Update on the SESAME light source

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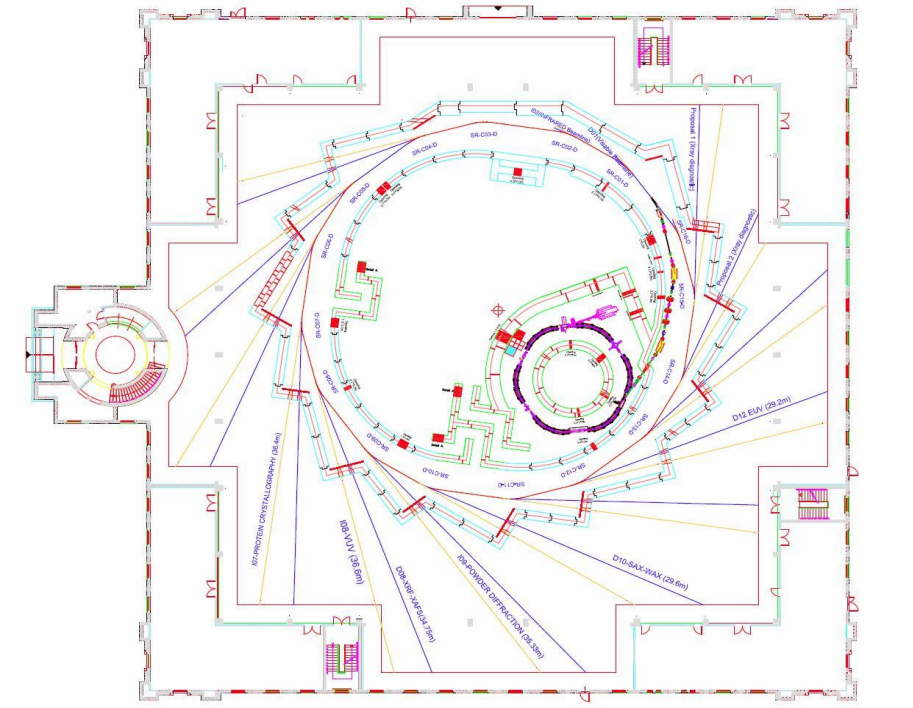
On behalf of the SESAME team

Outline

- Overview
- Booster operation
- Storage ring
  - SR subsystems
- Roof
- Installation schedule
- Beam lines

Overview

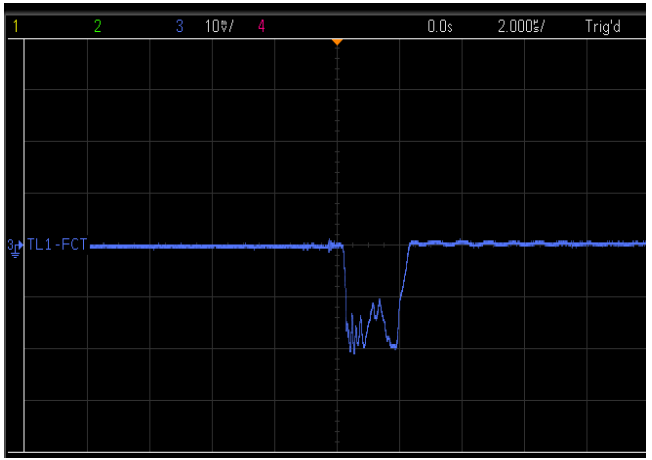


SESAME machine	
Microtron	22 MeV
Booster:	800 MeV
Storage ring	2500 MeV

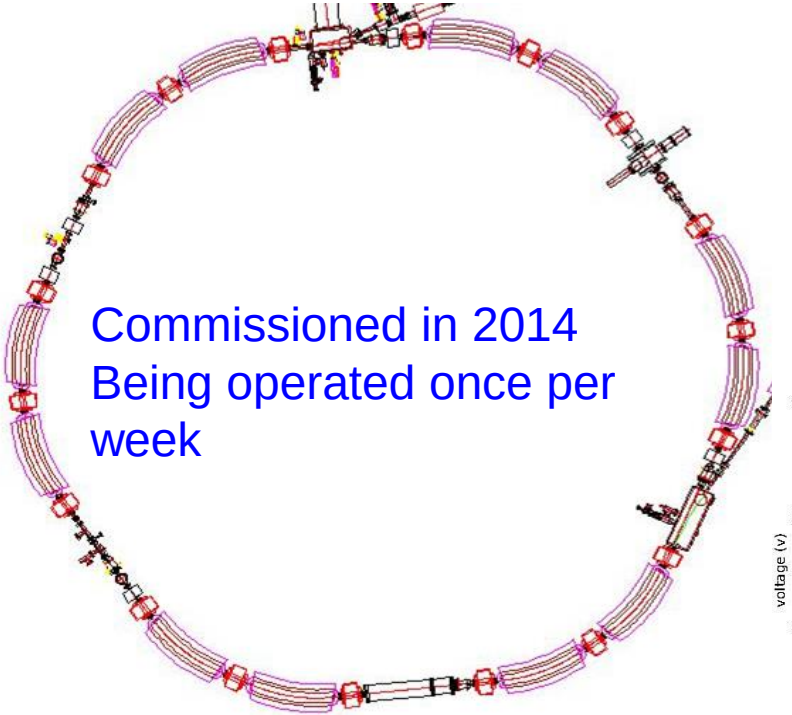
Microtron

Commissioned in 2011

Operating energy	20 MeV
RF frequency	3.00 GHz
Hor./ver. emittance ~	2.7/4.5 mm. mrad
Pulse Width ~	2 μs
Pulse Current ~	8 mA

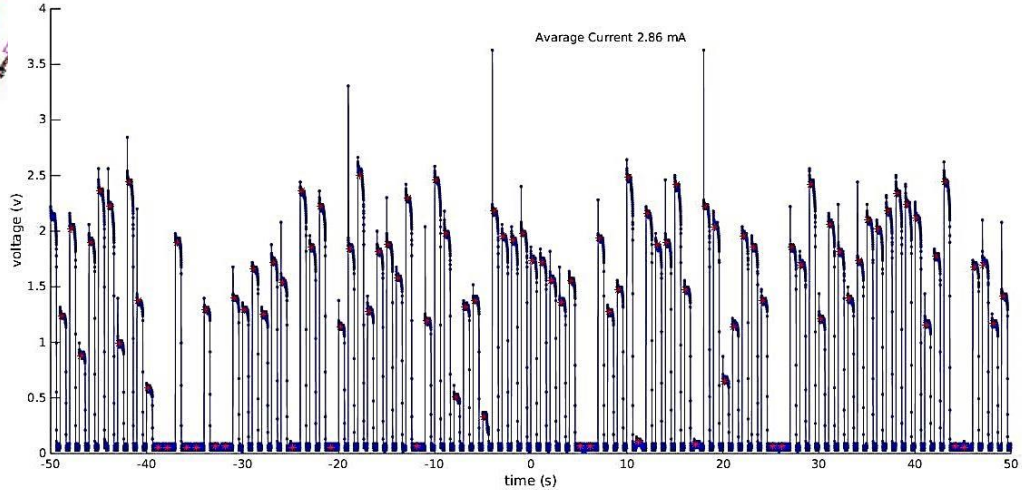


Booster

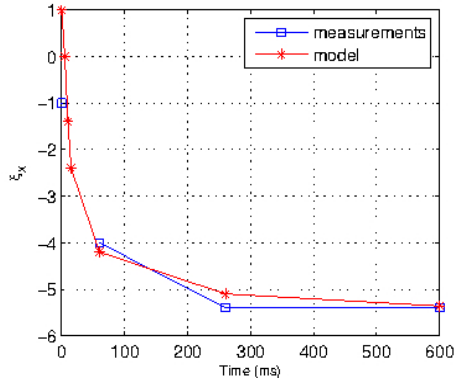


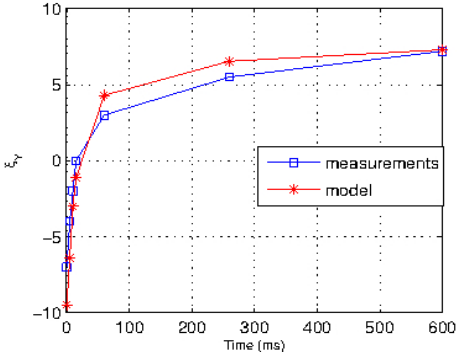
Commissioned in 2014
Being operated once per week

Circumference	38.4 m
Periodicity	6 FODO
Energy	20-800 MeV
Emittance	170 nm. rad.
RF frequency	500 MHz
Maximum current	8 mA
Tune	2.21/1.43



Booster

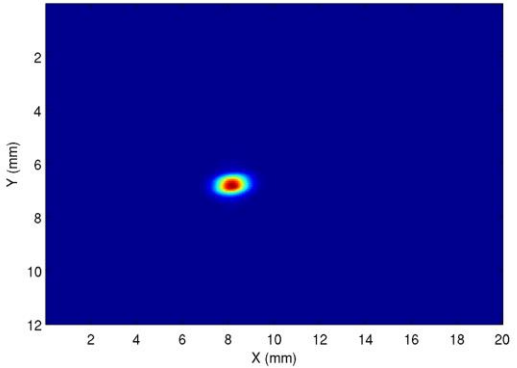


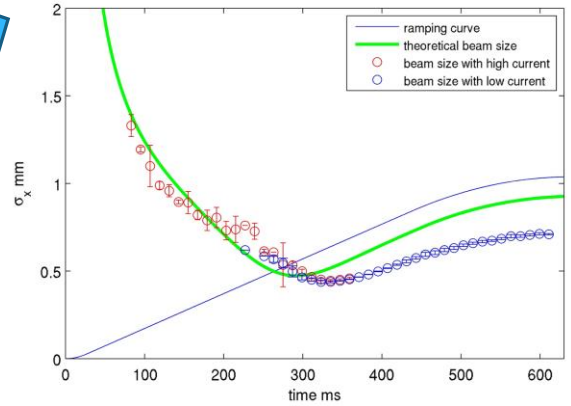


Sextupole component in dipole (constant)

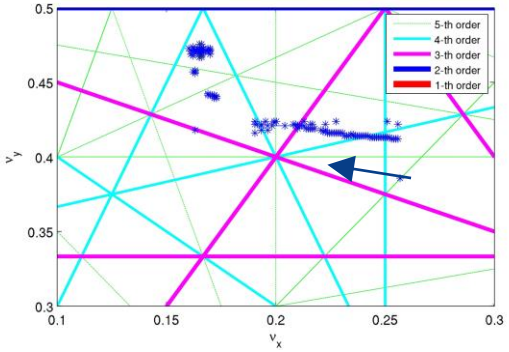
+

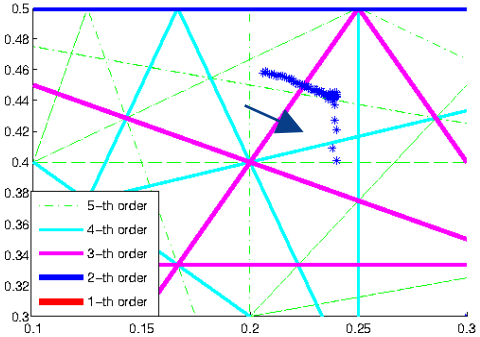
EDDY current induced sextupole component





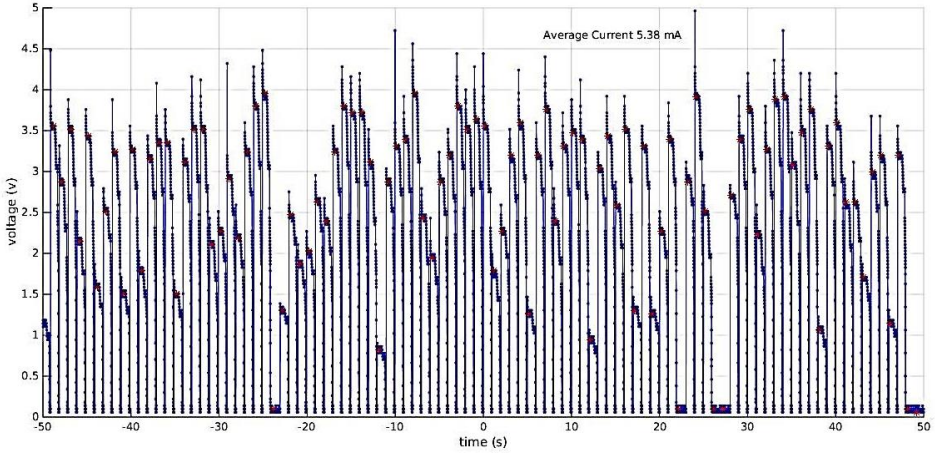
Booster



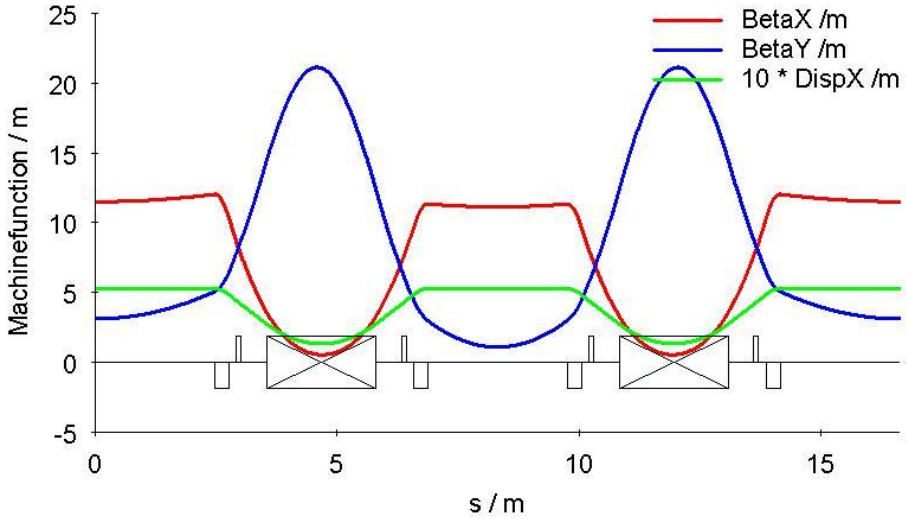


FFL + more stable tune
+ new working point

average current >5mA



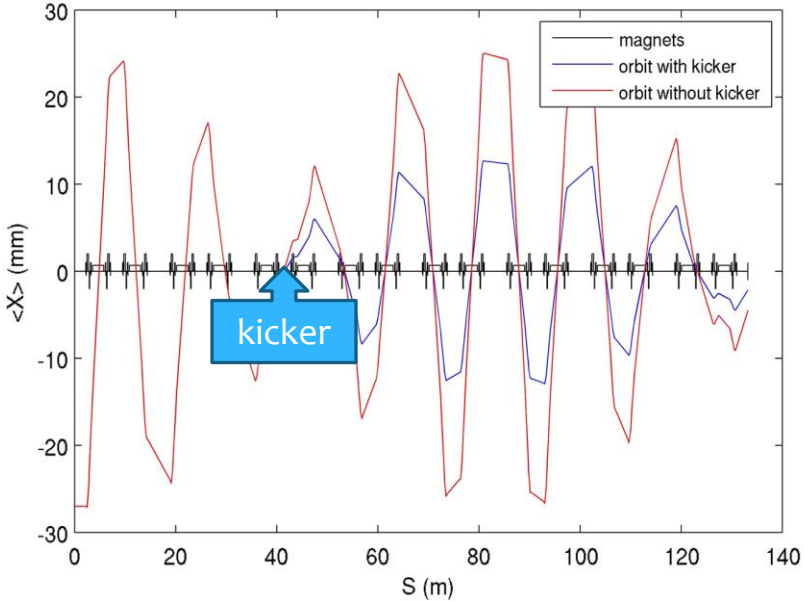
Storage Ring



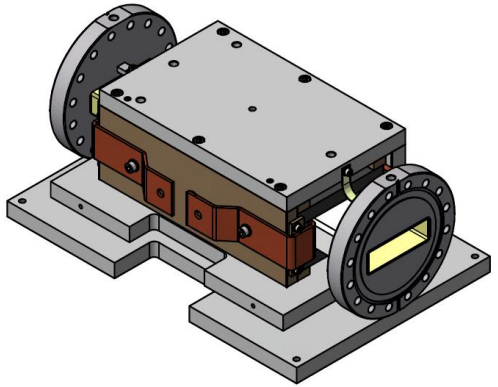
Energy	2.5 GeV
Current	0.4 A
Periods	8 DBA
Circumference	133.2 m
Tune horiz./vert.	7.23/6.19
Emittance	26 nm. rad
Mom. Comp.	0.008
Radiation loss	0.6 MeV

Bending magnet B0 = 1.455T, g = -2.79T/m.
16 straight sections (8x 4.4m + 8x 2.4m).

Storage Ring



Single dipole kicker injection scheme



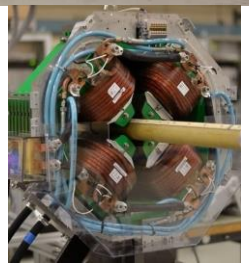
Integrated Field	5.33	mT.m
Magnetic Length	300	mm
Pulse Shape	Half sine	
Pulse length	0.9	μs
Repetition Rate	1	Hz
Maximum Magnetic field	20.0	mT
Magnetic gap height/width	38/90	mm

Magnets

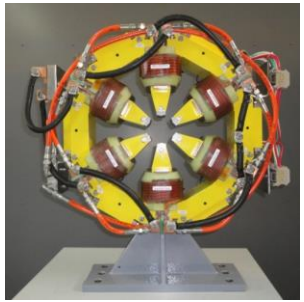
CESSAMag project SESAME-CERN/EU collaboration

- **Dipole (constructed by TESLA, UK). Measured at ALBA.**

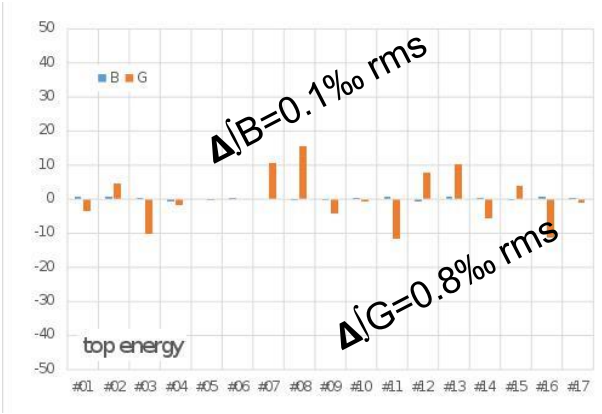
- **Quadrupole (Elytt-Spain, coils by STS-Turkey). Measured at CERN**



- **Sextupole (CNE-Cyprus & HMC-3-Pakistan, coils by SEF-France). Measured at CERN**

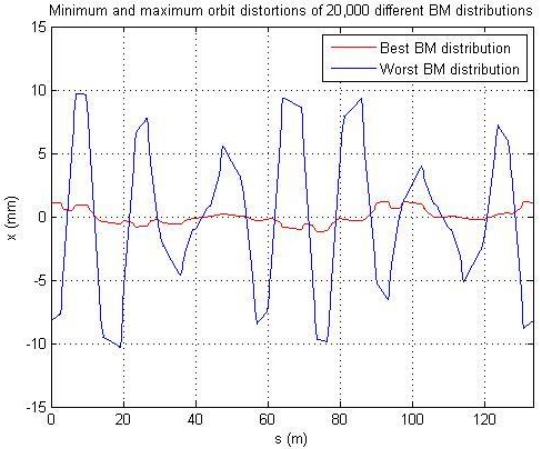


Magnets



- All 17 bending magnets were measured. 8 of them are already in SESAME
- All 33 Sextupoles from Cyprus (SC)
- All 33 Quadrupole De-focusing (QD)
- 20 Quadrupoles Focusing (QF) (13 to be measured)
- 23 Sextupoles from Pakistan (SP) (10 to be measured)

All measured magnets have excellent quality



We will go for dipole sorting option.

Power Supplies and Controllers

Industrial Power supplies (TDK-Lambda)

PSI controllers

Homemade interface

- One unit for dipoles
- 4 units for sextupoles(2 SF and 2 SD)
- 64 units for quadrupoles
- 64 units for correctors + 2 for skew quads (PSI PS+PSI controller)

Stability < 100 ppm

Pulsed PS

Industrial PS

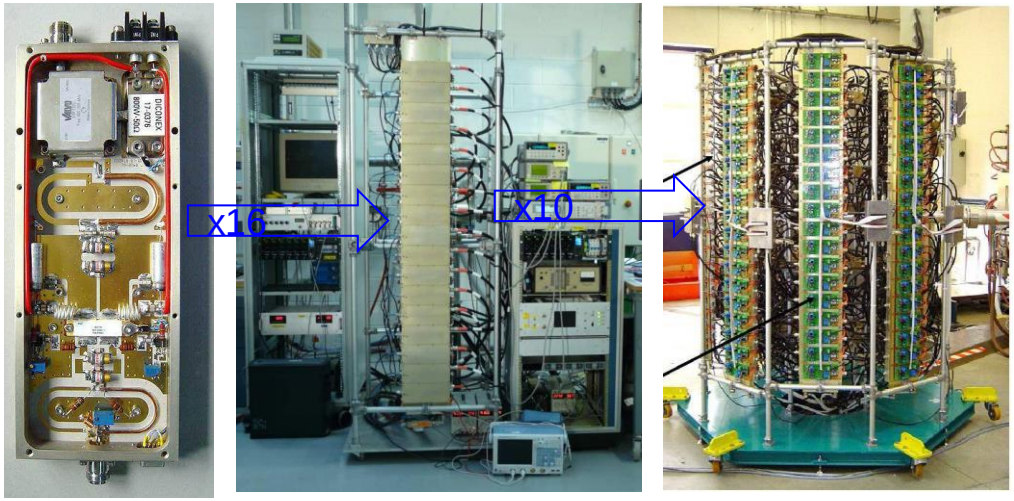
+

homemade controller

Power Supplies and Controllers

- Assembled at CERN by CERN + SESAME people
- Shipped at beginning of November (expected to be in SESAME by the end of 2015)
- Installation march-april 2016

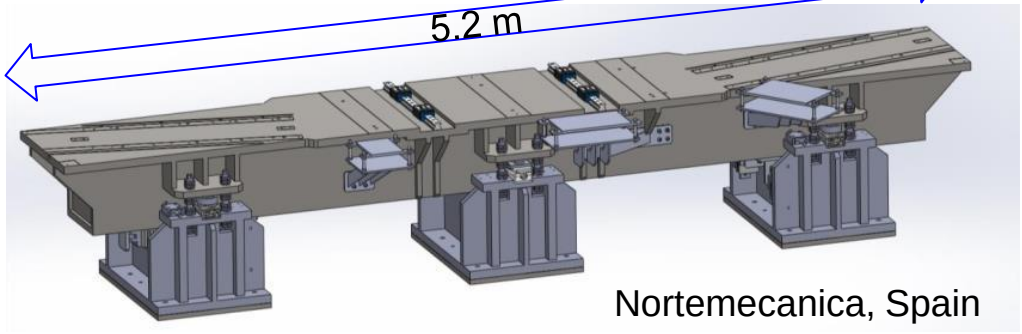
RF



4 x 500 MHz 80 kW Solid-State-Amplifier. Designed SOLEIL
Built up of amplifier 1 done by SOLEIL
Built up of amplifier 2,3,4 by SIGMA-Phi
First 2 expected February 2016 other 2 June 2016

4 Elettra cavities
2 expected April 2016 rest August

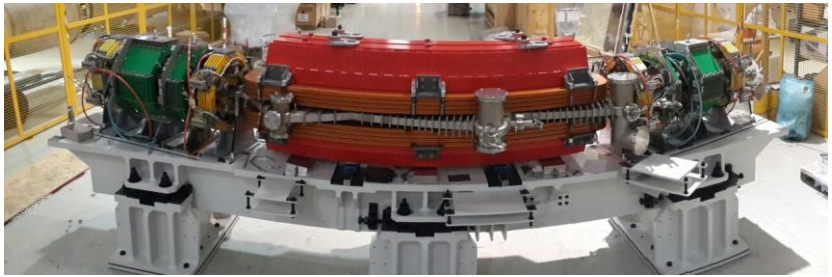
Girder



Flatness < ± 50 µm
Pin-positioning < ± 50 µm
Deflection under load < 50 µm

8 from 16 are on site. The rest are expected by the February 2016.

Prototype was setup with magnets & vacuum chamber at CERN in April 2015

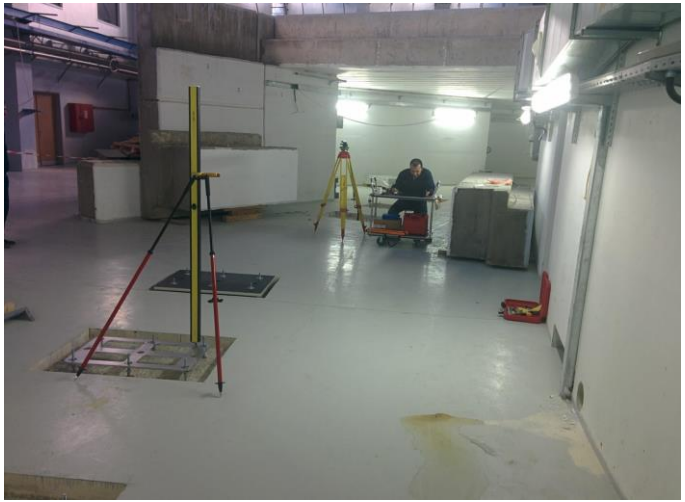


Vacuum

- **Factory acceptance test for first batch of vacuum chamber passed**
- **Delivery of last Components April 2016**
- **Vacuum Pumps, Valves: at SESAME or on the way to SESAME (Feb.2016)**

Roof

Installation schedule



Installation of Magnets	**Jan. – Jun 2016**
Vacuum	**Feb. – Aug. 2016**
Cooling	**Apr. – Sep. 2016**
Cable trays	**May – Oct. 2016**
Cabling	**Jun – Oct. 2016**
Alignment, Check of installation	**Nov. 2016**
Start Commissioning	**Dec 2016**

Phase 1- Day 1 Beam Lines

Beamline	Energy	Will be ready	Remark
Infrared	0.01 - 1 eV	end 2016	New
X-ray Absorption/Fluorescent	3 - 30 KeV	end 2016	ESRF/HZDR
Powder Diffraction	3 - 25 KeV	2017	SLS
Protein Crystallography	4 - 14 KeV	2017	New

THE END

Thank you for your attention