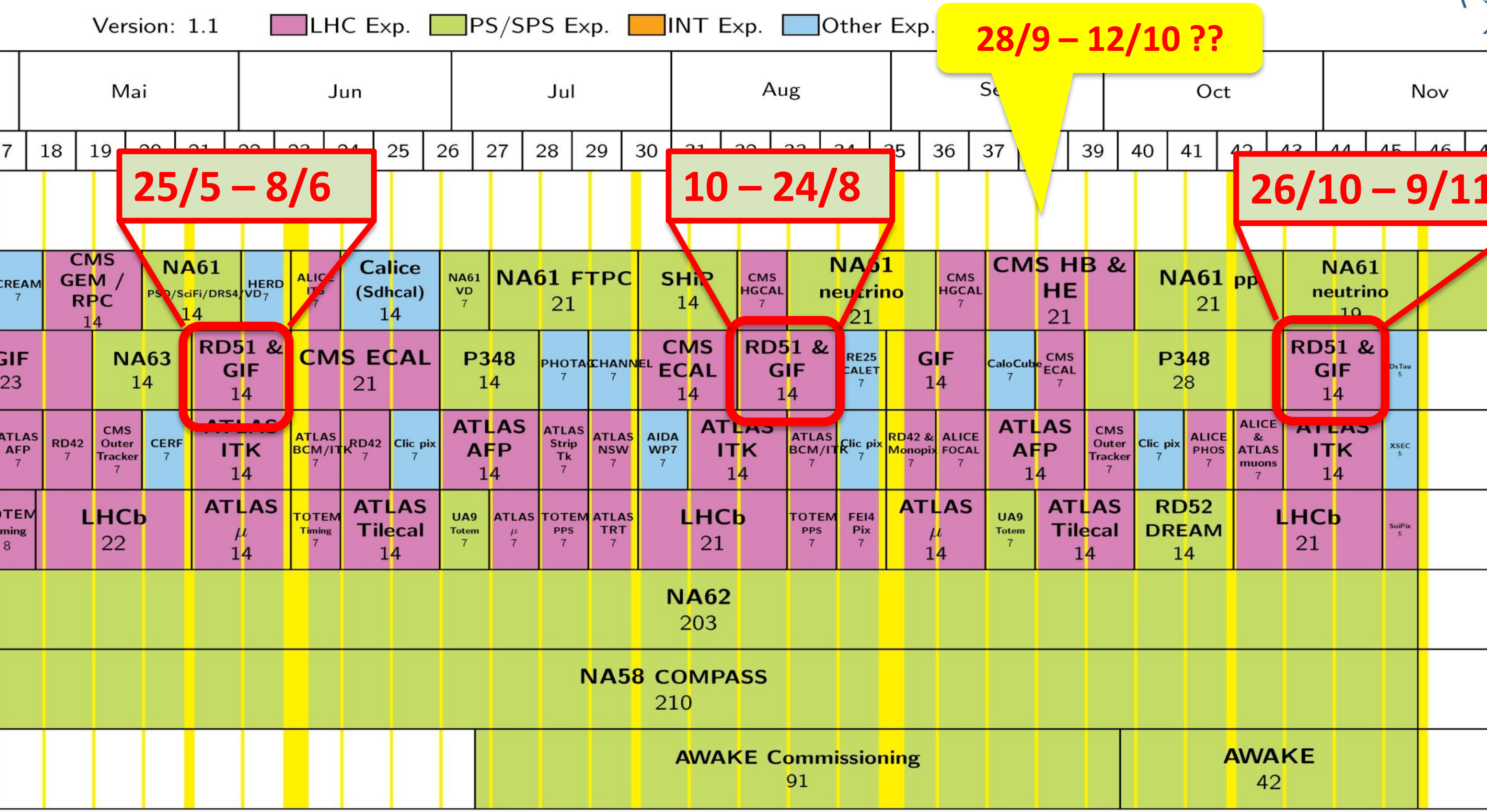
WG7 plans for 2016

Eraldo Oliveri
Yorgos Tsipolitis

SPS user schedule for 2016



Coordinator. Email: Sps.Coordinator@cern.ch, Tel: +41 75 411 3845.

ailable here: http://sps-schedule.web.cern.ch/sps-schedule/
tor schedule v1.3

Expression of Interest

R&D lines, Detectors and measurements
that will be probably part of the
2016 rd51 test beams…

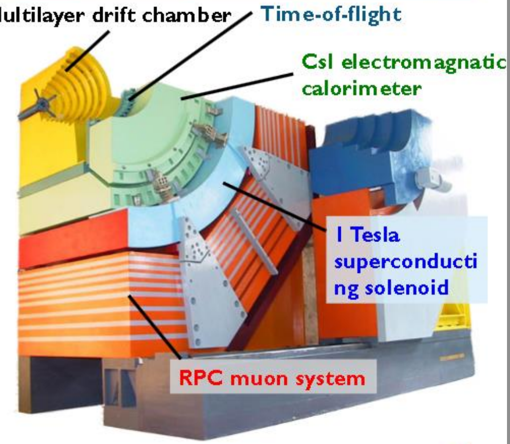
From official requests, preliminary requests, simple interest… and coffee & cigarette "meetings" !!

BESIII: INFN Ferrara et al.

BES-III (Beijing Spectrometer III) is τ-charm factory located at the Beijing e+e- collider BEPC-II working in the energy range from 2 GeV to 4.6 GeV.

The BESIII detector

- Multi-purpose magnetic spectrometer with 93% of 4π angular coverage.
- Our group is committed to data analysis and to hardware upgrade of the inner tracker.

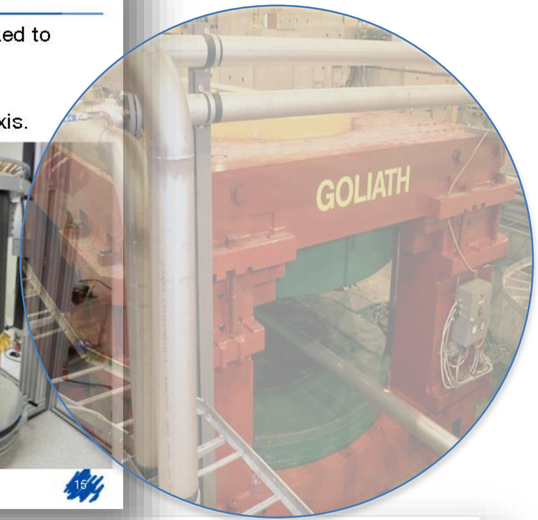


G. Cibinetto 15th RD51 Collaboration Meeting

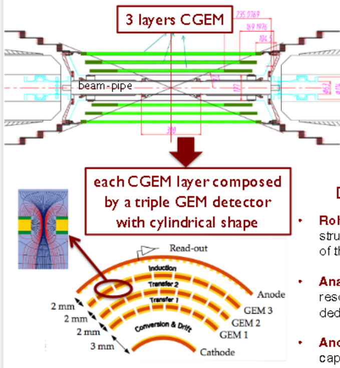
The KLOE-2 assembly technique

- A dedicated assembling machine has been designed and realized to perform the insertion of the electrodes.
- Axial alignment has a precision of 0.1mm/1.5m.
- The structure can rotate by 180° around its central horizontal axis.

G. Cibinetto 15th RD51 Collaboration Meeting



Cylindrical GEM Inner Tracker



Detector requirements

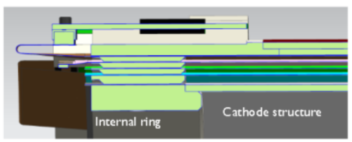
- Rate capability: ~10^4 Hz/cm^2
- Spatial resolution: σ_{xy} =~130 μm ; σ_z=~1 mm
- Momentum resolution: σpt/Pt =~0.5% @1 GeV
- Efficiency = ~98%
- Material budget ≤ 1.5% of X_0 for all layers
- Coverage: 93% 4π
- Operation duration ~ 5 years

Detector peculiarities and innovations

- **Rohacell** will be used in the cathode and anode structure with a substantial reduction of the thickness of the detector.
- **Analogue readout** to reach the required spatial resolution with a reasonable number of channels. A dedicated ASIC chip will be developed.
- **Anode plane with jagged strips** to limit the parasitic capacitance

G. Cibinetto - L'esperimento BESIII Riunione di Bilancio CSNI, Lecce 29/9/2015

Detector mechanical design



The Ferrara group is responsible for the mechanical design of the detector, construction tooling and supporting structures.

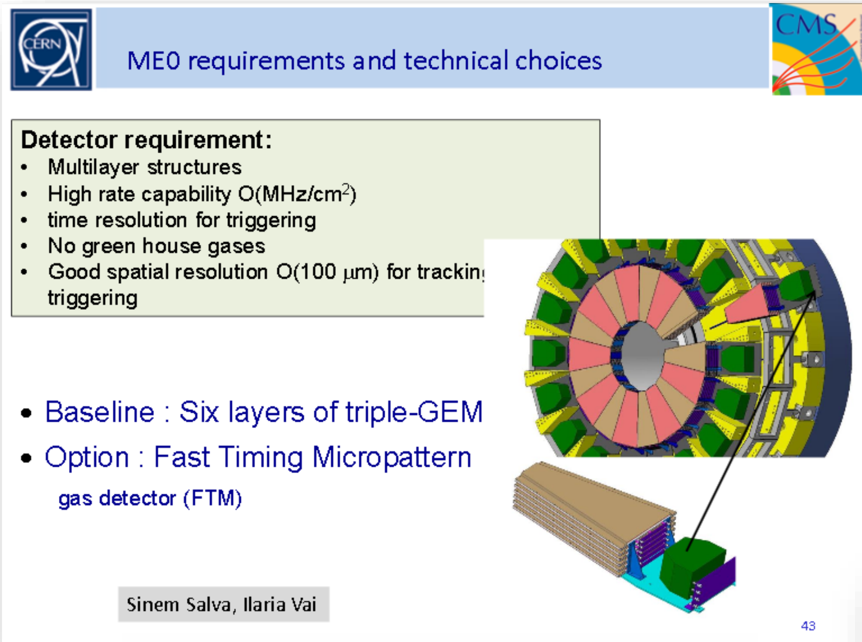
G. Cibinetto 15th RD51 Collaboration Meeting

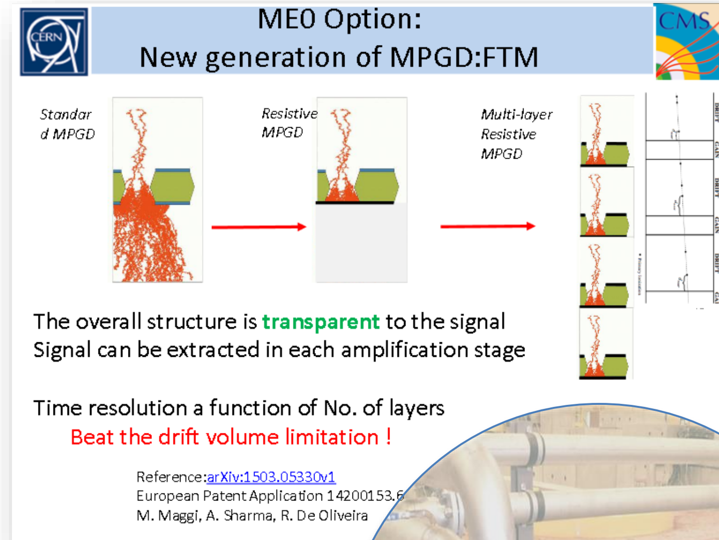
May/June… See following talk

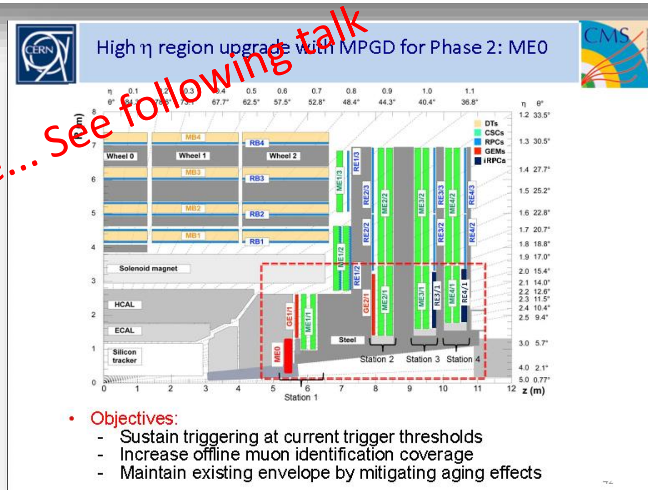
https://indico.cern.ch/event/365380/session/11/contribution/44/attachments/726469/996922/RD51-cibinetto-ferrara.pdf

Very rich physics program: Charm, charmonium and exotic states spectroscopy, light hadrons, F.F., τ physics. BESIII has the world largest J/ψ and ψ (2S) dataset.

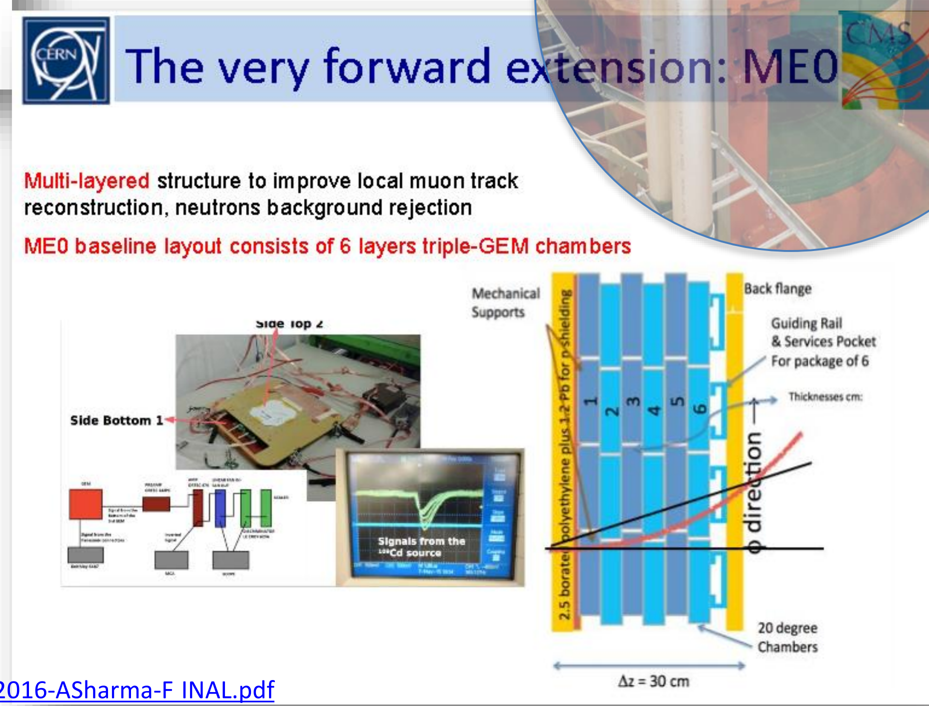
CMS GEM Collaboration R&D







May/June... See following talk



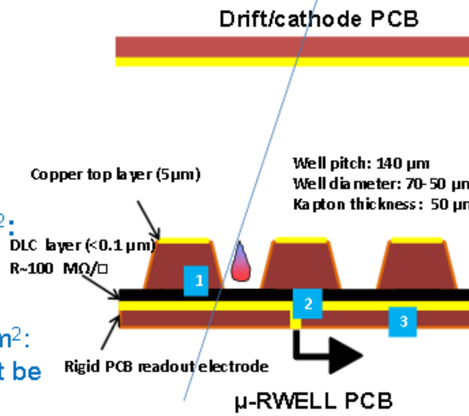
https://indico.cern.ch/event/484223/attachments/1220034/1790422/Seminar-CERN-Feb-5-2016-ASharma-F INAL.pdf

CMS (LNF et al) R&D

The μ-RWELL architecture

The **μ-RWELL_PCB** is realized by **coupling:**

1. a "**suitable WELL patterned kapton foil** as "amplification stage"
2. a "**resistive stage**" for the discharge suppression & current evacuation
   i. **"Low particle rate" (LR)** << 100 kHz/cm^2**:** single resistive layer → surface resistivity ~100 MΩ/□ (CMS-phase2 upgrade)
   ii. **"High particle rate" (HR)** >> 100 kHz/cm^2: more sophisticated resistive scheme must be implemented (MPDG_NEXT- LNF)
3. a **standard readout PCB**

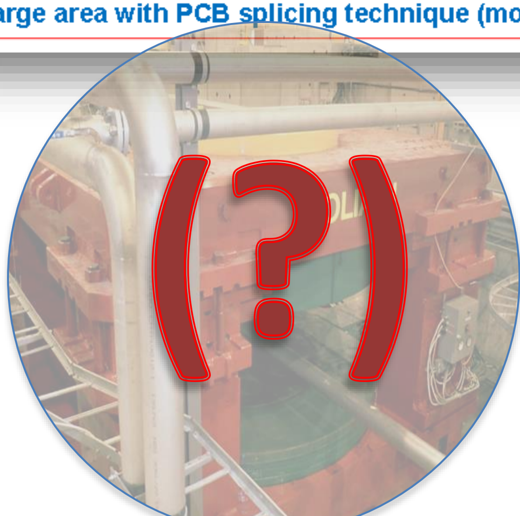


G. Bencivenni et al., 2015_JINST_10_P02008

The μ-RWELL is a compact & simple to build:

- only two mechanical components: **μ-RWELL_PCB + cathode**
- no critical & time consuming assembly steps:
  - no gluing, no stretching, easy handling
- no stiff & large frames
- **large area with PCB splicing technique (more simple than GEM and MM)**

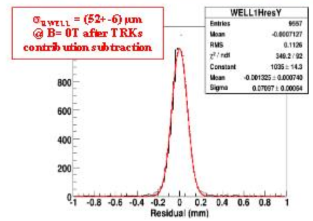
7

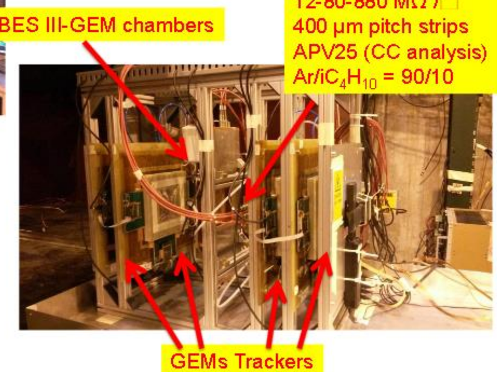


The μ-RWELL performance: Beam Tests

H4 Beam Area (RD51)
Muon beam momentum: 150 GeV/c
Goliath: B up to 1.4 T

μ-RWELL prototype
12-80-880 MΩ/□
400 μm pitch strips
APV25 (CC analysis)
Ar/iC$_4$H$_{10}$ = 90/10





G. Bencivenni - 14th Vienna Conference on Instrumentation, 18th Feb. 2016

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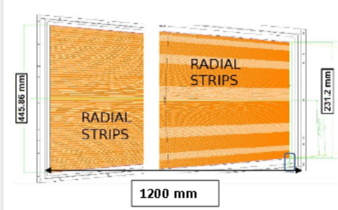
Towards large area & detector engineering

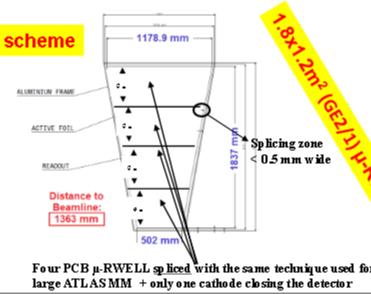
In the framework of the **CMS-phase2 muon upgrade** we are developing **large size μ-RWELL**. The **R&D** is performed in strict collaboration with an Italian industrial partner (**ELTOS SpA**). The work will be performed in **two years** with following schedule:

1. Construction of the first **1.2x0.5m^2 (GE1/1) μ-RWELL** **(07/2016)**
2. Full characterization of the **1.2x0.5m^2 (GE1/1) μ-RWELL** **(12/2016)**
3. Mechanical study and mock-up of 1.8x1.2 m^2 (GE2/1) μ-RWELL **(05/2017)**
4. Construction of the first **1.8x1.2m^2 (GE2/1) μ-RWELL** **(12/2017)**
5. Full characterization of the **1.8x1.2m^2 (GE2/1) μ-RWELL** **(06/2018)**

1.2x0.5m^2 (GE1/1) μ-RWELL **LR scheme**



1.8x1.2m^2 (GE2/1) μ-RWELL



G. Bencivenni - 14th VCI, 18th Feb. 2016

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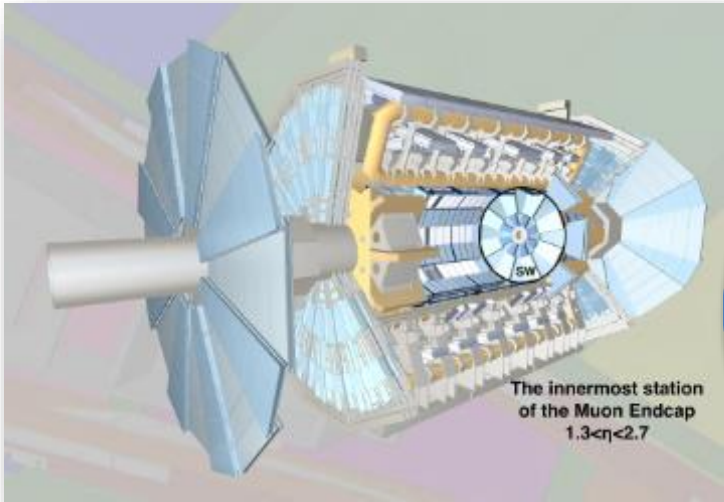
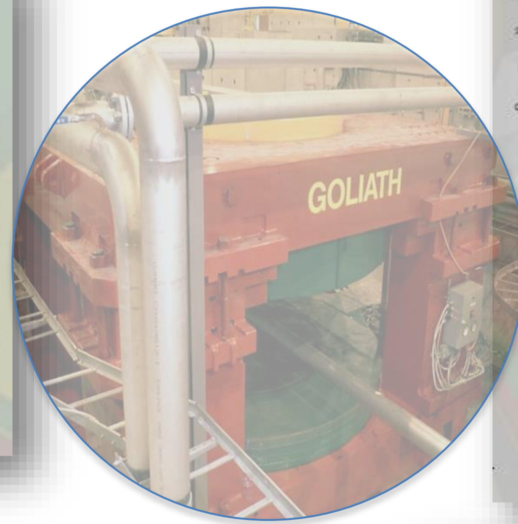
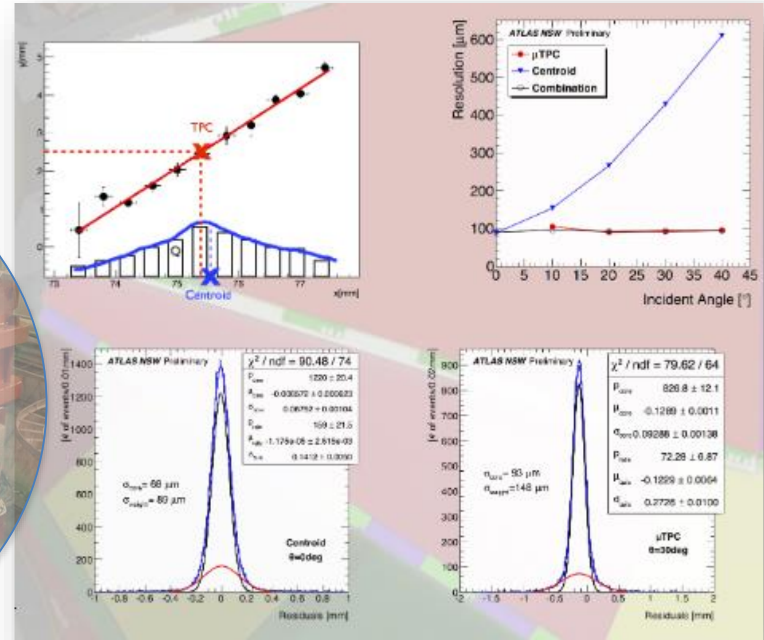
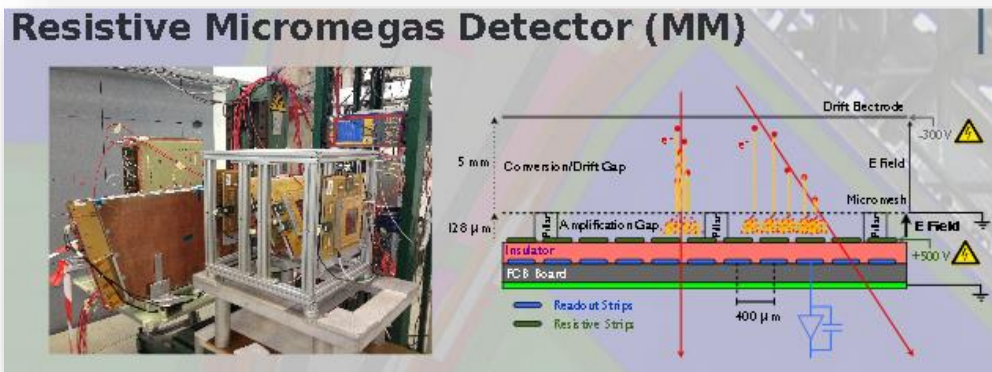
https://indico.cern.ch/event/391665/session/24/contribution/121/attachments/1230339/1803210/VCI-micro-RWELL-Bencivenni.pdf

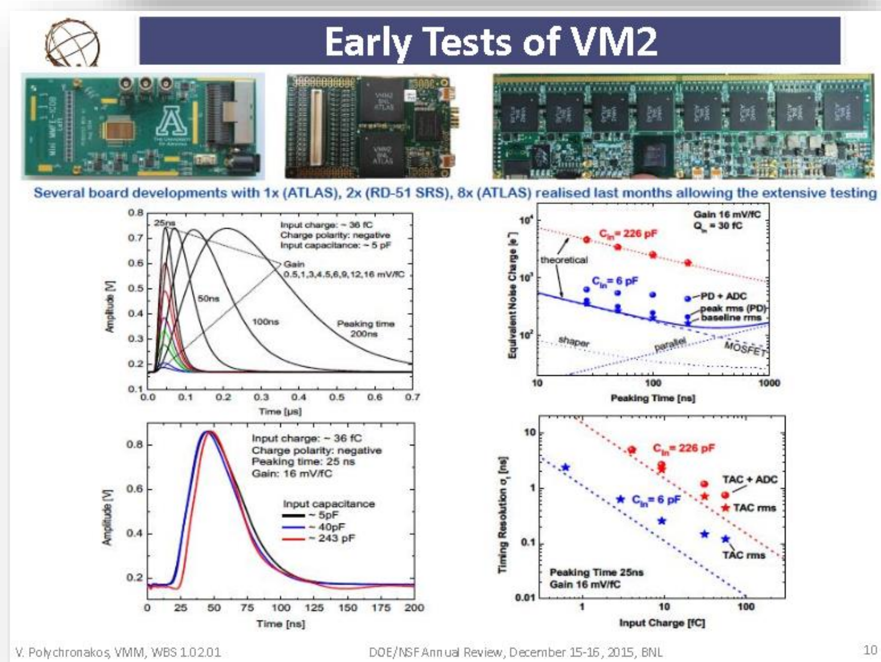
ATLAS NSW micromegas











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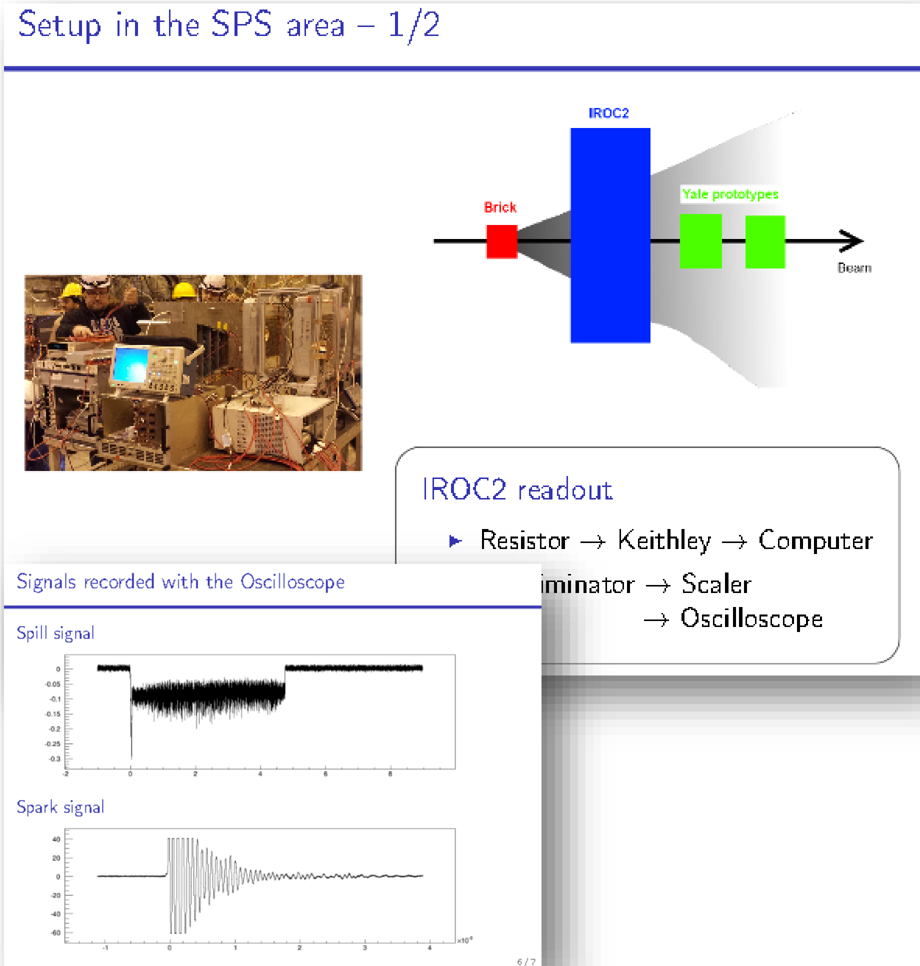
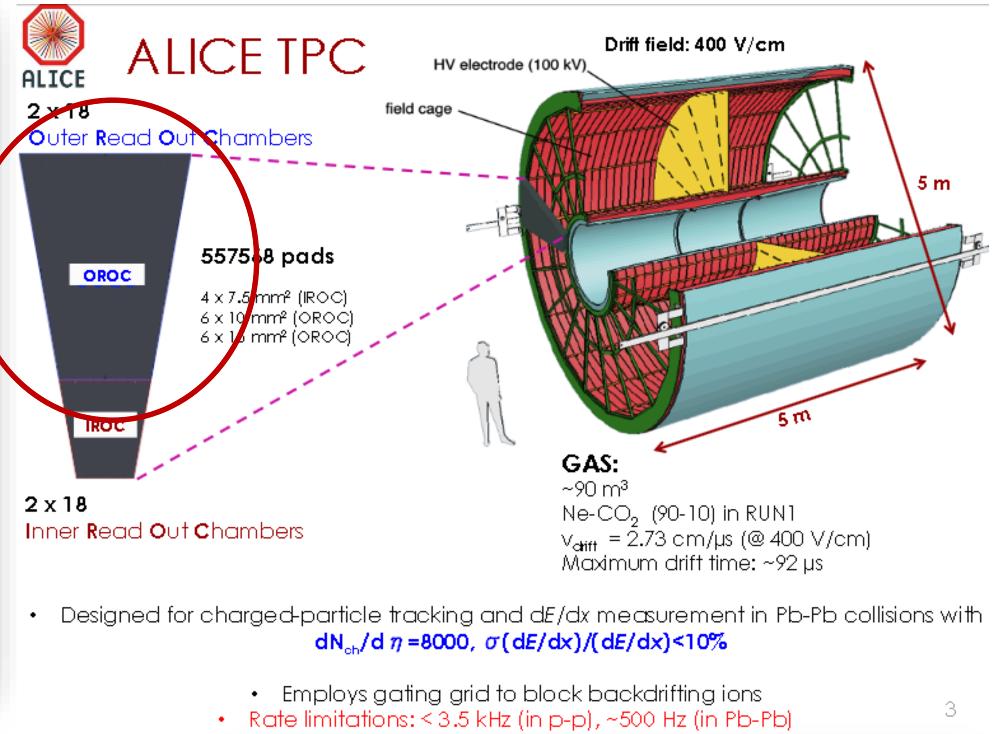
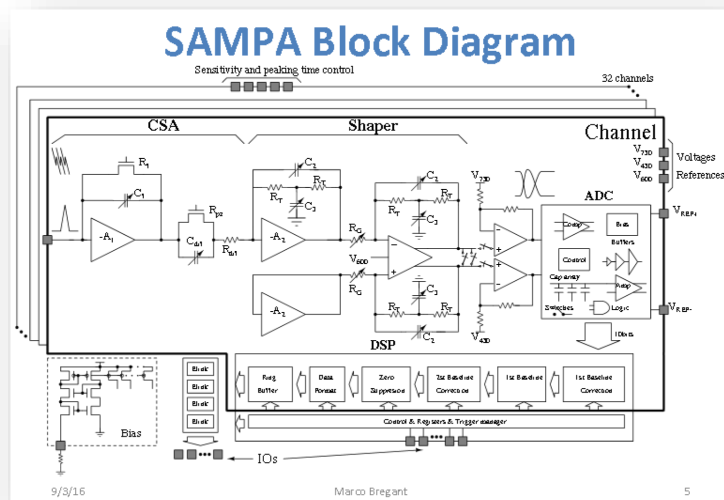
https://indico.cern.ch/event/496113/session/2/contribution/8/attachments/1240891/1824720/RD51_9March_VMM.pdf

ALICE TPC GEM (Discharge Studies-OROC & SAMPA?)

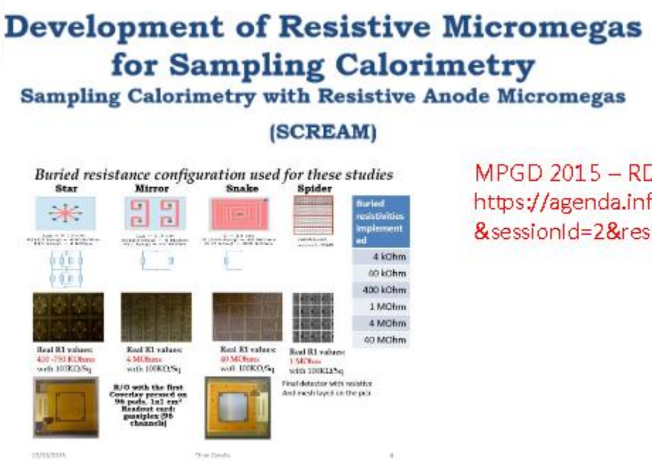






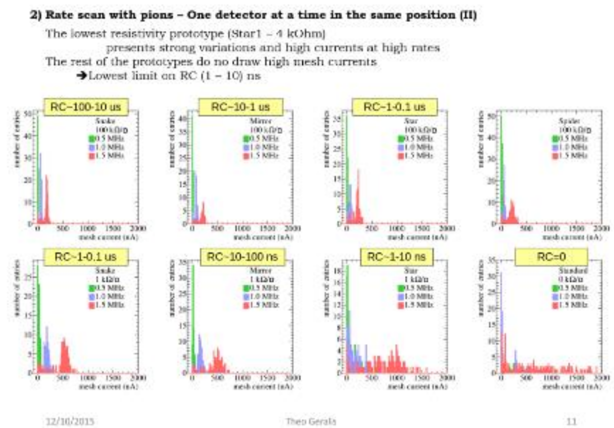
https://indico.cern.ch/event/356113/session/4/contribution/7/attachments/707650/971501/ALICE-Rd51-miniWeekDec-9-12-14.pdf
https://indico.cern.ch/event/328632/session/1/contribution/4/attachments/639264/879676/gasik_pg4_11072014.pdf
https://indico.cern.ch/event/496113/session/2/contribution/9/attachments/1241002/1825010/1603_RD51wg5_Bregant.pdf

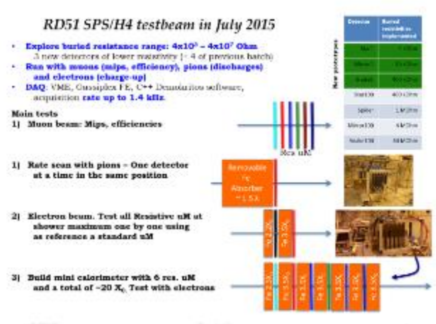
SCREAM

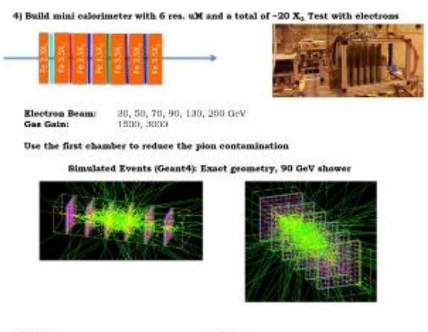


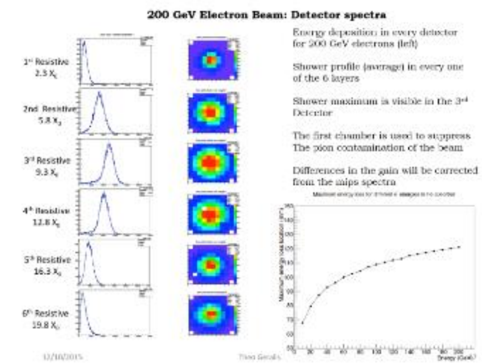
(LAPP/NCSR/CEA)

MPGD 2015 – RD51 Collaboration Meeting:
https://agenda.infn.it/getFile.py/access?contribId=109&sessionId=2&resId=0&materialId=slides&confId=8839









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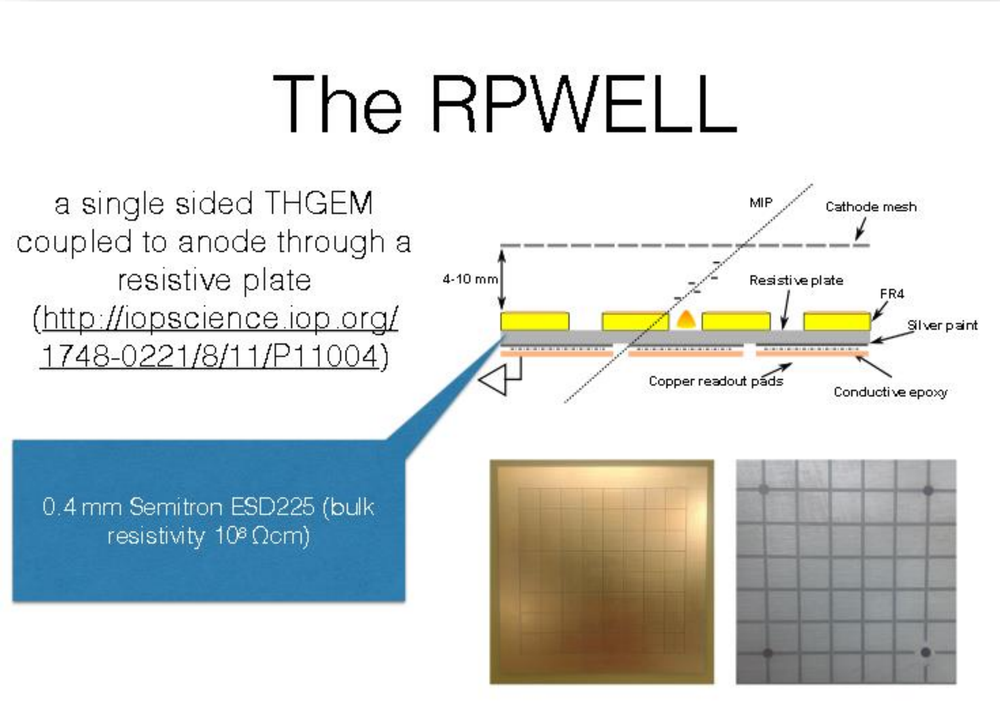
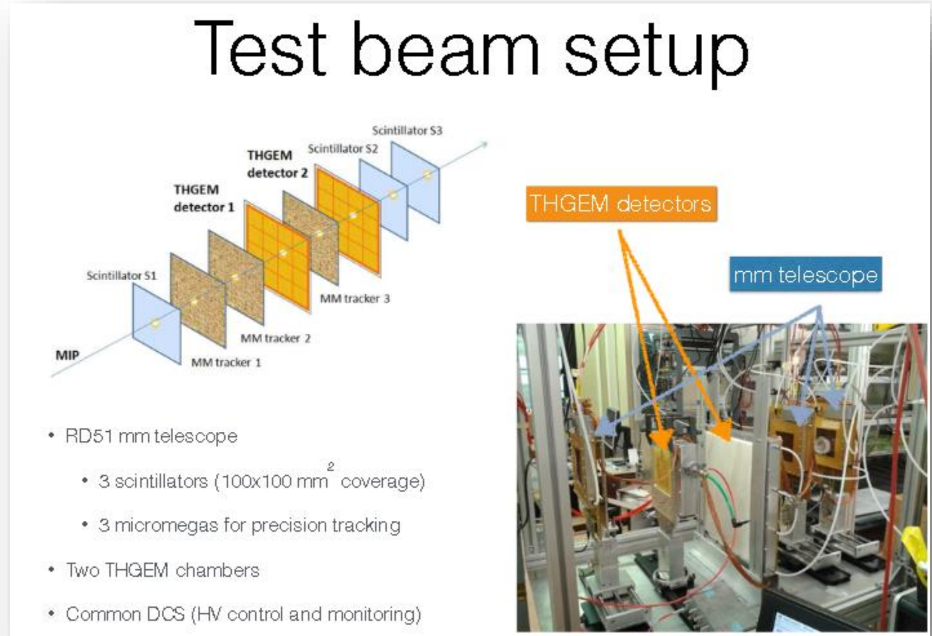
Weizmann et al.





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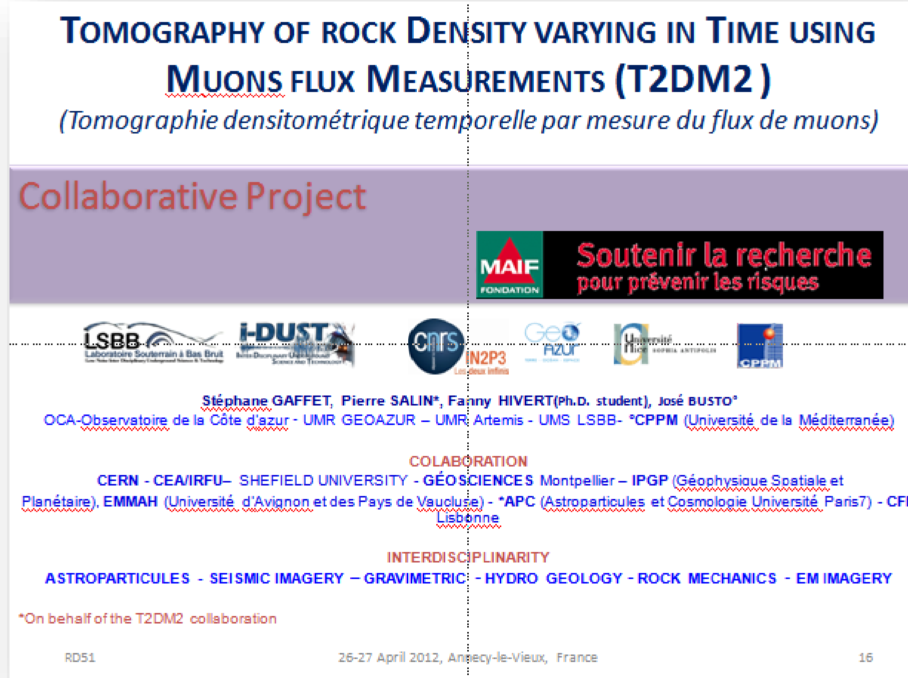
T2DM2(LSBB)



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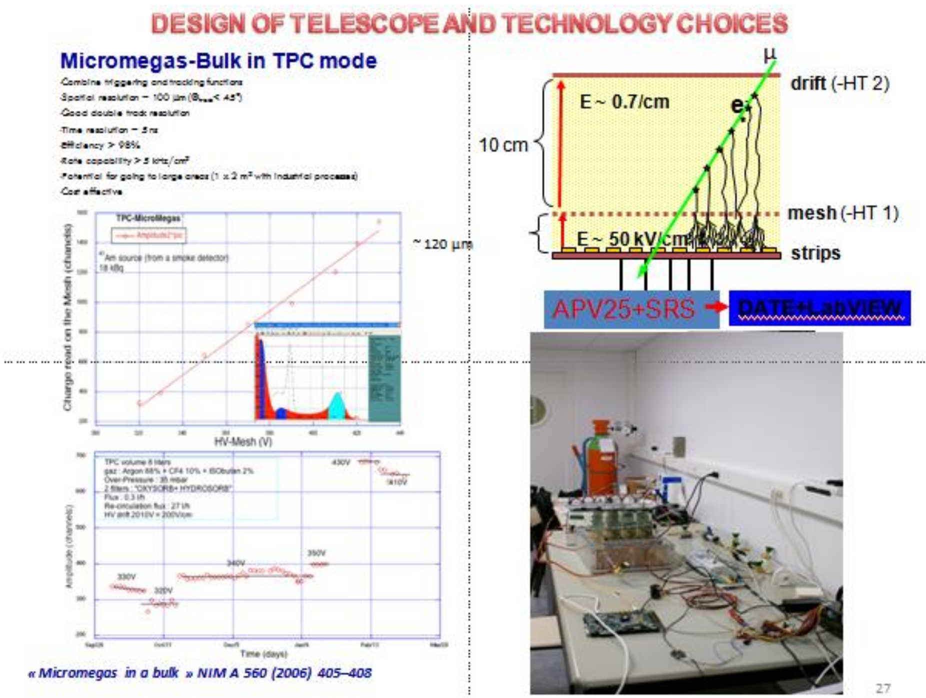
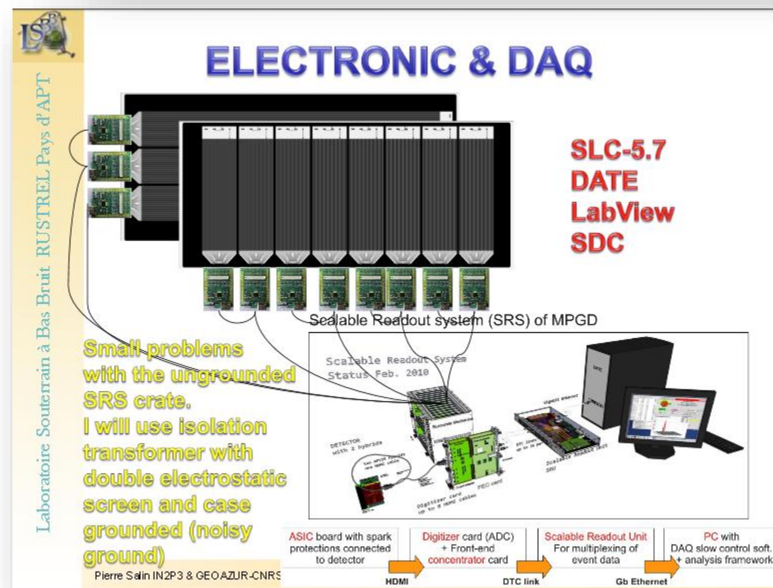


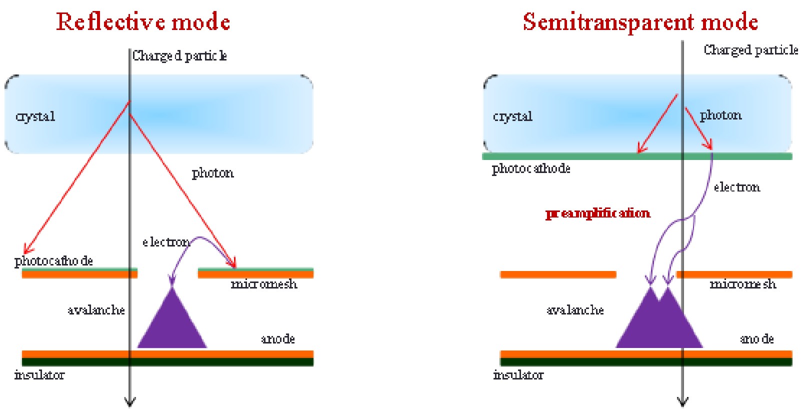


APV25 and Self-Triggering (Mesh) micromegas

Picosecond

Primary ionization: photoelectrons

- Cherenkov light produced by charged particles crossing a MgF_2 crystal
- Photoelectrons extracted from a photocathode (CsI)
  → Simultaneous & well localized ionization of the gas

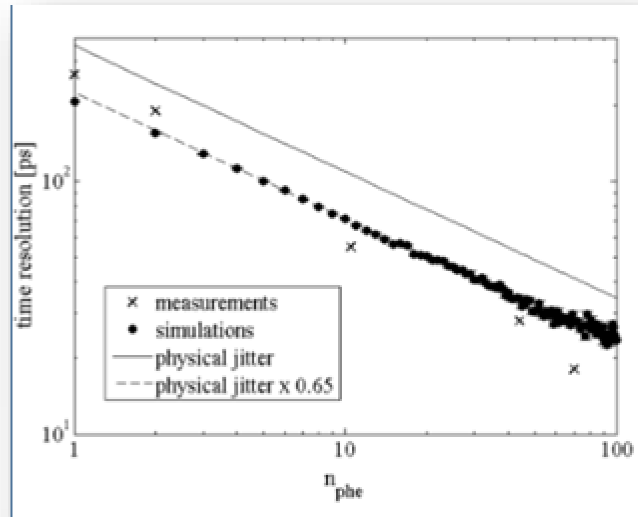


Irfu - CEA Saclay
Institut de recherche sur les lois fondamentales de l'Univers

15th RD51 Collaboration Meeting
18 - 20 March 2015
CERN

On the way to sub-100ps timing with Micromegas

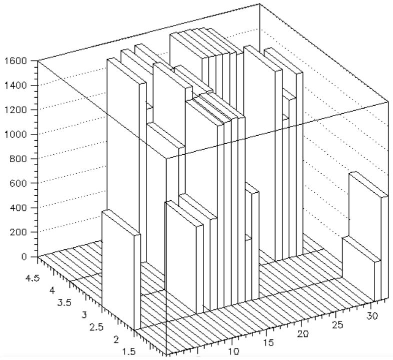
T. Papaevangelou
IRFU / CEA Saclay



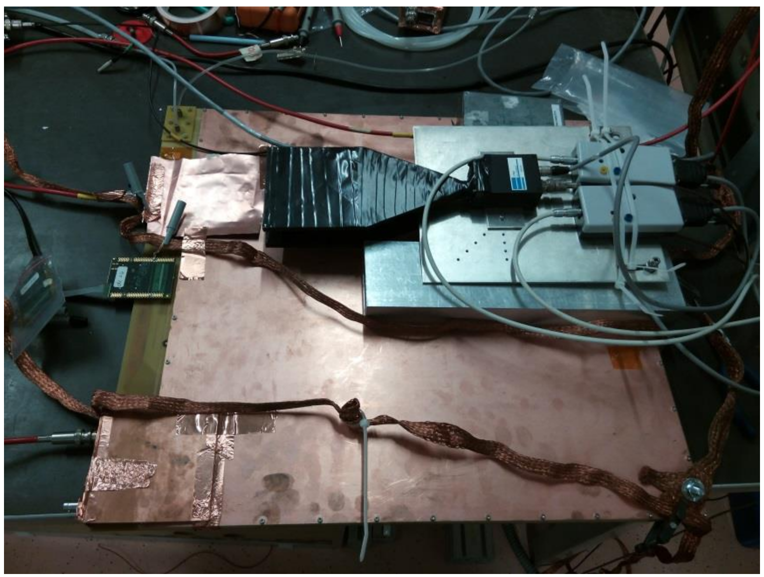
https://indico.cern.ch/event/365380/session/6/contribution/52/attachments/726496/996958/ThomasPapaevangelou_100psMM.pdf

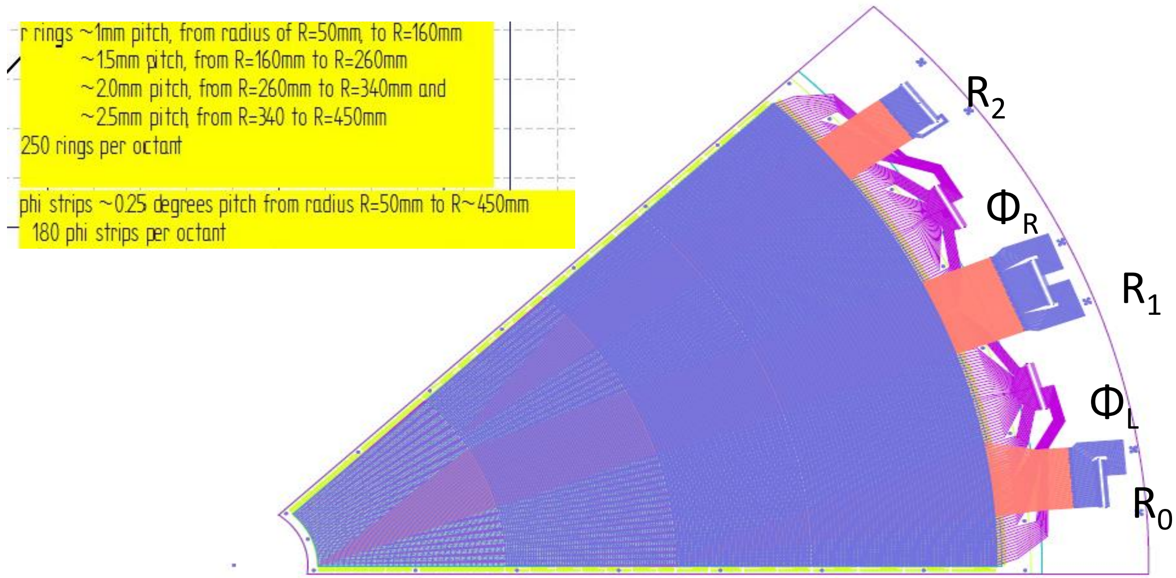
50x50 cm^2 MICROMEGAS for Shower Detection

4 columns of 32 pads each
1.5 x 12.5 cm^2 per pad



A Shower Event

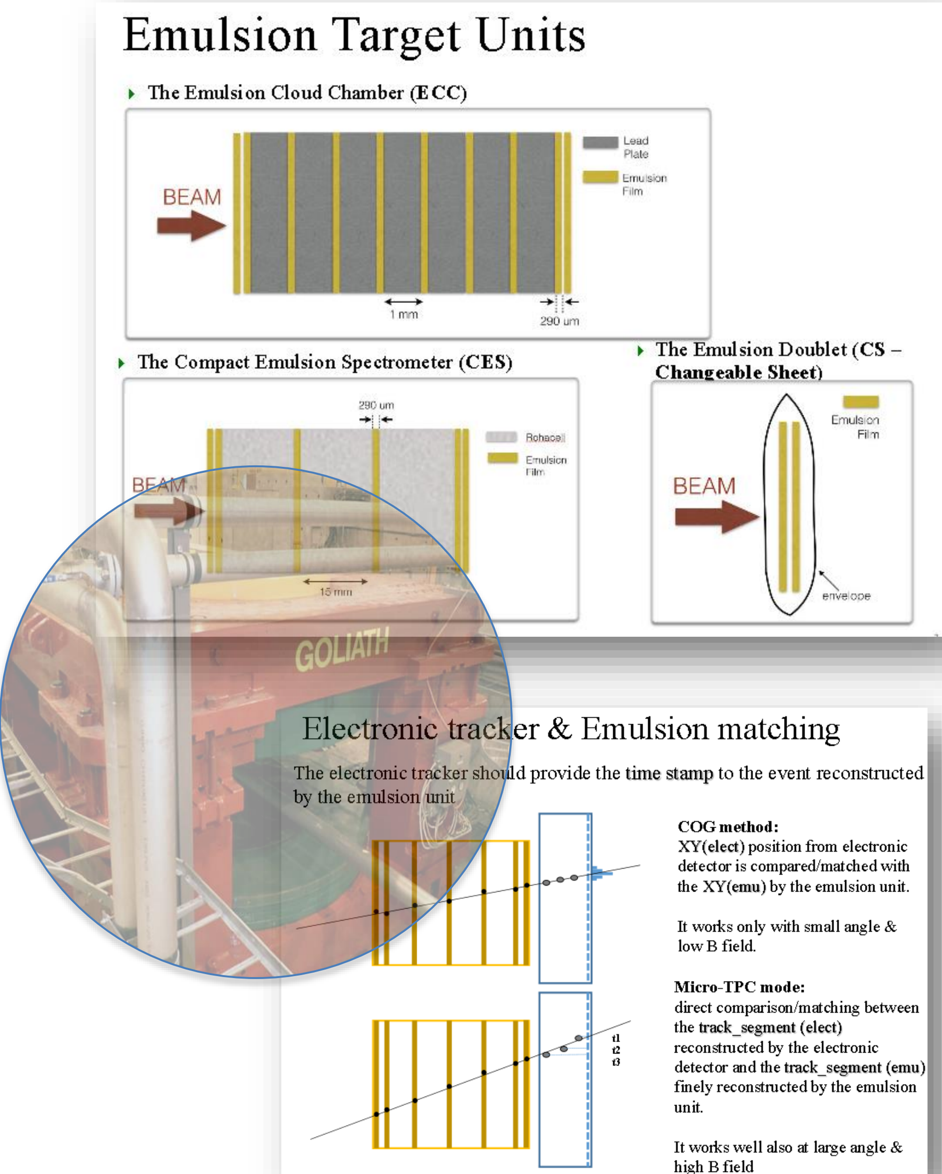


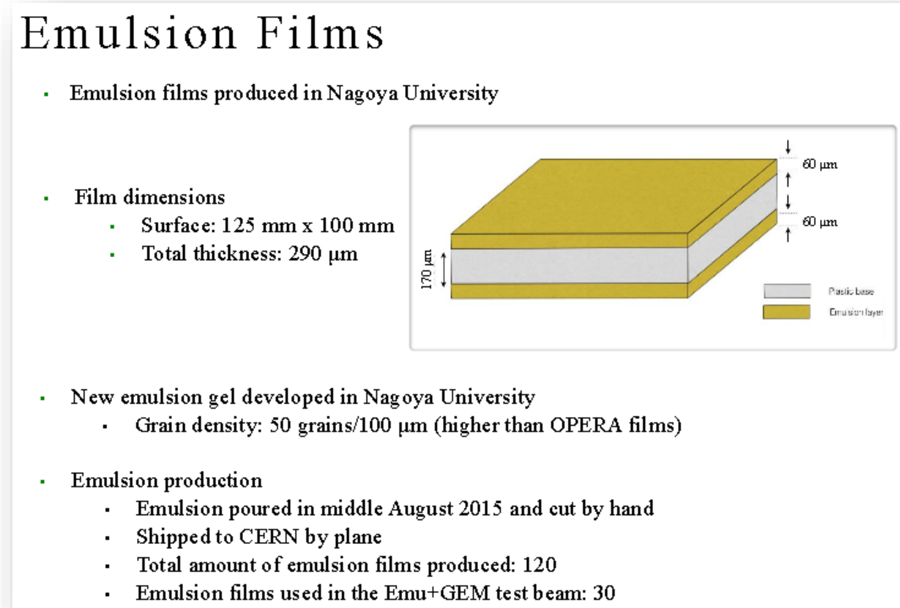


R-φ Micromegas
octant – segmentation and connectors

2 octants, to be integrated to two
TPC detectors (e.g. used as polarimeters)

SHIP: Emulsion and MPGDs





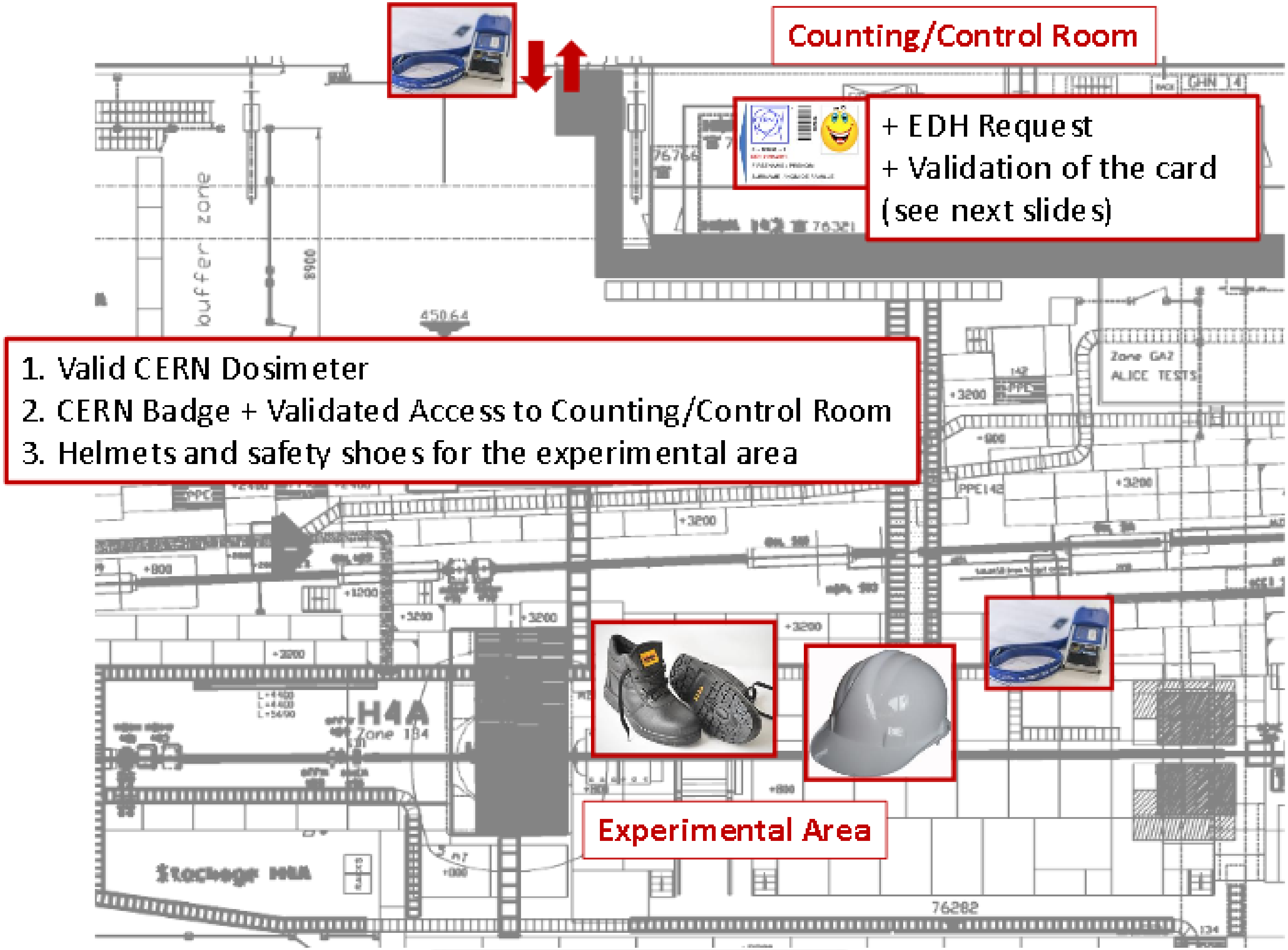
2015 rd51 test beam : Emulsion+gem/microresitive well
2016 rd51 test beam (?): Emulsion and micromegas

https://indico.cern.ch/event/457639/session/4/contribution/37/attachments/1202519/1750754/Risultati_test_beam_november_2015.pdf

…. and maybe Optical Readout….

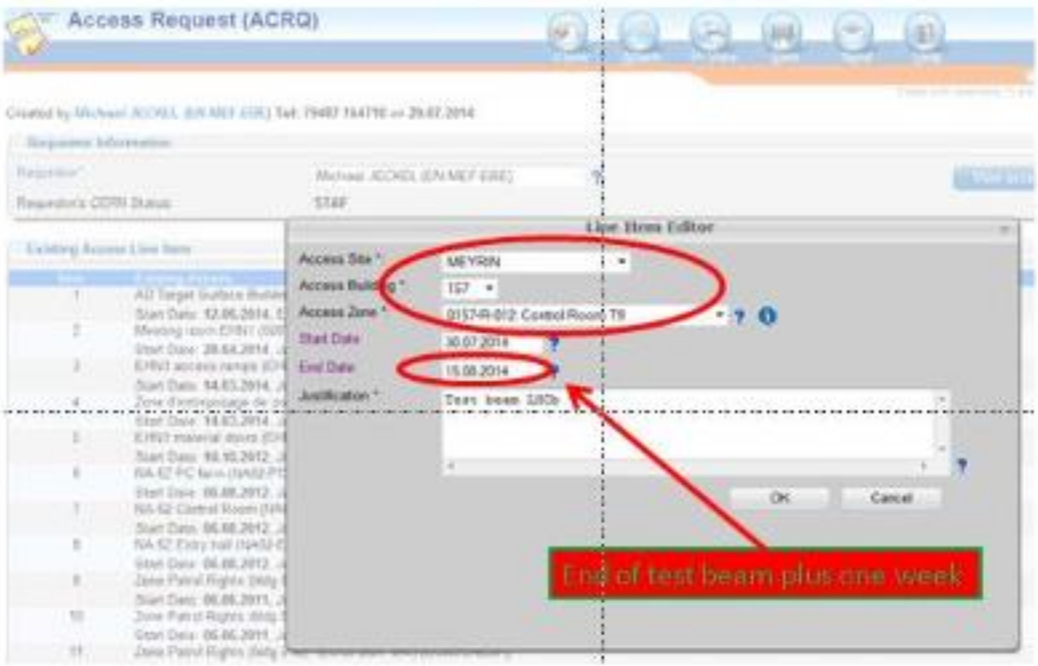
Some Practical info….

What you need to access the Test Beam



ACCESS TO THE CONTROL/COUNTING ROOM: To Be requested VIA EDH by each user

https://edms.cern.ch/document/1421828/1



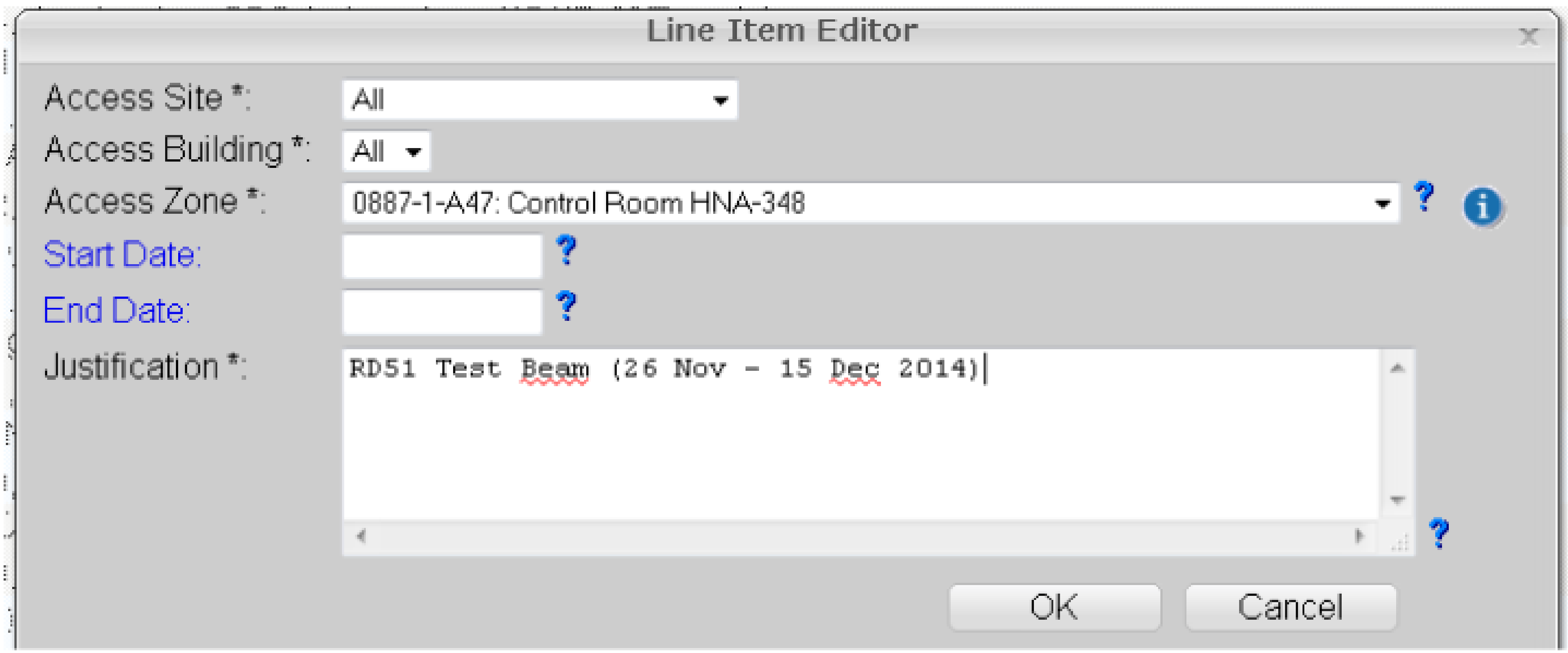
Online Reader to validate your access in: R1, R2, R3, EHN1

Ref. To previous link for more info

See next slide for the references to our Counting/Control Room

Our Counting/Control Room

SBA zone	Room number	User	Terminal	Phone	Barrack	Building / Office	Host Name
H4-134	887/R-K47	H4A	H4A	76282	HNA-348	887/1-A47	cwo-hna348-h4a



End Date: 1 week more suggested

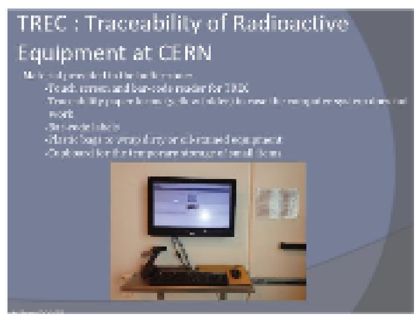
Material leaving the experimental area… just to keep in mind

any export of material from the CERN Experimental Area halls/buildings 157 (East Area), 193 (AD), 887 (EHN1), 888 (EHN2), 911 (ECN3) to an external destination must be:

registered in EDH using the Shipping Request form https://edh.cern.ch/Document/SHIP.

EDH Shipping Requests issued from the above mentioned areas (also for material declared as non-radioactive by the owner) are automatically forwarded to the relevant Radiation Protection Officer that will proceed with the compulsory radiological control before authorizing the transport.

Please note that this procedure also applies to material/goods belonging to external institutes as well as if the material is transported afterwards by the owner itself (e.g. CERN transport services not required in the EDH form).



We will take care of this but keep in mind that you cannot simply leave the area with your equipments without having RP check

New procedure, i.e. possible delay

https://sps-schedule.web.cern.ch/sps-schedule/RadioProtectionDocuments/BufferzoneEHN1-english.pdf

Fluorinated gases

From: Yorgos Tsipolitis [mailto:Yorgos.Tsipolitis@cern.ch]
Sent: Wednesday, February 24, 2016 3:06 PM
To: Olga Beltramello
Cc: Yorgos Tsipolitis; Alexandre Desmarest; Letizia Di Giulio; Maurici Galofre Vila; Eraldo Oliveri
Subject: Re: fluorinated gases

Dear Olga

please find the information concerning the CF4 gas in RD51. As I told you on the phone we only have one group that participates in our test beam periods and uses CF4 gas. It is the CMS GEM upgrade.

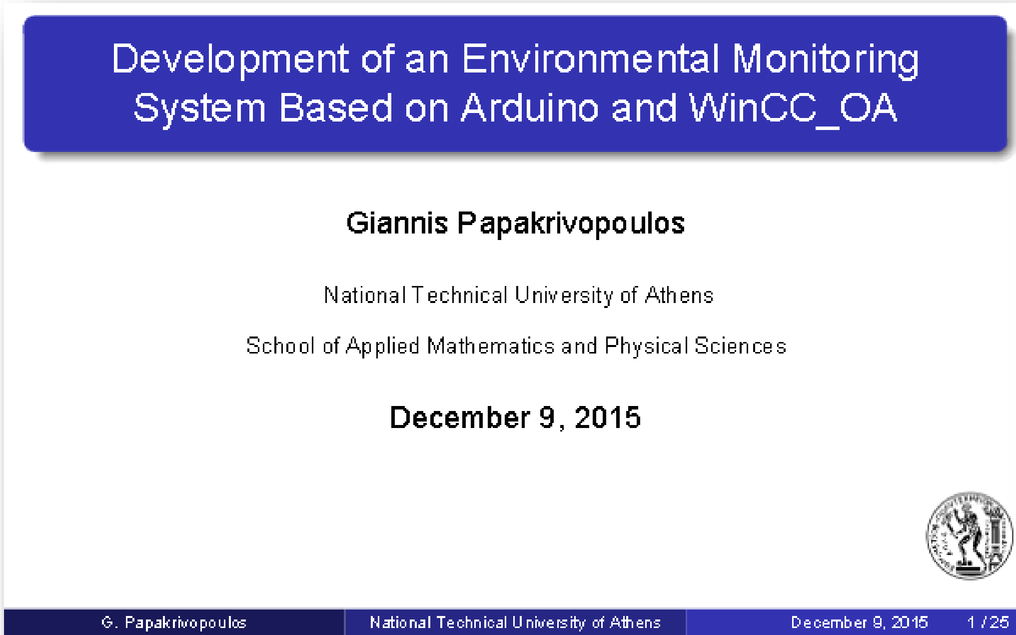
- Handling fluorinated greenhouse gases for experimental purposes – particle detection,
- Names of responsible people: Ilaria Vai (EP-CMG-PS), Sinem Salva (EP-UCM), Brian Dorney (EP-CMX-DA), Jeremie Alexandre Merlin(EP-CMX-DA), and Michele Bianco (EP-CMX-DA),
- Rate of gas should not exceed 5 L/hr
- the gas is flashed at the exhaust line provided in the H4 gas zone.

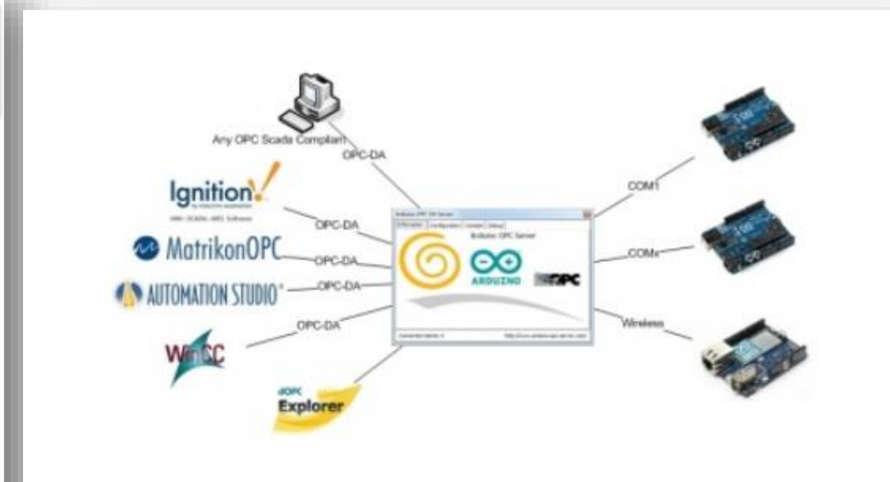
Further more if there will be some training for the CF4 gas handling may be it is good that myself (Yorgos Tsipolitis) as glioms of RD51 and Eraldo Oliveri as technical coordinator follow the course as well.

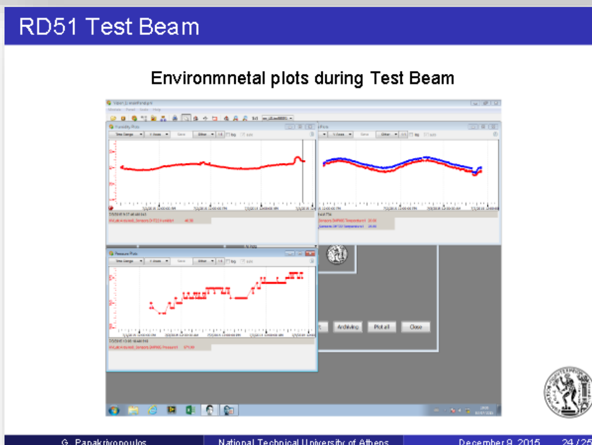
If you have any more questions please let me know

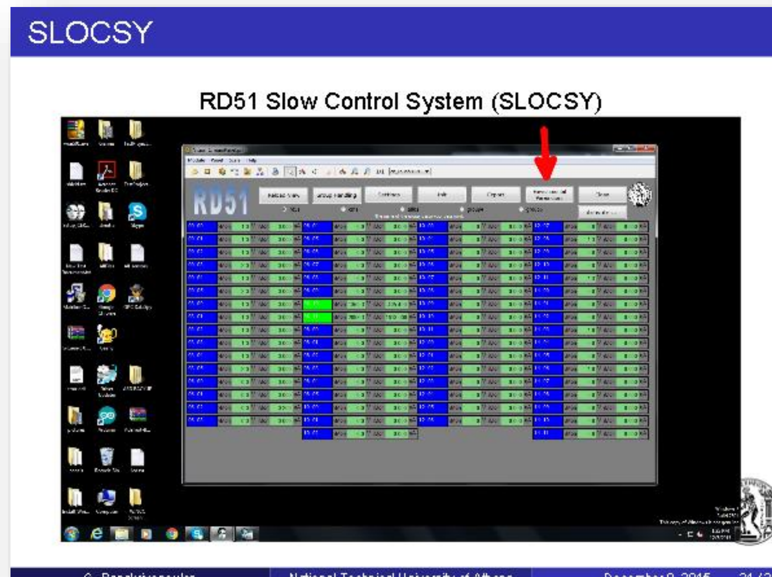
best regards

Yorgos



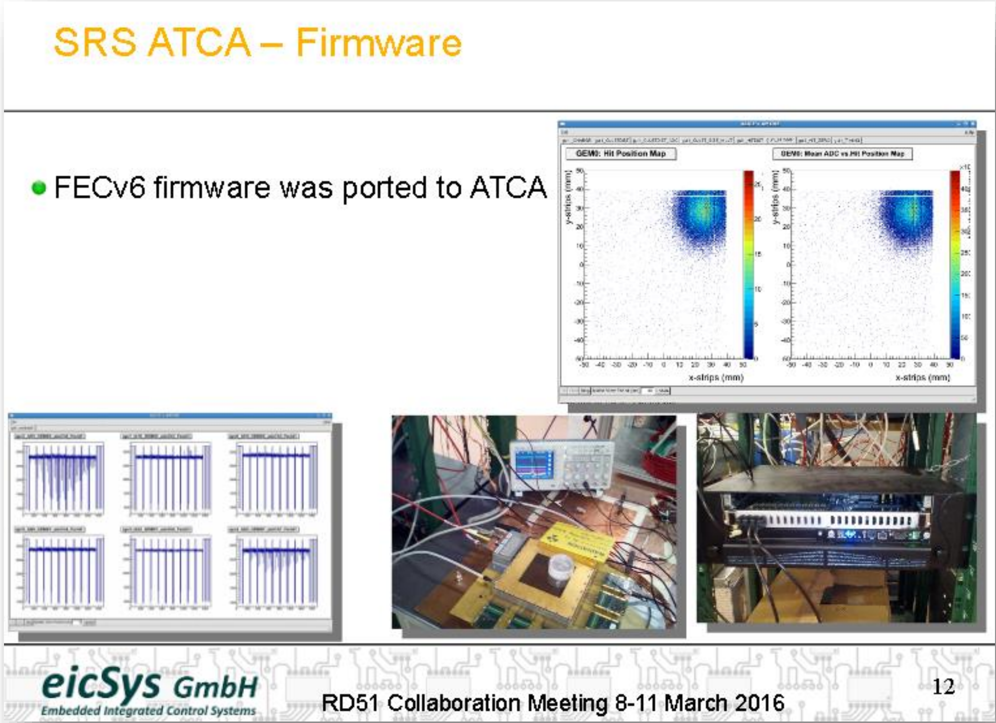


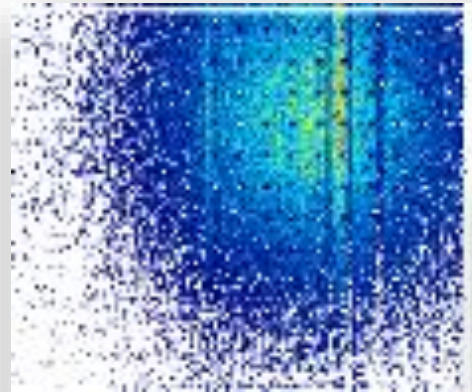


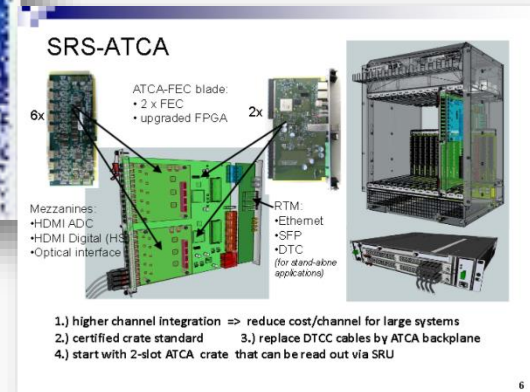


https://indico.cern.ch/event/457639/session/4/contribution/40/attachments/1202340/1750427/RD51MiniWeek_Arduino.pdf

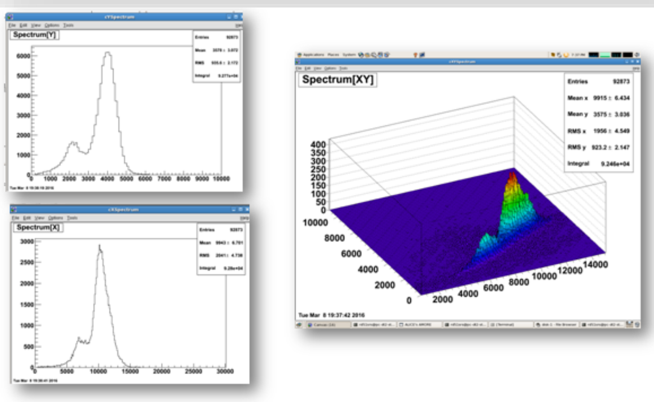
ATCA SRS in BEAM





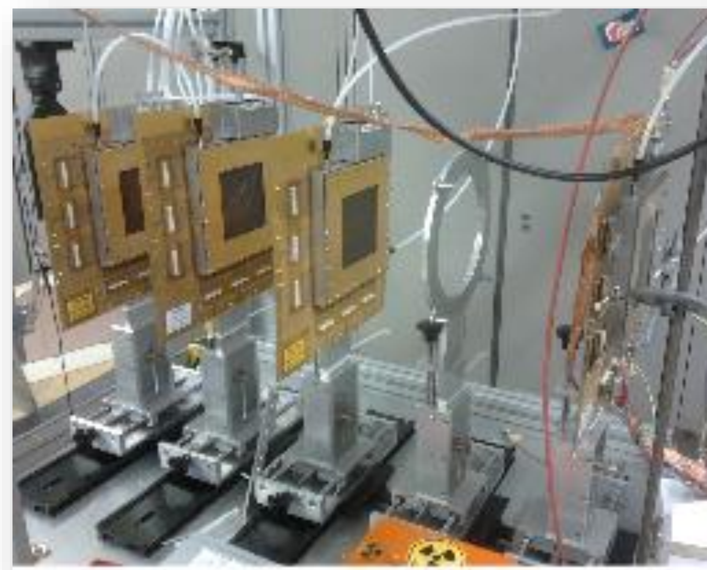


From lab to test beam

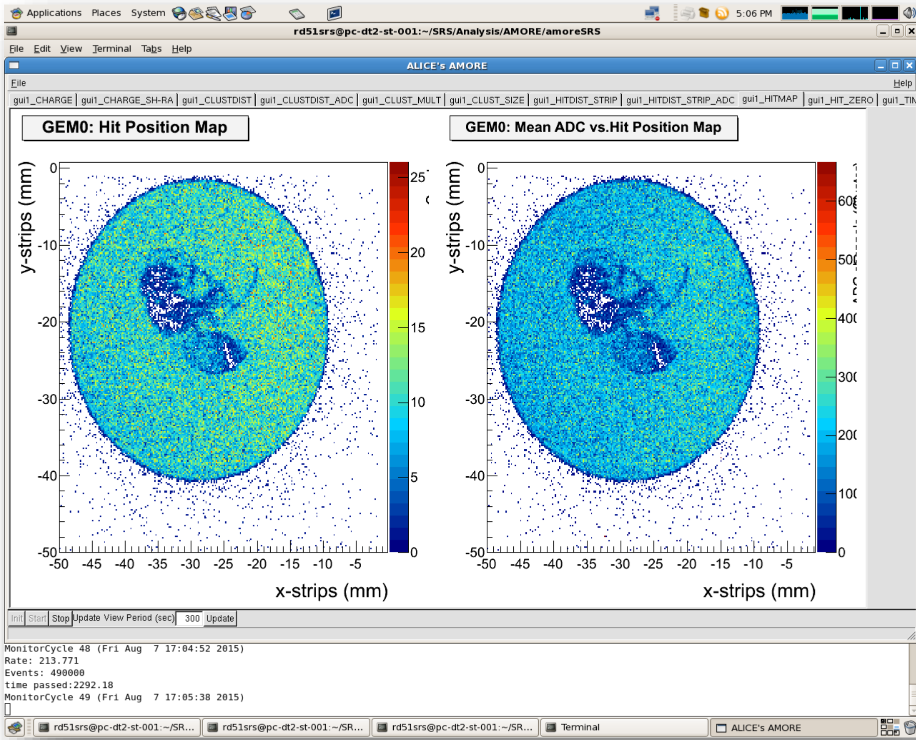


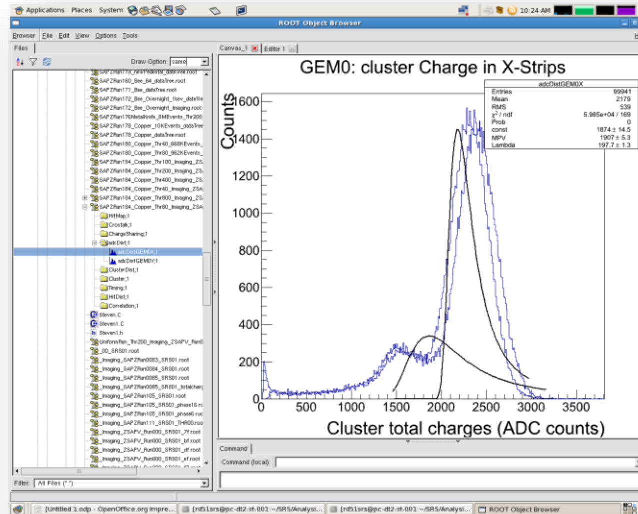
Charge spectrum in the two coordinates, correlation and sharing.
Additional Noise Rejection should be applied to clean up events and remove possible cross talk (not ATCA related)

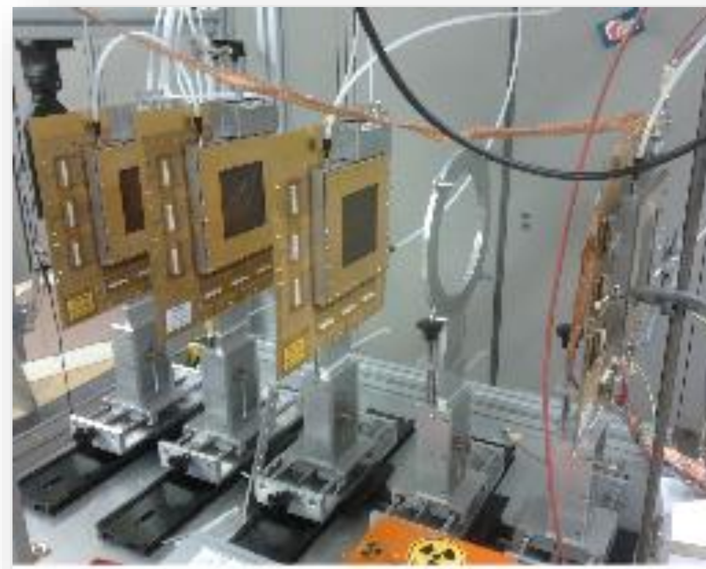
https://indico.cern.ch/event/496113/session/2/contribution/11/attachments/1241018/1824951/ATCA-SRS-GEMROC.pdf



SRS & Zero Suppression Firmware







From lab to test beam