

DRD1 test beam campaigns

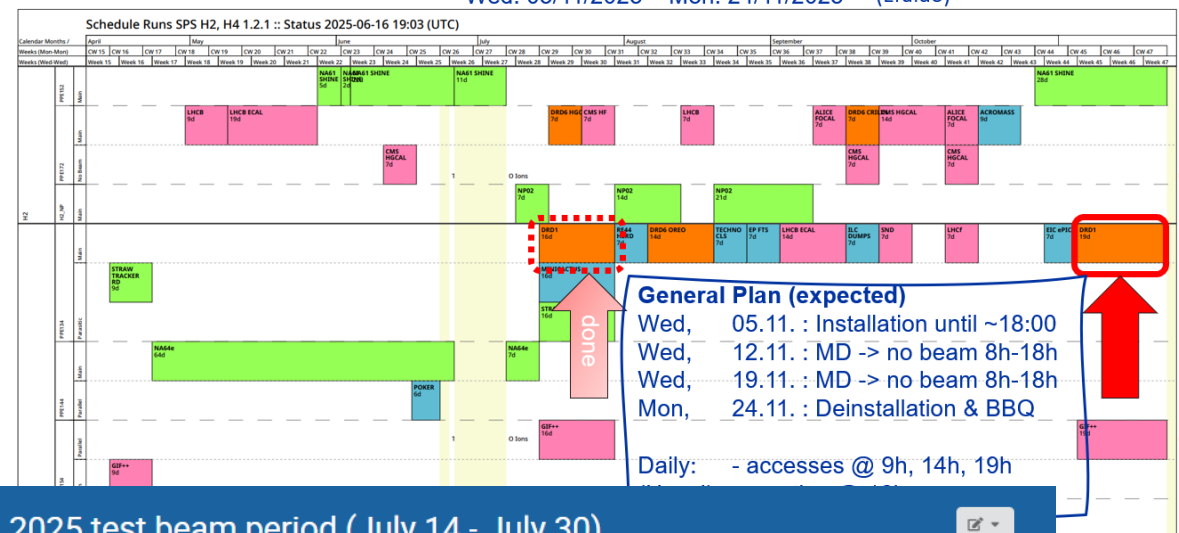
DRD1 H4(PPE134) 2025 Test Beam

Wed. 05/11/2025 – Mon. 24/11/2025

Yorgos Tsiopolitis: +41754118992
Karl Jonathan Flöthner: +41754110839
(Eraldo)

Two test beam campaigns in 2025

- Mon. 14/07/2025 – Wed. 30/7/2025 (13 groups)
 - Thanks for the great collaboration of all participants (e.g. the complete dismounting worked within 4h)
 - More information on Indico*: <https://indico.cern.ch/event/1578401/>
 - Some visual impressions on the next slide
- Wed. 05/11/2025 – Mon. 24/11/2025
 - Reaching the limit of PPE134 with potential 17 setups
 - More information will be gathered on Indico*: <https://indico.cern.ch/event/1599108/>



1st DRD1 2025 test beam period (July 14 - July 30)

14 Jul 2025, 08:00 → 30 Jul 2025, 20:00 Europe/Zurich

📍 EHN1 - PPE134 (CERN)

👤 Eraldo Oliveri (CERN), Karl Jonathan Floethner (University of Bonn (DE)), Yorgos Tsiopolitis (National Technical Univ. of Athens (GR))

2nd DRD1 2025 test beam period (November 05 - November 24)

5 Nov 2025, 08:00 → 24 Nov 2025, 20:00 Europe/Zurich

📍 EHN1 - PPE134 (CERN)

👤 Eraldo Oliveri (CERN), Karl Jonathan Floethner (University of Bonn (DE)), Yorgos Tsiopolitis (National Technical Univ. of Athens (GR))

We profit a lot from the support in EHN1 (see more details next slide)

- Both test beam campaigns would have been impossible without the upgraded gas system!

*You need to sign up for the WG7 mailing list to have access: <https://drd1.web.cern.ch/activities-wg7>



DRD1

10/10/2025

Karl Jonathan Flöthner: +41754110839, Yorgos Tsiopolitis: +41754118992 (, Eraldo)

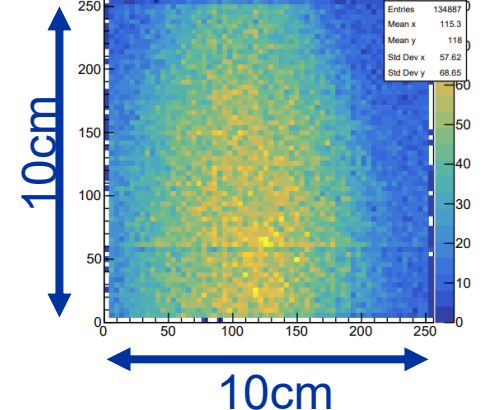
All Requirements have been fulfilled in July

Muon: Wide Muon beam with the highest possible rate (up to $2e5$ /spill with spill $\sim 5s$)

**Pion: 3.5 shifts, including rate scans (100kHz – 1MHz), and high rate tests (a few MHz)
→ Special thanks to Nikos, and in particular Florian for the quad. tuning**

Magnet: 2 shifts with 1T

Example Muon beam profile

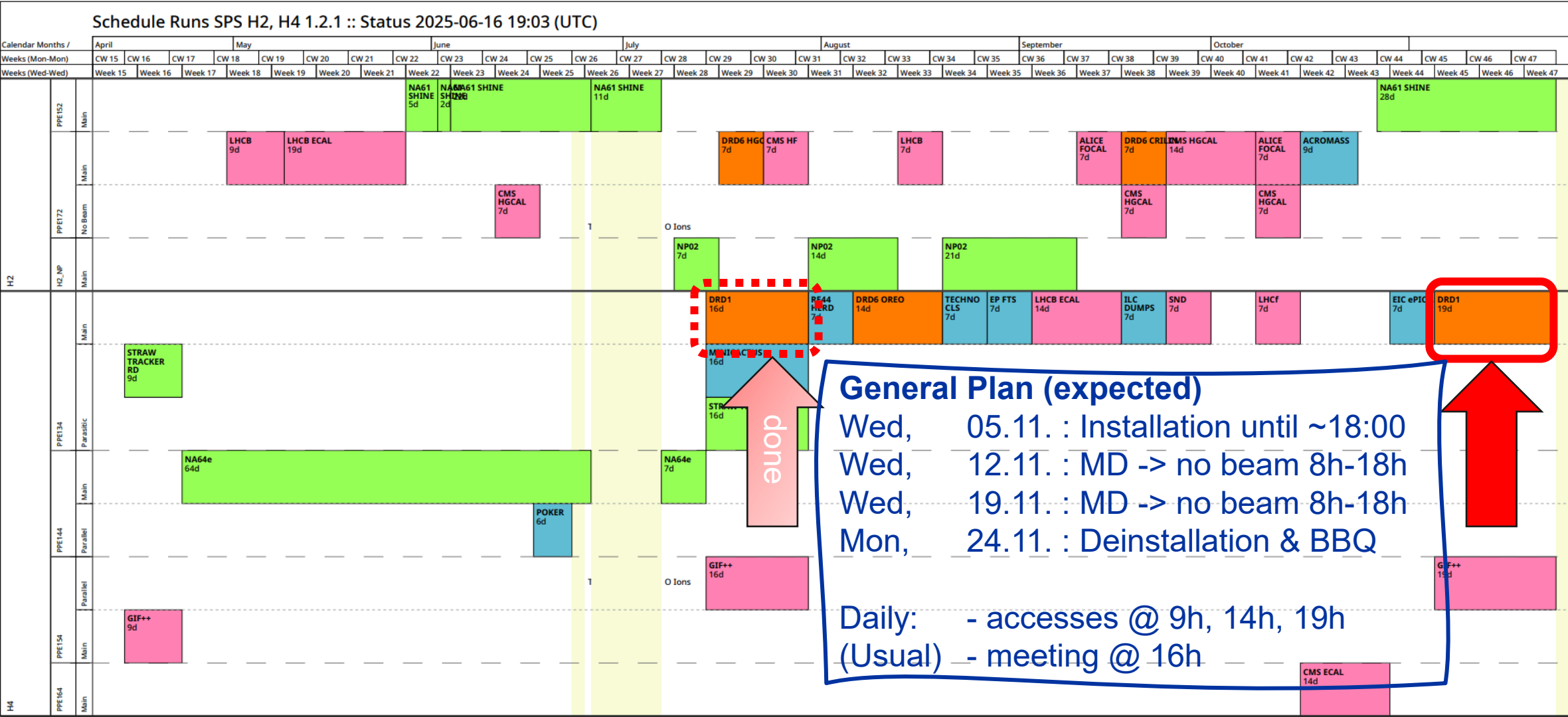


**Nikos and Bastien provide the general support (Beam Tuning and the Magnet).
Michael, Sylvain and the NA team provided excellent help with the craning and tables.
David & Ahmet is our primary contact for gas infrastructure.
Pion and Magnet runs have to be arranged with GIF++ - Thanks for the flexibility!**

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Wed. 05/11/2025 – Mon. 24/11/2025

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(Eraldo)



<https://ps-sps-coordination.web.cern.ch/ps-sps-coordination/>

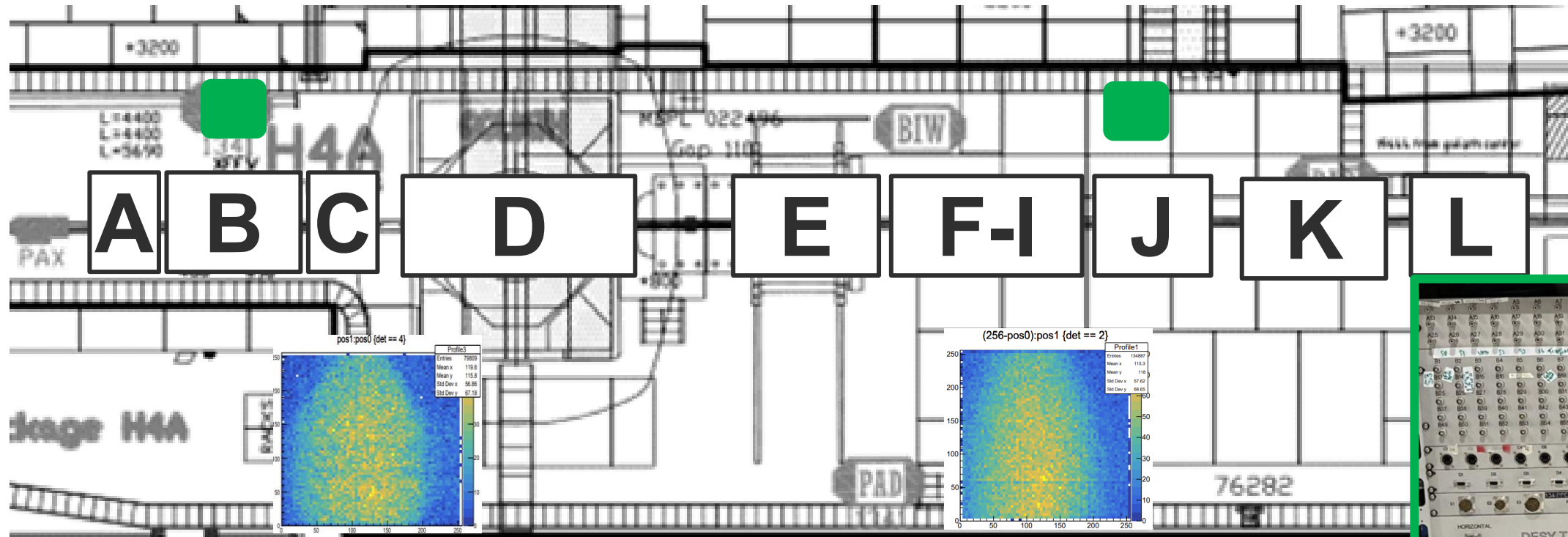


DRD1

10/10/2025

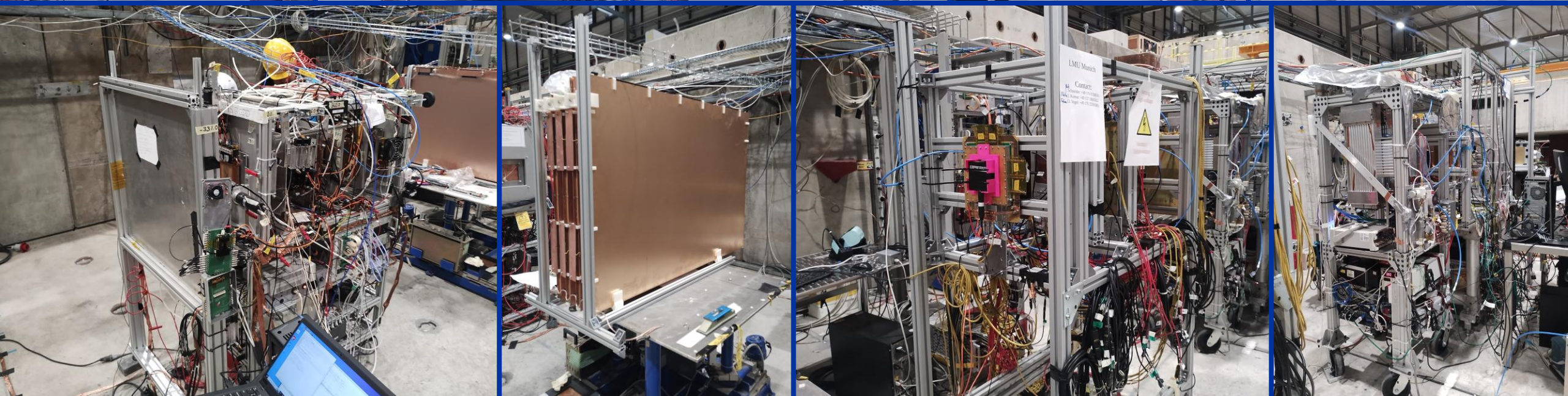
Karl Jonathan Flöthner: +41754110839, Yorgos Tsiopolitis: +41754118992 (, Eraldo)

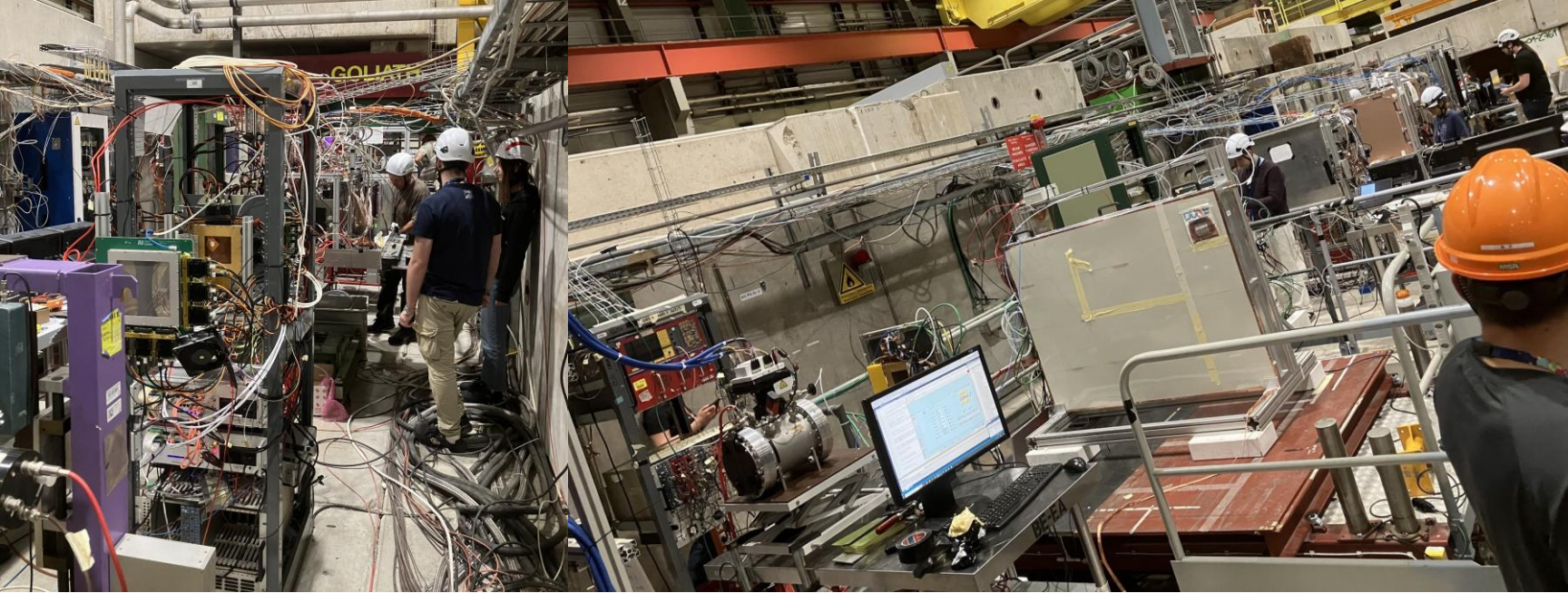
BEAM H4, PPE134 – INSTALLATION (DRD1, July 14th)



A: DRD1 telescope B
 B: PICOSEC
 C: PARASITIC: minicatus
 D: USTC (uRGroove)
 E: DUNE Bologna group - INFN Section of Bologna
 F: MWPC-Tracker-VMM

G: *GEM-TPCs – not ready*
 H: INFN Bari RPC group
 I: DRD1 telescope A
 J: LMU Munich
 K: PARASITIC: straws
 L: HYDRA tracker (TU Darmstadt)





08:12

11:53

We had an incredible handover, thanks to RP measuring as early as possible, HERD giving us time until lunch, and the incredible work of the transport team with the craning!



Current status (November)

<https://docs.google.com/spreadsheets/d/16Mqzecz0V4XCufhDHhCzhEq2GT9TmlkJNb2j3HA4j4g/edit?usp=sharing>

- 17 setups (+ 2 parasitic) → 17 confirmed interest (some reference... July was 13)

Team/Institute		Period of Interest	Beam requirements	Magnetic Field	Required gas (mixtures and approximate	Involved	Infrastructure needs (moveable and/or remotely controllable tables, DRD1 telescopes,	Radioactive Sources (for	Survey for
HYDRA tracker (TU Darmstadt)		All	MIPs, scan (up to a few 100 kHz)	No	Ar-CO2 (90-10), T2kmixture (Ar-CF4-IC4H10 95-3-2), if available	TU Darmstadt, GSI	LAPP	55Fe and/or 90Sr	No
DUNE Bologna group - INFN Section of Bologna		All	muons pions electrons	no magnetic field	Ar/CO2 85/15, Ar/CO2 70/30	INFN section of Bologna DUNE Collaboration	if possible, 1 DESY and 2 XSCA --> BIG RED for November	No sources needed	N/A
USTC		All	muon and pion(for high rate test)	1T magnetic field for 2 shifts	Ar:CO2:CF4/45:15:40 and Ar:IC4H10/98:2	USTC and LICP(Lanzhou Institute of Chemical Physics)	scintillators and NIM modules for trigger, HV power supply. SRS/APV25 telescope; 2nd beam: one normal table	Fe55 and Sr90	No need
GEM-TPCs		All	Muons and pions and scan	No	Mixer: He/CO2 and Ar/CO2	HIP PSI Czech Technical University CERN	two XSCA tables, if possible	No	No
PICOSEC		All	Muons, Pions?	no	Ar/CO2 70/30, Ne/CF4/C2H6	PICOSEC Coll.	2 DESY		
Optical Readout		All	Muons, Pions?	no	Ar/CF4	GDD			
DRD1 telescope		All	Muons and Pions	no	Ar/CO2 70/30	GDD			
INFN Bari RPC group		Summer and/or fall	pions and muons	no	Unclear	University of Bari	DRD1 tracker telescope		
Optical HP TPC		fall.	muons and pions, ideally around 2.5GeV,	0.5T, if possible.	Ar/CF4 (99/1)	IGFAE, UVigo, IFIC, Liverpool	DRD1 telescope and trigger appreciated (Space resolution <1mm needed)	Fe55	In principle not needed.
MPGD-HCAL		November	pions and muons	Not needed	Ar:CO2:C4H10(93:5:2) Ar:CO2:CF4 (45:15:40)	CERN INFN & University of Bari INFN RM3 INFN Naples Weizmann	DESY and fixed table	Not needed	Not needed
FCC μ RWELL		November	muons, some run of pions	no	ArCO2 (70:30) and ArCO2CF4(45:15:40)	INFN-FE, INFN-BO, INFN-TO, INFN-LNF	DESY and fixed table	no	
JLAB: PICOSEC		November 2025	Muons	No	Ar/CO2 70/30, Ne/CF4/C2H6	Jefferson Lab, Florida Tech, U. of Virginia, Stony Brook U. Univ. of South Carolina	Same as PICOSEC (second PICOSEC telescope)	no	Same as PICOSEC
JLAB: EIC ePIC MPGDs		November 2025	pions and muons	Yes	Ar-CO2 (80/20), Ar-CO2-iso (90/7/3),Ar-iso (95/5), Ar-CO2-CF4 (45,10,45)	Jefferson Lab, CEA Saclay, INFN Roma II	XSCA or DESY (ideally); 3 to 4 racks for HV, electronics and DAQ	No	Yes
Thomas Jefferson National Accelerator Facility, USA		November, 2025	pions and muons	1.5 T GOLIATH magnet is important requirement	ArCO2(80:20) Ar-CO2-IC4H10 (95:3:2) Ar-CO2-CF4	Jefferson Lab, Florida Institute of Technology, University of Virginia	DESY or XSCA and LAPP needed. NIM crate/rack for electronics Trigger for SRS	Not required	Yes
USTC RICH for STCF		November	Muons	no	Ar/CO2 93/7	USTC	Fixed table	55Fe	No
FCC-ee straw tracker		November					One support table (movable preferred) with space below (for DAQ)		
Tandem-GEM-TPC		November	scan pions (or muons)	Not needed.	Ar/CO2 80/20 as default, if possible 70/30 & 90/10	Wigner RCP	if available, trigger scintillator signals few NIM crate slots	Not needed.	Not needed.
INFN Roma Tre and Napoli		November 5 - 19	- muons - Lower priority: a short period with pions with a scan in rate	Not needed	Ar/CO2/Isobutane 93/5/2	INFN Roma Tre and Napoli / RHUM Project	IF AVAILABLE: A movable table for large chamber scan	Not needed	Not needed
PARASITIC: straws		July (maybe November)	muons	Not needed.	Ar/CO2 93/7 & 70/30	INP	None	None	None
PARASITIC: minicactus		July (maybe November)	muons	Not needed	No gas	Irfu/CEA, IFAE Barcelona, University of Liverpool	Need one MCP signal. Moveable table. Remote control would be a plus, but not mandatory.	None	None

BEAM H4, PPE134 – start prep (DRD1, November 5th – 24th)

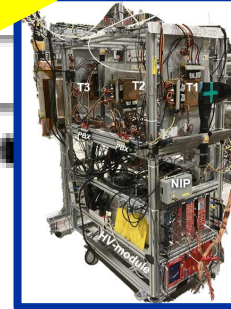
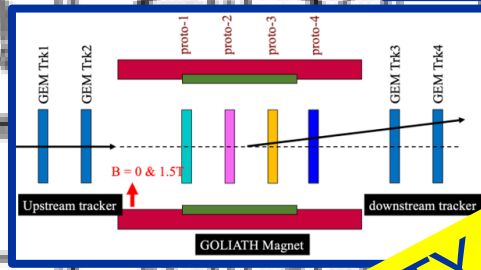
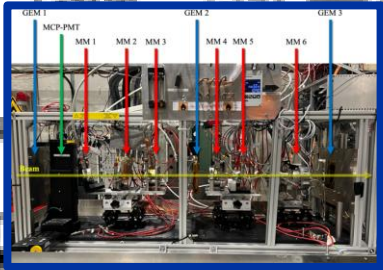
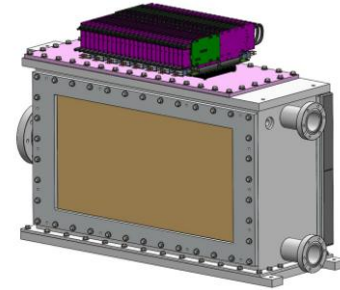
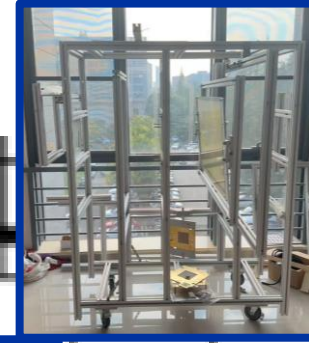
XSCA



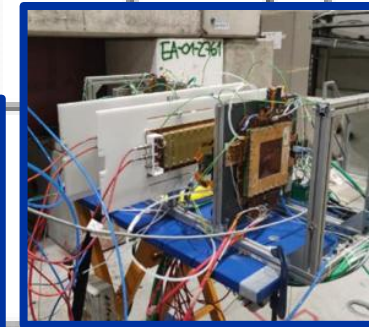
Table Alu



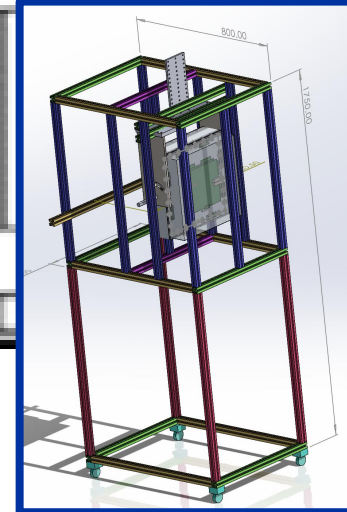
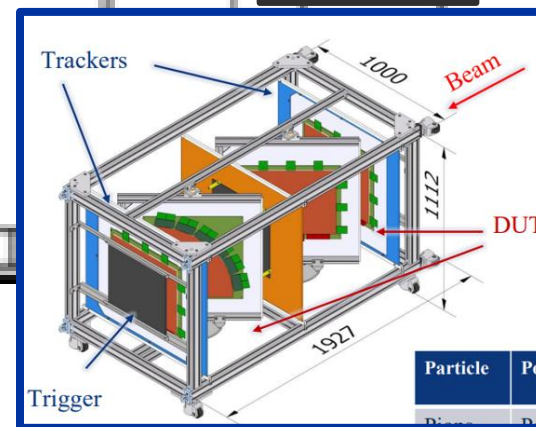
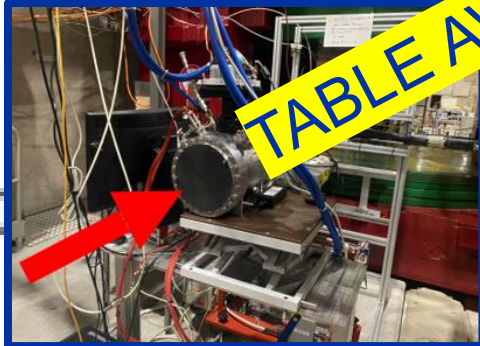
XSCA



Bleu-Orange

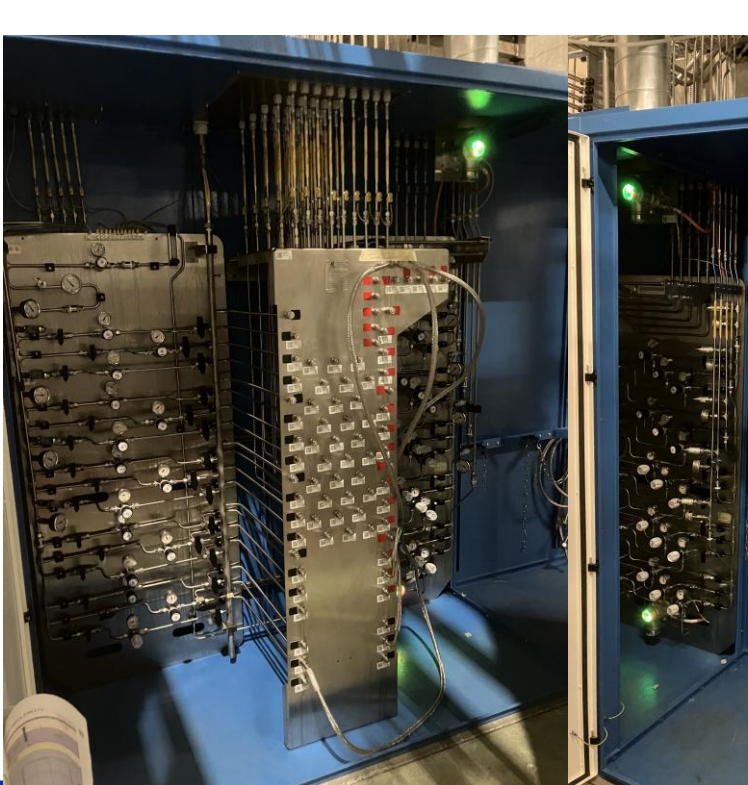
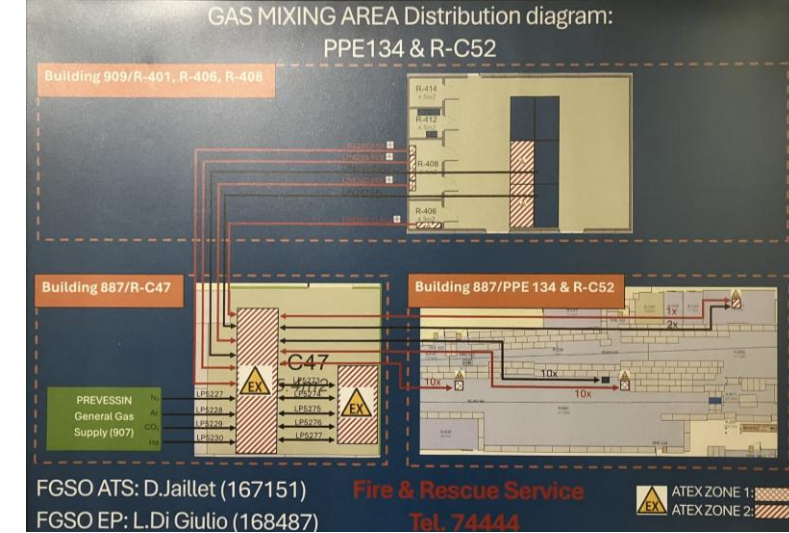


XSCA



New Gas Area was REALLY needed

- 30 lines from cabinet to area (+10 ext)
- Space for 8 bottles (NOT flammable)
- Rack needs to be placed for flowmeter, Mixer, etc.



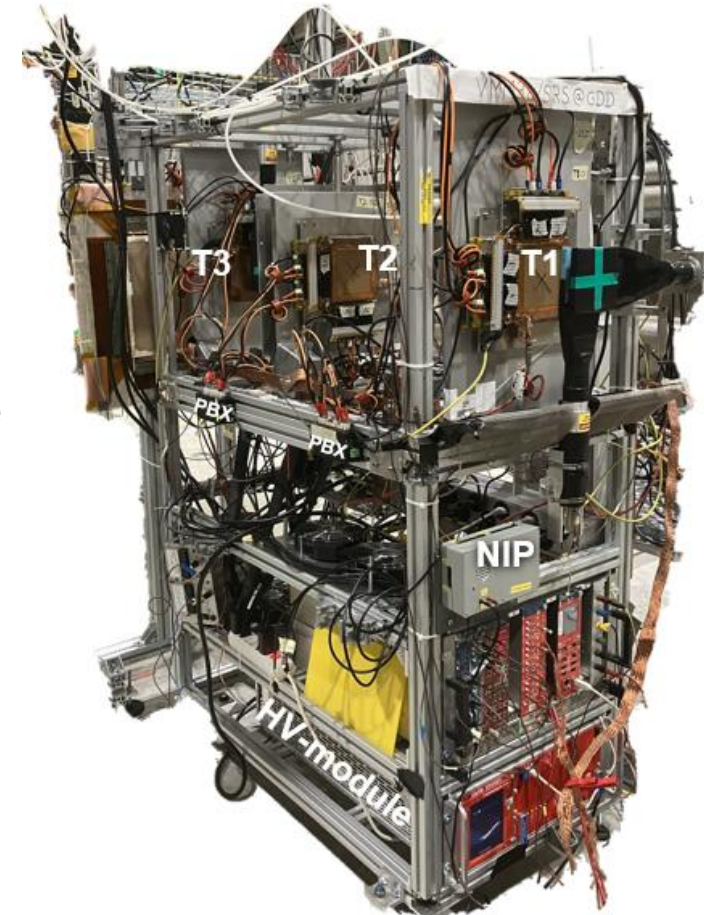
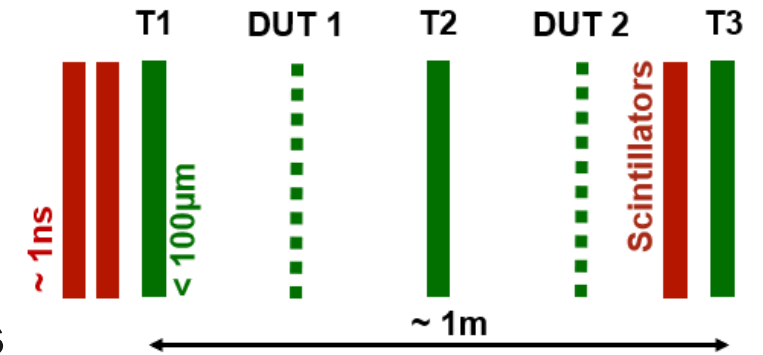
USER Ne/CF4/C2H6 80/10/10	USER Ar/Iso 90/10	Ar/Iso 95/5	USER? He/Iso 90/10	MIX Ne/ISO	Ar/CF4/Iso 95/3/2	Ar/CO2/Iso 93/5/2	Ar/Iso 98/2	Part. USER Ar/CO2/CF4 45/15/40	USER Ar/CF4 80/20	Ar/CO2 93/7	Ar/CO2 90/10	Ar/CO2 85/15	Ar/CO2 80/20	Ar/CO2 70/30	USER R134a
1	1	1	1	1	1	3	2	5	1	3	2	1	2	8	1



DRD1 VMM3a/SRS telescope(s)

→ Following talk by David

- **Can provide trigger from scintillators & position from GEMs**
 - Potential use by multiple groups in parallel
- **Integration of DUT**
 - Small DUTs can be mounted within the telescope
 - Large DUTs (approx. >20cmx20cm active area) need own support structure
 - Make sure to have Hirose connectors (or adapters to match)
- **Preparation of DUTs**
 - We strongly recommend getting in contact with the GDD team to run the DUT with VMM3a/SRS before the test beam in the lab



Dziękuję!

We hope to see you at the next test beam (BBQ)

Picture from shared DRD1/GIF++ BBQ in July25



DRD1

10/10/2025

Karl Jonathan Flöthner: +41754110839, Yorgos Tsiopolitis: +41754118992 (, Eraldo)

11

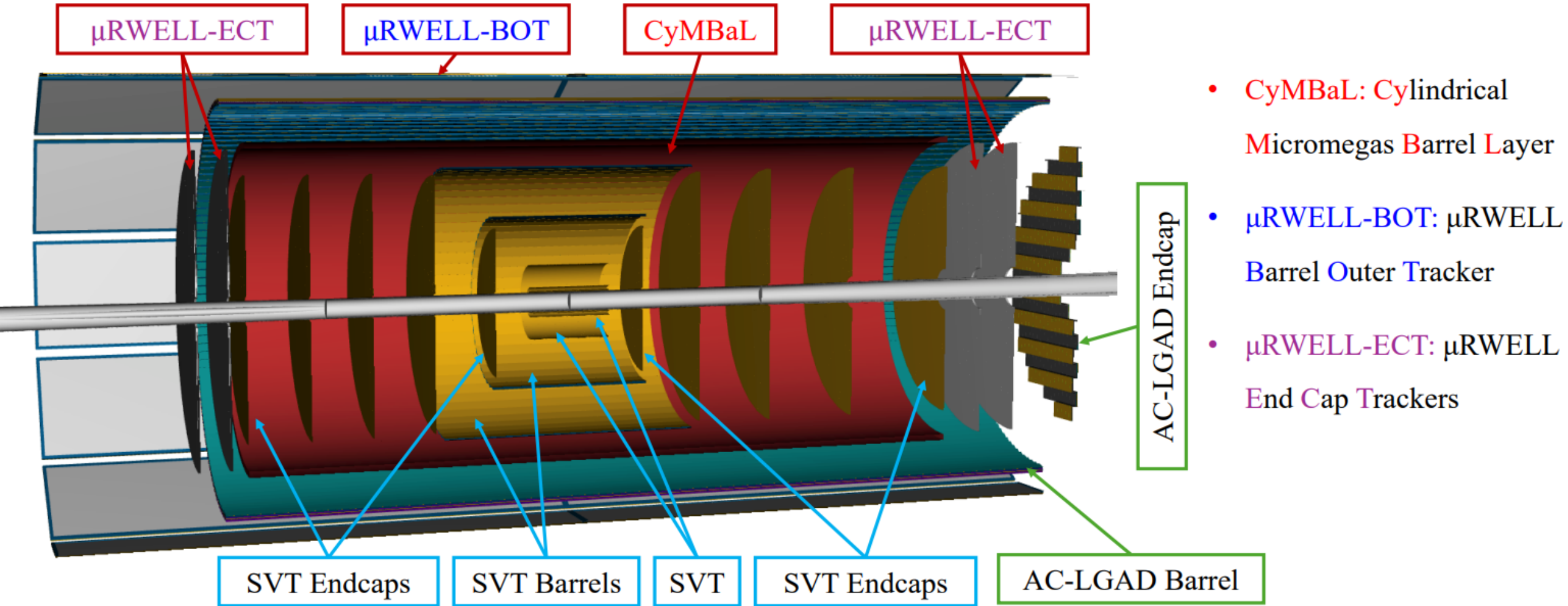
Setups November

ePIC MPGD Trackers - November test beam preparations

Kondo Gnanvo (**JLab**), Francesco Bossù (**CEA Saclay**) , Annalisa. D'Angelo (**INFN Roma**)

On behalf of EIC MPGD-DSC

ePIC MPGD Trackers – Overview



Technologies: MAPS (Si) - MPGDs (Gaseous) - AC-LGADs (Si)

CEA Saclay Group - Test beam plans for ePIC CyMBaL

Goals:

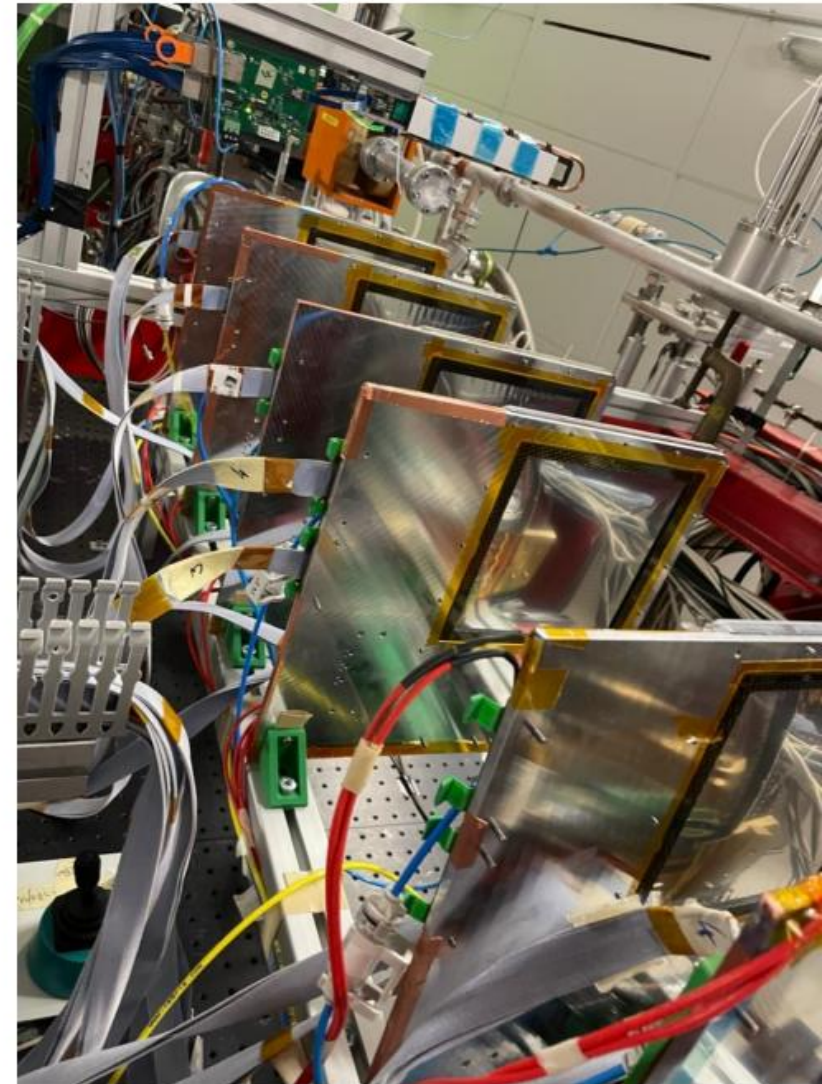
- Finalization of the studies on the 2D readout and resistive layer patterns that were started in the 2023 beam test
- Study the spatial and time resolutions with 1 mm readout strips and different types of the resistive layers.
- Study the performance as a function of the track angle

Updates from 2023:

- New PCB design:
 - Stack as close as to the final detector
 - Only one pattern per module, 2D orthogonal strips with 33% coverage of the top layer
- New resistive ink that is able to provide higher resistivity ($2 - 5 \text{ M}\Omega/\square$)
- New photo-resistive material: forced to move to Dynamask due to end of production of Pyralux

Setup as in MAMI

- Silicon pixel reference tracker
- Structure to hold 30cmx30cm modules (with active area of 12cmx12cm)
- Structure able to hold the modules at different angles
- Detectors read out with DREAM electronics



INFN Roma Group - Test beam plans for ePIC μ RWELL-ECT

MPGD endcap test beam scope

Study of the performance of 2D hybrid GEM- μ RWELL detectors

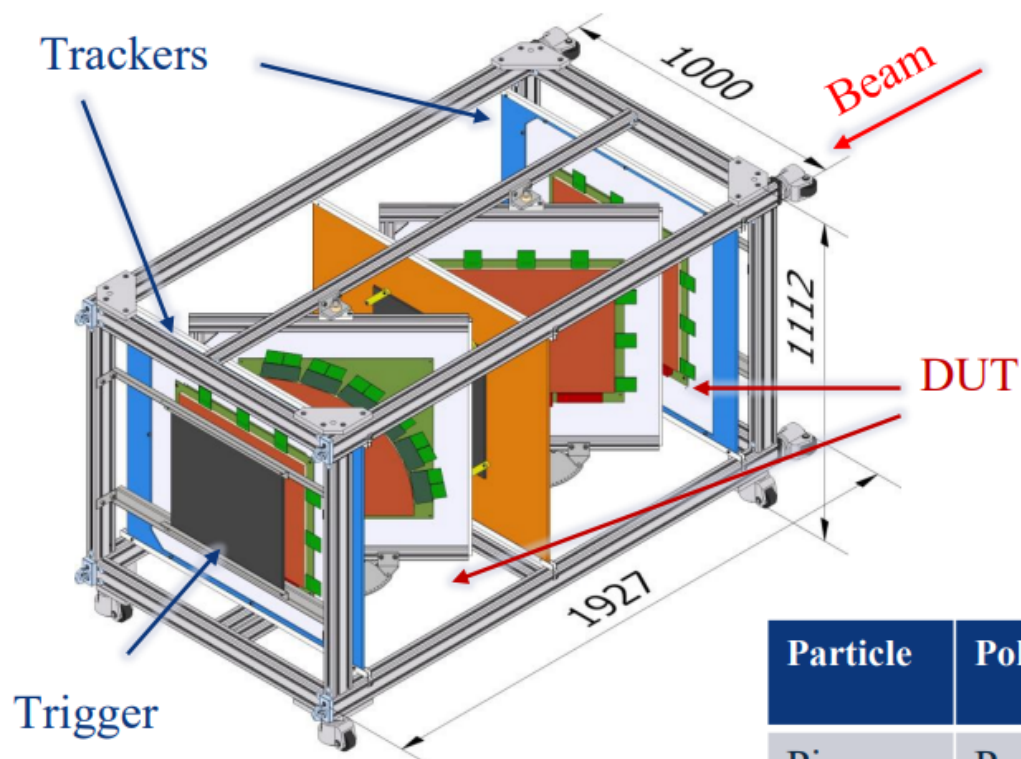
- tests with different geometries and readout patterns
- test at different track angles

Service needed:

- Tables: 1 Fixed + 1 Moving
- GAS : Ar-CO₂-CF₄ 45-15-40,
- High Voltage : 100 - 2500 V range

2025 Test Beam requests

Particle	Polarity	Energy (0.1 to 15 GeV/c (T09))	High purity	Intensity	Beam size (Ømm)	Run number
Pions	Positive/Negative/does not matter	Highest energy	Yes (Not critical)	1E2 to 8E6	~3	NA
Muons	Positive/Negative/does not matter	Highest energy	Not critical	1E2 to 8E6	1 to 40	NA



Instrumentation:

- Cherenkov signal
- Scintillator signal

Infrastructure

- Electronics rack in zone

JLab Group - Test beam plans for ePIC μ RWELL-BOT

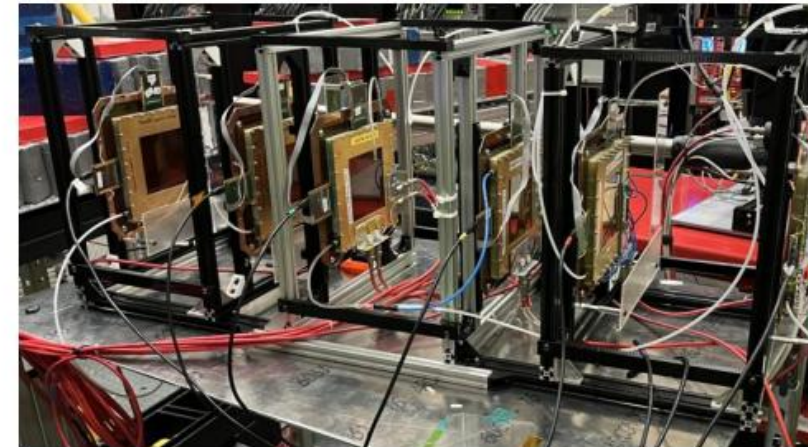
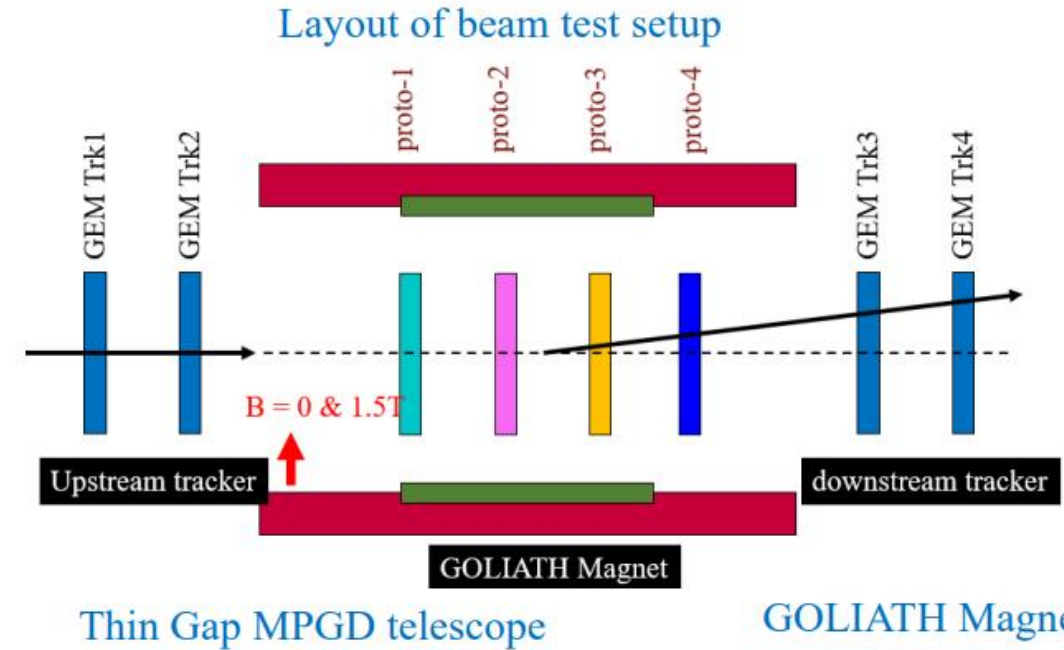
Same setup as S. Tarafdar request for EIC Generic R&D

μ RWELL-BOT test beam scope: Performance of Thin Gap GEM- μ RWELL detectors in magnetic field

- ❖ Test of various prototypes in 1.5T B field of the GOLIATH Magnet
 - ❖ Pion beam for the B-Field tests – 150 GeV for 2D efficiency map
- CERN test beam focuses on performance in B field to complement:
- ❖ FNAL 2023: Spatial position vs. track angle
 - ❖ JLab Hall D 2025: Efficiency of thin gap with various gas mixtures

Prototypes: EIC Generic R&D thin-gap GEM- μ RWELL prototypes:

- ❖ **Proto-1:** 10 cm $\times$ 10 cm, 1-mm gap, X-Y strips
- ❖ **Proto-2:** 10 cm $\times$ 10 cm, 1.5 mm gap, X-Y strips
- ❖ **Proto-3:** 30 cm $\times$ 30 cm, double sided 1-mm gap, X-Y strips
- ❖ **Proto-4:** 10 cm $\times$ 10 cm, double-sided 1-mm gap, 3 mm pad readout



ePIC MPGD Trackers – Test beam requirements

❖ MPGD-DSC requests

- Beam requirements → High momentum muons, pions (for B test) and electrons all OK,
- Access to GOLIATH magnet
- Gas mixture: Ar-CO₂ (80/20), Ar-isobutane 95/5, Ar-CO₂-isobutane (90/7/3), Ar-CO₂-CF₄ (45/10/45)
 - Standard mixtures provided by DRD1?
- Infrastructure & equipment
 - Electronics racks → each ePIC MPGD setup will bring its readout + DAQ and HV power supply
 - Movable and / or remotely controllable tables <https://asm.cern.ch/experimental-area/tables-description>,

Thin gap MPGD tracker- CERN November test beam preparations

Sourav Tarafdar & Kondo Gnanvo

JLab (USA)

Huong Ngyuyen

University of Virginia (USA)

Setup description

Items in setup :

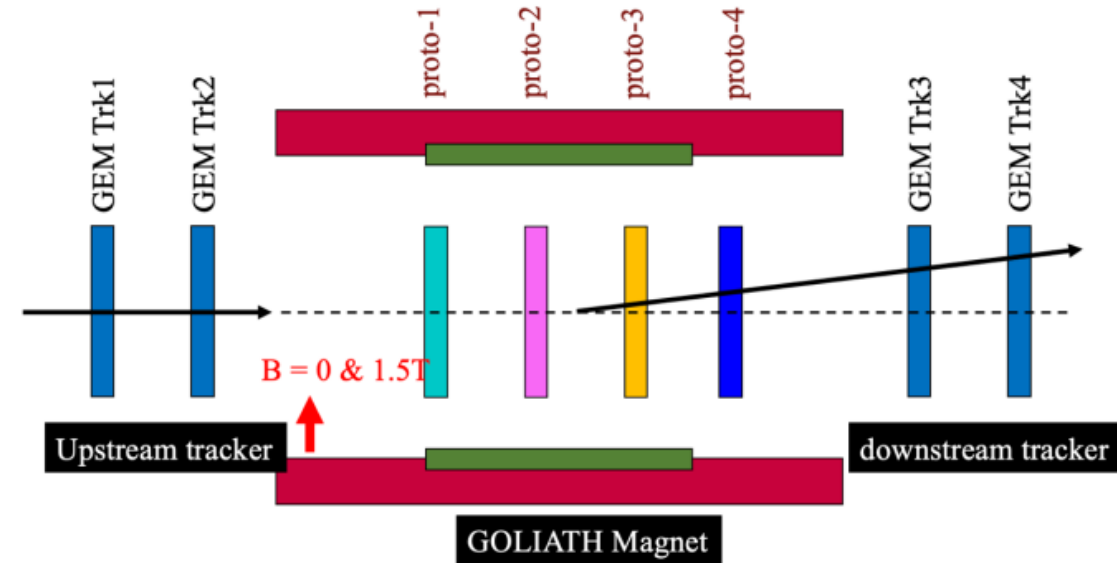
- Four MPGD DUT (One 30 cm x 30 cm and three 10 cm x 10 cm active area)
- GEM tracker telescope
- SRS based electronics
- DAQ computer
- HVPS

Requests from CERN :

- Goliath Magnet availability → Most important
- Gas mixture : N_2 , $Ar-CO_2(80/20)$, $Ar-CO_2-iC_4H_{10}(90/7/3)$
- NIM crate/ rack for electronics
- Trigger for SRS
- Pions & muons beam

Placement of DUTs and GEM tracker telescope

- DUTs are expected to be in magnet
 - *Maximum size 40 cm x 40 cm x 40 cm*
- Tracker telescope outside magnet
 - *Maximum size 40 cm x 40 cm x 20 cm on front and back of magnet*



Plans for November 2025 test beam

DRD1 Collaboration Meeting – 19/06/2025

F. Chiapponi, INFN Bologna

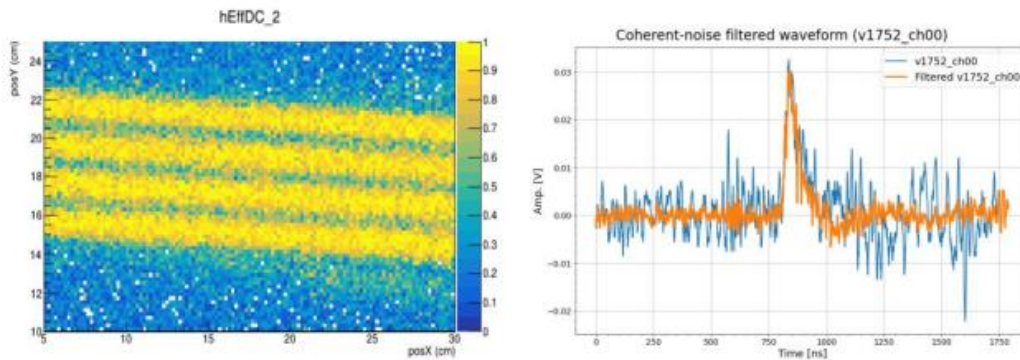
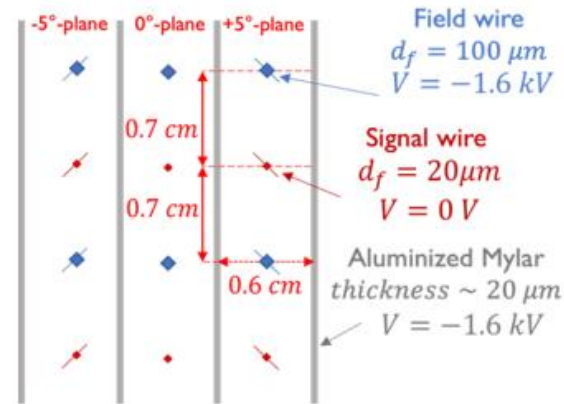
On behalf of:

Bologna: M. Guerzoni, A. Margotti, G. Perozzi, F. Poppi, M. Pozzato, E. Savin, G. Sirri, N. Tosi

Pavia: D. Calabro, G.L. Raselli, M. Rossella

120x80 cm² prototype

- 120×80 cm² active area
- **3 wire planes** with stereo angles (-5°, 0°, +5°)
- **4 segmented mylar planes** (20 μm thick)
- Gold-plated tungsten **sense** wire (20 μm)
- Copper-beryllium **field** wire (100 μm)
- **168** readout channels
- Readout: **VTX preamplifiers + external digitizers**



Measurements plan

- Study signal waveforms vs HV
- Time-distance relation to investigate drift velocity
- Efficiency along wires direction

Setup

Same as for the July TB:

- DC placed on RED table to allow x-y scan
- Tracker with 4 GEMs
- 2 scintillators + PMTs for trigger

The setup will be squeezed to stay on the RED table

Needs

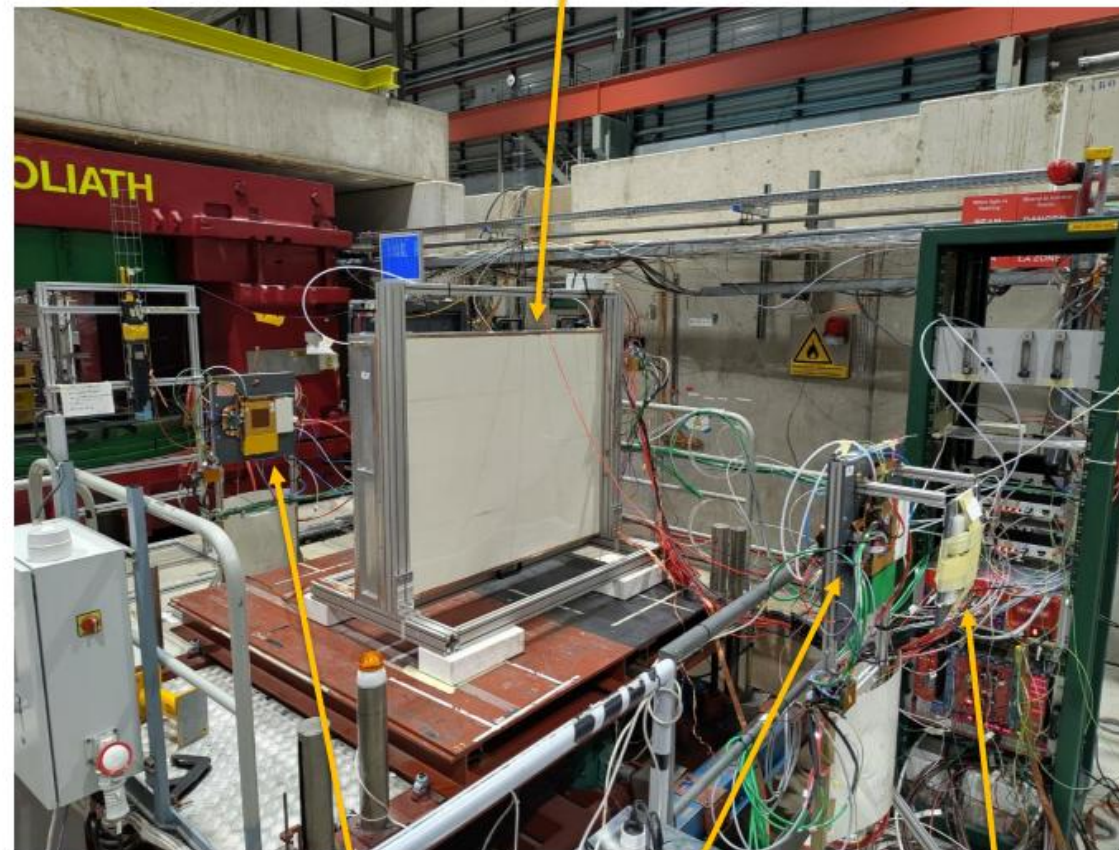
Drift chamber:

- Gas: **Ar/CO₂ 85/15** → we'll bring a mixer
- No magnetic field
- Beam: **muons, pions**

GEM tracker:

- Gas: **Ar/CO₂ 70/30** → standard

DUT : drift chamber



2 **GEM** (front) + 2 **GEM** (back) + 2 **scintillators**

HYDRA TRACKER BEAM TEST

Meytal Duer

September 18th, 2025

JULY BEAM TEST

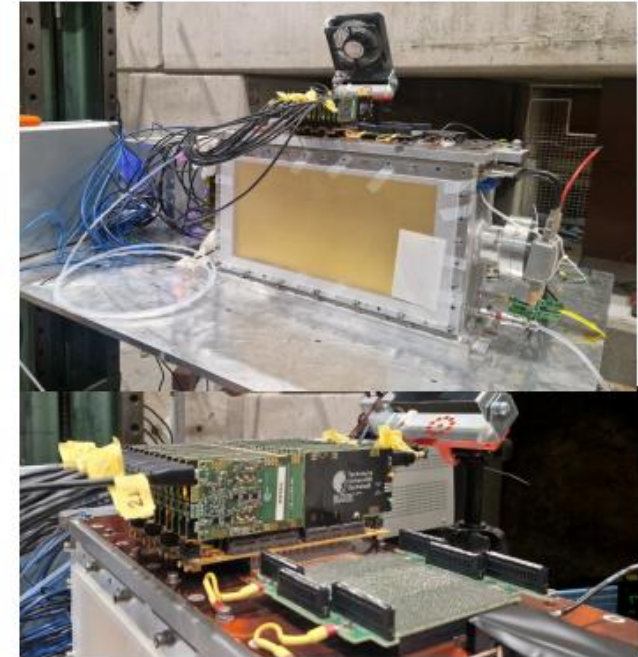
Agenda: performance test for $\frac{1}{2}$ of the TPC (24 hybrids)

Muon beam:

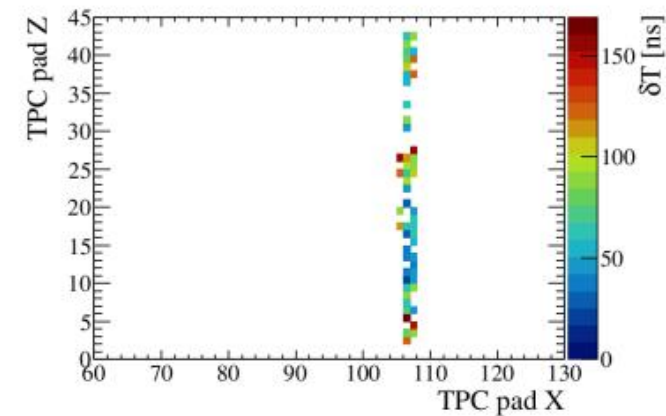
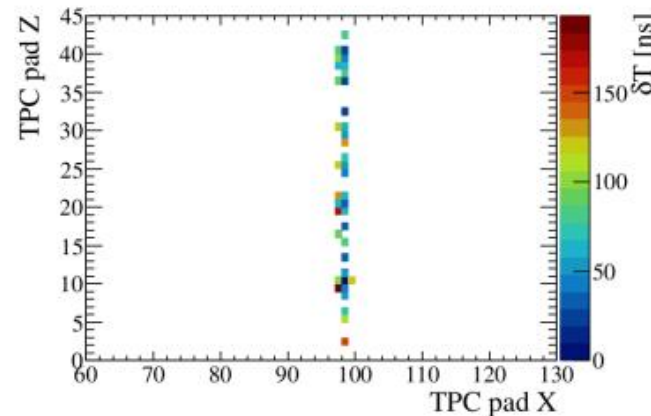
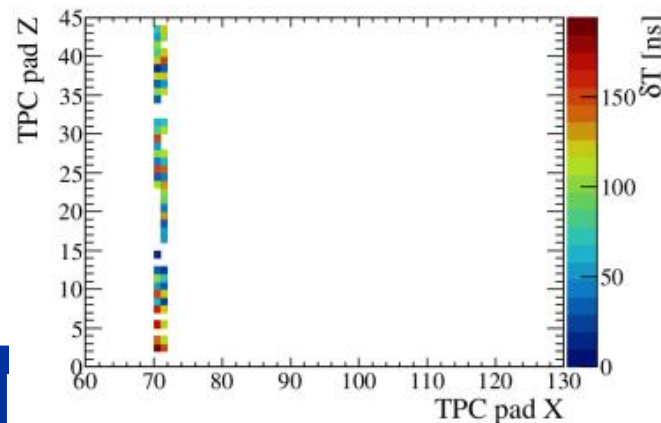
- VMM settings: thresholds, gain
- Gain (amplification) scan: 2,000 – 10,000
- Ion-backflow settings

Pion beam (1 shift):

- Rate scan: 10^4 – 10^6 pps
- Gain scan, IBF settings



muon tracks after clustering (time & space)

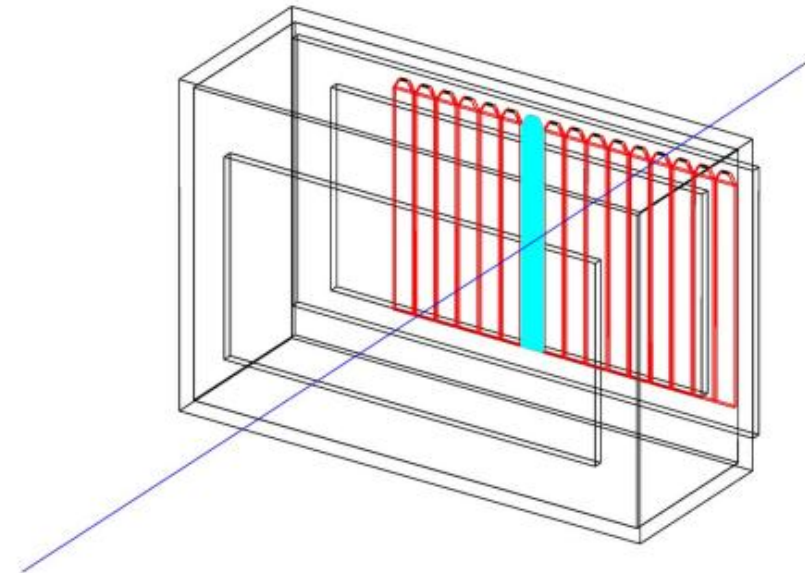
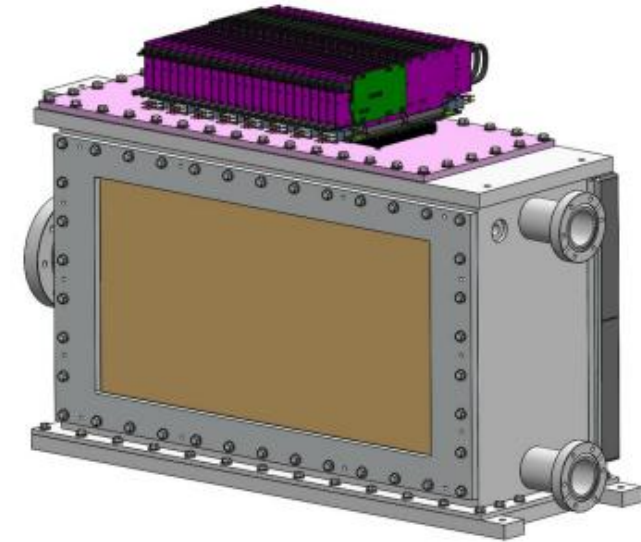


A new pion tracker for hypernuclei studies at R3B/GSI:

- **TPC** – VMM3a/SRS readout
- **Scintillator wall** for trigger and timing – TRB readout (GSI)

Planned measurements:

- **Performance test** for $\frac{1}{2}$ of the TPC (24 VMM hybrids)
+ scintillator wall
- **DAQ test** – time synchronization of detectors
- **MIPs** (preferably pions)
- **Rate capabilities**: scan up to a few 100 kHz
- Optimize HV and electronics settings



- **Setup:**
 - TPC (55.5(L)x22.9(W)x40(H) cm³, <80 kg) + scintillator wall
 - HV crate, LV power supplies
 - SRS crate
 - VME crate
 - NIM crate
 - 2 DAQ PCs (+1 laptop)
- **Gas:** Ar-CO₂ (90-10) & T2K (CF₄ -iC₄H₁₀ (95-3-2))
- **Table:** 1 DESY4 if possible
- No magnetic field

Optical readout test in Nov 2025

GDD, 2 persons

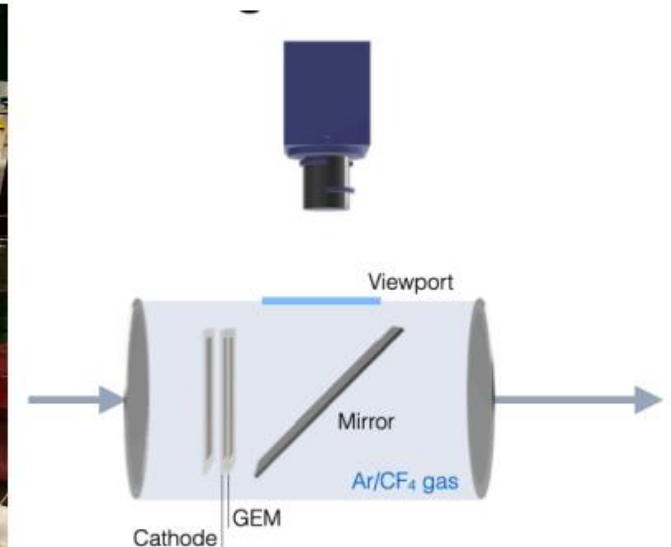
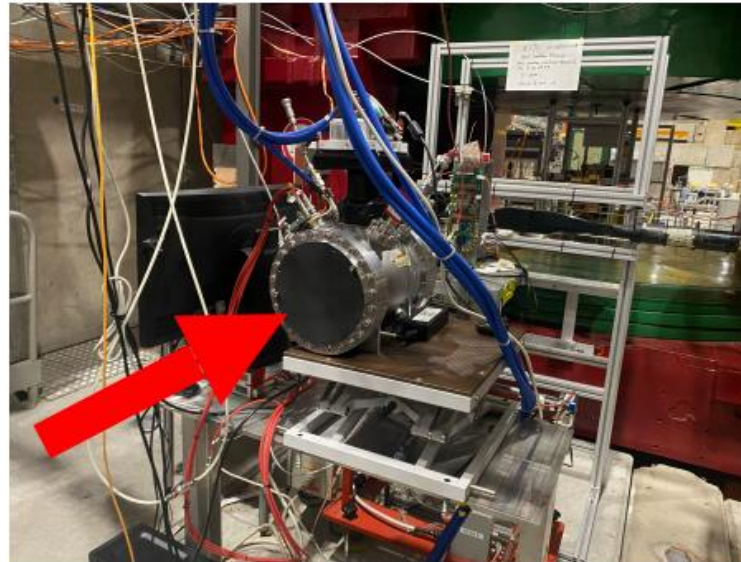
Request muon and pion beam

Ar/CF₄ (80/20%) sealed + flushed.
Gas available.

Total length 2x 1.5m = min 3m

1 movable table (XSCA?)
+ 1 metallic table

preferred position behind



PICOSEC MM Setup

4 teams - 6 persons

Request muon and pion beam

Ne-CF₄-C₂H₆ 80-10-10 flushed + Ar/CF₄ 70/30 flushed

2 telescopes:

CERN telescope

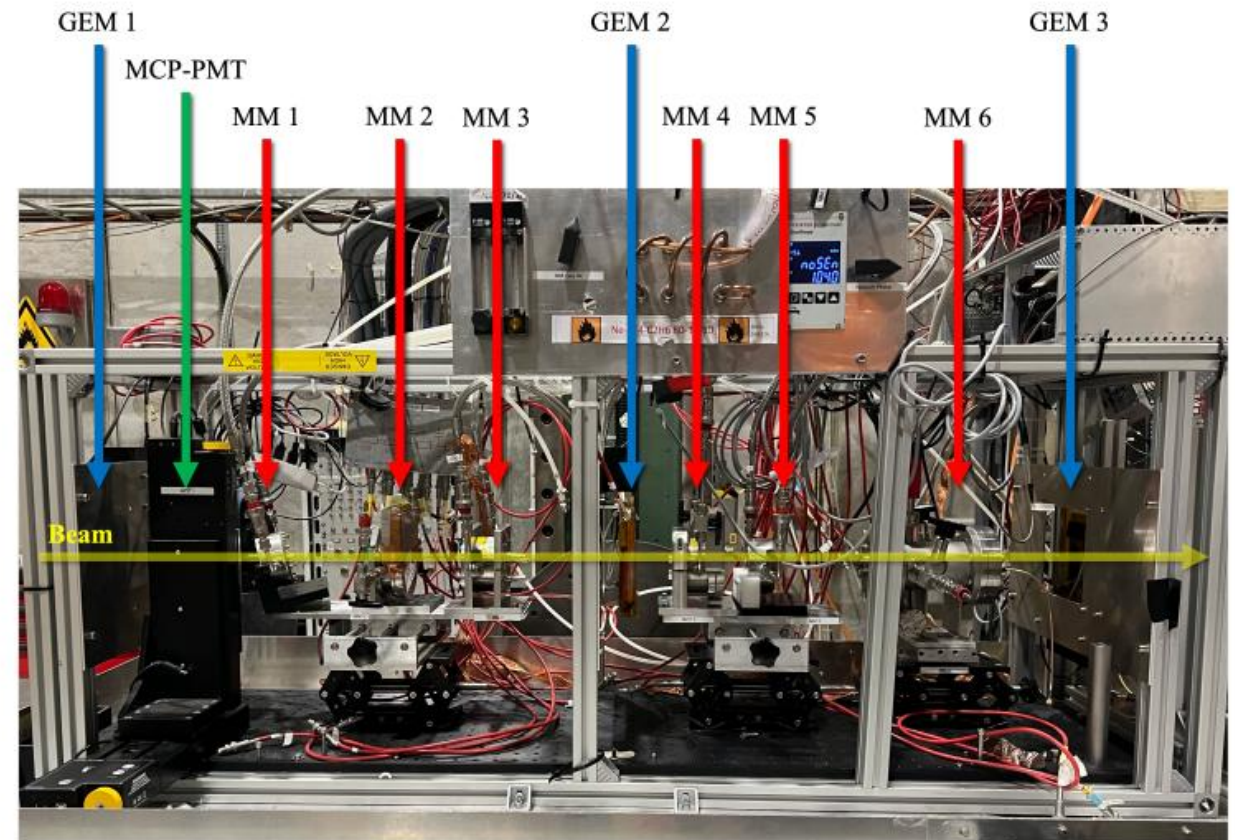
JLab Telescope (~40 cm x 40 cm x 150 m)

Total length 2x 1.5m = min 3m

2 DESY tables

+ 2 metallic tables (for oscilloscopes)

preferred position before magnet



November Beam test setup of USTC RICH detector

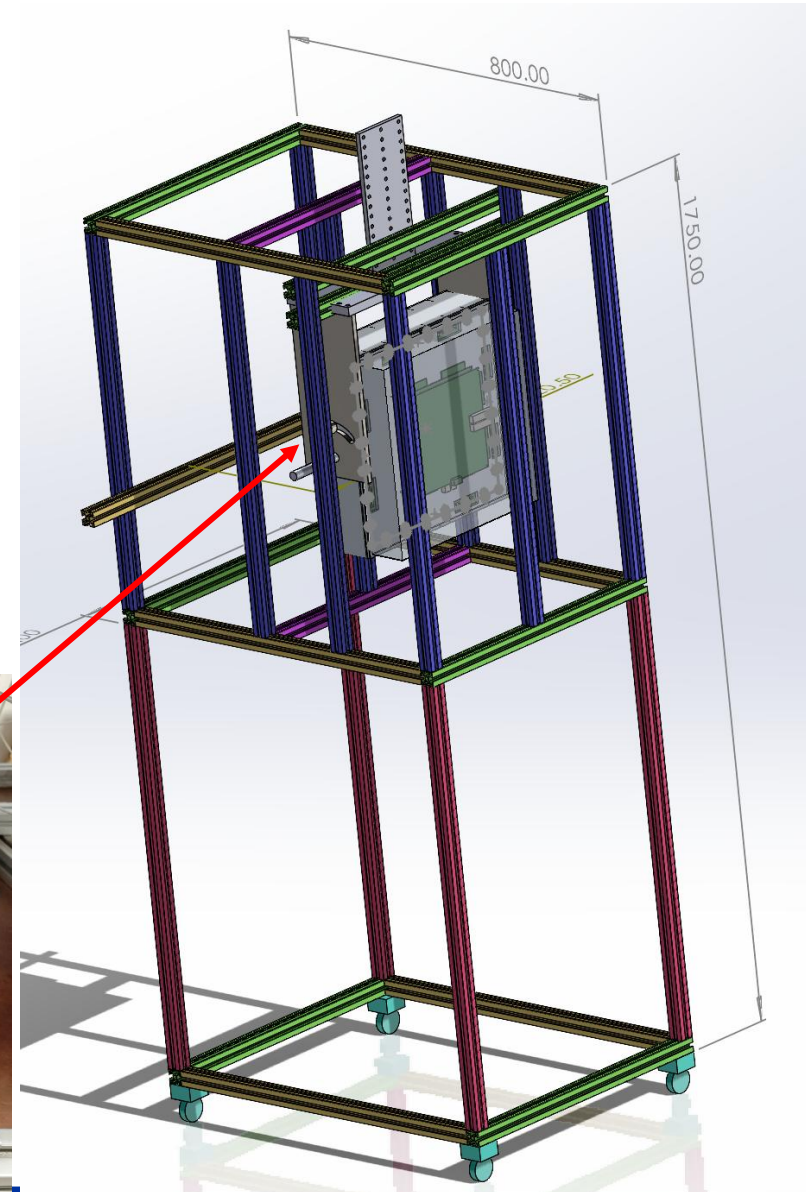
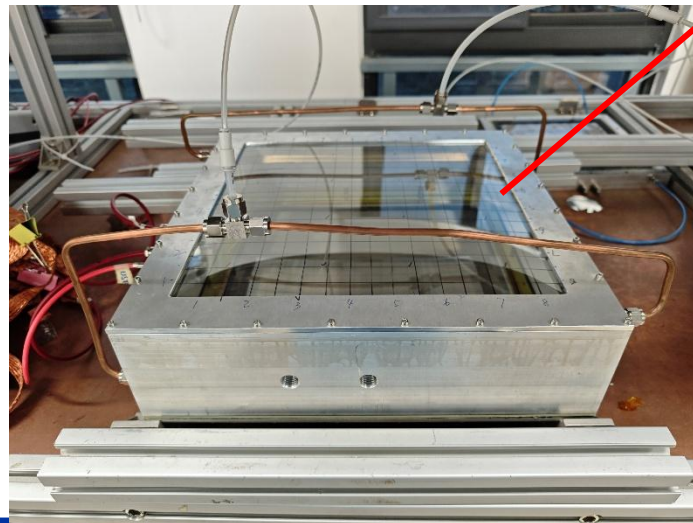
Detector: RICHs based on double Micromegas, Micromegas tracker

Beam requirements: muons, Ar/CO₂ (93/7)

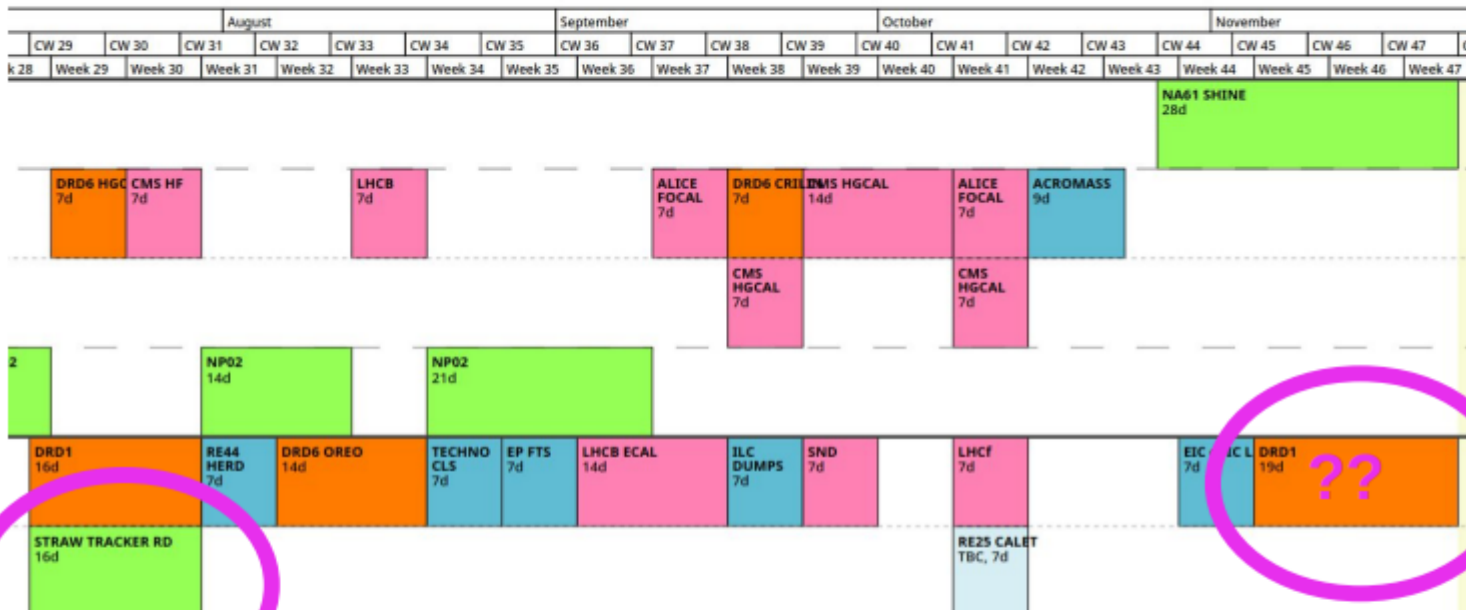
Setup: 0.8m~1m (along the beam direction)

Prepared by us: electronics, HV, LV, NIM chassis, ...

Infrastructure Needs: A table for the equipment

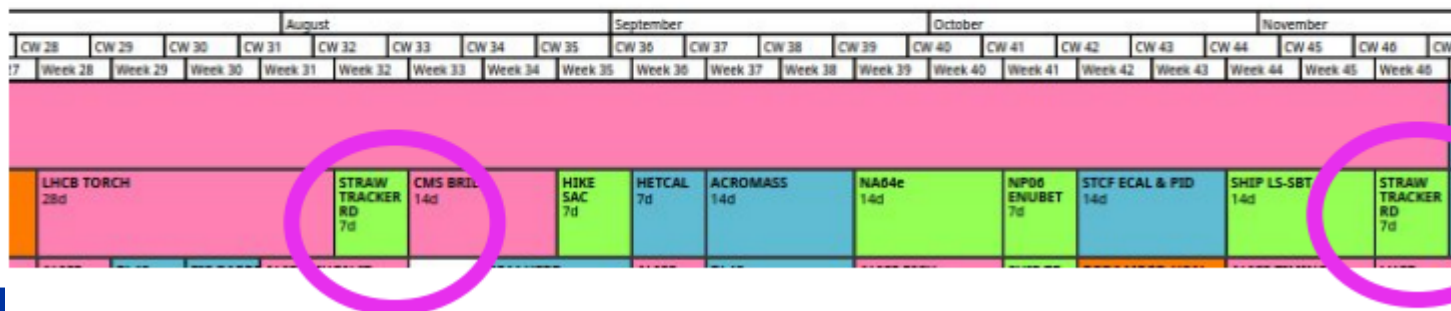


StrawTrackerRD setup testbeam schedule



Four items for November:

- charge studies - PS, AZALEA
- **DUNE prototype (overpressure)**
 - > to be decided, PS or H4?
 - if goes to H4, one or two small prototypes will be added (without reference tracking)
- **sMDT (flammable gas)**
 - > to be decided, PS or H4





CZECH
TECHNICAL
UNIVERSITY
IN
PRAGUE

CYLINDRICAL GEM-TPC with TIMEPIX3 READOUT

Francisco García
Helsinki Institute of Physics
Hugo Natal da Luz, Martin Farkaš
Czech Technical University

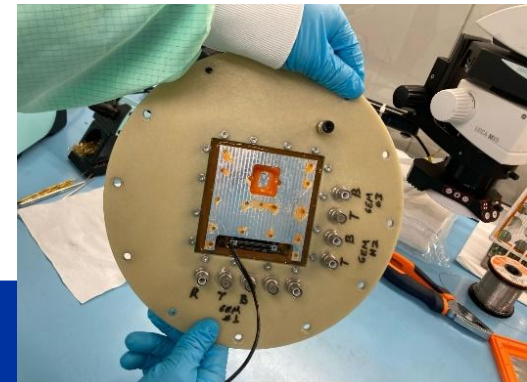
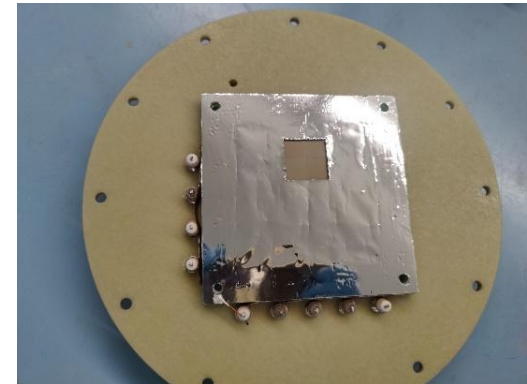
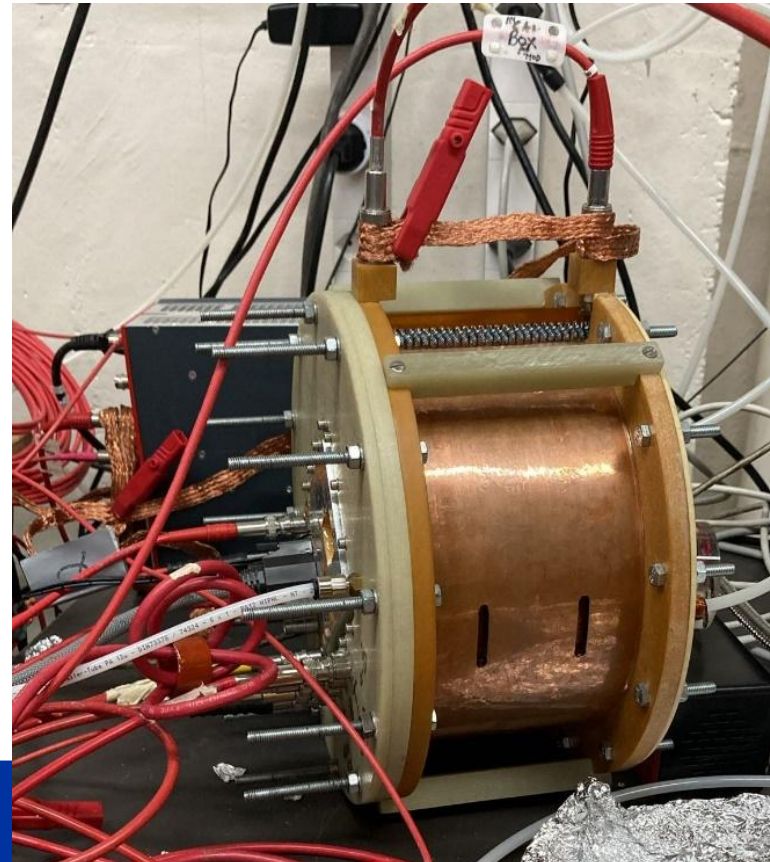
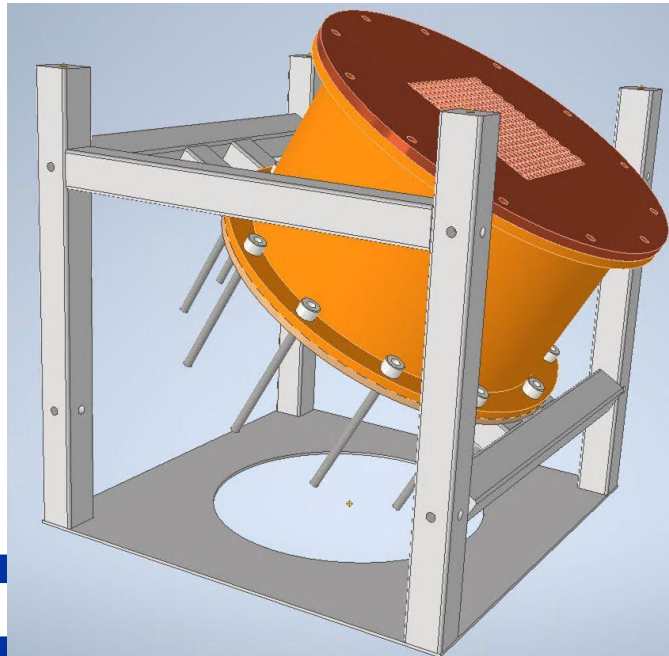
Integration of the TimePix3 Readout

Cylindrical GEM-TPC

- 20 cm Diameter
- 12 cm Drift length
- Triple GEM stack of 10 cm x 10 cm

Readout electronics:

1. Timepix3 quad module (4 TimePix3 ASICs)
2. Total area: 28 mm x 28mm



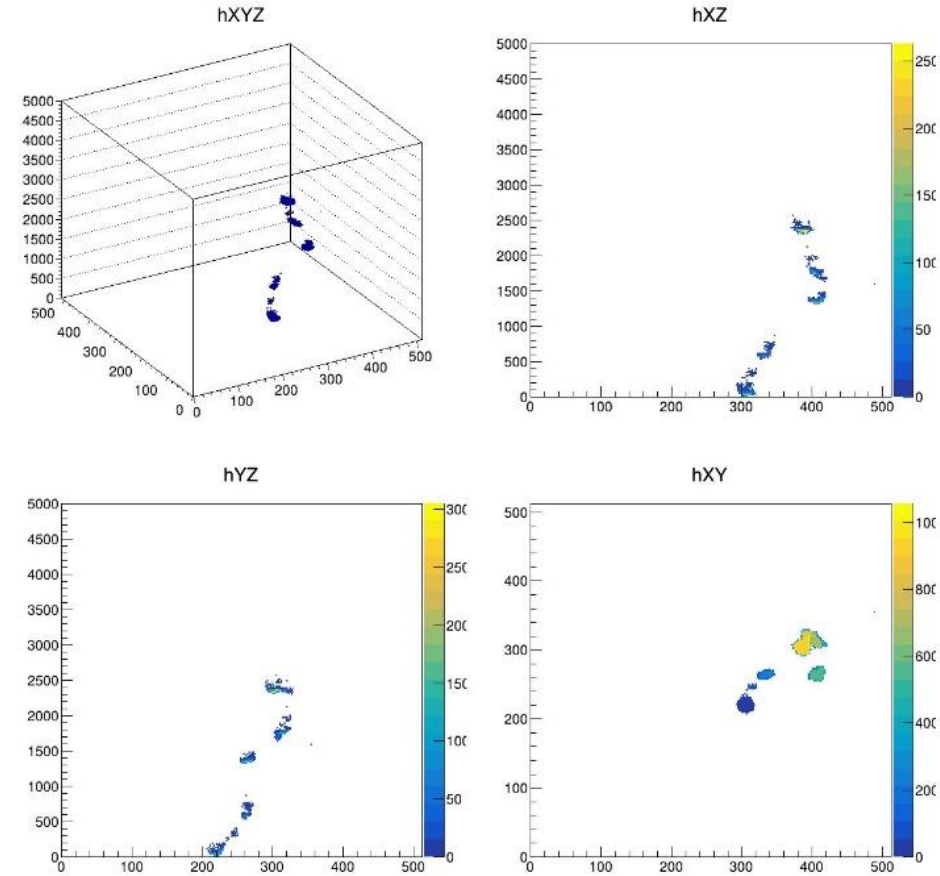
First Tests and SPS Request

Requirements:

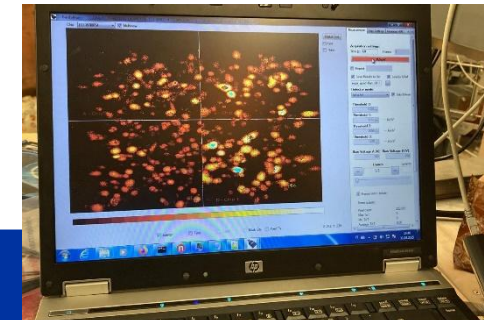
1. ArCO₂ (70/30) 5l/h flow
2. Close to a VMM3a-SRS reference tracker
3. X-Y table XSCA remote controlled from CR
4. One Table for: CAEN high voltage and DAQ computer

Physics program:

1. Pion/Muons beam >150GeV is fine
2. Beam spot: 3 - 7 mm RMS both planes
3. Drift field scans
4. Gain scans
5. Track topology studies
6. TimePix3 reference tracker (possible)!?



BURDAMAN GUI



MiniCactus Beam test with DRD1 (parasitic)

Roy ALEKSAN, Yavuz DEGERLI, Fabrice GUILLOUX, Jean-Pierre MEYER, Philippe SCHWEMLING*

CEA/Irfu

*also Université Paris Cité

Raimon CASANOVA, Sebastian GRINSTEIN, Joaquim PIÑOL

IFAE Barcelona

Archie HANLON, Eva VILELLA

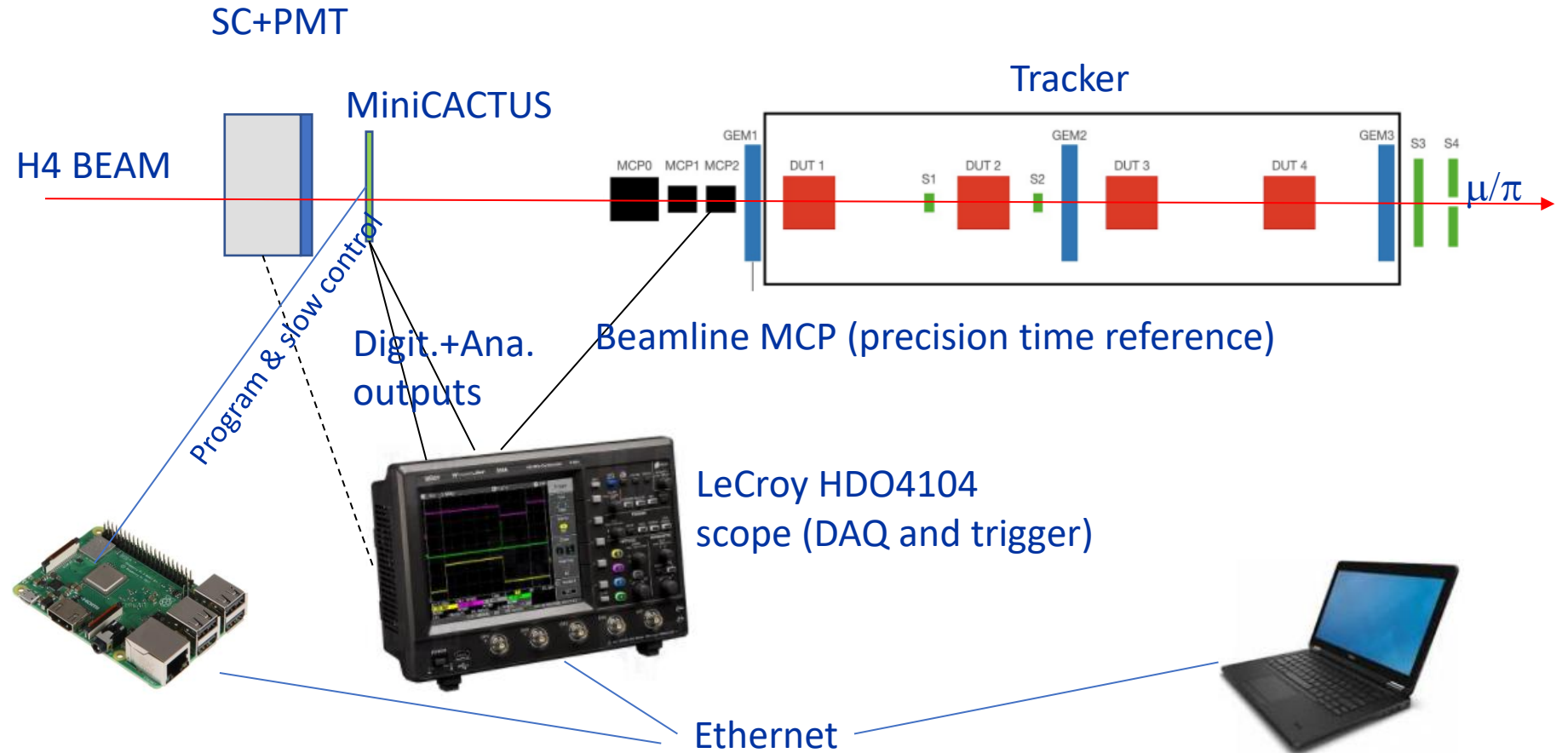
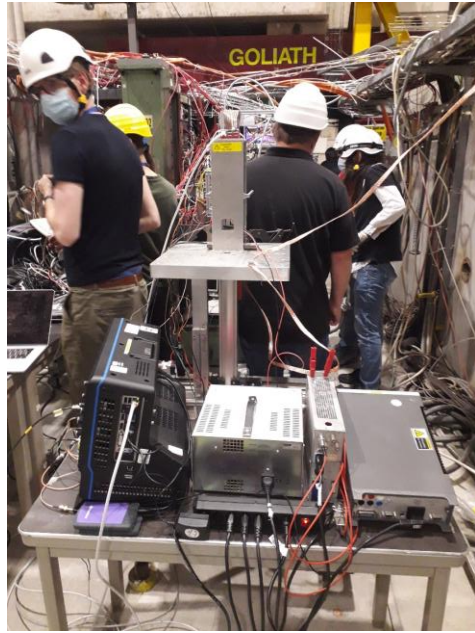
University of Liverpool

Tomasz HEMPEREK

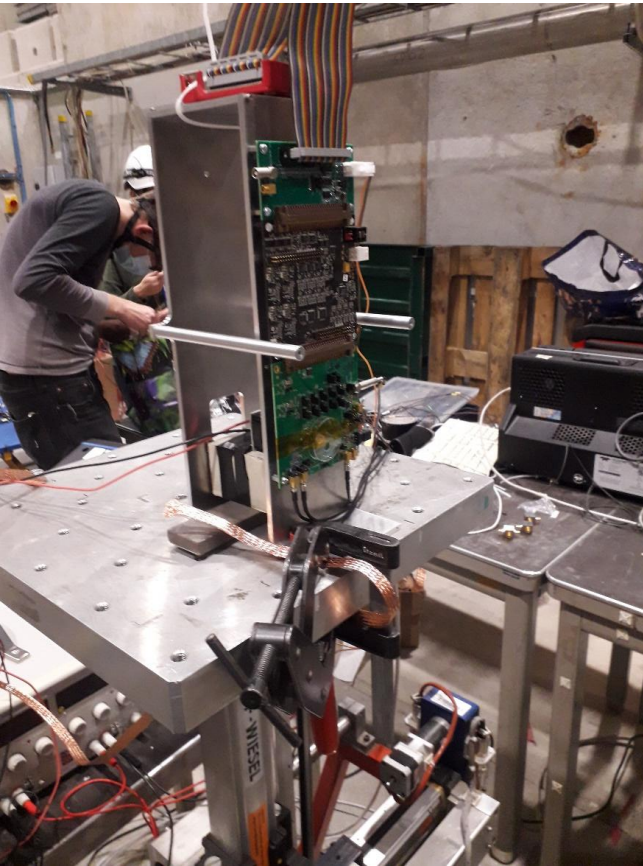
(U. Bonn, now at DECTRIS)



MiniCACTUS Test-Beam Setup (not to scale)



Infrastructure and installation



- Need to be aligned within a few mm with MCP to get best timing information from MCP → moveable table. Remote control nice to have, but not mandatory
- Magnetic field : not needed.
- Gases : Not applicable, not needed
- Need two network cable connections :
 - Raspberry PI (slow control)
 - Scope
- Beam : preferably muons. Pions are not a problem for us

Dimensions : 15 cm x 15 cm x 40 cm

Tandem GEM TPC

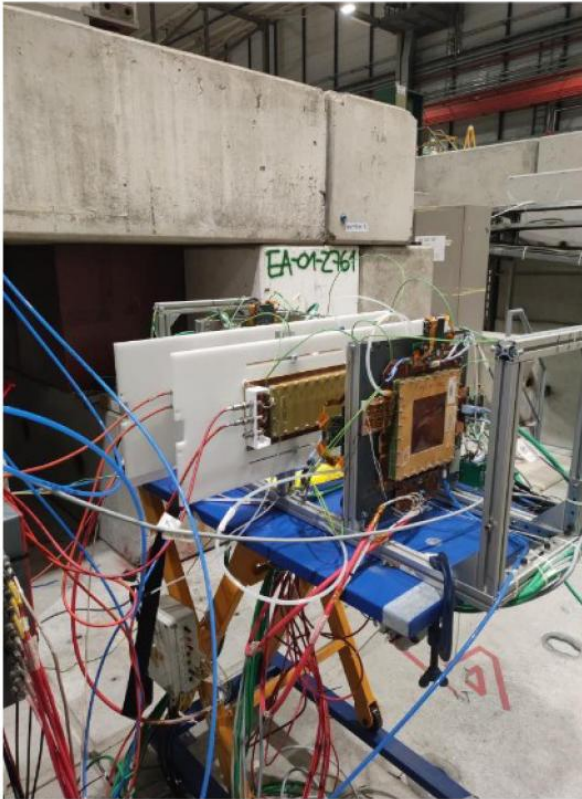
- WignerRPC (Hungary)
- Tandem GEM TPC : two 10^3cm^3 TPC, rotated 90deg to achieve self calibrating drift.
Plan to confirm operation and self-drift-calibration in beam conditions with various voltage and gas settings, and evaluate high intensity behaviour.
- Requirements:
Beam: Pion beam, various intensity
Gas: Ar+CO₂ mixture [%] : default 80+20 , and tests with 70+30 or 90+10
Table: about half m², preferably a remote-movable table
NIM crate with few slots
- Trigger: Few plastic scintillators + NIM modules
HV: Standalone CAEN HV units, 4 ch for TPCs, and 2 for trigger.
Readout: NA61 TPC readout electronics
Operation: Single PC for DAQ op.

Plans for test of uRWELL with TIGER/GEMROC

- Groups: INFN Ferrara, Torino
- Work within the development for the FCC *IDEA* muon detector
- Plans is to test uRWELL with different strip pitch and resistivity with electronics developed for BESIII experiment
 - Test was performed last July, we bring updates to the setup to test the noise reduction
- We plan to operate with muons
- Gas mixture ArCO₂ (70:30) and maybe other (Ar/CO₂/CF₄ (45:15:40) – but probably not needed)
- Setup:
 - 1 uRWELL “sandwiched” between 4 GEMs trackers, scintillators will provide trigger
 - 100x50x50 cm, (100 cm along the beam direction); we need a table to raise to the beam level, no need to move it afterwards
- Plan to perform HV scan on different prototypes
- Contact people: Giulio Mezzadri (gmezzadr@fe.infn.it); Federico Matias Melendi (fmelendi@fe.infn.it); Gianluigi Cibinetto (cibinett@fe.infn.it)

Last year setup and one result

From E. Di Fiore Master Thesis



Components

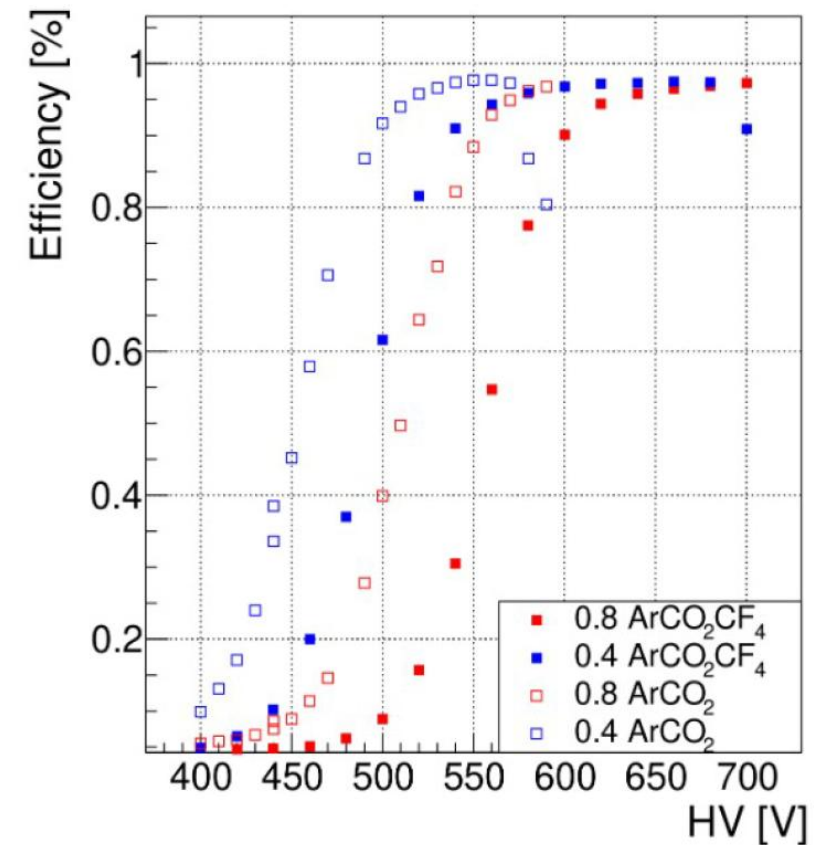
- μ -RWELLs (DUTs)
- Tracking system (four triple-GEM)
- TIGER-GEMROC readout chain
- Trigger system

Mechanical support

- Four planes
- (100 x 32 x 34) cm
- Vertical and horizontal positions

Detectors	Distances [cm]
Trackers 1-2	6.2
Tracker 2 - DUT 1	20
DUTs 1-2	38.3
DUT 2- Tracker3	49.5
Trackers 3-4	55.5

ArCO₂CF₄ vs ArCO₂

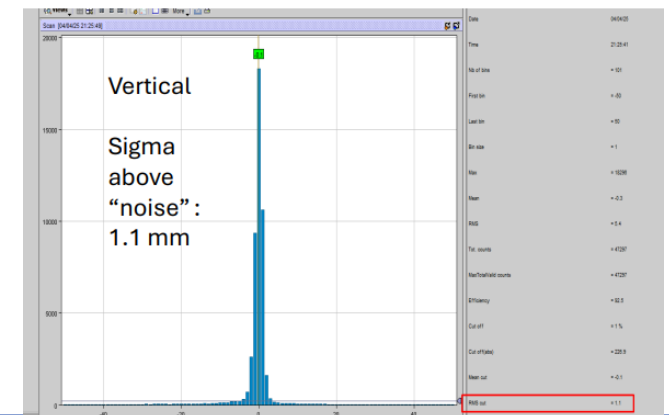
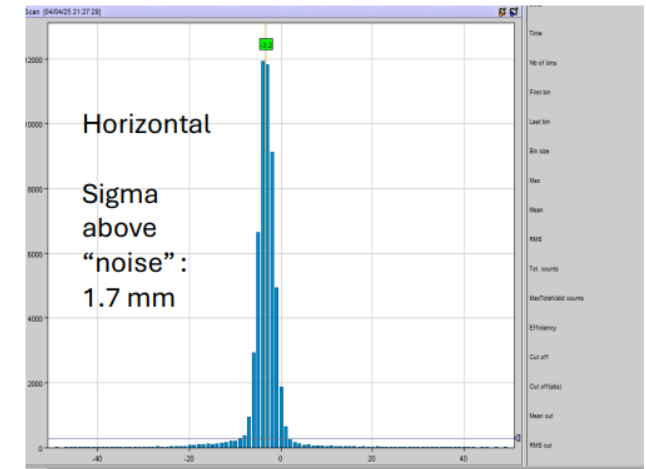


Just to give an *IDEA* of the setup and the kind of measurement we plan to make

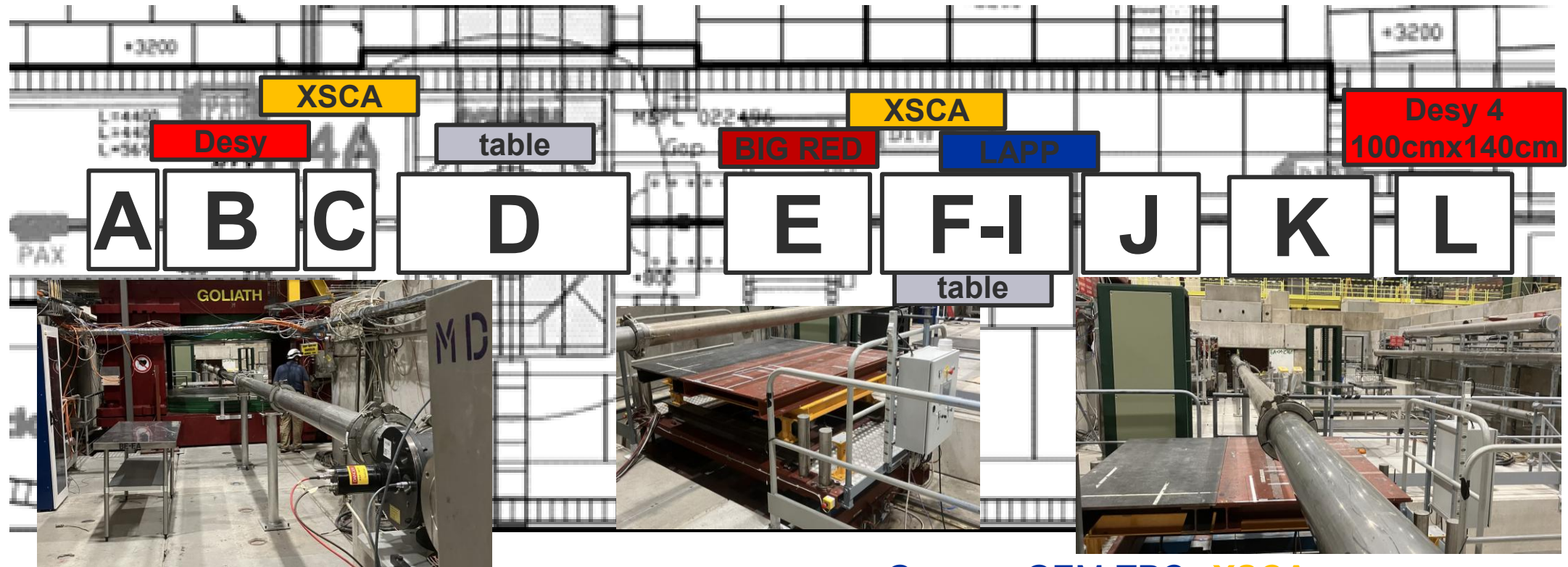
Backup

Pion and Magnet usage (example July 25)

- Default beam condition will Muons $\sim 150\text{GeV}/c$ with $\sim 200\text{k}$ per spill (one spill = $\sim 5\text{s}$)
 - Rate: $2.1\text{e}5$ coincidences
- Pion beam, requested by 4 groups for scans
 - Nikos did the first tests to improve the pion beam
 - To be coordinated with GIF
 - In the past, we had a few shifts of 4h-8h (possibly during night)
- Magnet, requested by 2 groups ($0.5\text{T} - 1.5\text{T}$)
 - To be coordinated with give & setups behind goliath
 - Same here, few shifts of 4h-8h (possibly night)



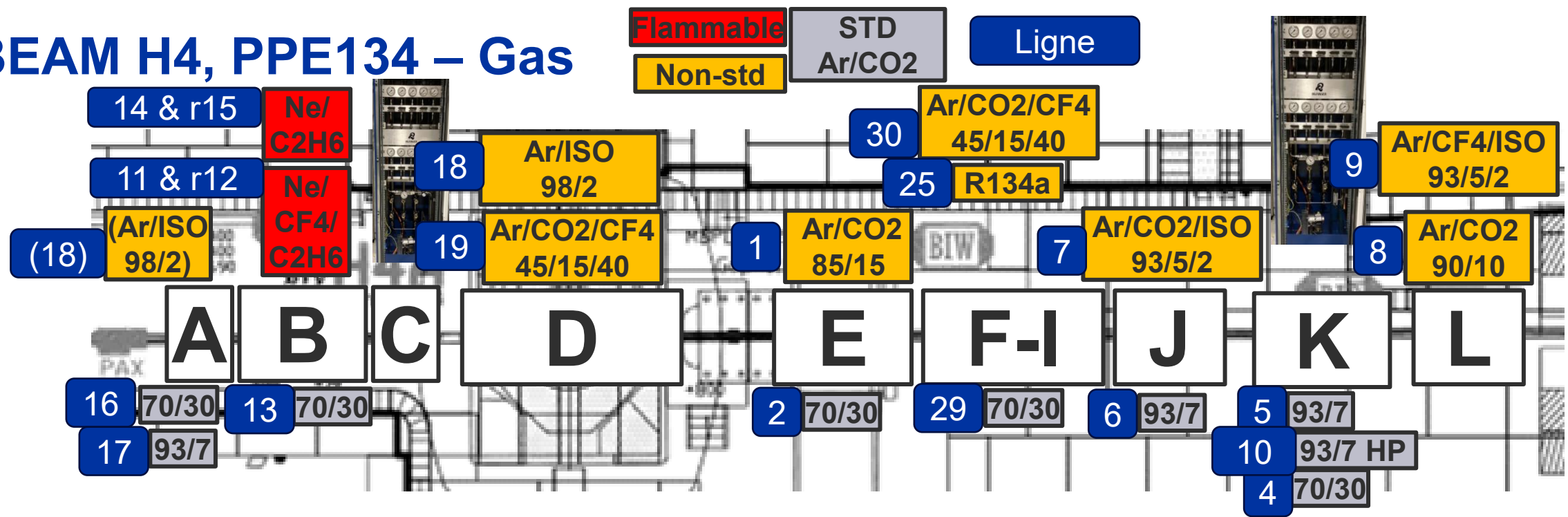
BEAM H4, PPE134 – Moveable Tables



A: DRD1 telescope B
 B: PICOSEC **DESY**
 C: PARASITIC: minicatus
 D: USTC (uRGroove) table
 E: DUNE Bologna group **DESY/red Table**
 F: MWPC-Tracker-VMM table

G: GEM-TPCs **XSCA**
 H: INFN Bari RPC group
 I: DRD1 telescope A
 J: LMU Munich
 K: PARASITIC: straws
 L: HYDRA tracker **DESY/XSCA**

BEAM H4, PPE134 – Gas



A: DRD1 telescope B Ar/CO2 93/7 & 70/30
(& Ar/ISO 98/2)

B: PICOSEC Ne/CF4/C2H6

C: PARASITIC: minicatus

D: USTC (uRGroove)
Ar/CO2/CF4 45/15/40 & Ar/ISO 98/2

E: DUNE Bologna group Ar/CO2 70/30 & 85/15

F: MWPC-Tracker-VMM Ar/CO2 70/30 or 93/7

G: GEM-TPCs Mixer: Ar/CO2 & He/CO2

H: INFN Bari RPC group R134a

I: DRD1 telescope A
Ar/CO2 70/30 & Ar/CO2/CF4 45/15/40

J: LMU Munich Ar/CO2 & Ar/CO2/ISO
Ar/CO2/ISO 93/5/2 & Ar/CO2 93/7

K: PARASITIC: straws Ar/CO2 70/30 & 93/7

L: HYDRA tracker
Ar/CO2 70/30 (or 90/10) & Ar/CF4/ISO 93/5/2

3 Spills + GIF access (PAXNA14404 reduces to 15uSv/h)
-> XCSH.022.068 to -8.5 & 8.5 (beam ref -12/12)
(don't forget to remove the cross for 'update beam ref')

