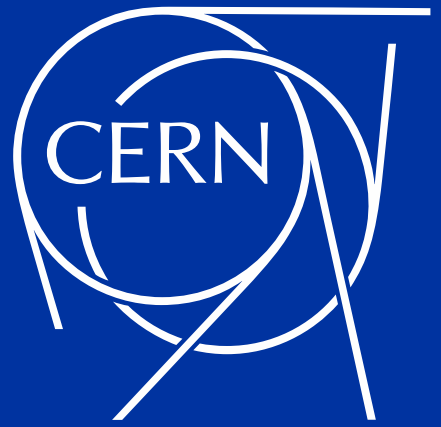


MPP Meeting
BLMINJ System Deployment

William Viganò, BE-BI-BL

04/12/2020

Outline

- System Deployment
  - Summary
  - LINAC4
  - PSB Rings
  - PSB Injection/Extraction
  - PS Ring
  - TT2 and F16 line
  - FTA and nTOF
  - TT10
  - To be done
- HV modulation test

System Deployment Overview

Machine	Area	Building	Rack name	ACQ crate	VME crate	FESA Device	Timing	CIBU1	CIBU2	Detector type	# of channels
LN4	L4, LT	400-R-01	BY06	LN4_ACQ_CRATE	cfv-400-blmln4a	LN4.BLM.A	LN4	CIB.400.L4CH (L4+TL)	CIB.400.L4TL4Z (L4T+LT+LTB)	IC	23
	LBE		BY07		cfv-400-blmln4b	LN4.BLM.B	LN4	CIB.361.LBE (LBE)		IC	1
PSB	Ring	361-1-203	42	PSB42_ACQ_CRATE	cfv-361-blmbra	BR.BLM.A	PSB	CIB.361.PSB34 (ring1&2)	CIB.361.PSB34 (ring 3&4)	IC	32
			41E	PSB41E_ACQ_CRATE	cfv-361-blmbrb	BR.BLM.B	PSB	CIB.361.PSB34 (ring 1&2)	CIB.361.PSB34 (ring 3&4)	FIC/IC	34
	BI		68C	PSB68D_ACQ_CRATE	cfv-361-blmbi	BI.BLM	PSB	CIB.361.PSB12 (BI&injection)		IC	13
	BT		68D		cfv-361-blmbt	BT.BLM	PSB		CIB.361.PSB34 (extraction&TFL)	IC	9
	BTM					BTM.BLM	PSB			IC	3
	BTP					BTP.BLM	PSB			IC	4
	BTY					BTY.BLM	PSB			IC	9
PS	Ring	359-R-001	CRH11	PSCRH11_ACQ_CRATE	cfv-359-blmpra	PR.BLM.A	CPS			IC	50
			CRH12	PSCRH12_ACQ_CRATE	cfv-359-blmprb	PR.BLM.B	CPS			IC	50
	TT2: FTN,FTA, F16	269-R-003	RA1008	RA1008_ACQ_CRATE	cfv-269-blmtt2	TT2.BLM	CPS			IC	49
	EA: F61, F62, F63	157-1-009	BY01-APR	TLRA1_ACQ_CRATE	cfv-157-blmea	EA.BLM	CPS			IC	15
SPS	TT10	269-R-003	RA1009	TT10269_ACQ_CRATE	cfv-269-blmtt10a	TT10.BLM.A	SPS	CIB.269.TT2EXT		IC	8
		868-R-002	RA0320	TT10868_ACQ_CRATE	cfv-ba1-blmtt10b	TT10.BLM.B	SPS	CIB.BA1.INJ		IC	22

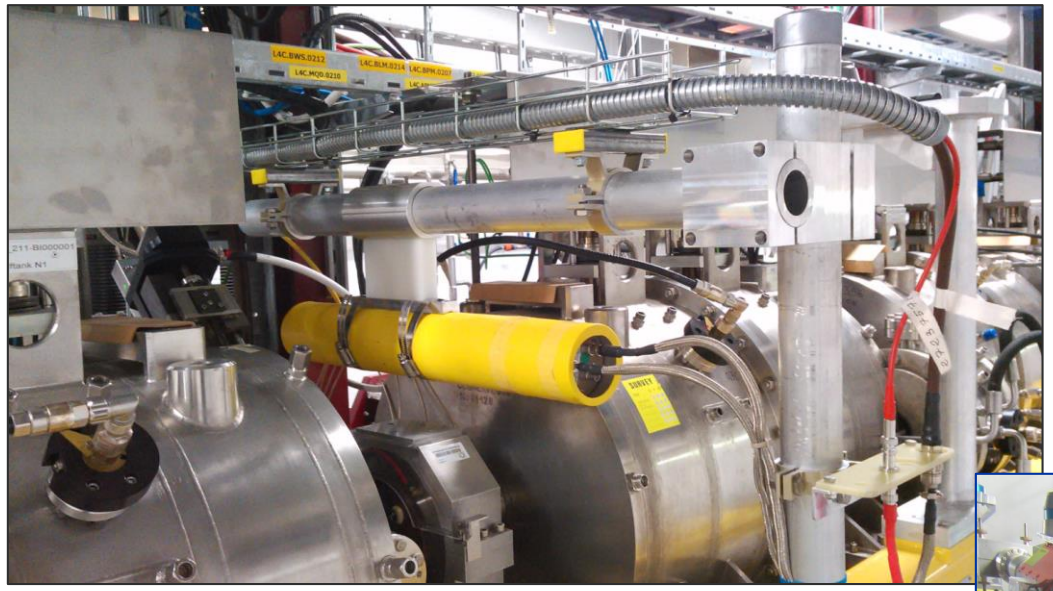
System Deployment Summary

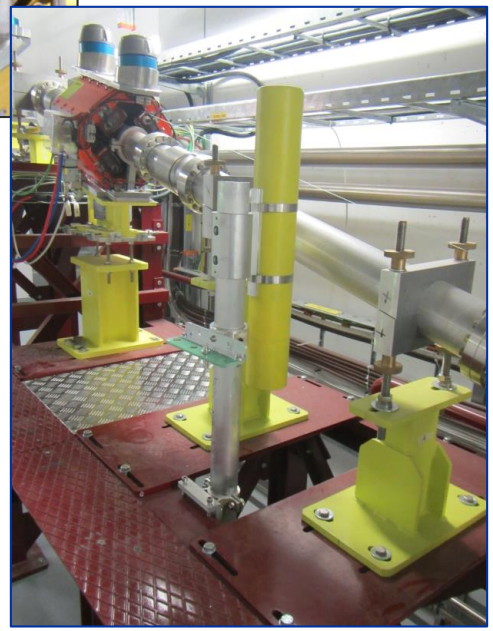
System element	Quantity
Racks	15
VME Crates	14
Acquisition Crates	9
Processing cards	51
Acquisition cards	51
Detectors	322

BLM for Injectors - Rack arrangement

Pos.	Module	Description	Picture - Front View
45	Beam Interlock	Standard CERN User Interface for Beam Interlock System, which consist of a 2U Module	
44			
43	Beam Interlock	Standard CERN User Interface for Beam Interlock System, which consist of a 2U Module	
42			
41	Standard Deflector	Simple CERN made deflector for cooling system to circulate cold air from the front and push hot air on the back	
40	BLEPC	VME Crate for the BLM Threshold Comparison and Processing, equipped with: 1 CPU; up to 8xBLEPT; 1 xBLECS; 1 xCTRV; 8xBLM Daisy Chain Jumper	
39			
38			
37			
36			
35			
34			
33			
32	Standard Deflector	Simple CERN made deflector for cooling system to suck cold air from the front and push hot air on the back + External cable arrangement support	
31	High Voltage Power Supply	Custom 3U crate equipped with: 2 NCE3000.20 High Voltage supply + several connections	
30			
29			
28	Standard Deflector	Simple CERN made deflector for cooling system to suck cold air from the front and push hot air on the back	
27	FAN Tray	Schroff 10713108	
26	BLEAC	BLM Acquisition Crate equipped with: 1 BLEMP; 1 Legenda Panel; up to 8 BLEDP; 1 BLEJP; 1 BLECU	
25			
24			
23			
22			
21			
20	FAN Tray	Schroff 10713108	
19	Deflector with filter	Schroff 10713144	
18	USB Hub + Instruments	Fixed plate 350mm deep + External cable arrangement support	
17			
16			
15	Signal Panels	Metallic support for the signal cable arrangement. It is fixed in the middle area of the rack by additional metallic guides	
14			
13			
12			
11			
10			
9			
8			
7			
6	HV Distribution	Custom High Voltage Distribution fanout crate for powering the detectors	
5			
4			
3	Free	Leave it free	
2	Free	Leave it free	
1	Free	Leave it free	

LINAC4





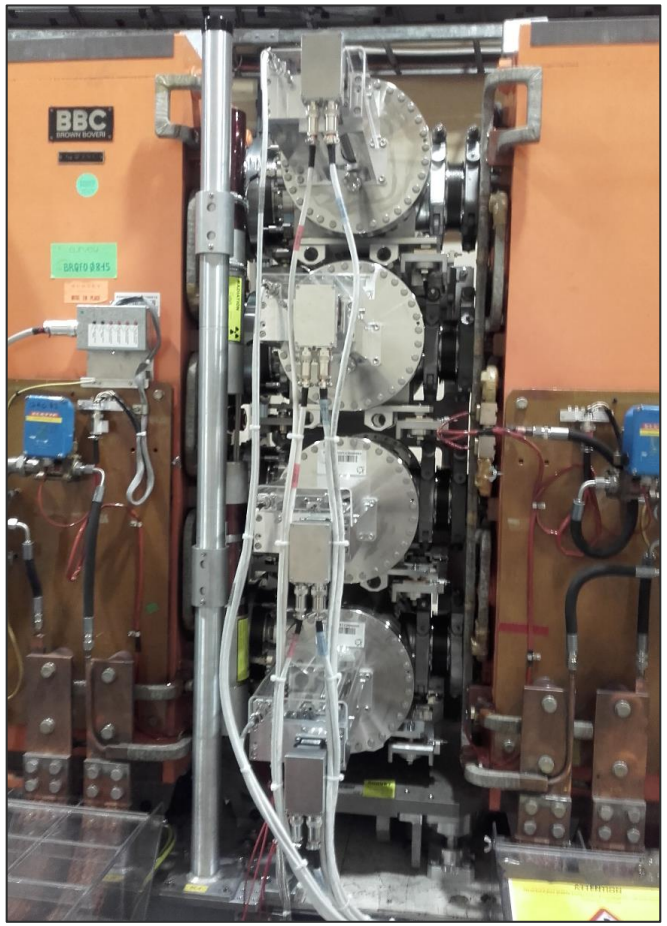
- **24 x channels installed long the lines:**
  - L4D (2 detectors)
  - L4C (4 detectors)
  - L4P (3 detectors)
  - L4Z (1 detector)
  - L4T (8 detectors)
  - LT (3 detectors)
  - LTB (1 detectors)
  - LBE (1 detector)

PSB Rings

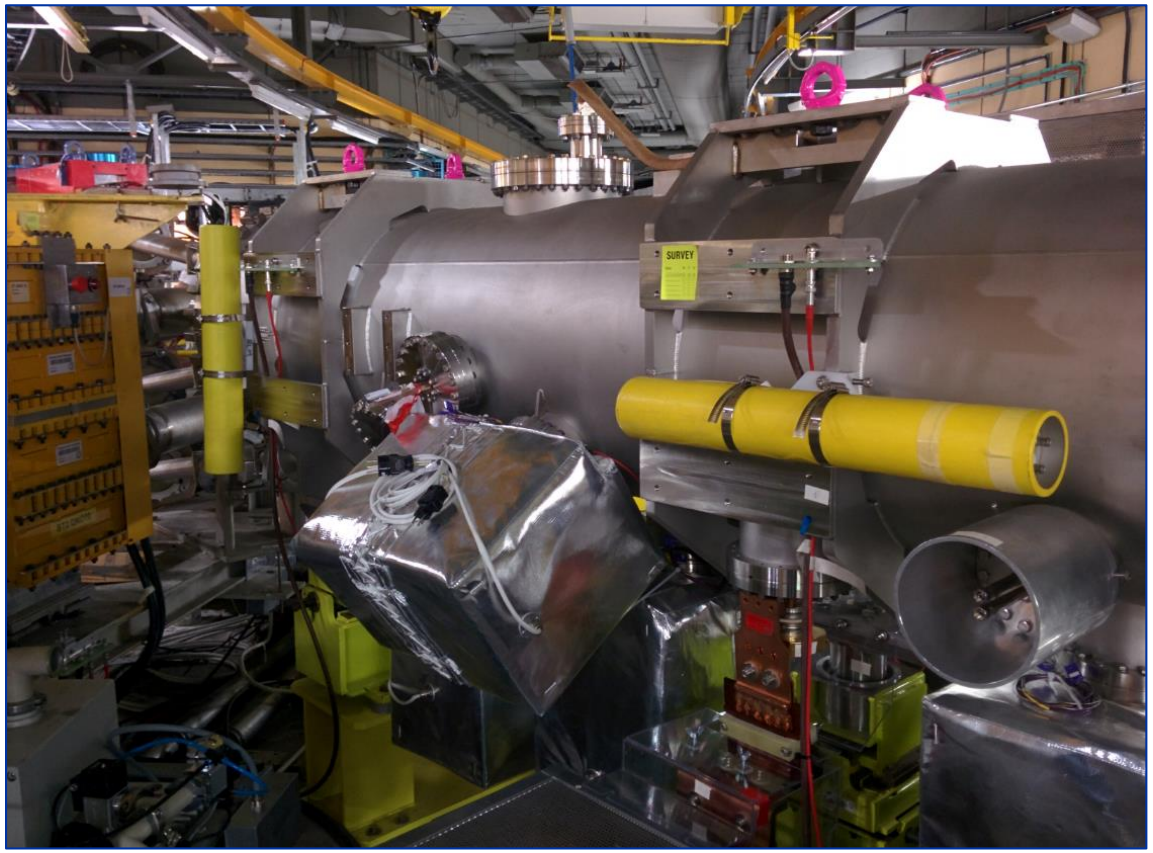
32 x IC detectors located from 1L2 to 16L2

32 x Flat Ionization Chambers detectors located from 1L3 to 16L3

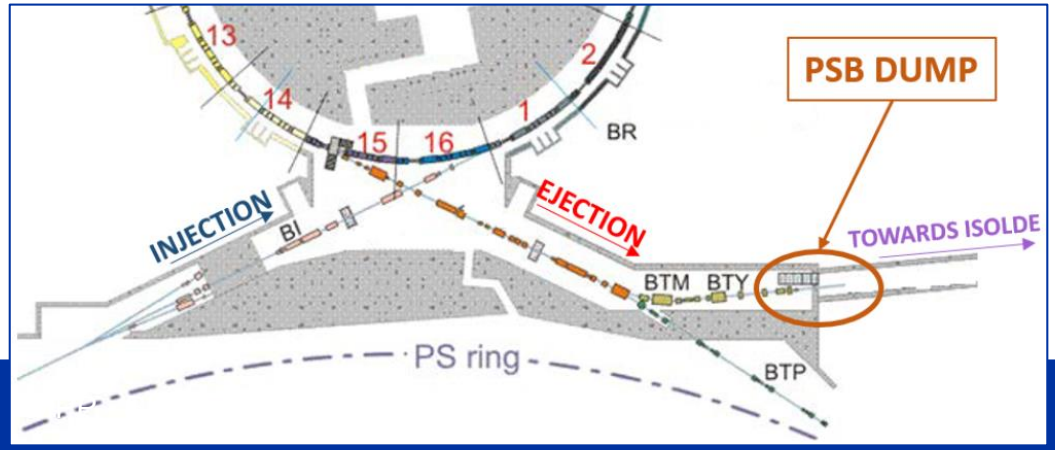
2 x IC detectors located at 8L4 (absorber scraper)



PSB Injection / Extraction

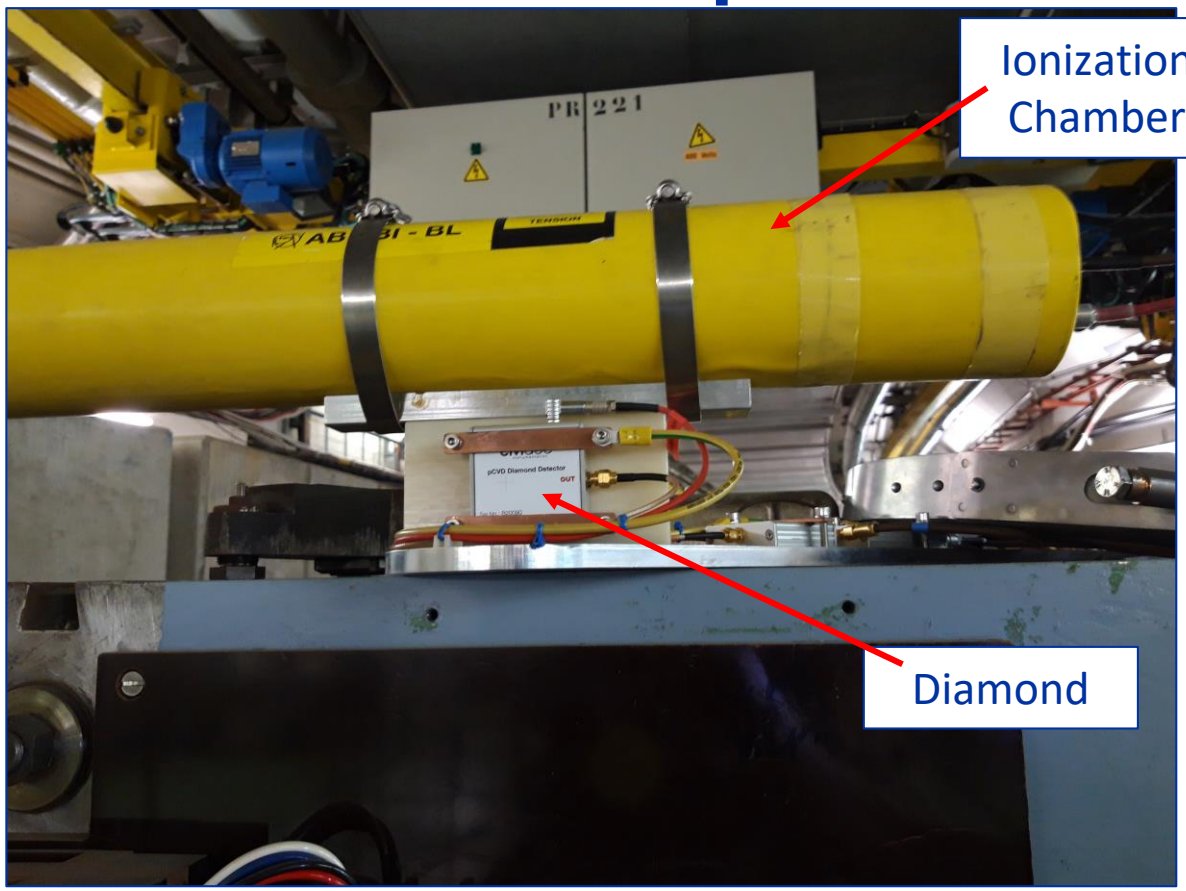


- **38 x channels installed long the lines:**
  - BI (13 detectors)
  - BE (2 detectors)
  - BT (7 detectors)
  - BTM (3 detectors)
  - BTP (4 detectors)
  - BTY (6 detectors)
  - ISOLDE (3 detectors)

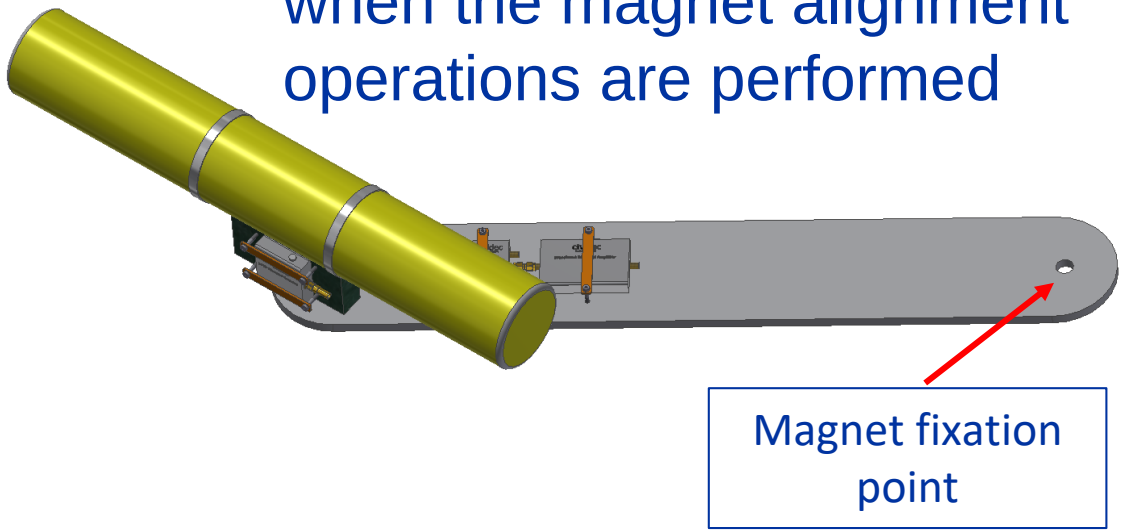


PS Ring

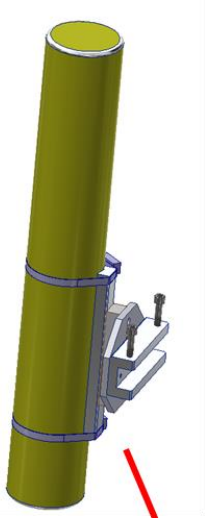
- **100 x Ionization Chambers + 17 diamonds installed on top of the MU elements.**



- Detectors supports have been designed to allow a quick displacement/repositioning when the magnet alignment operations are performed

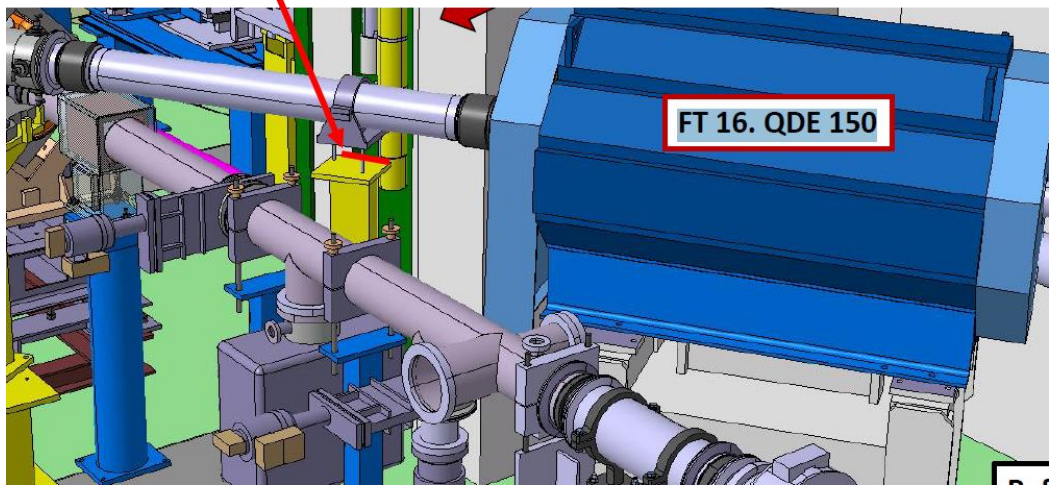


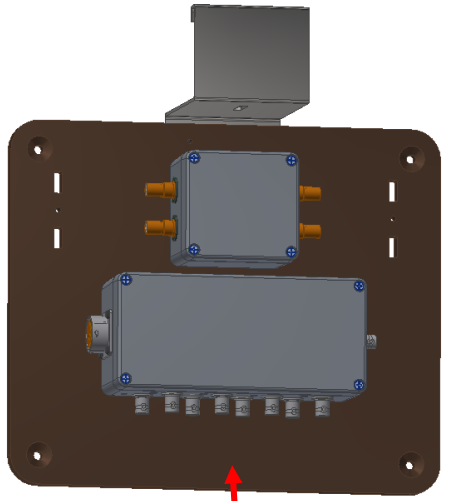
F16 and TT2 line



42 channels installed

- new cabling paradigm with NES18 multiwire and distribution boxes

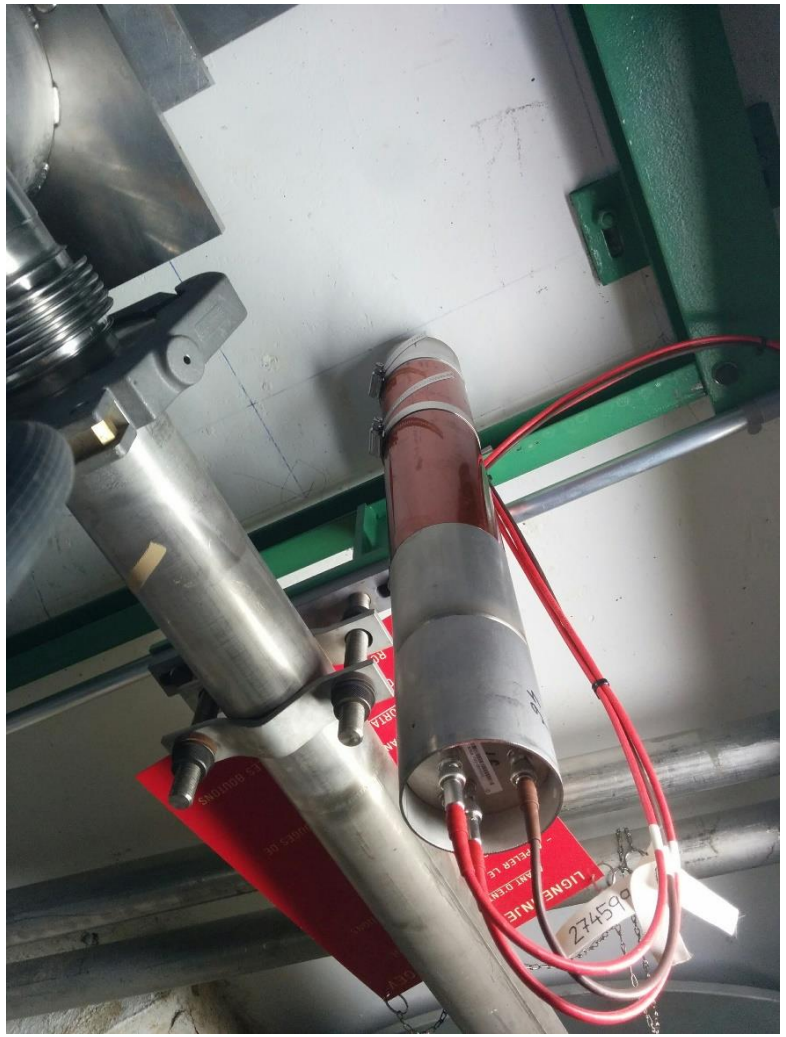




Signal and HV distribution boxes mounted in proximity to the cable tray or the wall

Drilling on the floor and simple support

FTA and nTOF Target Area



Installation completed

- 4 channels for the FTA line
- 6 channels for the nTOF target area

Detector Support Design

- Custom support design for all locations at FTA
- Baseline support type for nTOF target area detectors (same as TT2 line)

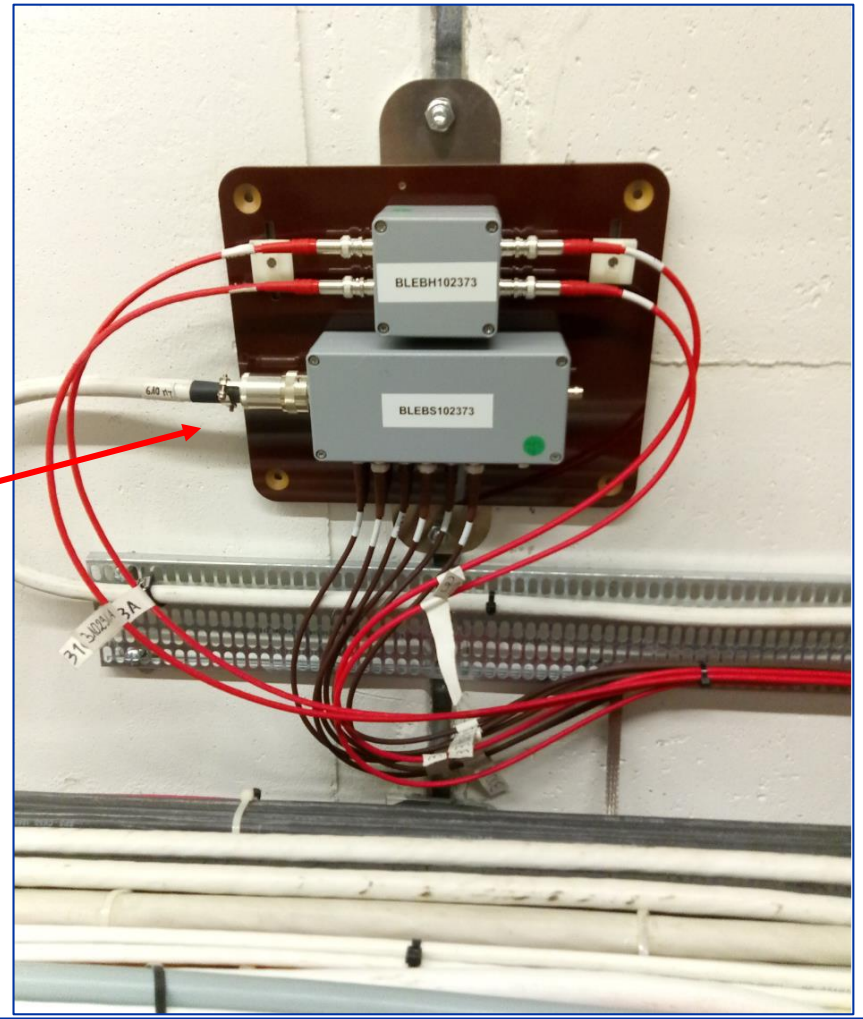
TT10 line

28 channels installed

- Same architecture as for the TT2 line

Detector mounted on the floor support

Signal and HV distribution boxes mounted on top of the cable tray

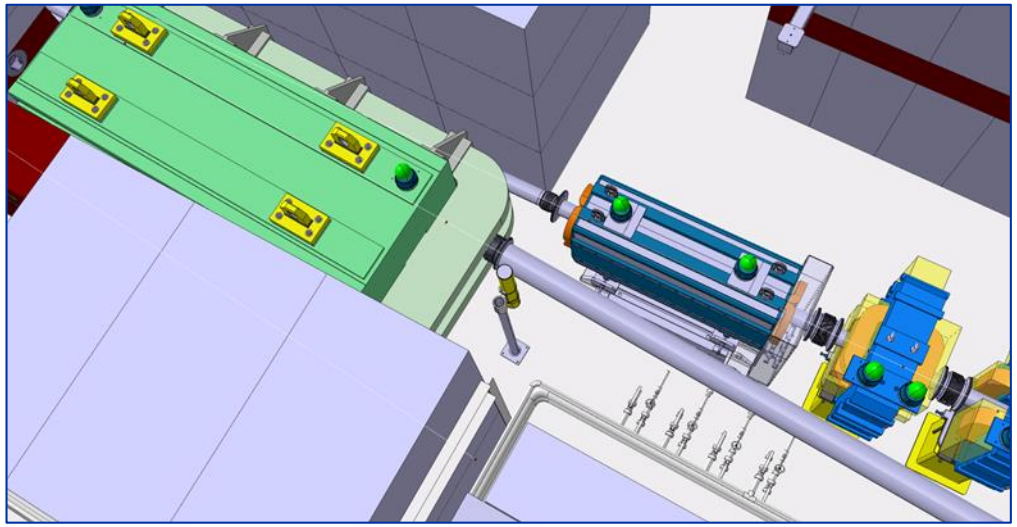


To be done

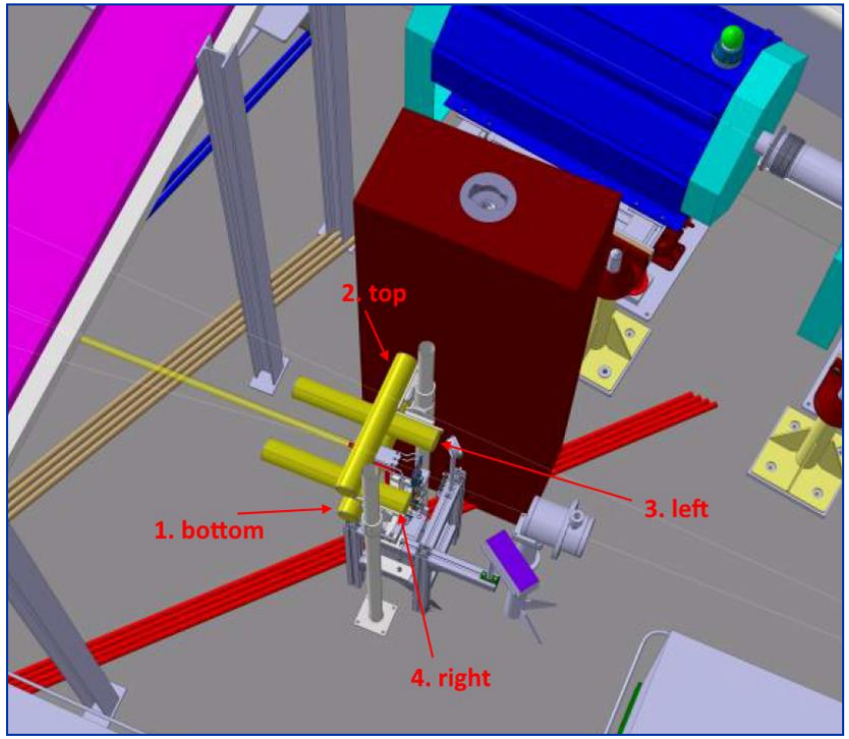
All installations are completed except:

- 8 channels for East Area targets
- 3 channels for East Area transfer line

T08 Line

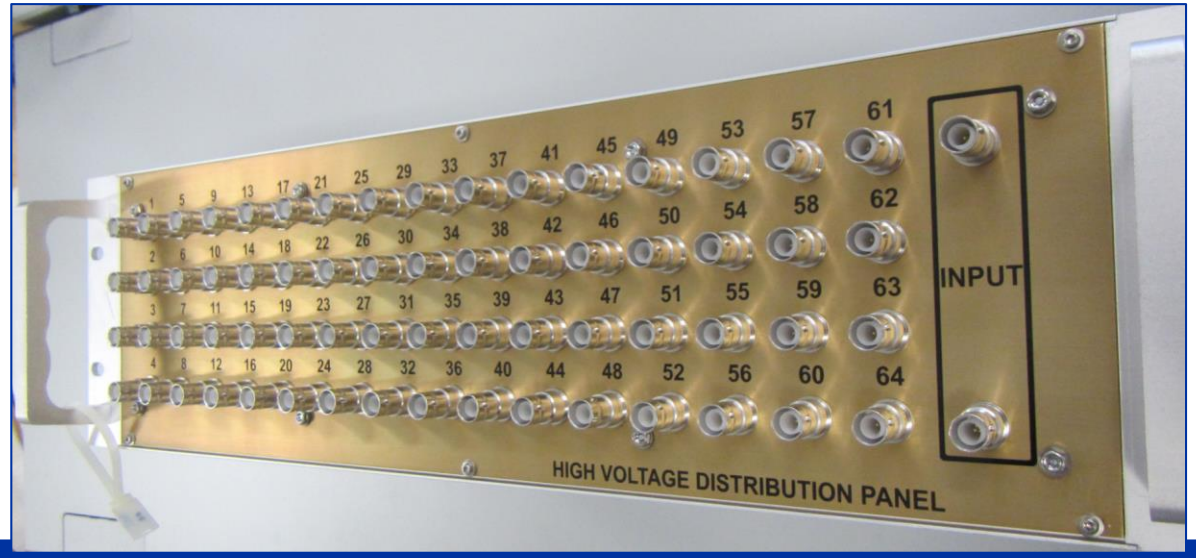


T10/T11 Target zone



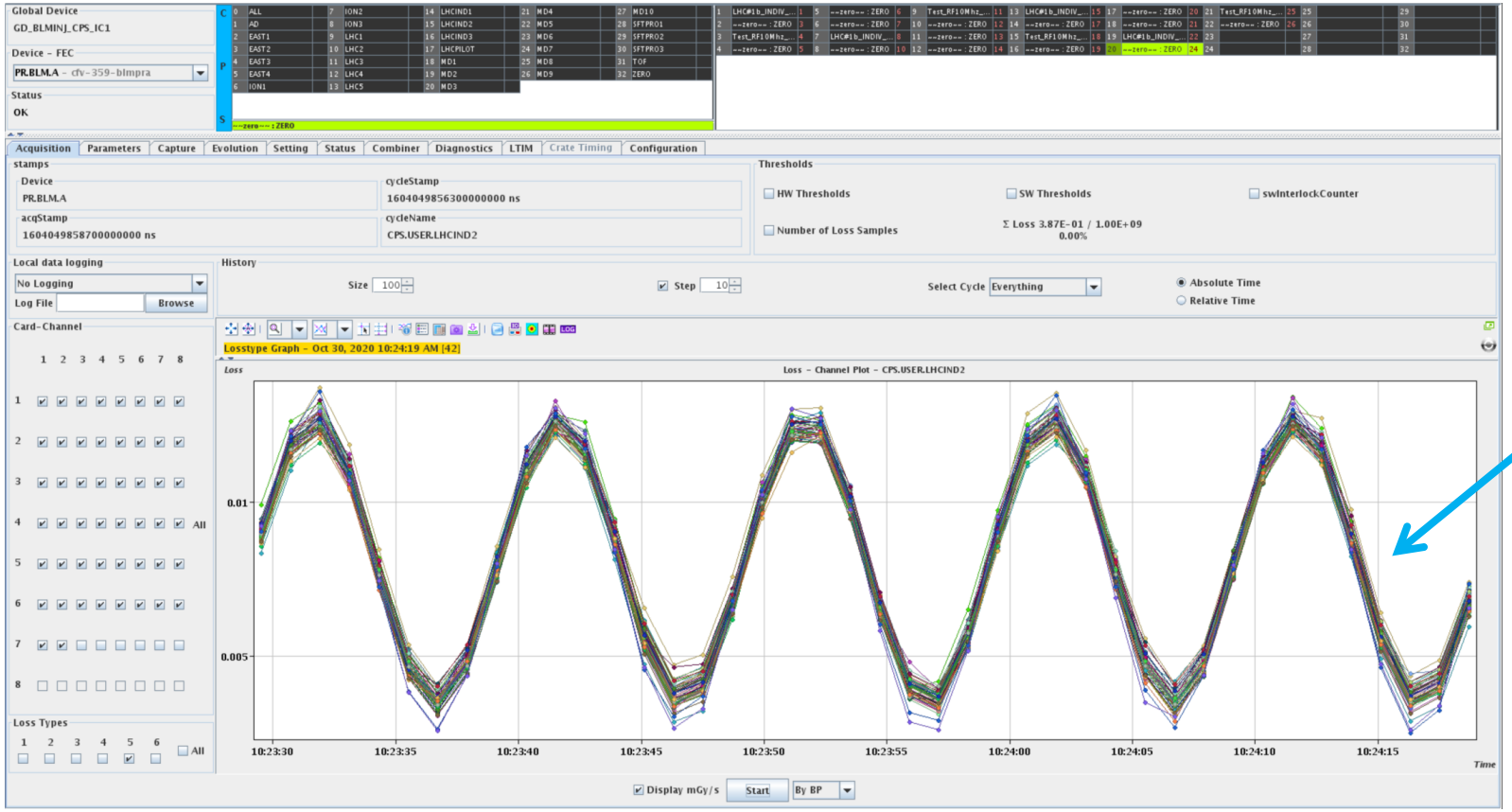
Fail safe High Voltage distribution

- 64 output channels.
- Max output worst case current = 2mA @ 1500V_{DC}
- Double power supply input, single failure tolerant.
- Permanent short-circuit tolerant.
- High humidity tolerant.
- Internal Ionization Chambers discharging capacitor.



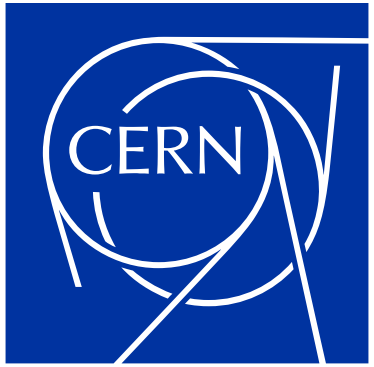
High Voltage Modulation Test

All channels connections are regularly verified remotely by means of the detectors' HV power supply modulation.



The HV power supply modulation induces to all correctly connected & powered channels few pA current proportional to the input.

In this way the entire connection chain and the detector performance are verified.



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