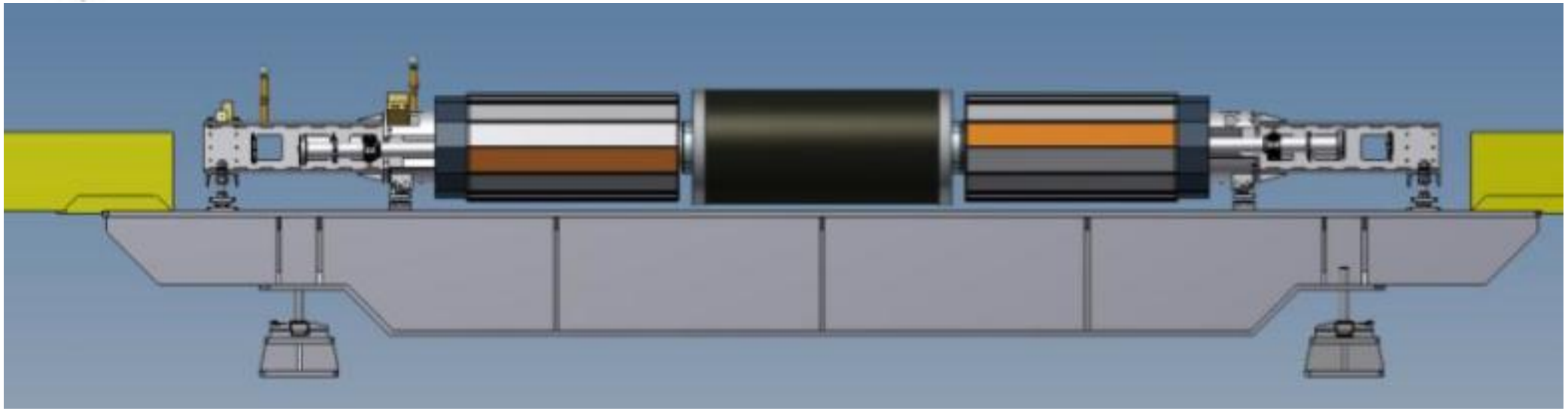
Status of the KLOE upgrades

46th LNF Scientific Committee

G. Morello on behalf of the KLOE-2 collaboration



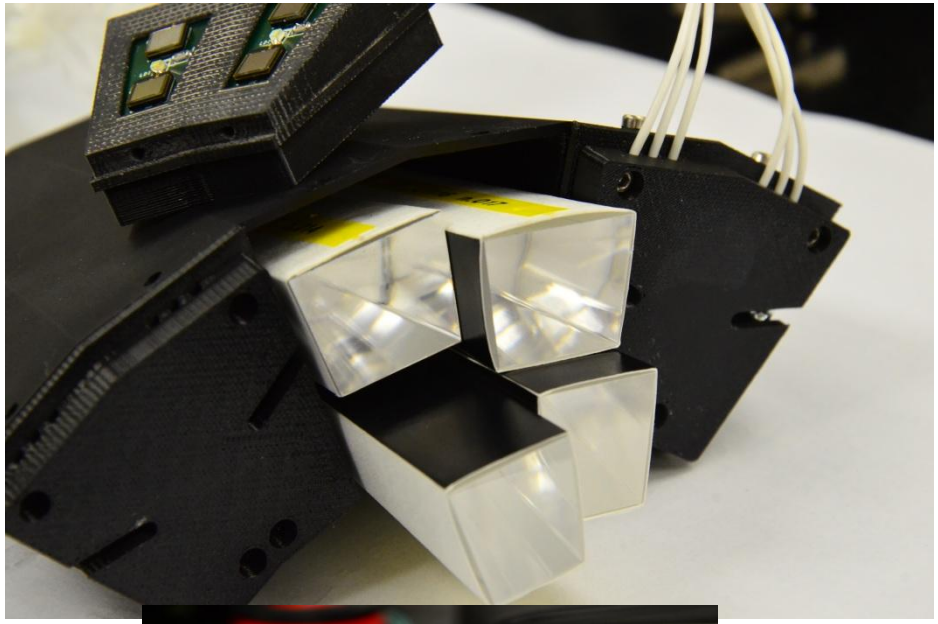
CCalT status @ last SC

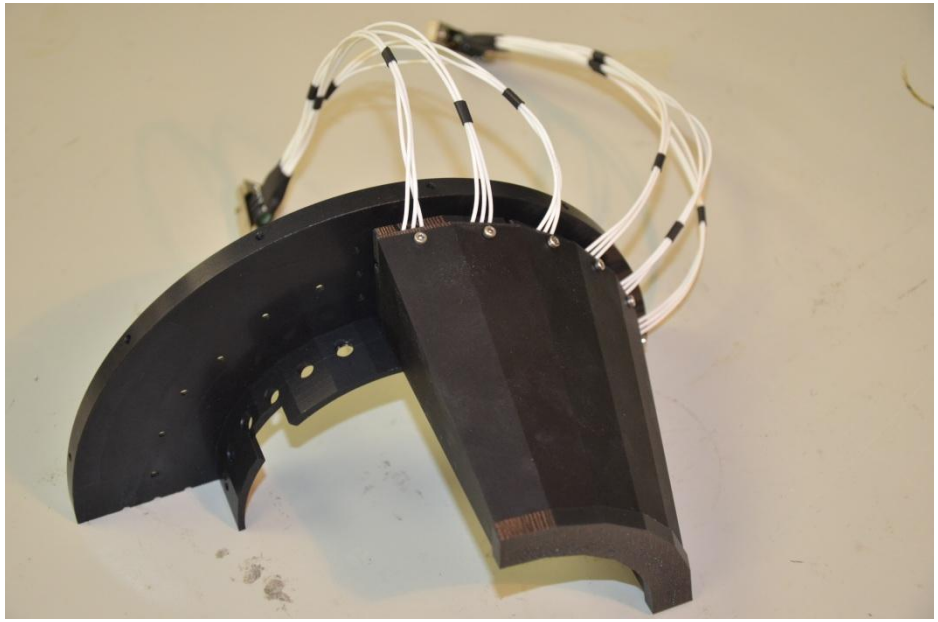
- From the performed tests a resolution of 10-15 % at 511 keV is achieved.
- The crystals were wrapped by adhesive mylar
- From the testbeam @ BTF of a single crystal σ_t ~ 450 ps @ 150 MeV

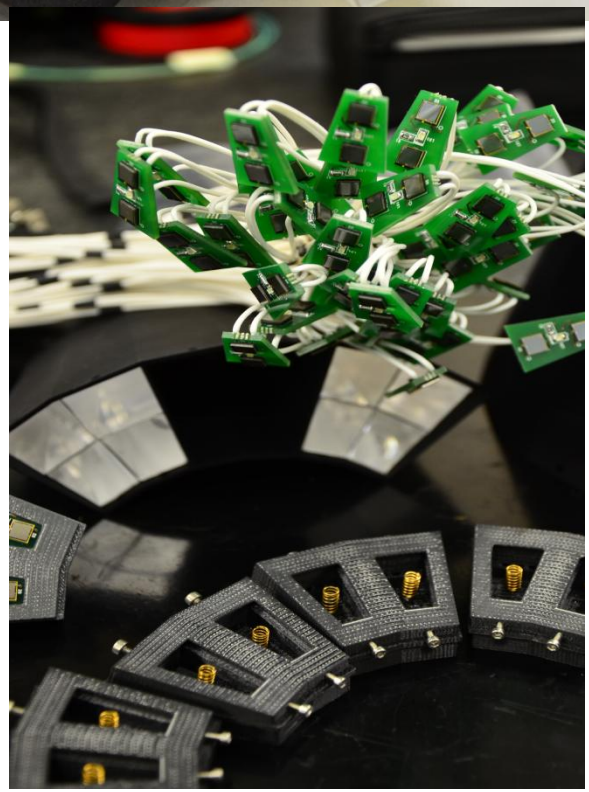
Tasks:

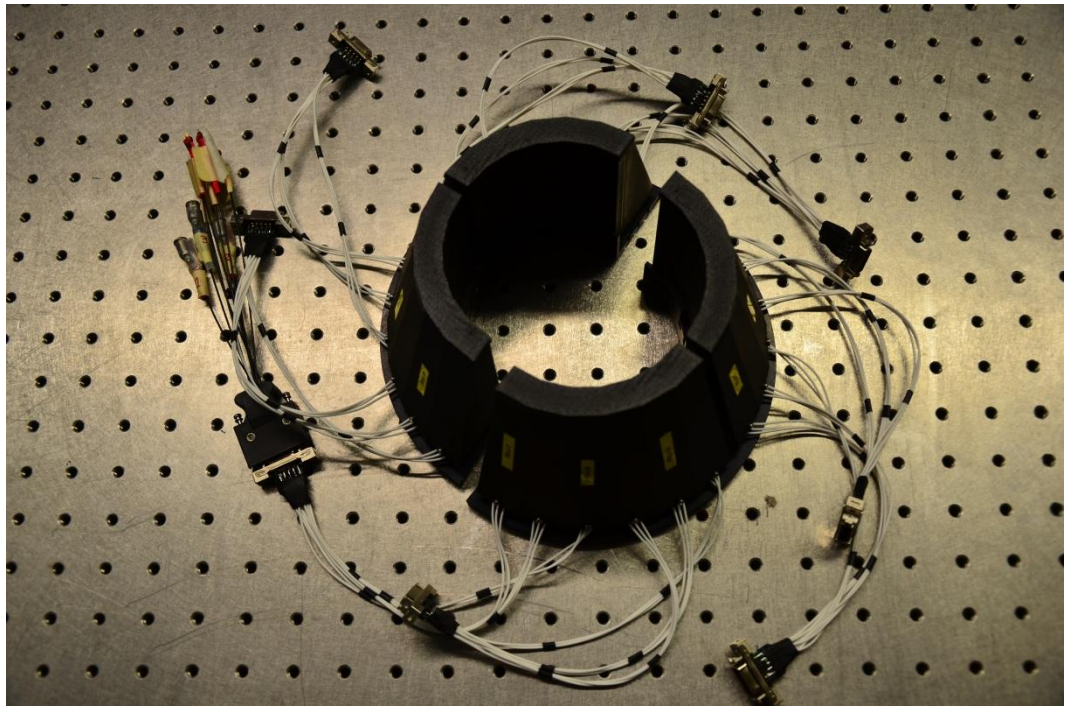
- Production of forward plates ✓
- Production of photodetectors holder plates (3D print in ABS) ✓
- Finalization of the design of the QD0 coupling plate ✓
- Production of PCB and mouting and test of SiPM ✓
- Production of QD0 coupling plates ✓
- Anodization of aluminum parts ✓
- Completion of crystals characterization with ^{22}Na ✓
- Wrapping of all crystals ✓
- Assembly of all modules ✓
- Test of the final FEE chain with cosmics ✓

Status of the KLOE-2 CCalT

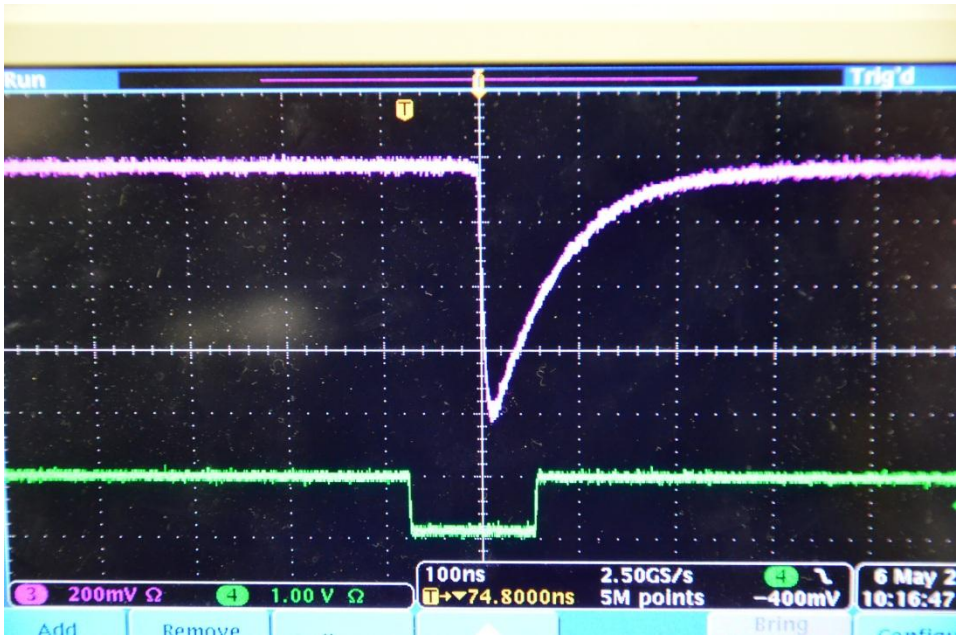


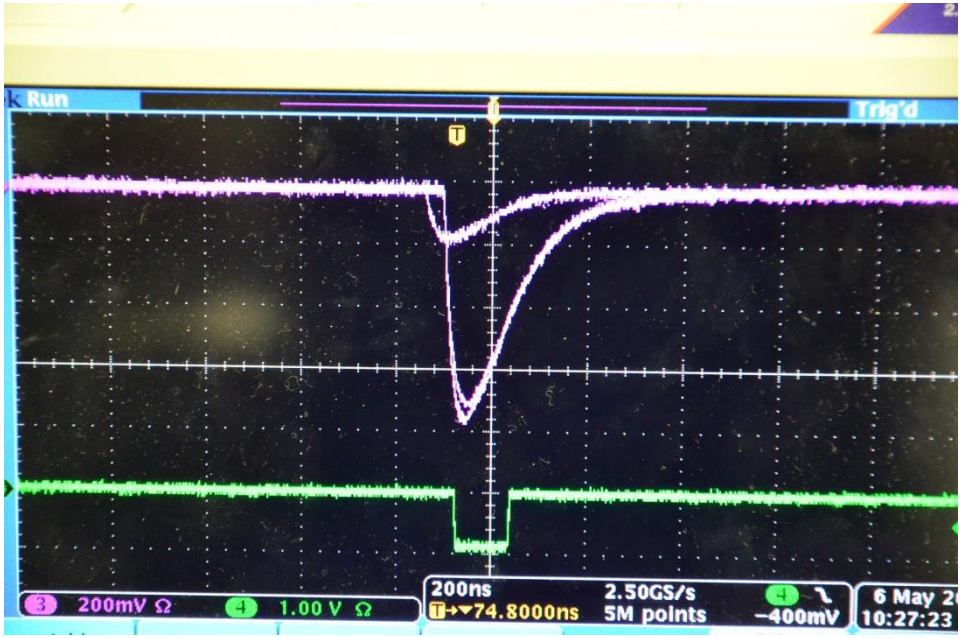




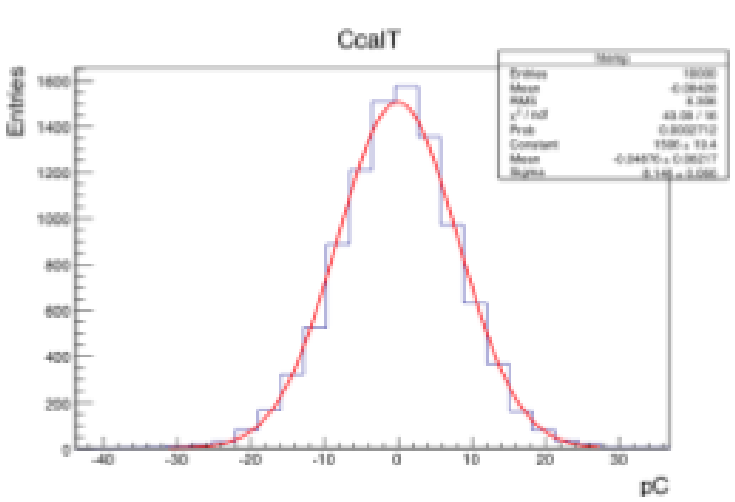


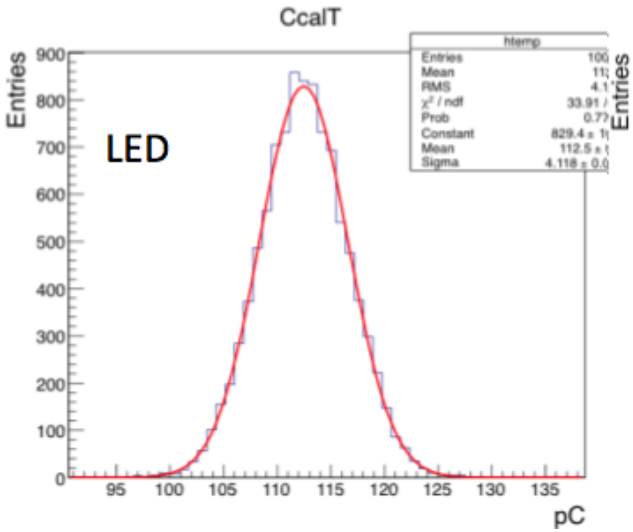
Status of the KLOE-2 CCalT

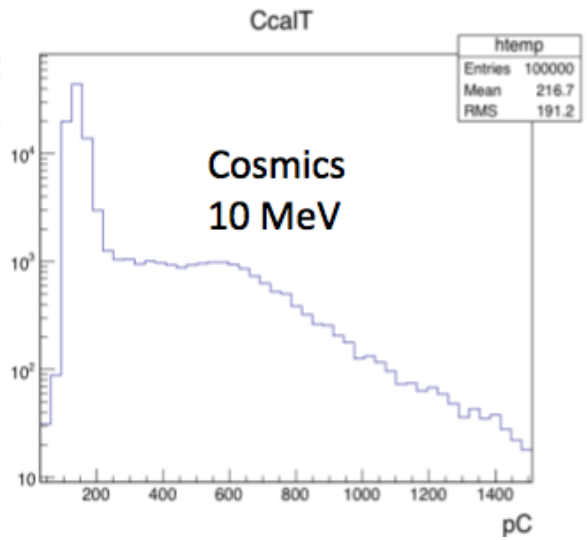




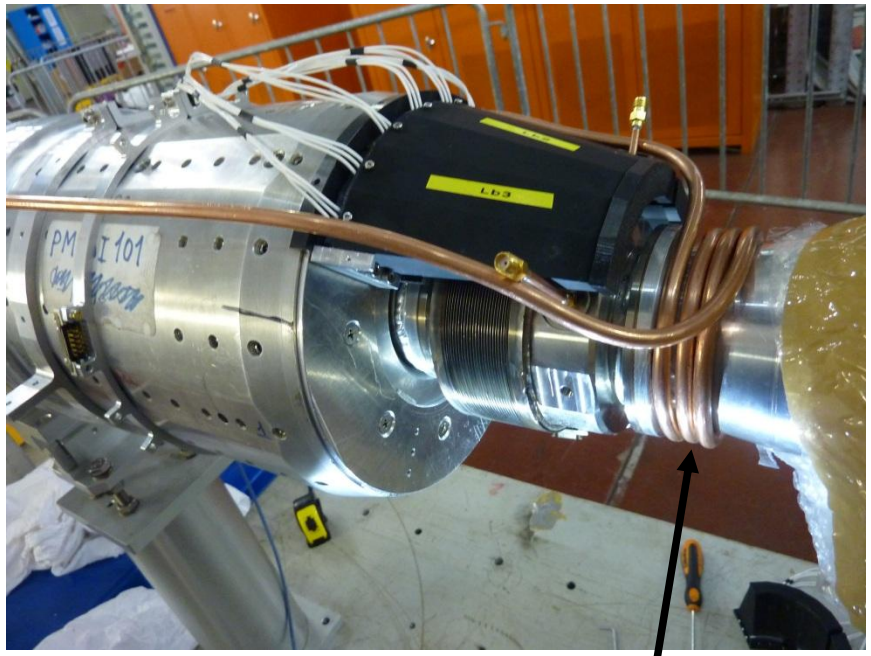
For few channels pedestal, mip and LED acquisition runs were taken



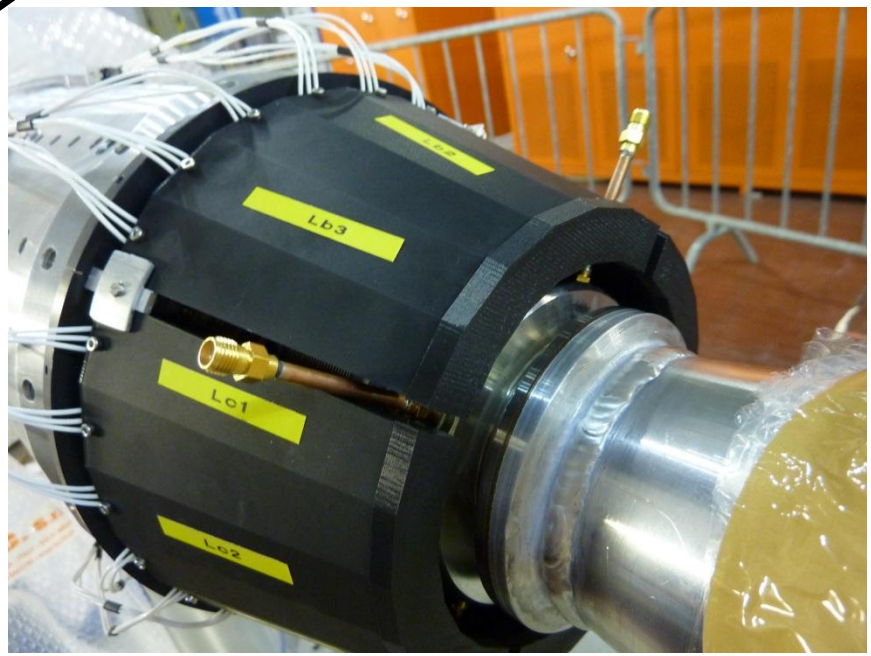




4 modules of the CCalT have been installed, cabled and tested!



Support for the IT



Copper coil for the water cooling of the BP

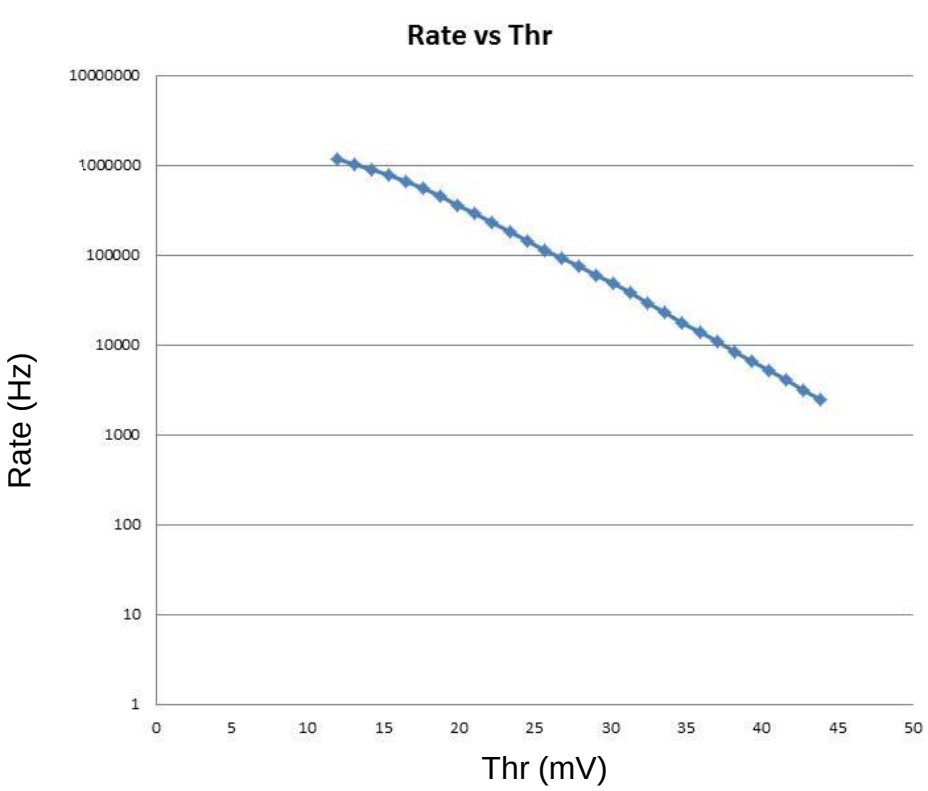
The second CCalT will be installed and cabled in few days

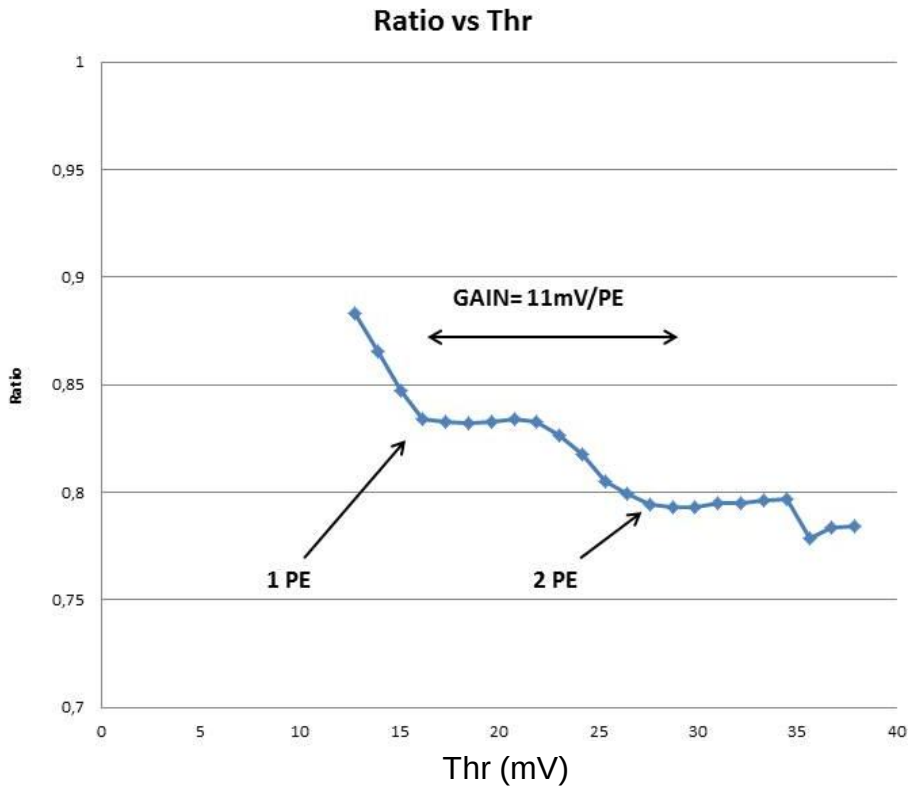
QCalT status @ last SC

- 1/4 QcalT assembled
- Tiles tested with ^{90}Sr source to check fiber-tile coupling
- Light yield of towers measured with cosmic rays
- Plastic fibers polished and ready to be coupled to SiPM
- Mechanical preparation of steel structure and painting done
- Full FEE chain tested
- Final PCB produced and sent to FBK for SiPM bonding

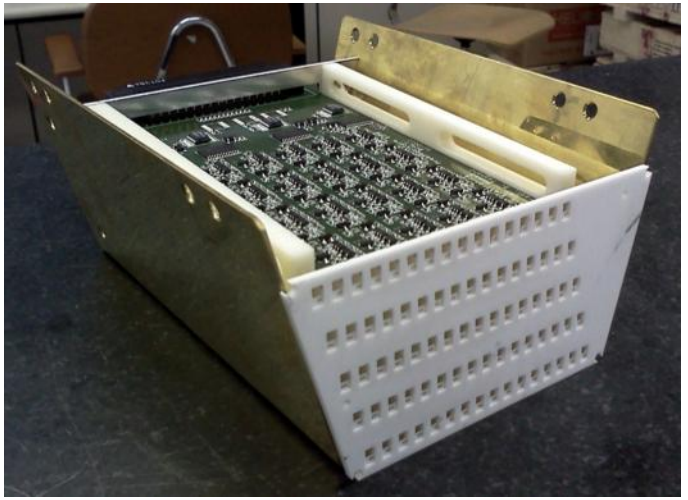
Tasks:

- Final test of the FEE chain ✓
- Assembly of PCB SiPM on the existing modules ✓
- Gain calibration of all SiPM ✓
- Completion of mechanical assembly ✓





The readout is based on TDC.
A calibration curve of the SiPM was built scanning on the threshold and measuring the dark rate.

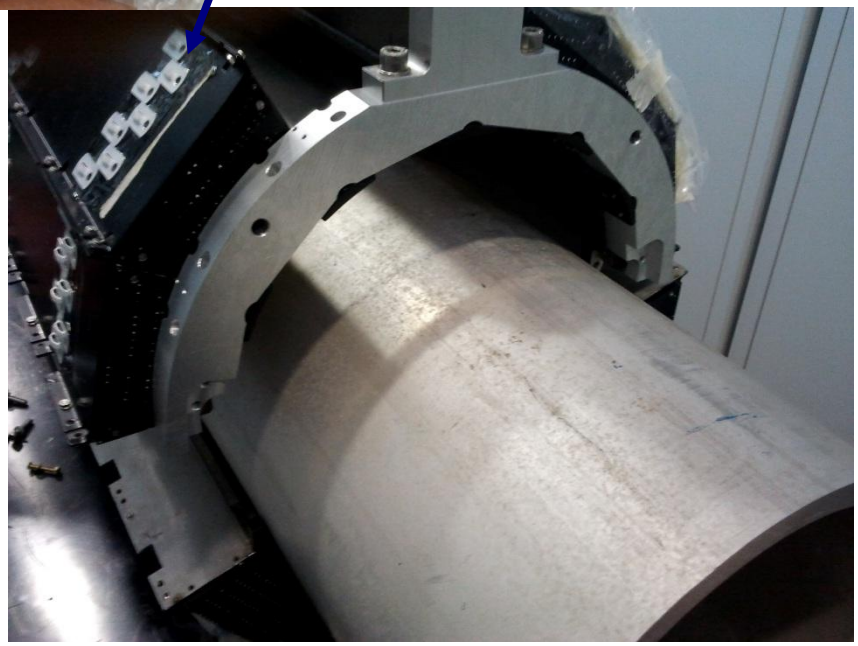


Status of the KLOE-2 QCalT

All the parts of the QCalT are ready and mounted on their mechanical support

Supports to fix the CCalT & IT cables and for the gas and cooling pipes

Installation test



Inner Tracker status @ last SC

- 3 layers completed and tested with ^{90}Sr source and cosmic rays
- Tests done with the final FEE chain
- Installation of the Blocking Capacitor boards

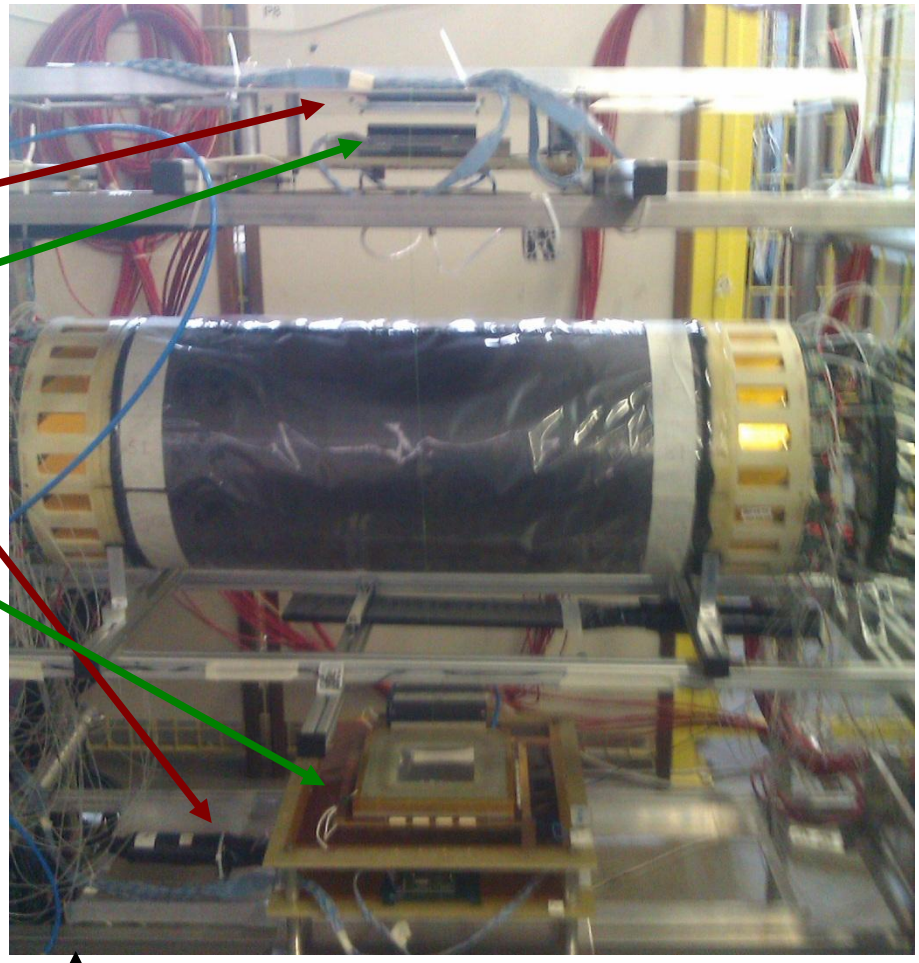
Tasks:

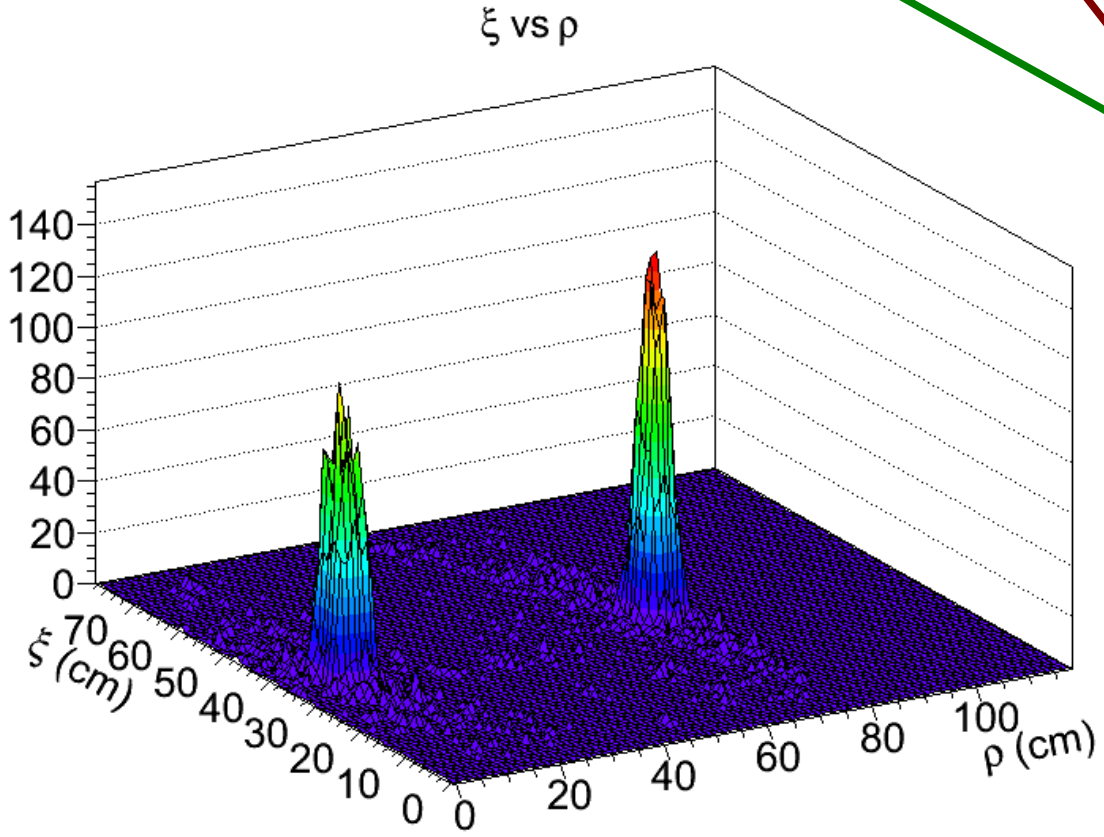
- Construction of the Layer 4 ✓
- Test with Layer 4 ✓
- Insertion of all the Layers ✓
- Installation of the Faraday cage ✓

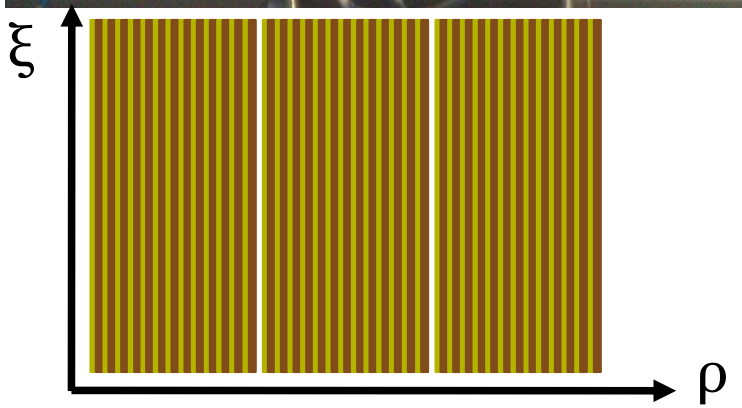
A cosmic ray data taking period was held for all the layers

Trigger: 2 pairs of scintillators

External tracking provided by three planar triple-GEM

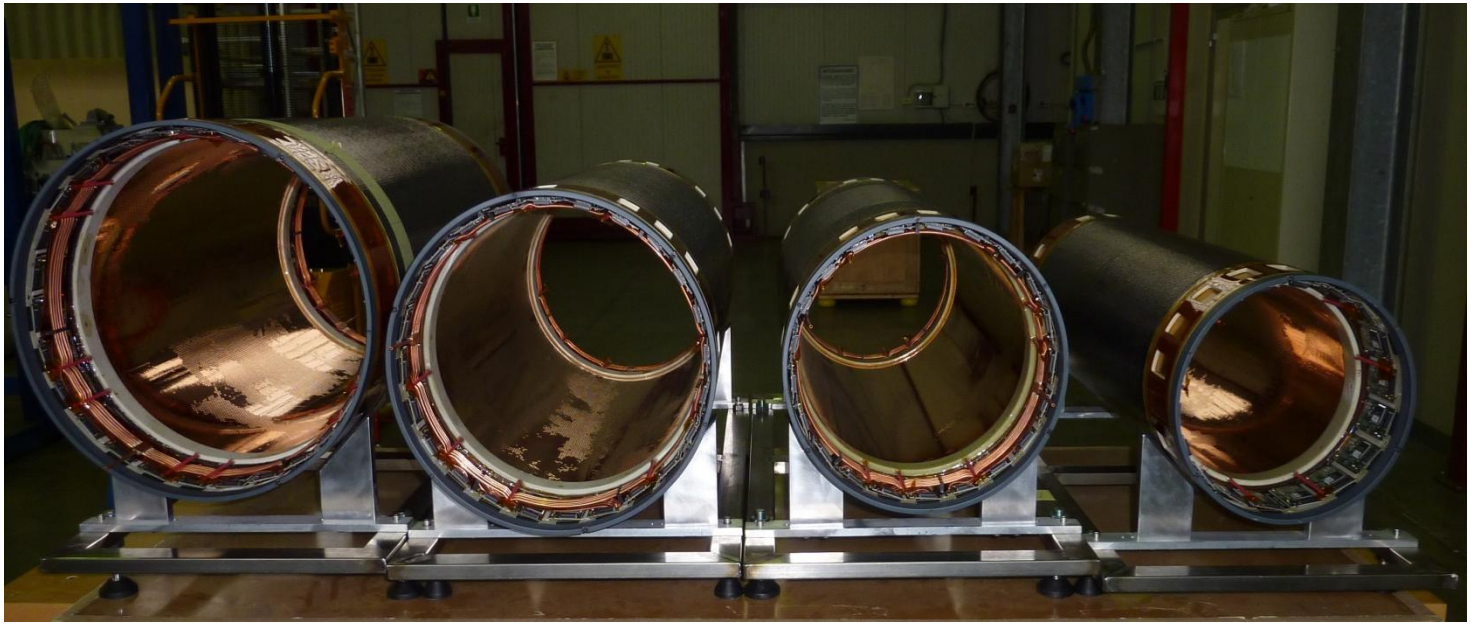


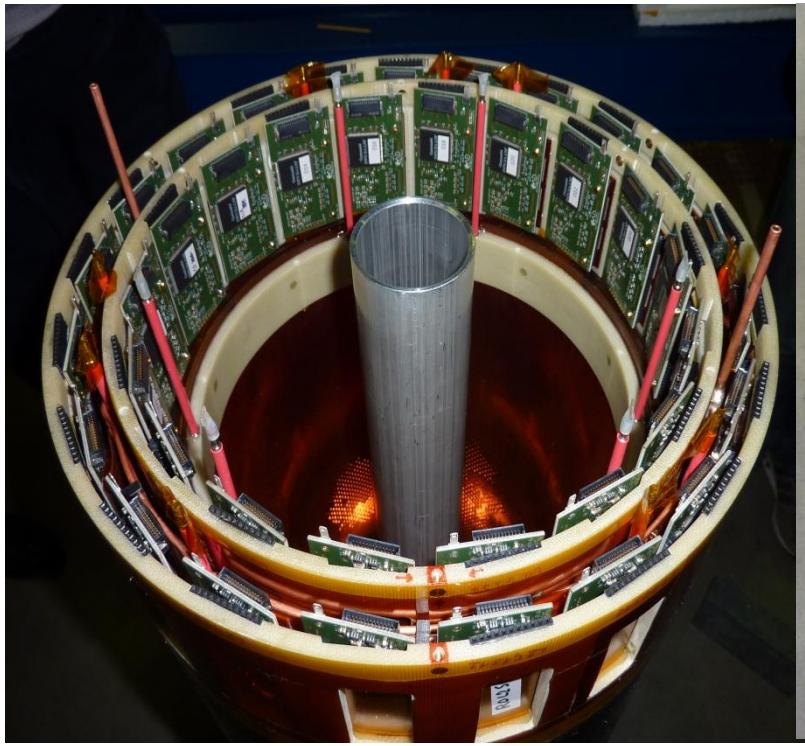


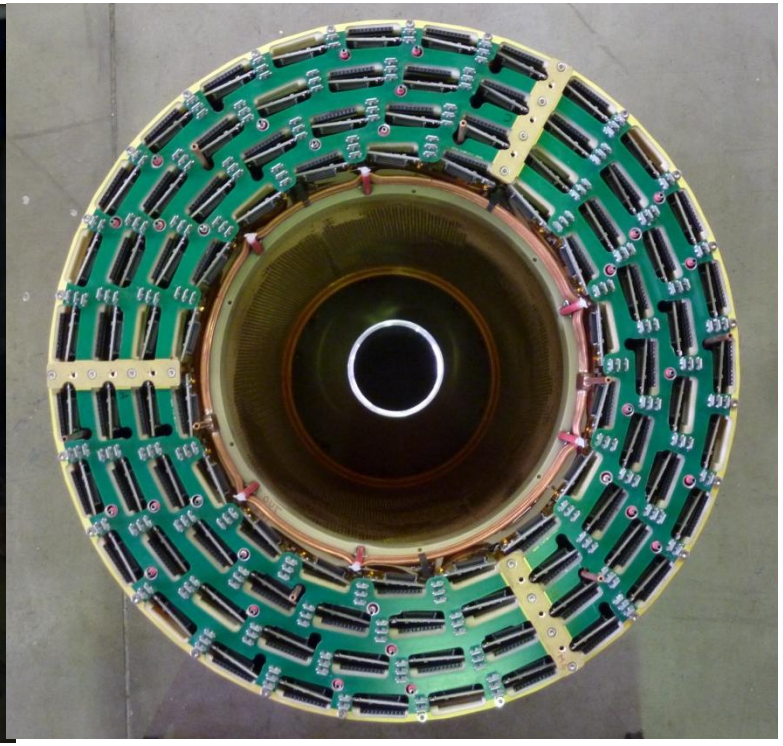


Status of the KLOE-2 Inner Tracker

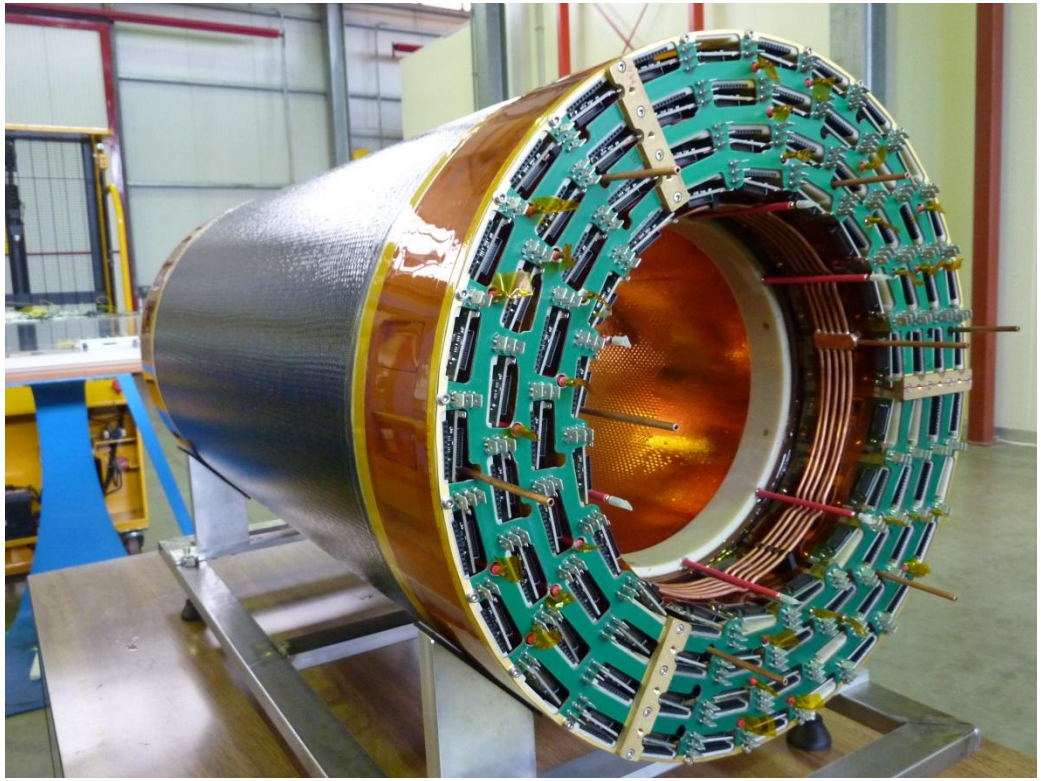
- The Layer 4 assembly was completed in February.
- All the layers were tested again before the final step.
- The insertion of the layers was led by a PVC bar sliding inside an aluminum tube.
- The step was completed mounting the FC kept by brass bars also acting as spacers between the CGEMs







The Inner Tracker was assembled on March, 14th 2013!



http://www.lnf.infn.it/public/index.php?option=com_content&view=article&id=359%3Agems-become-cylindrical&catid=21%3Anovita&Itemid=153&lang=it

- The detector is equipped with copper coils provided by ISOLCERAM for water cooling of the FEE boards.
- Two kapton stripes are installed on the external fiberglass flanges to insulate the Blocking Capacitor boards.
- The Faraday cage is completed by two cylindrical copper sheets soldered to the PCBs

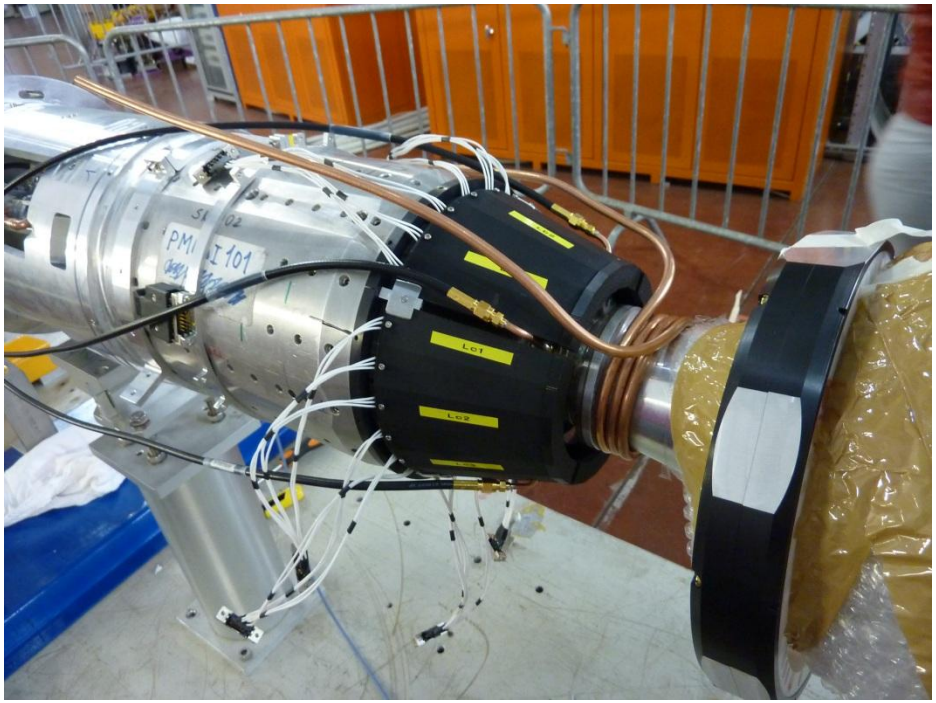
Before integrating the IT some operations will be performed in DAΦNE hall:

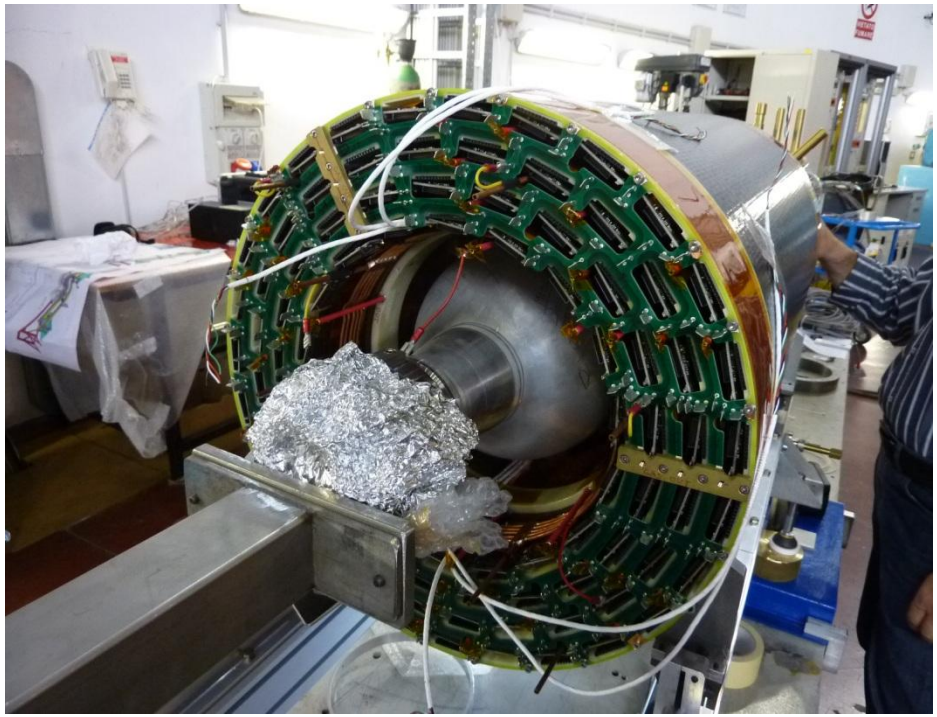
- Pulsing runs to check the cabling scheme
- Cosmic ray runs
- Definition of threshold for noisy and inefficient strips

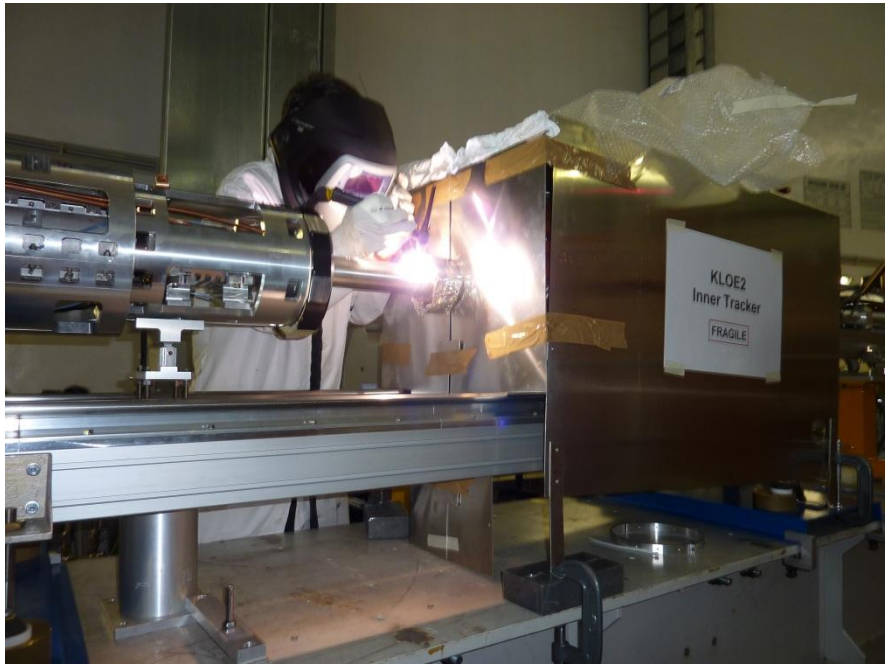
Monitoring the IT:

- Slow Control System embedded in the present environment Web Browser based to set/read High Voltage, Low Voltage, Gas System
- KLOE and DAΦNE presenter log operational conditions: currents and gas parameters
- Event Display
- Reference histograms: strips occupancy, cluster size, efficiency and resolutions
- Alignment and calibration with Bhabha scattering events and Drift Chamber information

Status of the integration

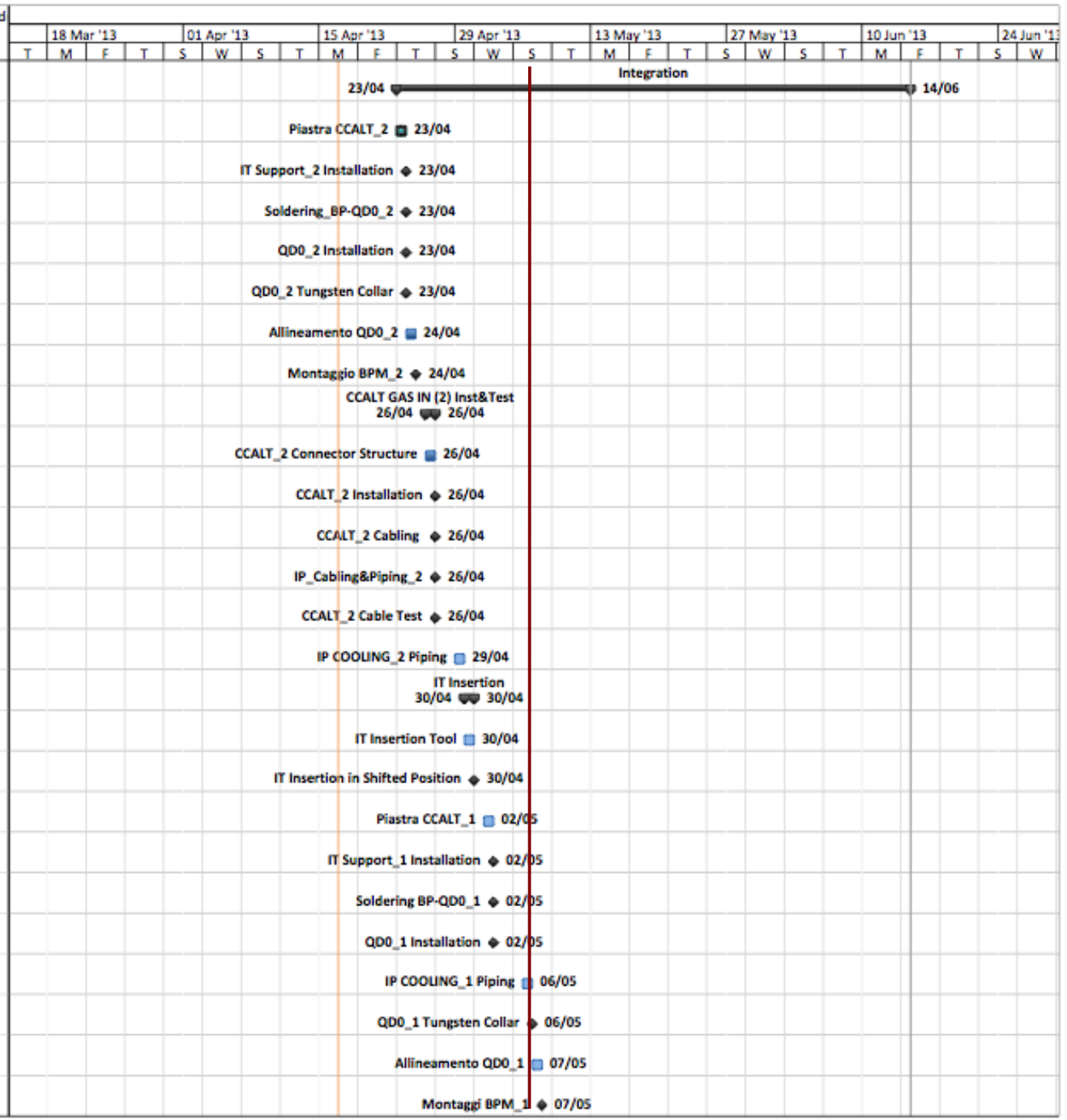






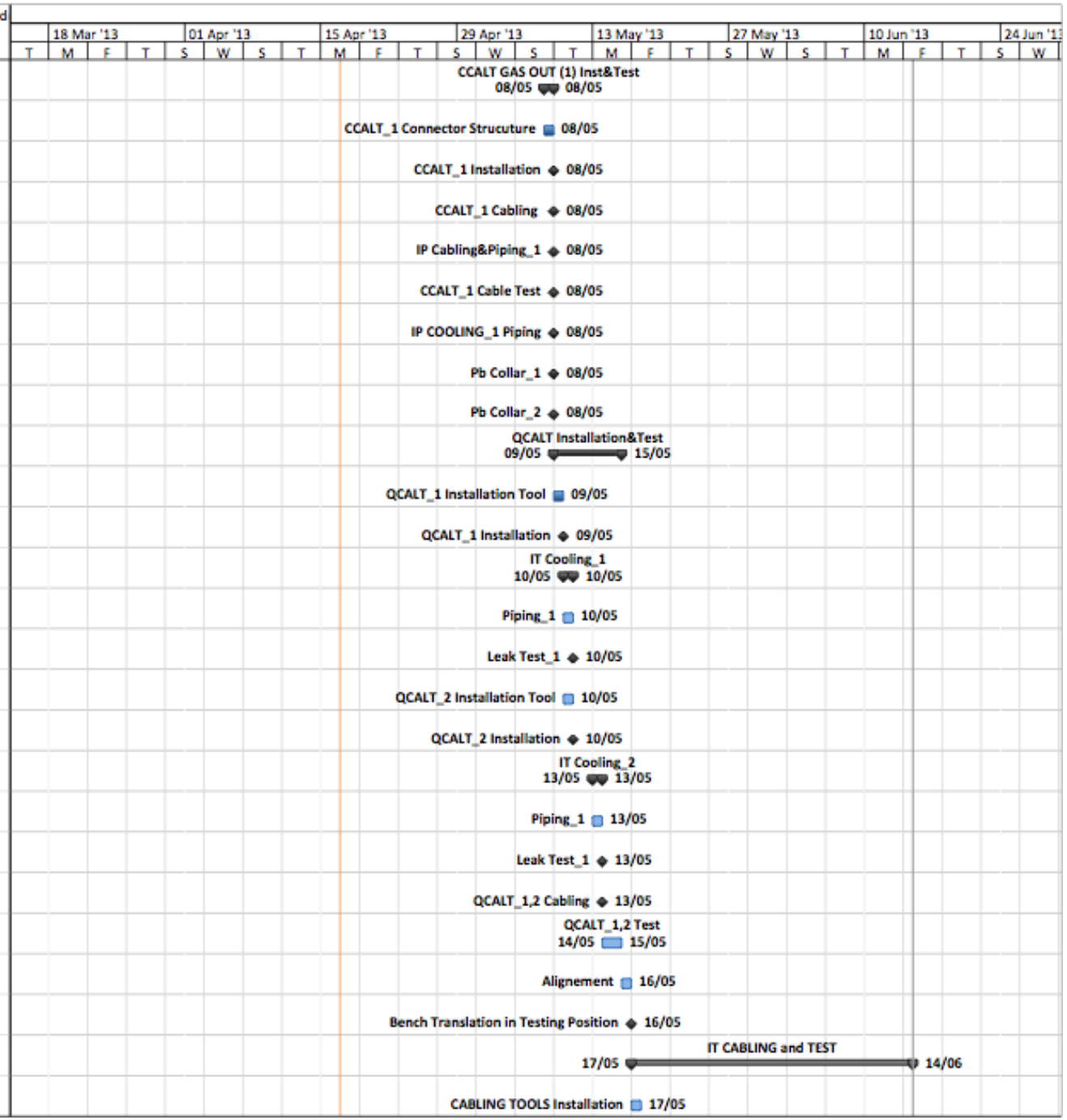
Status of the integration

ID	Task Mode	Task Name	Duration	Start	Finish	Pred
1		**Integration**	**36 days?**	**Tue 23/04/13**	**Fri 14/06/13**	
2		Piastra CCALT_2	1 day?	Tue 23/04/13	Tue 23/04/13	
3		IT Support_2 Installation	0 days	Tue 23/04/13	Tue 23/04/13	2
4		Soldering_BP-QD0_2	0 days	Tue 23/04/13	Tue 23/04/13	3
5		QD0_2 Installation	0 days	Tue 23/04/13	Tue 23/04/13	4
6		QD0_2 Tungsten Collar	0 days	Tue 23/04/13	Tue 23/04/13	5
7		Allineamento QD0_2	1 day	Wed 24/04/13	Wed 24/04/13	6
8		Montaggio BPM_2	0 days	Wed 24/04/13	Wed 24/04/13	7
9		**CCALT GAS IN (2) Inst&Test**	**1 day**	**Fri 26/04/13**	**Fri 26/04/13**	
10		CCALT_2 Connector Structure	1 day	Fri 26/04/13	Fri 26/04/13	7
11		CCALT_2 Installation	0 days	Fri 26/04/13	Fri 26/04/13	10
12		CCALT_2 Cabling	0 days	Fri 26/04/13	Fri 26/04/13	11
13		IP_Cabling&Piping_2	0 days	Fri 26/04/13	Fri 26/04/13	12
14		CCALT_2 Cable Test	0 days	Fri 26/04/13	Fri 26/04/13	13
15		IP COOLING_2 Piping	1 day	Mon 29/04/13	Mon 29/04/13	14
16		**IT Insertion**	**1 day**	**Tue 30/04/13**	**Tue 30/04/13**	
17		IT Insertion Tool	1 day	Tue 30/04/13	Tue 30/04/13	15
18		IT Insertion in Shifted Position	0 days	Tue 30/04/13	Tue 30/04/13	17
19		Piastra CCALT_1	1 day	Thu 02/05/13	Thu 02/05/13	18
20		IT Support_1 Installation	0 days	Thu 02/05/13	Thu 02/05/13	19
21		Soldering BP-QD0_1	0 days	Thu 02/05/13	Thu 02/05/13	20
22		QD0_1 Installation	0 days	Thu 02/05/13	Thu 02/05/13	21
23		IP COOLING_1 Piping	1 day	Mon 06/05/13	Mon 06/05/13	22
24		QD0_1 Tungsten Collar	0 days	Mon 06/05/13	Mon 06/05/13	23
25		Allineamento QD0_1	1 day	Tue 07/05/13	Tue 07/05/13	24
26		Montaggi BPM_1	0 days	Tue 07/05/13	Tue 07/05/13	25



Status of the integration

ID	Task Mode	Task Name	Duration	Start	Finish	Pred
27		**CCALT GAS OUT (1) Inst&Test**	**1 day**	**Wed 08/05/13**	**Wed 08/05/13**	
28		CCALT_1 Connector Strucuture	1 day	Wed 08/05/13	Wed 08/05/13	26
29		CCALT_1 Installation	0 days	Wed 08/05/13	Wed 08/05/13	28
30		CCALT_1 Cabling	0 days	Wed 08/05/13	Wed 08/05/13	29
31		IP Cabling&Piping_1	0 days	Wed 08/05/13	Wed 08/05/13	30
32		CCALT_1 Cable Test	0 days	Wed 08/05/13	Wed 08/05/13	31
33		IP COOLING_1 Piping	0 days	Wed 08/05/13	Wed 08/05/13	32
34		Pb Collar_1	0 days	Wed 08/05/13	Wed 08/05/13	33
35		Pb Collar_2	0 days	Wed 08/05/13	Wed 08/05/13	34
36		**QCALT Installation&Test**	**5 days**	**Thu 09/05/13**	**Wed 15/05/13**	
37		QCALT_1 Installation Tool	1 day	Thu 09/05/13	Thu 09/05/13	35
38		QCALT_1 Installation	0 days	Thu 09/05/13	Thu 09/05/13	37
39		**IT Cooling_1**	**1 day**	**Fri 10/05/13**	**Fri 10/05/13**	
40		Piping_1	1 day	Fri 10/05/13	Fri 10/05/13	38
41		Leak Test_1	0 days	Fri 10/05/13	Fri 10/05/13	40
42		QCALT_2 Installation Tool	1 day	Fri 10/05/13	Fri 10/05/13	38
43		QCALT_2 Installation	0 days	Fri 10/05/13	Fri 10/05/13	42
44		**IT Cooling_2**	**1 day**	**Mon 13/05/13**	**Mon 13/05/13**	
45		Piping_1	1 day	Mon 13/05/13	Mon 13/05/13	43
46		Leak Test_1	0 days	Mon 13/05/13	Mon 13/05/13	45
47		QCALT_1,2 Cabling	0 days	Mon 13/05/13	Mon 13/05/13	46
48		QCALT_1,2 Test	2 days	Tue 14/05/13	Wed 15/05/13	47
49		Alignement	1 day	Thu 16/05/13	Thu 16/05/13	48
50		Bench Translation in Testing Position	0 days	Thu 16/05/13	Thu 16/05/13	49
51		**IT CABLING and TEST**	**21 days**	**Fri 17/05/13**	**Fri 14/06/13**	
52		CABLING TOOLS Installation	1 day	Fri 17/05/13	Fri 17/05/13	50



Status of the integration

The past…

- CCalT installation done on May 6th

- IT insertion on the beam pipe done on May 7th

- Closure of the beam pipe done on May 8th

… and the future

- QcalT 1 & 2 installation since May 9th

- IT piping starting since May 10th; the cabling will start on May 17th

- Insertion of the BP with the detectors in KLOE in the middle of June

Conclusions

- All the upgrades of the KLOE apparatus are ready

- Their integration has just began

- The conclusion of the integration is foreseen for the end of June

- Very fruitfull collaboration with the AD!

Insertion tool