

# RD51 Common Test Beam: Status

RD51 collaboration week  
Kolymbari, June 2009  
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NTUA

# Outline

- RD51 Test beam requirements
- Schedule
- Experimental zone
- Setup sketch and mechanics
- Gas system & cables
- Magnet

# Dedicated semi-permanent test beam

From the approved proposal:

*"The collaboration would like to ask for the following resources and infrastructure at CERN:*

*[...] Access to irradiation and test beam facilities (including the possibility to keep "semi-permanent" setup). The collaboration foresees typically 2 annual test beam campaigns each of a few weeks duration."*

Semi-permanent setup means the RD51 members can always find:

- Dedicated cables and gas pipes permanently lying in the zone
- Stable dedicated gas mixing racks in the gas zone
- Dedicated space, electronics racks, computers in the control room
- Devices such as trigger scintillator and tracking telescope, as well as support mechanics. They will be stored out of the beam line but in the experimental area or very close to it

# 2009 Specific test beam requirements

## Requirements 2009:

- Dimension: around 60x60 cm<sup>2</sup> planar devices; weight: few kg devices
- CF<sub>4</sub> and flammable gas mixtures
- High resolution (better than 70μm) external tracker
- Low or high rate beam, typically MIPS (pions preferred)
- Mechanical Support allowing X-Y position and rotation
- High Magnetic field, sometimes together with low energy beam

## Groups involved in summer time slot:

- CERN GDD Large Area GEM detector (large support)
- Frascati KLOE-2 GEM prototypes (magnet, flammable gases)

## Groups involved in autumn time slot:

- CERN GDD Large Area GEM detector
- Paul Colas' Saclay group MicroMegas TPC (magnet, low energy beam)
- Stephane Aune's Saclay group MicroMegas (magnet?, flammable gases?)
- Bonn TPC (high energy beam, magnet?)

## PS Operation

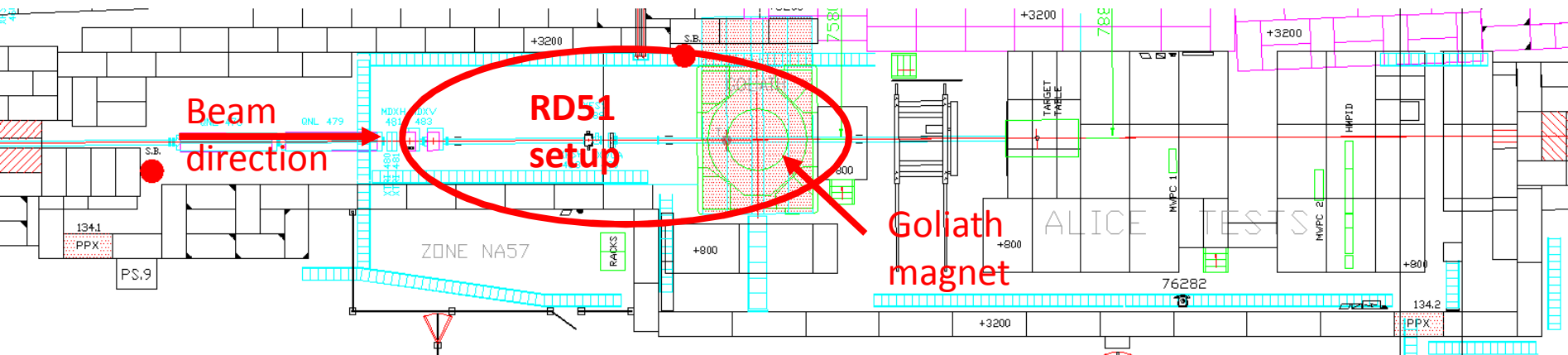
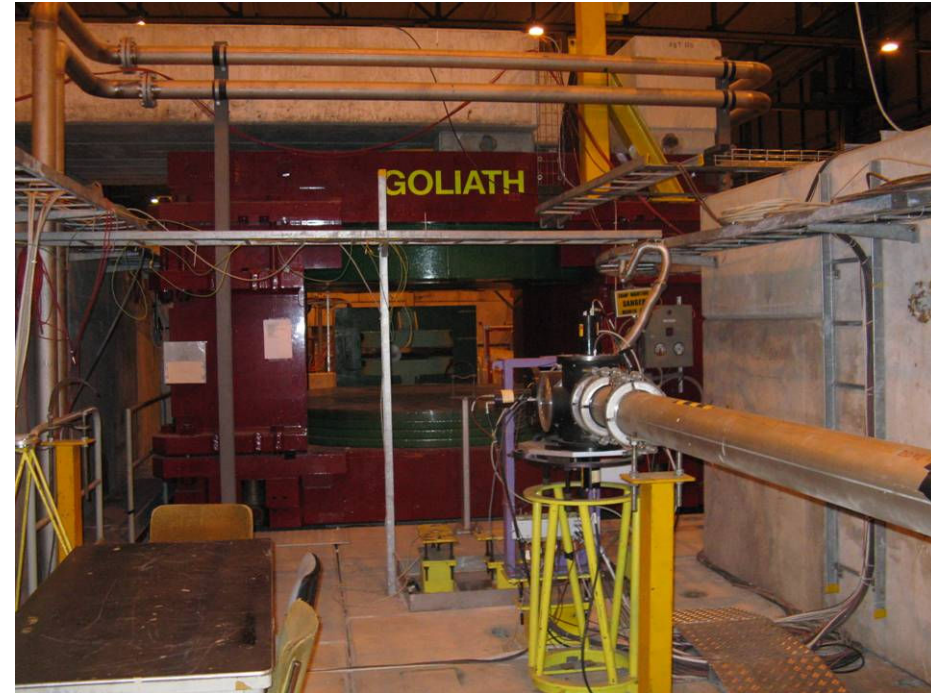
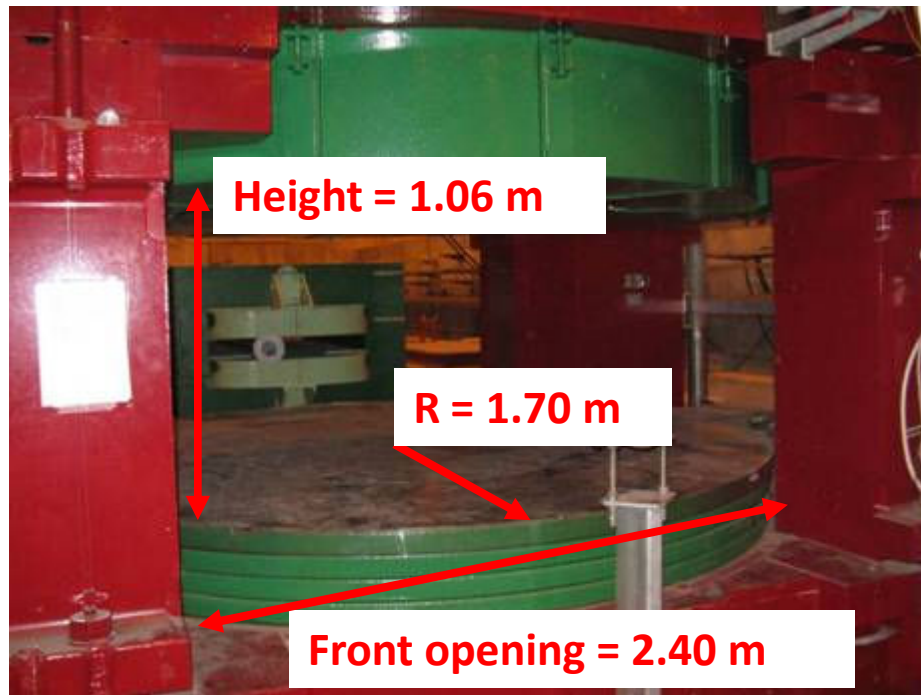
(colour code: purple (dark) = scheduling meeting, light green (light) = weekend)

## DS Operation

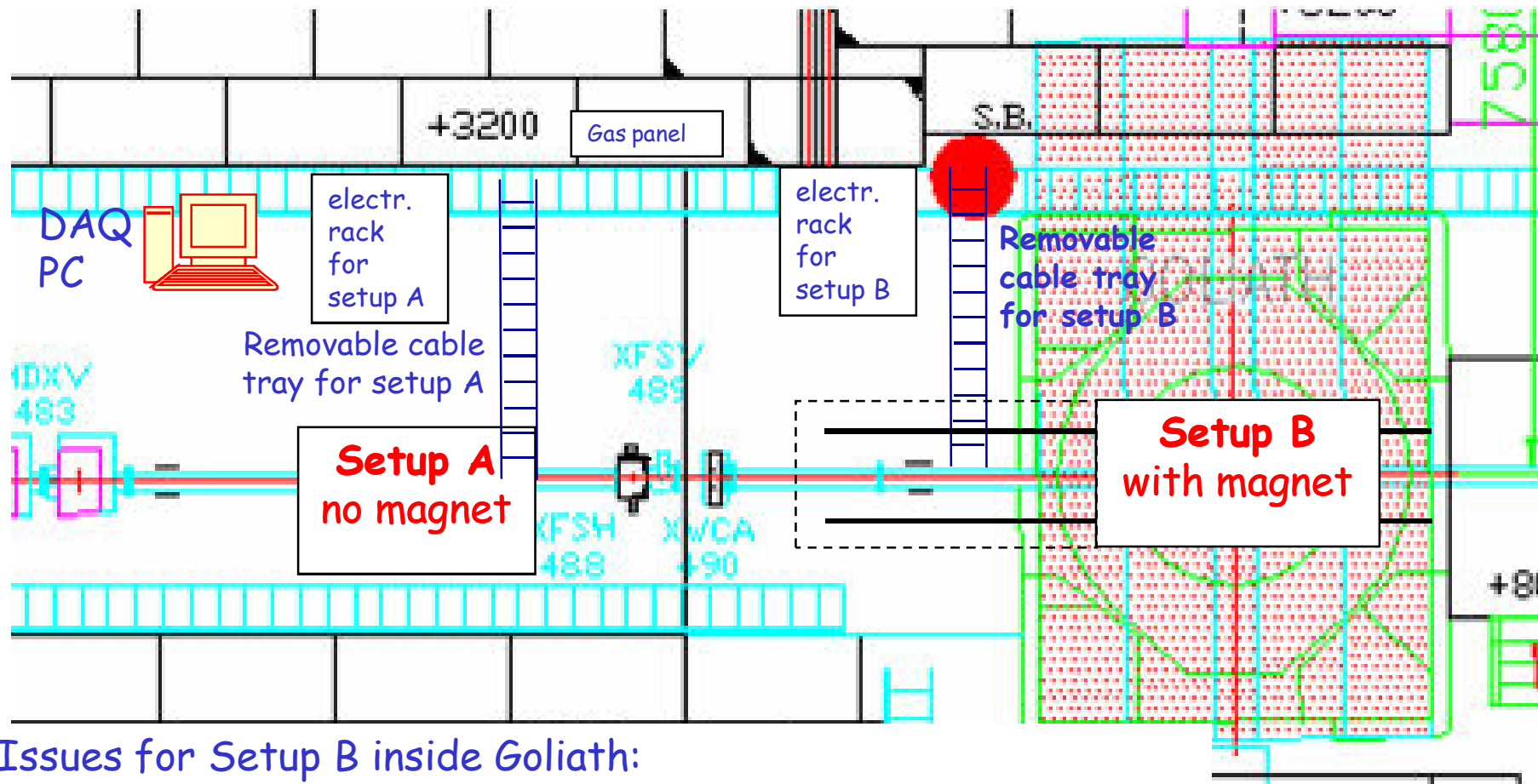
(colour code, purple (dark) – scheduling meeting, light

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# SPS/H4 line at Preveessin North Area



# The RD51 installation @ SPS/H4

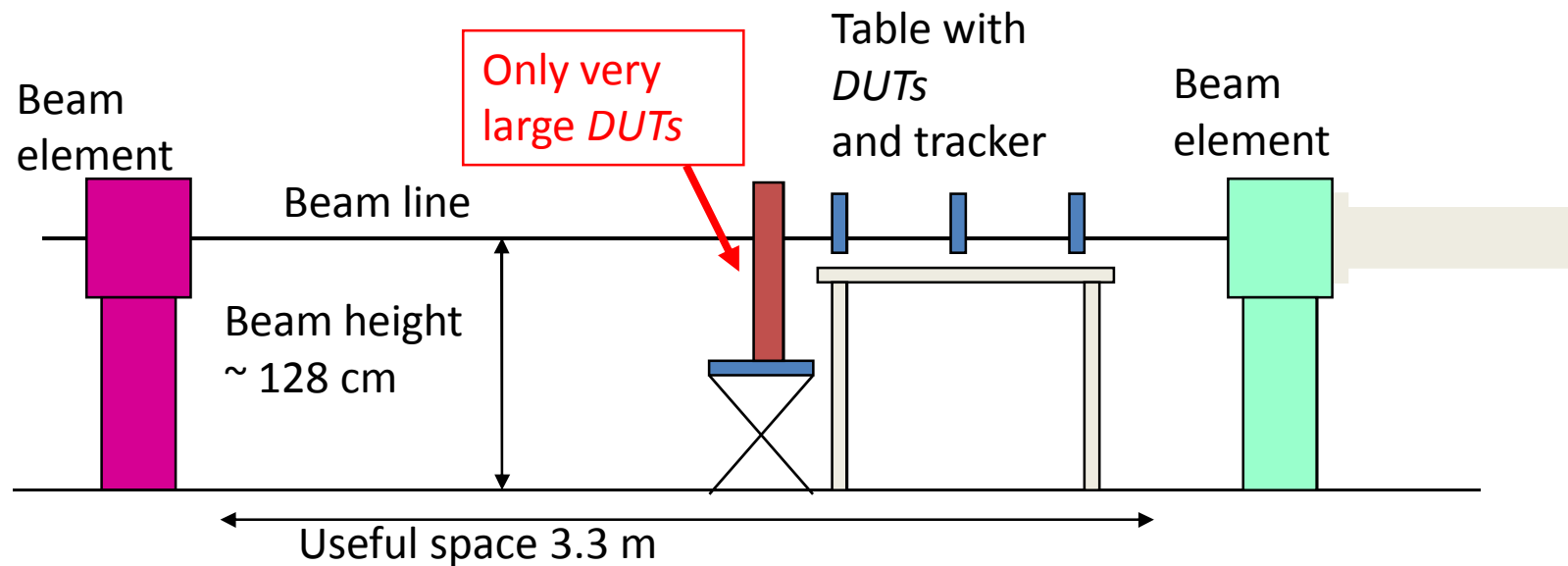


Issues for Setup B inside Goliath:

- Electronics rack is in a region with a 5-10mT fringe field
- Cables length can arrive up to more than 8 m

# Setup "A" outside the magnet

Placed upstream Goliath, composed by a table with precisely-positioned tracking elements and an external support for the case of very large *Detectors Under Test (DUTs)*



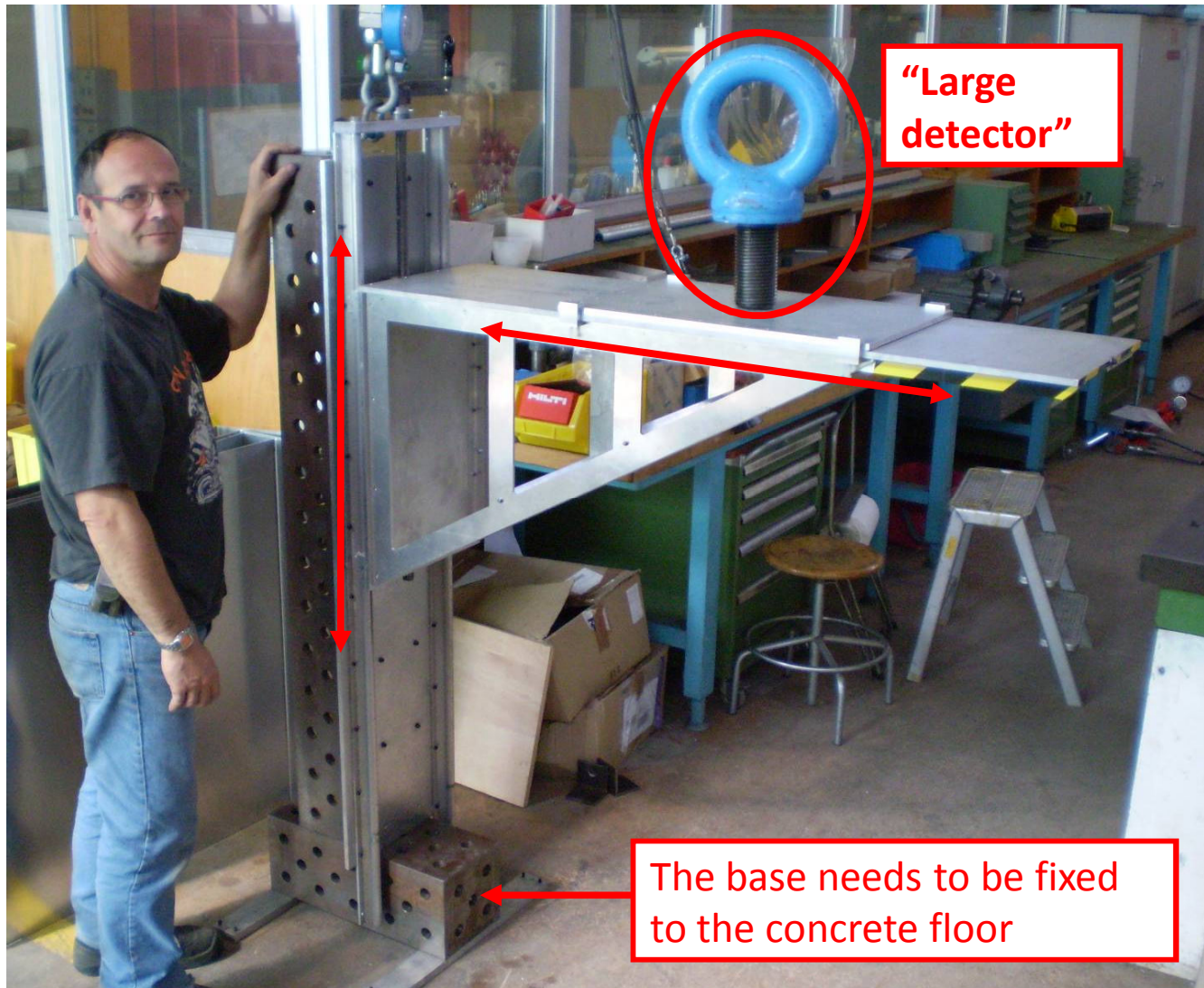


# Setup "A" table



- height ~ 70 cm
- Surface  $85 \times 120 \text{ cm}^2$  with a grid of holes
- Suitable for small ( $20 \times 20 \text{ cm}^2$ ), light (5 kg) tracking elements and *DUTs*
- In case of flammable gas, retention buckets can be added on the table (closing the fixation holes)
- Moved out of beam on the side when not used, without dismounting the tracker

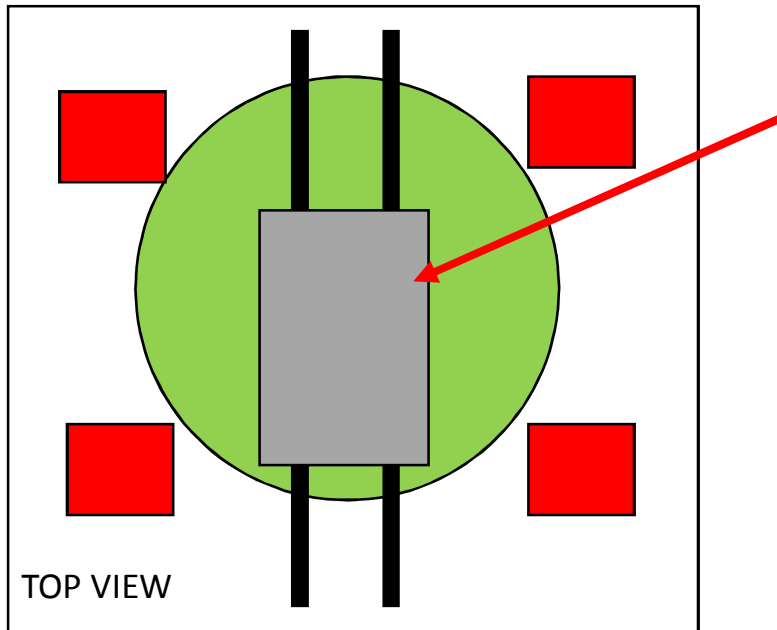
# Large detector support



# Tracker & DAQ

- A new micromegas tracker, 3 x-y detectors, are ready and will be at CERN next Monday (Demokritos & NTU Athens groups)
- The DAQ system is already at CERN and working
- There is a problem with the block transfer that limits the R/O but will be fixed.

# Setup "B" inside the magnet

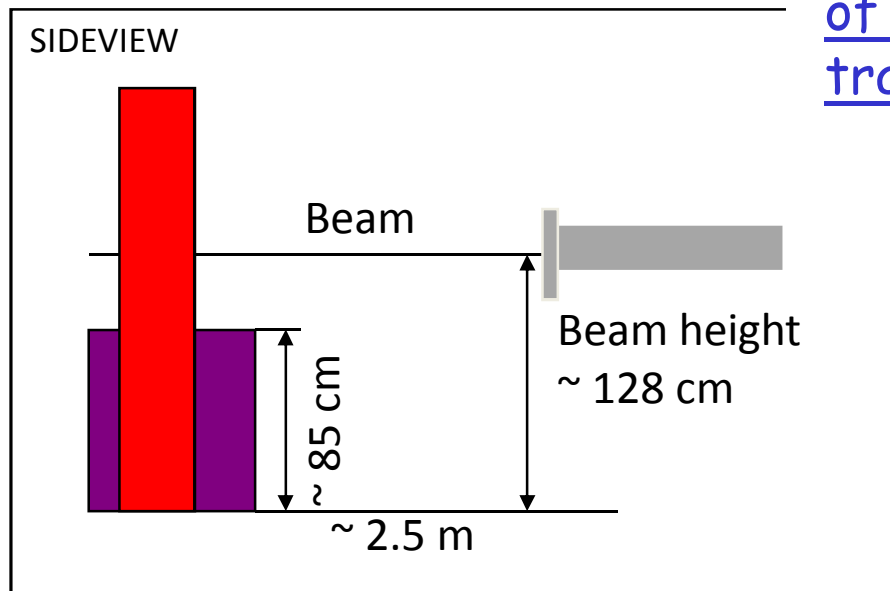


Similar table mounted over rails

Rails will extend out of the magnet for about 1m, with two legs for support

Table will be moved out of the beam when not used. Rails will stay, if possible

More than 8m length for cable, to arrive from rack to the farthest part of the magnet, properly using cable trays



RAIL SYSTEM:



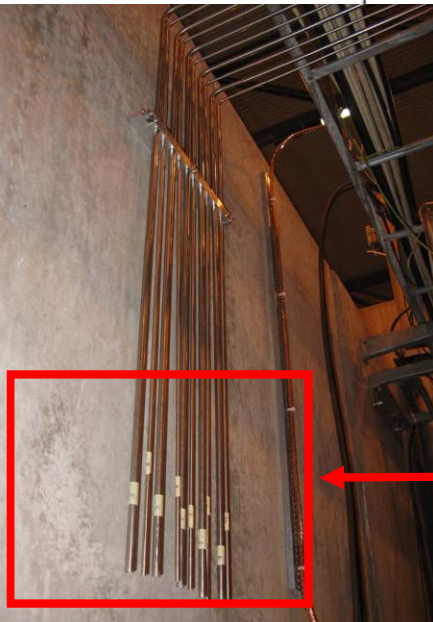
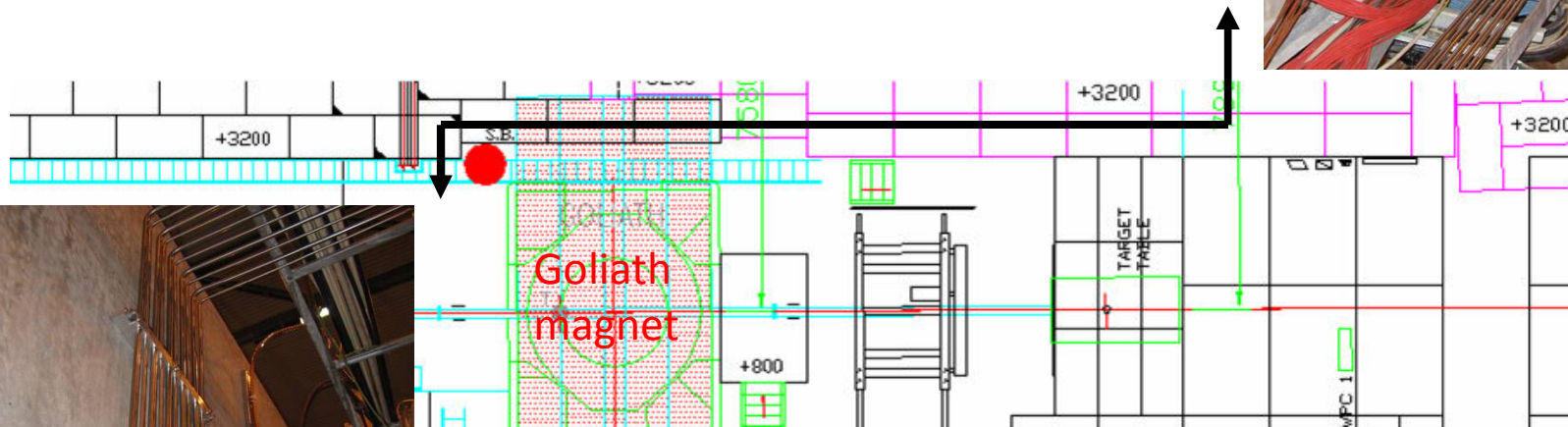


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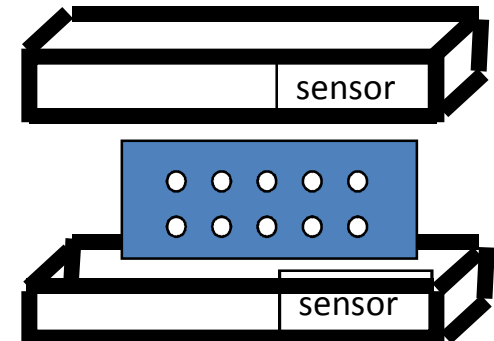


# Gas Pipes

- **Stainless steel** from gas zone to a patch panel in the experimental area
- **5 lines**, each with 6mm diam. pipes for inlet and 10mm diam. pipes as exhaust



Gas panel includes also **retention buckets** for flammable gas sensors.



# Cables list (barrack → area)

Lines installed from the experimental area to the barracks

- Fiber line x2
- Ethernet lines x3 + 2 small switches at both sides
- SHV lines x4
- 16 LEMO coaxial cables

Still missing:

- Other fiber lines for October
- More coaxial cables

Cables inside the experimental area must be provided by the users!!!

# Specification and field map from NA57

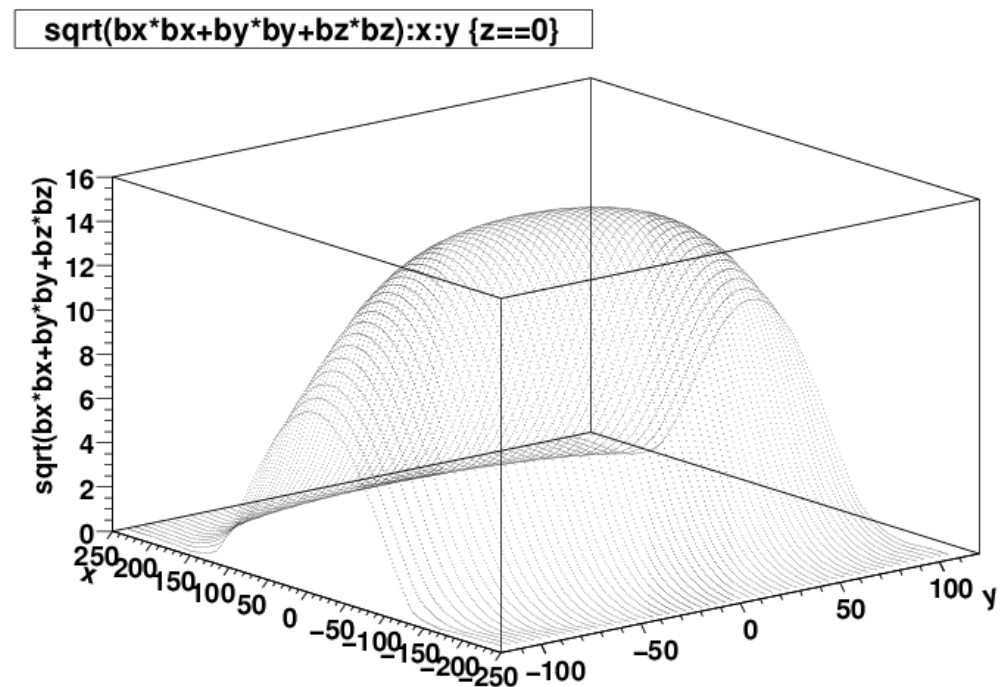
Power: about 2MW

Maximum field: 1.4T

Gap volume: around 8 m<sup>3</sup>

Max. water pressure: 10 bar

- Looking at the map realized during NA57 experiment, the field seems to drop fast when approaching the border.



Field map realized during NA57  
experiment, file decoded by Frascati  
group  
RD51-WG7