

# RD51 – WG7 : 2009 – TODAY

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L Neutrino Platform

K12

M2

P42

EHN1

H2, H4, H6, H8





# Our time slots: updated to v3.0

PS Operation

## Period 2 2009 Jun 4 to Jul 9

document issue date: 14-April-2009

Version 3.0

(colour code: purple (dark) = scheduling meeting , light green (light) = weekend)

Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7
Jun	Jun	Jun	Jun	Wk23	Jun	Jun	Jun	Jun	Jun	Jun	Wk25	Jun	Jun	Jun	Jun	Jun	Jun	Wk26	Jun	Jun	Jun	Jun	Jun	Wk28	Jun	Jul	Jul	Jul	Jul	Jul	Jul	Wk27	Jul

**MPGD 2009**

Machine

T2 -H2	NA61-TR	8h D Lazic	CMS-HCAL	8h A DiMauro	WCALO	8h P Luukka	CMS-SiUpgr	
T2 -H4	NA63	8h M Mazziotta	SITRD	8h M Mazziotta	SITRD	8h M Alfonsi	RD51	CMS-ECAL

PS Operation

## Period 6 2009 Oct 22 to Nov 23

document issue date: 14-April-2009

Version 3.0

(colour code: purple (dark) = scheduling meeting , light green (light) = weekend)

Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Oct	Oct	Oct	Oct	Wk43	Oct	Oct	Oct	Oct	Oct	Nov	Wk44	Nov	Nov	Nov	Nov	Nov	Nov	Wk45	Nov	Nov	Nov	Nov	Nov	Nov

Machine

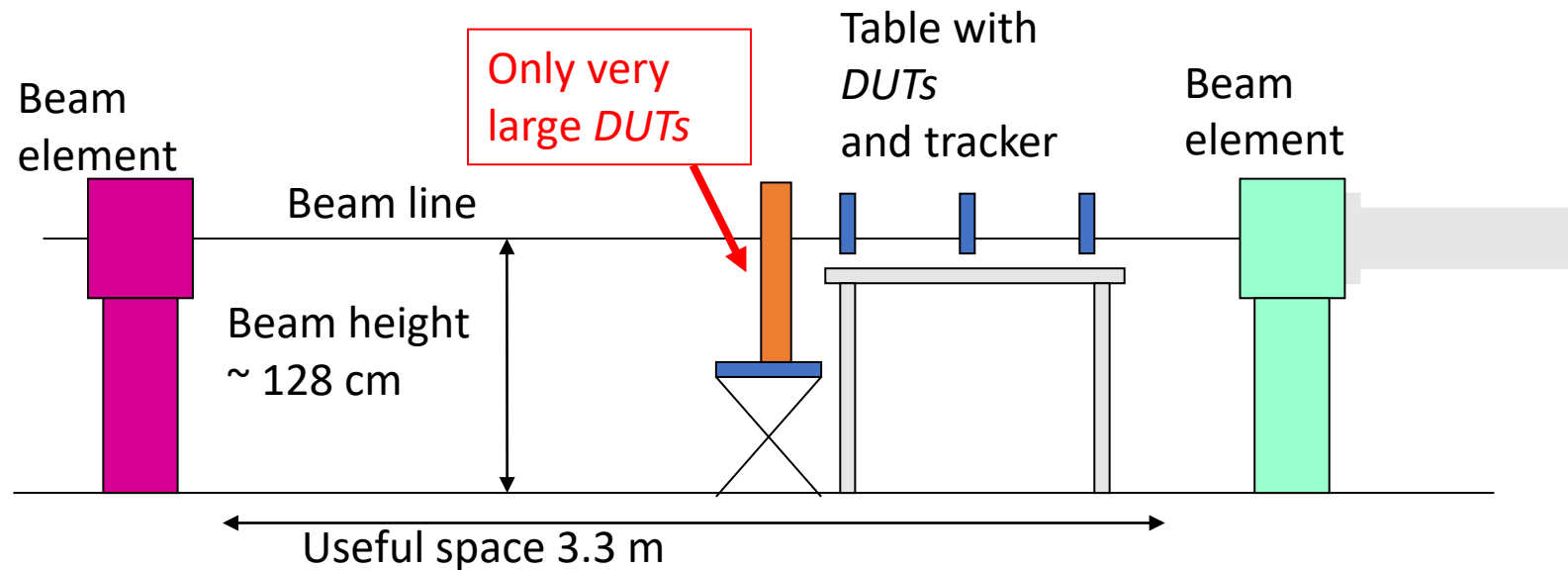
T2 -H2	8h Z Fodor	NA61	8h L
T2 -H4	8h M Alfonsi	RD51	8h A Singovski
		CMS-ECAL	8h Y Itow

... but we had the best headquarters !!!

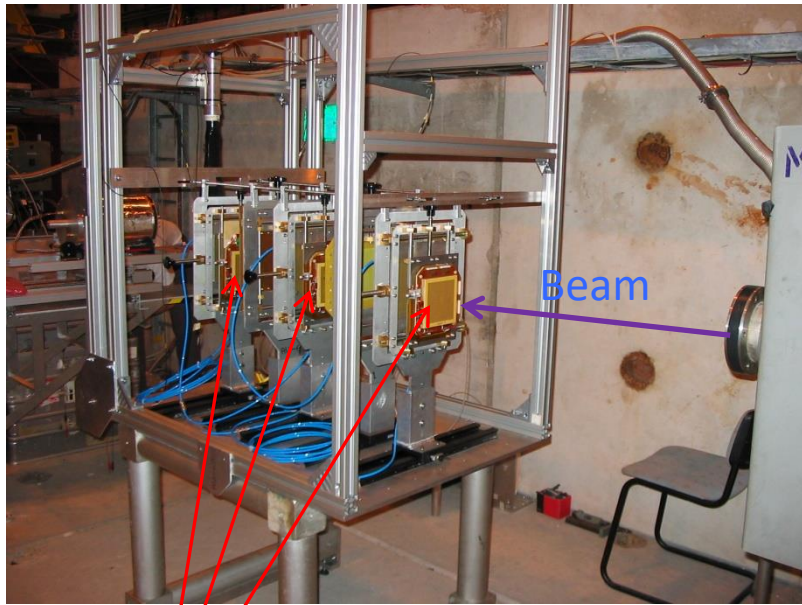


# Setup "A" outside the magnet

- Placed upstream *Goliath*, composed by a table with precisely-positioned tracking elements and an external support for the case of very large *Detectors Under Test (DUTs)*



# Setup A



GEM telescope

Micromegas Telescope

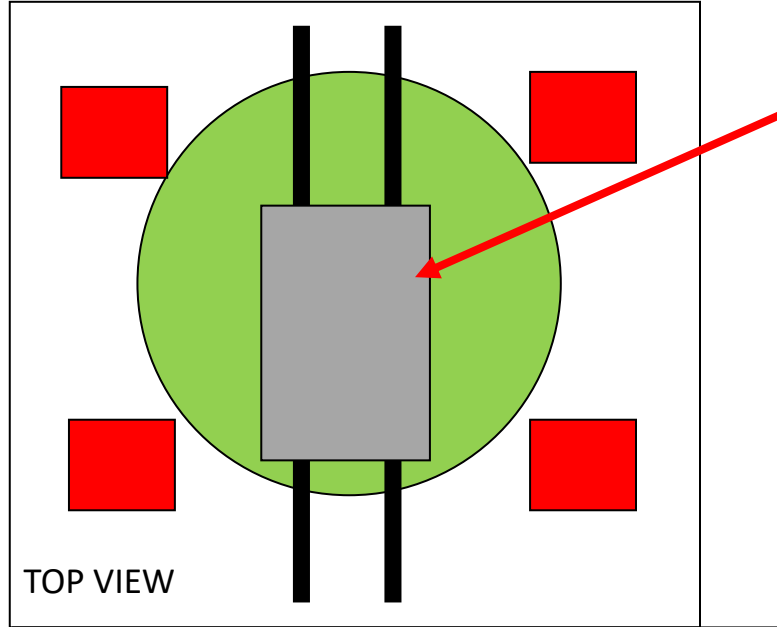
DUT  $\mu$ Megas

DUT Triple GEM



Beam

# Setup "B" inside the magnet

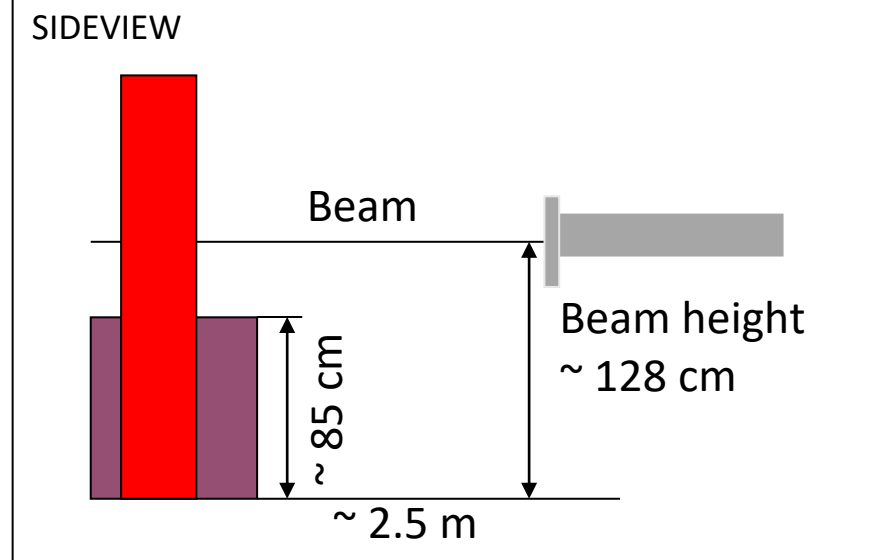


Similar table mounted over rails

Rails will extend out of the magnet for about 1m, with two legs for support

Table is moved out of the beam when not used.

More than 8m length for cable, to arrive from rack to the farthest part of the magnet, properly using cable trays



RAIL SYSTEM:





# Specification and field map from NA57

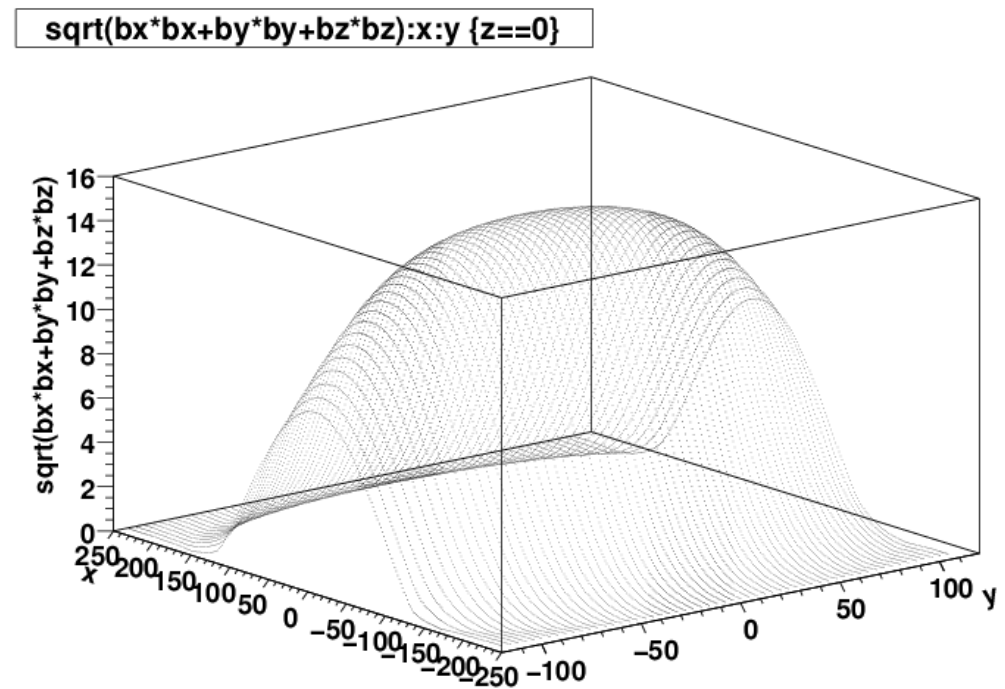
Power: about 2MW

Maximum field: 1.4T

Gap volume: around 8 m<sup>3</sup>

Max. water pressure: 10 bar

- Looking at the map realized during NA57 experiment, the field seems to drop fast when approaching the border.



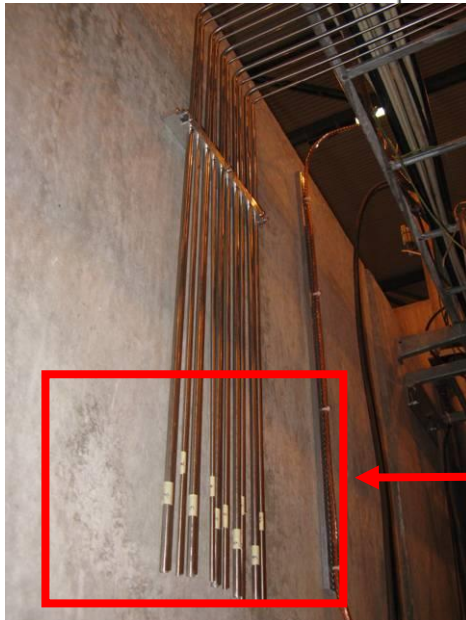
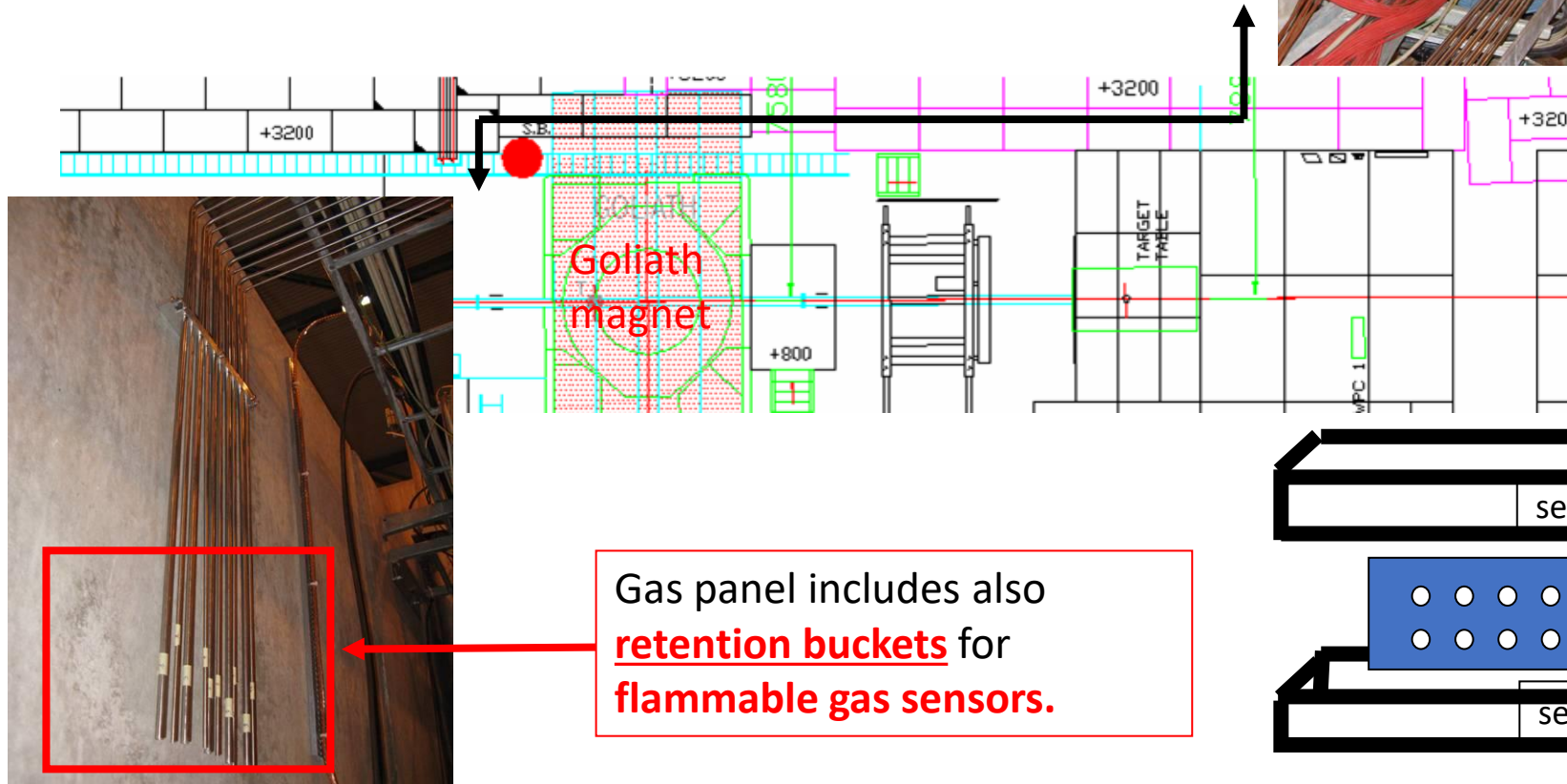
Field map realized during NA57 experiment, file decoded by Frascati group

# Setup "B" inside the magnet

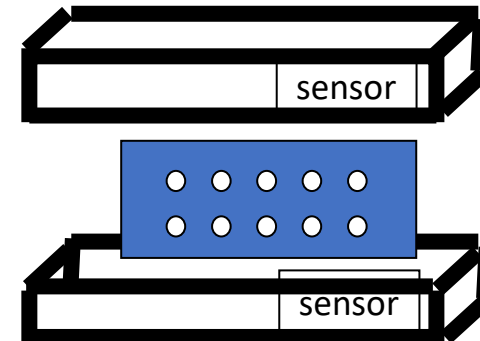


# Gas Pipes

- **Stainless steel** from gas zone to a patch panel in the experimental area
- **6 lines**, each with 6mm diam. pipes for inlet and 10mm diam. pipes as exhaust



Gas panel includes also **retention buckets** for flammable gas sensors.



# SLOW Control System

Intro

Main

Init

Config

Export

Prospects



Component	vMon	iMon	uA	Component	vMon	iMon	uA	Component	vMon	iMon	uA
03-00	0.00	0.000	0.00	03-05	0.00	0.000	0.00	04-00	3.00	0.000	0.00
03-01	0.00	0.000	0.00	03-07	0.00	0.000	0.00	04-01	1.00	0.000	0.00
03-02	0.00	0.000	0.00	03-08	0.00	0.000	0.00	04-02	1.00	0.000	0.00
03-03	0.00	0.000	0.00	Sac_6	393.25	0.150	0.00	04-03	0.00	0.000	0.00
Mesh	539.00	0.000	0.00	Sac_5	389.25	0.418	0.00	04-04	0.00	0.000	0.00
Drift	999.50	0.000	0.00	03-11	0.00	0.000	0.00	04-05	1.00	0.000	0.00

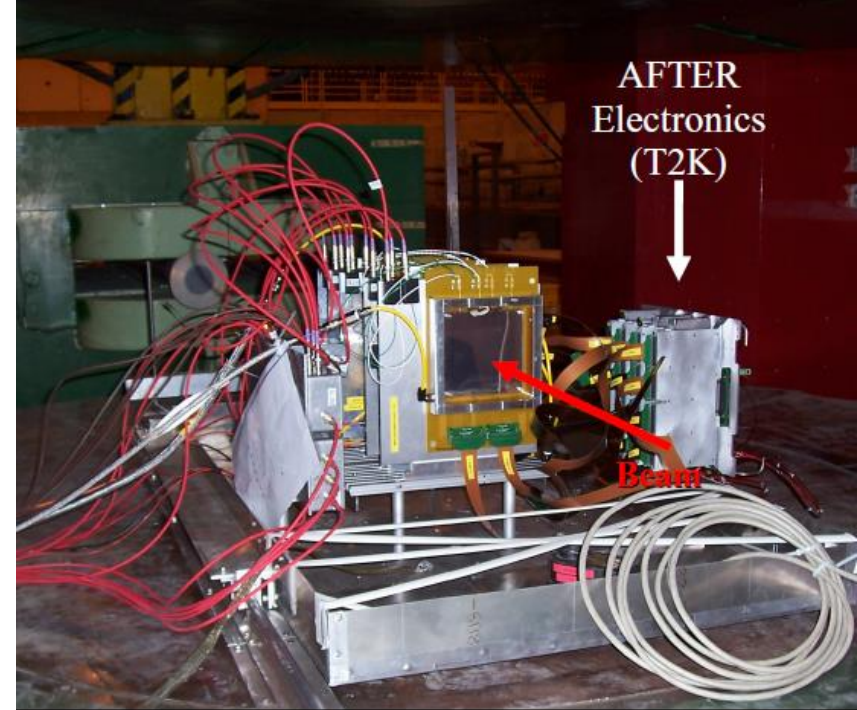
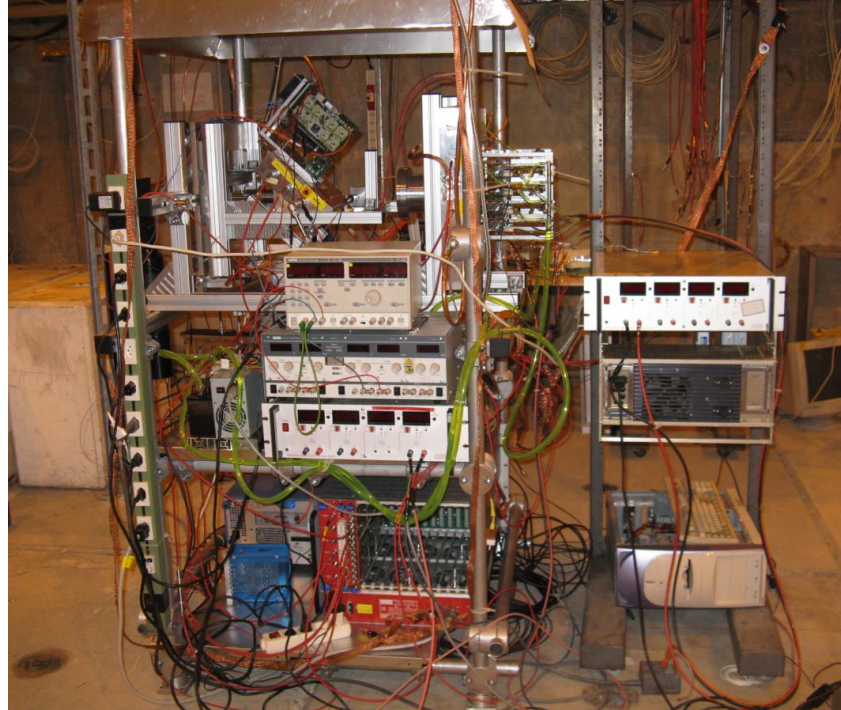
## Main Window

- ✓ Status of all
- ✓ vMon
- ✓ iMon
- ✓ Settings
- ✓ Initialization
- ✓ Export data

# Organization in the TB

	lowest priority					main user
Mon 19th Oct						
Tue 20th Oct						only control room stuff can be installed..
Wed 21st Oct						only control room stuff can be installed..
Thu 22nd Oct						only control room stuff can be installed..
Morning 8 - 16						we can
Evening 16 - 24	0					No "main user" shifts up to next morning - access regulated by "gentleman agreement". Magnet OFF, just one test after completing the installation
Fri 23rd Oct						
Night 24 - 8						
Morning 8 - 16	0					
Evening 16 - 24	1A	MM TPC	RES MM	THGEM	CERN	Bonn
Sat 24th Oct						
Night 24 - 8	1B	Bonn	MM TPC	RES MM	THGEM	CERN
Morning 8 - 16	1C	CERN	Bonn	MM TPC	RES MM	THGEM
Evening 16 - 24	1D	THGEM	CERN	Bonn	MM TPC	RES MM
Sun 25th Oct						
Night 24 - 8	1E	RES MM	THGEM	CERN	Bonn	MM TPC
Morning 8 - 16	2A	MM TPC	RES MM	THGEM	CERN	Bonn
Evening 16 - 24	2B	Bonn	MM TPC	RES MM	THGEM	CERN

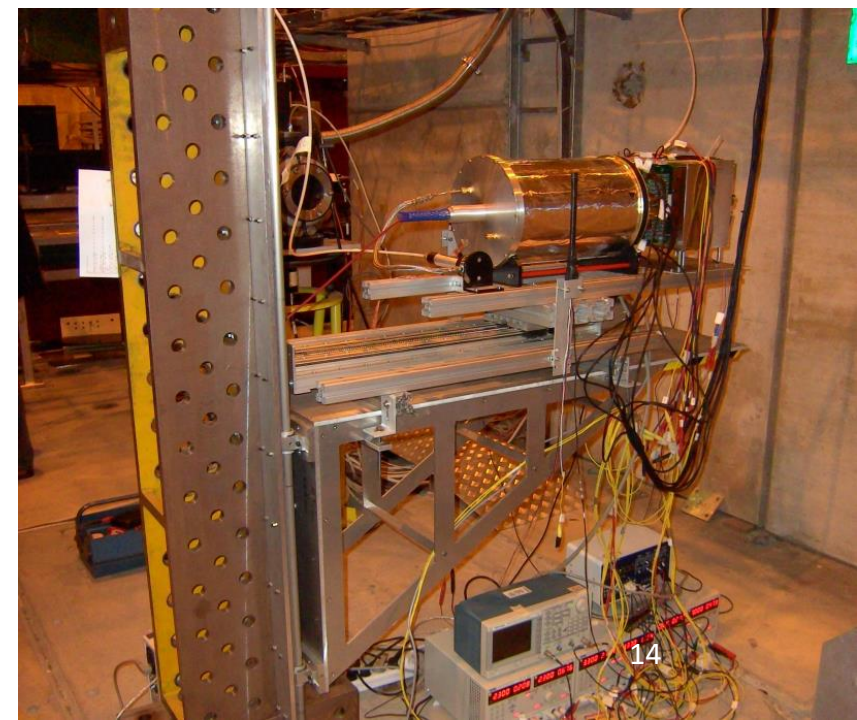
Main user & daily meetings to organize access & beam setting



Freiburg Collaboration meeting - Plenary - 27/05/2010



M. Alfonsi - CERN



# 2010

Issue date: 17-May-2010 Version 2.0 (colour code: purple (dark) = scheduling meeting , light green (light) = weekend or holiday)

	Thu 3 Jun	Fri 4 Jun	Sat 5 Jun	Sun 6 Jun	Mon 7 Jun	Tue 8 Jun	Wed 9 Jun	Thu 10 Jun	Fri 11 Jun	Sat 12 Jun	Sun 13 Jun	Mon 14 Jun	Tue 15 Jun	Wed 16 Jun	Thu 17 Jun	Fri 18 Jun	Sat 19 Jun	Sun 20 Jun	Mon 21 Jun	Tue 22 Jun	Wed 23 Jun	Thu 24 Jun	Fri 25 Jun	Sat 26 Jun	Sun 27 Jun	Mon 28 Jun	Tue 29 Jun	Wed 30 Jun	Thu 1 Jul	Fri 2 Jul	Sat 3 Jul	Sun 4 Jul	Mon 5 Jul	Tue 6 Jul	Wed 7 Jul	Thu 8 Jul			
ie	8																																						
	BIG MD		WED MD														BIG MD																						
-H2	8h T Rohe I Lak		CPIX CGRPC														8h D Lazic		CMS-CALO														8h CMS-HCALRO						
-H4	8h M Prest		PHOTAG dipole				8h M Chefdevill				CALICE-MMEGAS				8h M Alfonsi				RD51																				
-H6	8h Diamond		RD42 SPIDER				8h H W/Velhuis				CMOSILC A3DSi				8h A Ceccucci				NA02 - MMEGAS APIX																				

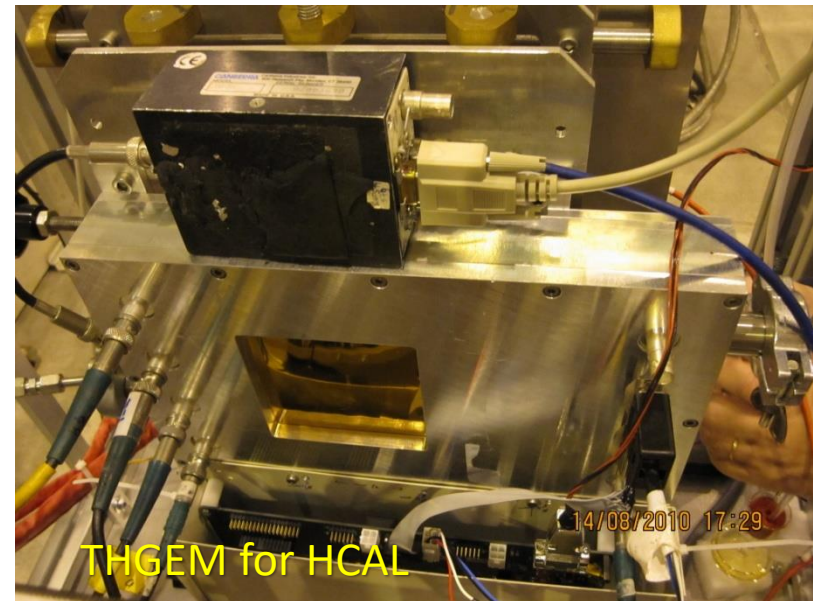
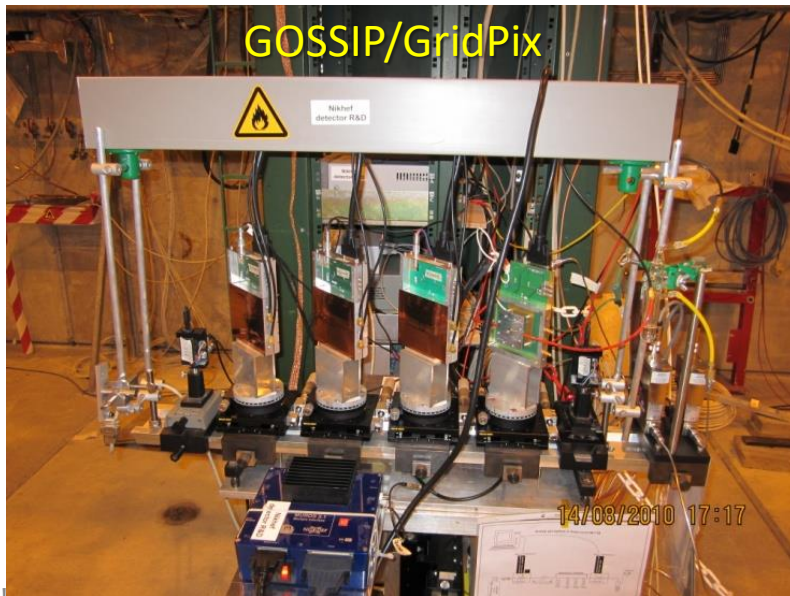
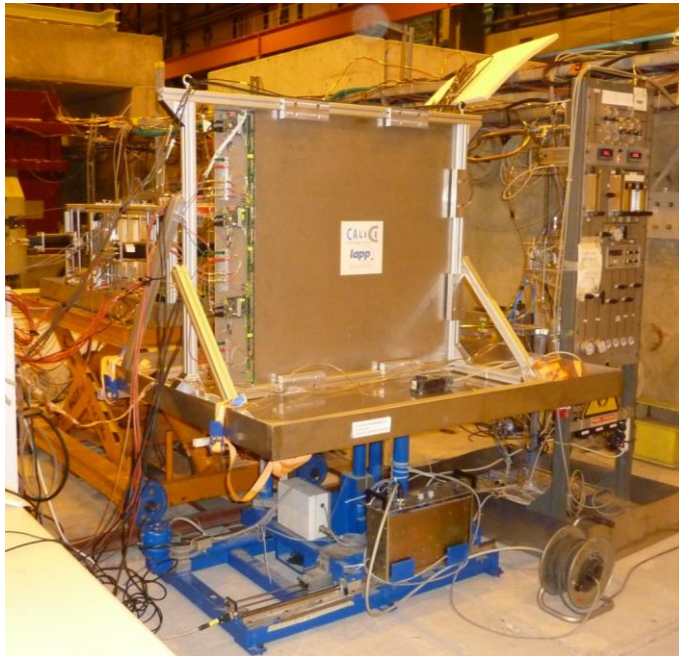
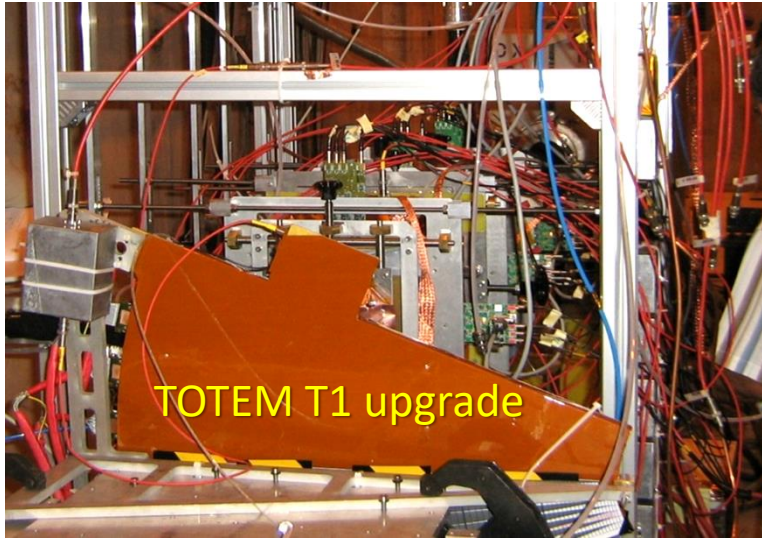
& 18 – 29 October

## SPS Operation Period 4 2010 Aug 12 to Sep 16

Schedule issue date: 14-July-2010 Version 2.0 (colour code: purple (dark) = scheduling meeting , light green (light) = weekend or holiday)

	Thu 12 Aug	Fri 13 Aug	Sat 14 Aug	Sun 15 Aug	Mon 16 Aug	Tue 17 Aug	Wed 18 Aug	Thu 19 Aug	Fri 20 Aug	Sat 21 Aug	Sun 22 Aug	Mon 23 Aug	Tue 24 Aug	Wed 25 Aug	Thu 26 Aug	Fri 27 Aug	Sat 28 Aug	Sun 29 Aug	Mon 30 Aug	Tue 31 Aug	Wed 1 Sep	Thu 2 Sep	Fri 3 Sep	Sat 4 Sep	Sun 5 Sep	Mon 6 Sep	Tue 7 Sep	Wed 8 Sep	Thu 9 Sep	Fri 10 Sep	Sat 11 Sep	Sun 12 Sep	Mon 13 Sep
Machine	TH J MD		BIG MD																														
T2 -H2	8h Z Fodor																RD51																
T2 -H4	8h M Alfonsi		RD51				8h A di Mauro				ANCE-EMCAL				8h M Battaglia				SOIPIX				8h W Lustermann										
T4 -H6	8h H W /H Kadan		Diamond RD42				8h H Wilkens								ALFA FP BCM																		

2010





	35 26 Apr 31 May	35 31 May 5 Jul	35 5 Jul 9 Aug	35 9 Aug 13 Sep	35 13 Sep 18 Oct	34 18 Oct 21 Nov														
T2 -H2	NA 4	NA61 10	CMS 07	CALICE 18	CMS 10	CMS 14	NA61 11	NA61 Protons 35	NA61 6	CMS 14	CREAM 9	CMS 6	CMS 10	NUCLEON 10	NA61 14					
T2 -H4	NA 4	H4IRRAD 22	CMS 10	H4IRRAD 12	RD51 8	PHOTAG 9	H4IRRAD 11	CMS 9	RD51 6	RD51 13	NA63 4	SOPIX 7	FAIR 7	CALET 11	PEBS 10	PANDA 7	RD51 7	CMS 7	LHCF 7	14
	NA	NA62	NA62	ALICE	DEFET	APPS	A	ABCD	AIDA	A	A	BELLE	ATLAS	BELLE	A	A	NA62			

light green (light) = weekend or holiday

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue
27	28	29	30	1	2	3	4	5
Wk26	Jun	Jun	Jun	Jul	Jul	Jul	Wk27	Jul

8 0 8

WED MID

CALICE-SDHCAL

8h	Y Tsipolitis	RD51
8h	H Kadan	RD42

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Wk32	Aug	Aug	Aug	Aug	Aug	Aug	Wk33	Aug	Aug	Aug	Aug	Aug	Aug	Wk34

8 0 8

WED MID

8h  
Z Fodor

8h	Y Tsipolitis	RD51
8h	I Grear	AIDA-TK

Apr-2011

Version 1.0

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue
17	18	19	20	21	22	23	24	25
Wk42	Oct	Oct	Oct	Oct	Oct	Oct	Wk43	Oct

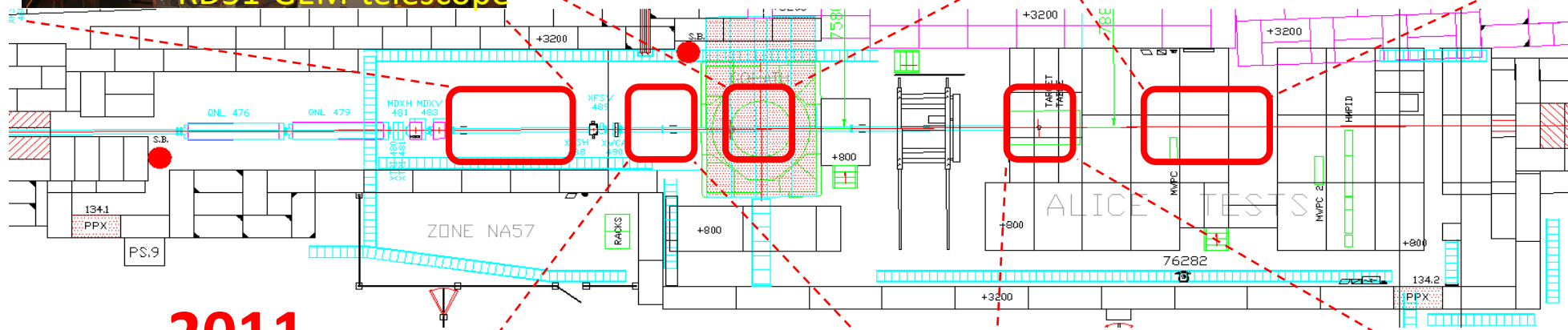
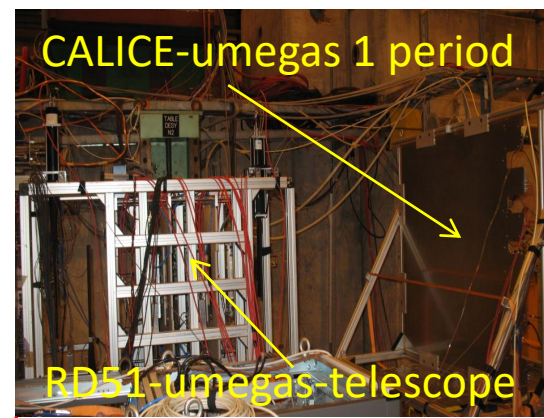
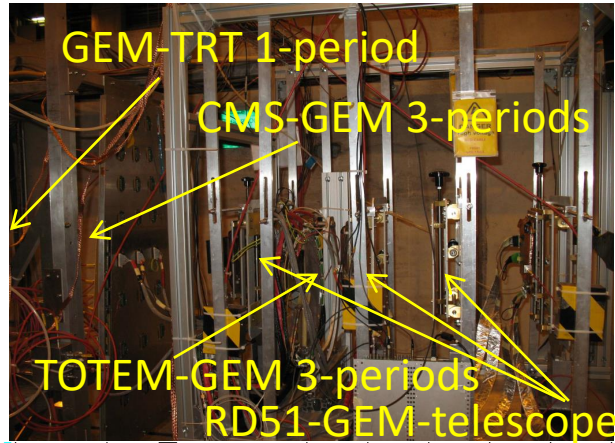
8h  
D Lazic

CMS-

8h	Y Tsipolitis	RD51	8h	A
8h	H Wilkens	NA62	8h	Ceccucci

# Test beam requests for 2011

- We have 9 groups that will participate in the 2011 RD51 Test Beams
  - 1<sup>st</sup> period : 3 groups
  - 2<sup>nd</sup> period : 6 groups
  - 3<sup>rd</sup> period : 7 groups



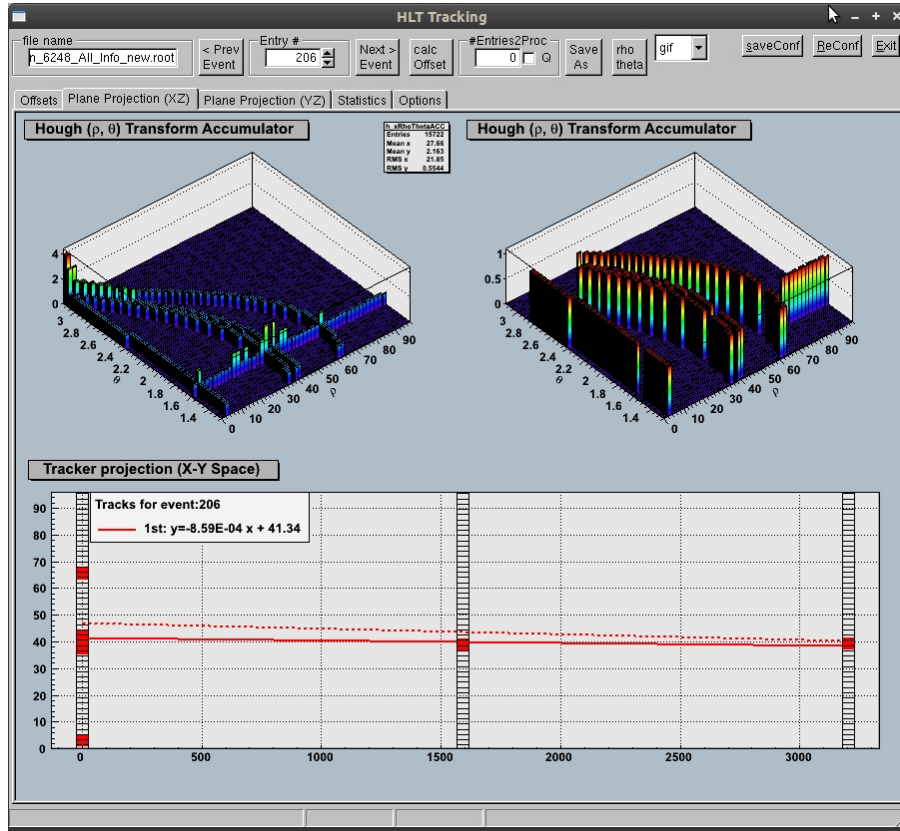
**2011**

- 3-periods (9+12+6 days)**
- CMS-GEM 3-periods
- JLAB-GEM 1-period
- TOTEM-GEM 3-periods
- COMPASS-THGEM 2 periods
- DHCAL-THGEM 1 period
- CALICE-umegas 1 period
- GEM-TRT 1 period



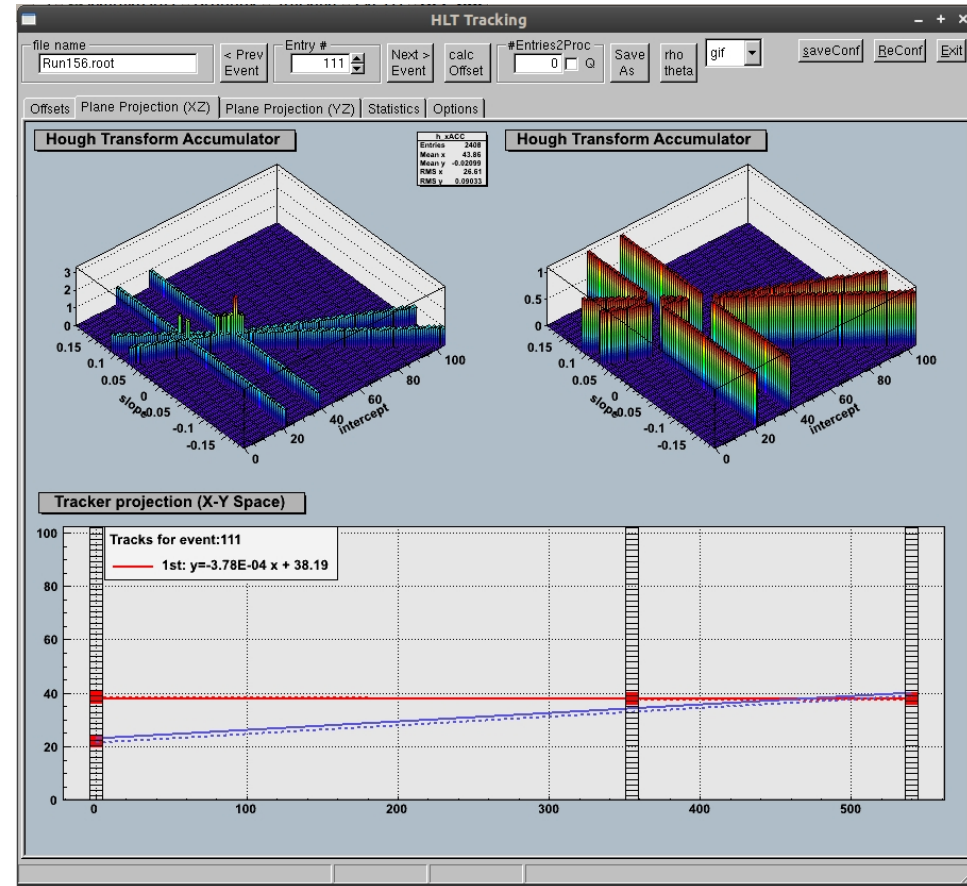
2 more groups did not make it because their HW was not ready in time

# Tracks with the beam telescopes

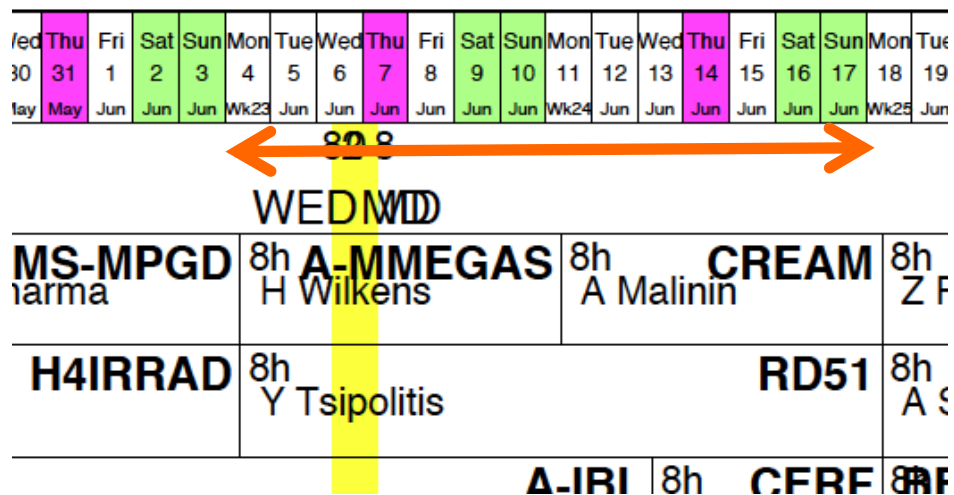


umegas telescope

GEM telescope

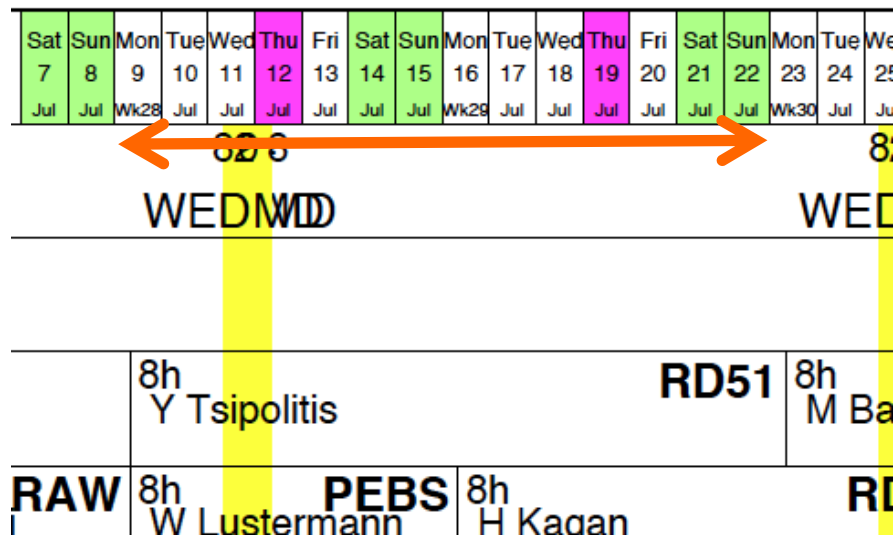


# 2012 TB periods



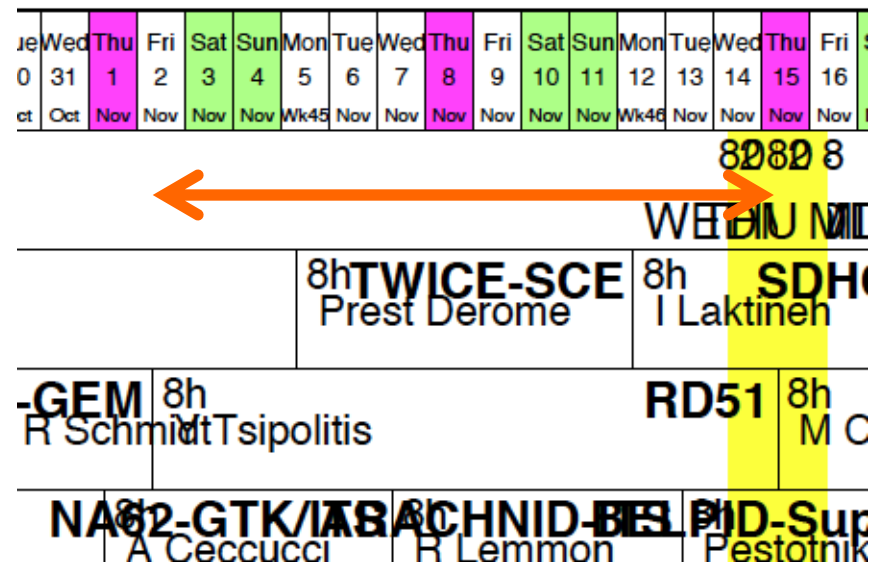
Version 1.0

(colour code: purple (dark) :



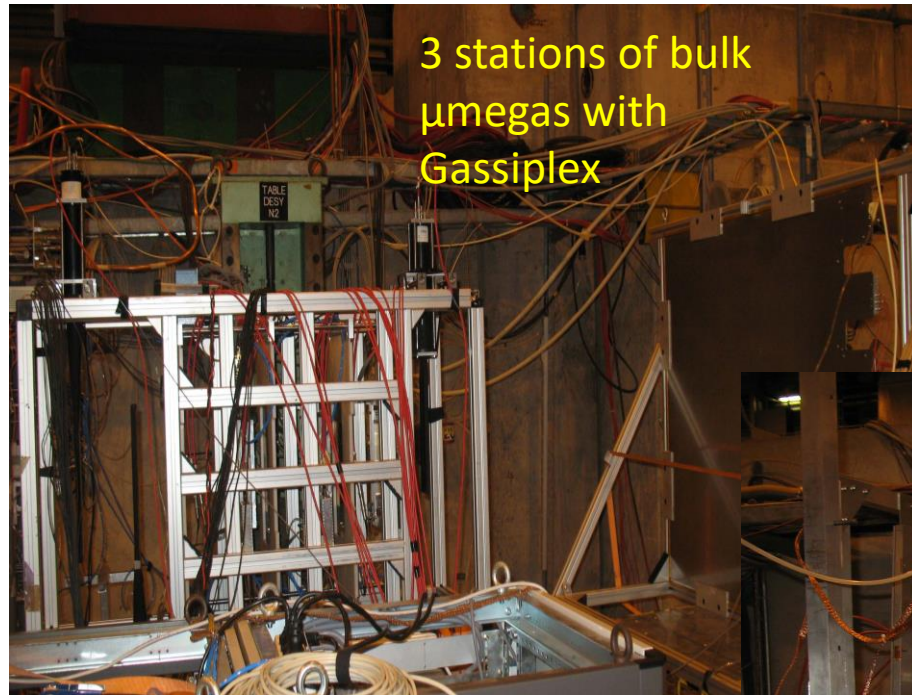
Version 1.0

(colour code: purple (dark) :



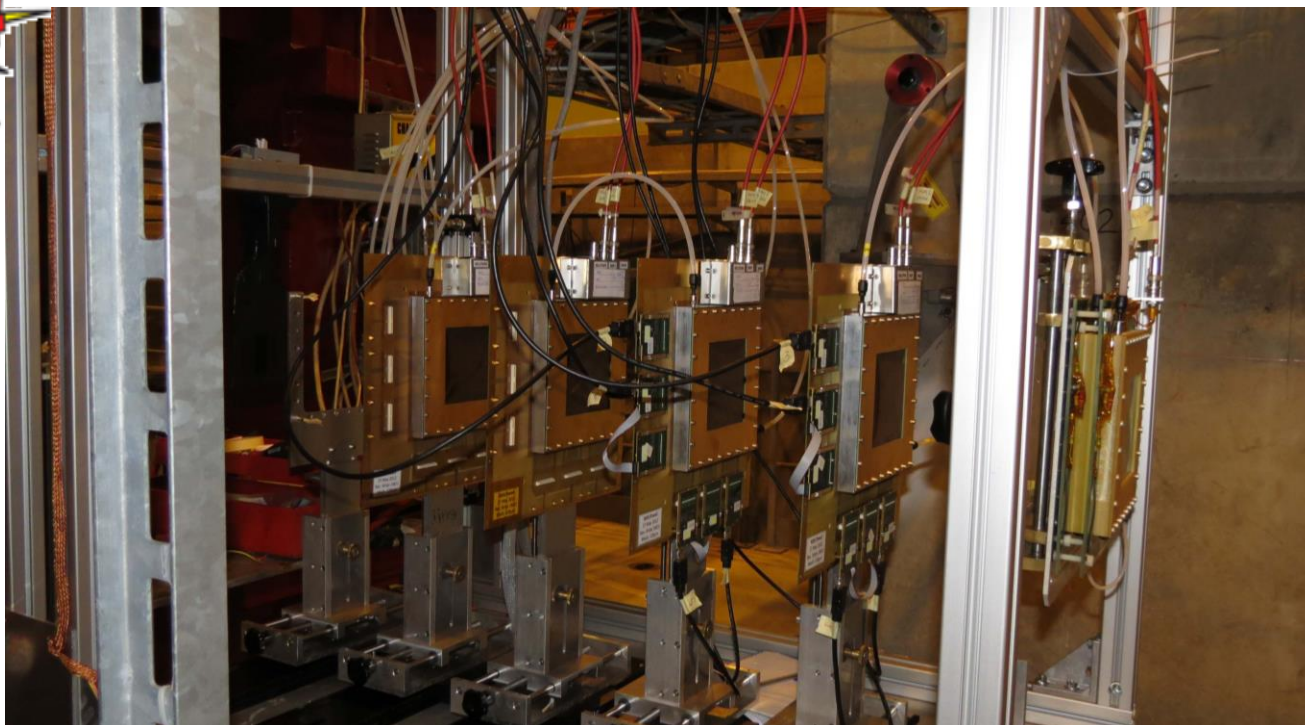
**In total 40 days of beam**

# Beam Telescopes



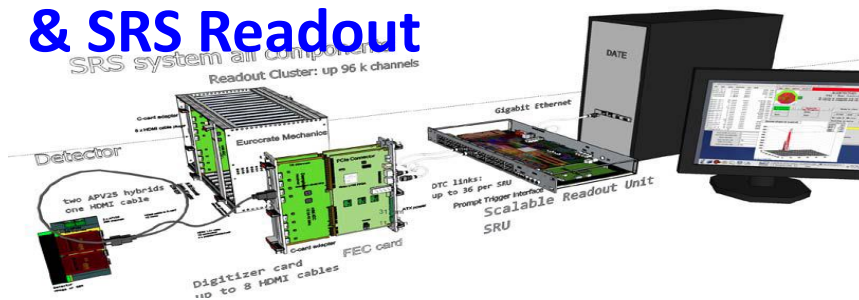


# Beam Telescopes



New beam telescope with 5 resistive  $\mu$ egas chambers with x-y readout, 250  $\mu$ m strips, active area 9x9 cm<sup>2</sup>

## & SRS Readout





# DAQ 1: DATE

The screenshot shows the infoBrowser application window. The main area displays a log of messages for run 138, including the start of processes, detector LDCs, and various configuration steps. A control panel for 'DATEDAQ\_TEST\_DAQ::DAQ\_TEST\_CONTROL' is overlaid on the right, showing the status as 'Ready to start' and 'Data Taking'. The control panel includes buttons for 'Start', 'Stop', 'Abort', and 'Start processes', along with dropdown menus for 'HLT: mode A', 'LDC: Local Recording OFF', and 'GDC: eventBuilding OFF'. A 'DAQ\_TEST' window in the foreground shows 'LDC status display' for 'alonedlc' on 'localhost', with various trigger and data rates. A terminal window at the bottom shows the execution of the 'slowControl start' command.

Severity	Time	Host	Facility
Info	17:11:30	pc-dt2-st-001	runControl
Info	17:11:30	pc-dt2-st-001	runControl
Info	17:11:30	pc-dt2-st-001	runControl
Info	17:11:32	pc-dt2-st-001	dateRec
Info	17:11:33	pc-dt2-st-001	ReadoutShell
Info	17:11:34	pc-dt2-st-001	ReadoutShell
Info	17:11:34	pc-dt2-st-001	ReadoutShell
Info	17:11:35	pc-dt2-st-001	ReadoutShell
Info	17:11:36	pc-dt2-st-001	ReadoutShell
Info	17:11:37	pc-dt2-st-001	ReadoutShell
Info	17:11:38	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	readout
Info	17:11:39	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	ReadoutShell
Info	17:11:39	pc-dt2-st-001	equipmentList
Info	17:11:39	pc-dt2-st-001	equipmentList
Info	17:11:39	pc-dt2-st-001	equipmentList
Info	17:11:39	pc-dt2-st-001	readout
Info	17:11:41	pc-dt2-st-001	runControlHI
Info	17:11:41	pc-dt2-st-001	runControlHI

DAQ_TEST	
LDC status display	
LDC name	alonedlc
host	localhost
Current Trigger rate	0.000
Average Trigger rate	0.000
Number of sub-events	0
Sub-event rate	0
Sub-events recorded	2
Sub-event recorded rate	0
Bytes injected	144
Byte injected rate	0 B/s
Bytes recorded	144
Byte recorded rate	0 B/s
Nb. evts w/o HLT decision	0
mem allocation failed	0
average time bmAllocate	

```
Starting processes for run 138
Run starting with
Detector LDCs: alonedlc
dateRec: setup completed nCh:1 nChLocal:0 nChRemote:0 writeTo:local localSet:(nil)
Writing /dateSite/configurationFiles/SOR.commands
ERROR 1146 (42S02) at line 1: Table 'DATE_CONFIG.DETECTOR_CFG_TST' doesn't exist
Failed to fetch generic monitoring configuration file "monitoring.config". Retry:1/5
Failed to fetch generic monitoring configuration file "monitoring.config". Retry:2/5
Failed to fetch generic monitoring configuration file "monitoring.config". Retry:3/5
Failed to fetch generic monitoring configuration file "monitoring.config". Retry:4/5
Failed to fetch generic monitoring configuration file "monitoring.config". Retry:5/5
Something wrong reading the FILE CDH.config (errorcode=2175): CDH detector me
===== CONFIGURATION OF SRS CARD 0
set 10.0.0.2 -> 10.0.0.3
ADC_0 config
FEC_0 config
APV_0 config
APV_0 reset
PLL_0 config
equipmentList version 2.10
Arming RorData: source = detector electronics through Gb ethernet. eqld-1 sockin
Arming RorData: eqld-1 socket created (UDP RECVBUF SIZE 33552000 - UDP PA
EQUIPMENT/s armed
Start processes time : 11 seconds
Current RC options loaded from : DATE_CONFIG
```

Run Control Status: STARTED

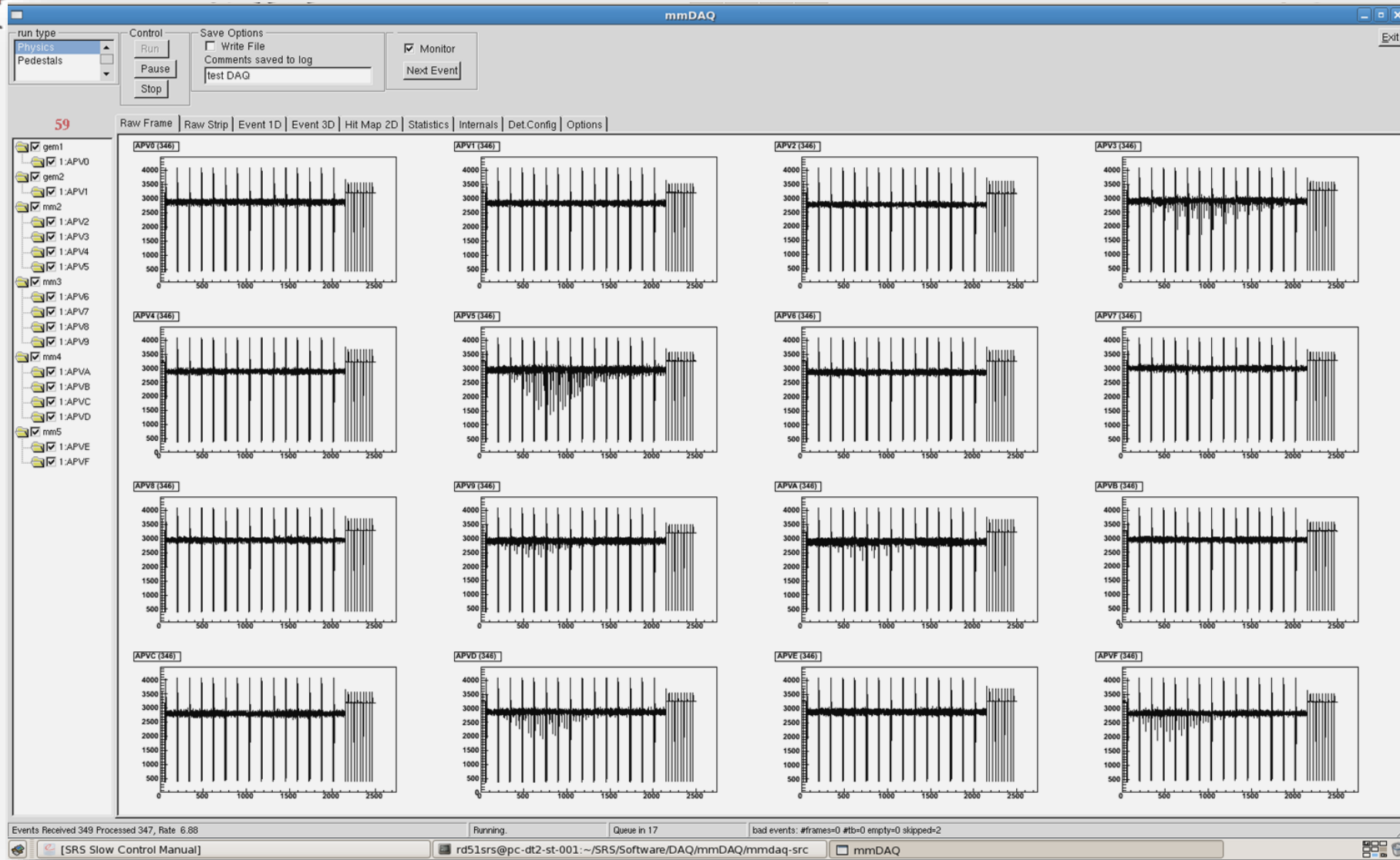
```
Wed 13 17:11:41 (HI) Current RC options loaded from : DATE_CONFIG
Wed 13 17:11:41 (HI) Start processes time : 11 seconds
Wed 13 17:11:30 (RC) Detector LDCs: alonedlc
Wed 13 17:11:30 (RC) Run starting with
Wed 13 17:11:30 (RC) Starting processes for run 138
Wed 13 17:11:30 (RC) Get and update run number from database
Wed 13 17:11:30 (RC) No GDC selected - Force GDC off
Wed 13 17:11:30 (RC) New Run options loaded from : Database DATE_CONFIG
```

```
[pc-dt2-st-001] /home/rd51srs/SRS/Software/SlowControl/CScript > ./slowControl start
start0.txt startTest.txt startTest.txt-
[pc-dt2-st-001] /home/rd51srs/SRS/Software/SlowControl/CScript > ./slowControl start
start0.txt startTest.txt startTest.txt-
[pc-dt2-st-001] /home/rd51srs/SRS/Software/SlowControl/CScript > ./slowControl start0.txt
```





# DAQ 2: mmDAQ



# NEW! Q 3: SRS-Labview

Consumer Design Pattern (Data)

File Open Run Access Panels

**NATIONAL INSTRUMENTS LabVIEW Certified Developer**

**APV-srs Data Acquisition for RD-51 Main Control Panel**

Version 1.3. April 2012  
 (C) 2011-2012 Riccardo de Asmundis  
 INFN Napoli, Italy  
 Certified LabVIEW Developer

**Program Status**

Running Environment

Development System

Running Command Interceptor

Stop UDP Data Receiver

Running Event Builder

Running Online Monitor Consumer

**Running...**

**UDP Communication Parameters**

Listening IP: 10.0.0.3

Listening Port: 6006

UDP Timeout [ms]: 3000

UDP frame size per Channel [bytes]: 8200

UDP Receiver: Disabled

Receiving Holdoff (ms):

**APV Selection**

**Board Selection**

0  Master APV

1  Both APV

2  Both APV

3  Master APV

4  Master APV

5  Master APV

6  Both APV

7  Both APV

**File Saving Parameters**

**Basic Path for File Saving**

C:\Users\Administrator\Desktop\CERN-RD51  
 APV via srs\Data

**Data File Name**

Tests

**Error Status**

Current error

status code

● 54

source

UDP Open in srs\_UDP\_Initialise\_Conn.vi  
 i->srs Main.vi

**RUN Status**

# of required Events

Status

Run Idle

Current Run Number

# Accepted Events

**Queues Status (# Events)**

Received ●

Trailers Counter:

Building:

Analysing:

**Online Analysis Parameters**

**Channel/Strips to analyse**

Channel to be extracted:

# strips/channel:

Sampling time [s]:

# Samples/Strip:

Strips Reordering:

**Interpr. & Noise rej.**

Complement Data:

Baseline:

Reject Comm. Mode:

Common Mode Threshold:

**Header detection**

Threshold:

Limits:



# cable patch panel

- New patch panels from control room to the area (for the moment downstream GOLIATH):
  - 36 connectors type SHV
  - 60 connectors type BNC
  - 10 connectors type Rj45
  - 5 connectors type Subd9
  - 2 connectors type Subd9 (Profibus)
  - 3 connectors type Burndy 12, 19 & 28 pins

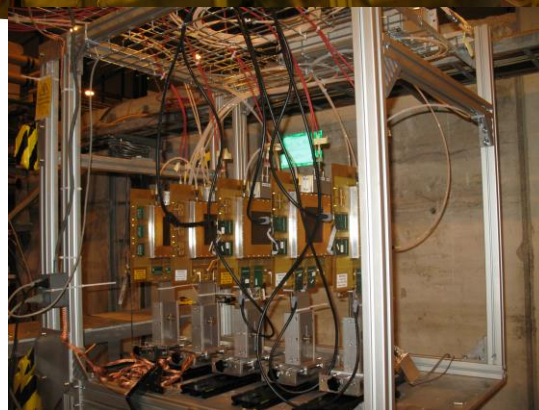


# Co-coordinator

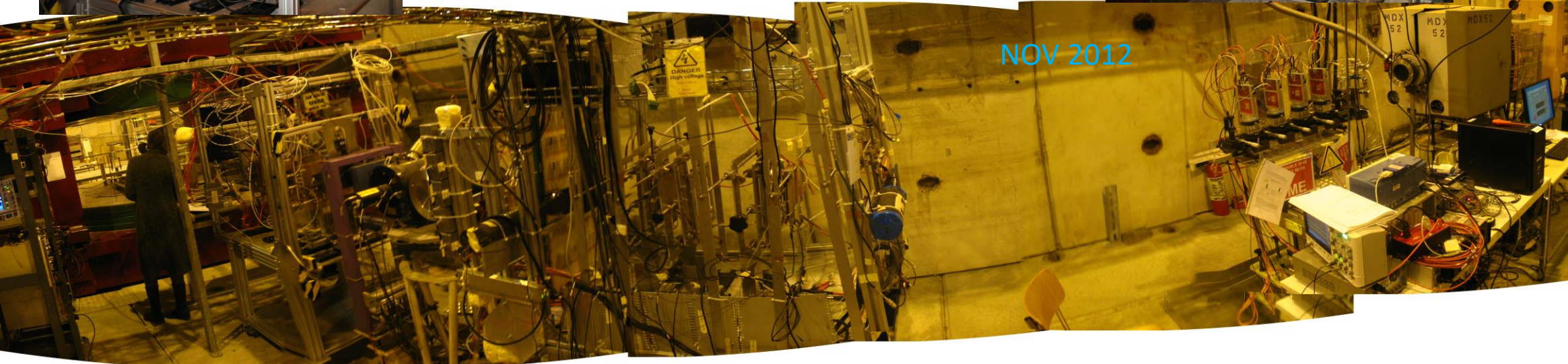




JUNE 2012



JULY 2012



NOV 2012

# 2014 SPS North Area Test beam

## Very Preliminary schedule

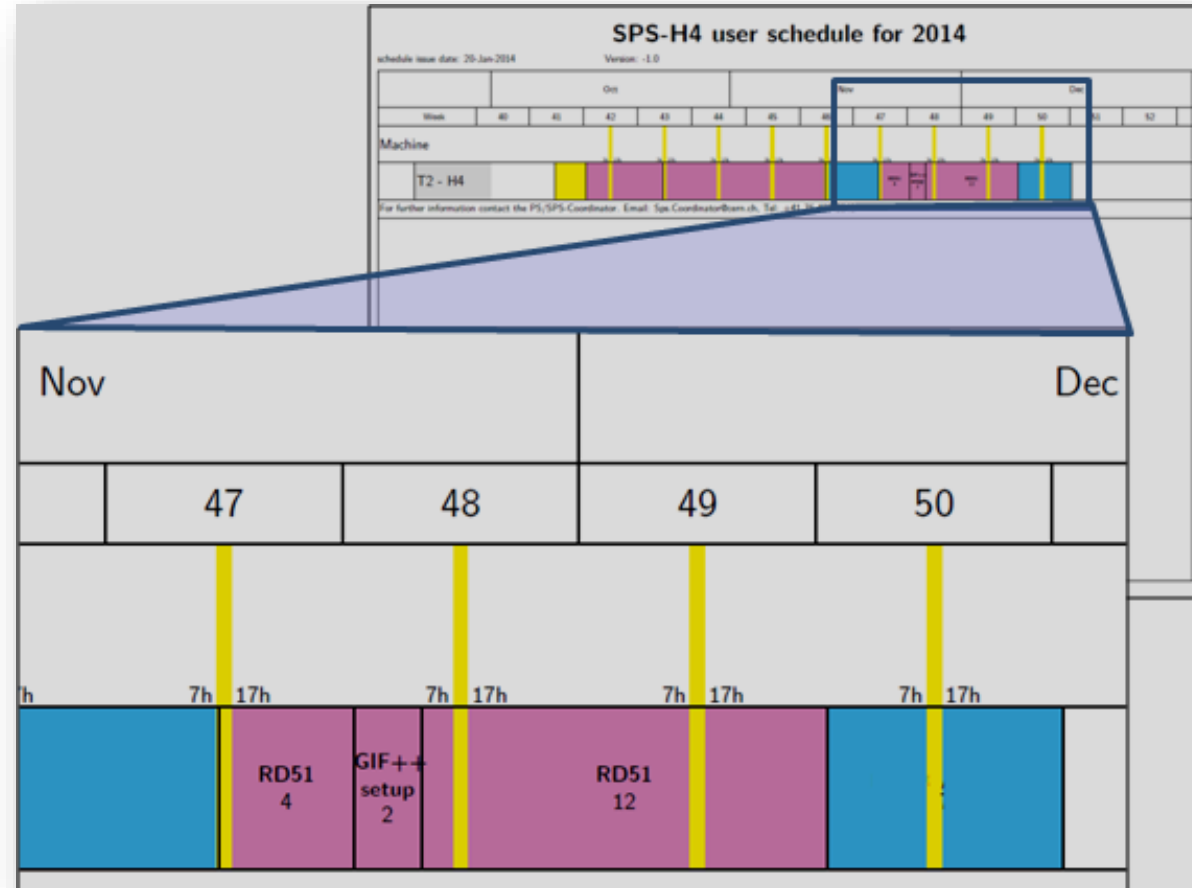
Beam availability for rd51 as  
main user (H4):

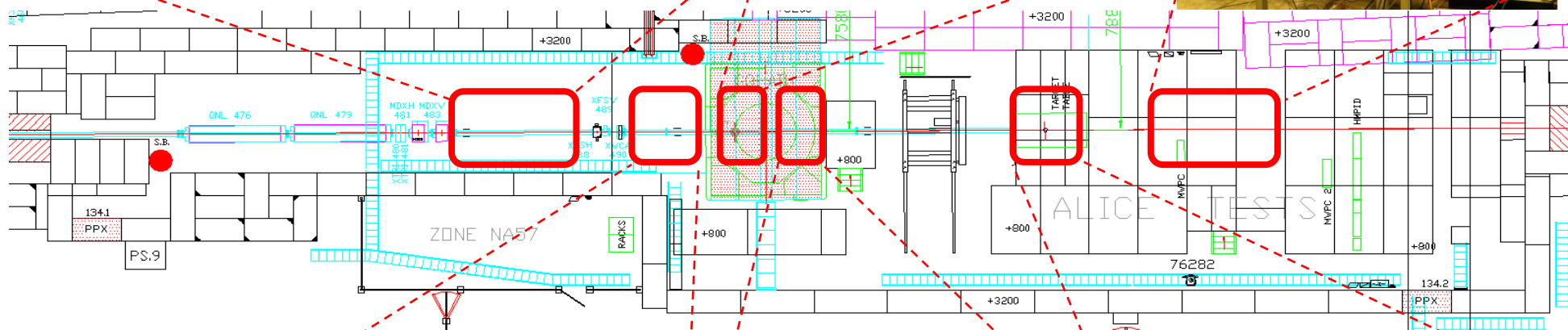
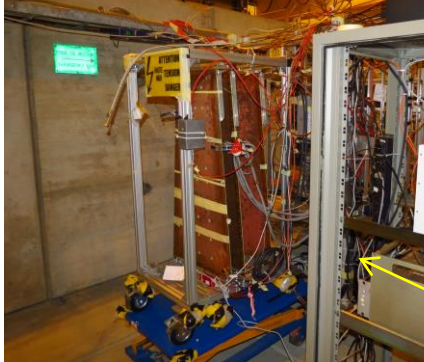
*16 days*

Period:

*26<sup>th</sup> November,*

*16<sup>th</sup> December*





**2014**

(19-5 days)

CMS-GEM

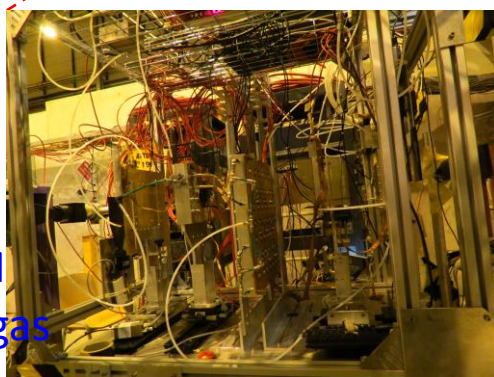
DHCAL-THGEM

ATLAS NSW umegas

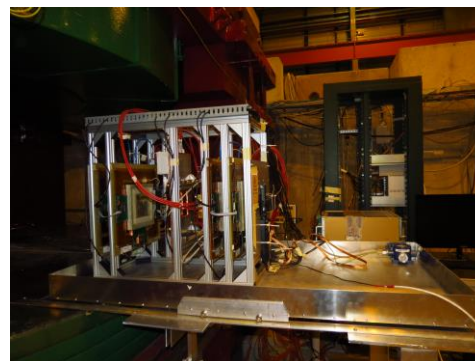
BES III-GEM

CMS umegas CALO

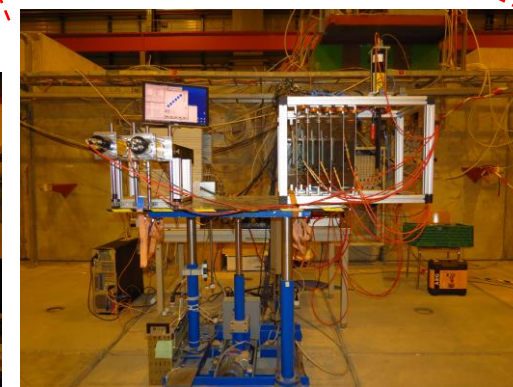
ALICE-GEM



**DHCAL-THGEM**



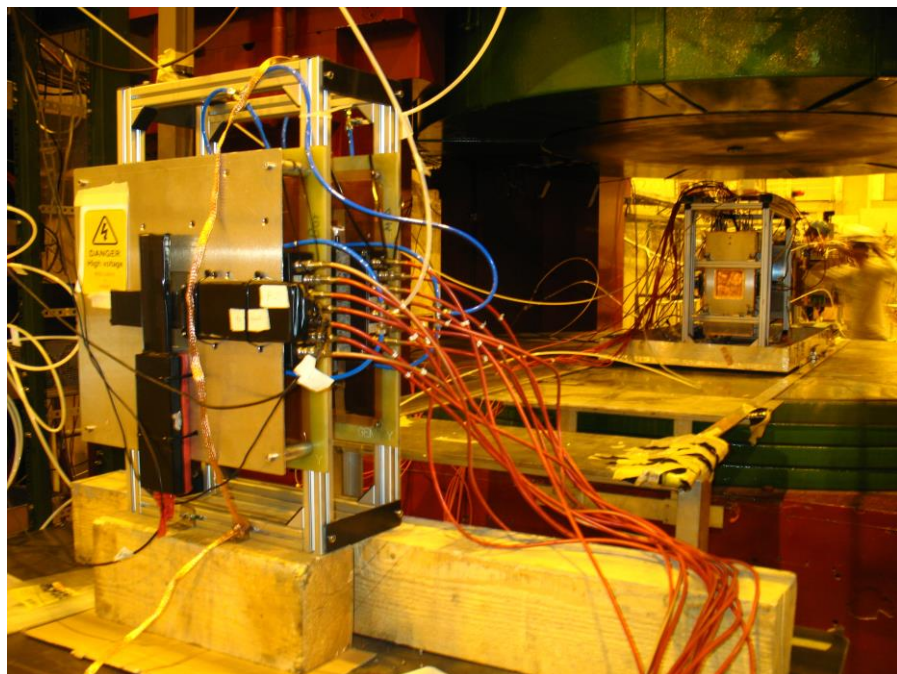
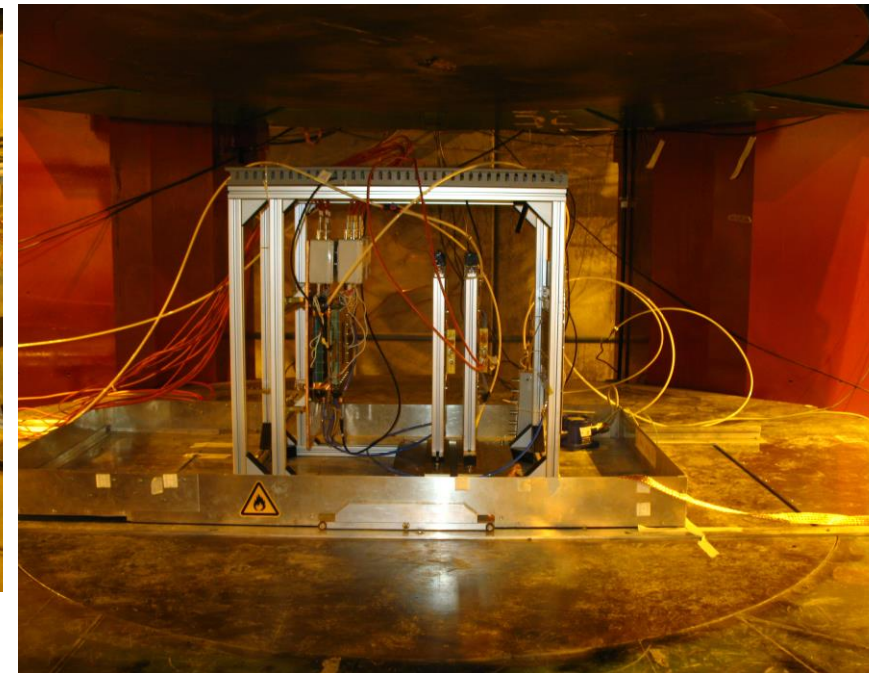
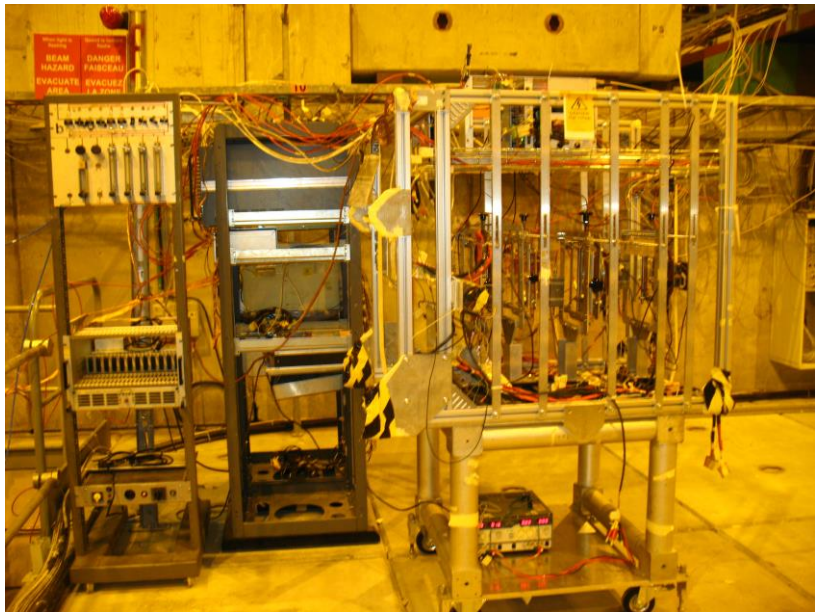
**BES III**



**CMS umegas CALO**







# SPS user schedule for 2016



Issue date: 31-May-2016

Version: 2.2

LHC Exp.
  PS/SPS Exp.
  INT Exp.
  Other Exp.

	Apr					Mai					Jun					Jul					Aug					Sep					Oct					Nov				
Week	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48				
Week																																								
2 - H2	TT20 Setup 16	CMS ECAL 5	RE19 CREAM 7	CMS GEM / RPC 14	NA61 PSL/SciFi/DRS 14	CMS ECAL 7	Calice (Sdhcal) 14	LHCb RICH 7	NA61 VD 7	NA61 FTPC 21	SHIP 14	ALICE ITS 7	RD51-BESSIII 7	HERD 7	CMS HGICAL 7	NA61 neutrino 42	NA61 pp 21	CMS HGICAL 5	NA61 SHIN 28																					
2 - H4	TT20 Setup 16	GIF 19	NA63 14	RD51 & GIF 14	CMS ECAL 21	NA64 14	PHOTACHANNEL 7	CMS ECAL 14	RD51 & GIF 14	GIF 14	CaloCut 7	CMS ECAL 7	RD51 & GIF 14	NA64 28	RE25 CALET 7	RE19 CREAM 7	ATLAS ZD 7																							
4 - H6	TT20 Setup 16	Clic pix 4	ATLAS AFP 6	RD42 7	CMS Outer Tracker 7	CERF 7	ATLAS ITK 14	ATLAS BCM/ITK 7	RD42 7	Clic pix 7	ATLAS AFP 14	ATLAS Strip Tk 7	ATLAS NSW 7	AIDA WP7 7	ATLAS ITK 14	ATLAS BCM/ITK 7	Clic pix 7	RD42 & ALICE Monopix FOCAL 7	ATLAS AFP 14	CMS Outer Tracker 7	Clic pix 7	ALICE PHOS 7	ALICE & ATLAS muons 7	ATLAS ITK 14	XSEC 5															
4 - H8	TT20 Setup 16	UA9 4	TOTEM Timing 8	LHCb 21	ATLAS μ 7	TOTEM Timing 7	ATLAS μ 7	ATLAS Tilecal 14	UA9 Totem 7	ATLAS μ 7	TOTEM PPS 7	ATLAS TRT 7	LHCb 21	TOTEM PPS 7	FEI4 Pix 7	ATLAS μ 14	UA9 Totem 7	ATLAS Tilecal 14	RD52 DREAM 14	LHCb 21	SciPix 5	UA9 cms outreach 6	RE29 DAMPE 6	RE25 CALET 7																
4 - K12	TT20 Setup 22	NA62 201																																						
6 - M2	TT20 Setup 22	NA58 COMPASS 201																																						
	AWAKE Commissioning 112																		AWAKE 42					AWAKE (T.B.C)																

25/5 - 8/6

10/8 - 24/8

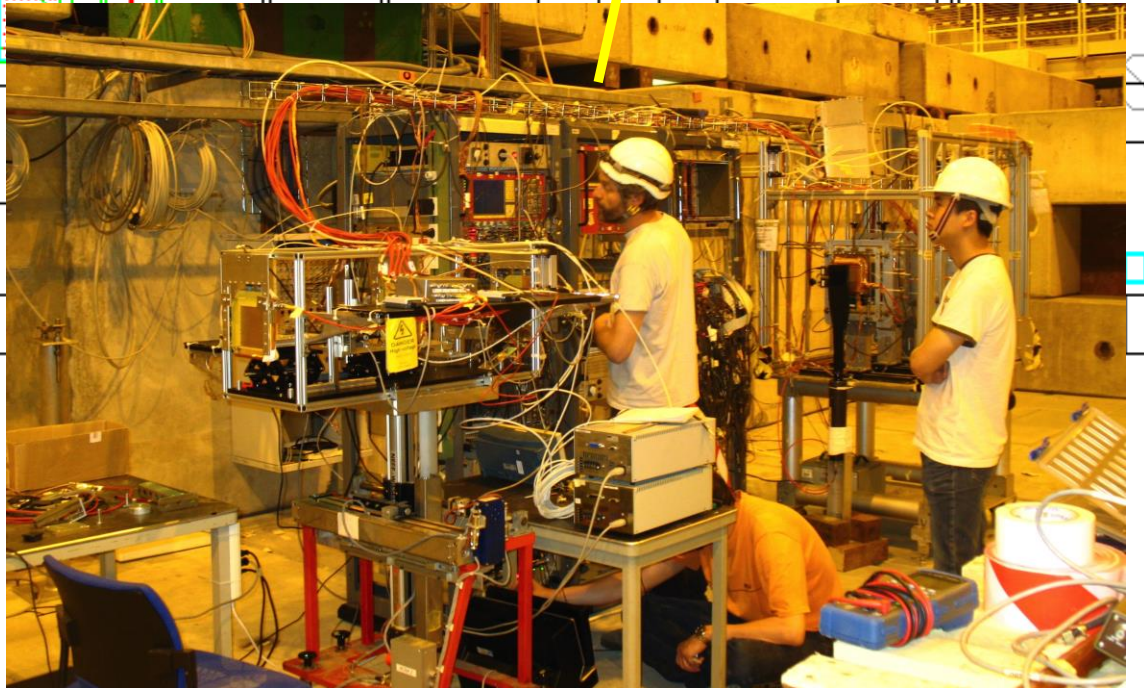
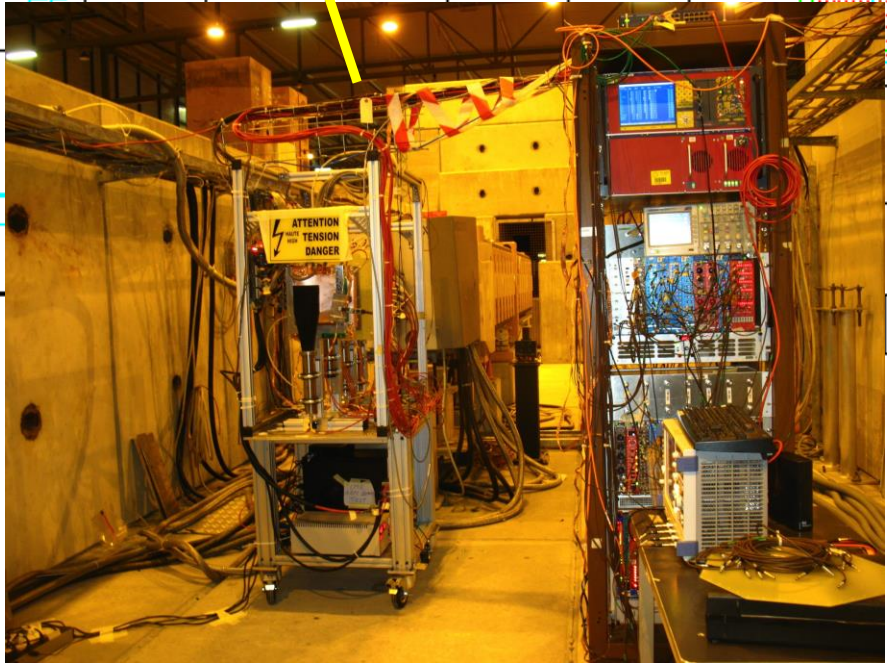
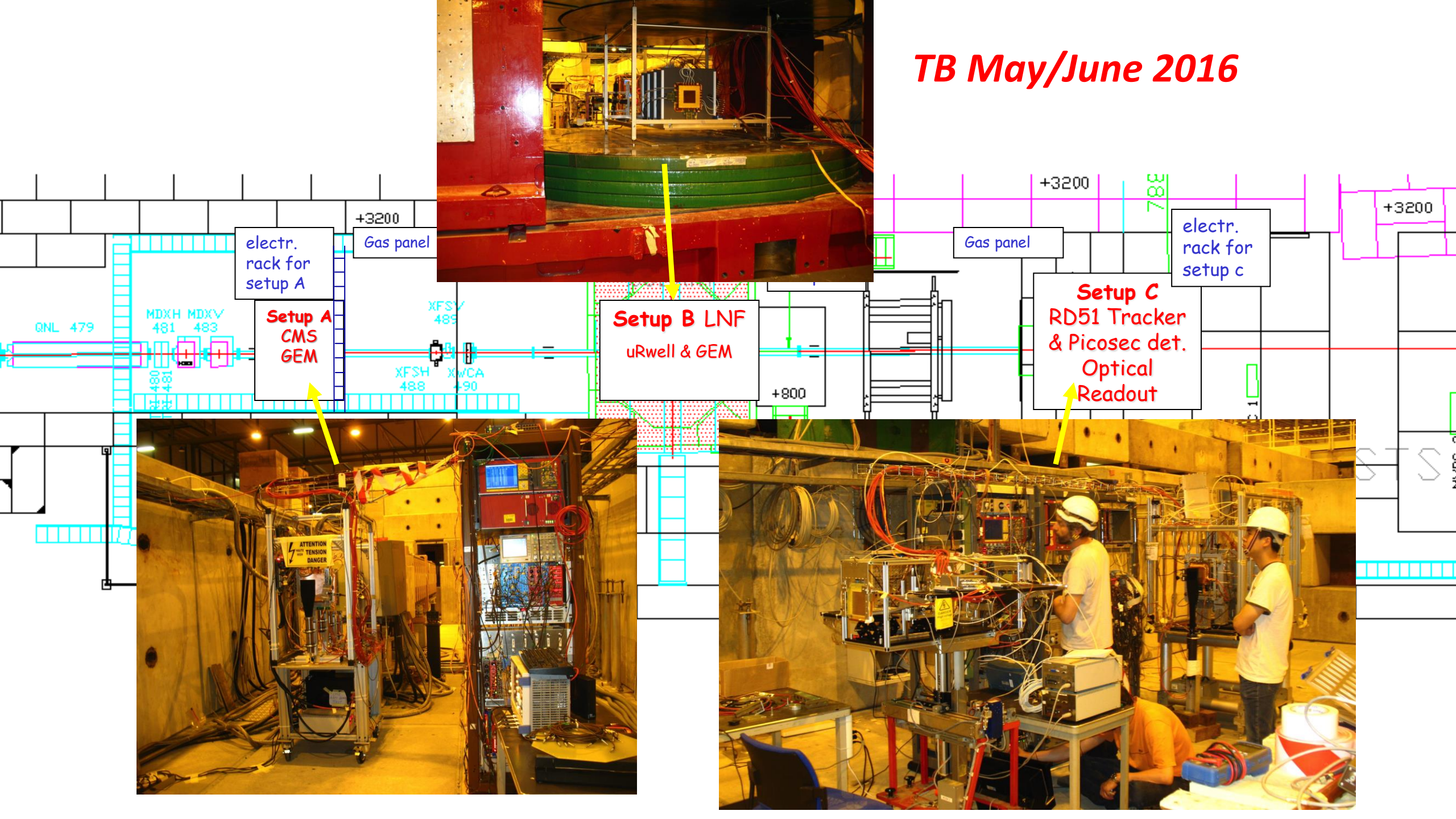
28/9 - 12/10

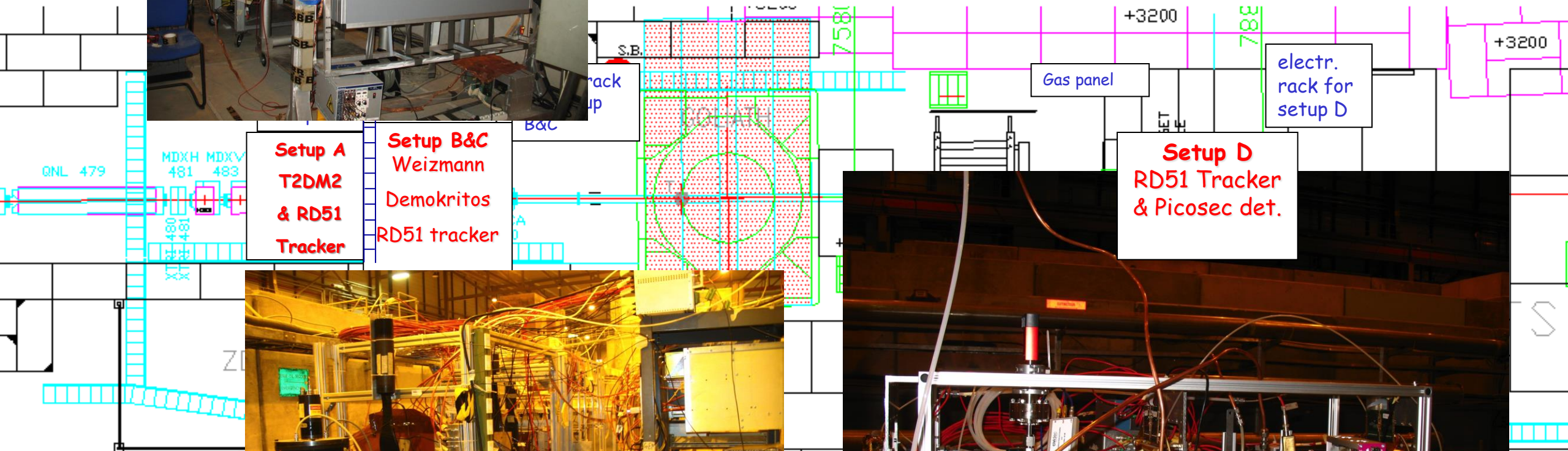
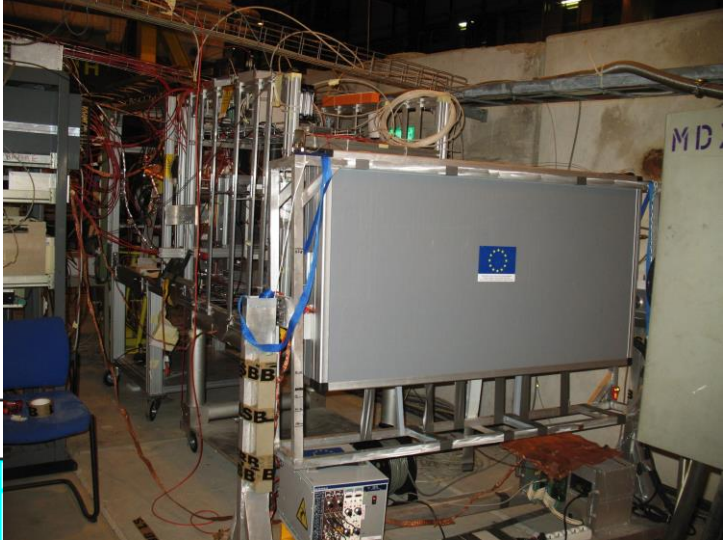
RD51 & GIF 14

RD51 & GIF 14

RD51 & GIF 14

**TB May/June 2016**

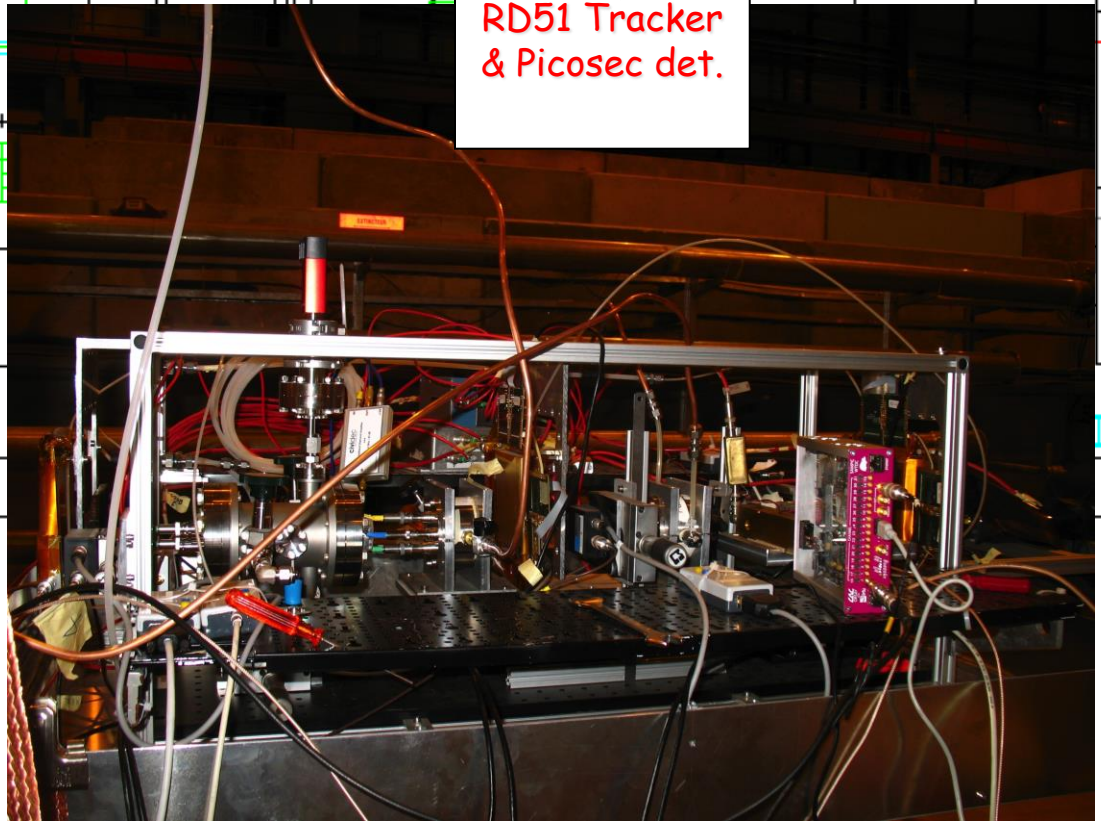
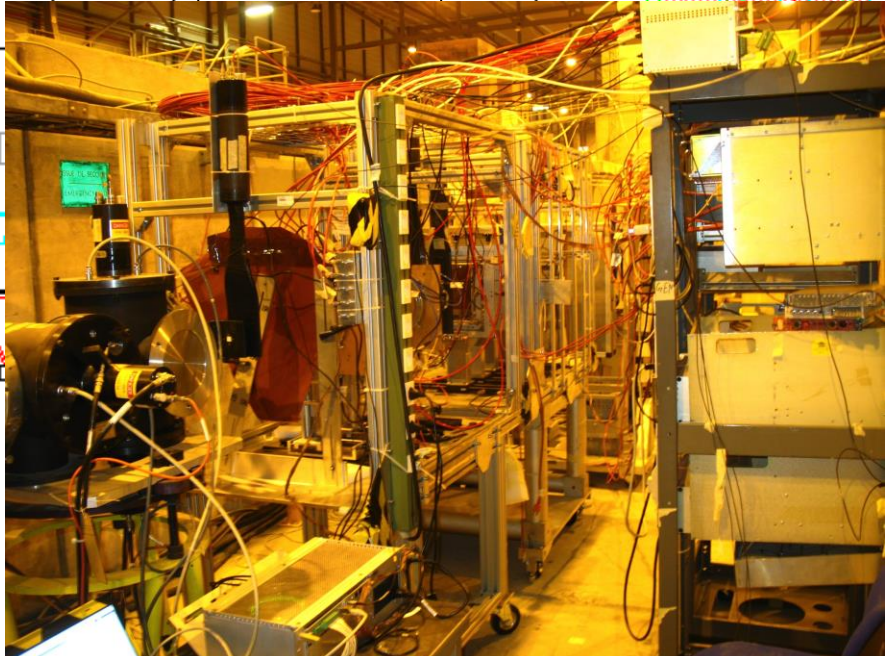




**Setup A**  
T2DM2  
& RD51  
Tracker

**Setup B&C**  
Weizmann  
Demokritos  
RD51 tracker

**Setup D**  
RD51 Tracker  
& Picosec det.



# 2017

## SPS user schedule for 2017

schedule issue date: 14-Nov-2017

Version: 2.4

LHC Exp.
  PS/SPS Exp.
  Other Exp.
  INT Exp.

		Mai					Jun					Jul					Aug					Sep					Oct				
Week		18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44			
Machine							UA9 TS1					TS2 Coldex RP										UA9 TS3 Coldex					Scallop RP				
North Area	T2 - H2	NA Setup 7	CMS HGCAL 7	HERD 4	DsTau 5	Calice (Ahcal) 7	SHIP 7	NA61 test 12	NA61 SHINE 14	NA61 test 9	CMS HGCAL 7	CMS HCAL 14	NA61 neutrino 35	Calice (Sdical) 7	SHiP combined 19	HERD 7	NA61 SHINE 14														
	T2 - H4	NA Setup 7	GIF CMS RPC 16		NA63 14	CMS ECAL 7	AIDA WP14 7	CMS ECAL R&D 7	CMS ECAL 7	GIF RD51 CMS GEM 14	HOTAXIAL 7	LEMMA 7	GIF RD51 14	GIF 7	CaloCube 7	NA64 33		GIF RD51 14	CMS ECAL 7	DsTau 4	HERD 5	CaloCube 5									
	T4 - H6	NA Setup 7	Clic pix 9	AIDA WP7 7	ATLAS ITK 21		CERF 7	RD42 7	ATLAS HGTD 7	Clic pix 7	ATLAS ITK 21		XSEC 7	ATLAS HGTD 7	RD42 7	Clic pix 7	CMS Timing 7	ATLAS HGTD 7	ALICE muons 7	Clic pix 7	ATLAS AF 7	ATLAS ITK 14		CMS HGCAL 5							
	T4 - H8	NA Setup 7	UA9 7	TOTEM PPS 7	ATLAS HVC-MOS 7	LHCb A-muons 16	ATLAS Tilecal 12	ATLAS TRT 7	ALICE ITS / FOCAL 7	UA9 Totem 7	RD52 DREAM 7	LHCb A-muons 21	NA62 GTK 7	UA9 Totem 7	ATLAS HVC-MOS 7	ATLAS Tilecal 14	ATLAS HVC-MOS 7	LHCb A-muons 14	UA9 Totem 5	UA9 7	RE29 DAMPE 7										

5-19 Jul.

2-16 Aug.

2-15 Oct.

- Test on beam and characterization of final (or almost) detectors (and services) ready for experiment

**(Almost) Final Detector**

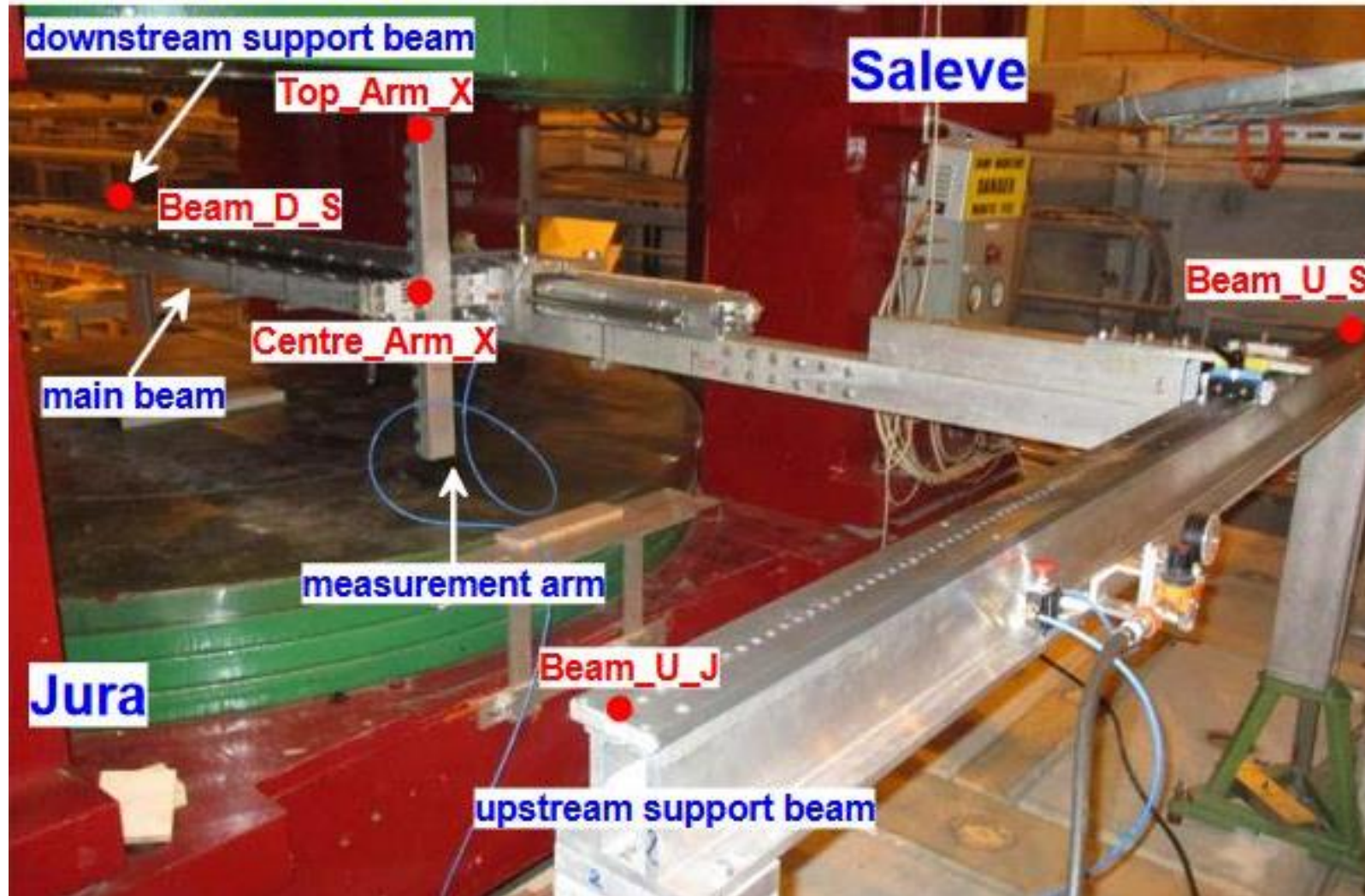
- Consolidated and standard MPGD technologies: R&D for short term applications in experiments/application

**"Consolidated" MPGD**

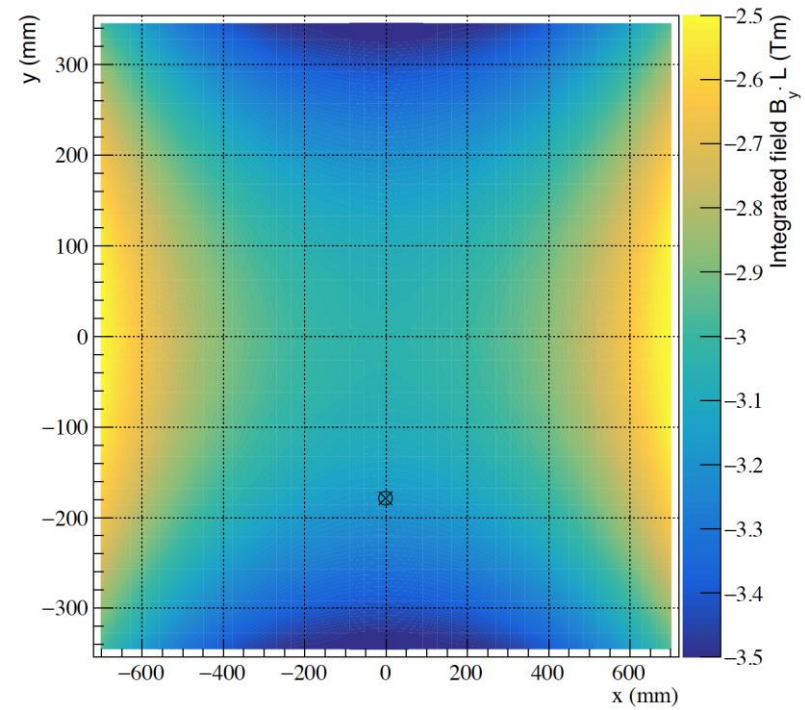
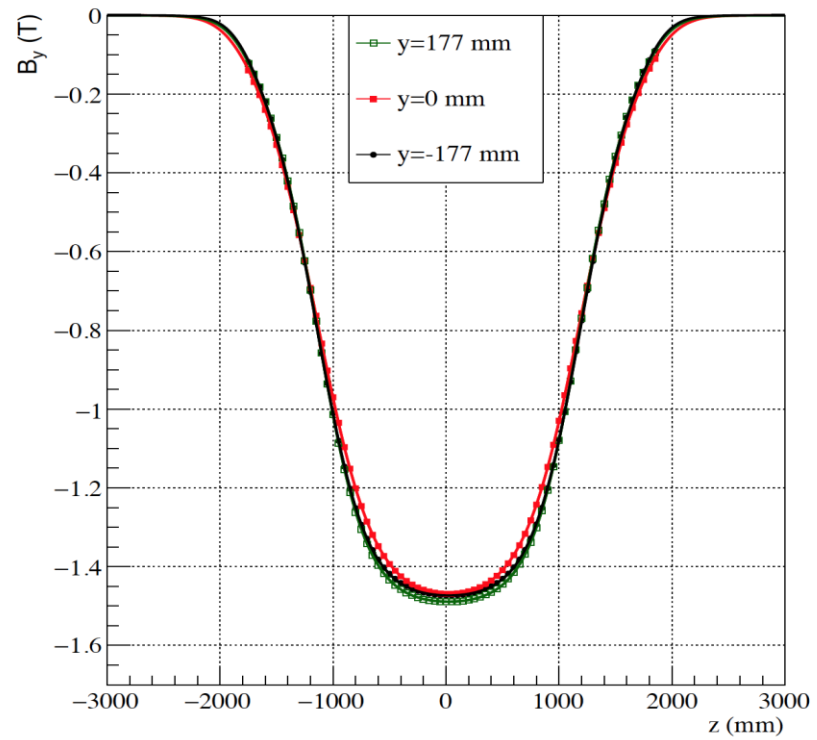
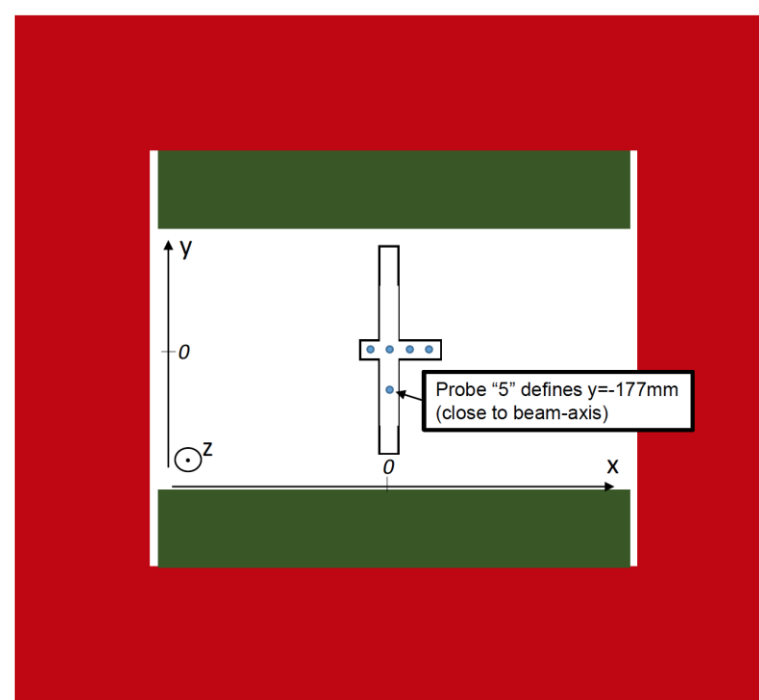
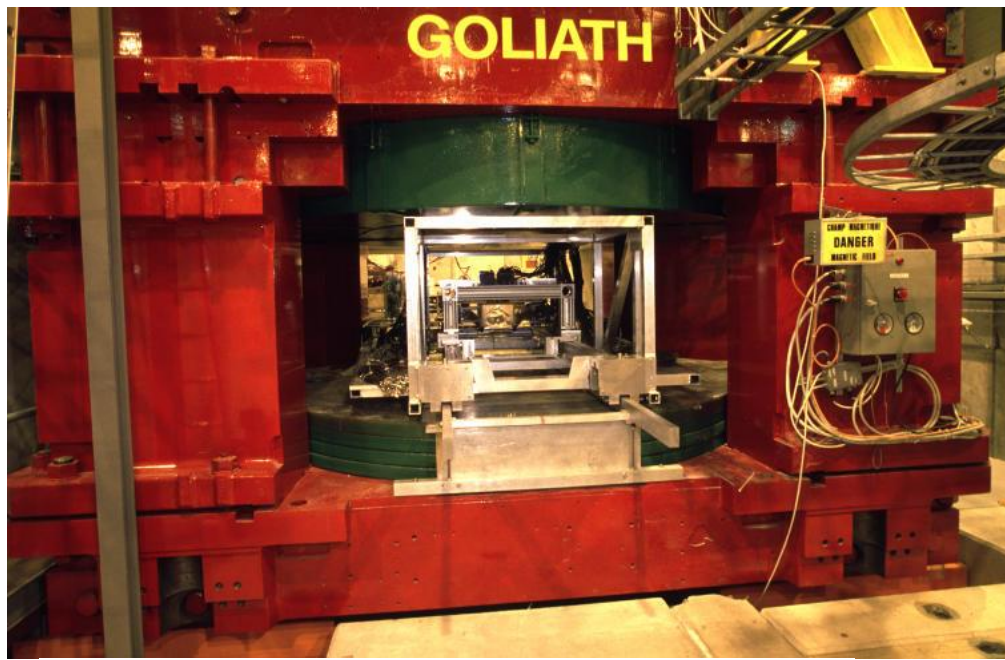
- Novel MPGD based solution: R&D for long term applications in experiments/application

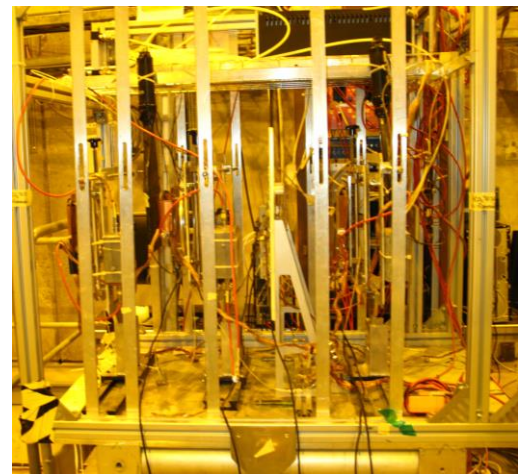
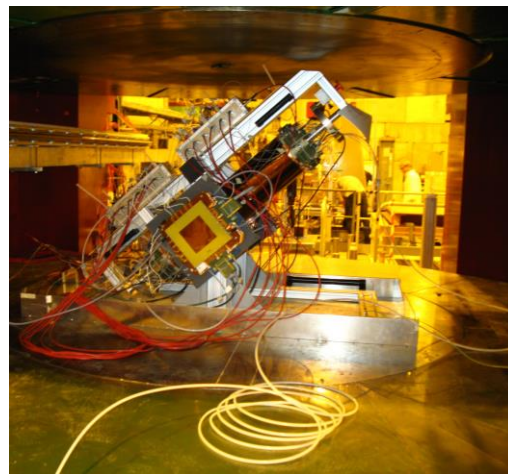
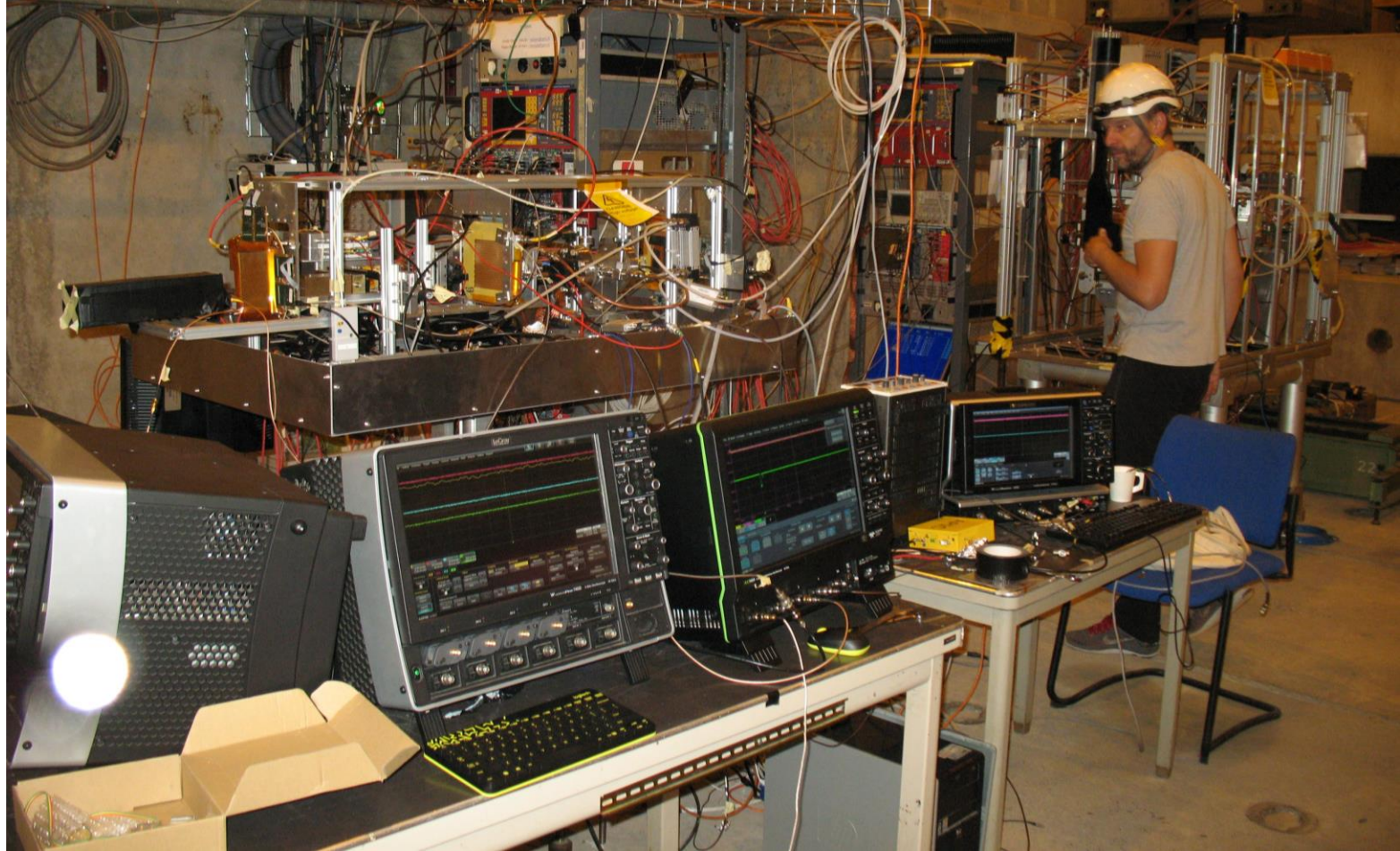
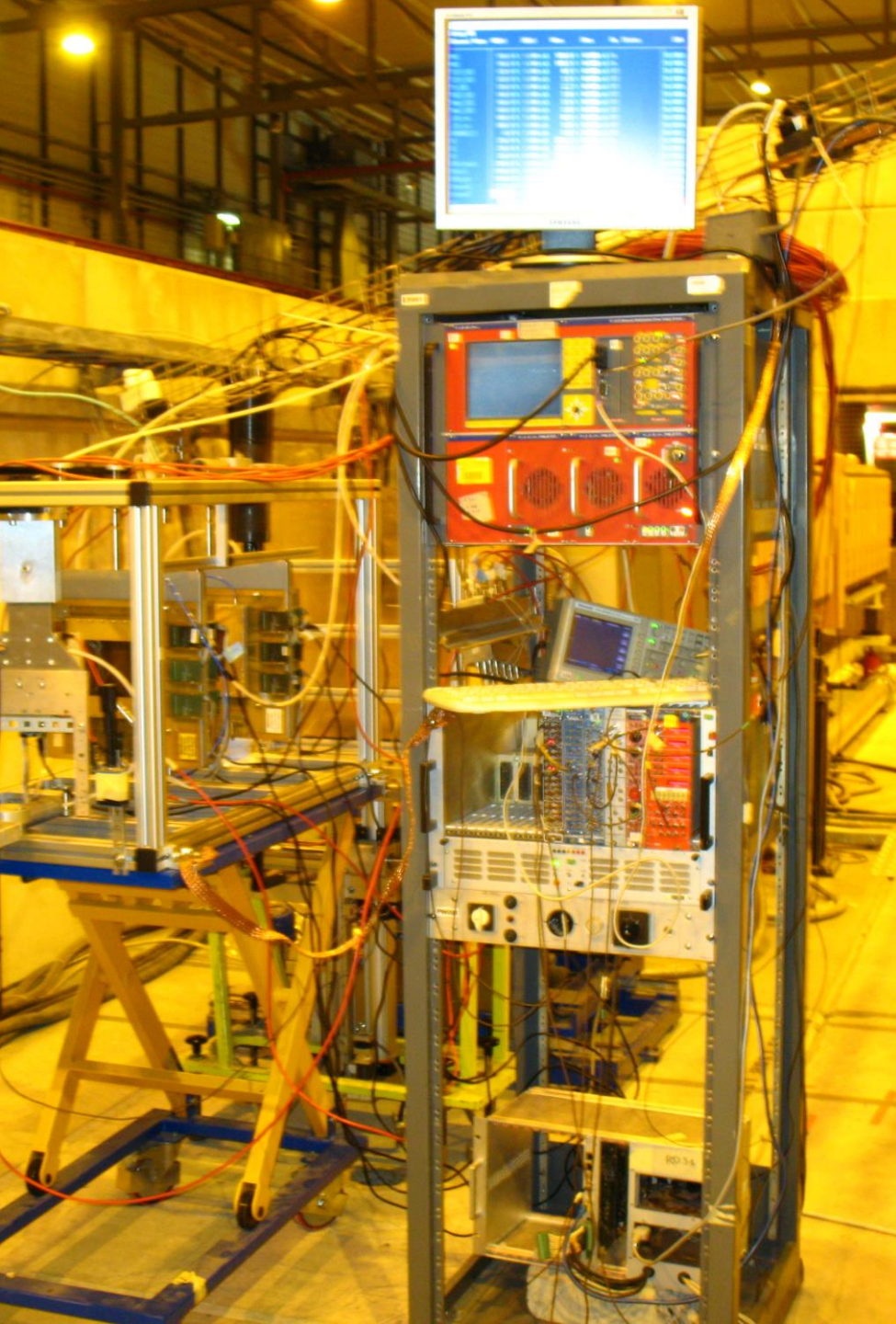
**Novel Structures**

# New Measurement of GOLIATH Field



15 probes in vertical direction:  $\Delta y = 59$  mm







# 2018

		Mar			Apr			Mai			Jun			Jul			Aug			Sep			Oct			Nov												
Week		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Machine		UA9 TS1 Coldex UA9 TS2 Coldex 1 WEEK Coldex RP																																				
Area	T2 - H2	SPS & TT20 Setup 18		NA Setup 8	HERD FIT 7	NA62 GTK 7	NA61 SHINE 14	Calice (Ahal) 14	TIC 7	CMS HGCAL 14	ATLAS ZDC 7	Calice (Ahal) 7	NA61 SHINE 28		AXIAL 7	KLEVER 7	LEMMA 7	DsTau 7	CMS HCAL 14	TIC 7	NA Setup 7	Calice (Sdhcal) 14	CMS HGCAL 14	HERD 7	NA61 SHINE 6	NA61 SHINE 6	NA6											
	T2 - H4	SPS & TT20 Setup 18		NA Setup 6	NA63 9	CMS ECAL 7	GIF RD51 14	NA64 setup 7	NA64 35			CMS ECAL 7	AIDA WP14 7	SHIP installation 7	SHiP Muon 14	SHIP Charm 7	GIF 7	GIF RD51 14		GIF 7	NP04 setup 7	NP04 7	CMS MTD 7	NP04 14	CMS ECAL 7	NP04 14	GIF RD51 7	NP04 6	NP04 6	RE29 DAMPE + CALOCUBE 7	HEI 7							
	T4 - H6	SPS & TT20 Setup 18		NA Setup 6	Clic pix 7	CMS Outer Tracker 7	ATLAS HGTD 7	ATLAS ITK 7	ATLAS ITK Kartel 7	RD42 7	ALICE muons 7	CERF 7	CMS Outer Tracker 7	Clic pix 7	ATLAS HGTD 7	ATLAS ITK		ATLAS AFP 7	ATLAS BCM 7	Clic pix 7	ATLAS ITK		ATLAS AFP 7	ALICE muons 7	RD42 7	AIDA WP7 7	ATLAS ITK Kartel 7	ATLAS HGTD Kartel 7	CMS Outer Tracker 7	ATLAS Strip TK 7	Clic pix 5							

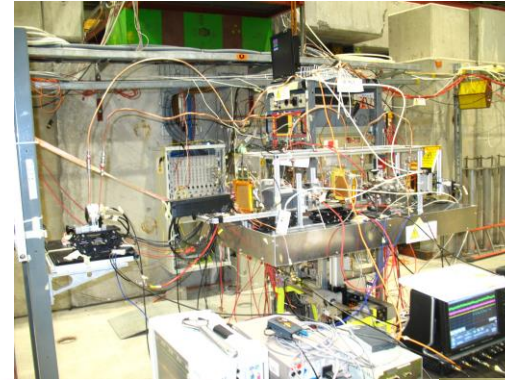
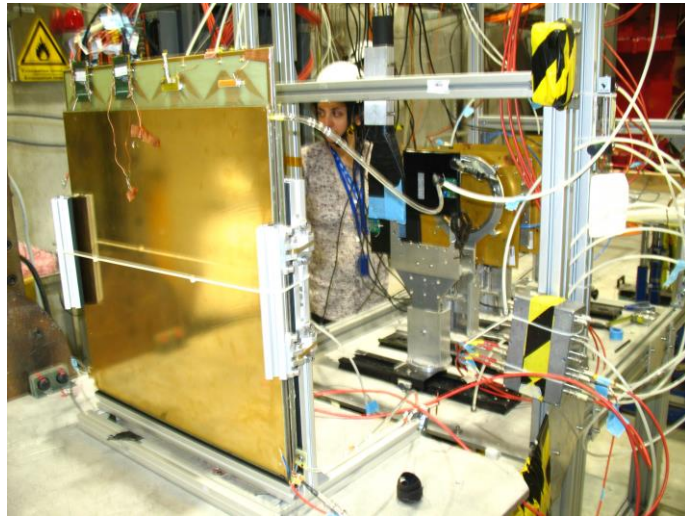
Three periods, 2 weeks in the first two, 1 week in October

The August test beam period moves one week earlier (starts 1<sup>st</sup> August)

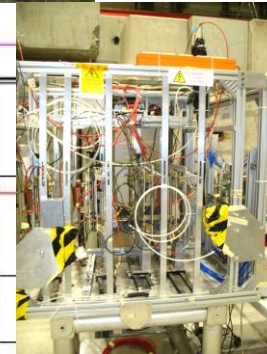
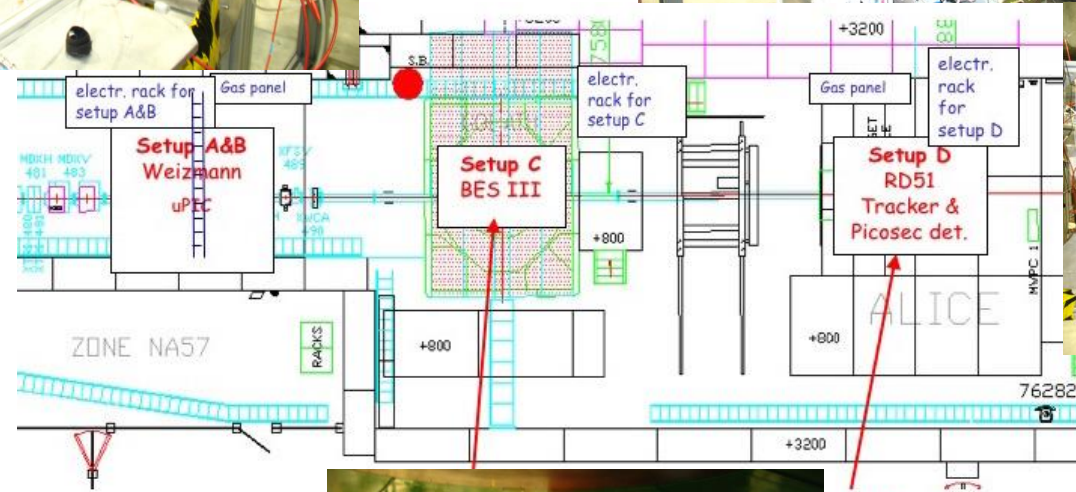
but we can stay parasitically during the GIF++ period with the agreement of 2 fixed accesses/day

<https://sps-schedule.web.cern.ch/sps-schedule/>

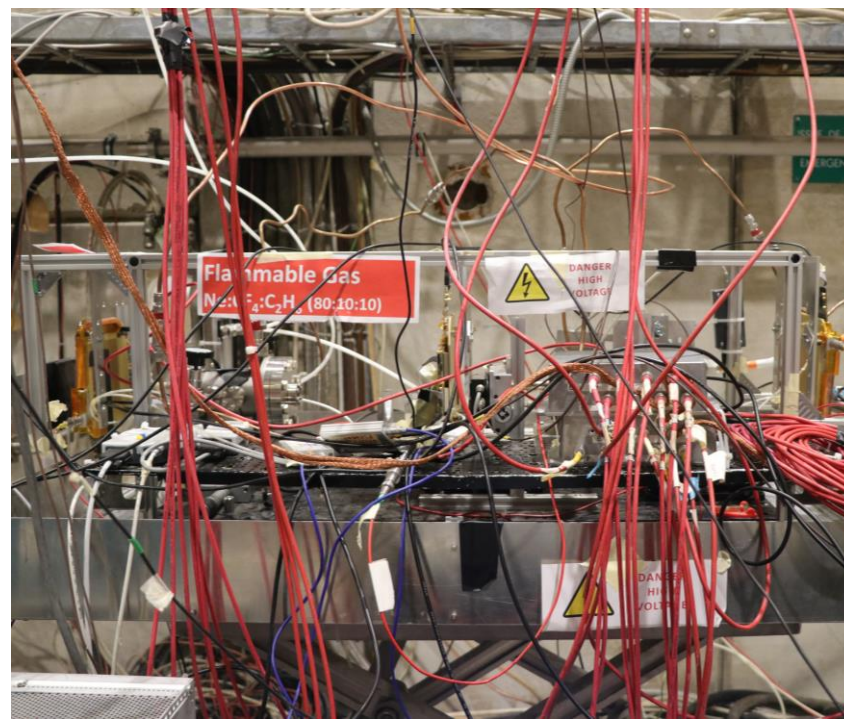
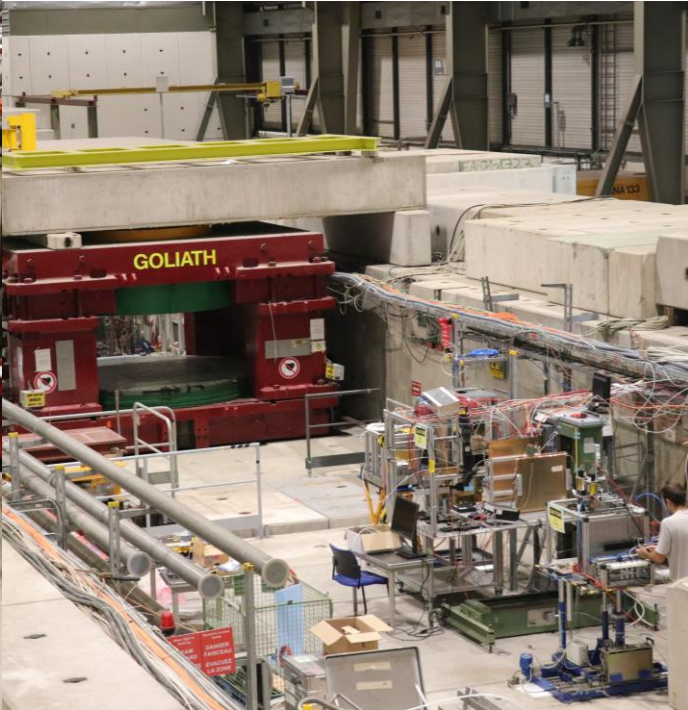
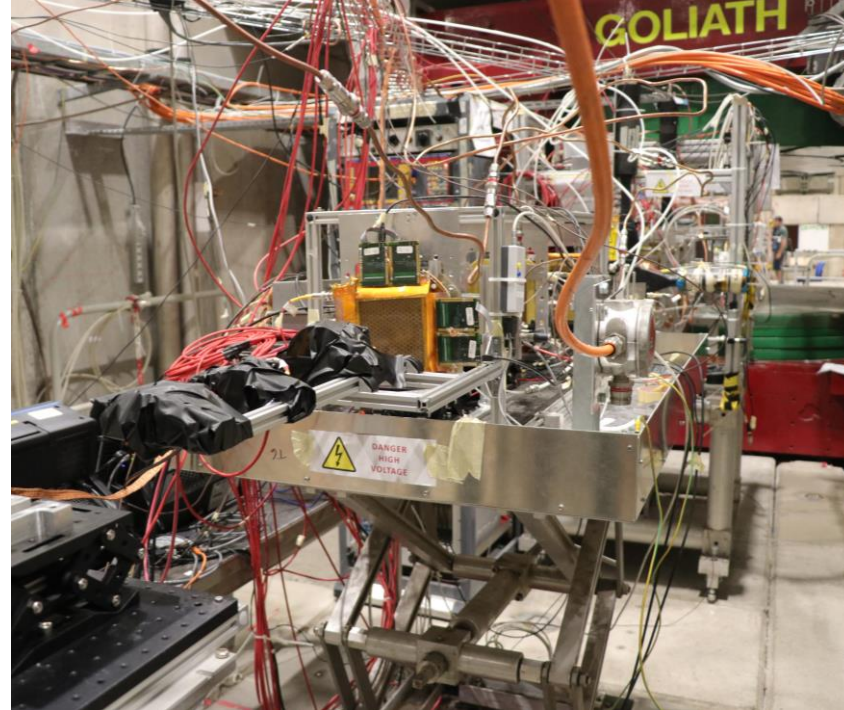
# April/May 2018



+ deep diffused APD's (RD50)



variable gas  
CF<sub>4</sub>:C<sub>2</sub>H<sub>6</sub> –  
(10:10)





Unfortunately ZOOM had no test beam in its features



# RD51 H4(PPE134)

## Generic and Application driven R&D

**Muon/Tracking:** GEM and mm  
**Timing:** PICOSEC micromegas

## Project driven R&D

**PBC:** mm and GEM (AMBER/COMPASS++)

## Detector Commissioning

e+e- collider : CGEM(BESIII)

## FE electronics and DAQ

TIGER-GEMROC  
 VMM3a-SRS

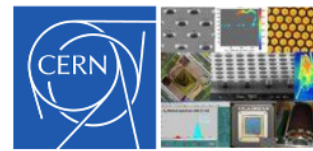
Mon. 12/07/2021 – Wed. 21/07/2021

## Confirmed Groups

Week 28-29	Project/Experiment	Beam Requirements	Reference Team
AMBER upgrade (mm & TIGER)	AMBER upgrade (mm & TIGER)	mu	INFN Torino
BES III	Upgrade of current inner drift chamber with a cylindrical GEM	mu, pi	INFN Ferrara
PICOSEC	Fast and Precise timing with MPGD (micromegas)	mu, e-	PICOSEC Coll.
RD51	New FE&DAQ for beam telescopes (SRS/VMM3a)	mu, pi, high rate	RD51 VMM



# RD51 H4 20/10-3/11 Test Beam



## Generic and Application driven R&D

**Muon/Tracking:** GEM, mm and straw  
**Timing:** PICOSEC micromegas, FTM, MINICTACTUS(MAPS)  
**Calorimetry:** RPWELL

## Detector Commissioning

HL-LHC, CMS GEM GE2/1

## Project driven R&D

**HL-LHC:** CMS ME0  
**PBC:** mm and GEM (AMBER/COMPASS++), Straw  
**GSI:** PANDA triple GEM  
**Medical Application:** Proton Computed Tomography

## FE electronics and DAQ

TIGER  
 VMM3a/SRS  
 VFAT3/GEB

Min Users	Physics Scope	Beam Requirements	Reference Team
1 COMPASS Upgrade	AMBER upgrade (mm & TIGER)	mu	INFN Torino
2 RPWELL	DHCAL	mu, pi	WEIZMANN
3 CMS	GE2/1, ME0 (HL-LHC)	mu, pi	CMS GEM
4 FTM, High Resolution GEM	FTM, GEMs	mu, pi	INFN Bari
5 Small pad Resistive mm & embedded readout	Small Pad Res. Mm (HL-LHC)	mu, pi	INFN Roma 3, Naples, CERN
6 PICOSEC	Fast and Precise timing with MPGD (micromegas)	mu, e-	PICOSEC Coll.
7 RD51 GDD	Triple GEM & VMM3a-SRS telescope	high rate pi	GDD
8 RD51 UNIANDES-GSI	Triple GEM & VMM3a-SRS telescope	mu, pi, high rate	UNIANDES
9 Proton Computed Tomography	Detector commissioning / Med	mu	LMU
10 GEM mm hybrid	Generic R&D	mu-pi	LMU
11 PARASITIC			
12 MINICTACTUS	Timing	mu-pi	IRFU
13 STRAW&VMM3a/Dubna	Tracker	mu-pi	Dubna

- Impressive research program covered
- Thanks to all teams for the fruitful sharing of beam/space/expertise and experiences
- Three beam periods of two weeks asked for spring/summer/fall.
- Let us know about your plans as soon as possible to properly organize them.

# SPS user schedule for 2022

issue date: 30-May-2022

Version: 1.10 ■ LHC Exp. ■ PS/SPS Exp. ■ Other Exp. ■ INT Exp.

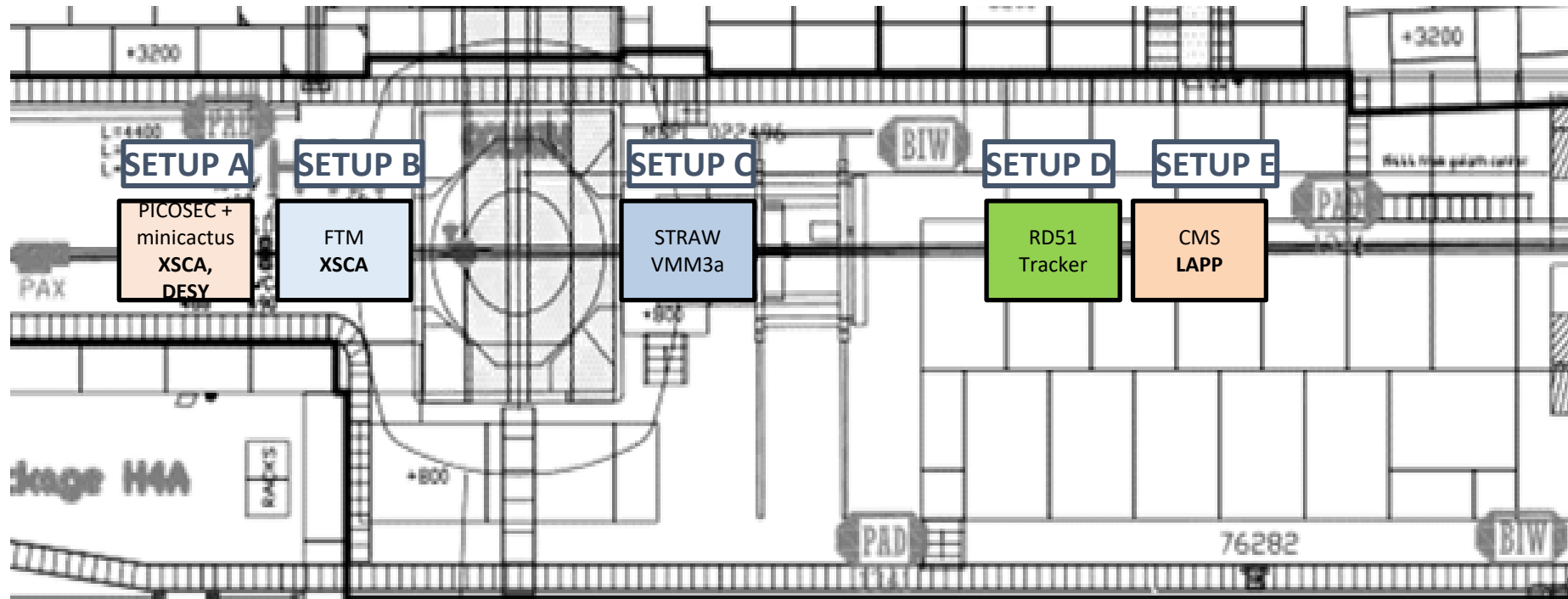
	Mar			Apr			Mai			Jun			Jul			Aug			Sep			Oct																															
Week	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45																		
Line																		TS1 RP																		TS2 Coldex RP																	
T2 - H2				SPS & TT20 Setup 7	NA Setup 14		NA61 SHINE 37			LHCb ECAL 7	Calice SiW ECAL 14		NA61 SHINE 35			STORM 7	KLEVER 7	CMS PIXELS 7	CMS OT 7	CMS HF 7	FASER pre shower 7	EP FTS 7	Calice Sdhcal 14	NA65 7	CMS HGAL 7	LHCf 7	LHCb ECAL 7	ALICE FOCAL 7																									
T2 - H4				SPS & TT20 Setup 7	NA Setup 14		GIF 23			RD51 7	GIF RD51 7	GIF 7	NA63 14	LHCb ECAL 7	CMS BRIL 7				LAS DOC 7	GIF RD51 14										Place-holder 14	GIF RD51 14	CMS ECAL 12																					
T4 - H6 main user				SPS & TT20 Setup 7	NA Setup 14		CMS PIXELS 7	ATLAS HFTD 7	ATLAS AEP 7	EP 7	ATLAS ITK 7	CERF 7	ALICE ITS 7	ATLAS MALTA 7	EP 7	ATLAS HCD 7	ATLAS ITK 7	CMS PIXELS 7	EP 7	ATLAS ITK 7	RD42 7	PICSEL 7	CMS OT 7	ALICE FOCAL 7	CMS PIXELS 7	ATLAS ITK 7	ATLAS AEP 7	MONO LITH 7	RD51 7	NA62 7	CMS ECAL 7	ATLAS ITK 7																					

1 week "alone"  
 1 week with GIF++  
 1 week parasitic  
 18 May – 8 June

2 weeks with GIF++  
 13 – 27 July

2 weeks with GIF++  
 19 Oct. – 2 Nov.

# 18 May – 8 June TB Period



- SETUP A: **PICOSEC micromegas** (F. Brunbauer, A. Utrobicic) + **MINICACTUS** (Y. Degerli, P. Schwemling)
- SETUP B: **FTM** (P. Verwilligen, A. Pellegrchia)
- SETUP C: **STRAW/VMM3a** (K. Kuznetsova, T. Enik)
- SETUP D: **RD51 Tracker** (K. Floethner, L. Scharenberg)
- SETUP E: **CMS GEM** (M. Bianco, F. Ivone)

# Looking into the Future...

- Although the test beam area is available since many years we always feel that we could improve things. For this reason we have prepared a “mini” questionnaire that we will circulate soon to get opinions/ideas/etc.



## WG7 - Common Facilities - Future RD51 - FORM

Dear friends,  
In an attempt to extend and better optimize our test beam campaigns in SPS/NA/H4 we would very much appreciate your opinion. It would be nice if you could spare some of your time to fill the questions below.  
Thanks in advance  
Eraldo & Yorgos



- Is there something that is missing at the test beam and you think it would be useful?
- From what we have in the test beam is there something that you think it could be better optimized?
- Do you face any difficulties on profiting of the existing facilities? If yes what are these?
- If you want, please add any of the following information: name, mail address and the group you belong to



# 2023

## RD51 H4(PPE134) April-May 2023 Test Beam

Mon. 24/04/2023 – Wed. 10/05/2023

Beam H4 – PPE134

Generic and Application driven R&D  
Muon/Tracking: GEM and Straw  
Timing: PICOSEC micromegas

Project Driven R&D  
HL-LHC: CMS ME0

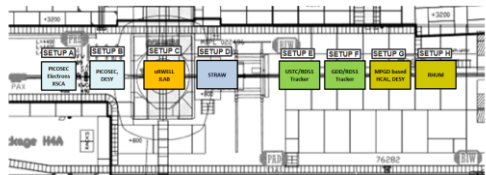
FE electronics and DAQ  
TIGER-GEMROC  
VMM3a-SRS  
VFAT3



5 setup

[https://indico.cern.ch/event/1285182/contributions/5400569/subcontributions/426737/attachments/2645452/4578954/RD51-H4\(PPE134\)-Beam-AprilMay2023.pdf](https://indico.cern.ch/event/1285182/contributions/5400569/subcontributions/426737/attachments/2645452/4578954/RD51-H4(PPE134)-Beam-AprilMay2023.pdf)

## BEAM H4, PPE134 – INSTALLATION (RD51, 5-19 July)

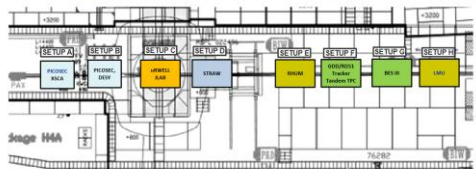


- SETUP A/B: PICOSEC (AUTH, CAE/IRFU, CERN-GDD, INFN PV, JLAB, RBI, USTC)
- SETUP C: JLAB uRWELL ← CANCELLED, late delivery of Detectors, POSTPONED TO AUGUST TB
- SETUP D: STRAW - PARASITIC
- SETUP E: USTC/RD51 Tracker
- SETUP F: CERN-GDD/RD51 Tracker
- SETUP G: MPGD based HCAL (INFN Ba-Na-LNF-RM3, WIS) Details on planned measurements (for most of the <https://indico.cern.ch/event/1273825/sessions/488>)
- SETUP H: RHUM (INFN Na-RM3)

7 setup

<https://indico.cern.ch/event/1308791/contributions/5505037/subcontributions/435868/attachments/2688816/4665508/RD51-July23-TestBeam-H4-SUMMARY.pdf>

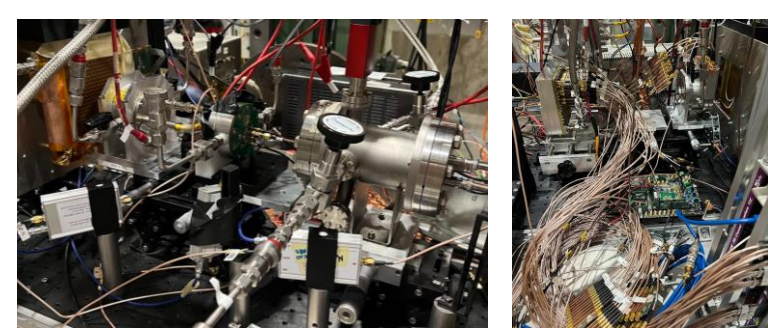
## BEAM H4, PPE134 – INSTALLATION (RD51, 23 August – 6 September)



- SETUP A: B: PICOSEC (F. Brunbauer, M. Litwinski)
- SETUP C: uRWELL (JLAB/R. Grunow)
- SETUP D: STRAW (T. Erik, K. Kazianova) - PARASITIC
- SETUP E: RHUM (M. Indio, G. Salsolozzo)
- SETUP F: GDD/RD51 Tracker (K. Eschberger & TANDEM TPC (F. Garcia)
- SETUP G: BES III (R. Farnley)
- SETUP H: LAMU (R. Heisterberger)

7 setup

<https://indico.cern.ch/event/1316325/contributions/5537101/subcontributions/438352/attachments/2699124/4684615/RD51-Aug23-TestBeam-H4-SETUP.pdf>

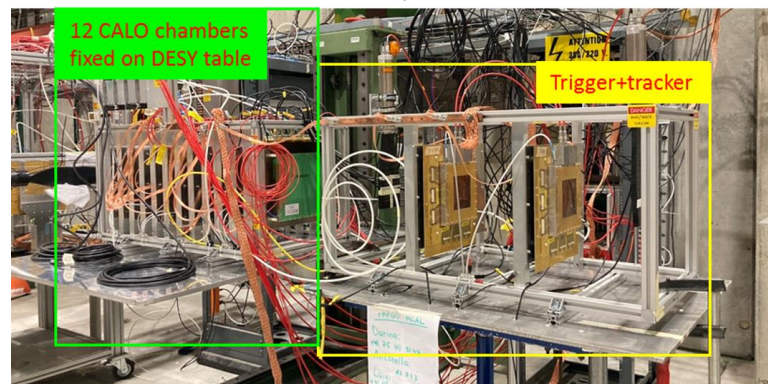


PICOSEC



RHUM

RD51 Triple GEM/SRS-VMM3a



MPGD DHCAL

## Generic and Application driven R&D

Muon/Tracking: **GEM**, Micromegas, uRWELL, uGroove, **TPC**, Straw

Timing: **PICOSEC micromegas**/uRWELL

Calorimetry: MPGD DHCAL

## Project Driven R&D & Commissioning

HL-LHC: CMS ME0

**PBC: GEM (AMBER/COMPASS++)**

e+e- collider : BESIII

## FE electronics and DAQ

Tracking: TIGER-GEMROC, **VMM3a-SRS**, VFAT3

Timing: **Custom Amplifiers, SAMPIC Digitizer, FASTIC**

(In RED where directly involved as GDD)

The last RD51 test beam @NA

GDD - DD section meeting - 21. Sept 2023 Karl Jonathan

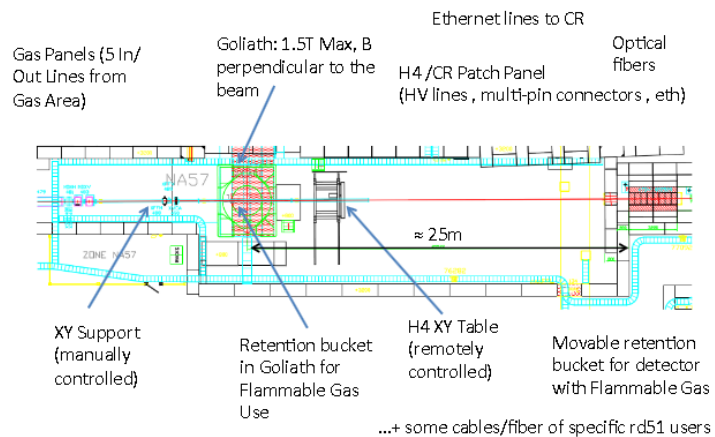
Flöthner

- RD51 test beam started in 2009
- In average 3 period per year with an average of about 6 groups running in parallel per beam
- **Strong support from EP-DT-DD/GDD**

What do we have after all these years ...

# RD51 Common Infrastructures and services

## H4-Common Test Beam Facility

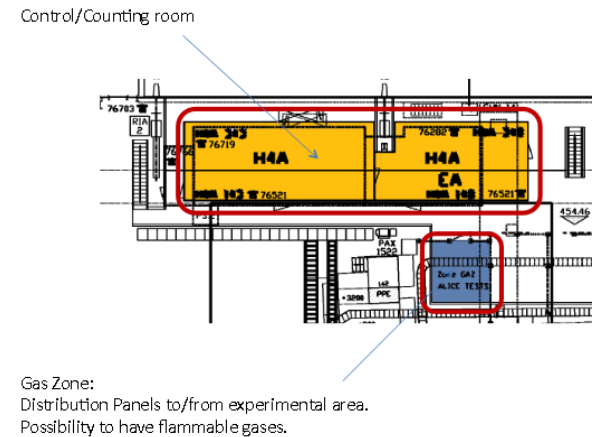


06/02/2014

10th RD51 Collaboration Meeting, Stony Brook University

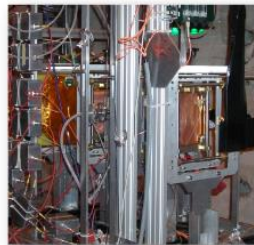
5

## CR & Gas Zone-Common Test Beam Facility

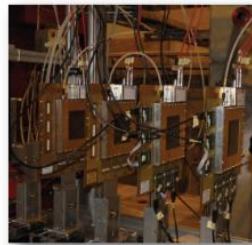


## Rd51 trackers

- Triple GEM Tracker
  - XY strips readout, 400um pitch
  - 10x10 cm<sup>2</sup>
  - APV (VFAT2)
  - DAQ&FE: SRS/APV (TURBO/VFAT)



- Resistive  $\mu$ egas tracker
  - XY strips readout, 250um pitch
  - 9x9 cm<sup>2</sup>
  - APV
  - DAQ&FE: SRS/APV

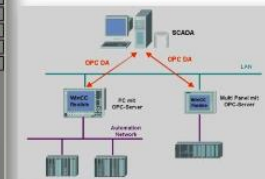
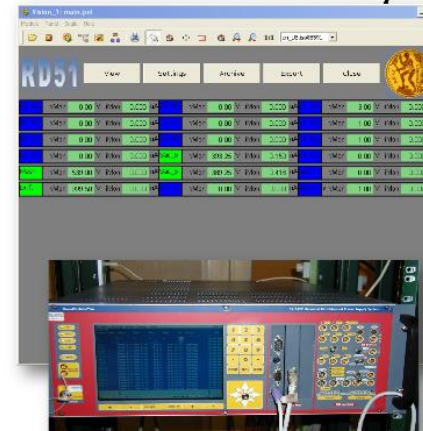


06/02/2014

13th RD51 Collaboration Meeting, CERN

9

## Slow Control System (HV/LV)



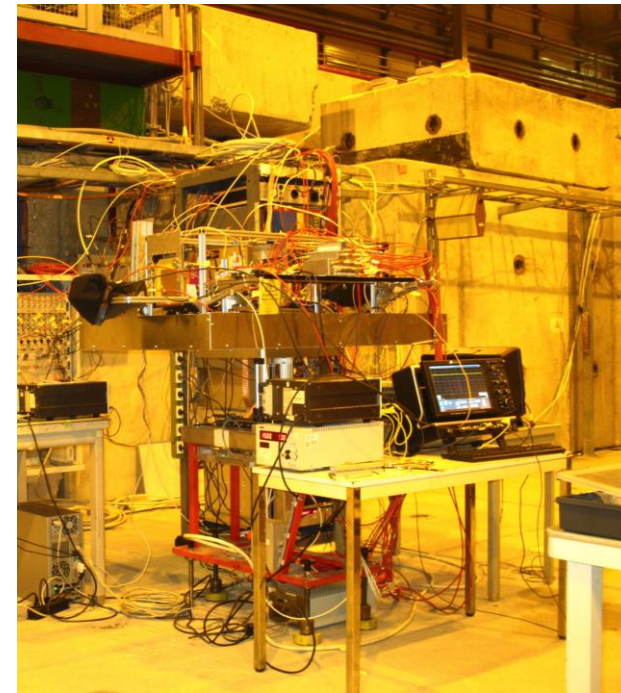
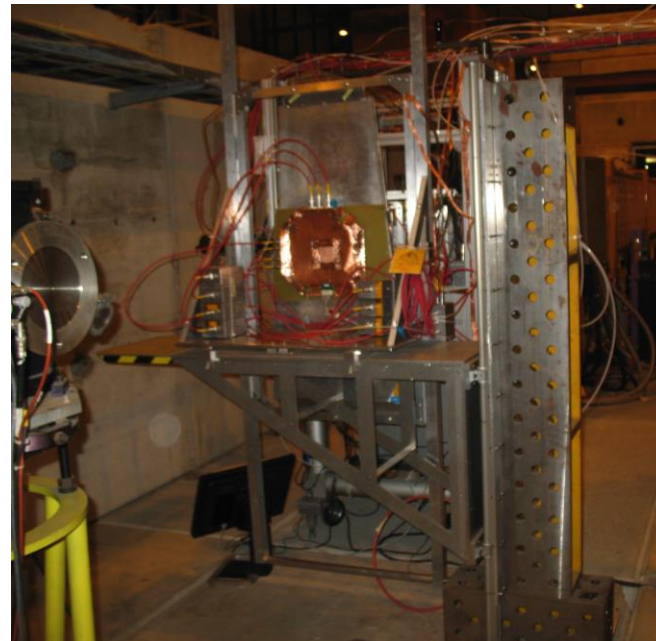
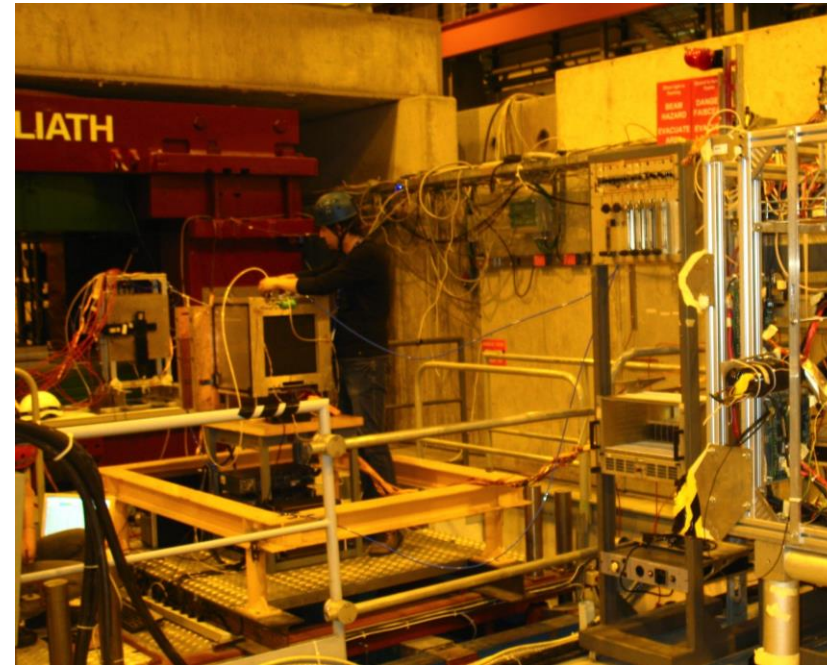
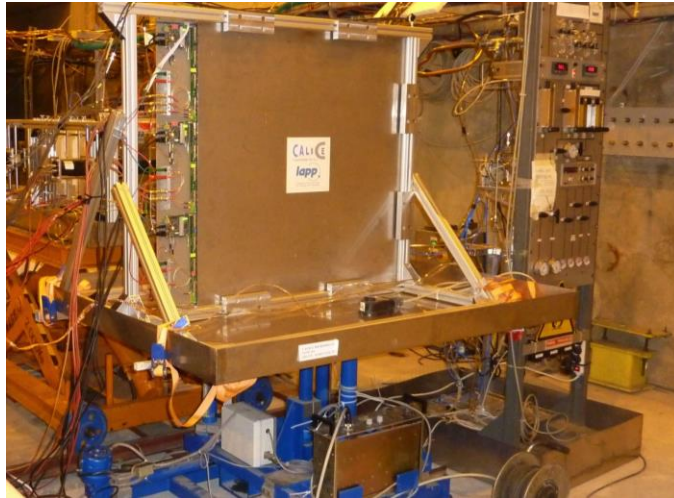
K. Karakostas

06/02/2014

13th RD51 Collaboration Meeting, CERN

10

## Moving tables & supports



# Semi permanent installation EHN1-H4 (SPS North Area) – RD51 Support to the collaborators

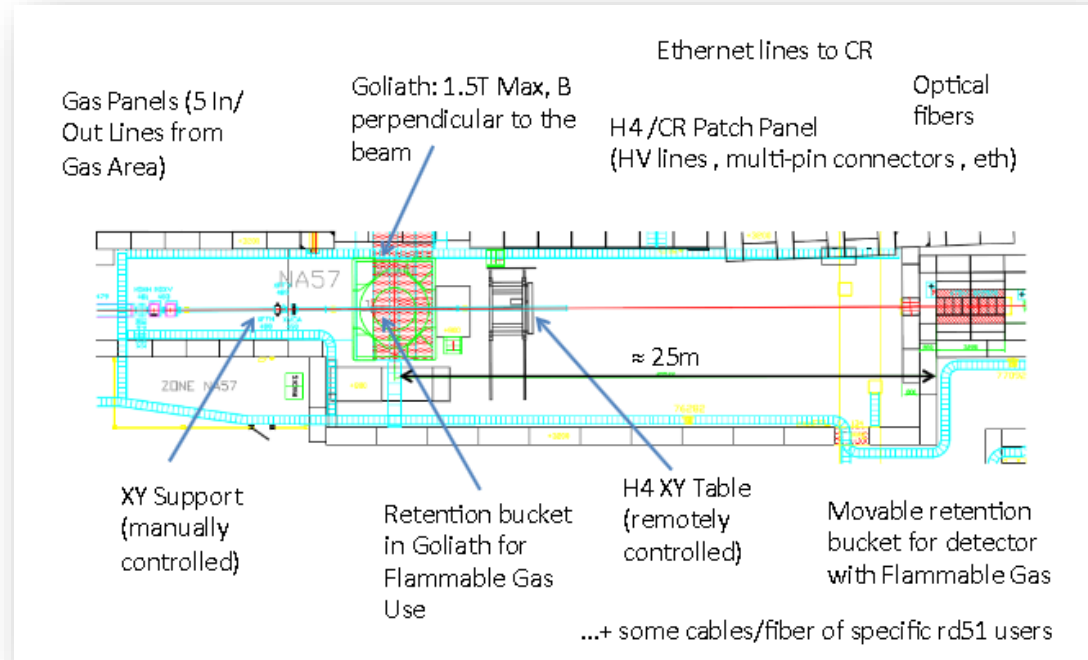
## **Interface** with the SPS coordinator

**Internal** (beam sharing between groups) and **external** (GIF++ and with any other parallel user) coordination

Typical Shift Scheme

	MAIN	Parasitic1	Parasitic2
Shift1	ALICE TPC	WIS/Aveiro/Coimbra	LNF
Shift2	ATLAS NSW	ALICE TPC	WIS/Aveiro/Coimbra
Shift3	CMS GEM	ATLAS NSW	ALICE TPC
Shift4	LAPP/UA/NCSR/IRFU	CMS GEM	ATLAS NSW
Shift5	LNF	LAPP/UA/NCSR/IRFU	CMS GEM
Shift6	WIS/Aveiro/Coimbra	LNF	LAPP/UA/NCSR/IRFU
Shift7	ALICE TPC	WIS/Aveiro/Coimbra	LNF
...			

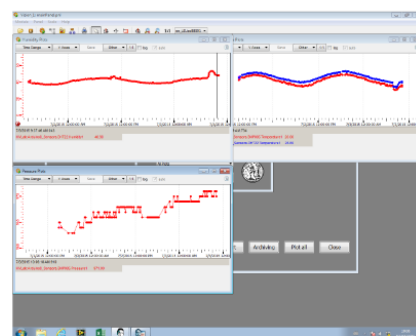
## **Infrastructures** (gas, HV, LV, sensors,...)



## RD51 DCS (Control and monitoring)



Environmental plots during Test Beam



## RD51 Trackers and SRS/APV25 DAQ



## Mechanical support (Miranda)



... all these are the seed to DRD1

Emergency passage

Door handle

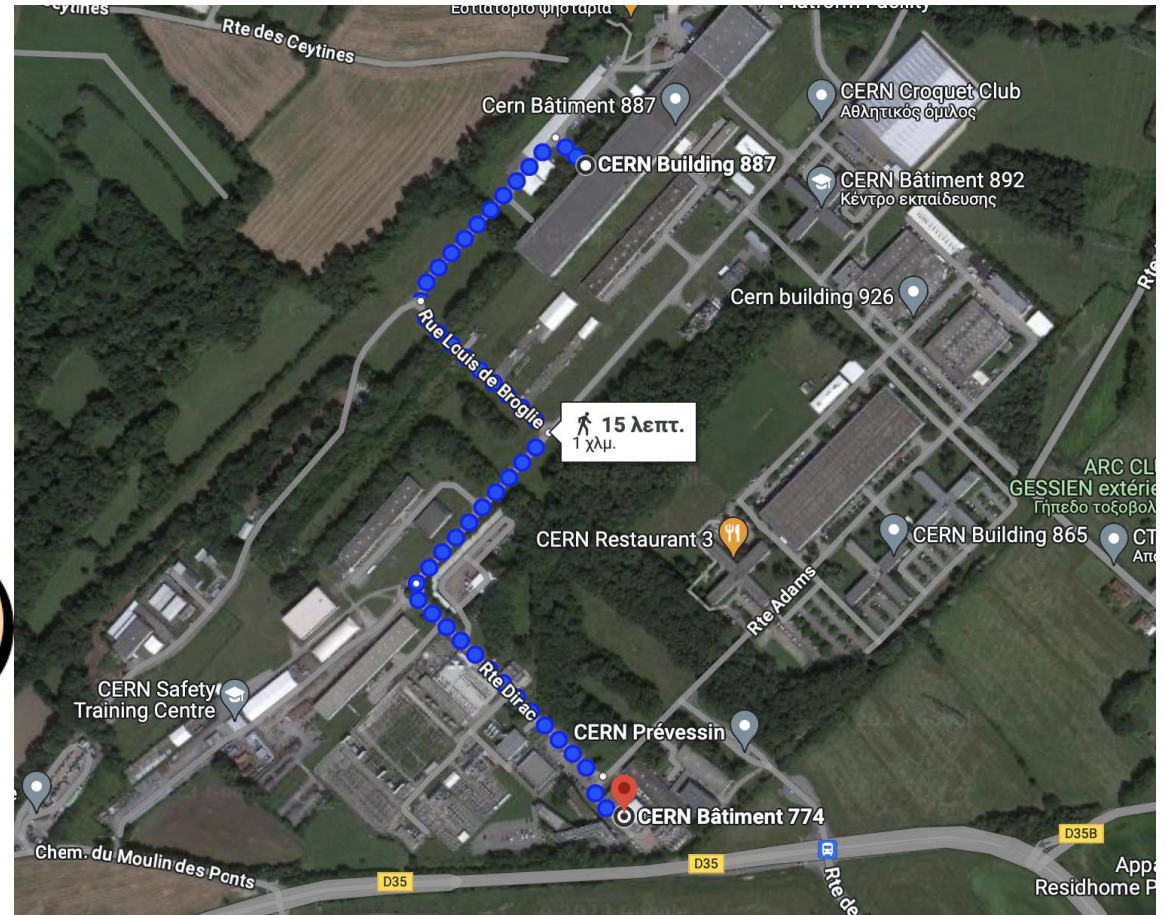


Light is green,  
you can enter



Light is red,  
you can't have an  
access

**COMMON  
PROBLEM !!!**



At the end of  
the test  
beam  
periods we  
had to  
celebrate !!!

# BBQ's







2010





2016





... the game went on !



The end of a successful 2023 Test beam !!!



Not  
Yet

**WE ARE NOT DONE !**

**THE ADVENTURE/FUN WILL CONTINUE WITH DRD1**

**2024 WILL BE A RD51/DRD1 TEST BEAM !**



# 2024

Physics start ISOLDE	April 8 <sup>th</sup>
Physics start nTOF	March 25 <sup>th</sup>
Physics start PS EA	March 18 <sup>th</sup>
Physics start SPS NA protons	April 10 <sup>th</sup>
Physics start ELENA	April 22 <sup>nd</sup>
Stop protons SPS NA	September 26 <sup>th</sup>
Pb Ion physics start SPS NA	September 30 <sup>th</sup>
Stop physics beams to AD, PS EA, SPS NA, ISOLDE, nTOF	October 28 <sup>th</sup>

**requests by Friday December 22<sup>nd</sup> 2023**