

WG7: Common Test Facilities

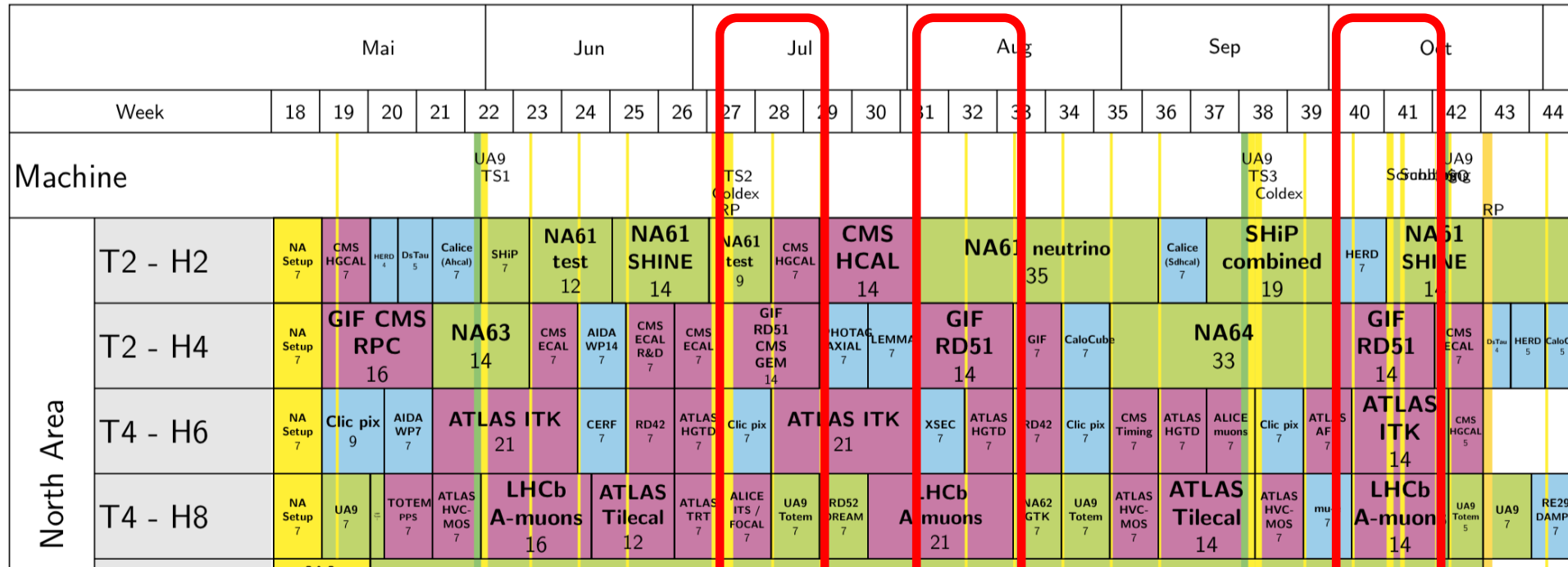
Eraldo Oliveri

Yorgos Tsipolitis

2017 SPS user schedule for 2017

schedule issue date: 14-Nov-2017

Version: 2.4 ■ LHC Exp. ■ PS/SPS Exp. ■ Other Exp. ■ INT Exp.



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 Raspberry system for environmental

WinCC OA

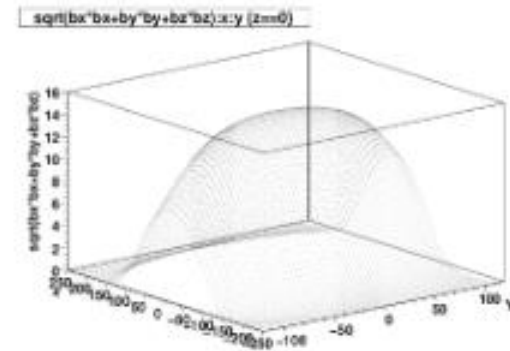
Raspberry Pi Project – Live plots from test beam 7/7- 19/7





M. Alfonsi (CERN)

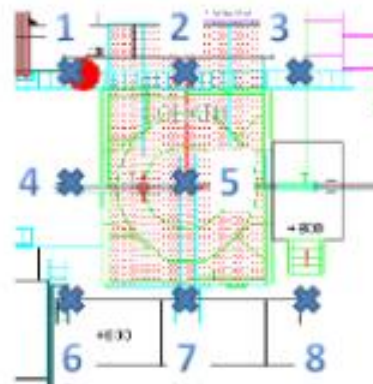
RD51-WG7 2009-VI 28/04/2009



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

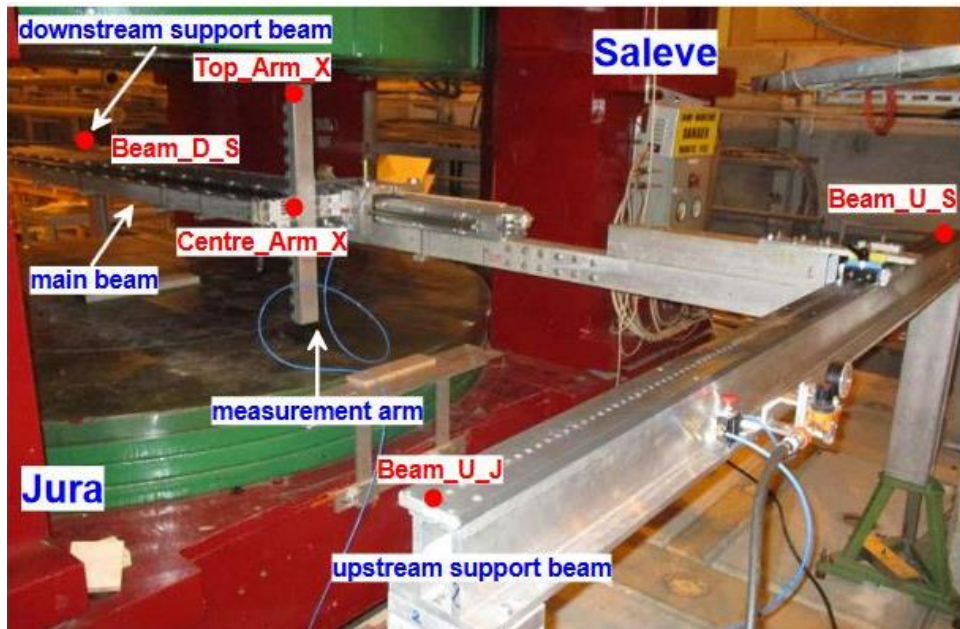
Power: about 2MW
 Maximum field: 1.4T
 Gap volume: around 8 m³

http://ab-div-po-mpc.web.cern.ch/ab-div-po-mpc/Pages/SPS_EA/Spectro/Goliath/Goliath.htm

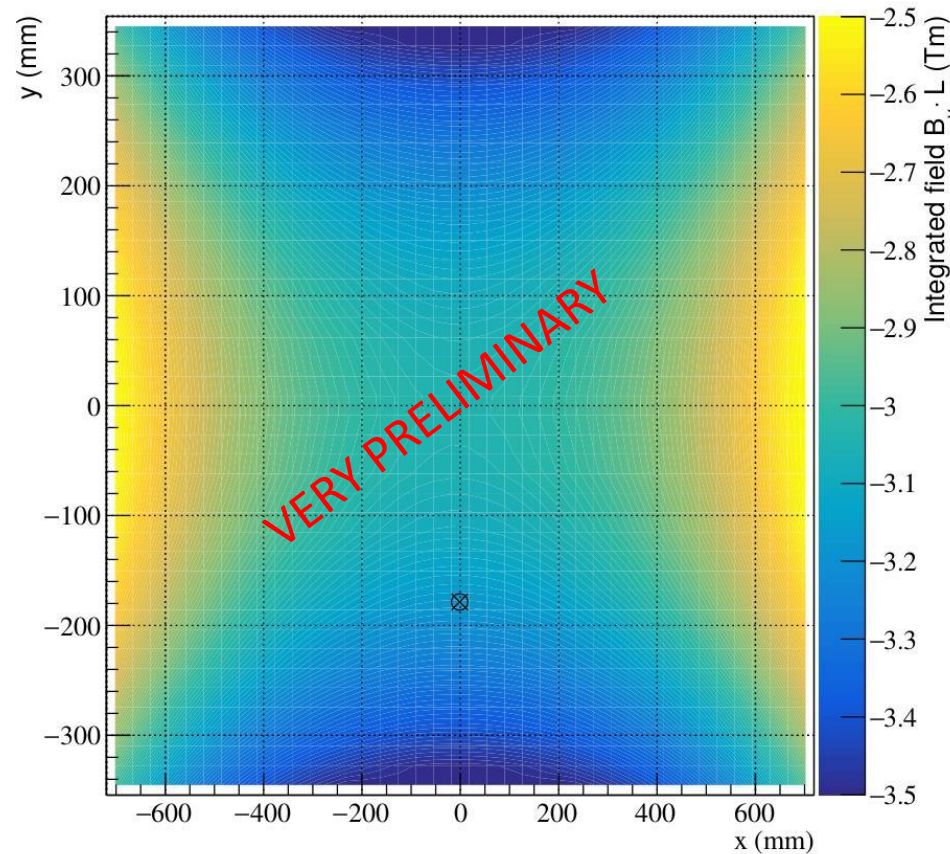
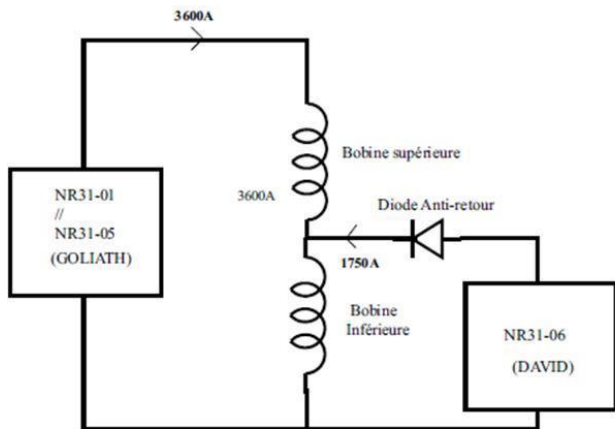


Point	Half Current	Maximum Current
1	0.0005 T	0.007 T
2	0.0004 T	0.010 T
3	0.0005 T	0.007 T
4	0.005 T	0.011 T
5	0.868 T	1.518 T
6	0.0003 T	0.006 T
7	0.0009 T	0.009 T
8	0.0004 T	0.008 T

New Measurement of GOLIATH Field



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

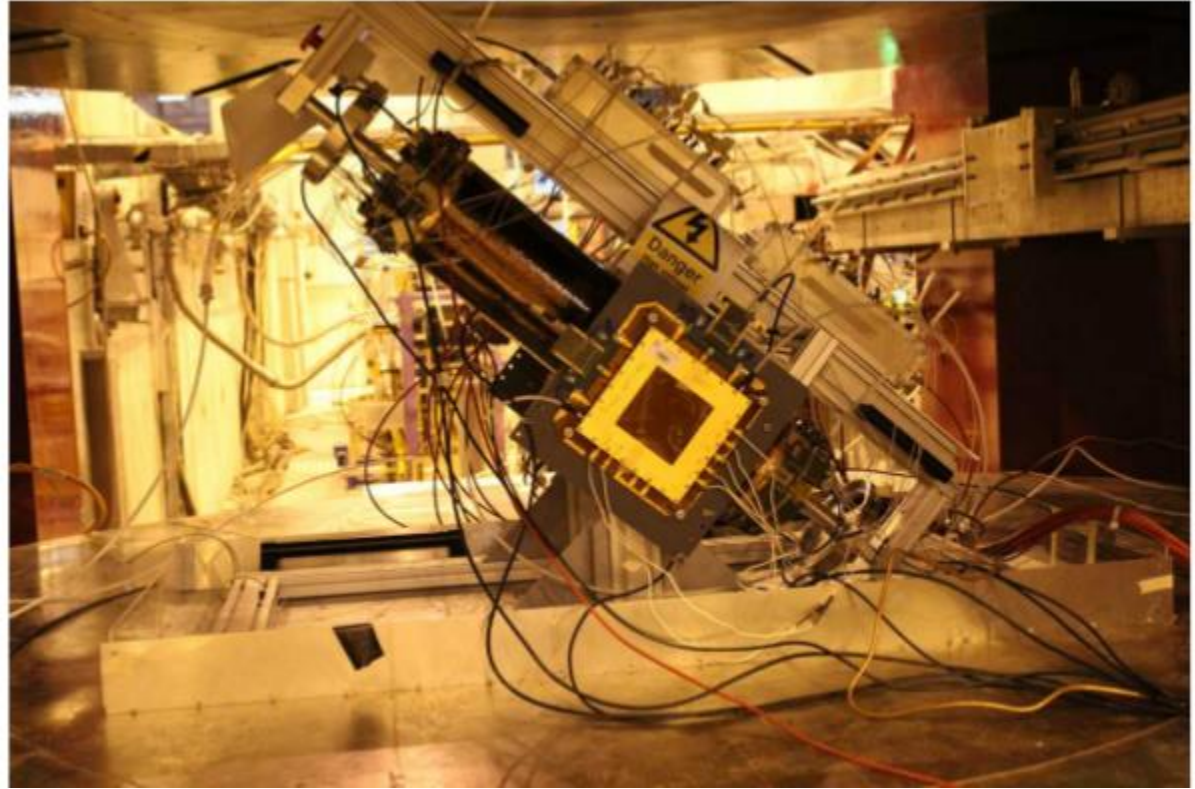


To have GOLIATH with full field we have to have also DAVID on

July period

BES III

(Almost) Final Detector



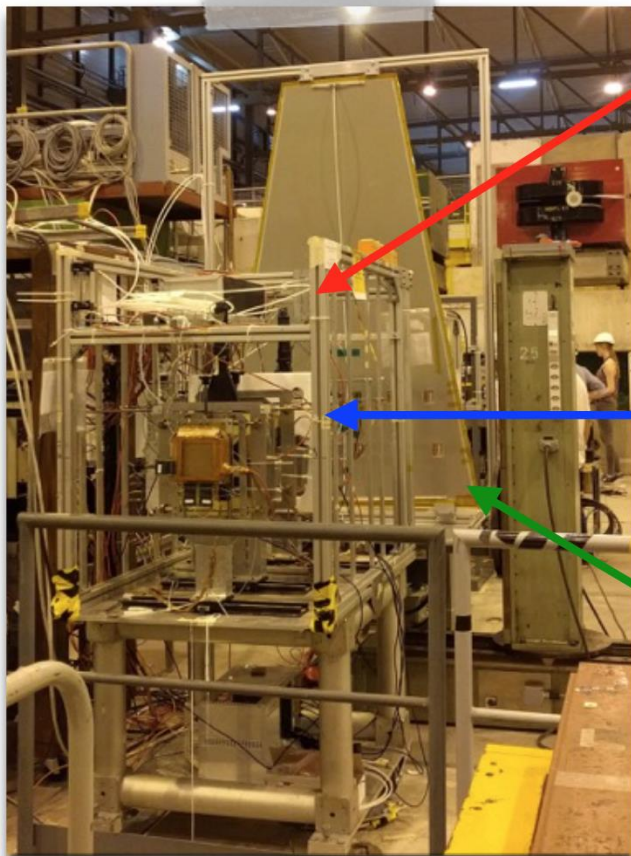
run with pions
HV scan – no B
HV scan – B = 1.5 T
B scan
Drift field scan
Transfer field scan
Induction field scan

https://indico.cern.ch/event/667256/contributions/2733261/attachments/1530896/2396029/bes3_activities_Mezzadri.pdf

μ -RWELL Test Beam @ H4

When: 5 - 19 July 2017

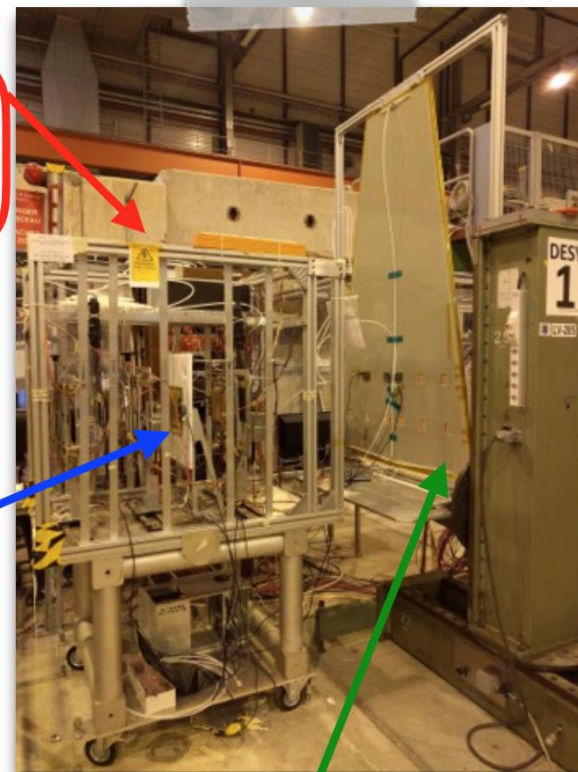
Setup:



2 GEM Trackers
(10x10 cm²)
RD51 setup

2 μ -RWELLS
(10x10 cm²)
HR scheme

1 μ -RWELL
(CMS-GE2/1 M4 shape)
LR scheme

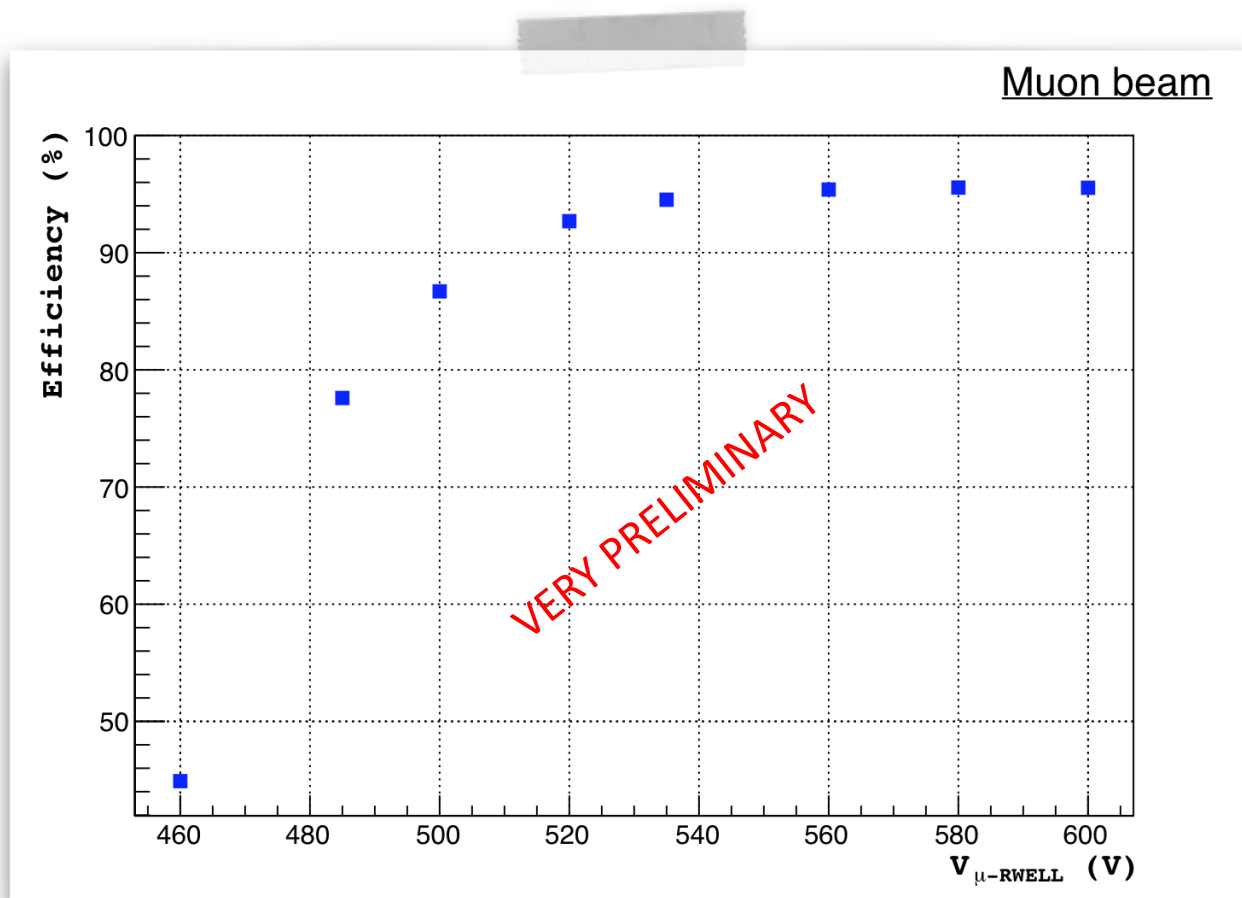


HR proto: HV_{WELL} scan

◆ Drift Field = 2.5 kV/cm

◆ $V_{\mu\text{-RWELL}}$ = scan

$$\text{Efficiency} = \frac{\# \text{ hits (Tracker 1 \& Tracker 2 \& HR proto)}}{\# \text{ hits (Tracker 1 \& Tracker 2)}}$$



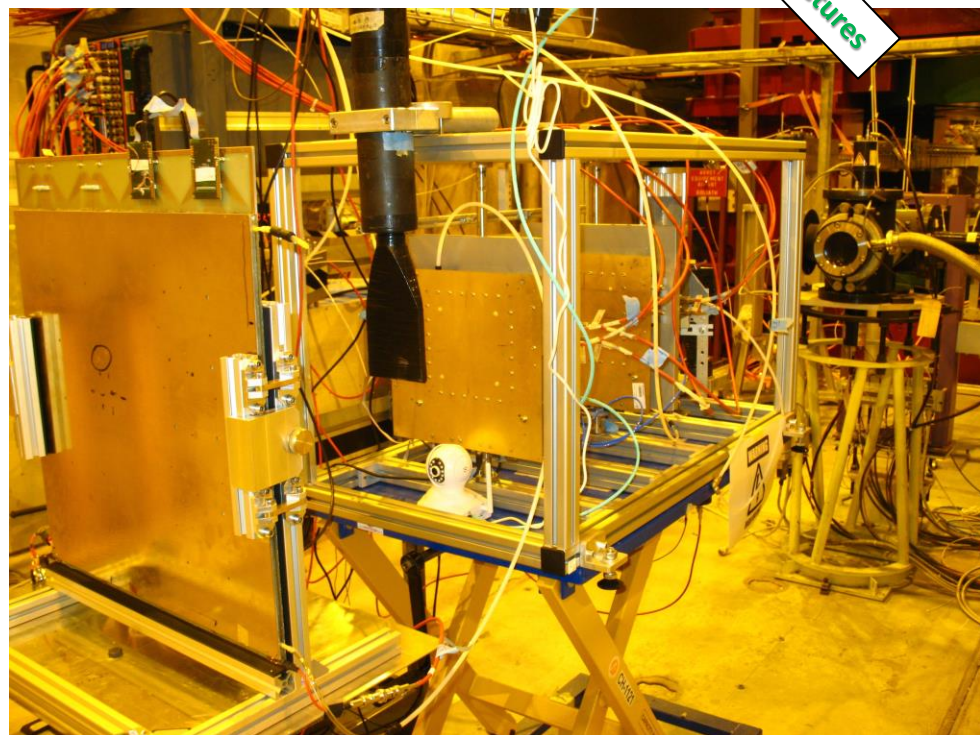
July period

RPWELL

Novel Structures

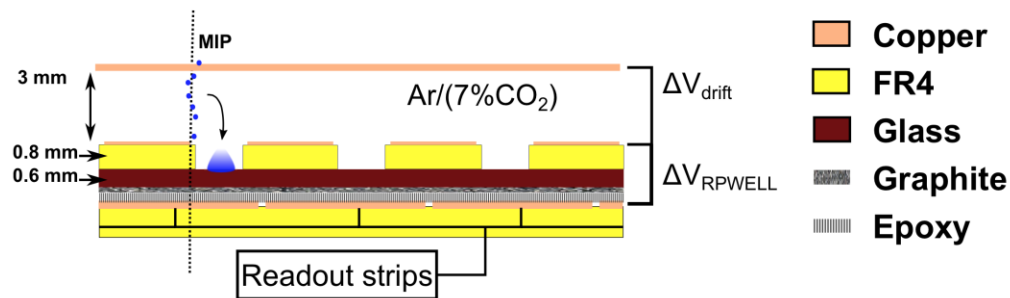


500 x 500 mm²



Measurements accomplished:

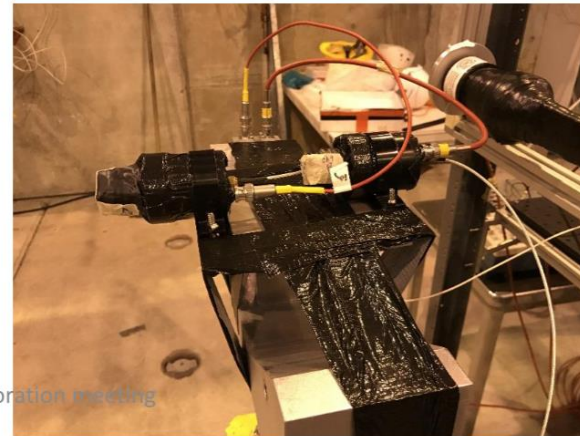
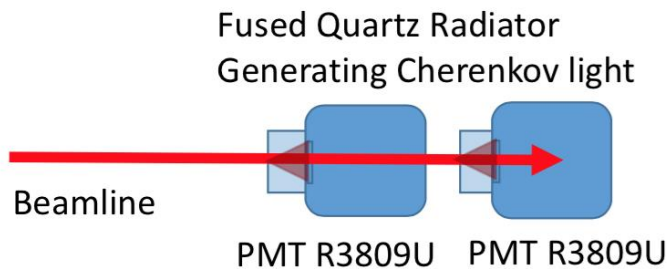
- ✓ Scan area with muons
- ✓ Gain uniformity
- ✓ Electrical stability



FTOF Prototype for Beam Test

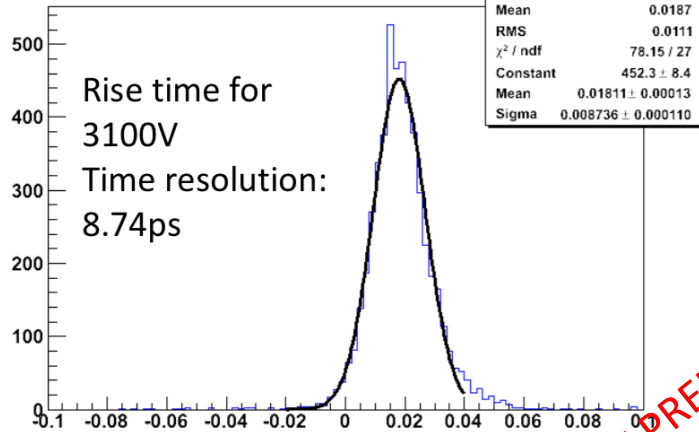
A FTOF prototype consists of quartz radiator, two MCP-PMT and Readout electronics.

- Quartz Radiator: JC-H02 fused silica from Quartz & Special Glasses Institute(Beijing)
- MCP-PMT: Recent R3809U from Hamamastu, R10754 in the future
- Readout electronics designed by USTC: Programmable Differential Amplifier(PDA) LMH6881/2 and Dual-threshold Differential Discriminator(DDD)

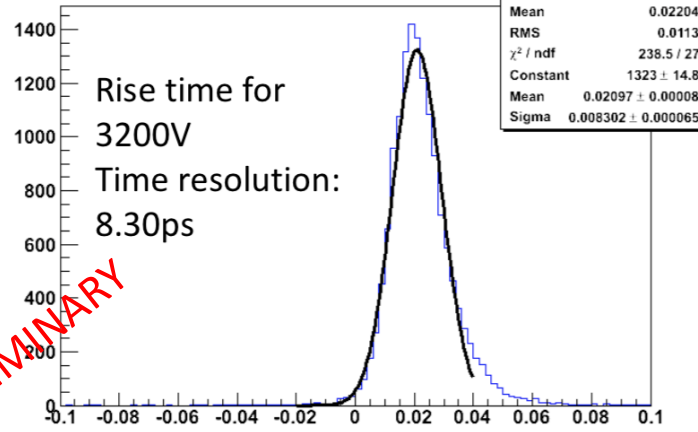


Time Distribution Readout by Oscilloscope

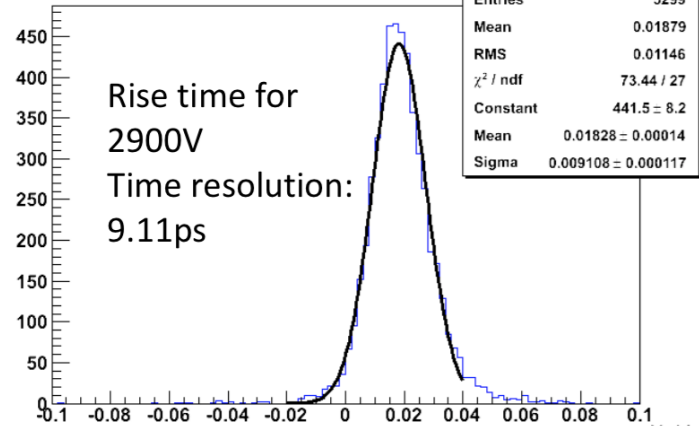
Rise time for 3100V



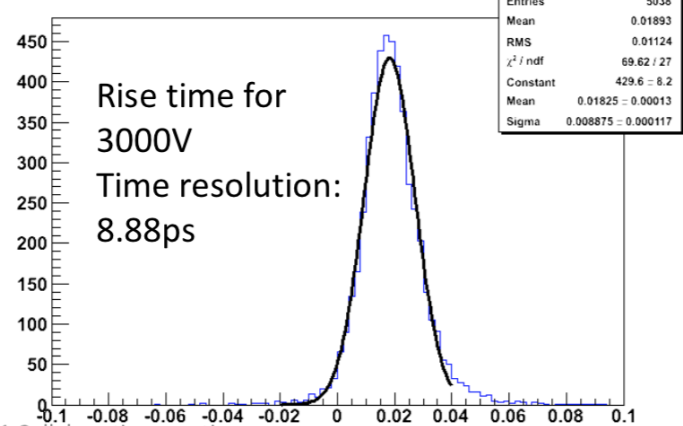
Rise time for 3200V



Rise time for 2900V



Rise time for 3000V



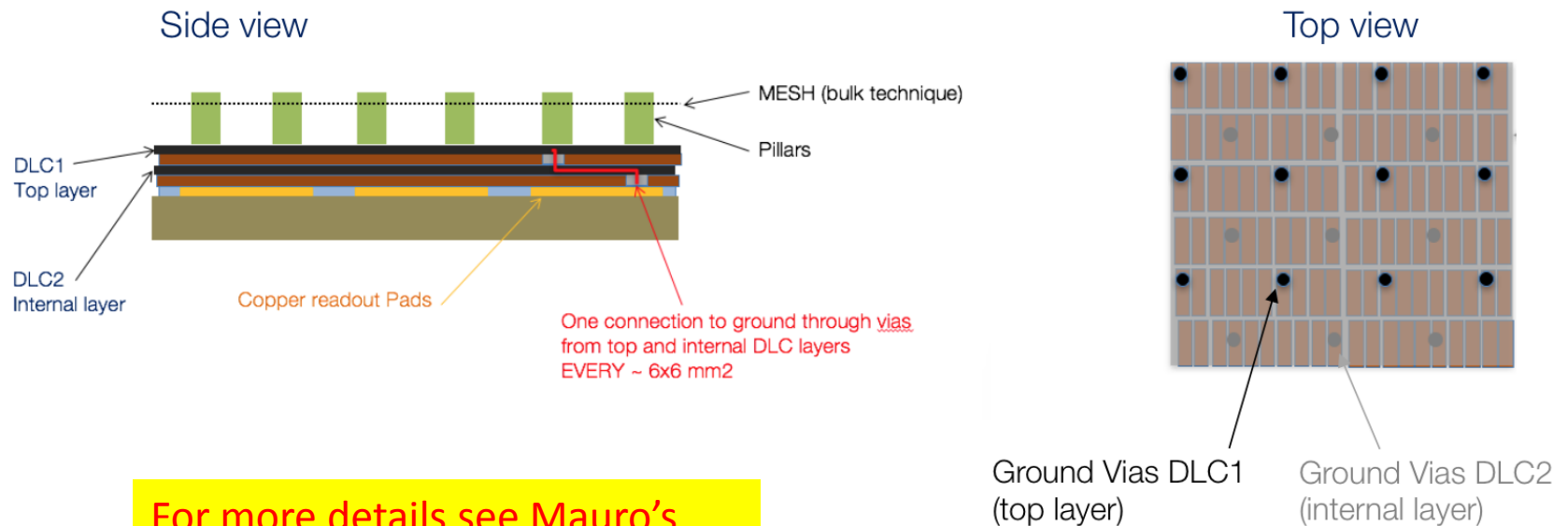
VERY PRELIMINARY

CURRENT DEVELOPMENTS – PADDY SERIES 2

SKETCH

"Consolidated" MPGD

- New Small-Pad Micromegas prototype with:
 - Double DLC resistive layer with a resistivity of $\sim 50\text{-}70 \text{ M}\Omega/\square$
 - Connection to ground through resistive vias
- Design driven by recent developments of μ -RWell detector



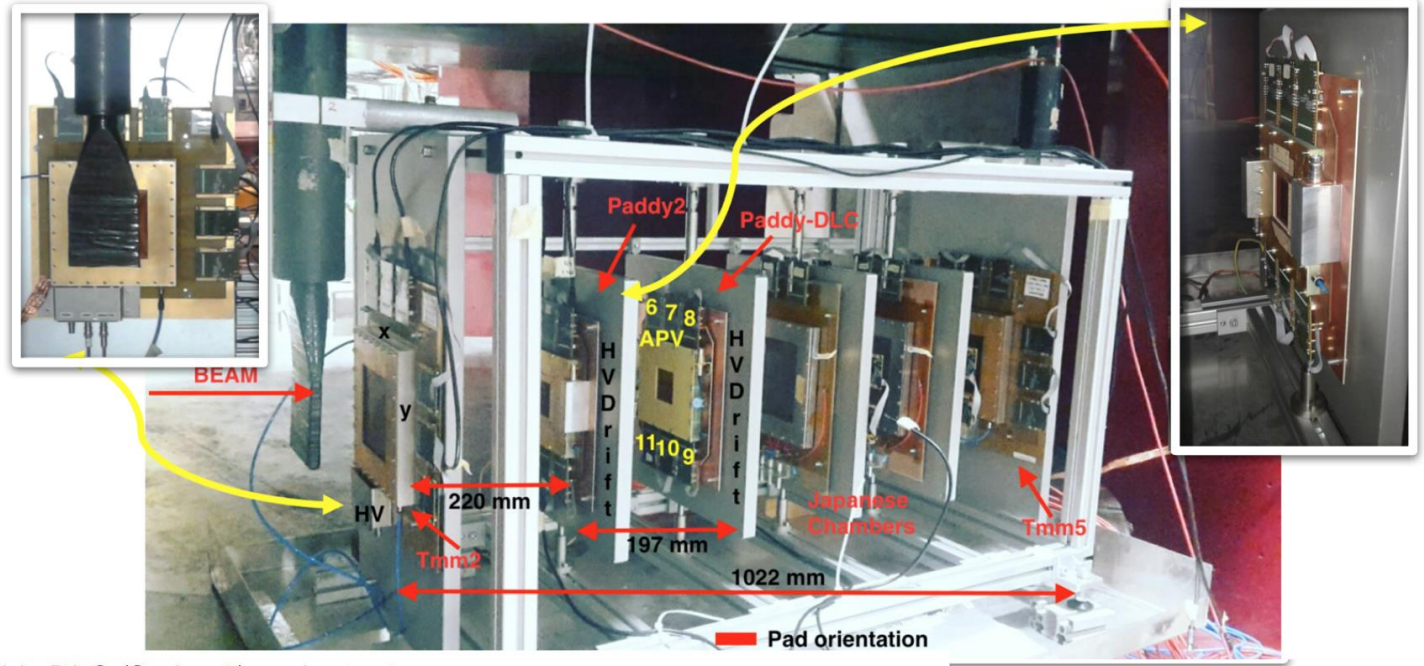
For more details see Mauro's talk in WG2



TEST BEAM – OCTOBER 2017

SPS H4 CERN
OCTOBER 2017

Beam:
high energy
muons/pions



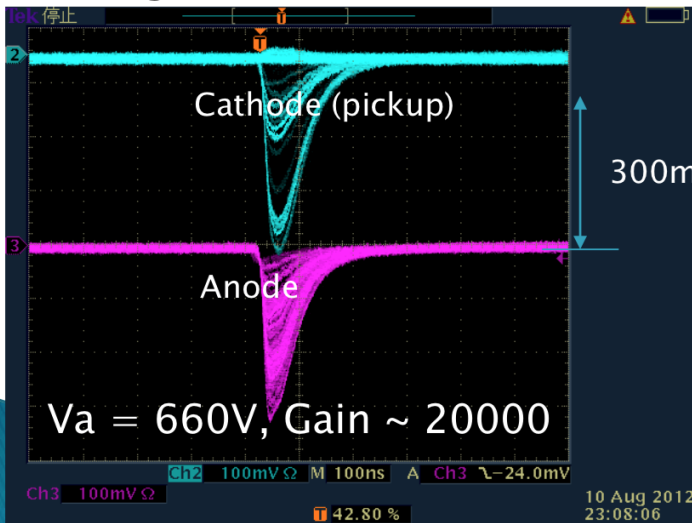
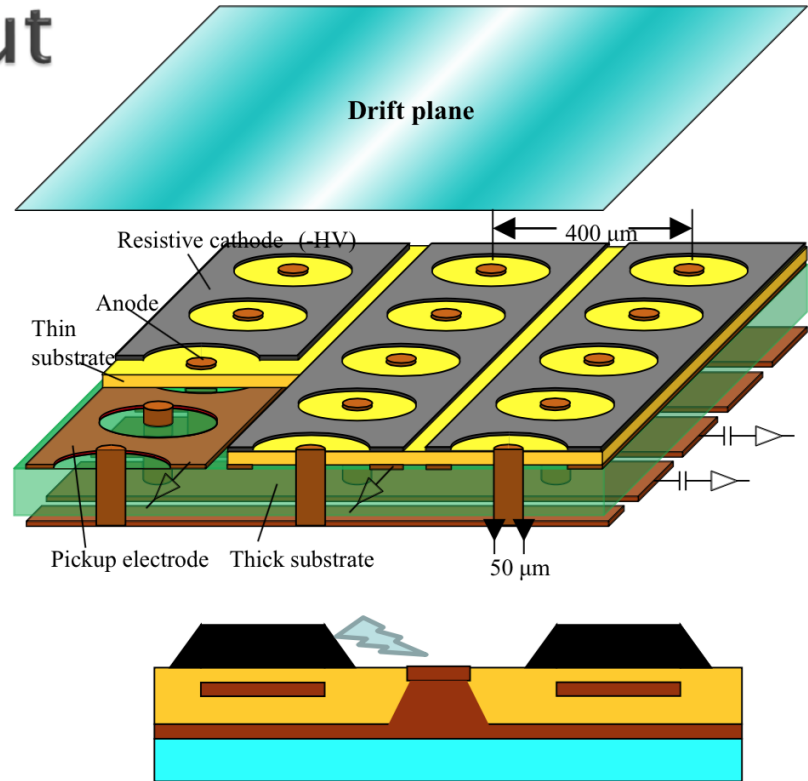
Setup:

- Paddy2 (series 1) and Paddy DLC (Series 2) under test
- 2 Tmm strips micromegas (x-y readout) for external tracking
- μ Pic and other micromegas by our Japanese colleagues in the same setup and same DAQ
- Gas: Ar:CO₂ 93:7
- Scintillators for triggering
- DAQ: SRS + APV25 with custom DAQ

by the way ..many thanks to our Japanese colleagues for the very effective and nice collaboration during data taking !

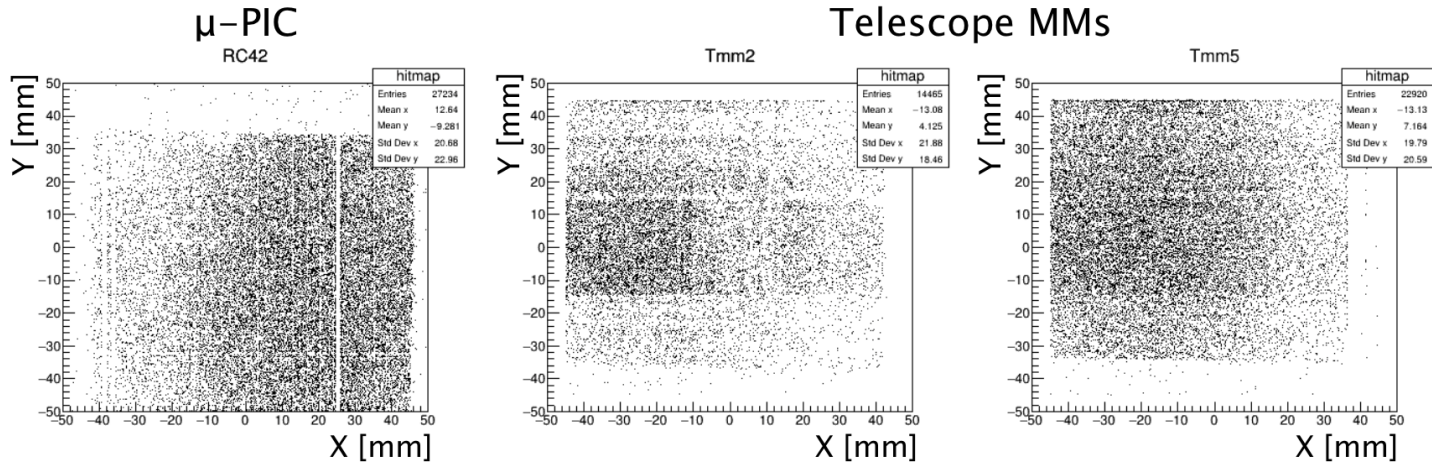
μ-PIC with resistive cathode and capacitive readout

- ▶ Detector design
 - All cathodes are made from carbon-polyimide
 - Pickup electrodes are lied under cathodes and insulator
 - We have two dimensional signals

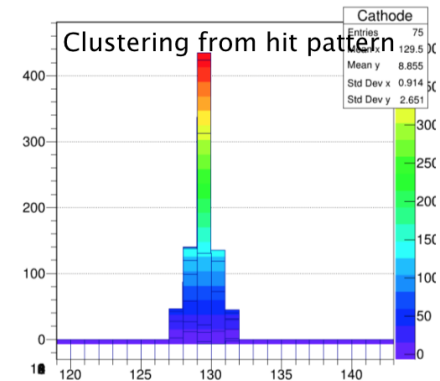
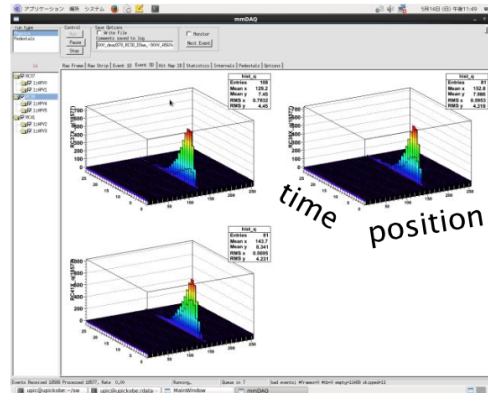


- Cathode signal on oscilloscope is inverted
- Two dimensional signal is induced on opposite sign.
- Not charge sharing.

2D hitmap (Muon run)



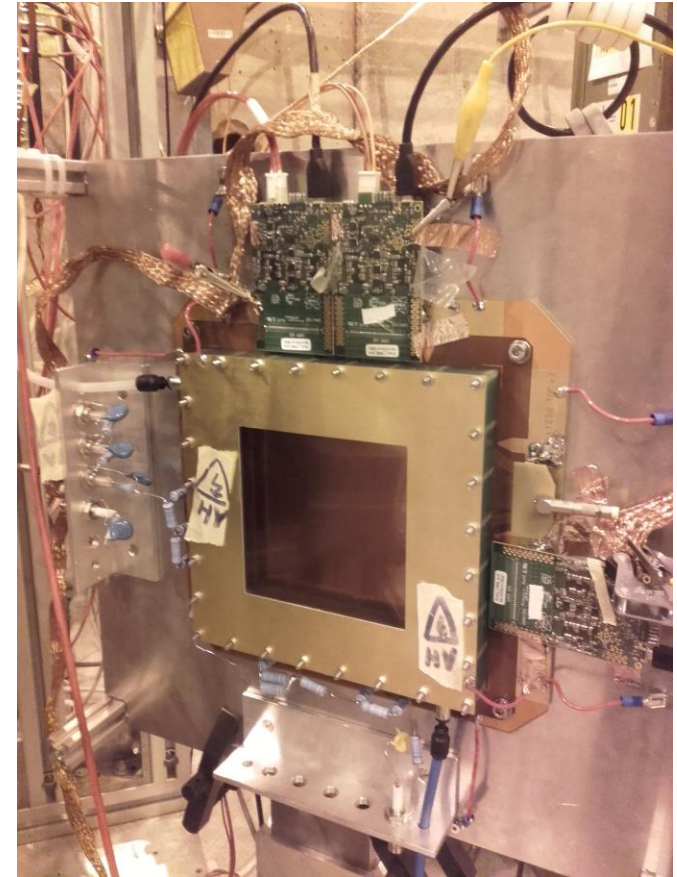
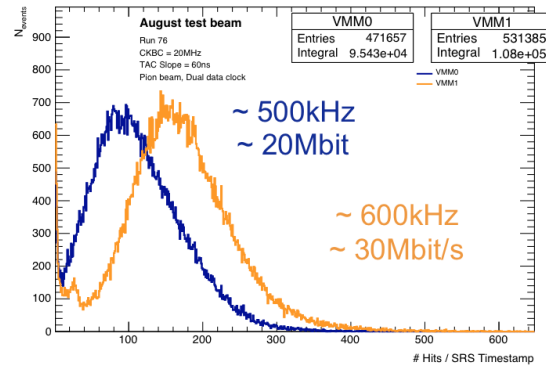
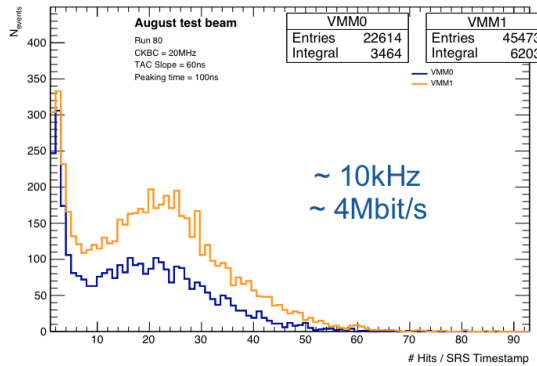
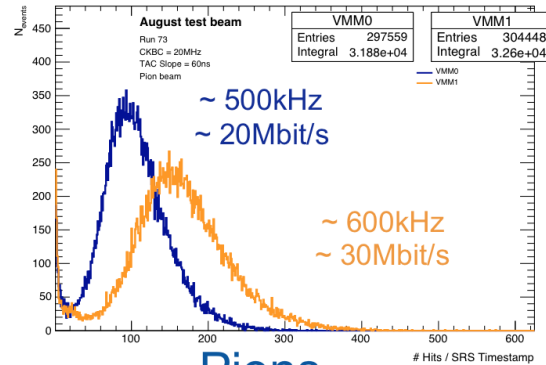
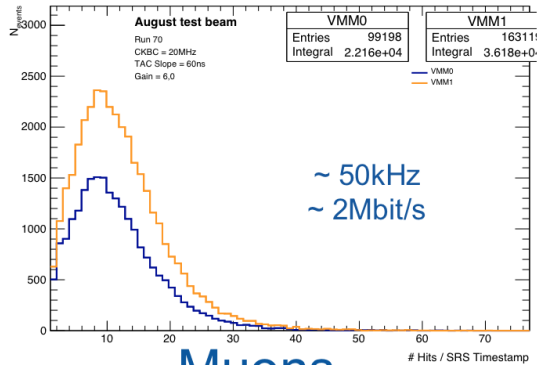
- Hit position:
centroid of mass
 $= \frac{\sum(x \cdot q_{max})}{\sum q_{max}}$
- (q_{max} means maximum ADX value)



July, August &
October period

VMM Test

Rates in muon and pion beam

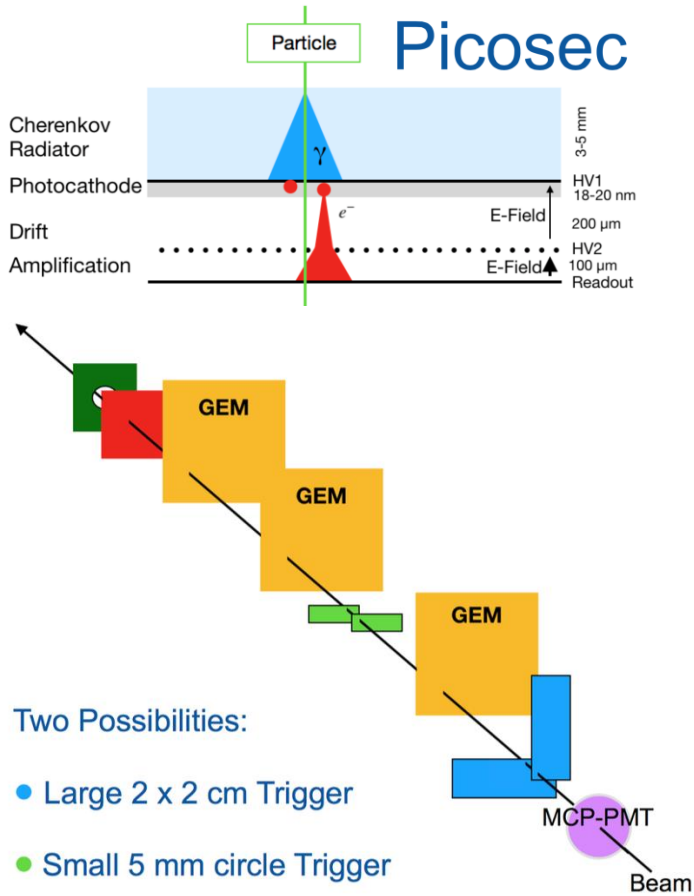


https://indico.cern.ch/event/676702/contributions/2820911/attachments/1575722/2488184/RD51_Miniweek_VMM3.pdf

July, August &
October period

PICOSEC

Novel Structures



Resistive Picosec HFS Multipad

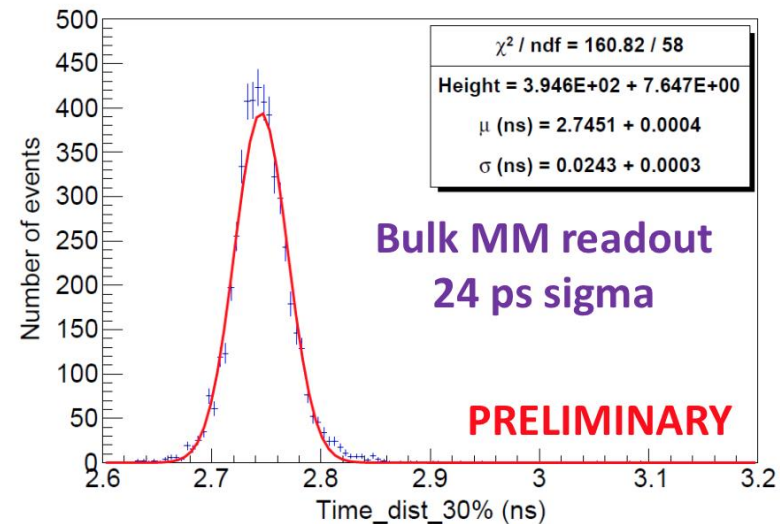
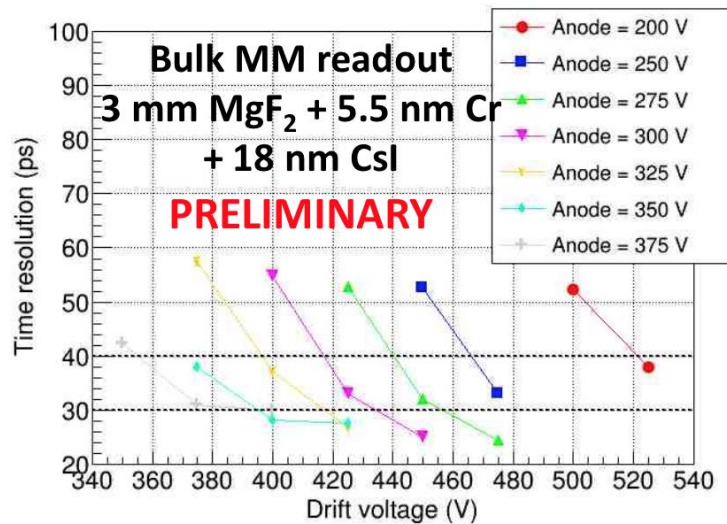


EP-DT
Detector Technologies

Lukas Sohl – RD51 Collaboration Meeting 2017

10

Timing measurements: beam tests



- Optimum operation point: Anode = +275 V, Drift = -475 V.
- **Muons:** Bulk readout (24 ps), resistive (35 ps). Nphe = ~10.
- **Pions:** First long runs (~1 hour) with resistive readout.



Further details: "Picosec" by L. Sohl (RD51-WG7 group, 27th Sep).

Plans for 2018

- 2018 is the last chance for test beam before the LS2
- We have requested 3 periods of 2 weeks each
- SPS schedule will come out around the end of January