

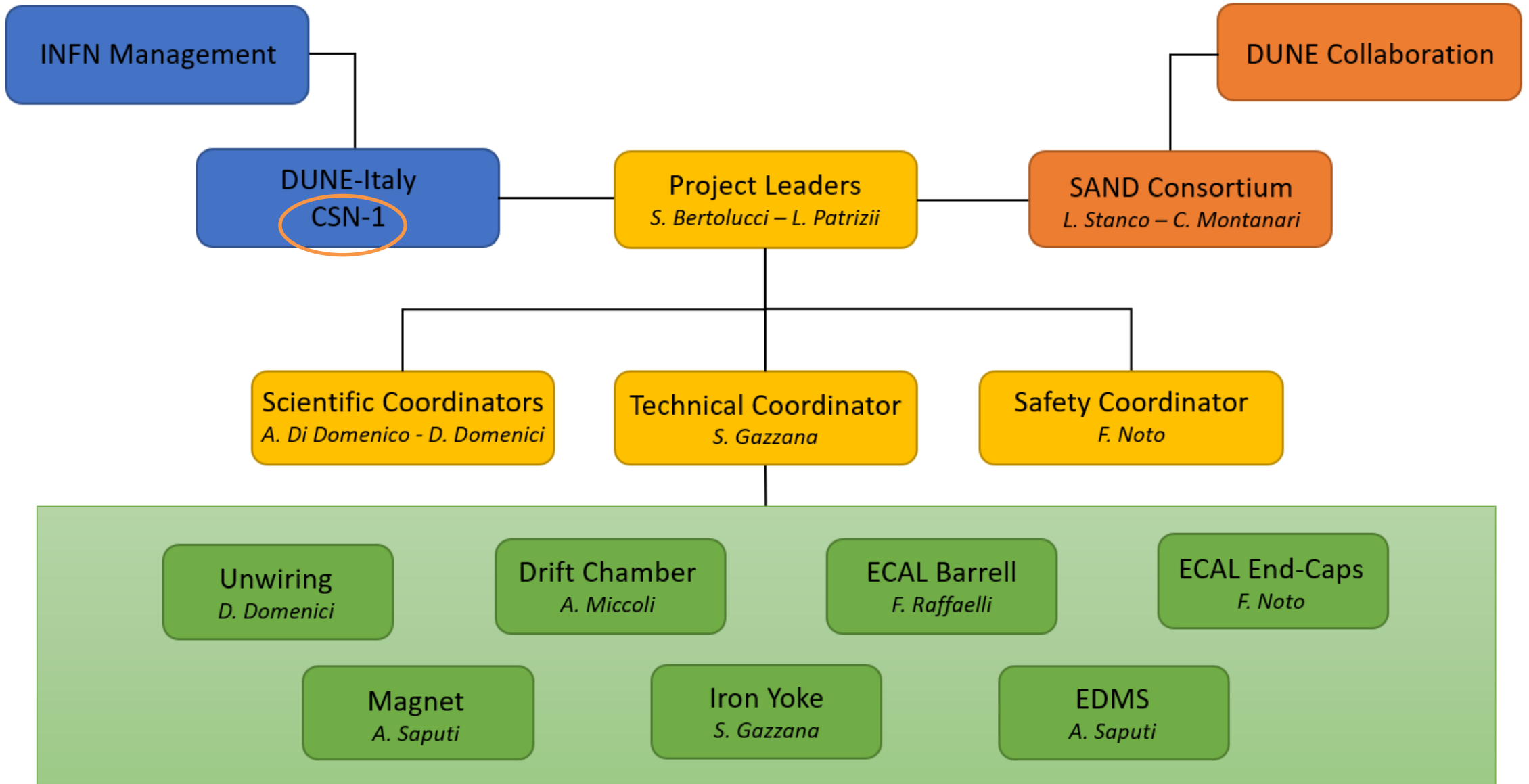


DUNE Collaboration Meeting SAND/ECAL and SAND/MAGNET Working Groups Report

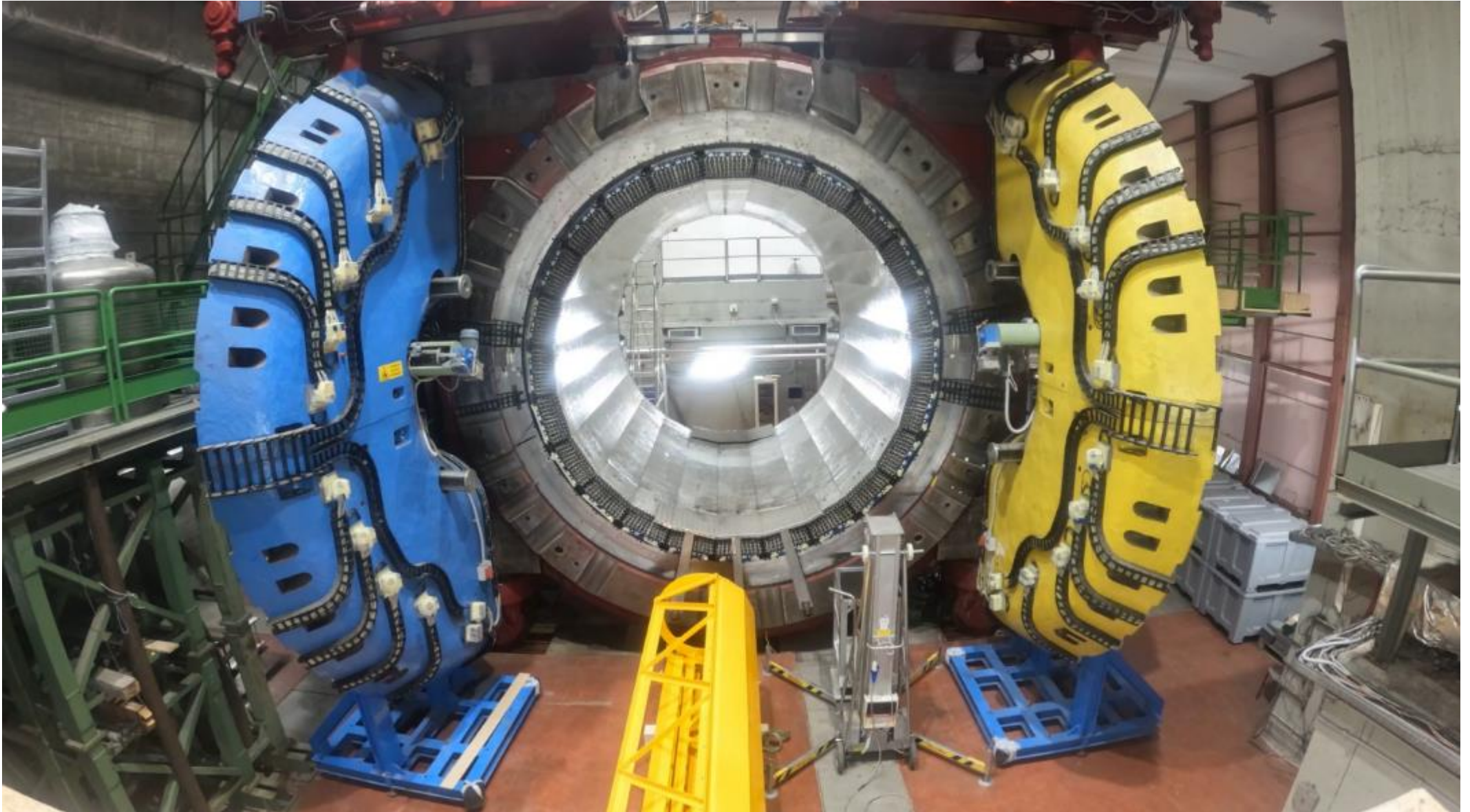
Danilo Domenici LNF - INFN

on behalf of the SAND ECAL/MAGNET Working Groups

KLOE-TO-SAND Project OBS

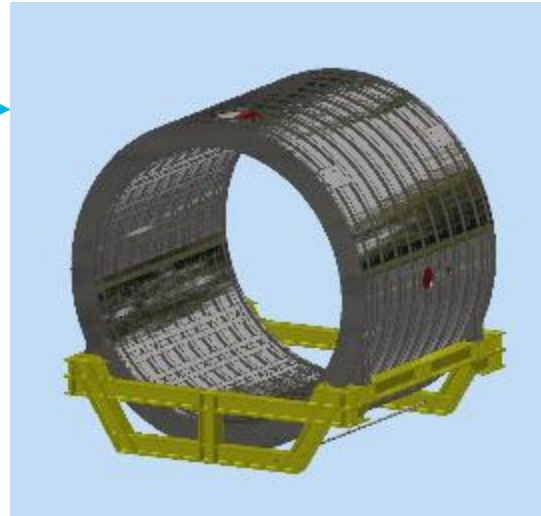


The KLOE detector: then and now



KLOE-TO SAND Operation List

- ✓ Removal of all the cables and the FEE+HV racks
- ✓ Extraction of the Drift Chamber
- Extraction of the ECAL (24 modules of barrel + 4 EndCaps)
 - New tape wrapping
 - Operational test
 - Dismounting of PMTs
 - Packaging
- Installation of new Magnet power supply
 - Cooling of coil
 - Operational test of magnet
- Extraction of the Magnet
- Dismounting of the Iron Yoke
- Shipping

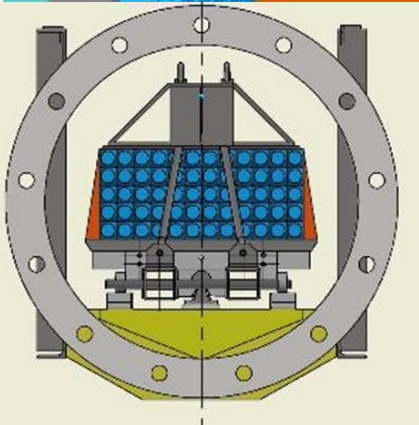
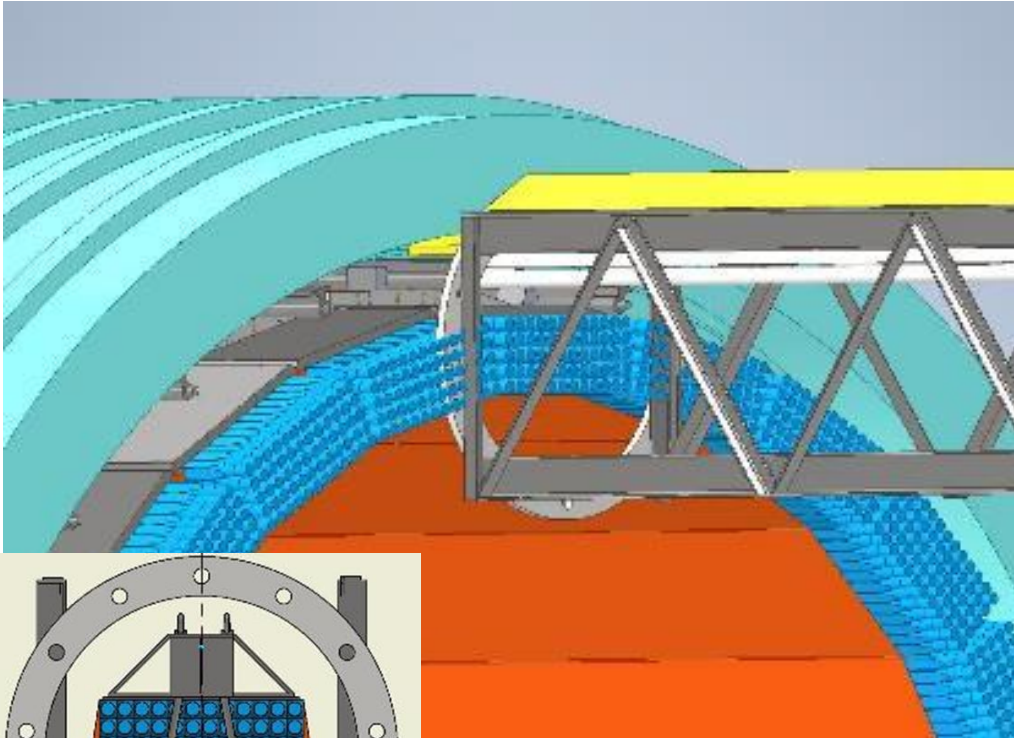


Extraction of Drift Chamber – done Winter 2022/2023

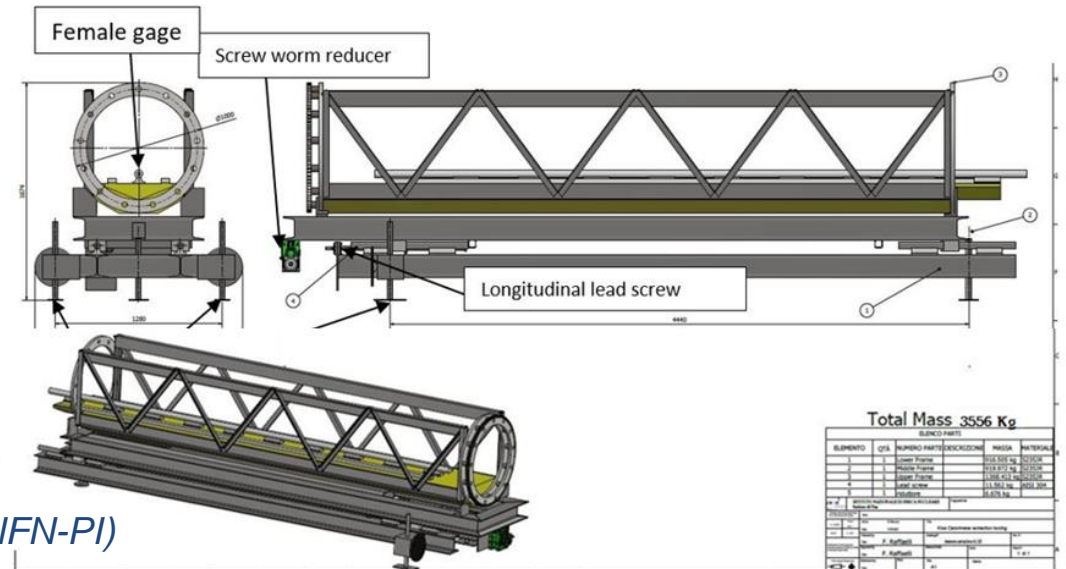


ECAL Barrell Dismounting – scheduled Autumn/Winter 2023

Barrell composed of 24 modules (3500kg each) fixed to the internal wall of magnet cryostat through 3 bearings sliding on guides

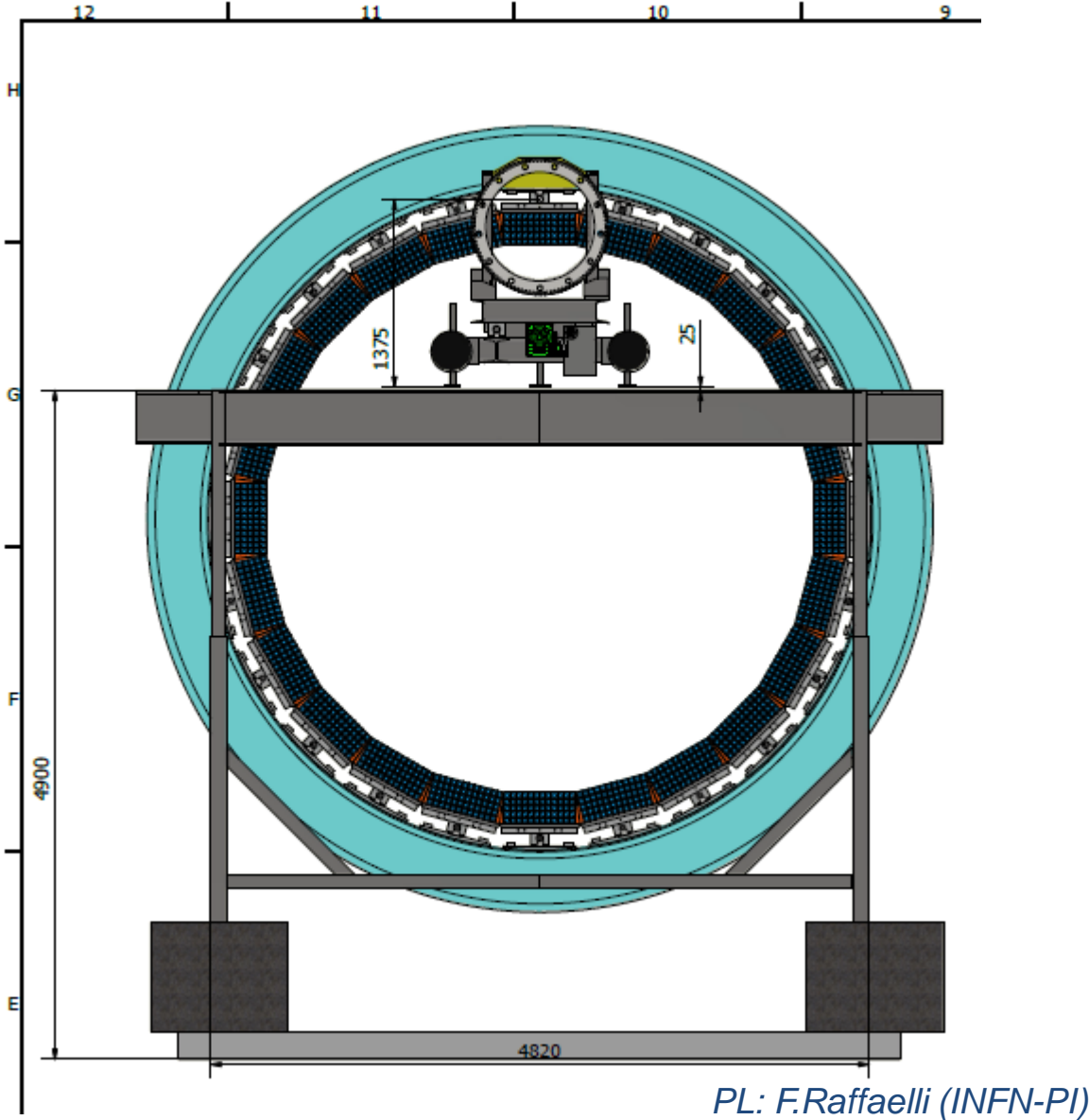


original insertion/extraction tool completely refurbished and anew operational



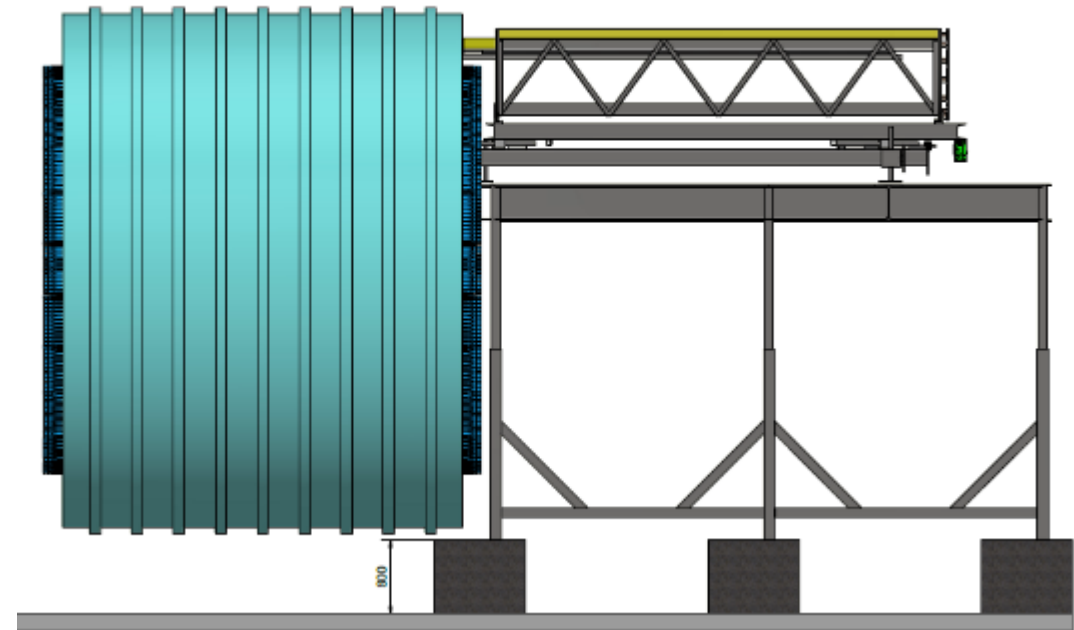
PL: F.Raffaelli (INFN-PI)

ECAL barrel Extraction Preparations: Carpentry

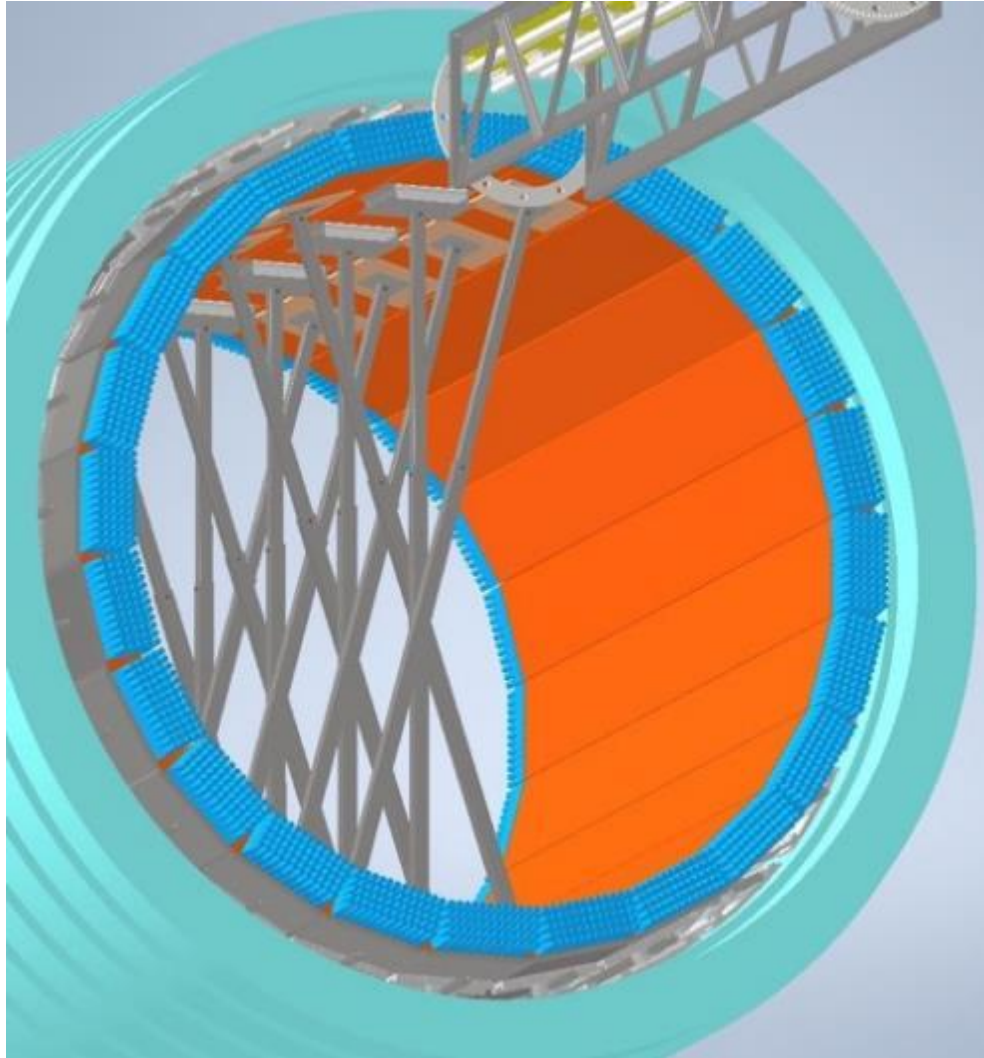


Fantini Sud is realizing a custom platform made by modular carpentry allowing to align extraction machine to all 24 modules

Platform and machine will be reused at FNAL for insertion and are certified both EU and US



ECAL barrel Extraction Preparations: Safety Rods



12 rollers mounted on poles will be placed as a redundant safety support for the extraction of the upper 3 modules

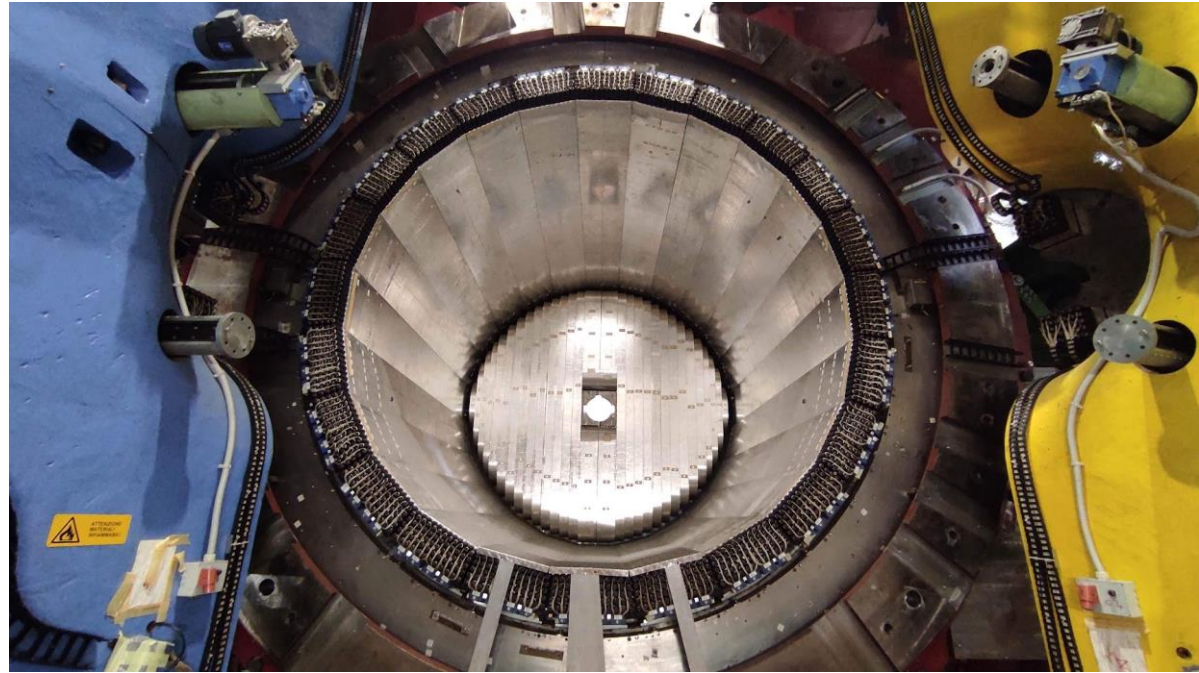
Parts are already in KLOE hall ready to be mounted



ECAL Position Survey

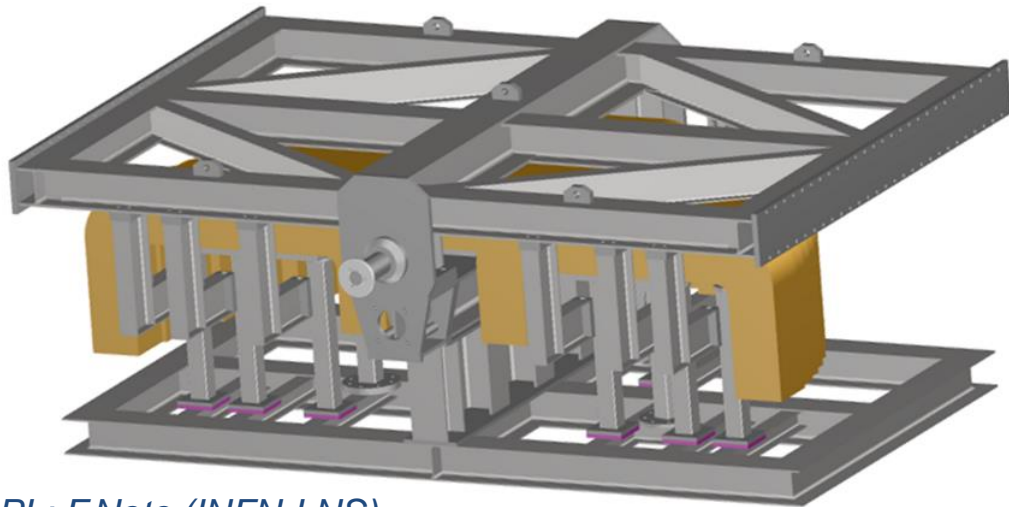
The whole surface of ECAL (EndCaps included) has been laser scanned to obtain a 10mm pitch matrix of point.

The position of each Barrel module has been measured wrt to the cryostat vessel.



ECAL EndCaps Dismounting – scheduled Winter 2024

EndCaps composed of 2 halves with 16 C-shaped modules each. Each half will be detached from iron but not disassembled



PL: F.Noto (INFN-LNS)

original insertion/extraction/rotation machine will be refurbished and modified



ECAL Test and Spare Parts

Spare PMTs

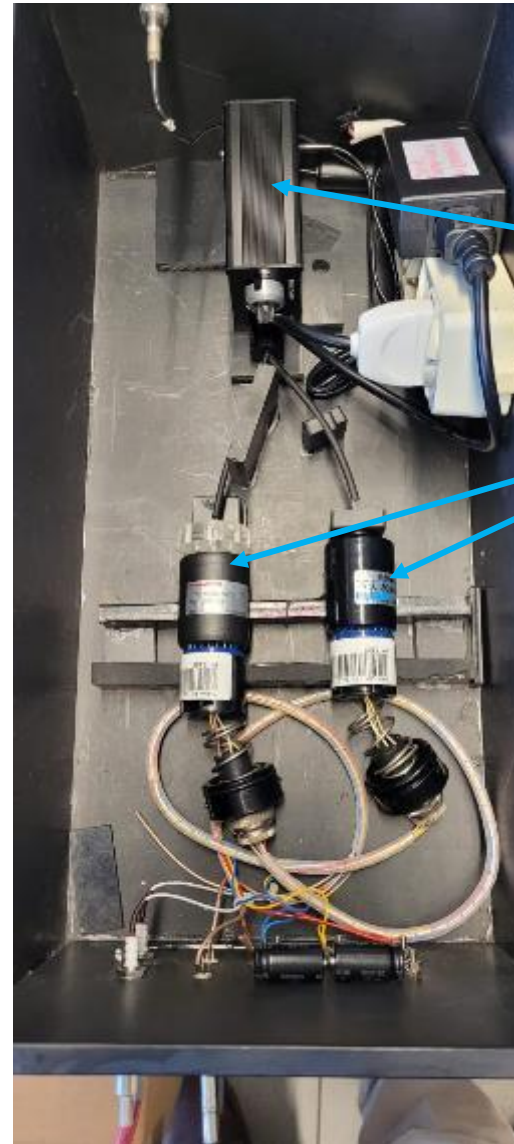
ECAL has 4880 Hamamatsu mesh PMT developed with KLOE.

Since the production line is being discontinued, we purchased 150 spare tubes. PMT sockets, voltage dividers and preamps OK (100 spares already available)



Spare PMTs Test

A sample of 25 PMTs of the new batch have been tested at LNF showing very good performance. The whole batch is now at FNAL.



Test Light-tight Box

Thanks to C.Piscitelli (INFN-Roma)

LED driver

PMTs under test

signals



Magnet Renovation – foreseen Q2 2024

New Power Supply

8 CAENels modules for 3000A - 20 V
REGUL8OR - TDK-Lambda Genesys+
customized with our interlock interface



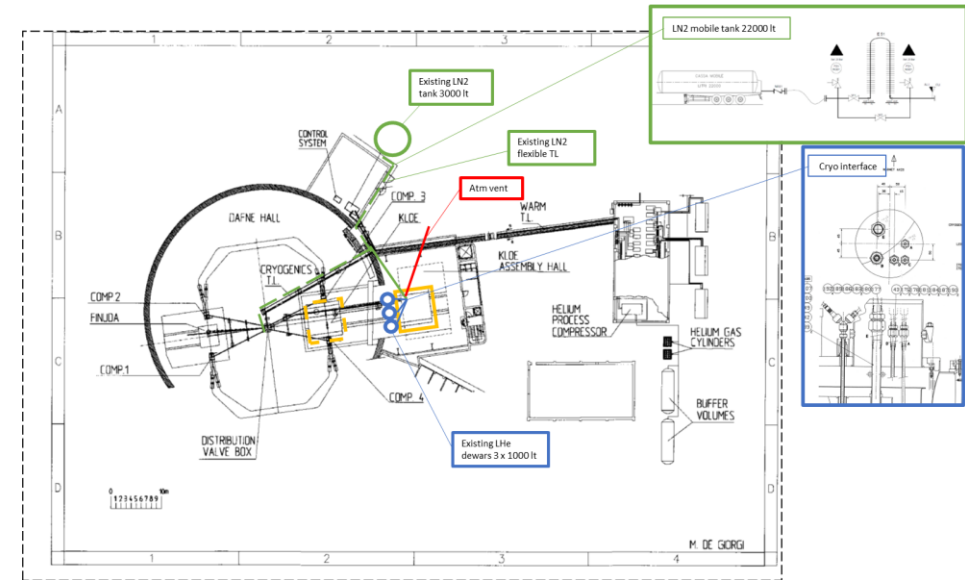
Power Electronics Revamping

Revamping of all parts compatible with DUNE duration and replacing of obsolete parts (dump resistance, discharge diodes, crowbar, contactors) by OCEM



Magnet & Control System Test

ASG-Superconductors will be contracted to perform a full check/revamping/certification of the magnet and provide support for the dismantling at LNF and mounting at FNAL



Coil will be cooled down with LN₂ and LHe for an operational test at low current is foreseen before shipping also to test integration of all the parts (PS, Quench Detector, Control System, Software Interface)

Magnet Extraction and Transport – foreseen Q3-Q4 2024

Diameter 5.80 m
Length 4,40 m
Weight 42 t

Original tools not available.
Reverse engineering and design
of the cradles and all ancillary
parts is ongoing

PL: A.Saputi (INFN-FE)



Truck deck carpentry
to be extended/rebuilt



Sliding cradle on rails with cryostat
at few cm from ground

Transportation cradle
for truck load

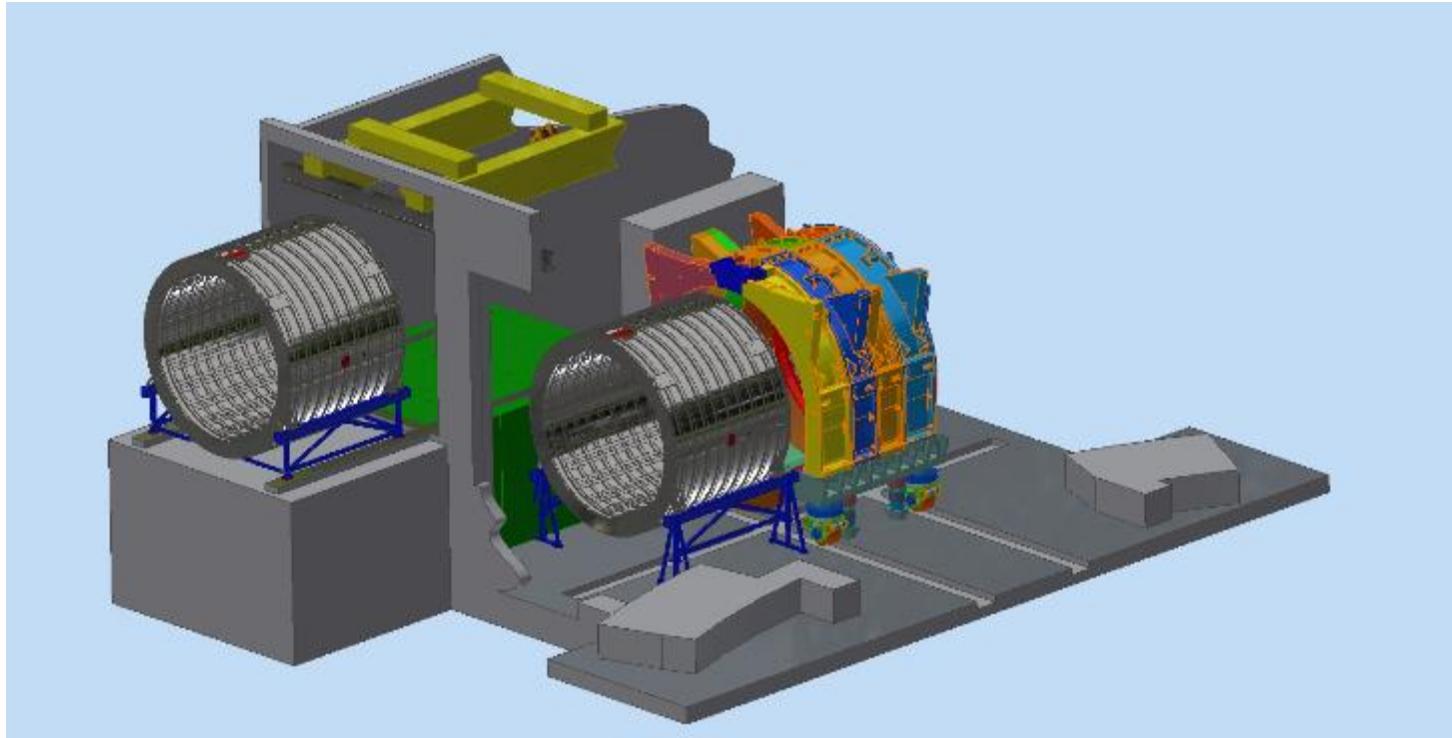


Coil Extraction

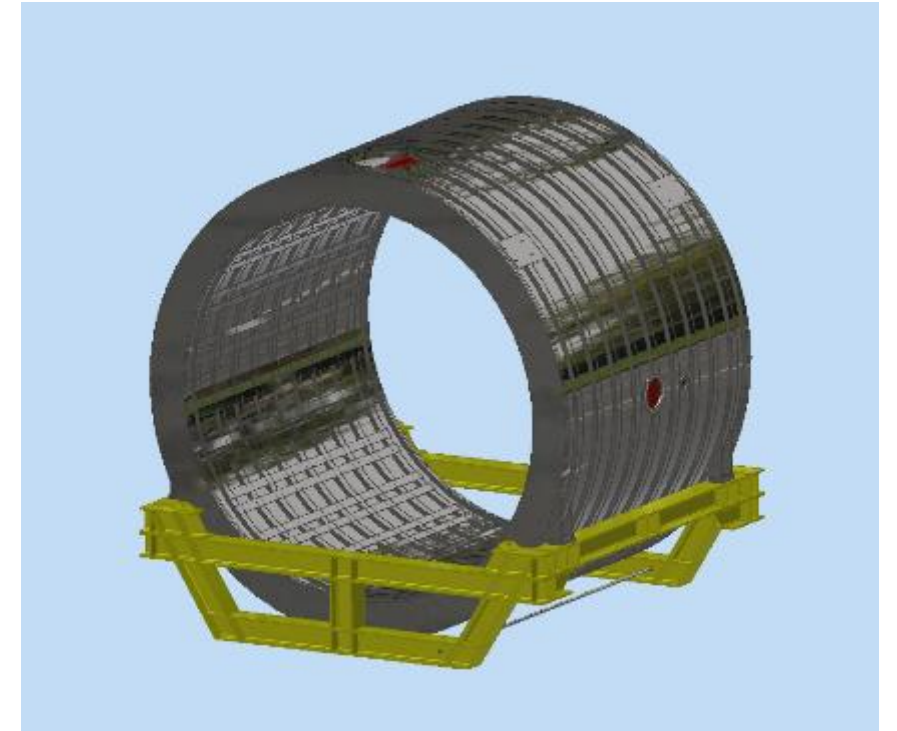
The coil cryostat is the largest and heaviest single piece of KLOE

All the handling tools are being designed anew and will be constructed and certified for EU and US

Diameter 5.80 m
Length 4,40 m
Weight 42 t



Cradle with rails to slide the coil out of the yoke



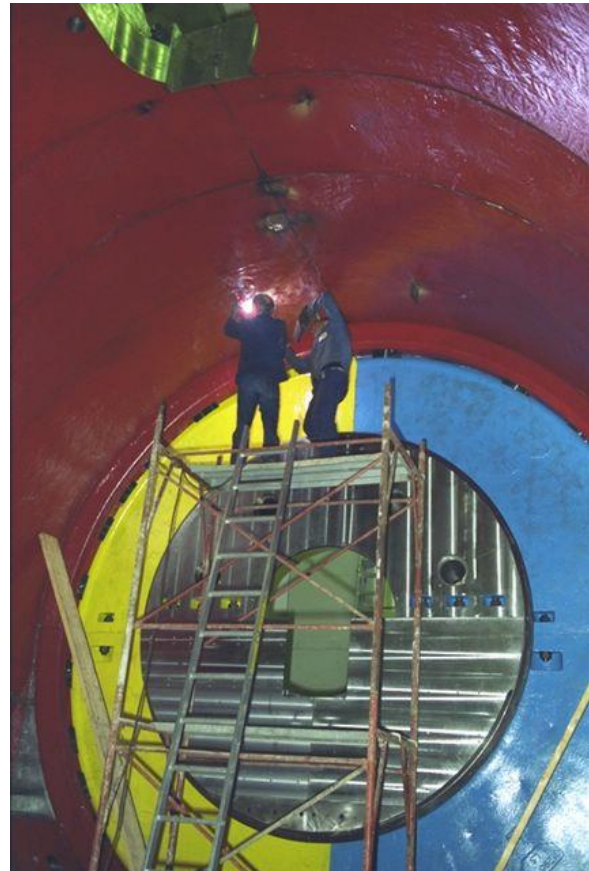
Transportation cradle

Iron Yoke Dismounting – foreseen Q3-Q4 2024

Iron Yoke is made by 34 parts
the heaviest is 20t for a total of 700t

Unsoldering and heat treatment are needed
Strictly related with magnet extraction

PL: S.Gazzana (INFN-LNF)



Conclusions

- The KLOE dismantling procedures needed to retrieve and refurbish ECAL, Magnet and Yoke as part of SAND are fully established
- The **dismounting of ECAL is really ready to begin**, after the complex purchasing of all the necessary tools both for Barrel and EndCaps
- Magnet test and revamping is the next step we expect to accomplish during 2024
- Magnet coil extraction tools are under design
- All tools and procedures, are designed to be **compliant with the future deployment at Fermilab**