

## Open questions and services

- ✓ Dimensions of cables and services
- ✓ Minimal cross section
- ✓ Routing possibilities

# A look in a running experiment!



ALICE SDD cooling system

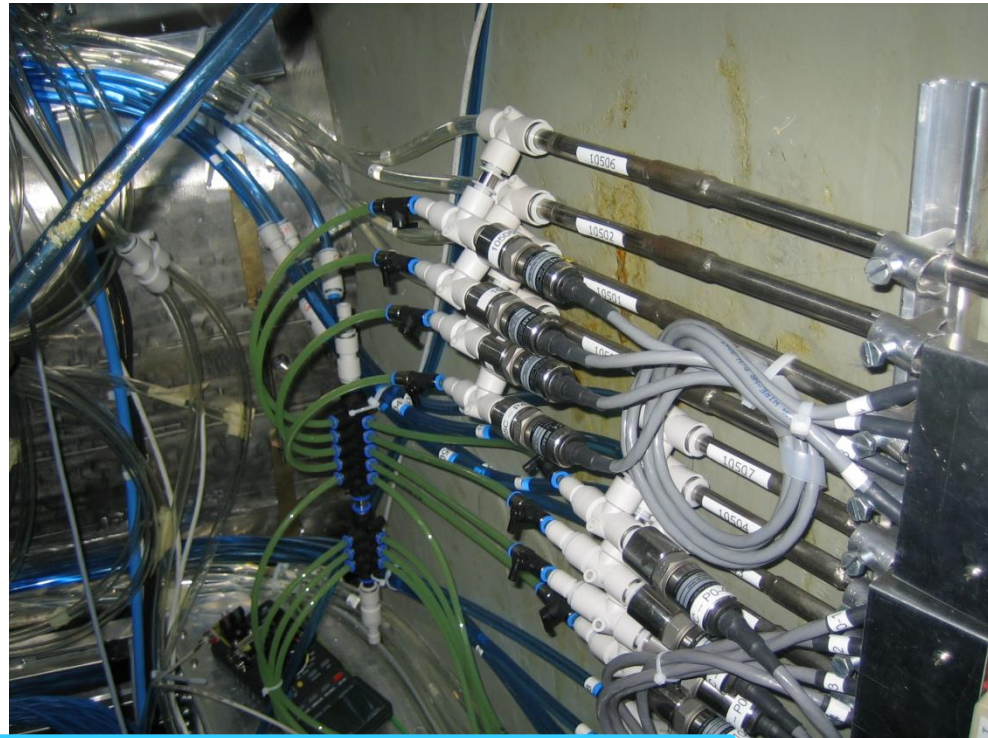


# A look in a running experiment!

Pressure regulators rack

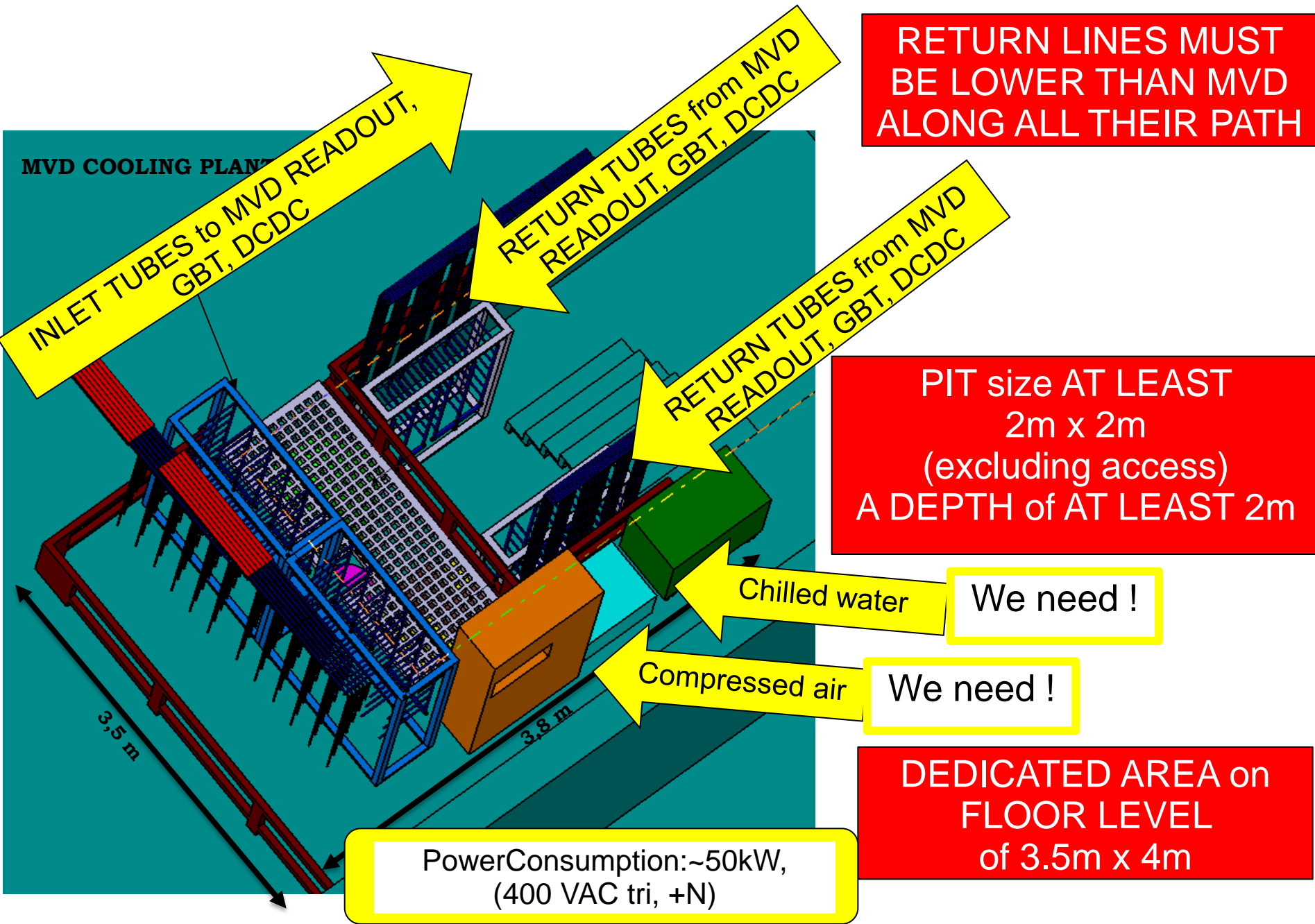


Pressure sensors at the  
experiment entrance



ALICE SDD cooling system

# Cooling plant in the pit





# Equipments at the PIT

PLC and controllers (included power supplies)

Tank

Vacuum pump

Inlet pump + filter

Water cleaning unit

Manifolds and about 85 inlet tubes

Manifolds and about 85 return tubes

Heat exchanger

85 pressure regulator

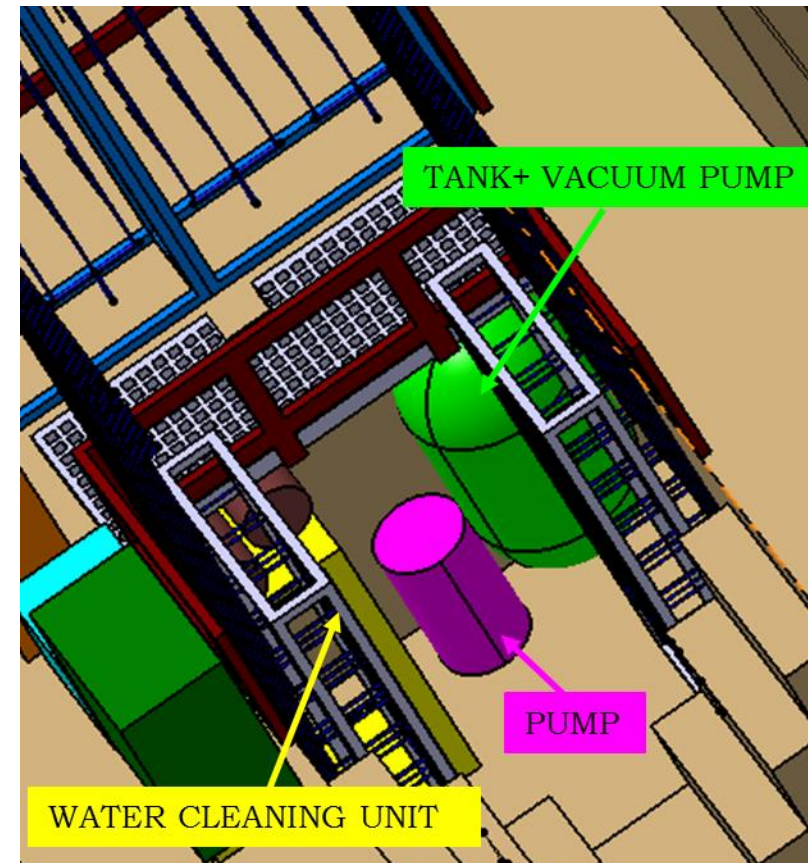
85 flow meters

85 valves on return lines

85 water Temperature sensors

170 pneumatic valves

Other sensors (tank level indicator,  
pump pressure sensors,  
water temperature sensors...)



# Dimension of the MVD hydraulic circuit

## **TUBES FROM COOLING PLANT TO MAGNET:**

21+22+38 INLET LINES= 81 INSULATED TUBES [Diam. 14mm+ insulation= 35 mm]

21+22+38 RETURN LINES = 81 TUBES [Diam. 16mm]

= 0,5 m\* 0,5m total section for Tubes FROM COOLING PLANT TO the MAGNET (In Stainless steel and Polyurethane)

## **IN FRONT OF THE MAGNET DOOR**

- 170 Pressure sensors (one on each tube) CLOSE TO MVD (immediately in front of the magnet)
- 170 Readout cables
- 170 Power supply cables

## **TUBES INSIDE THE MAGNET (around the beam pipe)**

- 14 Polyurethane tubes - inlet lines (diam. 8-10mm) to GBT Boards.
  - 14 Polyurethane tubes - return lines (diam. 8-10mm) from GBT Boards to magnet.
  - 24 Polyurethane tubes - inlet lines (diam. 8-10mm) to DC-DC Boards
  - 24 Polyurethane tubes - return lines (diam. 8-10mm) from DC-DC Boards to magnet.
  - 43 Polyurethane tubes - inlet lines (diam. 8-10mm) to manifold patch panel
- = 53+48= 101 Polyurethane tubes- inlet lines (diam. 4 mm) from manifold patch panel to MVD
- = 53+48= 101 Polyurethane tubes - return lines (diam. 4 mm) from MVD to manifold patch panel.
- 43 Polyurethane tubes- return lines (diam. 8-10mm) from manifold patch panel to magnet

### **THE MVD:**

- 53 + 48 U-Tubes for PIXEL and STRIPS in MP35N
- 14 + 24 U-Tubes for GBT and DC-DC Converter Boards in Stainless steel (?)

# General material indication

ALL WETTED PARTS MUST BE MADE OF STAINLESS STEEL  
(AISI 316 L)

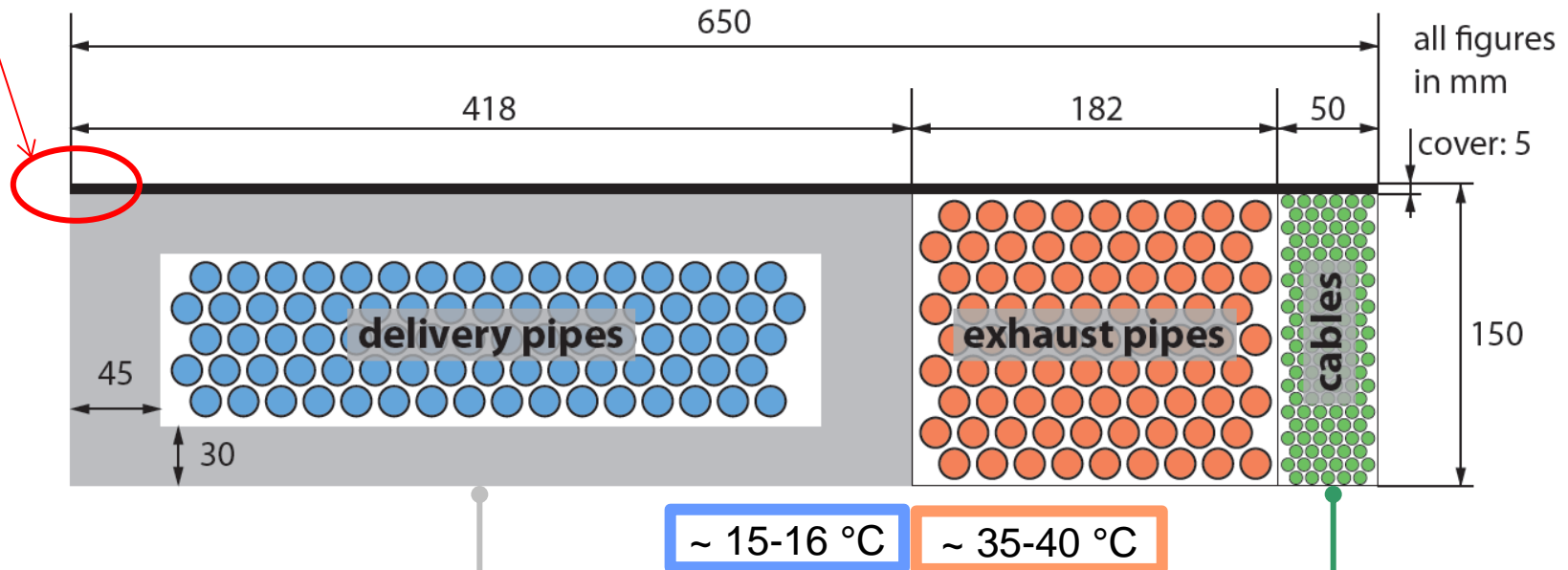
ALL PIPES MUST BE MADE OF ANTI-CORROSION ALLOYS  
(PHYNOX, MP35N)

FLEXIBLE PIPES MUST BE IN POLYURETHANE

Accurate knowledge of the dew point in the experimental hall  
(and in the MVD volume!)  
( $T \pm 0.5 \text{ }^{\circ}\text{C}$ )

# Cooling pipe cross section + cables, from MVD to PIT

Cover: from 5 mm to 10 mm (!)  
Cover supports (!)



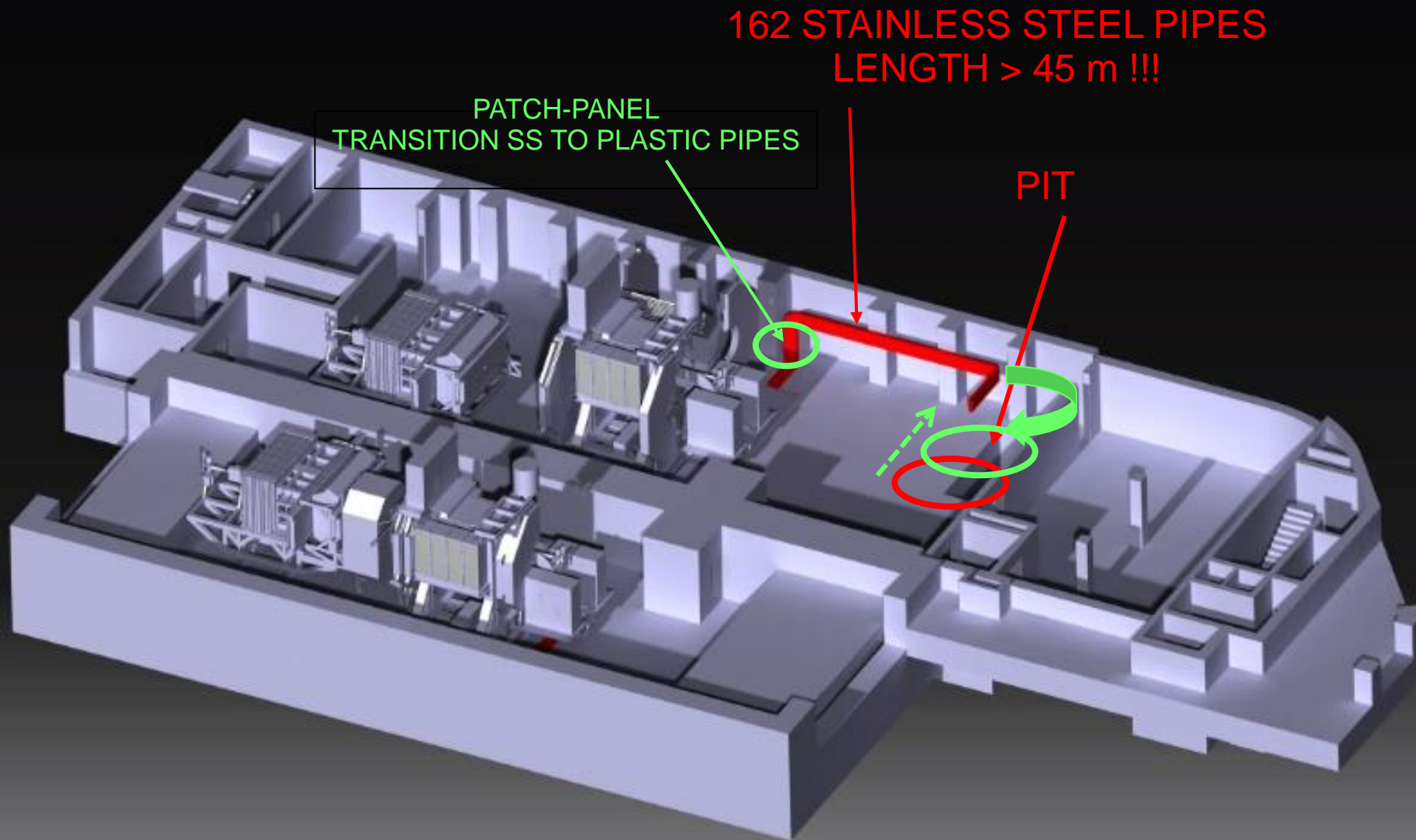
Alternative solution: insulator around all the MVD input pipes

- Cables to connect:
- Readout and power supply of ~ 170 pressure sensors, (MVD T and Umidity ?)
  - Alarms, interlocks ? – hard wired

Cables for Cooling system control  
(from Pit to Counting Room):  
50 mm x 50 mm (?)

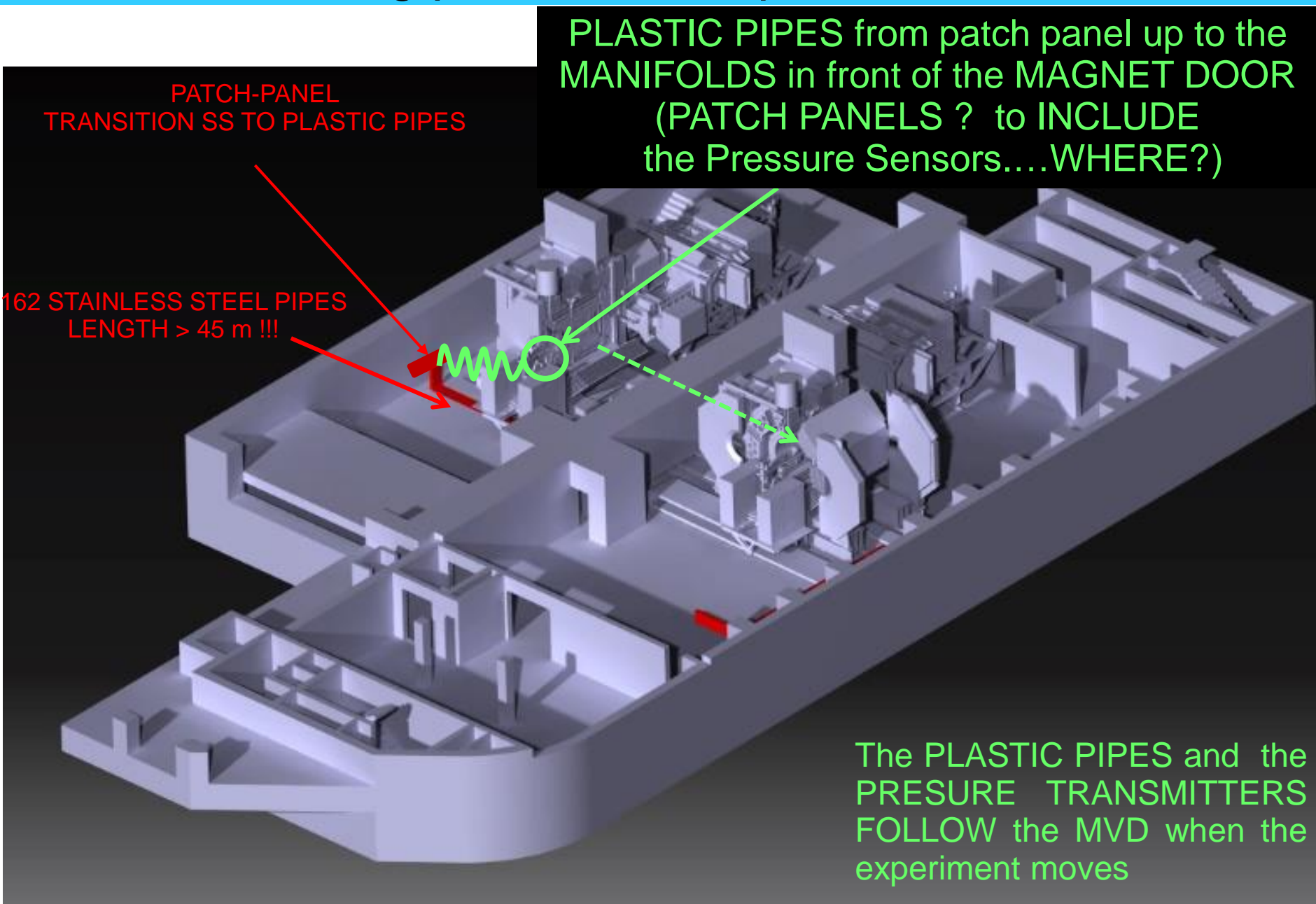


# Cooling plant in the experimental Hall



Move the MVD cooling system to the other side of the pit to gain return line length

# Cooling plant in the experimental Hall



# MVD rack request – near PANDA

near PANDA					
		crate number	U/crate	rack space [U]	
PIXEL part	Low Voltage-readout	8	8	64	
	High Voltage	3	8	24	
	LV/core/transceiver	3	8	24	
STRIP Part					
	Low Voltage	7	10	70	
	High Voltage	2	10	20	
General part					
	local cooling	4	3	12	
	on detector/interlocks	1	8	8	
				222 Total	

Total rack supply: ~ 75 kW

We are working to reduce the number to 188 U (47 units x 4 racks) !



# Cross sections at the magnet door

Cooling pipes + p sensor cables (towards pit):  
~ 650 mm x 150 mm

Power supply cables (towards the racks):  
400 mm x 200 mm

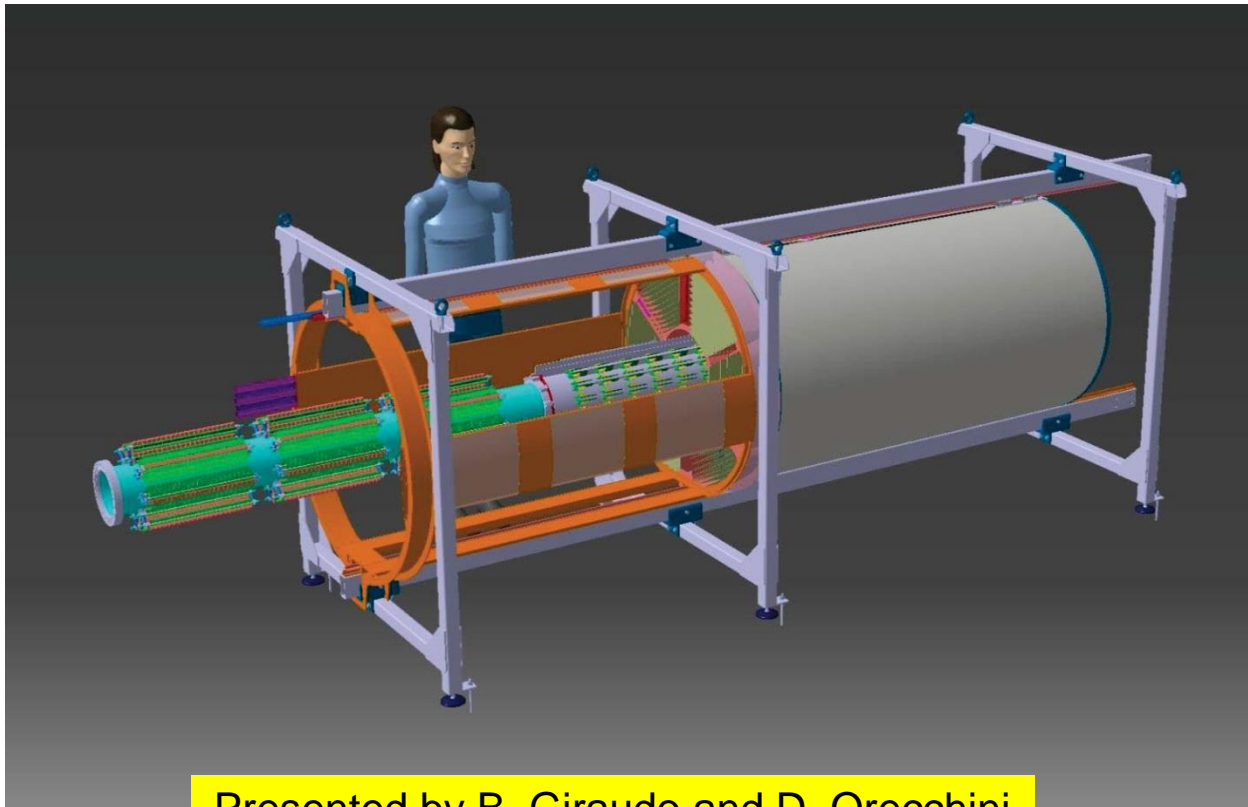
Optical fibers (from MVD to the CR) +  
power supplies control (from racks to CR, ...):  
~ 50 mm x 50 mm + ~ 50 mm x 50 mm

# MVD integration – I step

MVD assembled with the services (1 step) and then (2 step) inside the straw tracker and around the beam and target pipes in a **dedicated laboratory (clean)** at the GSI [ **about 12m x 10m area** ]

- ✓ Routing from the GBT to the super modules done
- ✓ Routing from the DC/DC converters to the super modules and to the GBT done
- ✓ Routing of the cooling pipes from patch panels (? where?) to super modules done

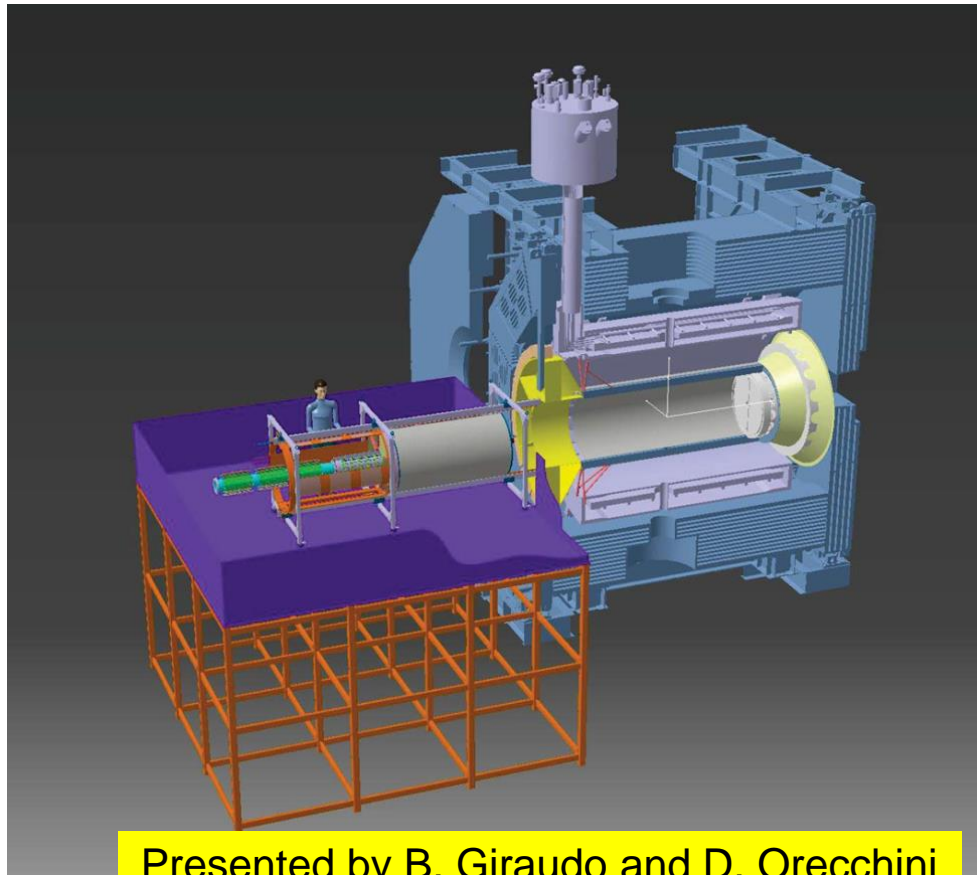
**MVD test** performed using cooling system , power supplies and optical fibers with daq (locally!)



Presented by B. Giraudo and D. Orecchini

# MVD installation – II step

- ✓ MVD – Straw tracker – Beam/Target cross system moves from the dedicated laboratory (?) to the platform in front of the magnet



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Spares

# MVD Hydraulic Circuit

