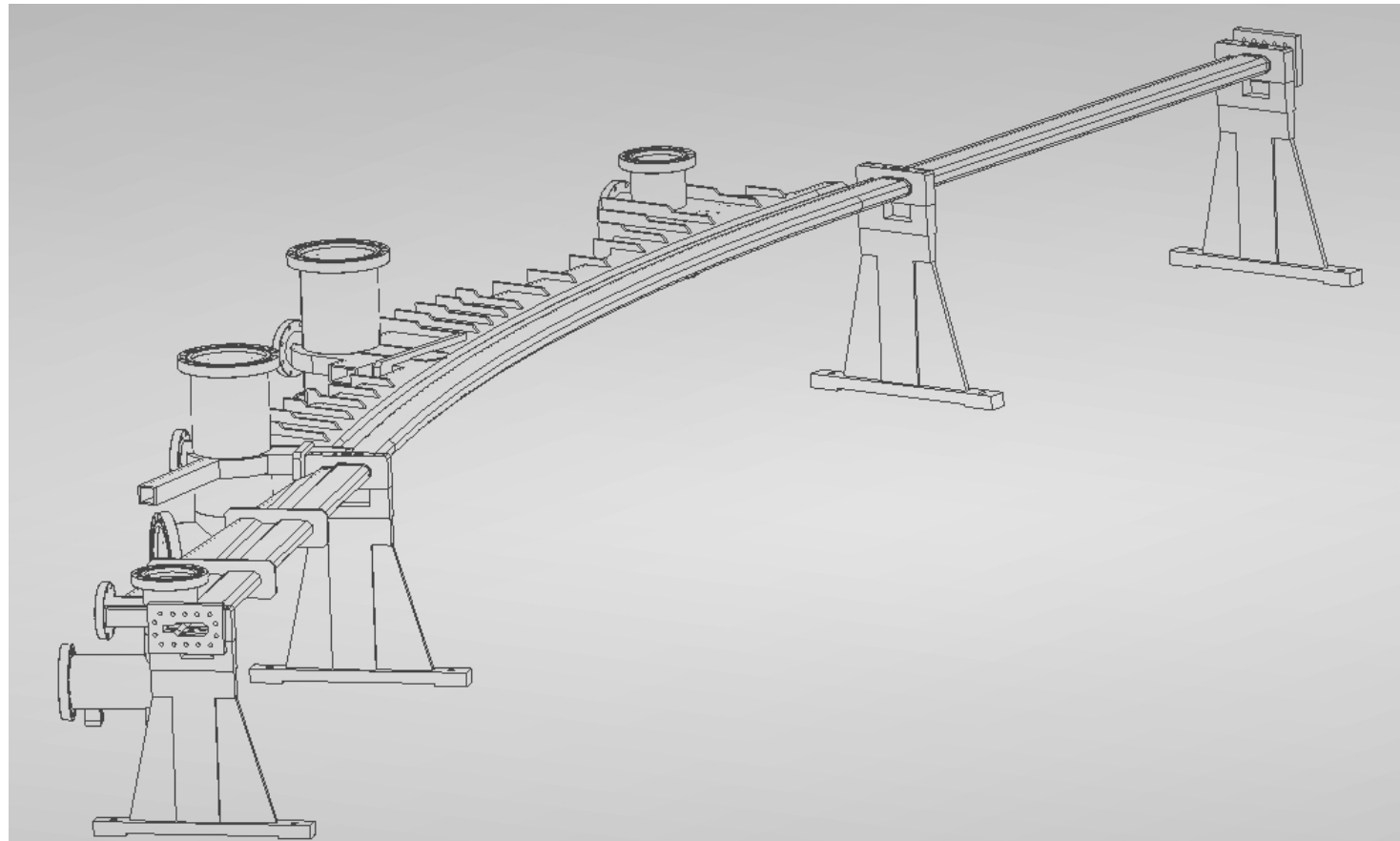
Storage-Ring-Vacuum-Chamber

Jun. 2014: Invitation to Bid

Aug.2014:3 bids received (FMB, CECOM, FZJ)

Oct. 2014: Evaluation internal and external

Feb.2014: FMB contracted Design-review

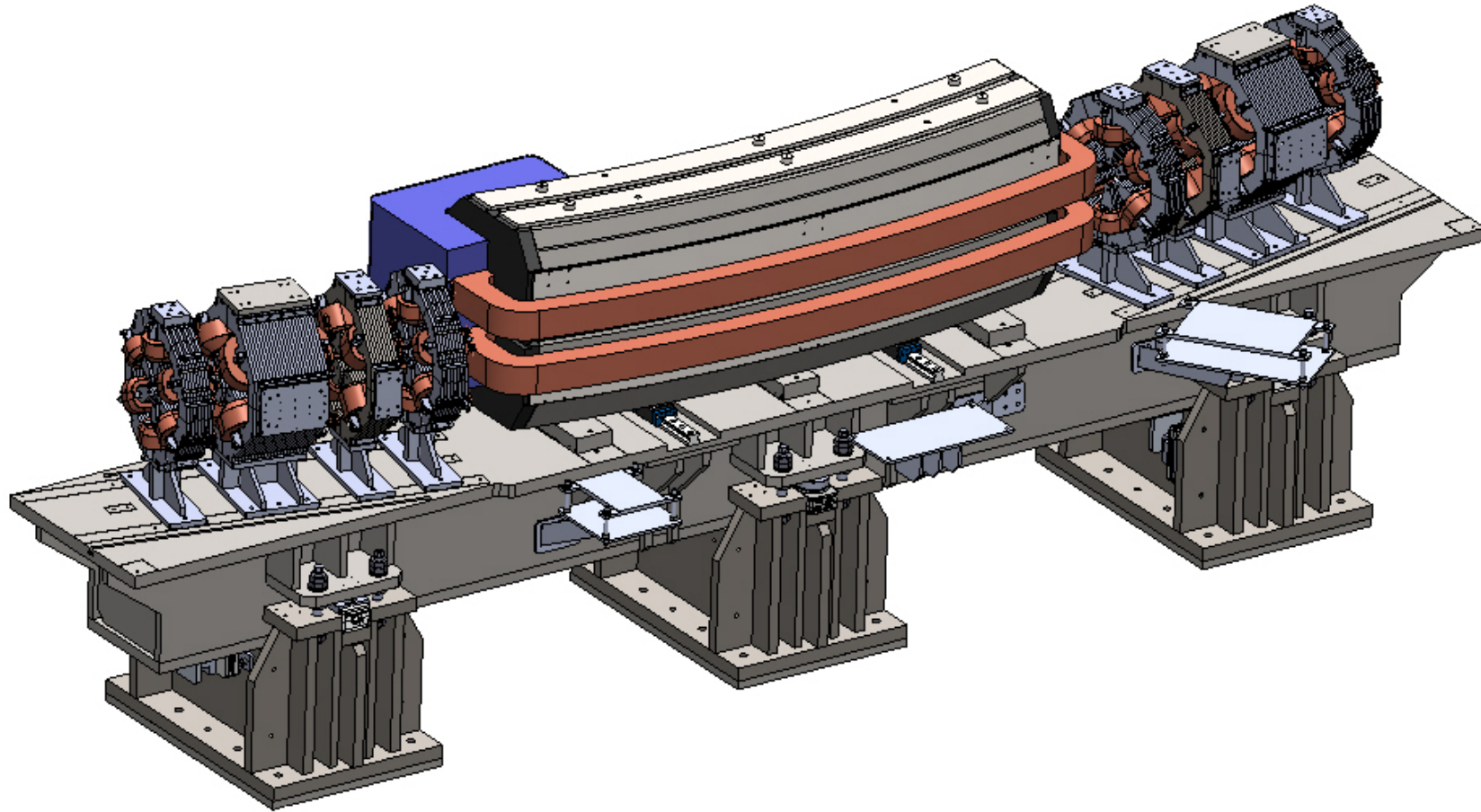


Storage-Ring-RF-Cavities



Sep. 2013:	Invitation to Bid
Nov. 2013:	3 bids received (RI, ELETTRA, TOSHIBA)
Oct. 2013:	Tender cancelled (in favor of collaboration with ELETTRA based on 1 M € contribution from Italy)
Feb. 2014:	Visit ELETTRA (Technical Clarification)
May 2014:	Collaboration agreement signed
	Delivery till mid 2016

Storage-ring Girders



Jan. 2014:	Invitation to Bid
Apr. 2014:	7 bids received (China, France, Iran, Israel, Pakistan, Russia, Spain)
July 2014:	Contract signed with Nortemecanica (Spain)

SR Solid State Amplifier (SSA)

SOLEIL had developed 150 kW 350 MHz solid state amplifier for SOLEIL storage-ring
has developed 500 MHz solid state amplifier for SESAMA and THOMX
has licensed technology to SIGMA-PHI Electron

Collaboration Agreement between SOLEIL and SESAME:
To built for SESAME one 80 kW 500 MHz Solid State Amplifier

Additional three 80 kW towers needed for storage-ring operation
Should be identical to first tower

Further three towers to be purchased commercially
Single Source Provider approved by finance committee

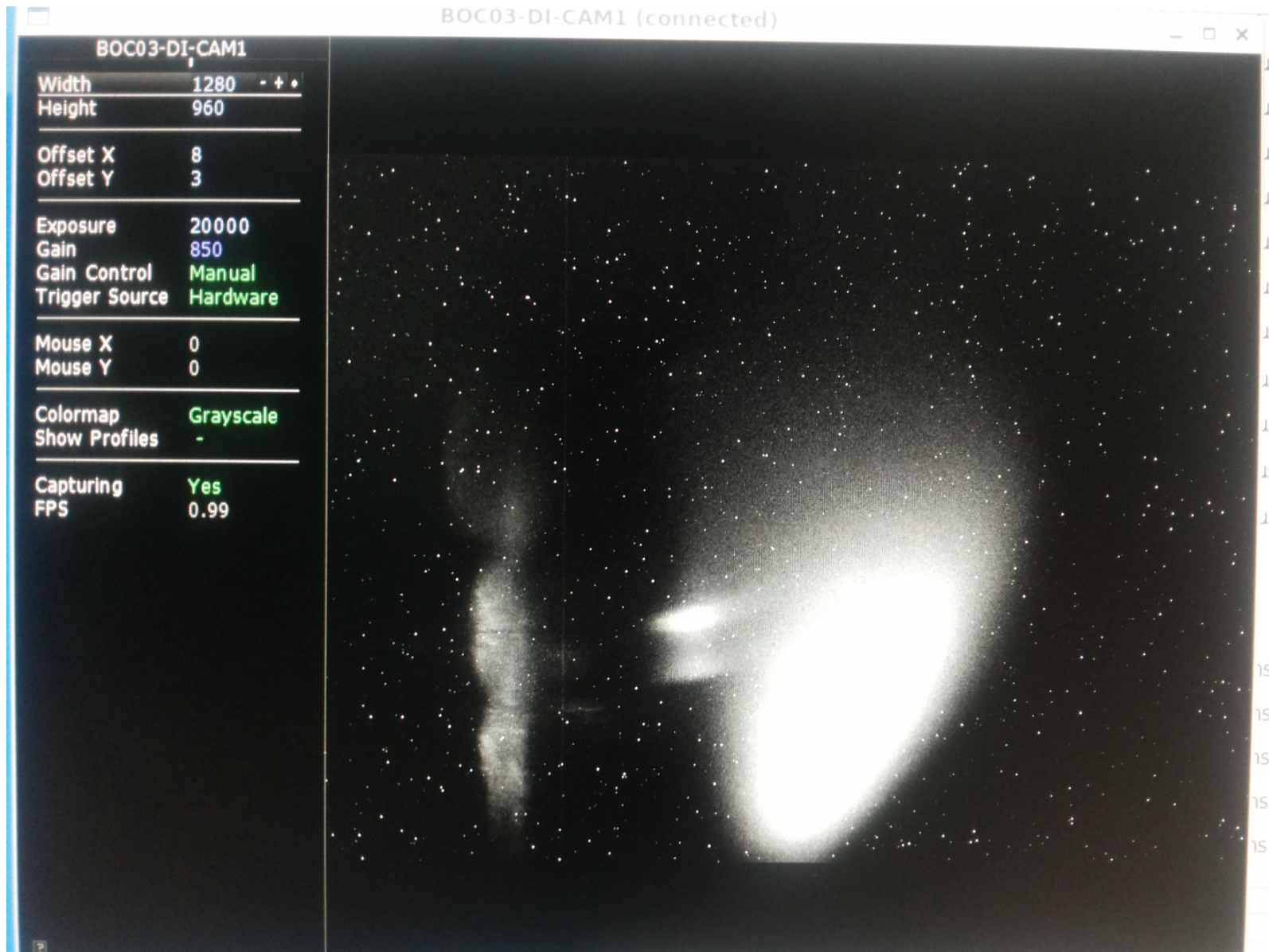
Booster-Commissioning

Feb. 2014:	Start of commissioning (delayed due to roof accident) Beam passed first two magnets
Mar. 2014:	Additional diagnostics installed Beam passed half the Booster
Apr. 2014:	Additional diagnostics installed One turn achieved (should be the easier part)
July 2014	20 MeV beam was stored in the booster
September 2014	800 MeV beam was achieved in the booster

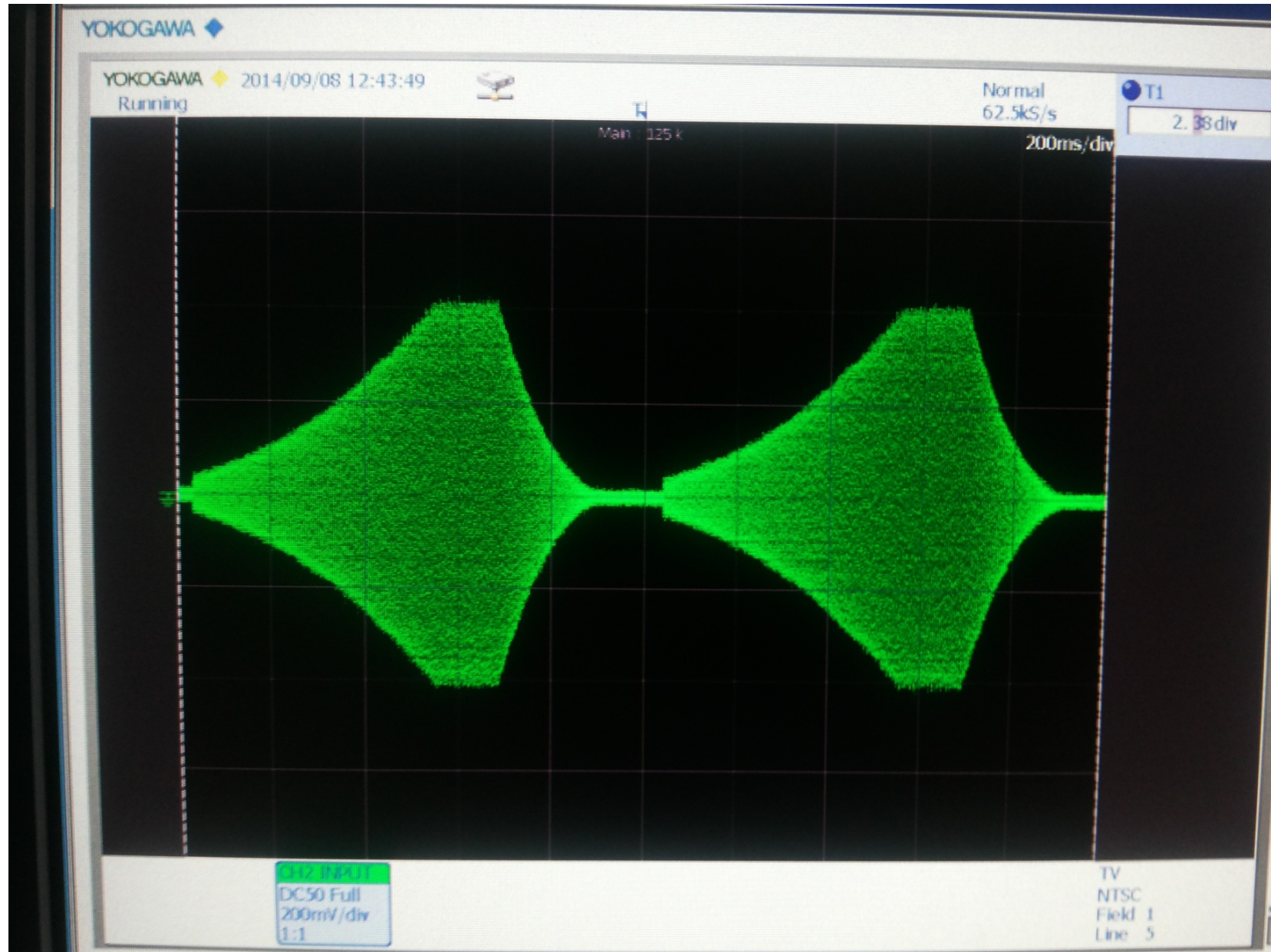
BOOSTER STATUS



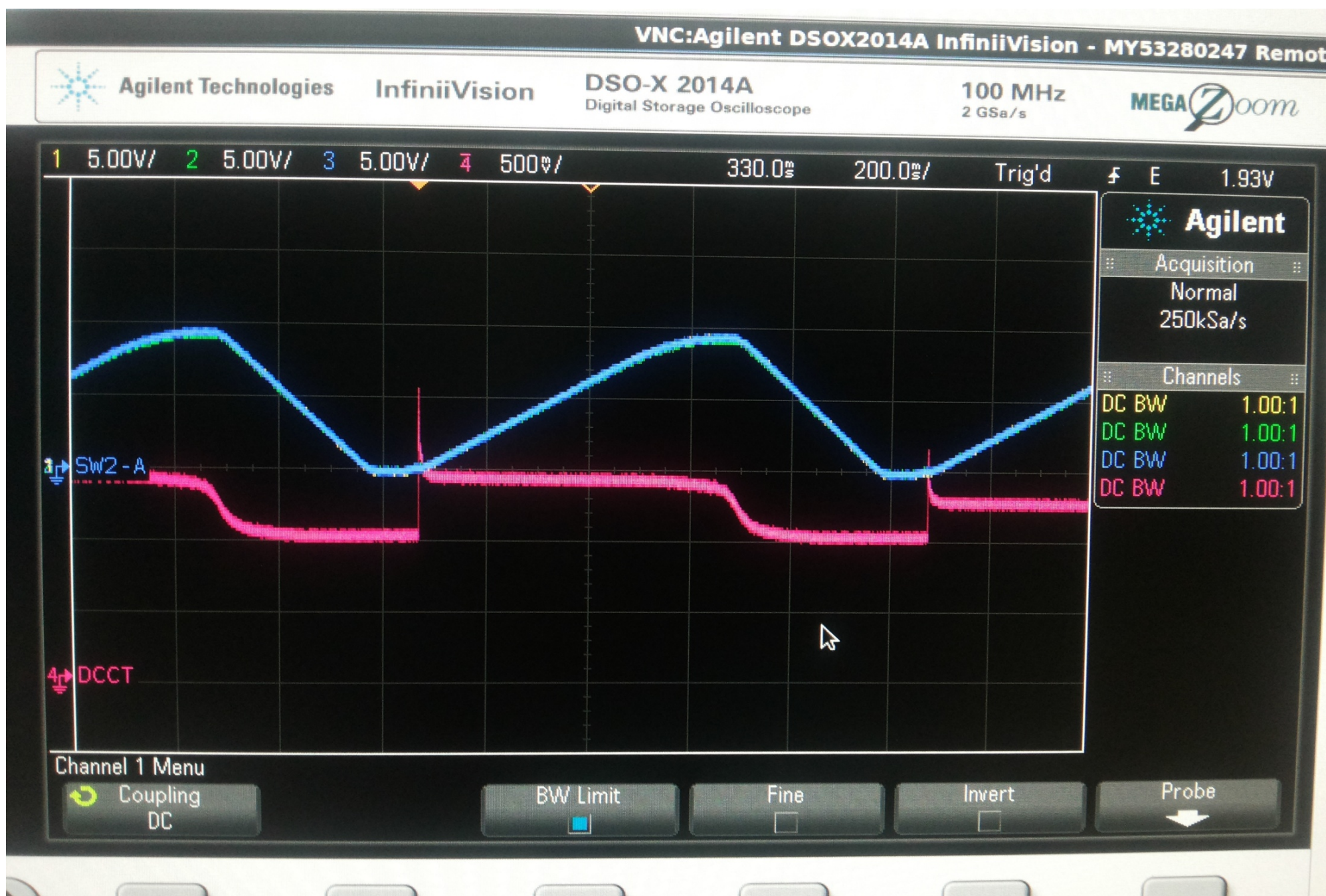
Image of the beam at 800 MeV using dipole photons



RF Cavity Voltage



800 MeV Booster Beam Achieved on September 3, 2014



SESAME staff in the control room at the moment of achieving 800 MeV



Magnet for Sesame at Cern 200315



Sesame Girdle from Spain at Cern

200315



The Sesame Team at Cern 300315



Together





R. Sarraf

Aerial view of the roof ready for final stage of dismantling in 5 pieces each about 20 tons (using 250-ton crane)







THE SCIENTISTS AND THEIR DRIVE
BROKE BOUNDARIES AND TOOK
THE PROJECT TO WHERE NO ONE
HAD THE RIGHT TO EXPECT

Science Beginning with Infra-Red Microscope

11 proposals approved. First experiments in 2014

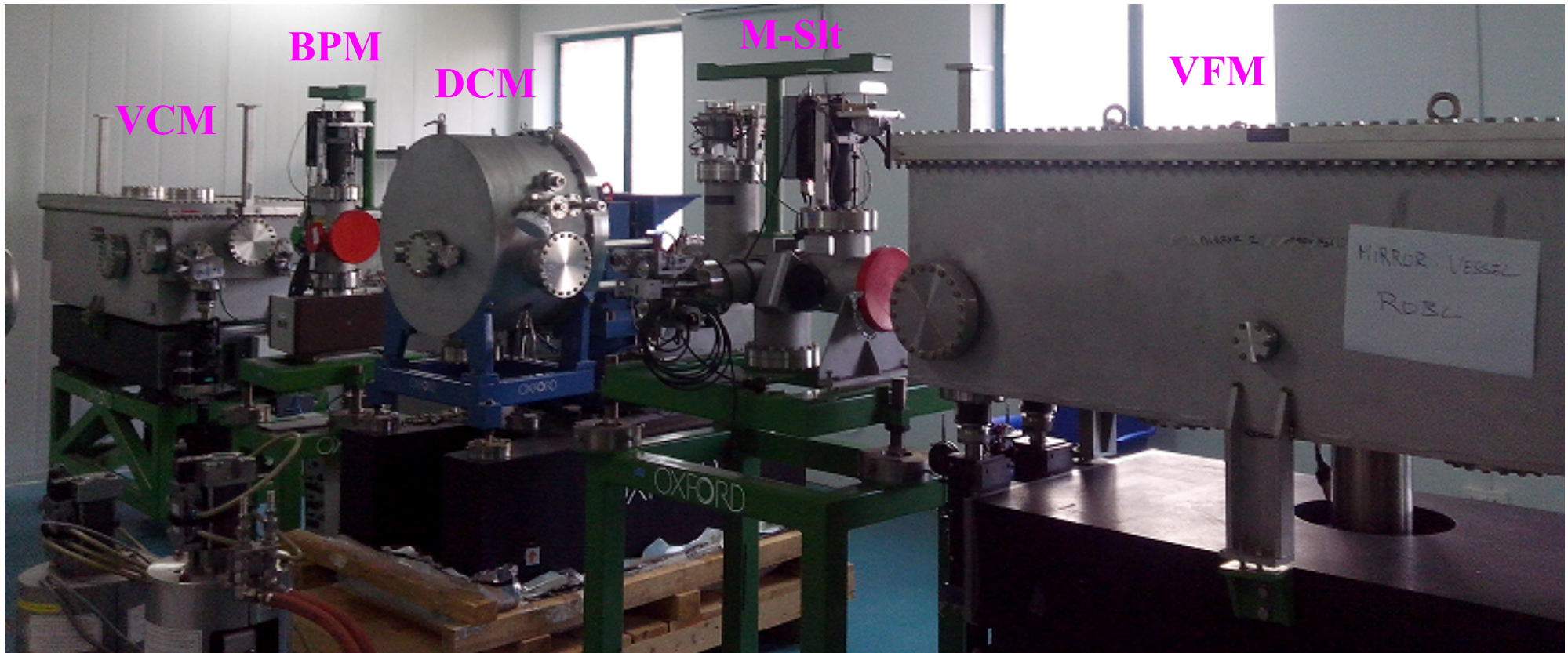
e.g. Study of breast cancer by
Fatemeh Elmi, Assistant Professor,
University of Mazandaran, North Iran
+ Randa Mansour and Nisreen
Dahshan, PhD students in the Faculty
of Pharmacy, University of Jordan.



Programme with synchrotron-radiation will begin in 2017

X-RAY ABSORPTION FINE STRUCTURE AND FLUORESCENCE BEAMLINE

Picture of the pre-aligned Beamline Components in the Test Area



VCM: Vertical Collimating Mirror

BPM: Beam Position Monitor

DCM: Double crystal Monochromator

M-Slt: Monochromatic Slits

VFM : Vertical Focusing Miroor

ANOTHER WORLD?

“As a string theorist, I work on parallel universes. I was always curious about what a parallel universe was like, and now I know. I’m living in one when I go to *SESAME* meetings”

Eliezer Rabinovici; Hebrew University and Israeli representative to the SESAME Council

Initial Scientific Programme of SESAME

- Structural Molecular Biology
- Atomic and Molecular Sciences
- Surface and Interface Science
- Environmental Science
- Material Science
- Archaeological Science
- Medical Applications (demanded by the users community at the 3rd Users Meeting)

SESAME Phase I Beamlines -Day 1 in red

No	Beamline	Energy	Source	Research
1	Multi-wavelength Anomalous Dispersion (MAD) Protein Crystallography	5 - 14 keV	In-vacuum undulator	Structural Molecular Biology (SMB)
2	Soft X-ray, Vacuum Ultra Violet (VUV)	0.05 - 2 keV	Elliptically Polarizing Undulator	Atomic, Molecular and Condensed Matter Physics
3	Small and Wide Angle X-ray Scattering (SAXS/WAXS)	8 - 12 keV	Undulator	SMB, Material Science
4	X-ray Fluorescence XRF/X-ray Absorption Fine Structure XAFS	3 - 30 keV	Multi-pole Wiggler	Material Science, Archaeology
5	Powder Diffraction	3 - 25 keV	Multi-pole Wiggler	Material science
6.	IR Spectro-microscopy	0.01 - 1 eV	Bending Magnet	Environmental, Materials and Archaeological Science
7	Atomic, Molecular & Optics	5 - 250 eV	Bending Magnet	Atomic and Molecular Physics

Training Programme (thanks to external support listed later)

- Users' Meetings, Schools, Workshops, Fellowships, visits to operating light-sources,... - is building technical and scientific capacity in the region

Users' Meeting Amman 2002



9th Users' Meeting
Amman 2012



SESAME-JSPS School
Amman 2011



SESAME-JSPS School

6 June 2008

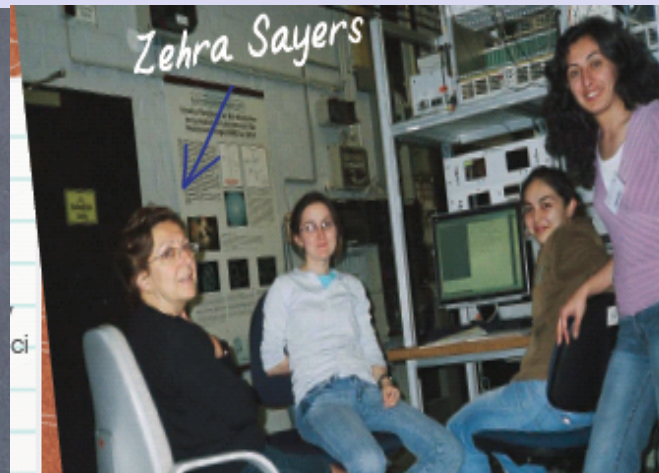
Some SESAME People, including Users of Day One Beamlines



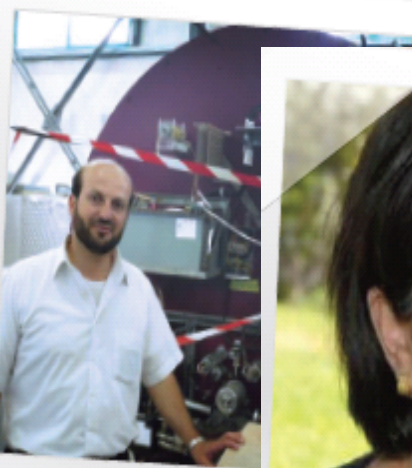
Mohammad Yous



Sumera Javeed



Zehra Sayers



Maher At



Irit Sagi



Vasilis Promponas



Mukhles Sowwan

Sesame People



Mohammad Yousef

Mohammad Yousef, shown here inspecting a monochromator at the Japanese Photon Factory, is a biophysicist and structural biologist from Cairo University who works on analyzing proteins, protein/DNA and protein/ligand complexes. The use of X-ray crystallography to determine the three-dimensional structures of biological macromolecules at atomic resolution is central to his work. The results of such studies provide the basis for understanding biological functions and guide the rational design of new therapeutics.

Mohammad, who has attended and spoken at many SESAME meetings, says "My research requires X-ray synchrotron beamlines, which are currently unavailable in the Middle East. Therefore, I do most of my research abroad. SESAME, when operational, will bring me home!"

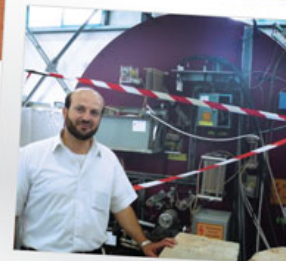
Sumera Javeed, who attended the 8th SESAME Users' Meeting in 2009, is interested in studying the growth of carbon nanoparticles and their disintegration using different techniques, says "For most of the experiments of interest to us, the diagnostics can be most effectively carried out using the soft X-ray beamline of SESAME. The broad spectrum of research programmes at SESAME will cater for the synchrotron radiation needs of the region, including specifically those of Pakistan. There are definitely cultural benefits involved in having scientists from different countries working close together."



Sumera Javeed

Sumera, pictured working on a hollow cathode DC magnetron sputtering setup for carbon film deposition, is based at the Accelerator and Carbon based Nanotechnology Laboratory, Pakistan Institute of Nuclear Science and Technology, Islamabad. Her basic field of research is carbon-based nanotechnology and ion physics. She is currently working on the formation of carbon thin films on metal substrates using a wide range of techniques.

Maher Attal attended the first SESAME workshop in Jordan (at Al-Balqa University) in 2000, was subsequently a SESAME trainee at the French synchrotron LURE, and has attended all the SESAME technical meetings and several of the Users' Meetings. He says that "As the first synchrotron light source in the Middle East, SESAME is a valuable and challenging experience through which I learned a completely new scientific field and obtained my PhD in accelerator physics. I think it will be a vital scientific research center which will activate, and make it much easier to carry out, scientific research in the region."



Maher Attal

Maher, seen here with the SESAME Microtron injector, is a Palestinian accelerator physicist who works at SESAME on accelerator physics related issues.



Irit Sagi

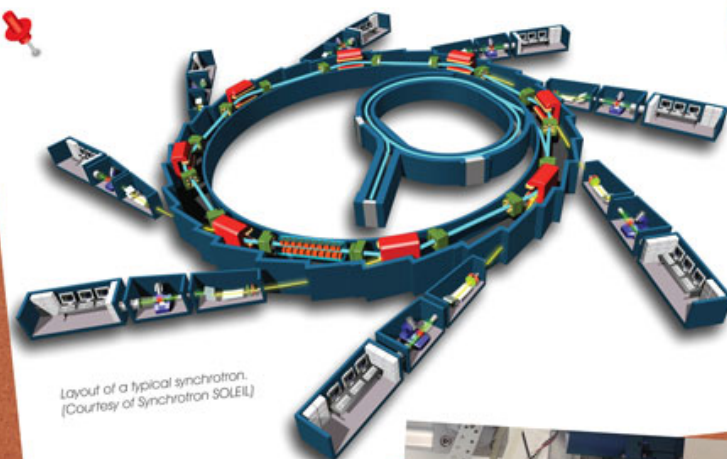
Irit Sagi is a professor of biophysics at the Weizmann Institute of Science in Rehovot. She is applying a unique, multidisciplinary approach to investigating enzymes, the complex molecular machines that regulate the chemistry of cells and organisms. Using synchrotron radiation in the X-ray regime, she advanced a method for precisely tracking, in real time, changes taking place in active enzymes at the level of single atoms. This method is currently employed by her research team to decipher the enzymes' mechanisms of action and to develop a new generation of safe and effective drugs.

Irit, who has been a member of the SESAME Scientific Advisory Committee since it was established, says "I have strongly supported SESAME for many years. Having a synchrotron in our area will create a unique opportunity to merge scientific expertise without regard to borders or nationalities. SESAME is designed to promote regional scientific projects and advance young scientists by extending their horizons with modern technology. I am looking forward to that day."

Sesame People

How SESAME works and what it can do

In SESAME, bunches of electrons will circulate at nearly the speed of light for several hours inside a long narrow evacuated pipe bent into the form of a closed ring 133 metres in circumference. As magnets surrounding the pipe steer electrons around such a ring, the electrons emit 'synchrotron light', with wavelengths that range from infrared radiation to X-rays. This light is collected by different 'beamlines' (optical systems) connected to the ring, and focussed on experimental samples; thus, many experiments can be carried out simultaneously. SESAME will be able to support up to 25 independent beamlines, each of which can serve several experiments. It will incorporate special devices called 'undulators' and 'wrigglers' which enhance the emission of synchrotron light, making it a competitive 'third generation' facility.



Seven beamlines, selected on the basis of requests from scientists in the region, will be available in the first few years of operation. Their properties and capabilities, which span the physical and biological sciences, are described in the SESAME brochure (<http://www.sesame.org.jo/brochure.pdf>), where examples are given of discoveries that have been made with similar beamlines at synchrotron light sources round the world. These examples include: work which provides insights into how antibiotics kill bacteria but not human cells; studies that have led to better understanding of motor neuron disease and are helping in the design of drugs to treat this condition; experiments that provided new insights into how certain diseases, including liver diseases, develop; work that is helping to improve the performance of photovoltaic solar cells; studies of materials that could be used to store carbon dioxide to prevent it entering the atmosphere; and an investigation that has shown that the ancient Egyptians developed a new technology to make opaque glass. Similar discoveries will surely be made at SESAME by users such as those featured here.



Vasilis Promponas, who is interested in predicting the structure, function and evolution of biological macromolecules using information encoded in amino acid sequences, says that "Our research so far is based on purely computational approaches to exploit experimental data. SESAME will provide unique opportunities for enriching our research with custom-produced experimental data, and the possibility for joint computational-experimental high-impact research activities. By predicting folding features of important classes of protein molecules (e.g. bacterial membrane proteins) we hope to open new directions for combating diseases."



Vasilis Promponas

Vasilis, seen here preparing a sample for a yeast protein expression microarray experiment at the European Laboratory for Molecular Biology, is a lecturer of bioinformatics in the Department of Biological Sciences at the University of Cyprus, and head of the Bioinformatics Research Laboratory, where he works on large-scale genome sequence analysis and protein structure and function prediction.

Zehra Sayers, pictured here with her students while collecting data at the synchrotron (DESY) in Hamburg, Germany, is a biophysicist. She worked for several years at the European Molecular Biology Laboratory Outstation at DESY before joining Sabanci University in Istanbul to establish the Biological Sciences and Bioengineering Programme. Her research, which combines molecular biology with structural analyses to investigate stress responses in plants, needs intense X-rays from a synchrotron light source. SESAME will provide enough beamtime to perform extended experiments on samples prepared on site.



Zehra Sayers

Synchrotron radiation emerging from a beam port. The blue colour comes from oxygen and nitrogen atoms in the air, ionised by the X-rays. (Credit: U.S. Department of Energy)

Zehra, who has chaired the SESAME Scientific Advisory Committee since 2002 and has been active in the organization of several SESAME Users' Meetings and specialized workshops, says "SESAME is a unique project; it provides means for training young scientists in top technologies with the clear goal of bringing this know-how to the Middle East. It will facilitate world-class research in the region and it provides an environment in which people, who otherwise live in constant conflict, can communicate and cooperate through the language of science".

Sesame People



Mukhles Sowwan

Mukhles Sowwan, pictured here in his laboratory (5th from left) with Nobel Laureate Torsten Wiesel (7th from left) and a number of his current and previous group members, is Director of the Nanotechnology Research Laboratory and the Vice Dean of the Faculty of Engineering at Al-Quds University, the Arab Palestinian University in East Jerusalem. His work focuses on the fabrication, synthesis and characterization of multifunctional organic/inorganic nanoparticles for different applications from drug delivery through molecular electronics to energy applications.

Mukhles, who has attended all of the SESAME Users' Meetings and serves on SESAME's Scientific Advisory Committee, says "I need synchrotron radiation to study the structure and phase stability of nanoparticles. SESAME will produce extremely bright X-rays that can be used to study very small objects like nanoparticles to man-made materials with unusual properties."

Seadat Varnasseri, shown here carrying out measurements on the SESAME booster, became involved in accelerator technology at the Daresbury Laboratory in the UK in 2001 and then worked on linear accelerators in his native Iran. He worked at SESAME from 2004 to 2010 on the finalisation of the design, with the help of colleagues at European light sources, especially SOLEIL in France, which he visited with support from UNESCO and the Canon Foundation.

During his time at SESAME Seadat tried to present one or two technical papers a year at international conferences, which he attended with support from the organisers, in order to promote and introduce the project to colleagues in Europe, Asia and the US. He says "SESAME from my point of view is an experimental laboratory not only for developing science and technology, but also for collaboration between different nations, religions and political views in the region of the Middle East".



Seadat Varnasseri

Aslam Baig, shown here aligning the laser system of an experiment designed to study multi-step laser excitation of atoms, founded the Atomic and Molecular Physics Laboratory at the Quaid-i-Azam University, Islamabad, after having worked for more than a decade at the Bonn Synchrotron Radiation Facility, Germany. After having been Pakistan's representative on the Interim SESAME Council and then on the Council, and a UNESCO consultant for SESAME, he worked as SESAME's founding Science Director until 2007.



Aslam Baig

Future SESAME users doing laboratory work during a 2006 Workshop in Alexandria.



Aslam, who organized the first SESAME Users' Meetings and actively participated in, and contributed to, the technical and scientific meetings that began the development of SESAME's scientific programme, says that "SESAME is an exciting experimental facility that has brought scientists from nations having diverse ideologies to work on scientific problems of common interests. As soon as SESAME is operational, I would like to set up an experiment to extend my on-going research on excited states of atoms, which uses lasers."

Who Will Use SESAME?

The scientists who will use SESAME will mostly be based in universities and research institutes in the region. Typically, they will visit SESAME two or three times a year for periods of up to a week to carry out experiments, often working in collaboration with scientists from other countries. While at SESAME they will be exposed to the highest scientific standards in a stimulating environment for international collaboration. When they return home to analyze the data they have obtained, they will take with them scientific expertise and knowledge to share with their colleagues and students.

From day one of operation, several hundred scientists, working in disciplines ranging from archaeology to the biological and medical sciences, are expected to use SESAME, which will be a unique multidisciplinary centre in the region. The number of users is expected to grow to 1000 or more as more beamlines are installed.



SESAME

Sesame People

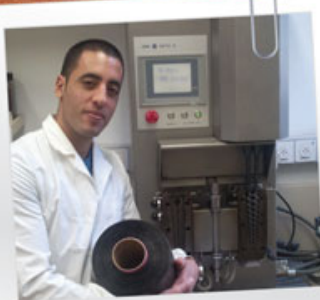


Azadeh Shahsavari

Azadeh Shahsavari, pictured at the 8th SESAME Users' Meeting at Petra (Jordan) in 2009 (which she attended with support from a fund to support potential SESAME users established by the American, British, European and German Physical Societies), is an Iranian PhD student at the Faculty of Pharmaceutical Sciences, University of Copenhagen. Her passion for science led her to work on structural biology.

Azadeh needed an X-ray source for her work; none was available in the Middle East, but she was able to use the Diamond synchrotron light source in the UK. She says "SESAME will provide me with a great opportunity to access a synchrotron light source nearer home. I expect SESAME to support a broad range of science and technology in the Middle East and bring together bright scientific minds."

Golan Tanami is a PhD student in Professor Gad Marom's laboratory at the Hebrew University of Jerusalem, where he is pictured. His research focuses on combining acicular nanofillers in a polymer matrix with reinforcing fibres, with the aim of achieving improved material properties by forming a judicious multiphase combination. The final outcome should be a lightweight yet strong material.



Golan Tanami

Golan says that "Synchrotron X-rays, from a source such as SESAME, are necessary for us to be able to investigate the morphology (crystallinity) of the material, as well as the interface between the matrix and the filler".

Hamed Tarawneh, seen here with a radio frequency cavity for the SESAME booster, is a Jordanian accelerator physicist. He attended the first SESAME workshop in Jordan in 2000 and then worked for a PhD in accelerator physics at the MAX-Lab, Lund University, Sweden, which he obtained in 2006. Since then he has worked as a staff member at SESAME, where he coordinates work on the SESAME booster synchrotron and is also involved in many aspects of the design of the main storage ring.



Hamed Tarawneh

Hamed says that "Through SESAME, I have had the chance to visit different synchrotron radiation facilities such as ALBA in Spain, SSRF in China, SOLEIL in France, and the Photon Factory in Japan, and also CERN in Switzerland. Such opportunities are fruitful as I discuss and learn many issues which benefit the progress of my work at SESAME."



Maged Al-Sherbiny

Maged Al-Sherbiny is an immunologist and biotechnologist from Cairo University. He is currently the President of the Academy of Scientific Research and Technology and the Assistant Minister for Scientific Research of Egypt.



Maged has also been a member of the Scientific Advisory Committee of SESAME for the past four years, and since he joined the SESAME family has been very active in promoting SESAME activities through Users' Meetings and lectures for the scientific community. He says that "It is my strong belief that SESAME is an excellent model to promote peace and development through the science and technology which will be provided by the state-of-the-art facility now being built in Jordan. I wish that one day SESAME will be as successful as CERN in joining scientists from all over the globe for the benefit of humankind."

Sesame People



Constantia Alexandrou

Constantia Alexandrou is Professor of Physics at the University of Cyprus and the Cyprus Institute. She is a theoretical and computational physicist, who leads work that will provide computational resources and know-how to scientists and engineers in Cyprus and the Eastern Mediterranean to enable state-of-the-art computer simulations. She coordinates a European Union project, which will fund a leased Internet line connecting SESAME to the Cyprus Institute. The latter will provide computational resources and expertise for the analysis of SESAME data. Joint work on this project is building strong links between the Cyprus Institute, SESAME and Jordan University.

Constantia, who has represented Cyprus on the SESAME Council, says "I am a strong supporter of SESAME because of the science and opportunities it brings to the region".

Zuheir El-bayyari, pictured here when visiting the Synchrotron Radiation Center at the University of Wisconsin-Madison, is currently receiving training through one of the numerous fellowships put at the disposal of SESAME. He is working mainly on early breast cancer detection using infrared micro-spectroscopy. When he gets home to Jordan he will work on the SESAME infrared beamline.



Zuheir El-bayyari

Zuheir, who has attended several SESAME Users' Meetings and Workshops, says "I hope to close technological gaps and perhaps ease tensions in the Middle East by bringing back to Jordan the knowledge I gained overseas".

Engin Ozdas, seen here aligning a sample capillary tube in an X-ray diffractometer in his laboratory, leads the Advanced Materials Research Group in the Physics Department, Hacettepe University, Turkey, where he works on superconducting materials, nanocarbon and layered intercalation compounds, which are commonly used for battery applications. His group is responsible for the design of SESAME's 'powder diffraction beamline'. This beamline, which incorporates some donated components from the Swiss Light Source, will be used to carry out experiments aimed at developing and characterising advanced materials.



Engin Ozdas

Engin, who has attended many SESAME Users' Meetings and Workshops and is a member of the SESAME Beamlines Advisory Committee, says "SESAME makes possible collaborative research between scientists from different countries (particularly those of the Members of SESAME) and with other synchrotron radiation centres, which have already welcomed several students from my group as visitors. The project has created trust and personal friendships between researchers in the Members of SESAME and developed countries, which may help solve regional and global political problems."



Inside the SESAME building, showing the shielding (which will house the main storage ring) nearing completion in November 2010.

Sesame People



*Khaled Toukan,
Director of SESAME*

Message

SESAME will be a pivotal pole for science in the region. It will offer state-of-the-art facilities where scientists can come together to carry out advanced scientific work which will contribute to promoting research and technologies in their respective countries. The numerous training opportunities that SESAME can provide are already helping to build the region's scientific capacity.

In the long run, SESAME will have far-reaching effects on the development of national capacities: it will contribute to improving the standards of teaching and research at national universities and help to make industries more competitive, while the opportunity to work at the Centre will motivate leading scientists and technologists to stay in the region, or to return if they have moved elsewhere.

Scientists wishing to join the SESAME fold are invited to write to me at:

→ sonia@sesame.org.jo



A photograph of the SESAME team taken in 2008.



1- SESAME (Jordan) 2- CLS (Canada) 3- Stanford Univ. (USA) 4- ALBA (Spain) 5- Soleil (France) 6- Sabanci Univ. (Turkey) 7- Elettra (Italy) 8- ALS (USA) 9- Soleil (France) 10- SESAME (Jordan) 11- Oxford Univ. (UK) 12- CERN (Switzerland) 13- Al-Quds Univ. (Palestinian Authority) 14- LBNL (USA) 15- PSI (Switzerland) 16- Hacettepe Univ. (Turkey)

Donated Equipment

- **From LURE, France**
 - Beamline, undulator
- **From SLS, Switzerland**
 - Beamline, wiggler
- **From Daresbury Lab & University of Liverpool, UK**
 - **Five** beamlines → day 1 Proton crystallography and XAFS/X-ray fluorescence beamlines
- **From SLAC, Stanford University, USA**
 - Undulator,...
- **From ALS, Bekeley, USA**
 - Wiggler
- **From LBNL, USA**
 - Wiggler
- **From Elettra, Italy**
 - Cavities

Preaching

...except ye repent,
ye shall all likewise
perish!





Nobel Laureates visit SESAME site in June, 2008

**45 Laureates have endorsed SESAME “as a beacon,
demonstrating how shared scientific initiatives can help light
the way towards peace”**



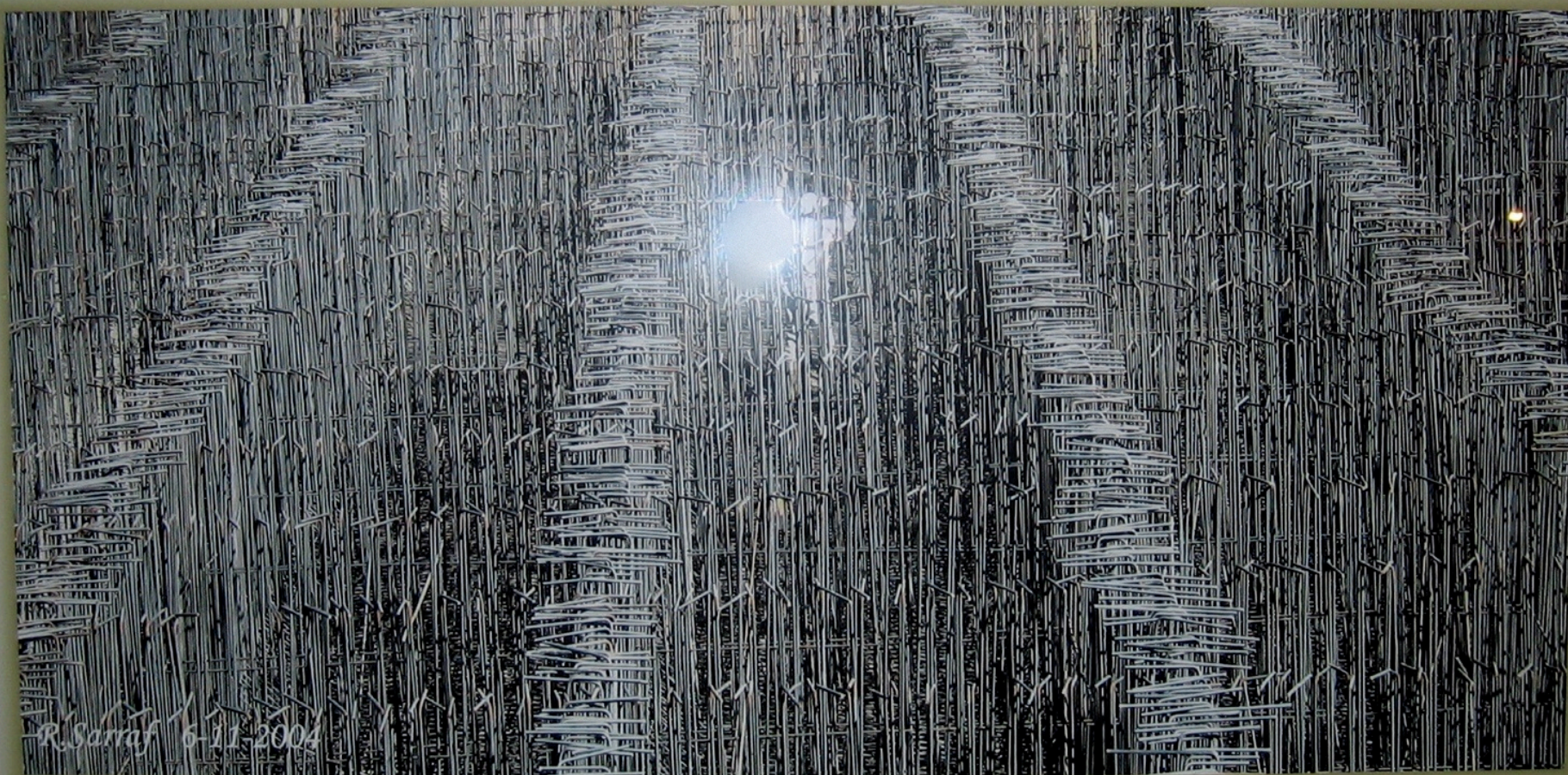
SESAME

- A world class competitive synchrotron radiation laboratory
- Providing non-discriminating scientific environment for working together
- Interdisciplinary research; an environment for collaborations as well as individual development
- Exploiting local advantages
- An advanced facility for training
- A place to which expatriate scientists can return

Conclusion: science can help building political bridges, for which strong scientific foundations are essential







R. Sarraf 6-11-2004

MUCHAS GRACIAS

תודה רבה