

KLOE-to-SAND: overview

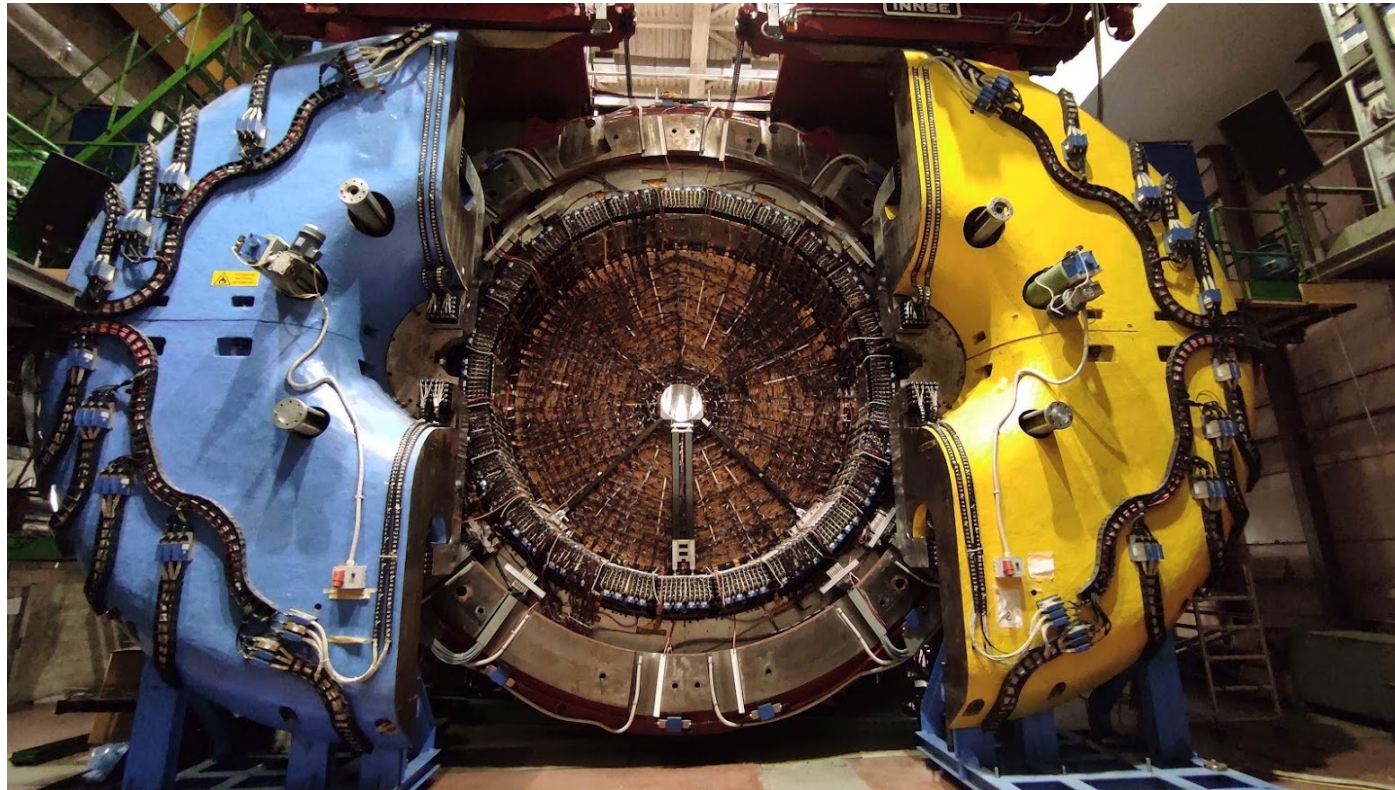
Antonio Di Domenico

Dipartimento di Fisica, Sapienza Università di Roma
and INFN-Roma, Italy



Danilo Domenici

INFN-LNF, Frascati, Italy



Meeting DUNE-Italia – Frascati, 10-12 novembre 2025

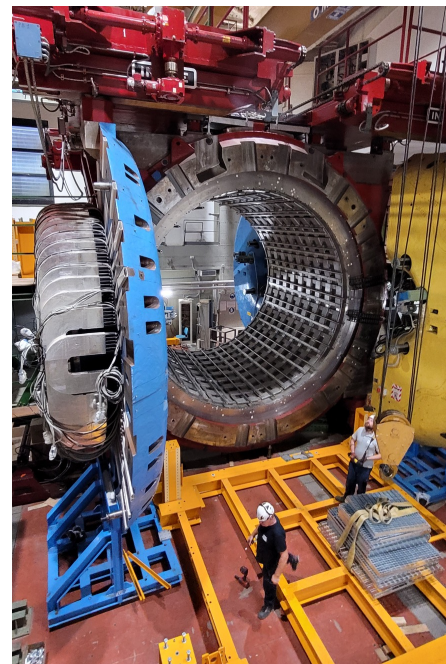
KLOE-to-SAND activities at LNF

Plan of operations:

- ✓ Removal of all cables and the FEE+HV racks
- ✓ Extraction of the Drift Chamber

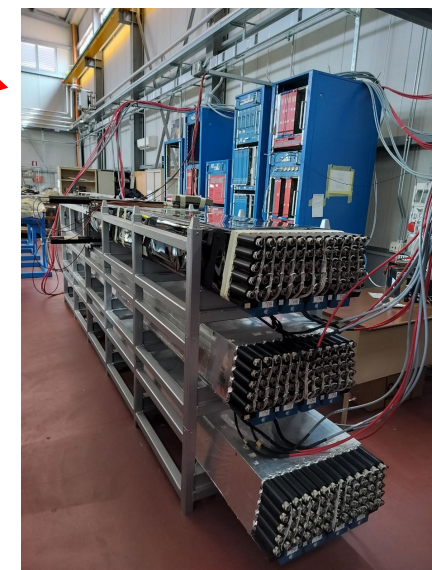
Calorimeter

- ✓ Laser tracker survey before ECAL dismounting
- ✓ Extraction of Barrel (24 modules) 
- insertion/extraction machine refurbished
- movable platform built
- Dismounting of EndCaps 
- original insertion/extraction/rotation machine has been refurbished and modified, test done
- Consolidation and test of ECAL modules 
- Studies for the ECAL working point & FEE

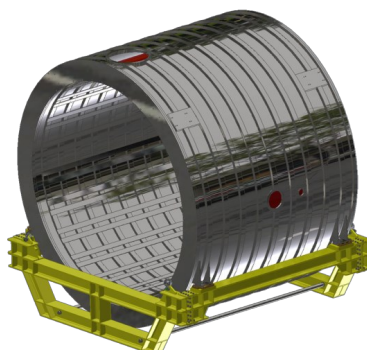


Magnet and Yoke

- Installation of new Power Supply 
- new Power supply unit and revamping of passive components (OCEM)
- revamping/update of control system
- Cooling of coil
- Operational test of magnet at LNF 
- in preparation
- Extraction of coil 
- Dismounting of Iron Yoke



Packaging & Shipping at Fermilab

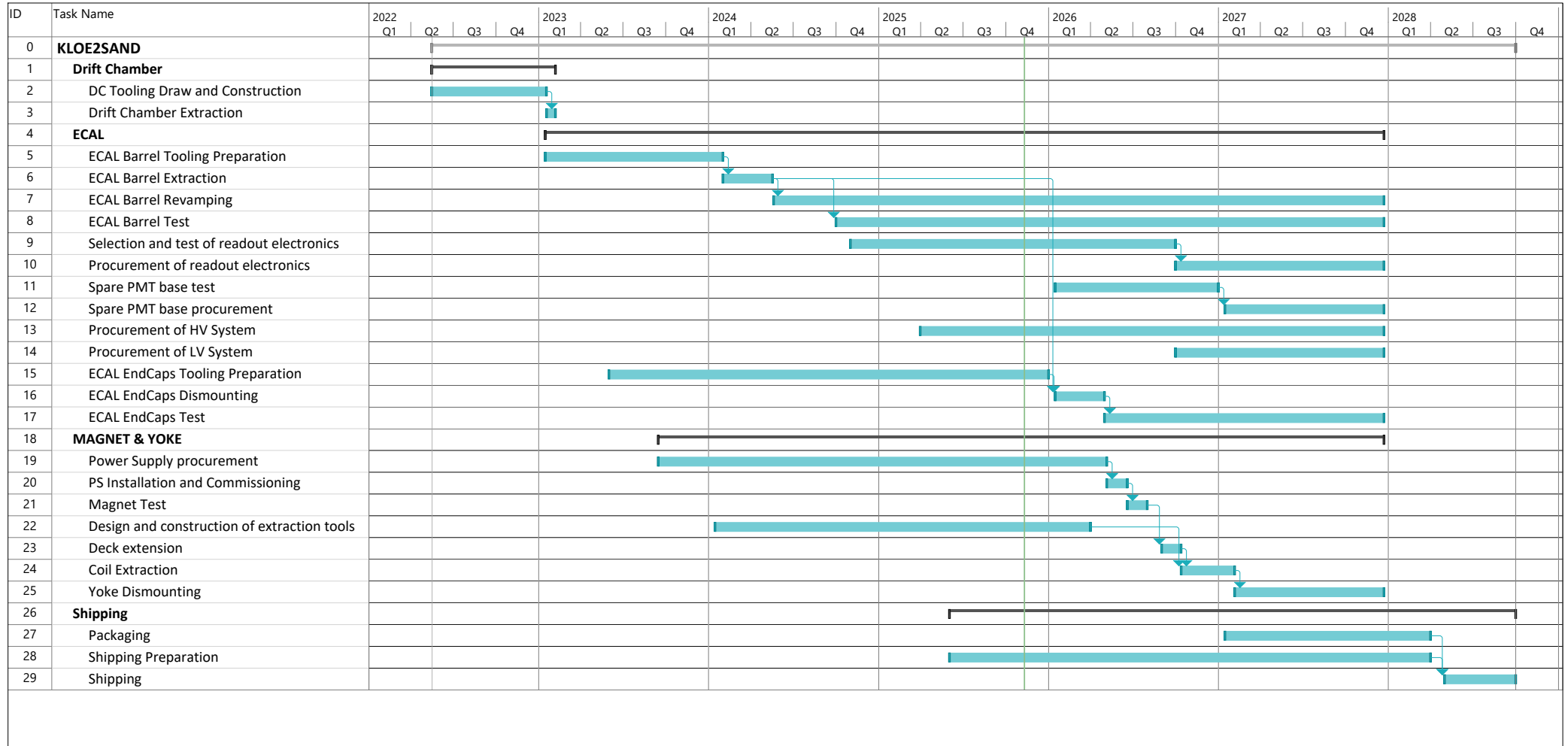


KLOE-to-SAND, ECAL and Magnet sessions

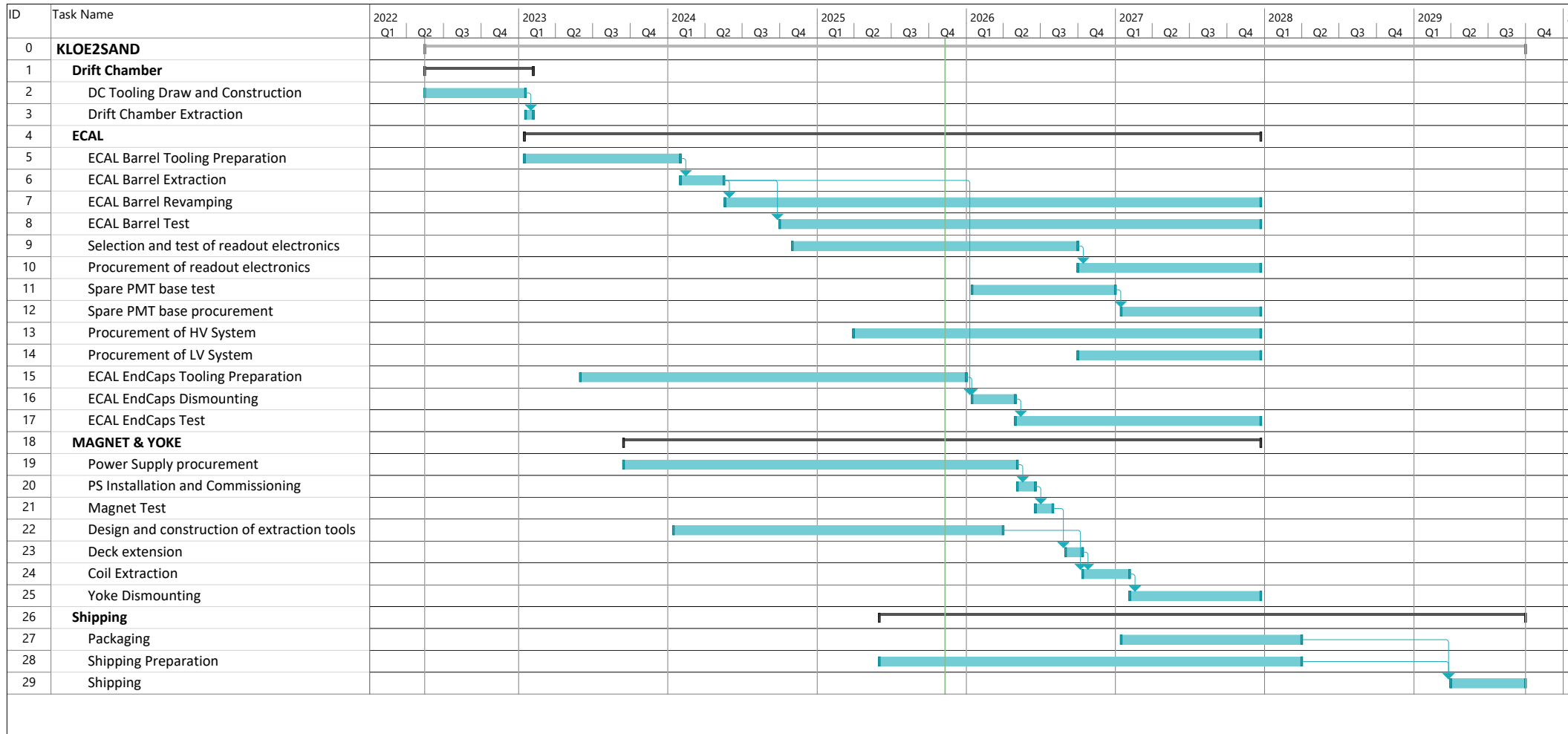


KLOE-to-SAND overview <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Antonio Di Domenico et al.</i> 14:30 - 14:50
ECAL End-Cap Dismounting <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Francesco Noto</i> 14:50 - 15:10
ECAL Barrel Refurbishing <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Fabrizio Raffaelli</i> 15:10 - 15:30
ECAL Barrel Test Stand at LNF <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Riccardo D'Amico</i> 15:30 - 15:50
ECAL Electronics <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Antonio Di Domenico</i> 15:50 - 16:10
Coffee Break <i>Auditorium B. Touschek, INFN - LNF</i>	16:10 - 16:30
Magnet Test: preparation, cryogenics and compliance <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Giovanni Ottavio Delle Monache</i> 16:30 - 16:50
Magnet Power Supply: status report <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Alessandro Vannozzi</i> 16:50 - 17:10
Magnet Extraction: mechanical tools and preparation <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Alessandro Saputi</i> 17:10 - 17:30
Magnet and ECAL Shipping at FNAL <i>Auditorium B. Touschek, INFN - LNF</i>	<i>Mr Daniele Pasciuto</i> 17:30 - 17:50

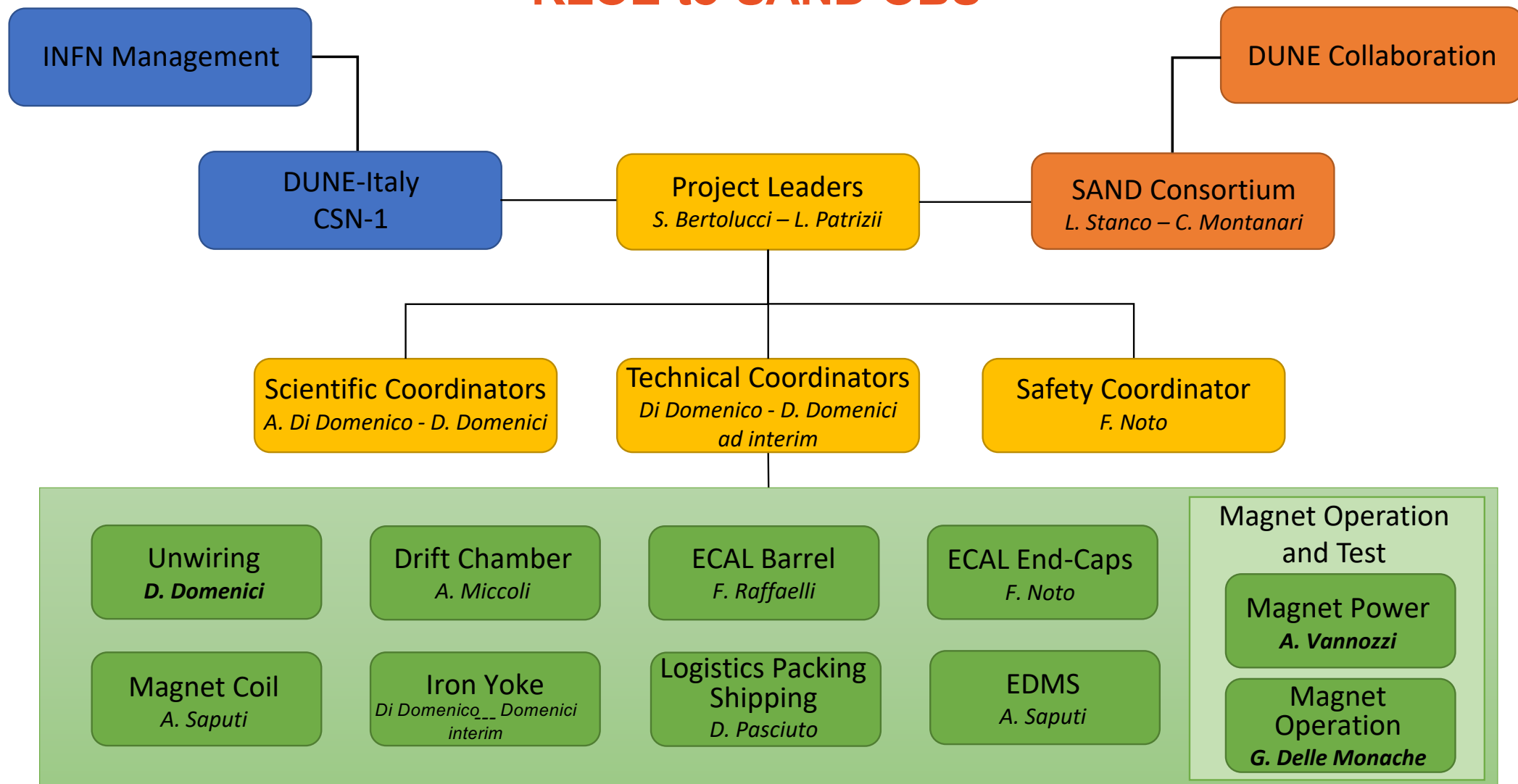
KLOE-to-SAND Project Time Schedule



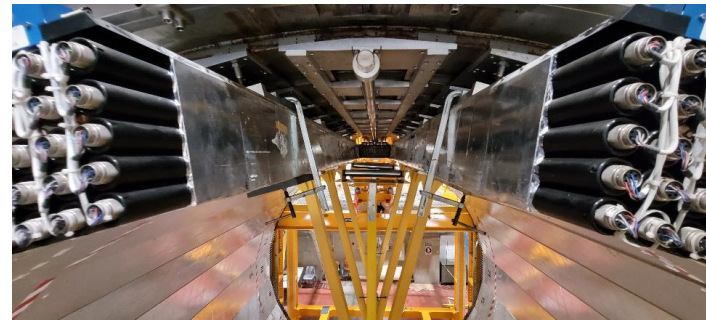
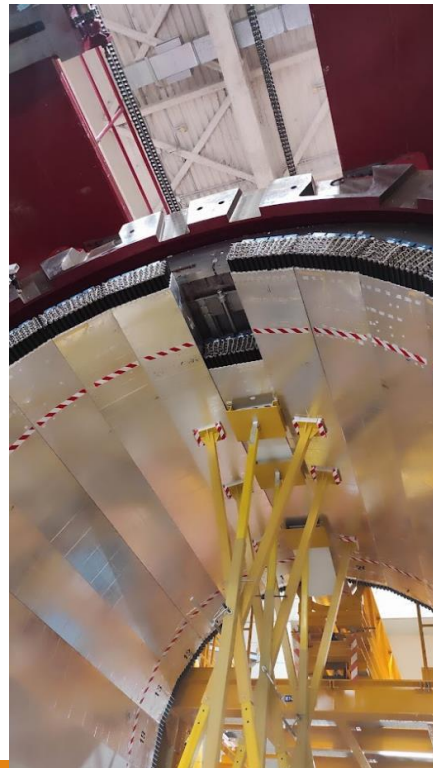
KLOE-to-SAND Project Time Schedule



KLOE-to-SAND OBS



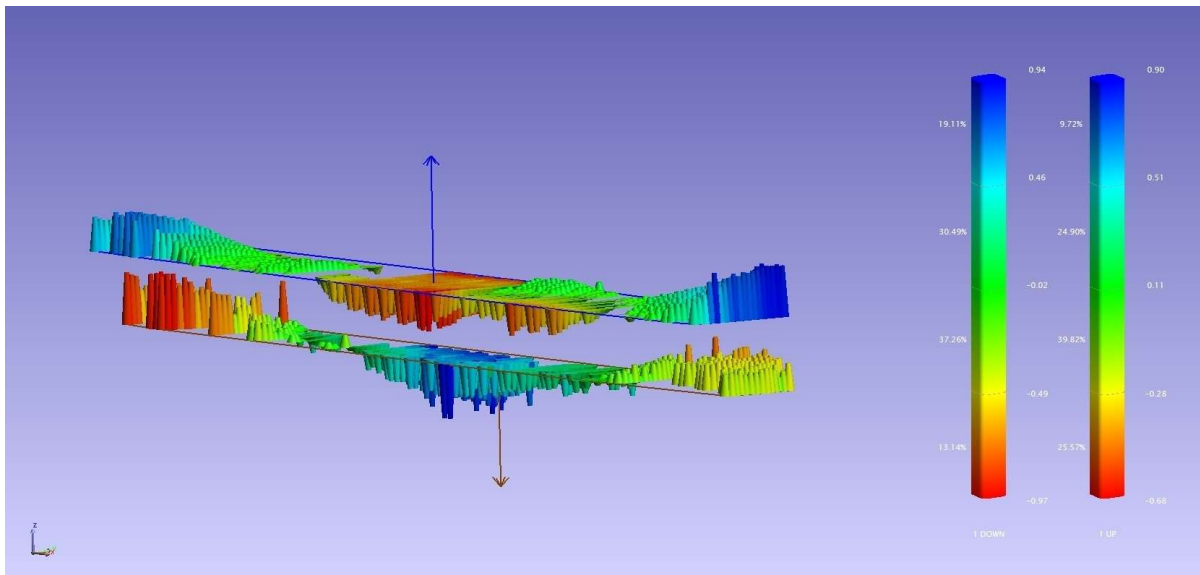
Extraction of barrel modules



ECAL barrel modules consolidation

SERVIZIO INGEGNERIA MECCANICA
LAVORO SVOLTO DA: MARCO PARIS, RAFFAELE DE LUCA
DATA: 26-08-2025

MISURA MODULI BARREL ECAL N°1



PIANO SUPERIORE

Plane Relationship D::1 UP	
Criteria	Measured
Flatness	1.58
Centroid X	4528.95
Centroid Y	-5450.83
Centroid Z	11.43
RMS	0.35
Measurements	1193

PIANO INFERIORE

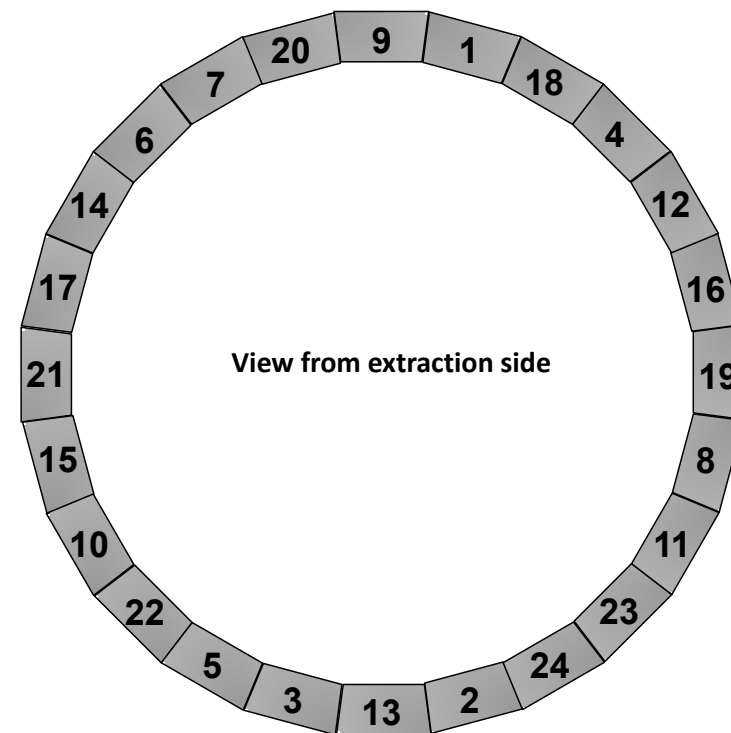
Plane Relationship D::1 DOWN	
Criteria	Measured
Flatness	1.91
Centroid X	4742.39
Centroid Y	-5354.59
Centroid Z	-250.49
RMS	0.44
Measurements	738

DISTANZA TRA I PIANI

Plane: GR-1 UP to vertices of Plane: GR-1 DOWN 30/07/2025 15:27:50	
Min = -261.65 (mm), Avg = -261.25 (mm), Max = -260.80 (mm), Points = 22	

Consolidation

- All barrel modules have been measured with a laser tracker to characterize their thickness and actual shape => useful info for re-wrapping with steel strips



ECAL barrel modules consolidation



Supports modified =>
regulating screws for more
precise alignment



ECAL barrel modules consolidation



original tape wrapping
partially damaged



original tape wrapping
removed



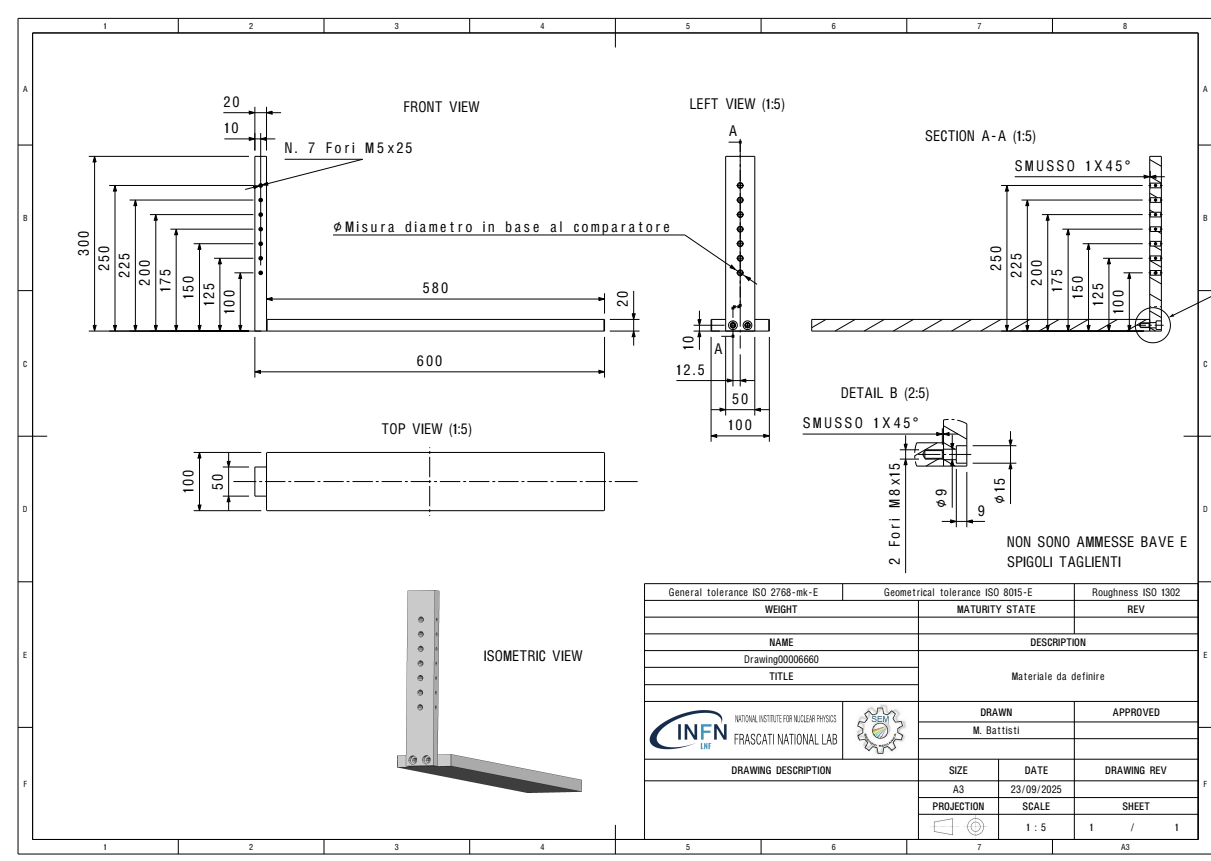
temporary light protection
cover applied
⇒ to avoid possible ambient light
irradiation of fibers

ECAL barrel modules consolidation



Consolidation

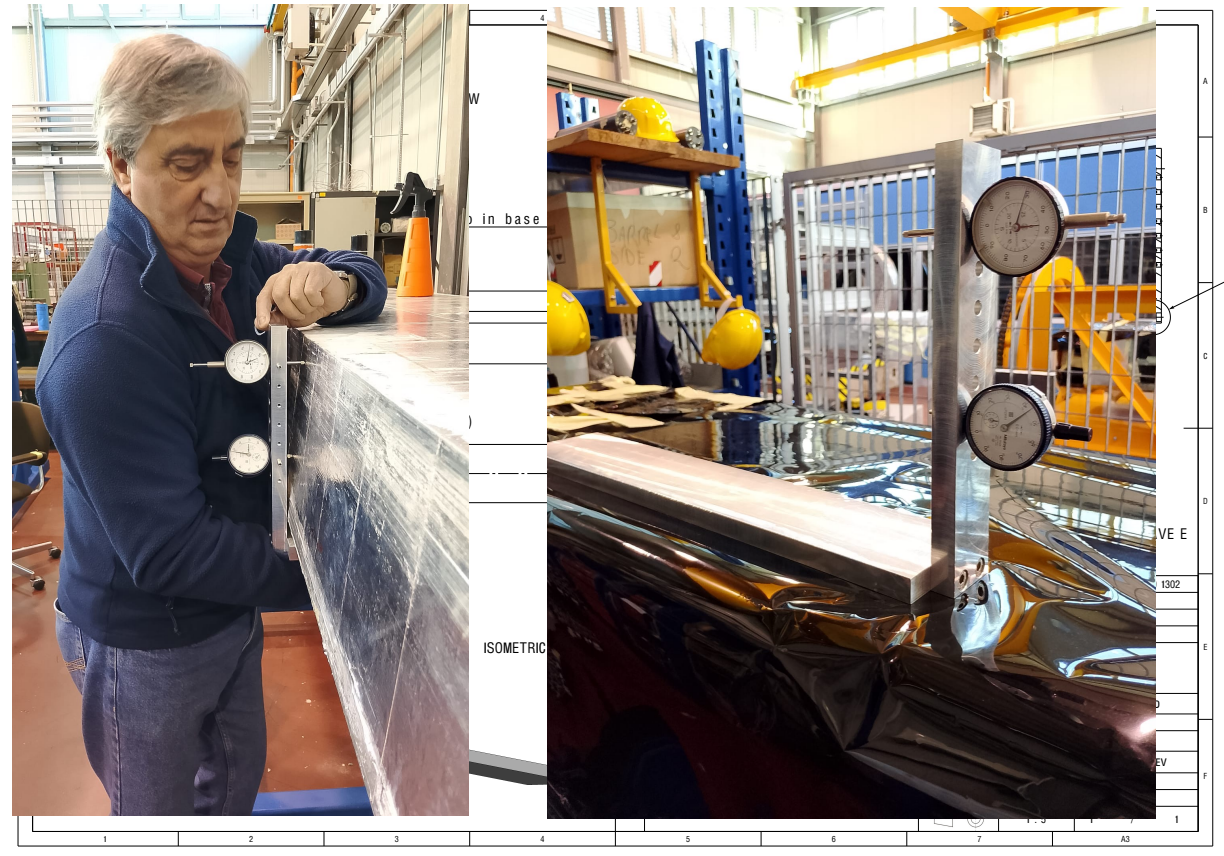
- The lateral sides of all barrel modules will be measured with a simple mechanical tool (set square with precision comparators) to spot possible deformation along the lateral plane
=> useful info for re-wrapping with steel strips



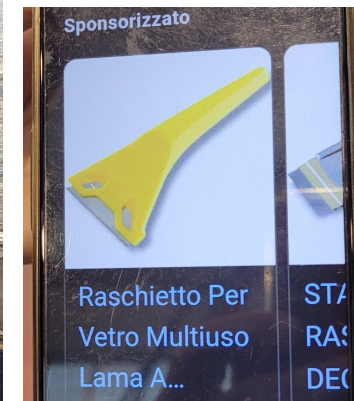
ECAL barrel modules consolidation

Consolidation

- The lateral sides of all barrel modules will be measured with a simple mechanical tool (set square with precision comparators) to spot possible deformation along the lateral plane
=> useful info for re-wrapping with steel strips



ECAL barrel modules consolidation



The removal of the tape from the bottom aluminum plate is the most difficult one: it requires specific products (not aggressive for Al), ~4 spray cans per module, and several hours of work => max rate ~ 1/module per day.

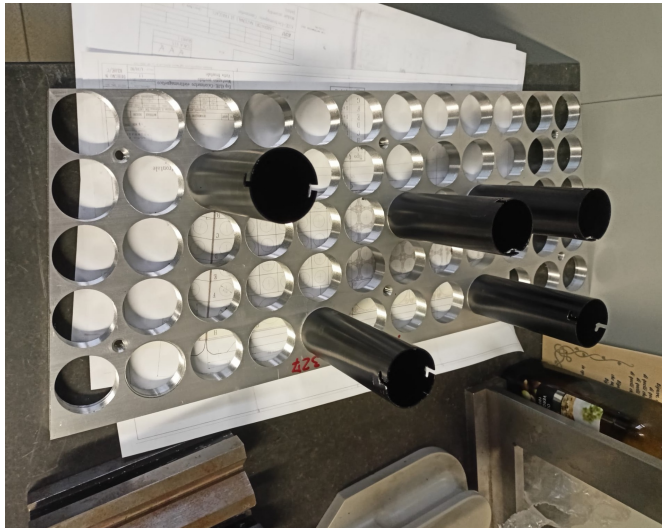


ECAL barrel modules consolidation



replacement of
damaged plate during
module extraction
operation

(new plates built in INFN
- Bologna – G. Pancaldi)

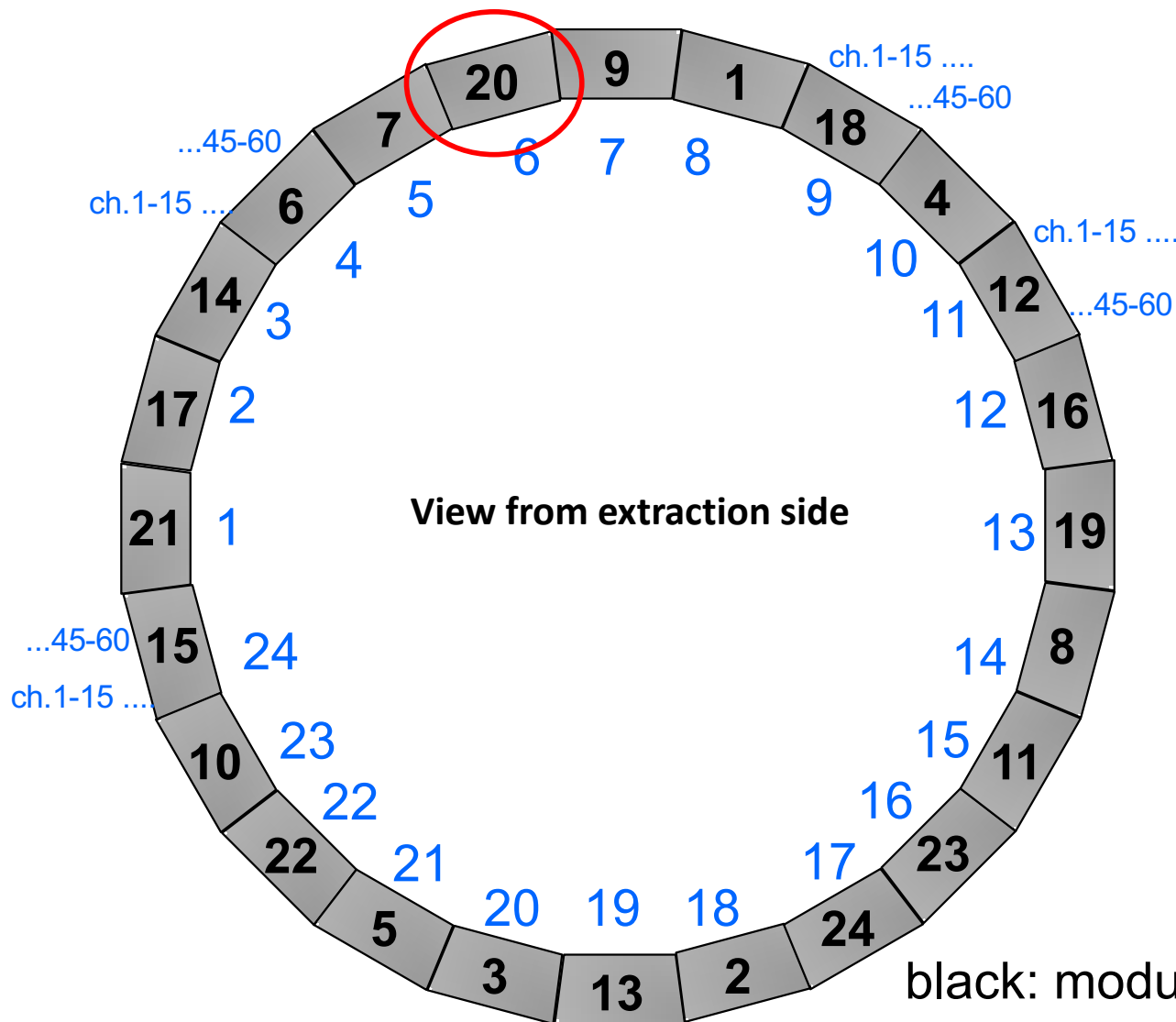


ECAL barrel module consolidation



We plan to infiltrate the glue in the delaminated layer of few modules; based on the experience and first tests on KLOE ECAL module 0 done at the end of last year

ECAL barrel modules – numbering schemes



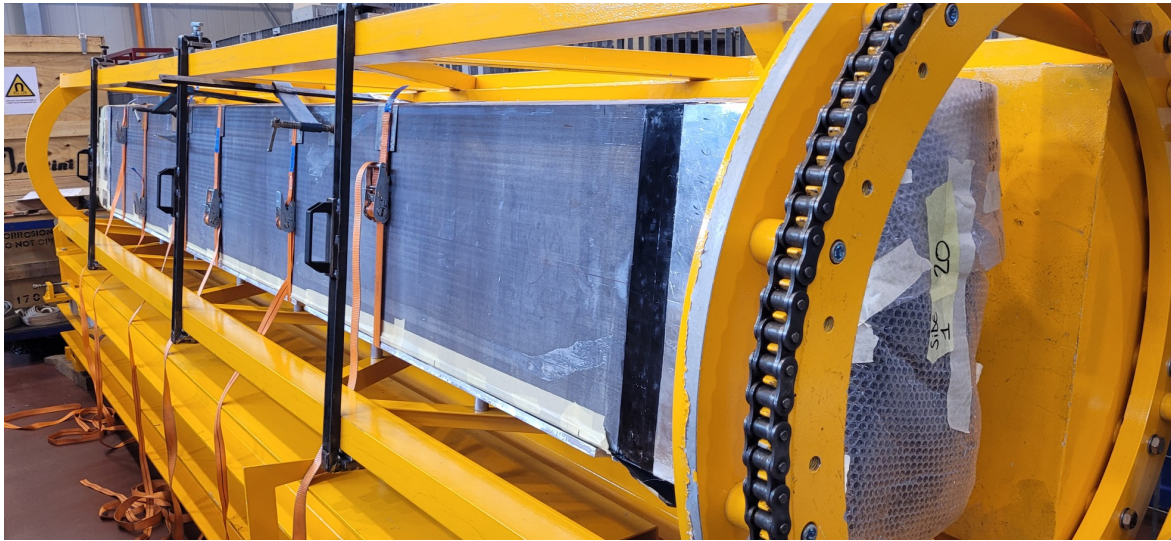
Mod.	Hour	Angle	Mod.	Hour	Angle
1	12:30	15	13	6:00	180
2	5:30	165	14	10:00	300
3	6:30	195	15	8:30	255
4	1:30	45	16	2:30	75
5	7:00	210	17	9:30	285
6	10:30	315	18	1:00	30
7	11:00	330	19	3:00	90
8	3:30	105	20	11:30	345
9	12:00	0	21	9:00	270
10	8:00	240	22	7:30	225
11	4:00	120	23	4:30	135
12	2:00	60	24	5:00	150

black: module construction numbering scheme
 blue: blue-box numbering scheme
 view from the module extraction side = side 1

Glue infiltration in the delaminated layer of module #20
(before installation of stainless steel “jackets”,
see Raffaelli’s presentation)



ECAL barrel modules consolidation



delaminated layer



glue infiltration



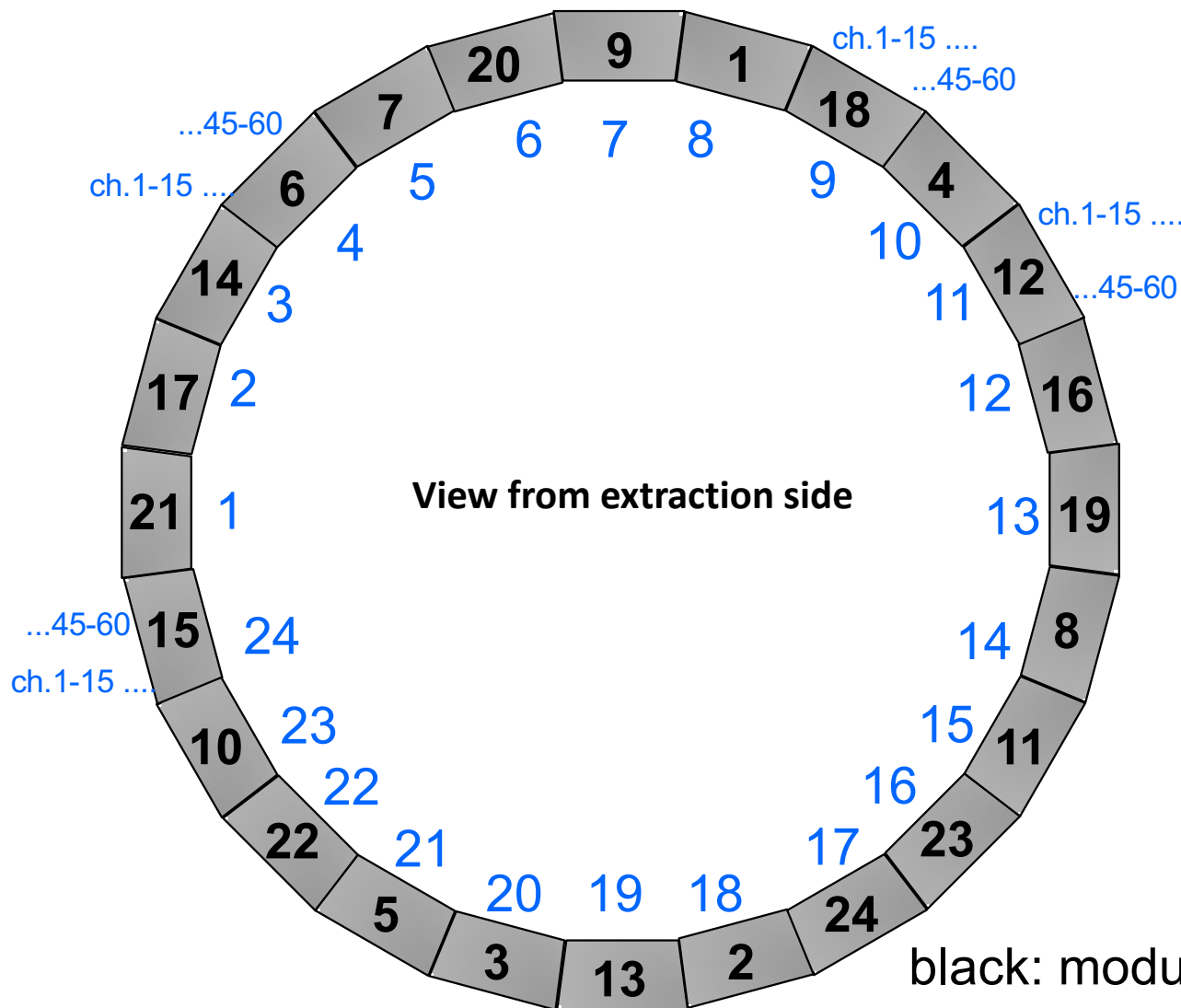
ECAL barrel modules consolidation



Glue infiltrations in the delaminated layer, from both lateral sides of the module; each infiltration takes in practice one day for the glue to cure.



ECAL barrel modules – numbering schemes



Mod.	Hour	Angle	Mod.	Hour	Angle
1	12:30	15	13	6:00	180
2	5:30	165	14	10:00	300
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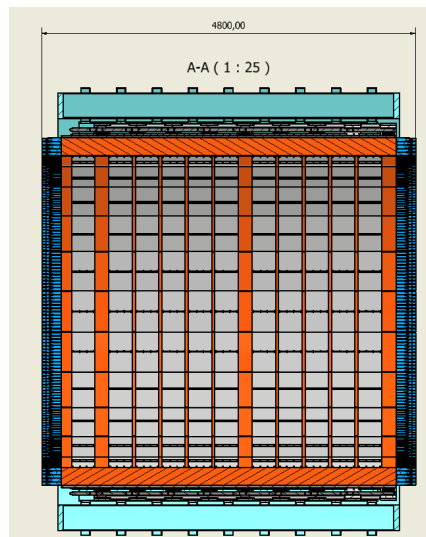
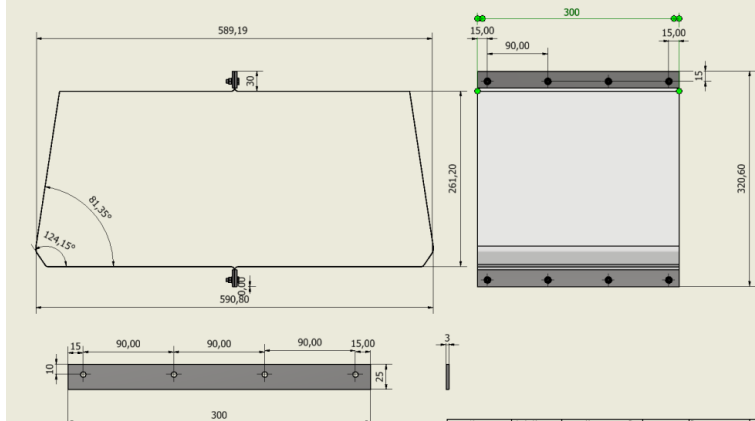
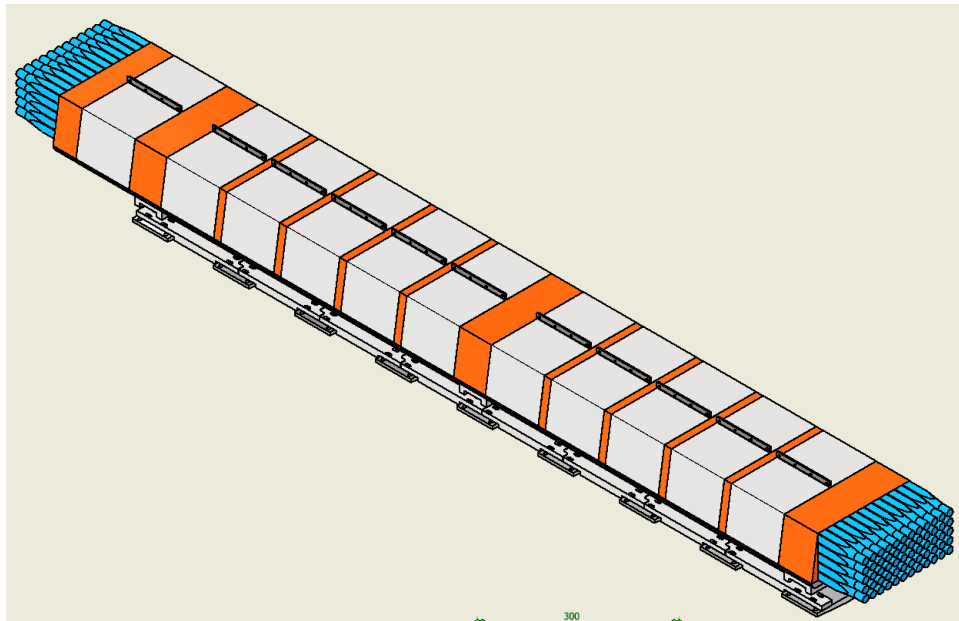
ECAL barrel modules consolidation – summary

# (blue box ID)	# (constr. ID)	present at test area	top tape removed	bottom tape removed	side size measured	light guides protection restored	infiltrated glue in delaminated layers	stainless steel jackets installed	tape for light tightness	under test with cosmic rays
1	21									
2	17	X	X	X	X					
3	14									
4	6									
5	7	X								X
6	20	X	X	X	XX		XX			
7	9	X	X	X	X					
8	1	X	X	X	X					
9	18	X								X
10	4	X								
11	12									
12	16	X								
13	19									
14	8	X	X	X	X					
15	11									
16	23									
17	24									
18	2									
19	13									
20	3									
21	5	X	X	X	X					
22	22	X	X	X	X					
23	10									
24	15									

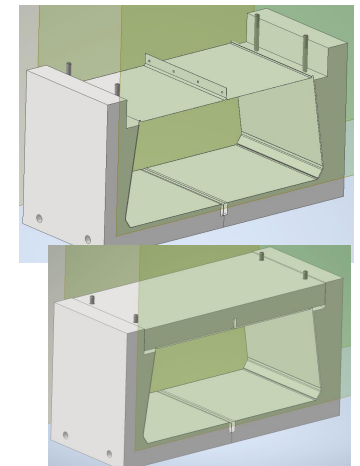
ECAL barrel modules consolidation

Consolidation (new re-wrapping procedure)

- “Re-wrap” the modules with stainless steel 0.4 mm strips glued with Epoxy 3M 2216
- Test on prototypes started



design of
gluing tools



9/1/2025

F. Raffaelli S. Mamaeli

ECAL barrel modules consolidation

