“The Vision of Egypt for the AfLS”

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SESAME in a few lines..

- SESAME started a long journey since 1997 when it was only a thought to construct the first light- source in the Middle-East.
- Current members are: Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey.
- Current observers: Brazil, China, the European Union, France, Germany, Greece, Italy, Japan, Kuwait, Portugal, the Russian Federation, Spain, Sweden, Switzerland, the United Kingdom and the United States.
- SESAME, the third generation light source seeks Excellency of Science, as well as, bridging the gaps between its diverse -culturally and politically- conflicting societies.
- Huge obstacles were faced, and more challenges are still there, but soon with its planned commissioning in 2016, the dream of so many people will become a reality.

SESAME and AfLS..

- **Resembling SESAME, the African Light Source (AfLS) embodies the first synchrotron-light facility for African countries.**

- **The progress is going forward with international support. However, with the preliminary studies, it is expected that the machine will be into operation not before 10-15 years.**

- **On the other hand, SESAME could be into operation within the next year with 2 day-1 beamlines, and more to be added, having secured the necessary fund of a few millions of dollars.**

- **For this, a joint strategy and urgent work plan is mandatory.**

SESAME, AfLS and Egypt..

- **Egypt has been always willing to strengthen the relation with African states and in particular, in science and technology.**

- **The Egyptian government, represented by the Academy of Scientific Research and Technology, ASRT, combines all the efforts and resources towards the benefit of all, extending the dream of SESAME to involve the interested African countries as well.**

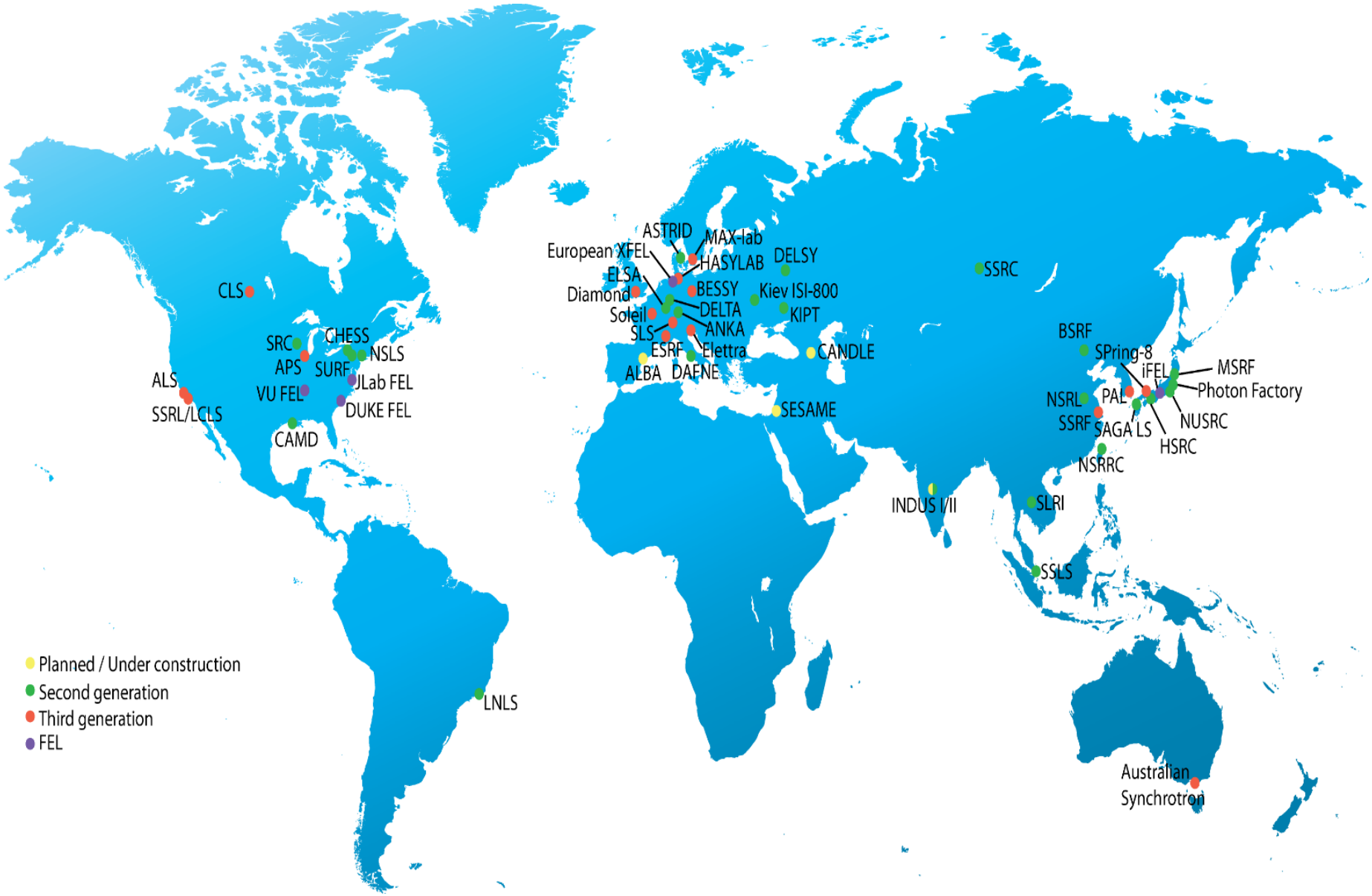
- **Two complimentary advanced centers for sample preparation, characterization and data analysis, are being established at Cairo and Helwan universities.**

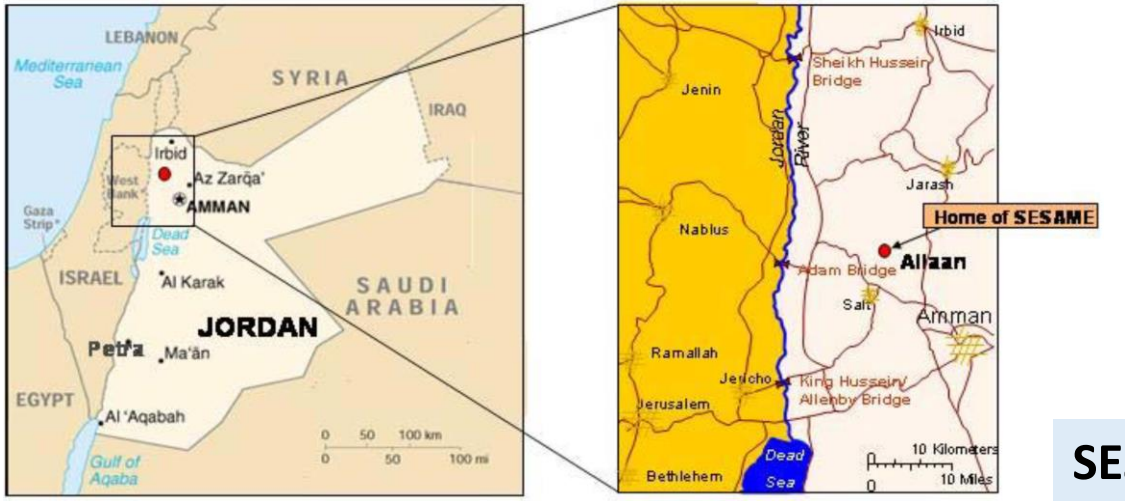
- **The facilities of these labs are scheduled to serve SESAME members, and could be also considered as a base of the AfLS centre, and the new joint African countries.**

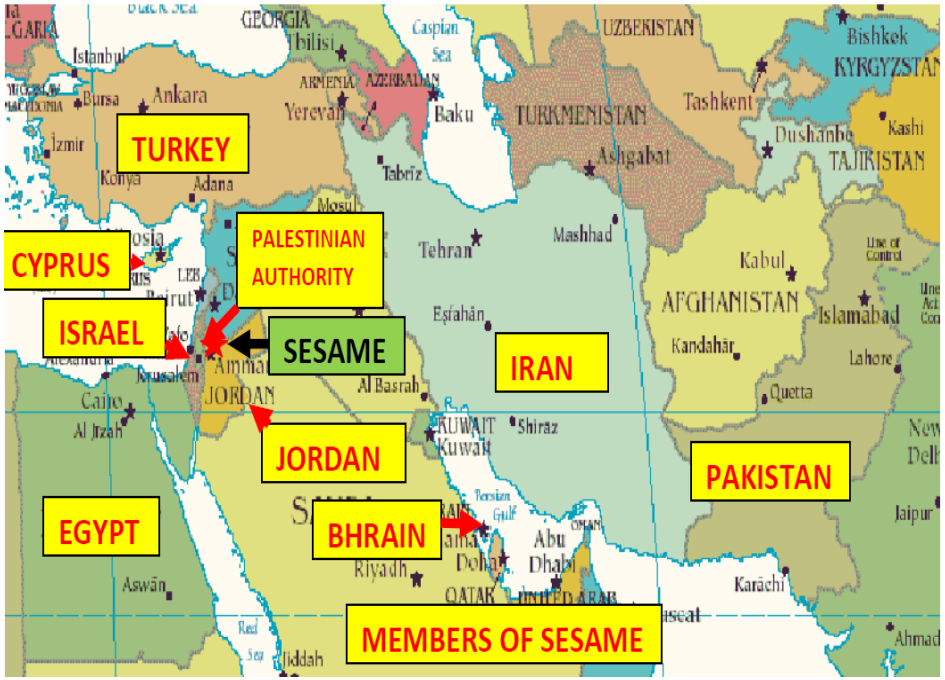
On behalf of: The National Network of Science, NNS, ASRT, Egypt

The presentation will convey the vision of Egypt highlighting the possible cooperation and integration themes between SESAME and AfLS, together with a proposed Egyptian initiative, its strategy, deliverables, as well as, challenges.

There are more than 60 light sources around the world;
NONE in the Middle East (before SESAME).. and
NONE in Africa (without the AfLS)..







SESAME aims to foster:

- Excellency of science and technology in the Middle East and neighbouring regions

- Cooperation across existing political divides

Intergovernmental organization at the service of its Members which have full control over its development, exploitation and financial matters.

When the journey of a thousand experiments starts with a boat!

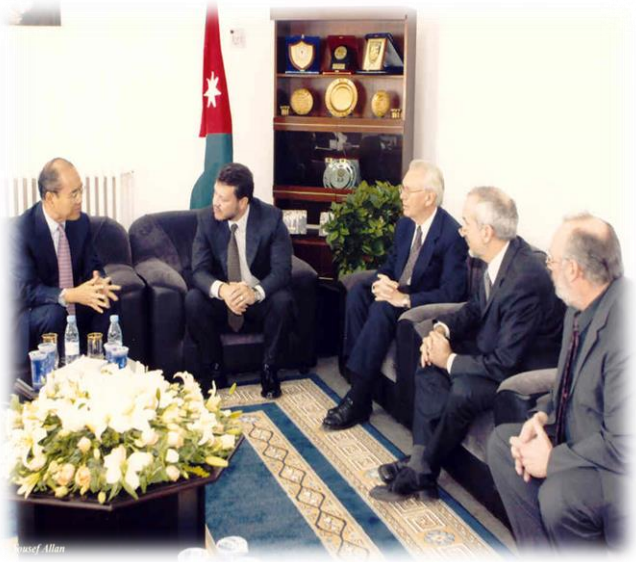
SESAME = Synchrotron light for Experimental Science and Applications in the Middle East

Herman Winick

G. A. Voss (DESY) watching the boat at Hamburg harbor on its way to Aqaba, Jordan with BESSY I on board; June 7, 2002

Very very Brief History of SESAME..

- **Convergence of two ideas** – build a light source in the Middle East (Abdus Salam – early 1980s) + foster projects that cross divides
- **Original proposal (1997) -** rebuild old 0.8 GeV Berlin Synchrotron (BESSY 1) in the Middle East, as basis for a new international organisation, modelled on CERN, under umbrella of UNESCO
- **1999 - (Interim) Council established**; followed by international advisory committees
- **2002 - decision to build a new 2.5 GeV ring** (still using BESSY booster)
  ⟹ ***competitive 3rd generation device***
- Ground breaking (2003); **completion of building (2008)**
- **Vigorous training programme and growing potential user community**



First experiments in 2016, ***assuming*** funding for main ring & beamlines is secured. *(new beamlines plus dapting/upgrading donated beamlines)*

OPEN SESAME..

Science and Technology

(capacity building)

Training

International Collaboration **Users facility**

(scientists, technicians, administrators)

Bringing nations together

(different traditions, religions, races, political systems)

Broad scientific programmes

“...model project for other regions....”

SESAME Outlay

Energy; 2.5 GeV

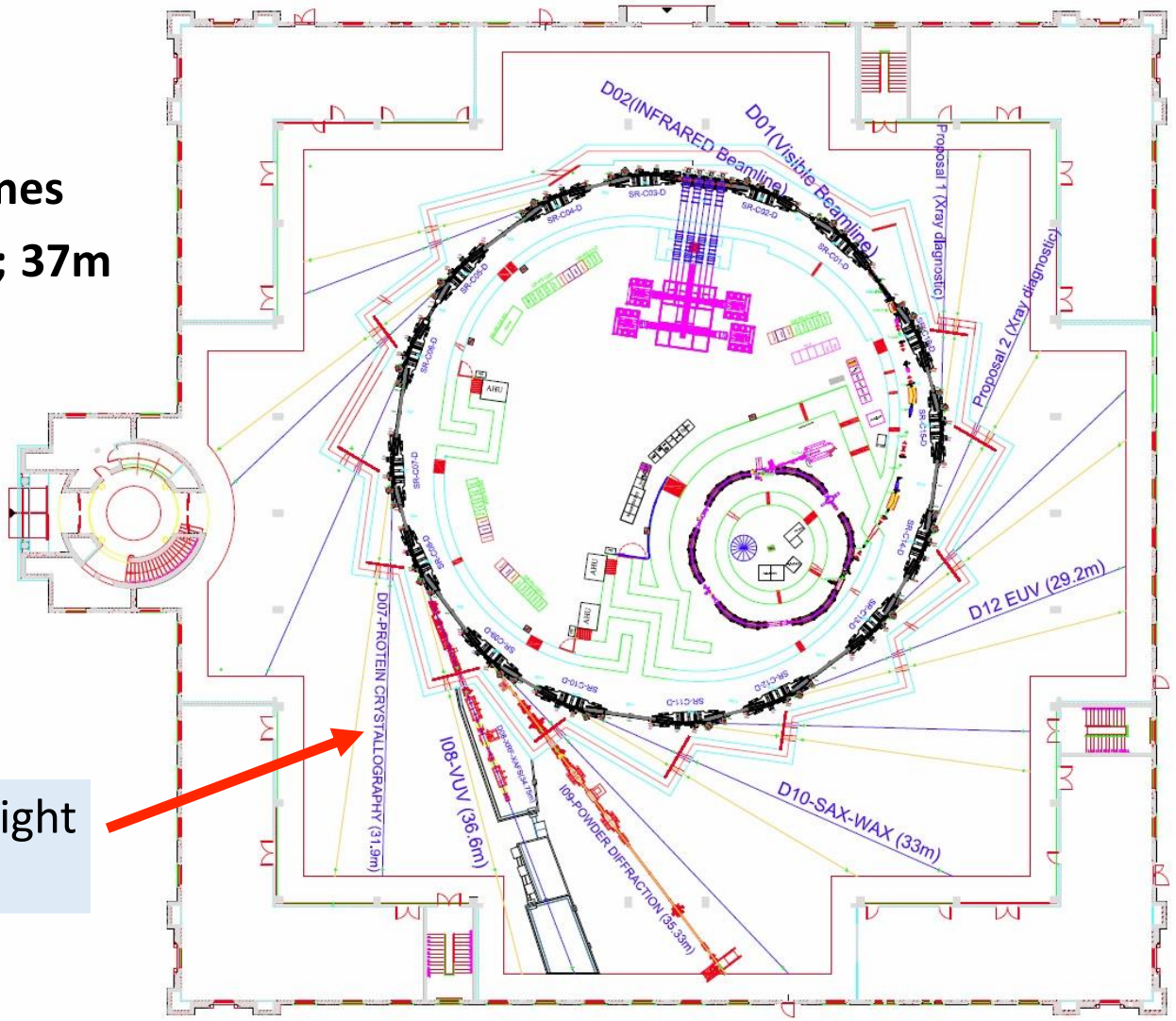
Circumference; 133m

12 Insertion Devices

16 Bending Magnet beamlines

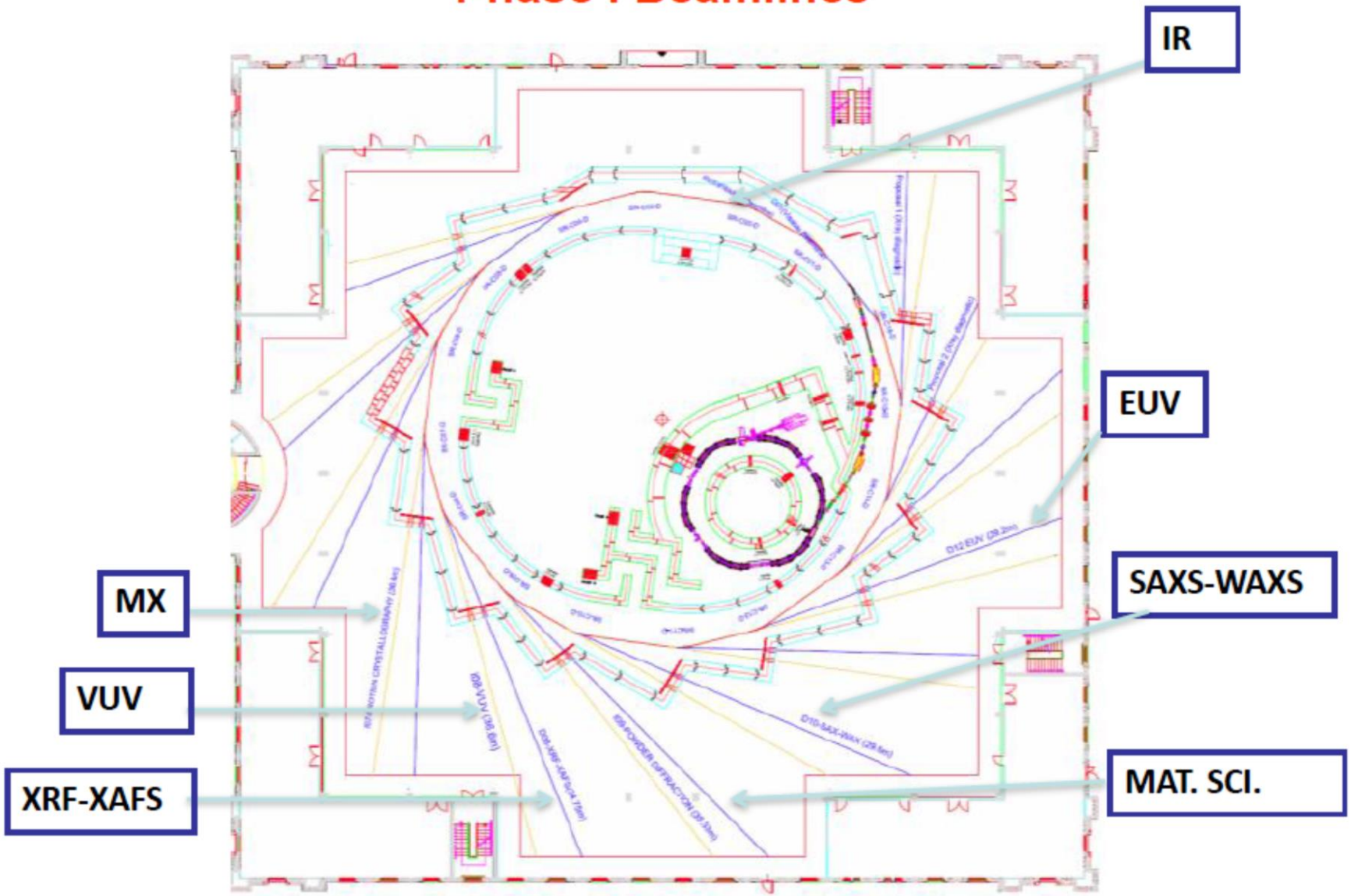
Maximum beamline length; 37m

Space for future full energy injector in main ring tunnel



Beamlines focus intense light (Infra-red to X-rays)

Phase I Beamlines



Space around the hall is allocated for preparation and technical support labs.

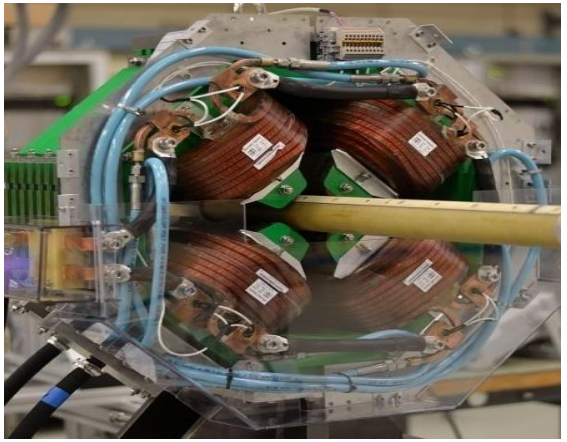
Storage Ring Status: Magnets

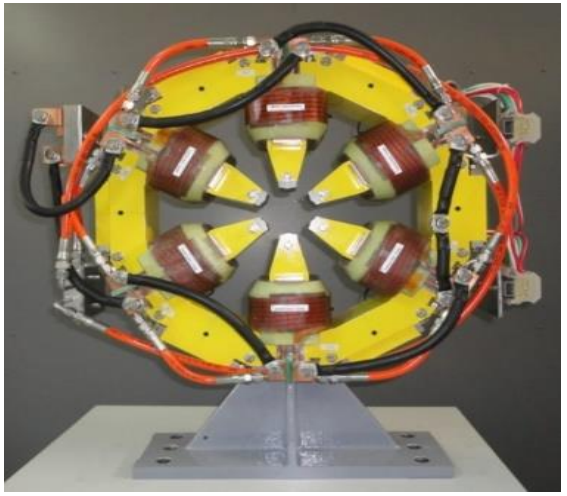
✓ Storage ring magnets are constructed through CESSAMag project in the frame of SESAME-CERN/EU collaboration.

✓ Dipole (constructed by TESLA, UK) prototype is magnetically measured at ALBA.

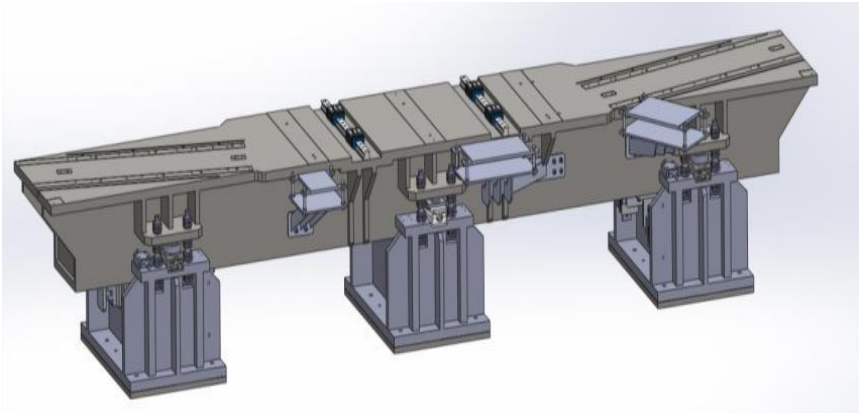
✓ Quadrupole prototype is assembled (by Elytt-Spain, coils by STS-Turkey) to be measured at CERN.

✓ Sextupole prototype (by CNE-Cyprus & HMC-3-Pakistan, coils by (SEF-France) magnetically measured at CERN.





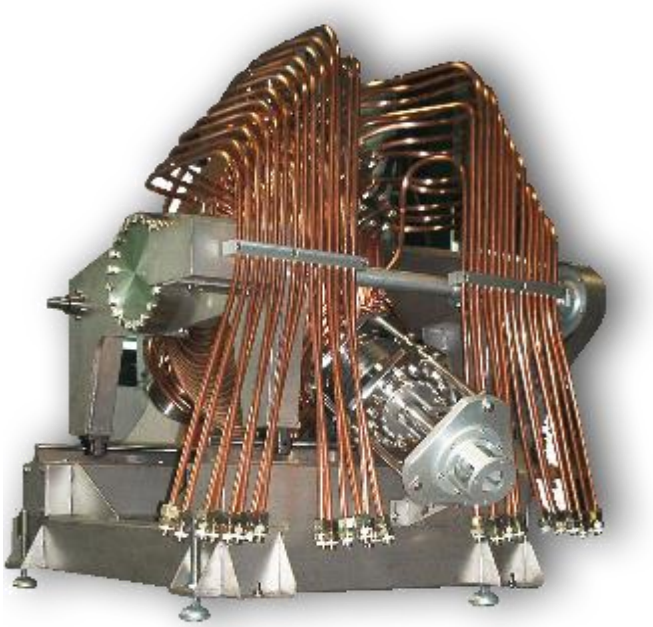
Storage Ring Status: Girders



✓ Contract has been signed with Nortemecanica, Spain.

✓ 9 were delivered out of 16 girders

Storage Ring Status: RF Cavities



Agreement signed with INFN and Elettra in May 2014 (Financial support from the Italian Ministry of Education, University and Research).
Under construction at Elettra.

COLLABORATION & TRAINING

1. **SOLEIL:**
   - IR beamline – Lot of work and efforts by Paul Dumas
   - RF & Alignment
2. **Canadian Light Source:**
   - Control Software and Hardware, Beamline Instrumentation
   - Using beamlines for various applications
   - MoU already signed between CLS and SESAME
3. **ALBA – Spanish Light Source**
   - Beamline Construction and Commissioning
   - Design of Storage Ring components
   - Radiation Protection
   - Fellowships are offered
4. **Swiss Light Source**
   - Frontends for BLs closely followed by Amor and Albin
   - Material Science BL as donation
5. **NSRRC – Taiwan Light Source**
   - Electronics and Instrumentation
   - Beamline Science and Techniques
   - Fellowships are offered
6. **Portugal - SESAME**
   - Fellowship Program
   - Both PhD and Postdoc Level
7. **LNLS - Brazilian Light Source**
   - Beamline Construction and Commissioning
   - Beamline Optics and Control
   - Fellowships are offered
8. **Elettra**
   - RF Cavities
   - Support for Training

Challenges to SESAME, AfLS or such huge facilities..

1. Capital funding + stable financial support for operation costs.

2. Attracting additional members, with which UNESCO is helping.

3. Broadening the scientific base of and sharing the benefits (AND the financial burden).

3. Compensating for differences in the financial, scientific, and human resources of the members.

Solution??

Sir. Chris L. Smith

… Shared Infrastructure & Collaborative Research.. Why?

- More science opportunities depend on LARGE INFRASTRUCTURES-: accelerators, SR-sources, large FELs, reactors and neutron sources, super computers, networking,…

- Obvious reasons?

  a. beyond budgets and technical expertise of individual countries..

  b. potential user base not large enough to justify the cost in individual countries..

- Obvious reasons to scientifically collaborate?

- the critical need for mass in terms of manpower and expertise..

(Not) so obvious reasons (to funding agencies)

- Combining intellectual resources to have better science and stronger networks..
- Bring all partners up to the highest standards
- Building bridges across political divides

Why not??

- Inertia lack, complicated decision making, choice of site,…

SESAME and AfLS?

Sir. Chris L. Smith

..Egyptian Initiative/proposal by the ASRT..

Synchrotron Collaboration Department

Cairo University

- All African countries having the interest in synchrotron light application could join SESAME and become *SESAME members.*
- African countries get benefit of the **complementary facilities of SESAME**.
- Cairo University is establishing a wet-lab 20Km south to Cairo, for sample preparation and data analysis. **It will be a complementary centre to SESAME, and could be also considered as a base of AfLS, serving** SESAME members AND the new joint African countries.
- **The Egyptian Government is ready to fund the expansion of this lab to accommodate the African Countries and to enhance the science and technology in Africa.**
- The new center will help the scientific communities in African countries to **work together and exchange scientific experience.**

Strategy..

- Establish a local SESAME scientific committee from different disciplines.
- Fund Synchrotron-based projects to ensure sustainability and creation of users demand.
- Solicit involvement of interested partners to create a functional Egyptian users network that could be extended to involve African users as well.

“Scientific” African Union?

Deliverables..

- An international multi-discipline critical mass capable of science advancement in the African scientific community.
- Establish strong scientific interactions among scientific communities within the Middle East and neighboring region..
- Close the culture gap among all, as a first step to form what is called the African Union to work for the benefit of all parties.

How can this meeting help?

- Spread the awareness of the existence of SESAME and AfLS
- Promote different possibilities of collaboration between them.
- Persuade funding agencies to contribute more.. Possibly through bilateral/multilateral agreements..
- Identify potential contributors and the more likely to join members.

Better late than never..

Thank you