RD51 H4(PPE134) 2021 Test Beam

Eraldo Oliveri: +41754116126
Yorgos Tsipolitis: +41754118992

Generic and Application driven R&D

Muon/Tracking: GEM and mm
Timing: PICOSEC micromegas

Project driven R&D

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

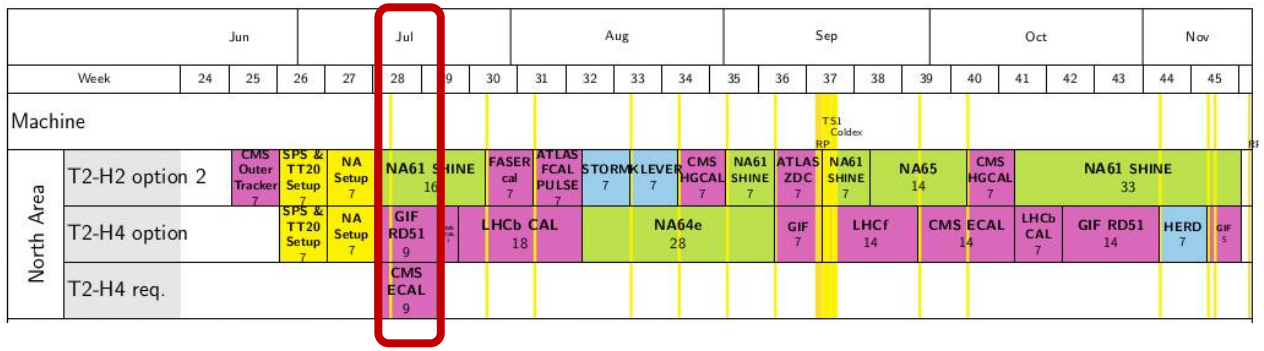
Detector Commissioning

e+e- collider : CGEM(**BESIII**)

FE electronics and DAQ

TIGER-GEMROC
VMM3a-SRS

Mon. 12/07/2021 – Wed. 21/07/2021



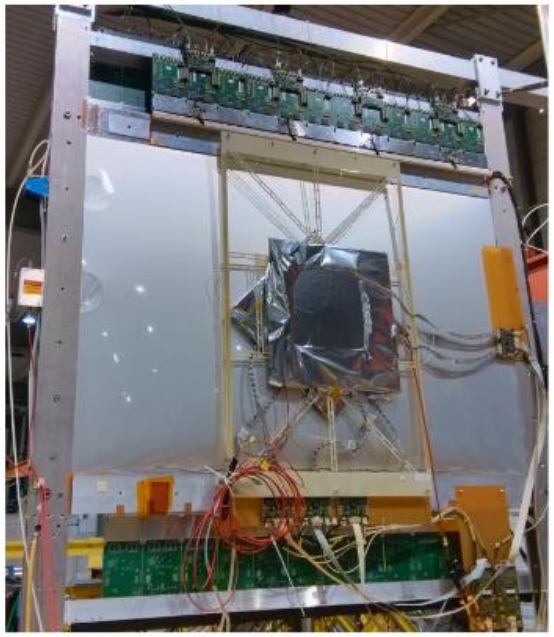
Confirmed Groups

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

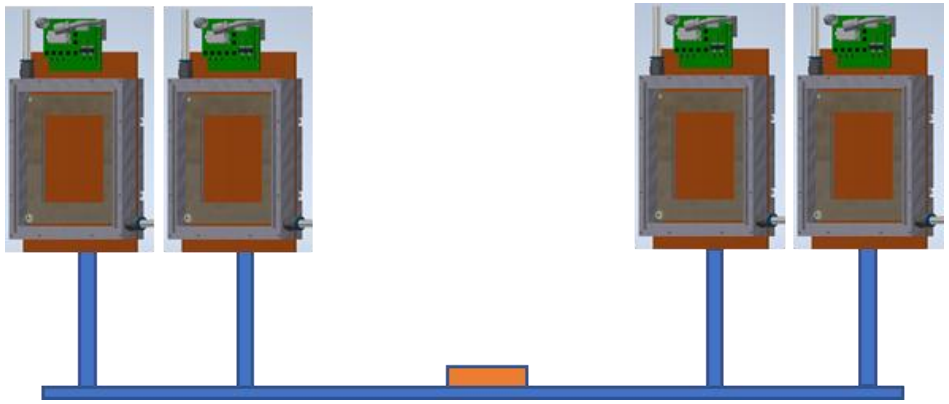
More info @ https://indico.cern.ch/event/989298/timetable/#20210219.detailed

AMBER/COMPASS++ MM prototype

Potential replacement of MWPC chambers



Teams: Dubna & INFN Torino



Tracker based on micromegas prototypes read with TIGER FE ASIC.

Contact person:
Maxim Alexeev
alekseev@to.infn.it

https://indico.cern.ch/event/989298/contributions/4228783/attachments/2193079/3707015/MM_prototyping_COMPASS_19_02_21.pdf

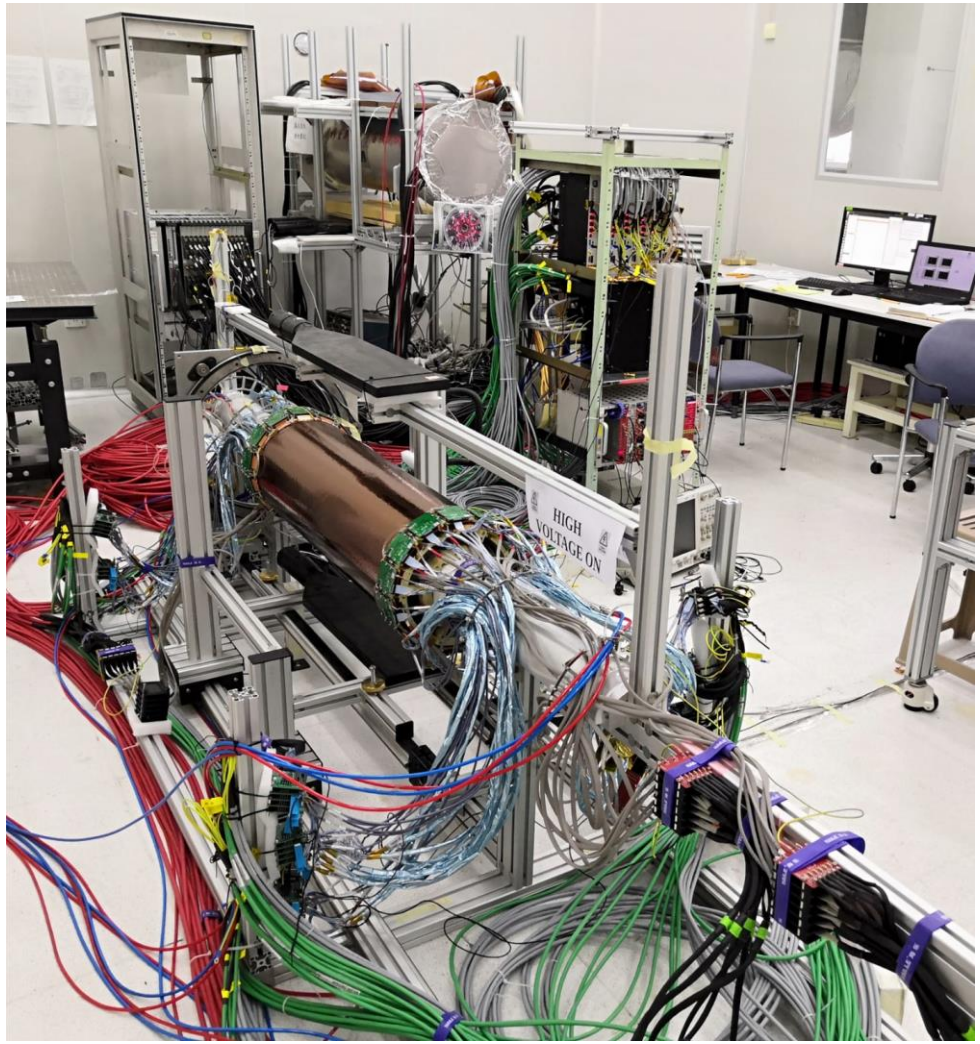
BESIII Cylindrical GEM detector

From the beginning of the pandemic outbreak, 2/3 of the **CGEM detector is taking cosmic data in Beijing with a "temporary", remotely-controlled setup**

Electronics integration and validation ongoing in Italy

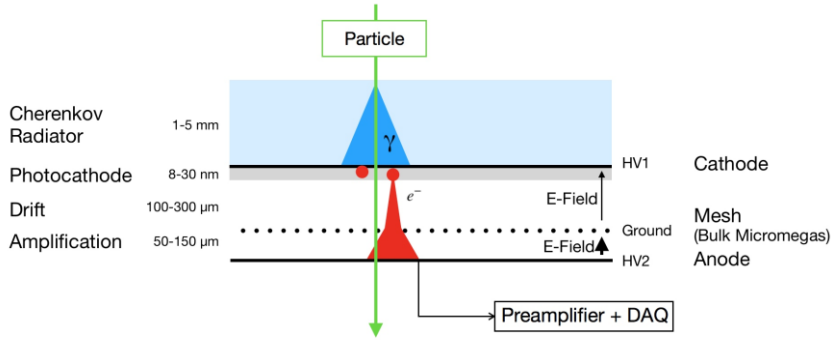
Test Beam goal: **validate full readout chain including the newly developed global/local fanout system**

Teams: INFN Ferrara and Torino

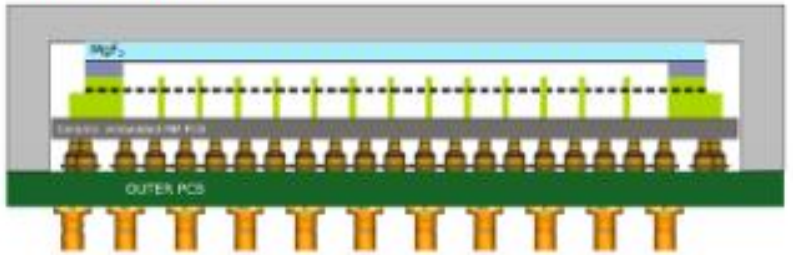


https://indico.cern.ch/event/989298/contributions/4228806/attachments/2192386/3707110/BES_TB_v2.pdf

PICOSEC- July test beam



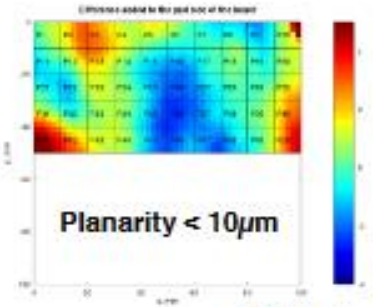
Cross-section



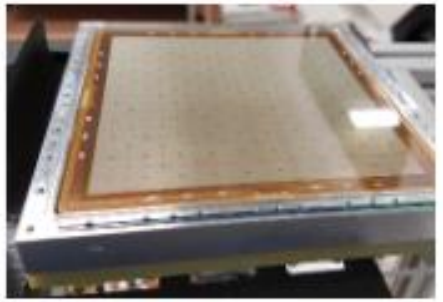
Test beam measurements

- Time resolution studies of the new (*) PICOSEC multipad prototype (10cm x 10 cm active area, 100 readout pads (1cm2 each)
- Single channel detector: test of single gap, of new FE amplifier (Saclay), SAMPIC digitizer readout.

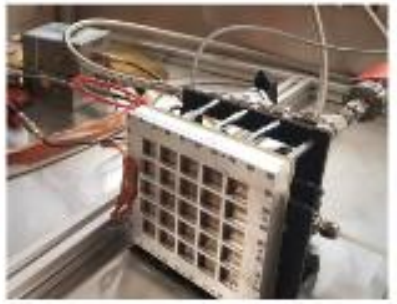
Bulk Micromegas on ceramic PCB



Assembled in housing



Lab test



Teams: micromegas PICOSEC collaboration

(*) First multipad prototype tested in H4 had time resolution of about 30psec but correction based on the tracker was needed (gap non-uniformity / planarity issues) https://doi.org/10.1016/j.nima.2021.165076

https://indico.cern.ch/event/989298/contributions/4228811/attachments/2193186/3707233/Picose-beam-presentation-F.pdf

SRS/VMM3a based DAQ for the new RD51 Tracker

A new tracker out of several new developments

New FE ASICs: VMM3A (BNL)

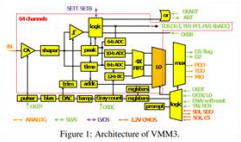


Figure 1: Architecture of VMM3.

https://cds.cern.ch/record/2309951/files/ATL-MUON-PROC-2018-003.pdf

New Developments on multichannel readout AISCs: VMM3A

New Development on MPGD technologies

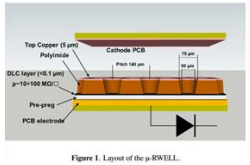
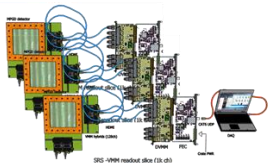


Figure 1. Layout of the µ-RWELL.

https://arxiv.org/pdf/1903.11017.pdf

New Detector Technology: µRWELL

New Development on MPGD multichannel Readout System: SRS/VMM interface

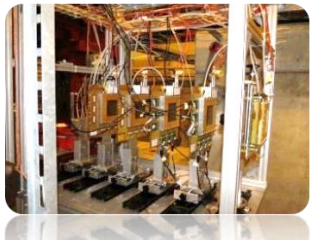


https://doi.org/10.1016/j.nima.2018.06.046

New Interface (VMM3) for the SRS

New common tracker available

One example of an existing common tracker: micromegas & SRS/APV25



Important investment (about 40kCHF in total) of resources from the collaboration.

Additional Support may come from AIDAinnova test beam and DAQ WP

https://indico.cern.ch/event/939299/contributions/3946844/attachments/2095123/3521352/LHCC143_OpenSession_RD51.pdf

- Activity for the preparation of the **new RD51 tracker based on µRWELL and SRS/VMM3a**
- July beam: focused on electronics (hardware/software)
- Tested on the RD51 triple GEM tracker
- 3+ people at CERN for the full period, contact: L. Scharenberg
- Material already at CERN
- No constraints on departure

This project is supported by RD51 and AIDAinnova (electronics/DAQ)

https://indico.cern.ch/event/1040996/contributions/4413346/attachments/2266862/3848971/wg7-lucian.pdf

Beam Requirements

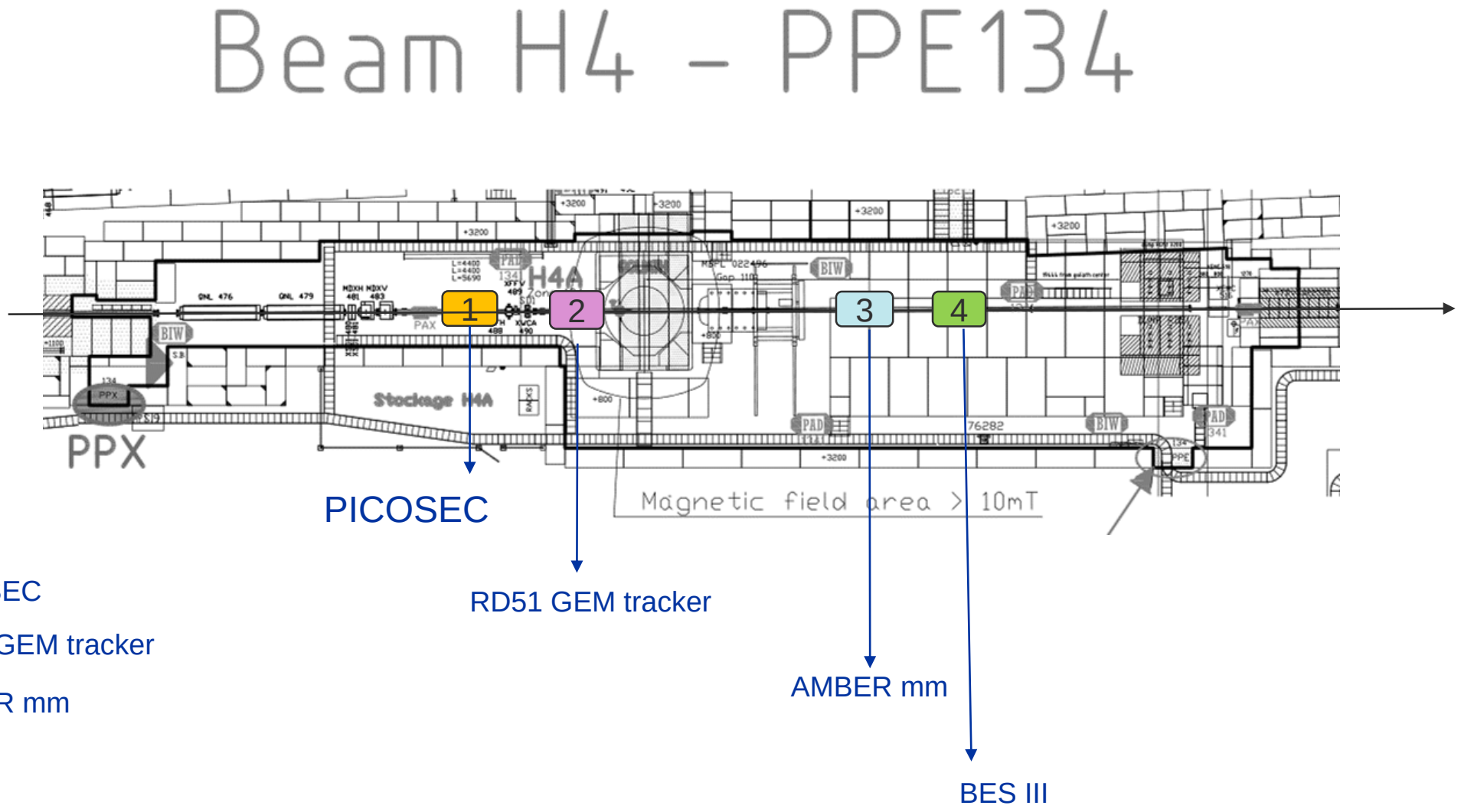
Week 28-29:

1. **mu,pi: highest rate** as possible (**limited previously by radiation alarm(*)**). Polarity and momentum not important (the configuration offering the highest rate is the preferred one). We would need to **change from muons to pions several times**.

2. e: 100GeV/c for 4-8h (end of the beam period). We keep it still as an option, just in case we will manage to finish the measurement program well in time

(*) with mu and pi we usually went up to few 10^4 and 10^6 per spill (4-5 sec) respectively. It would be useful to investigate if we can safely increase the rate (1 order of magnitude more would be really appreciated – studies @ higher rates and statistics).

Setup



1 PICOSEC

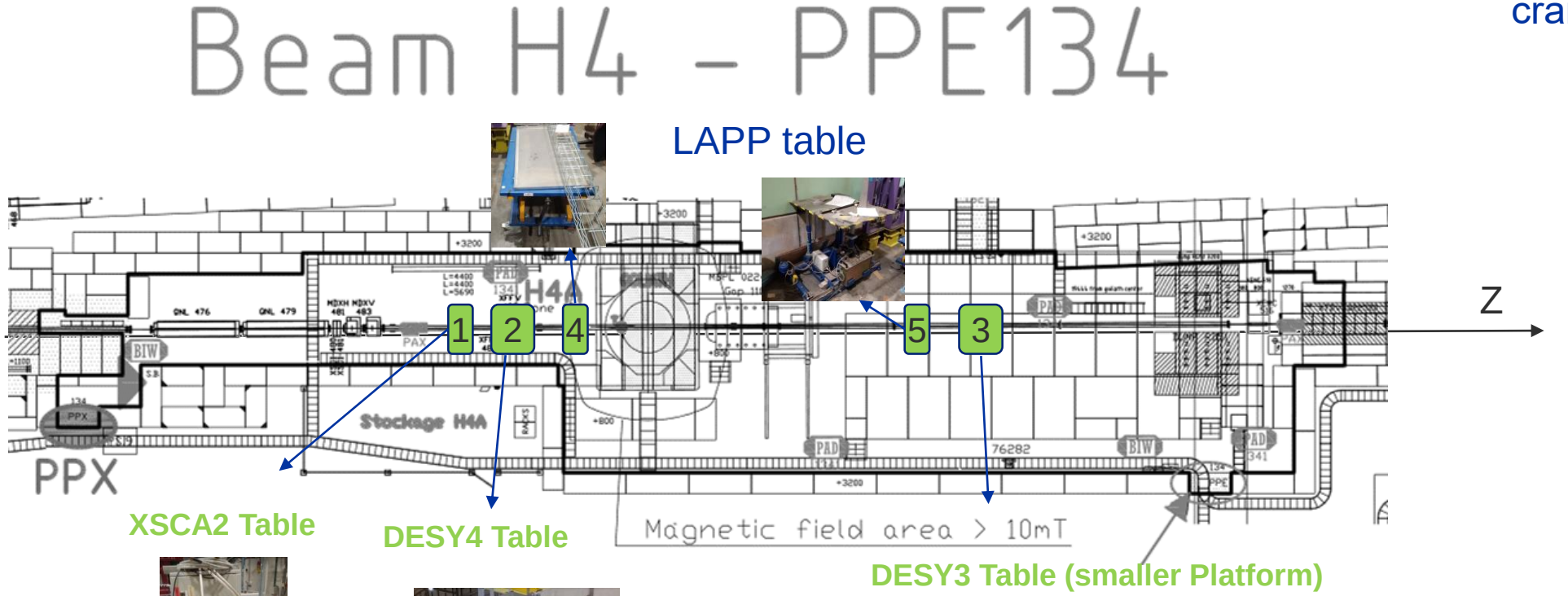
2 RD51 GEM tracker

3 AMBER mm

4 BES III

Infrastructure/Supports

Supports already installed.
Thanks to Michael's team & cranes' people.



1 XSCA TABLE

2 DESY TABLE

3 DESY TABLE

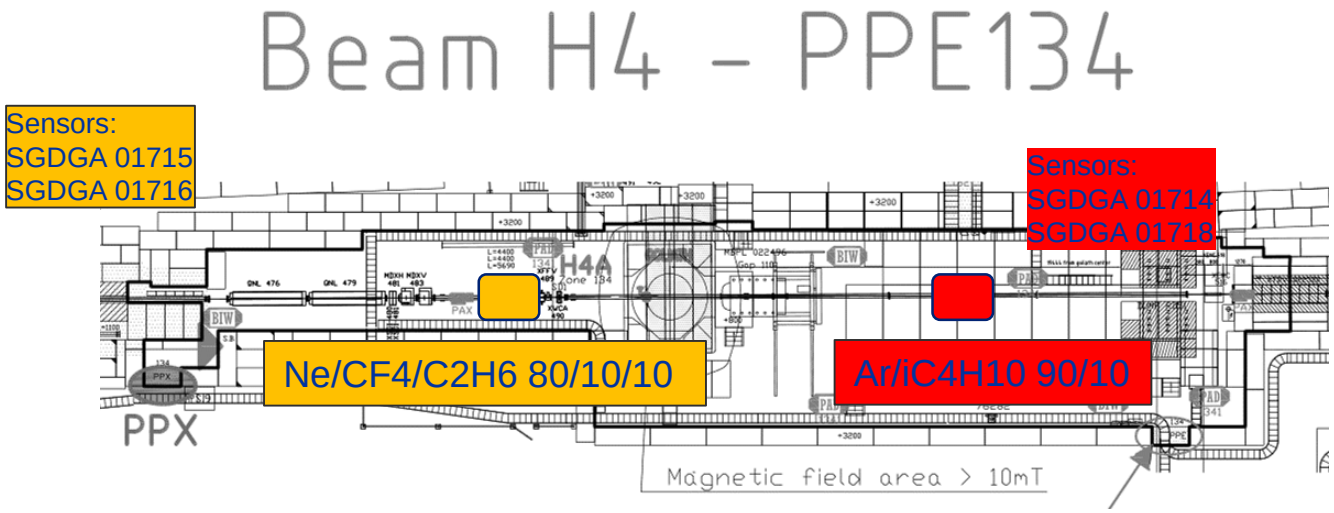
4 Manually controlled Support

5 LAPP TABLE (ok for LAPP people)

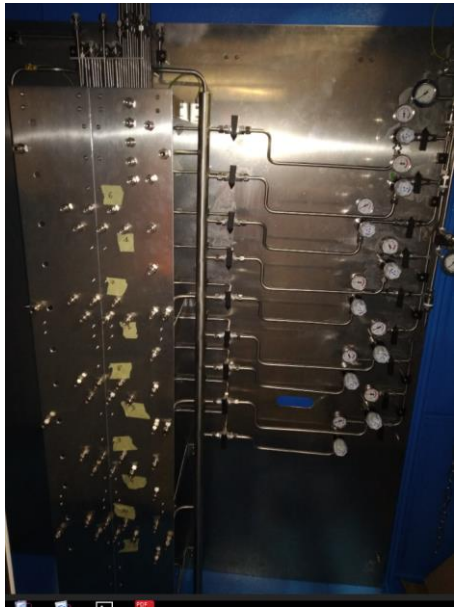
Eraldo Oliveri: +41754116126, Yorgos Tsipolitis: +41754118992

Infrastructure/Flammable gases

Zone gaz 887/R-C47



- BES III, line 1-6, Ar/iC4H10 90/10
- PICOSEC, line 2-7, Ne/CF4/C2H6 80/10/10



New gas distribution panel (and barrack) in 887/R-C47

Involved people:
Safety: L. Di Giulio, H. Wilkens, L.Tranchand
Sensors: N. Broca, P. Galland
Gas: D. Jaillet

Infrastructure/Alignment-Survey (B. Cumer)

H4 TEST

25/05/2016

From :

Benoit CUMER EN/ACE

Antje BEHRENS EN/ACE

H4 TEST

ADJUSTMENT OF RD51 PICOSEC TRACKER

Measurement of May 25th, 2016

The EDMS document 1689847, containing this report can be found at the following address :

https://edms.cern.ch/document/1689847

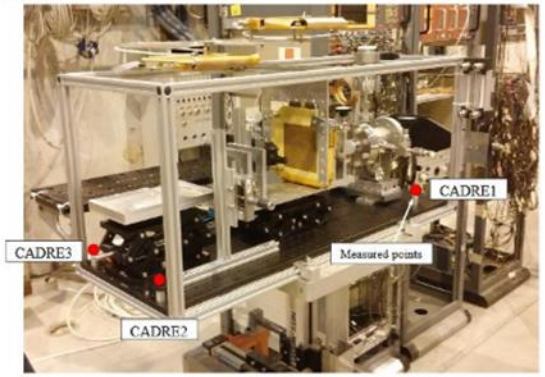


Figure 2 : Measured points on the detector, view from upstream side

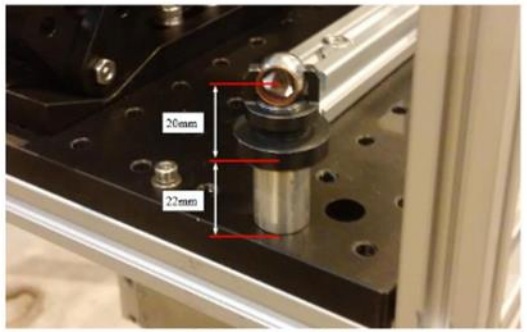


Figure 3 : Measured point on the detector

Friday 9th July, 2pm

Alexandre.Beynel@cern.ch
Dirk.Mergelkuhl@cern.ch

INSTALLATION PLANS

Monday 5th July - Thursday 8th July (WEEK 27)

Handling (to PPE134): **electronic racks, detector telescopes, supports. Date to be agreed with Nikos.**

Gas (887-R-C47, PPE134): **connection of all gas lines (Flammable and not flammable, leak tests)**

Control Room (887-1-B41, 887-1-A47): **installation of PC and DAQ/DCS electronics**

Friday 9th July

8:30am: Handling (to PPE134), **Final Transport of electronic equipment, detector telescopes, supports.**

2pm: **Survey for alignment (PICOSEC tracker)**

4pm: **Safety Inspection**

FRIDAY 9th JULY