SESAME: una collaborazione senza frontiere

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CERN & SESAME: Collaborations sans Frontieres

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FP7 CONTRACT 338602

IN SUPPORT OF

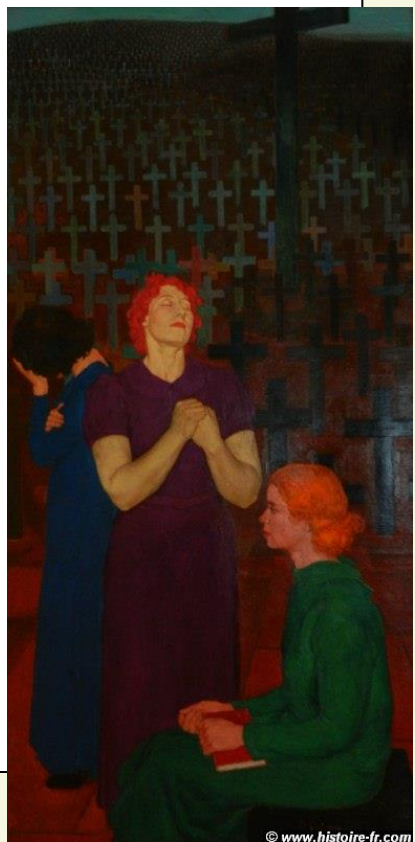
Outline

1. The parallel histories of CERN and SESAME
2. Where does SESAME stand?
3. The support of CERN and of the European Union to SESAME

The origin of CERN

The concept of CERN was born in 1949, five years after the end of World War II, on the ashes of Europe and of European science

Tens of million of casualties, mostly civilians



The origin of CERN

It was probably too early for governments to decide on collaborations.

The initiative came from a handful of visionary scientists: Raoul Dautry, Pierre Auger, Lew Kowarski, Edoardo Amaldi, Niels Bohr,…Louis de Broglie, Isidor Rabi who sought and obtained the support of UNESCO.

The origin of CERN

- *1954: CERN foundation*
- *1957: the SC*
- *1959: the PS*
- *…*

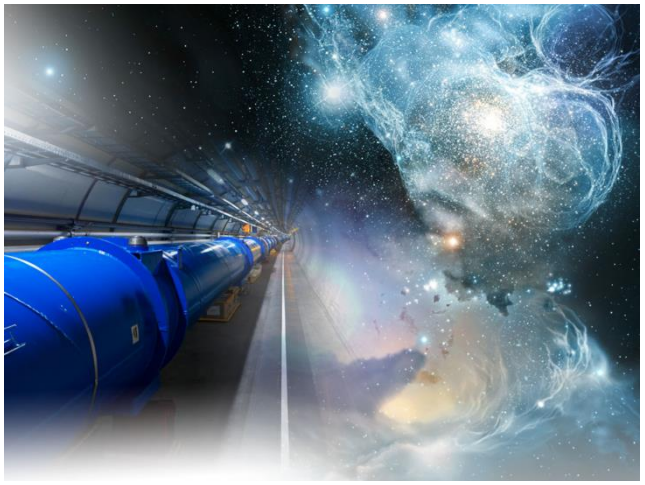
Motivations:

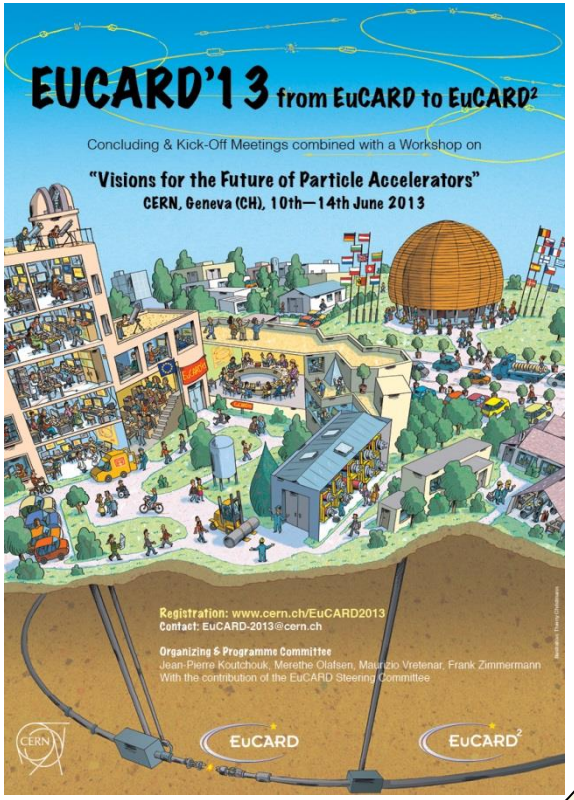
- ***Stop the brain drain***
- ***Restore European science***
- ***Share costs***
- ***Unite European scientists (researchers, institutes, politicians) around ground-breaking research***

LE CERN, L'ARME DE PAIX

(FROM WEB PUBLICATION)

- 2013: now one of the largest world instrument for basic research, 20 EU Member States, ~2400 staff, ~ 10,000 users, close to 100 nationalities.
- Excellence in science and technology (e.g. web), but not only, thanks to the international status.





The Evolution of SESAME

1980's: Nobel Laureate *Abdus Salam* suggests a light source for the Middle East.

1990's: Scientists advocate promotion of scientific cooperation as a vehicle of peace in the Middle East; in particular, *Middle East Scientific Cooperation (MESC)* group, based at CERN *(Sergio Fubini, Eliezer Rabinovici, Herwig Schopper, Tord Ekelof…)*

SESAME slides: Courtesy of prof Khaled Toukan, director of SESAME and Prof. Yasser Khalil, adm. director

History of SESAME

- 1997 – **Original idea *(Voss, Winick)***; Upgrade/rebuild BESSY 1(0.8 GeV) in the Middle East, as focal point for a new international research center. **Voss presents the concept to a *MESC* meeting in Turino;** positive response from Middle East scientists.
- 1998 – **Voss presents concept to *MESC* meeting in Uppsala;** *MESC* endorses SESAME
- 1999 - **1st meeting at UNESCO;** (Interim) Council established – ***Herwig Schopper elected as President of Interim Council*** .
- 2000 – **Begin workshops, schools;** *growing community interest*
- 2002 - **Decision to build a *new 2.5 GeV ring*** *(using BESSY injector)*
- 2003 - **Ground breaking for building;** completion in 2008
- 2008 – **Chris Llewellyn-Smith takes over as Council President**

First experiments in 2015, pending securing of funding for main ring & beamlines .

9/28/2013

NB: Prof Herwig Schopper and Prof. Sir Chris Llewellyn-Smith were both former CERN DG's

7

The origin of SESAME

Much similarities with the history of CERN birth:

Visionary scientists initiative endorsed by governments; UNESCO as an incubator for a new science for peace international organization; excellence in science as the primary goal; same statutes;

And important differences:

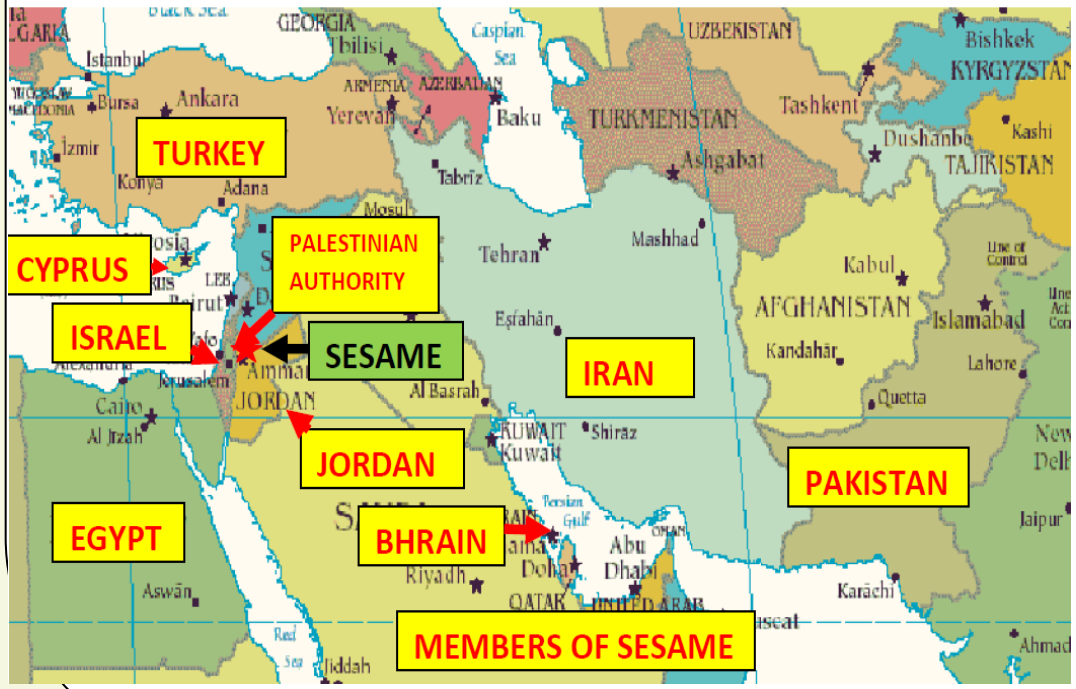
The most significant being that the conflict between States in the ME is not resolved.

SESAME ***is a 2.5 GeV light-source ('very powerful microscope') under construction near Amman-Jordan***

Purposes:

1- Foster excellence in science and technology in the Middle East (and prevent or reverse the brain drain)

2- Build bridges between diverse cultures

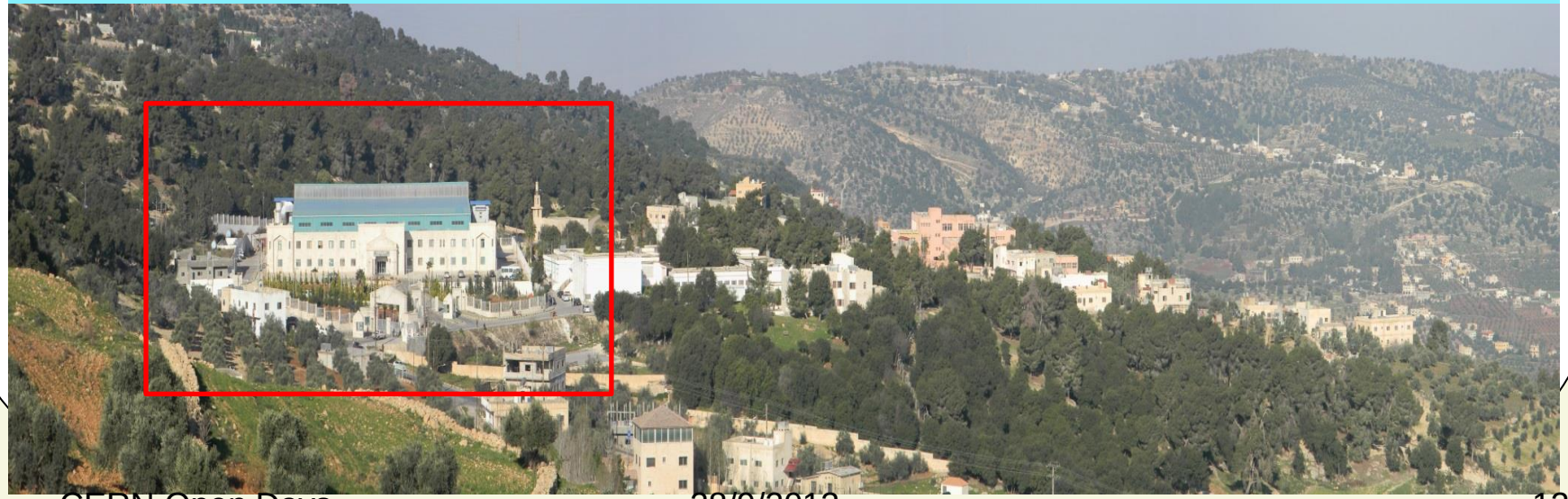


Observers: ***China, France, Germany, Greece, Italy, Japan, Kuwait, Portugal, Russian Federation, Sweden, Switzerland, UK, USA***

There are over 60 synchrotron-light sources in the world None in the Middle East

Why would Members be interested in SESAME:

- ***International Collaboration is obvious way for countries with limited science budgets to build synchrotron-light source.***
- ***Broad programs makes synchrotron-light sources ideal facilities for building scientific capacity.***
- ***SESAME will be a user facility: scientists will typically go to SESAME two or three times a year for a week or two to carry out experiments, in collaboration with scientists from other institutions/countries.***



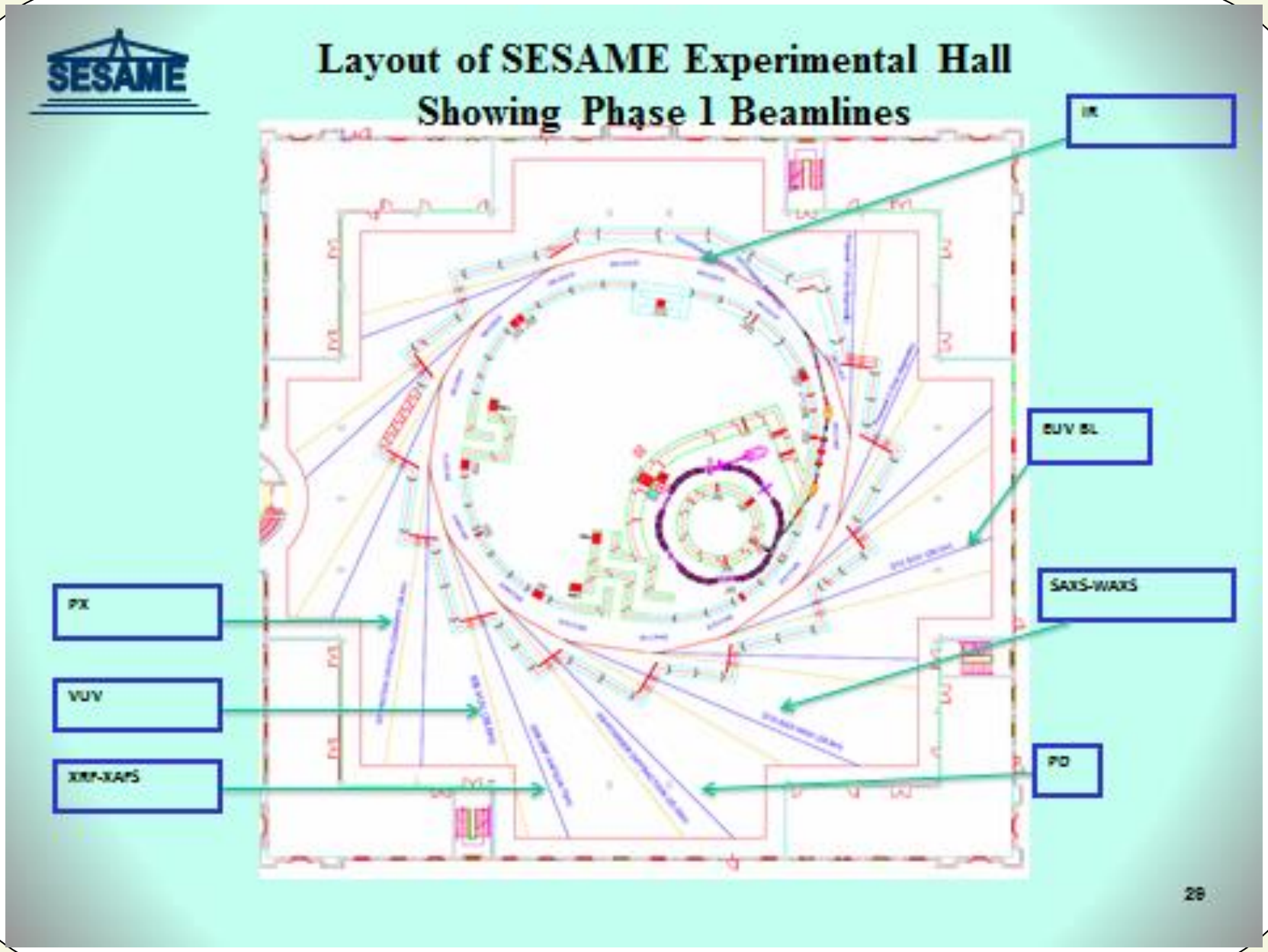

2006 11 17

SESAME has also other meanings to its region:

- It's a working example of Middle East collaboration
- It help building scientific and technical capacity in the region
- Its training programme (Fellowships, Visits, Schools) already building capacity for the future

Who is building SESAME:

- *Senior scientists and administrators are working together to govern SESAME (Council from the region & Advisory Committees from around the world)*
- *Young and senior scientists from the region are collaborating in preparing the scientific programme (Users' Meetings, Workshops)*


Layout of SESAME Experimental Hall
Showing Phase 1 Beamlines
IR
EUV BL
SAXS-WAXS
PD
PX
VUV
XRF-XAFS
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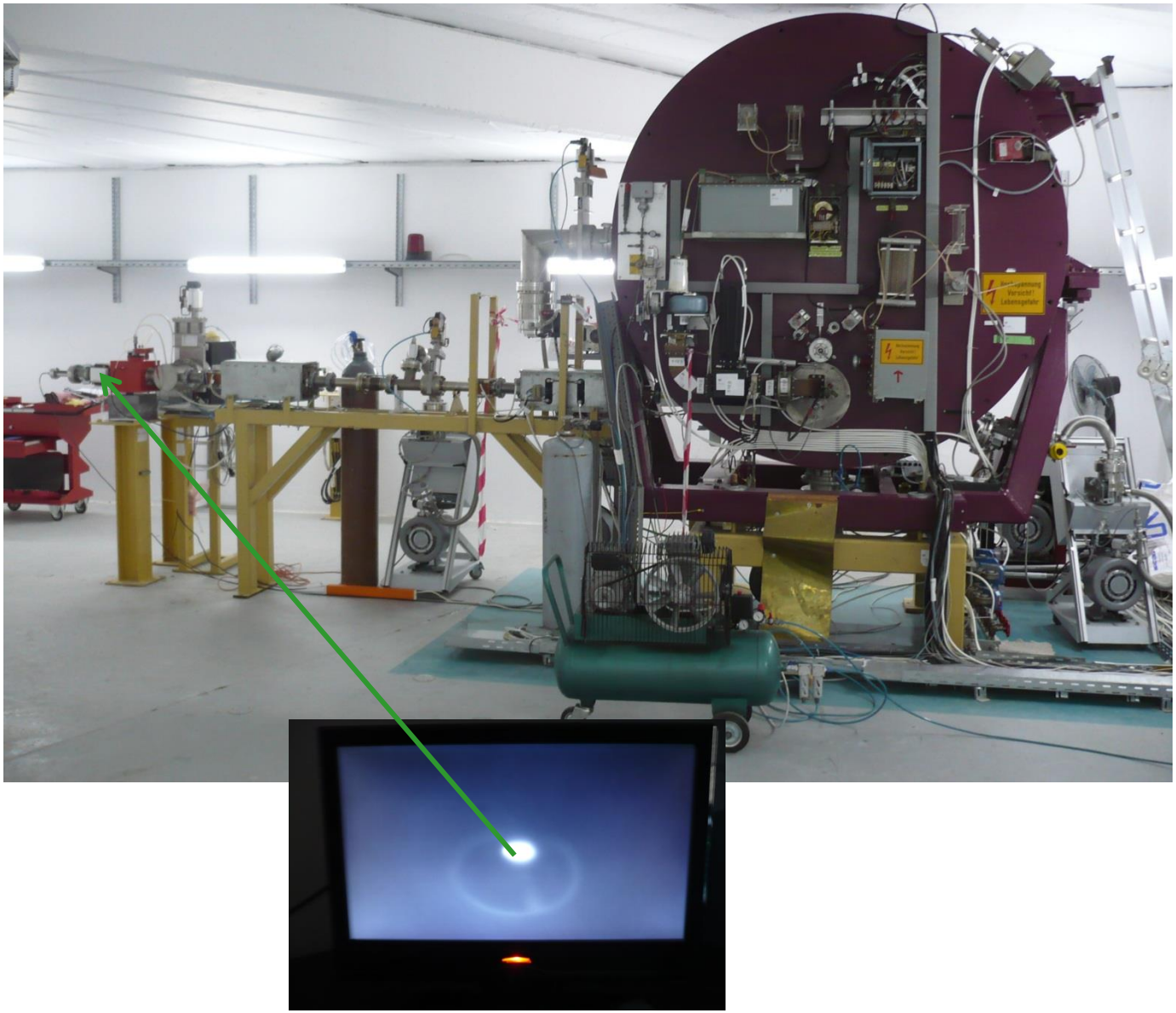
Tests of the MICROTRON Subsystems, 2008

Shielding Completed, May 2011

Beam in the Transfer Line 1 – (2012)



Open Roof of the Booster Area, Magnets Installed

SESAME Staff with Colleagues from CERN (2012)

20

Why a CERN-SESAME collaboration?

1. **Similar organization and societal goals:** both CERN and SESAME were founded by UNESCO, on exactly the same pattern, as **Science for Peace** organizations.
2. **Same goal of forefront science:** CERN in fundamental particle physics, SESAME in applied sciences.
3. **Accelerators as a common technology:** in both cases operated as open facilities for external users.
4. **Collaboration Agreements:** CERN, SESAME and Jordan signed a Collaboration Agreement in 2004. The first Protocol was signed in **2010** and the last in may 2013.

What leads CERN to act?

5. **Call for support from SESAME management:** CERN, as a recognized center of excellence, has a tradition of support to European national projects, e.g. MedAustron (A), CNAO (I), FAIR (D),… and, to international projects, e.g. ITER. **SESAME falls in this latter context.**
6. **Positive assessment by CERN of the scientific project perspectives and of the commitment of the Members.**
7. **Support of the CERN Council to finding ways to support SESAME (Dec. 2010).**
8. **a CERN support is likely to leverage additional support**

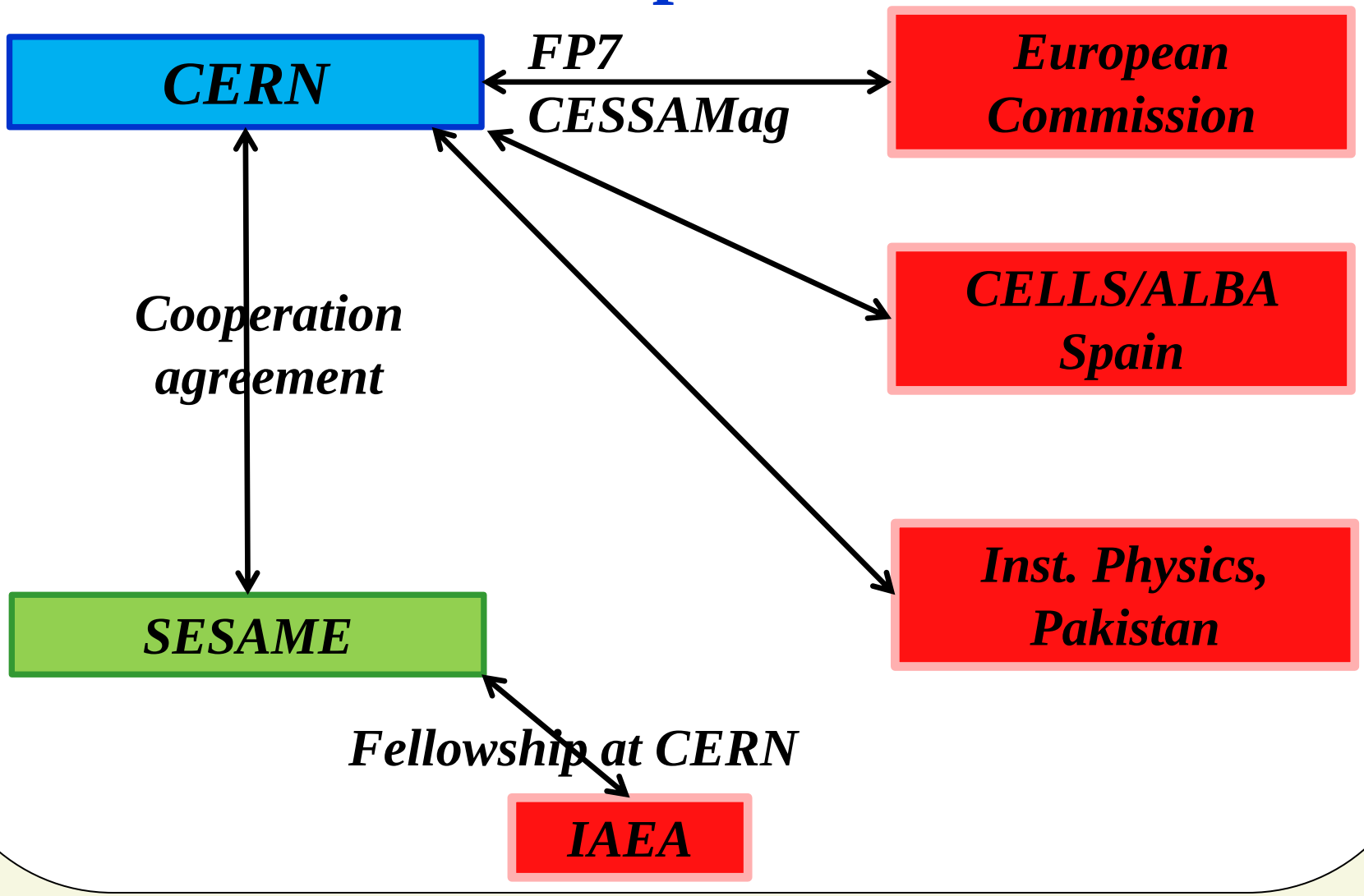
The solution found: a common venture between CERN and the European Commission in support of SESAME: FP7 CESSAMag

Goal: *deliver to SESAME a key system of the missing storage ring: the magnetic system with its power supplies*

Resources: *the EU funds CERN with 5 Meuros to buy the equipment and CERN carries the studies, the specifications and the procurement of the magnets and power supplies, in close collaboration with the SESAME direction, scientists and engineers.*

Type of action: *FP7 project in the framework of Euro-Mediterranean cooperation.*

Other partners have agreed helping CERN help SESAME



Work Plan

- CESSAMag was signed in May 2013
- All magnets are specified and will for most of them be ordered next week, mostly in Europe.
- Goal is to deliver and allow the machine commissioning in 2015/2016
- But…

Promoting concretely the spirit of SESAME in CESSAMag

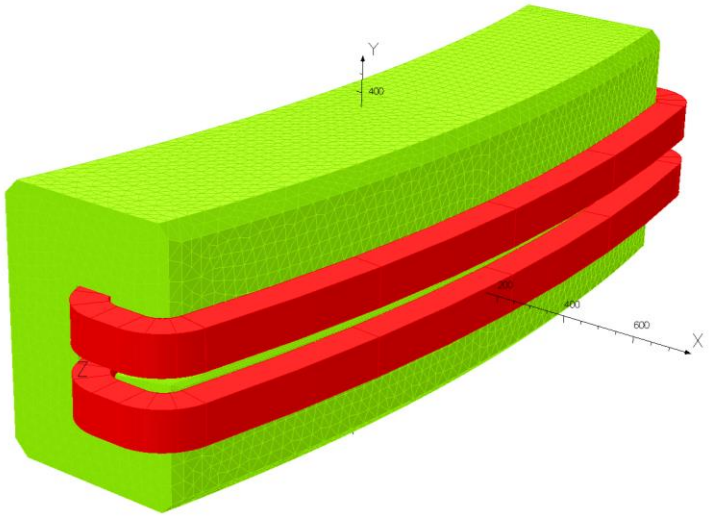
- Donation by Pakistan of assembly of 50% of the sextupoles against knowledge transfer
- Some purchases in Turkey and Cyprus, with knowledge transfer.

Magnetic measurement bench

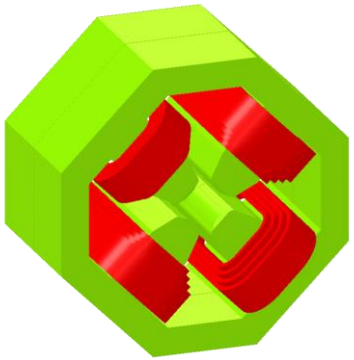
Bench for the measurement of the SESAME magnets.
Right: Louis Walckiers, CERN, Left: Mohammed Ebbeni, SESAME, on a 6 month IAEA fellowship at CERN

Sumera Yamin and Khalid Mansoor Hassan, from the Natl Center for Physics, Pakistan in training in the CERN magnet Group

SESAME: i magneti



16 + 1 dipoli

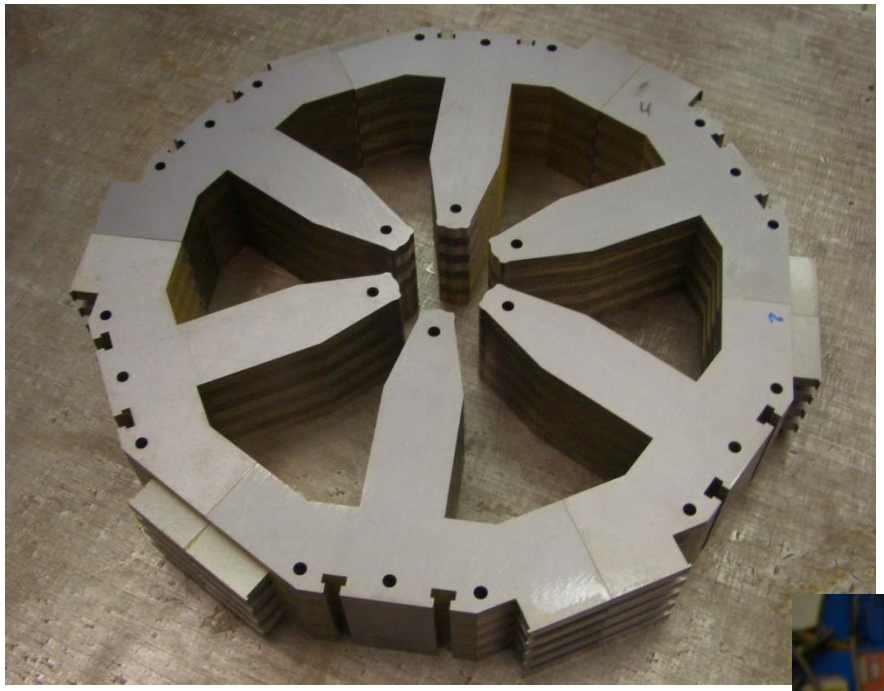


32 + 1 quadrupoli focalizzanti

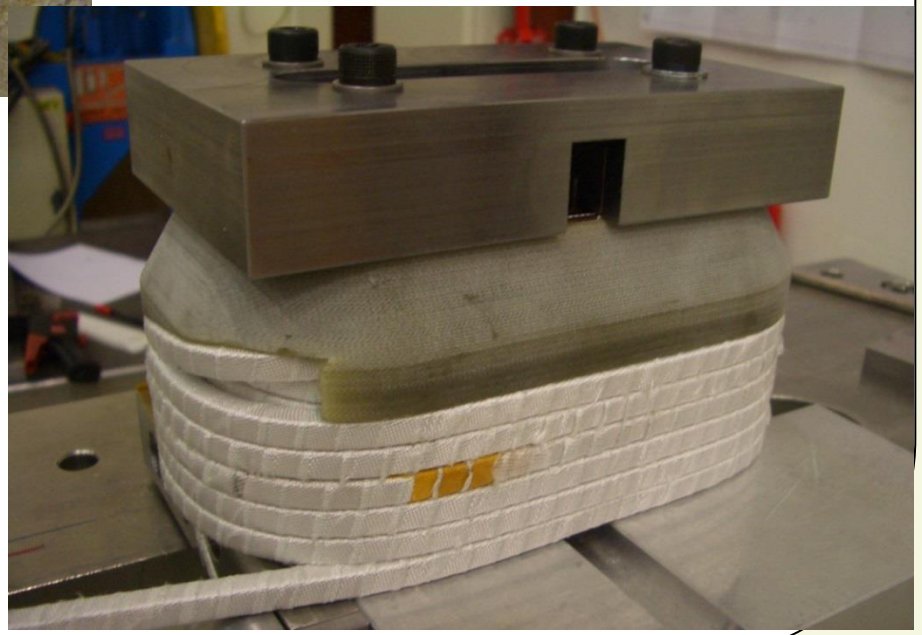
32 + 1 short quadrupoli defocalizzanti

64 + 2 sestupoli / correttori

Sono tutti elettromagneti dominati dal ferro, con bobine in rame.
Si va dalle 6,5 tonnellate dei dipoli ai 150 kg dei sestupoli.



Sextupole/corrector yoke [electrical steel from Austria, stamping in France]



Sextupole coil on the winding machine at CERN
[conductor from Finland and Switzerland, insulated in France with a UK tape]

Conclusion

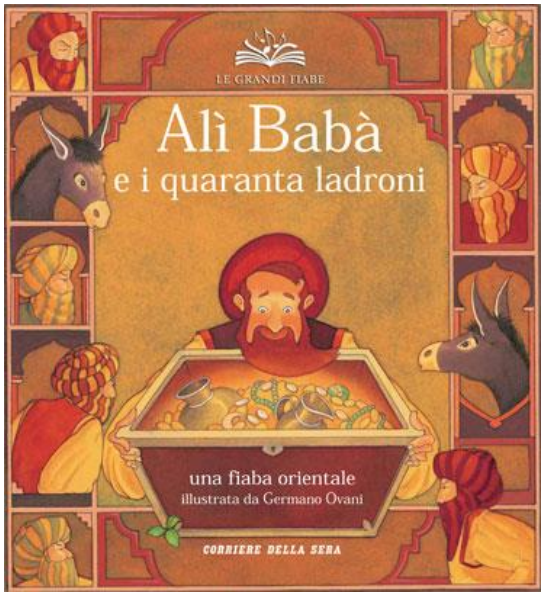
The CERN-SESAME collaboration has been an enriching experience.

We wish total success to SESAME in its challenging project

SESAME: il nome (second Herman Winick)

Synchrotron light for
Experimental Science and
Applications in the Middle East

a Middle East spice, the sesame seed, it's the seed for growth



Open Sesame: the door opener, to opens the door to jewels, to scientific knowledge!

Sesame Street, where young people are taught to cooperate and respect each other

Per chi vuol saperne di più

- SESAME website, www.sesame.org.jo
- CESSAMag website, cessamag.web.cern.ch
- European Commission memo, Questions and answers on 'SESAME', europa.eu/rapid/press-release_MEMO-13-460_en.htm
- Sesame synchrotron is a flash of unity in Middle East. BBC News, Science and environment. www.bbc.co.uk/news/science-environment-20447422
- SESAME: A Source of Light in the Middle East: Eliezer Rabinovici & Zehra Sayers at TEDxCERN www.youtube.com/watch?v=vrQ73AztQoM