Infrastructure, experience and local manpower for CBM-TRD construction & tests in HPD/IFIN-HH

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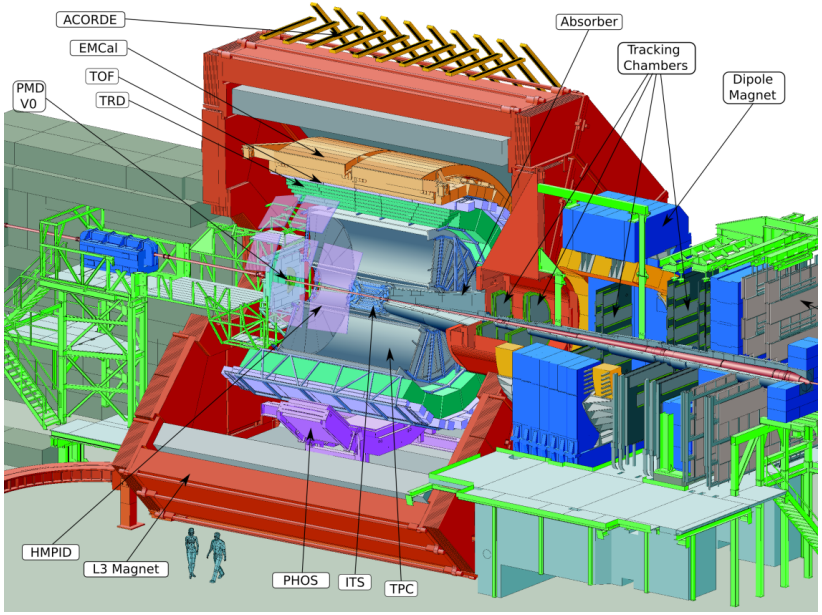
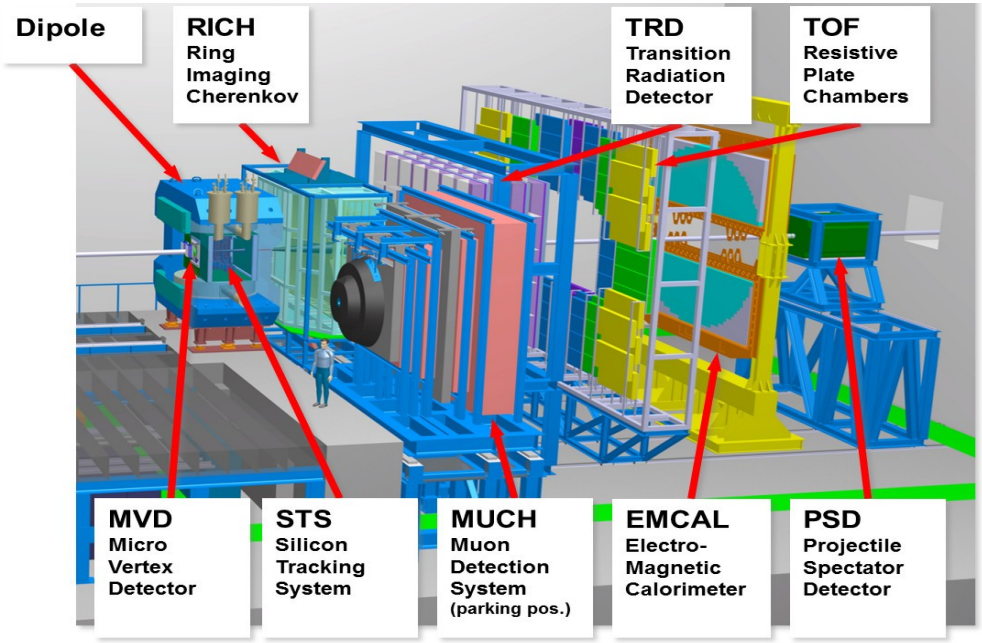
Major projects in which HPD is involved

ALICE experiment at LHC



- *ALICE-TRD prototype tests*
- *Design of the FEE chip (PASA)*
- *ALICE-TRD chamber assembling & tests*
- *ALICE-TRD SMs installation*
- *ALICE-TPC upgrade based on GEM technology, OROC assembling & tests*
- *Data analysis*

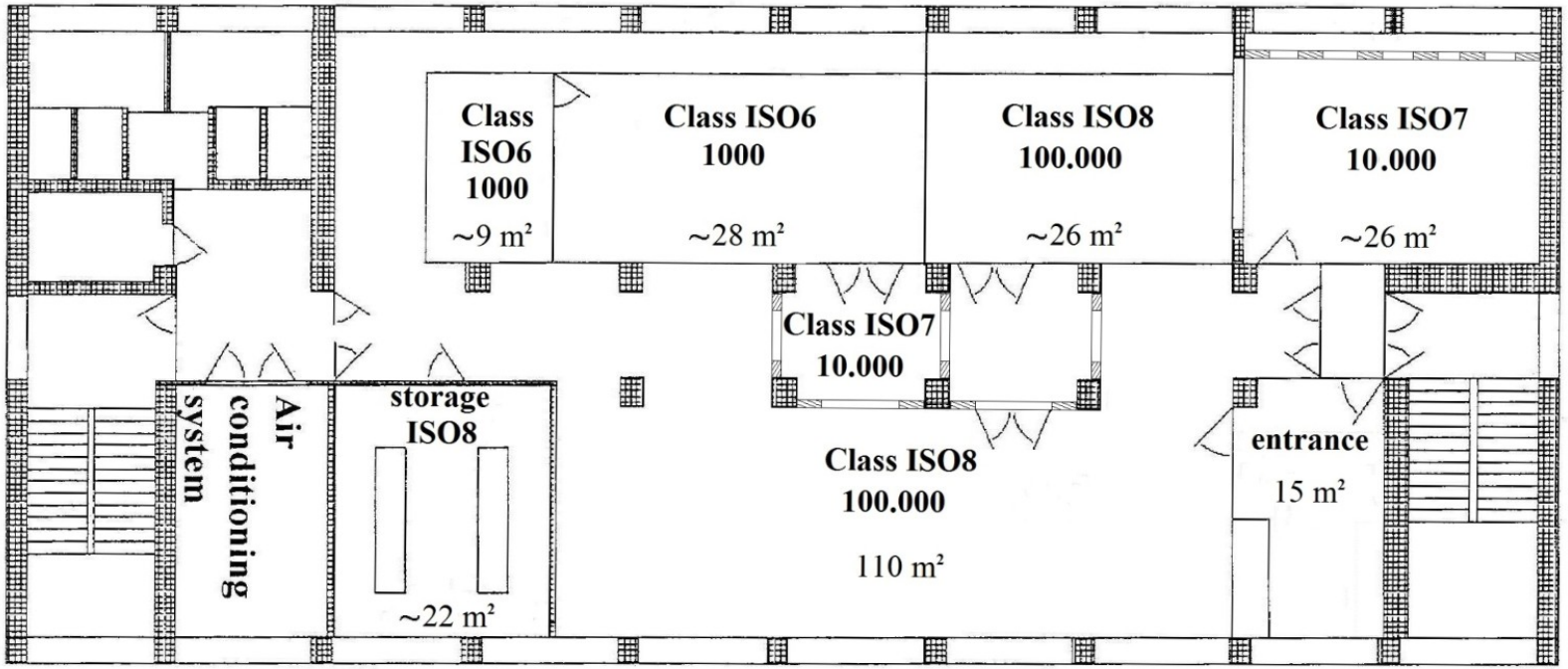
CBM experiment at FAIR



- *R&D activities for:*
  - ➔ *CBM-TRD subsystem*
  - ➔ *CBM-TOF subsystem*

Detector Laboratory Infrastructure

IFIN-HH, HPD Detector Laboratory Infrastructure



Five main clean rooms with 100000, 10000 and 1000 particles/ft³ air purity,

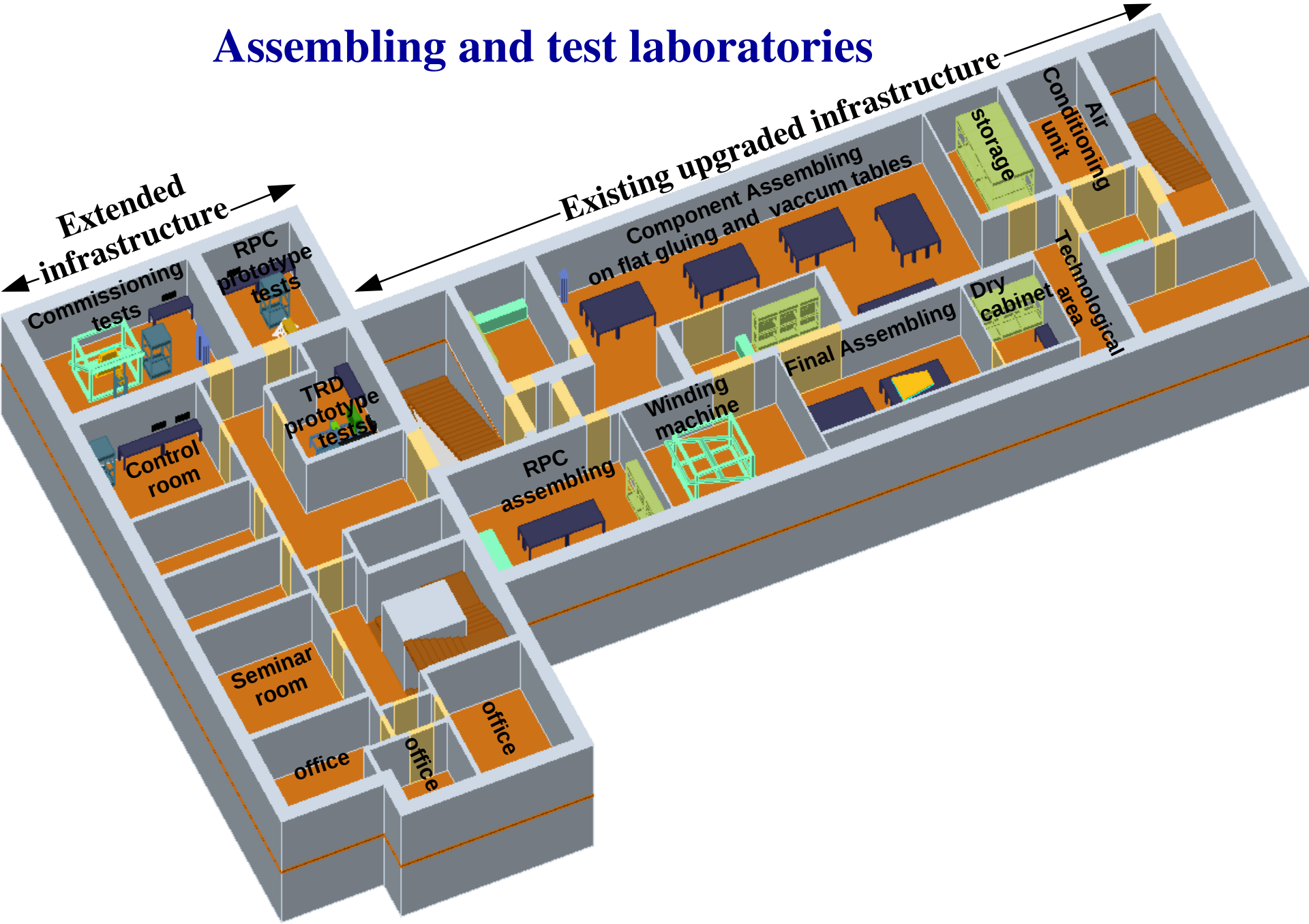
Controlled temperature and humidity

They were first time equipped during 2004 year

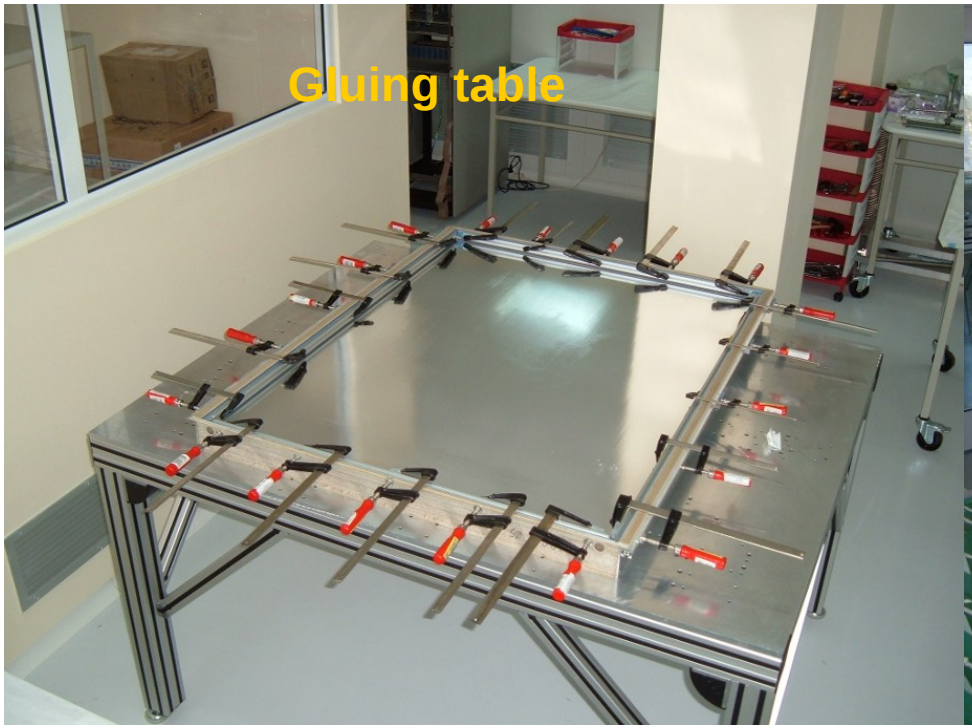
for ALICE-TRD chamber construction & testing

Later on, the existing infrastructure was upgraded and extended

Assembling and test laboratories

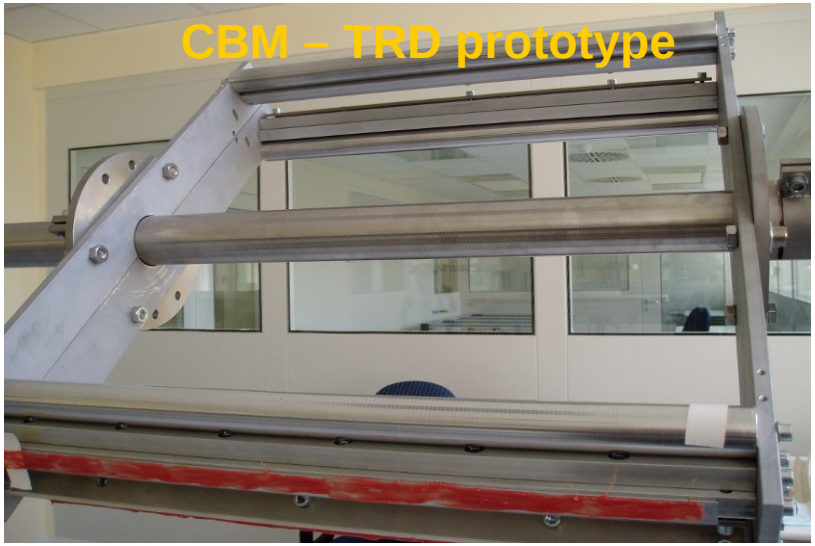


Body and component chamber assembling



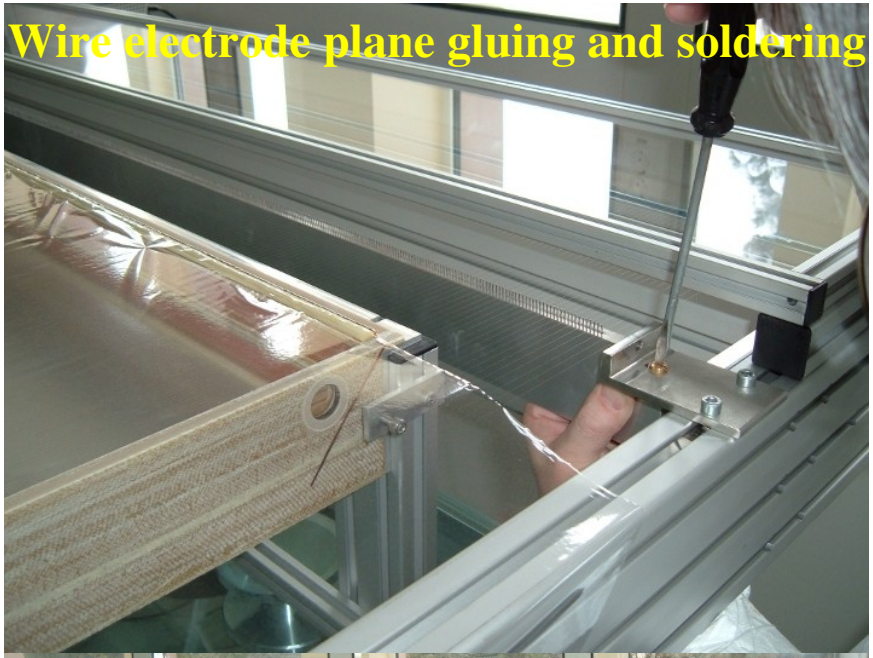
Clean room < 100 000 part/ft^3

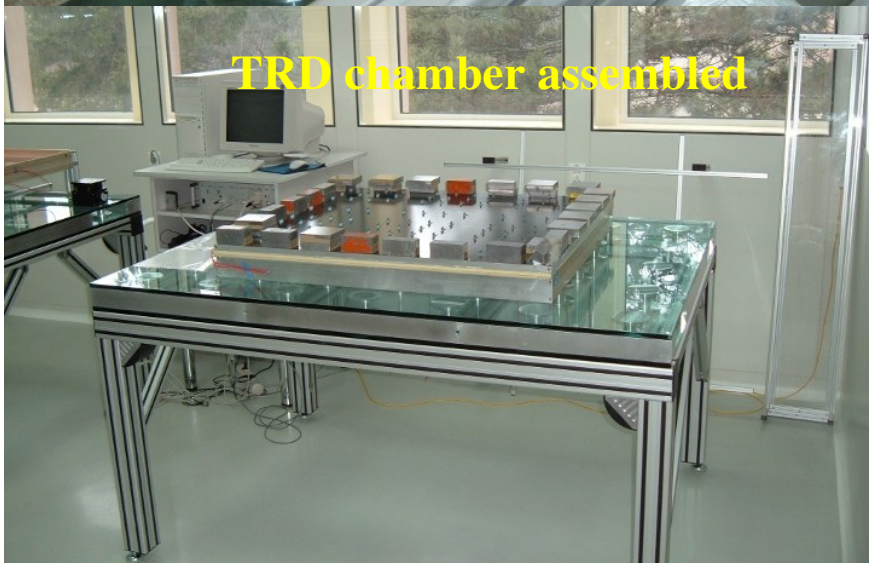
Winding machine for multi-wire electrodes



Clean room < 100 000 part/ft^3

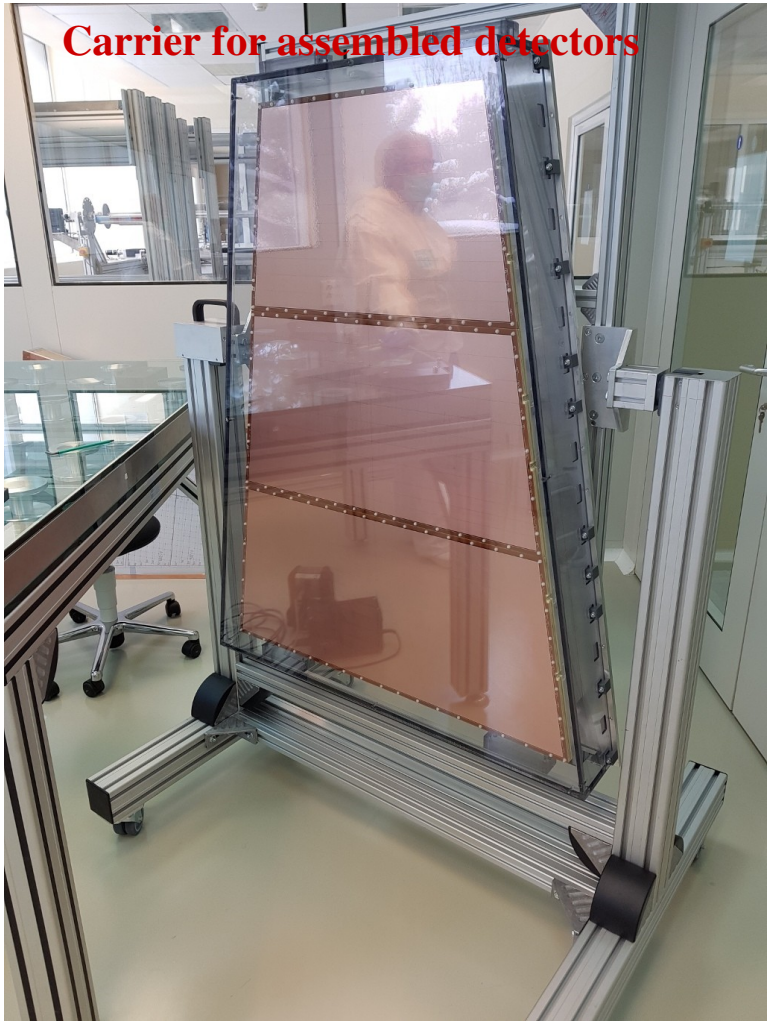
Final assembling & intermediar QA tests

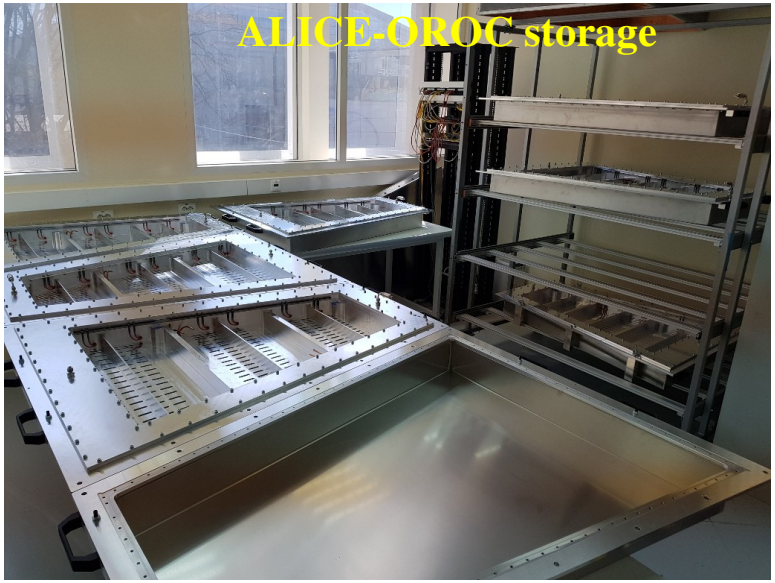




Clean room < 1000 part/ft^3

Storage area

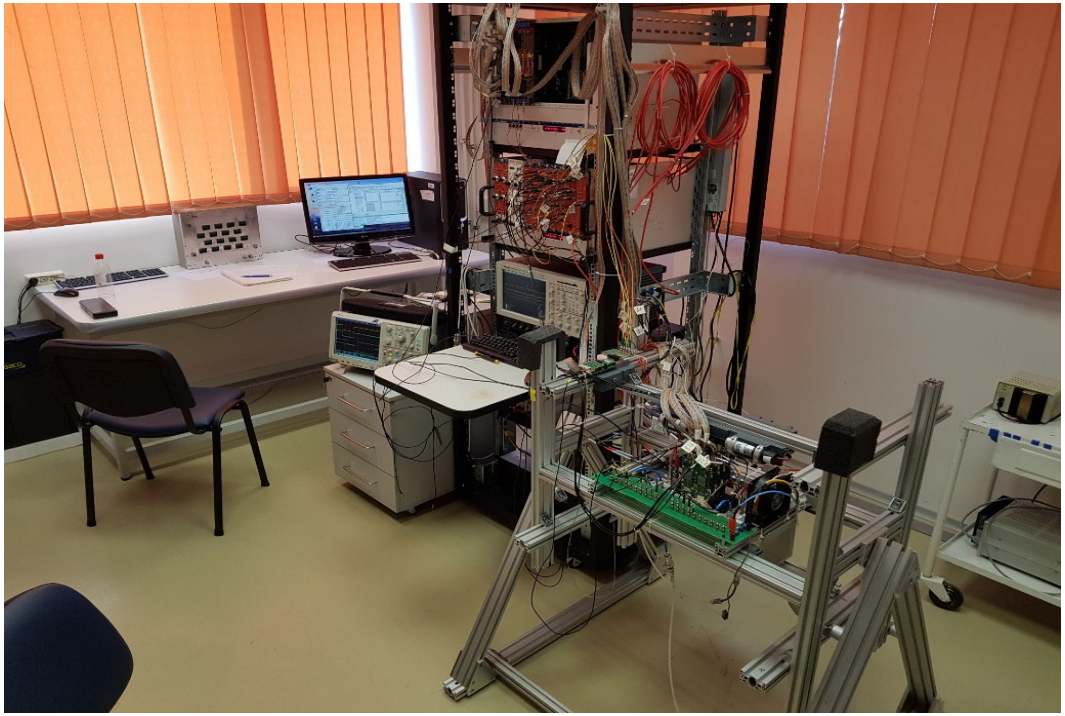




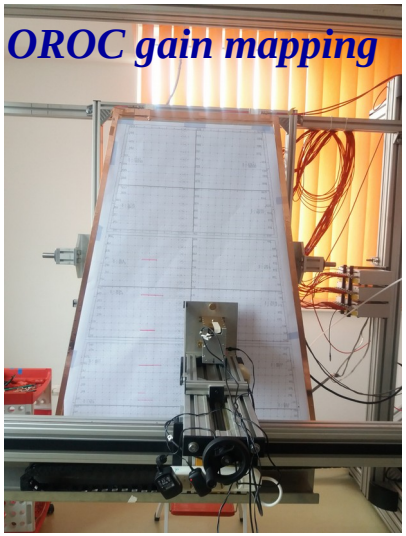
Prototype test labs

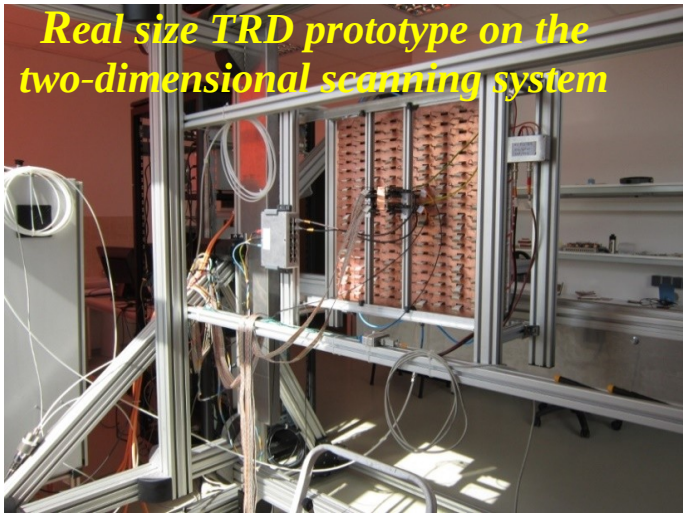
TRD radioactive source & X-ray tube tests

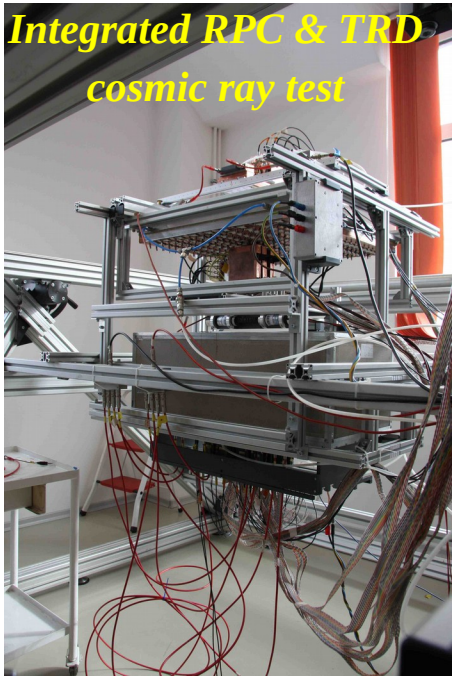
RPC radioactive source & cosmic ray tests



Detector commissioning laboratory







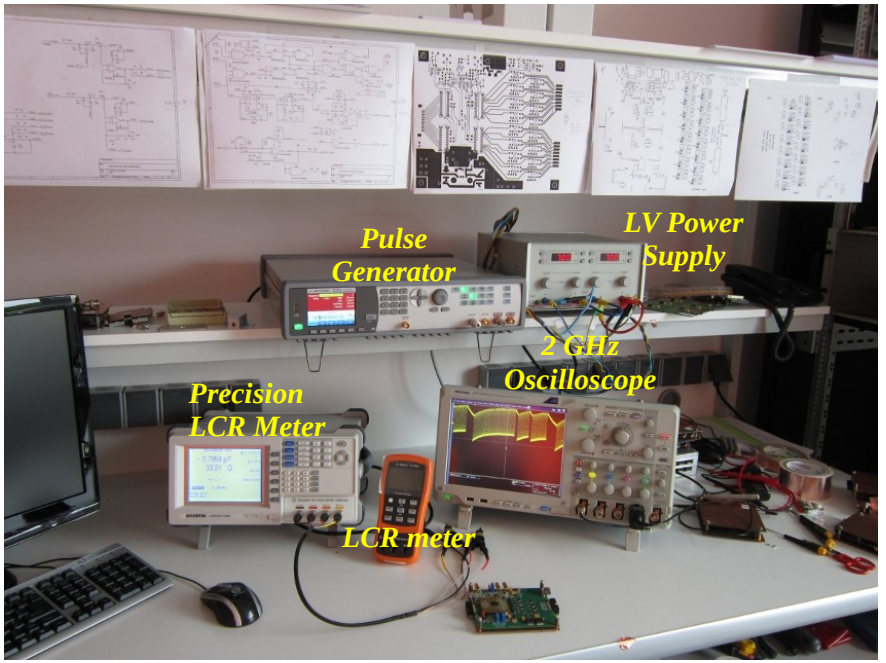
Laboratory infrastructure

- *gas system*
- *oxygen meter*
- *two-dimensional scanning system*
- *mini X-ray tube*
- *electronic modules*
- *DAQ systems*

Electronics laboratories

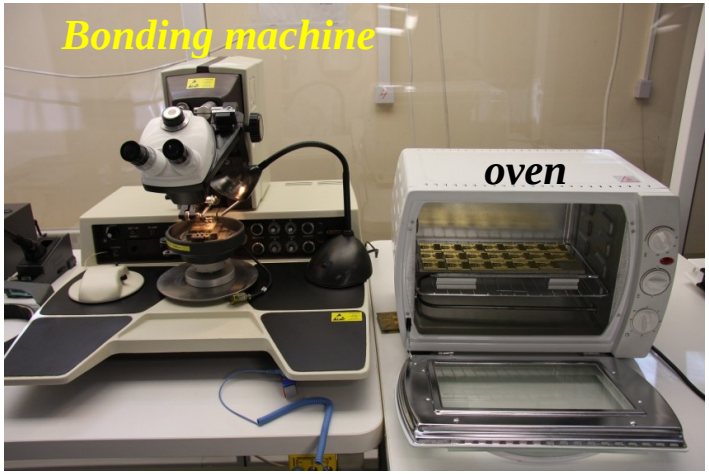
Laboratory infrastructure

Test and characterization of the FEE boards

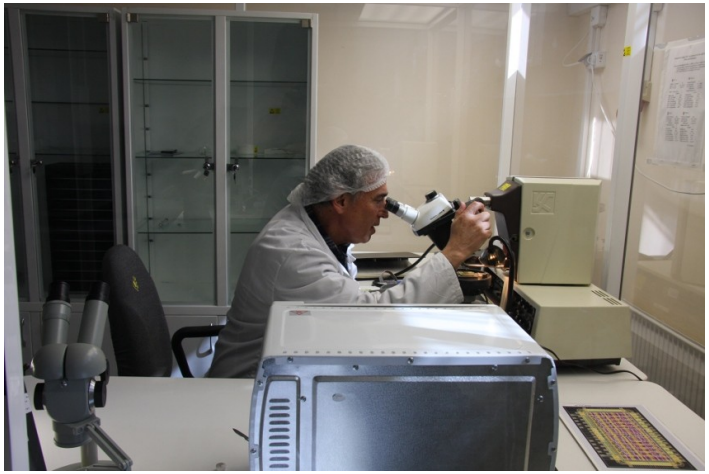


FEE R&D activities for the CBM-TRD

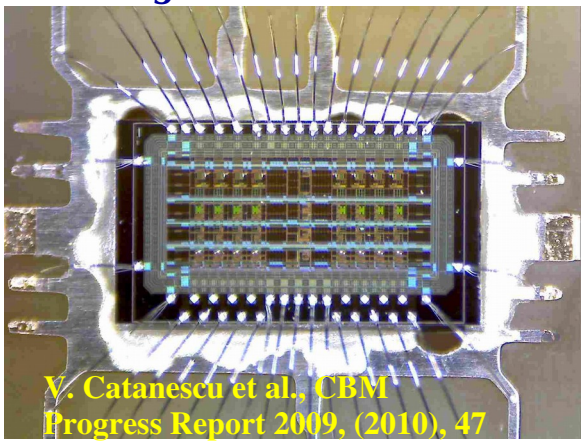
Bonding laboratory infrastructure



Bonding a chip



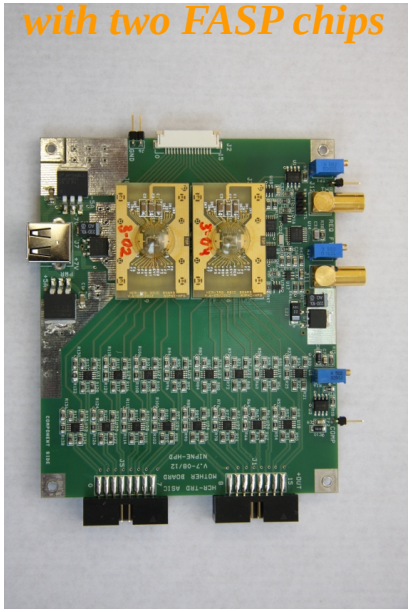
FASP chip bonded on a in house designed motherboard



In house designed front end board (FEB)

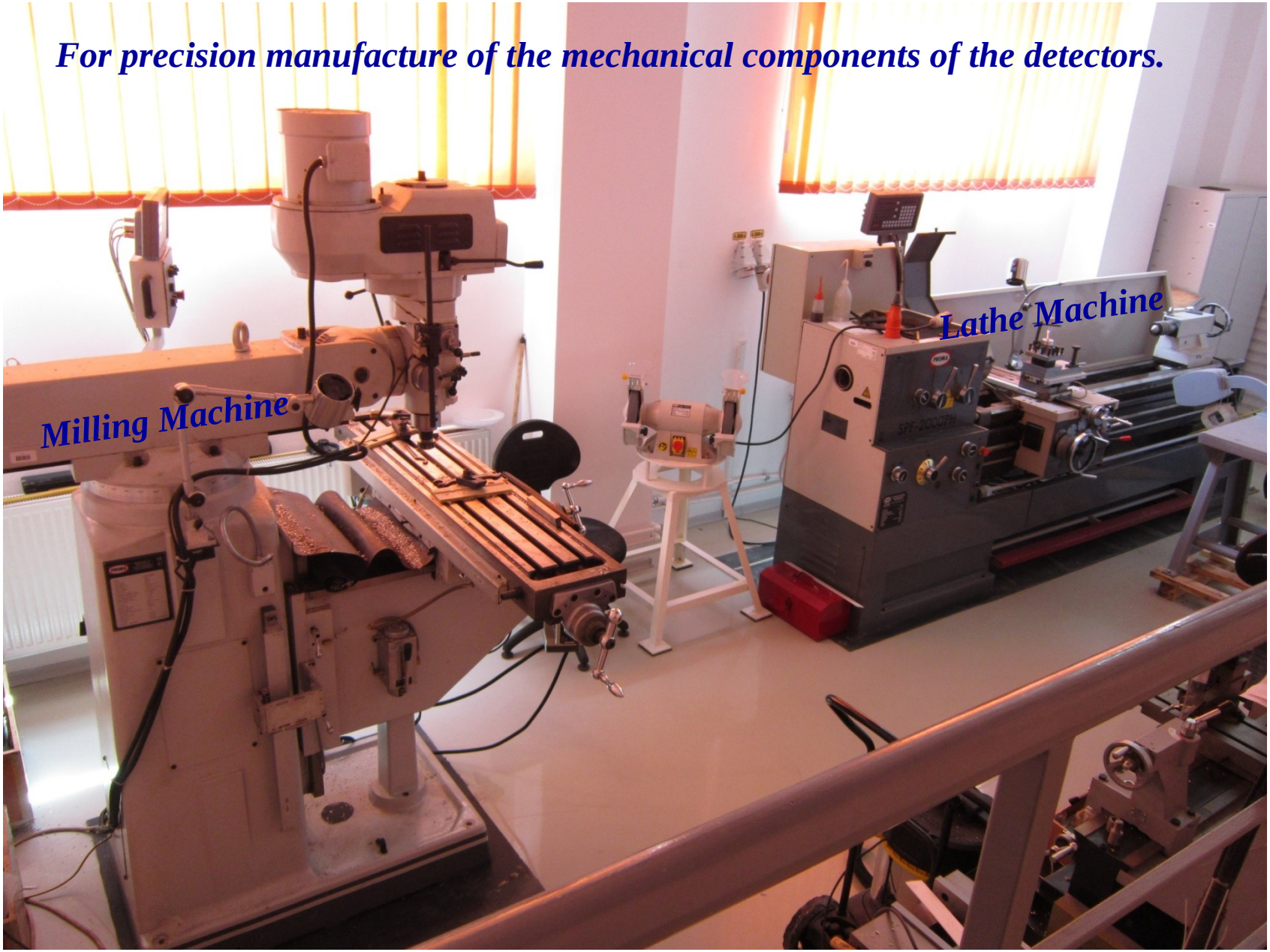
with a single FASP chip

with two FASP chips

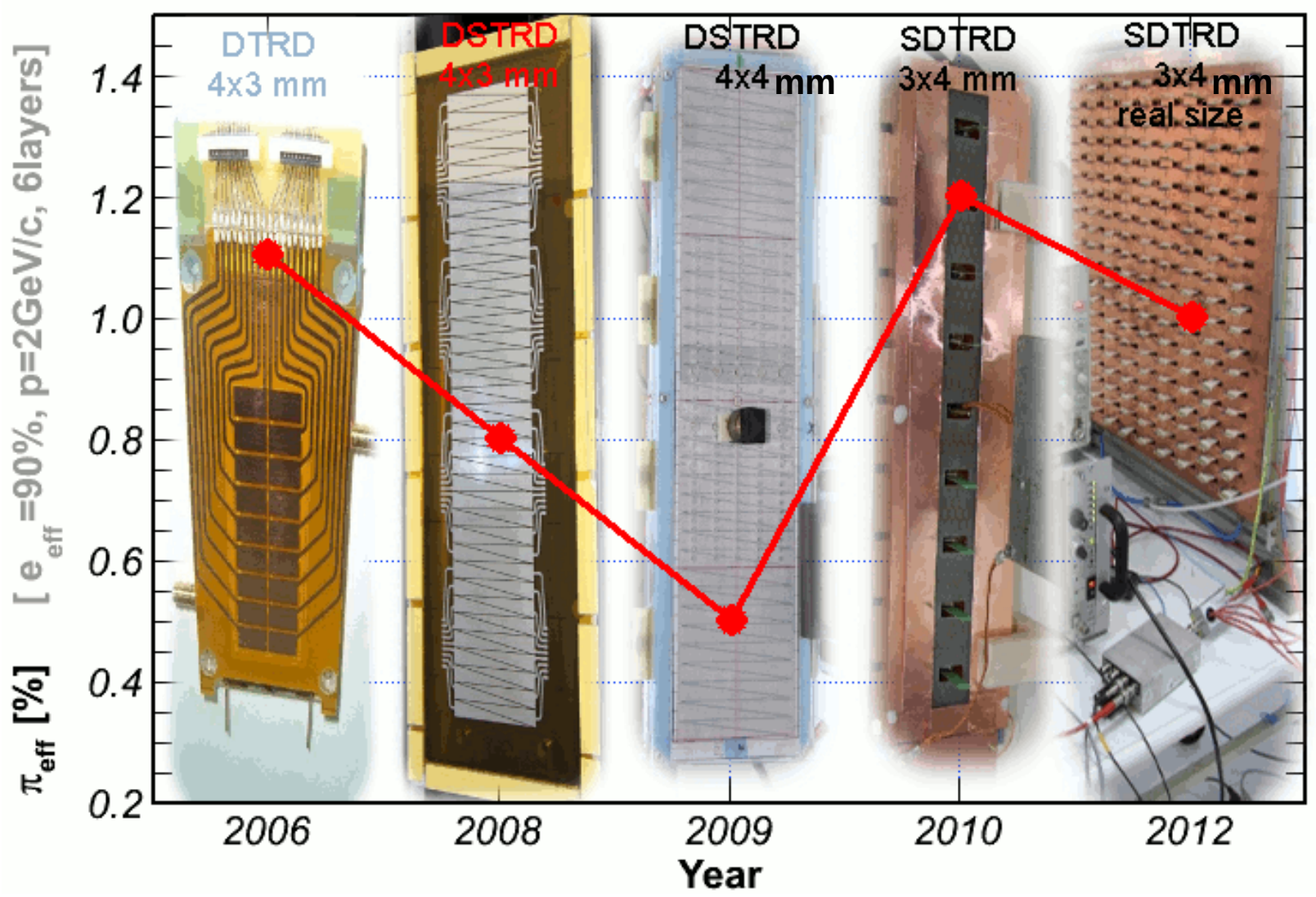


Mechanical Workshop

For precision manufacture of the mechanical components of the detectors.



CBM-TRD prototypes
pion misidentification performance for 6 layers

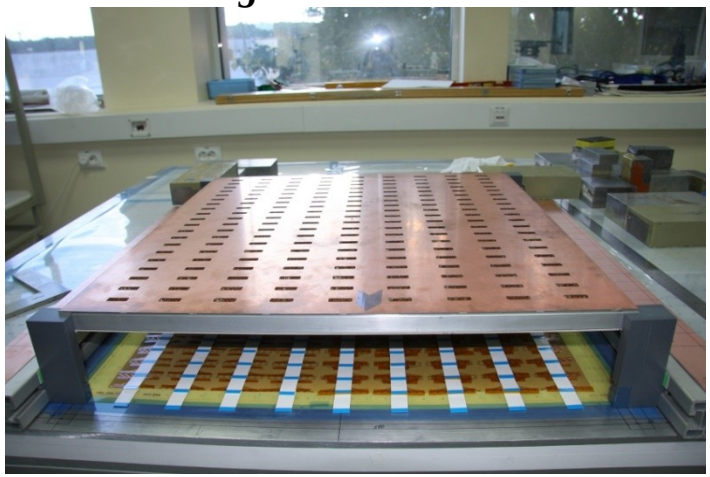


HPD Detector laboratory infrastructure used for CBM-TRD R&D

Some construction details of the TRD 2012 real size prototype

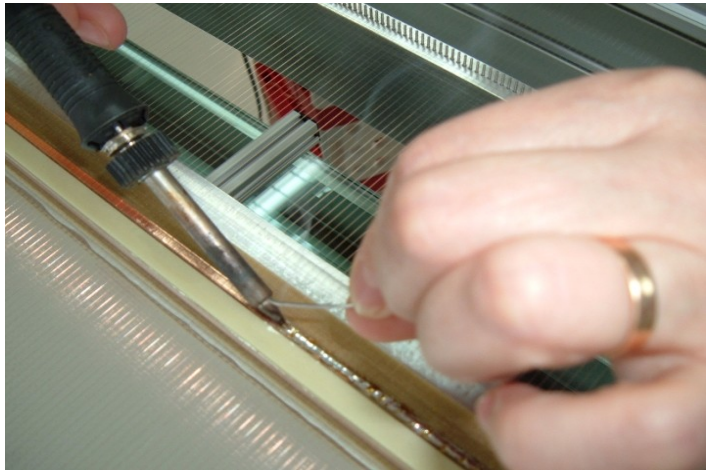
Soldering the flat cables on the back side of the readout electrode using pick and place machine

Assembling of the readout electrode using the vacuum table



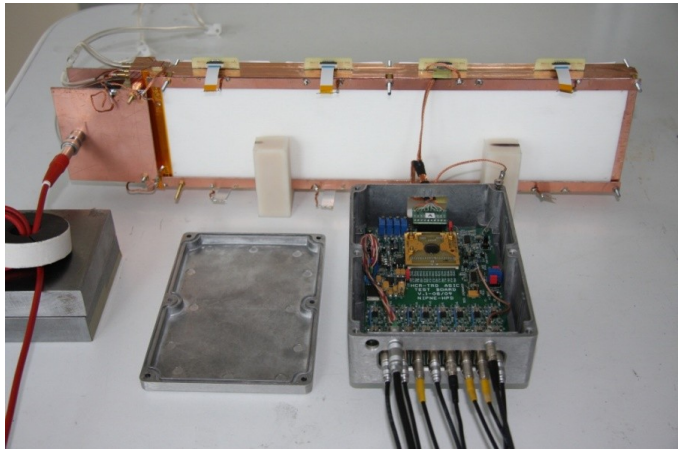
Assembling of the drift electrode using the gluing table

Gluing & soldering of the multiwire electrodes

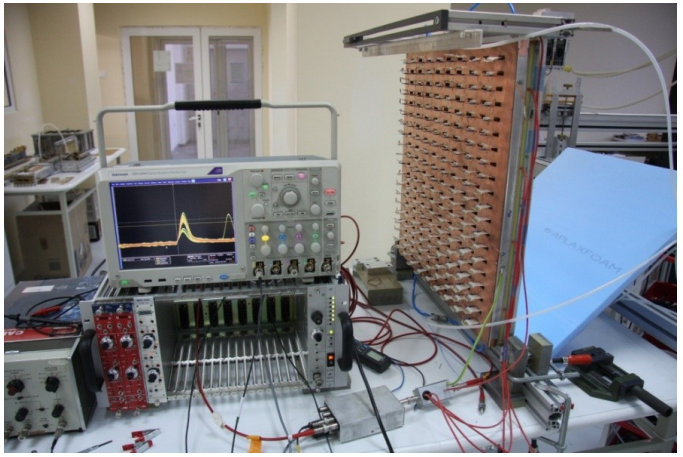


^{55}Fe source tests of the CBM-TRD prototypes

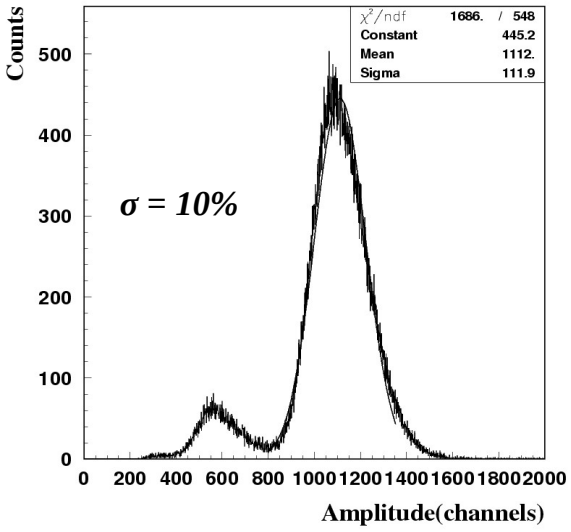
First DSTRD + FASP tests in the lab



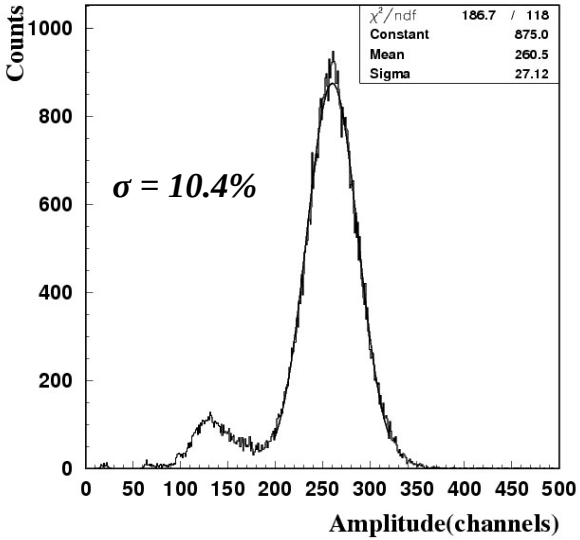
First signals from ^{55}Fe



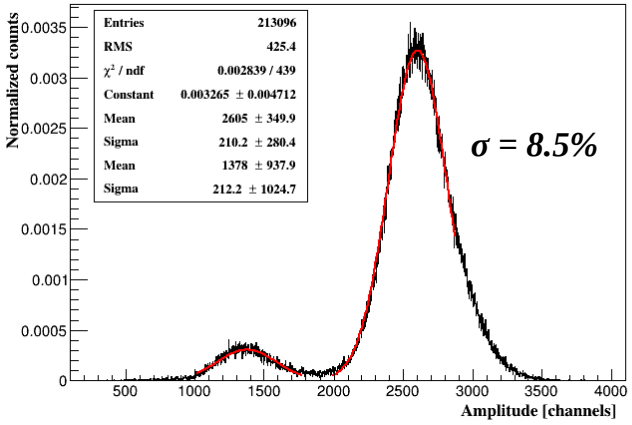
DSTRD-V2 Pad signal
FASP-V.0.1: fast Gaussian output



DSTRD-V2 Pad signal
FASP-V.0.1: flat top output

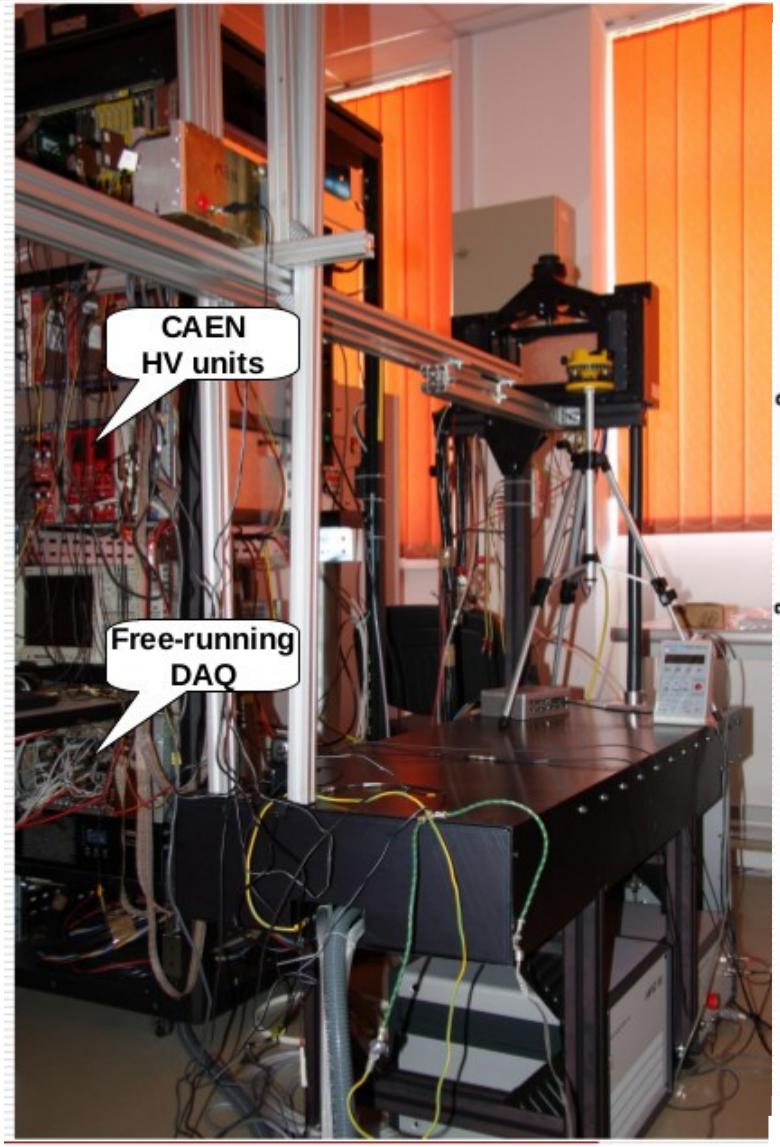


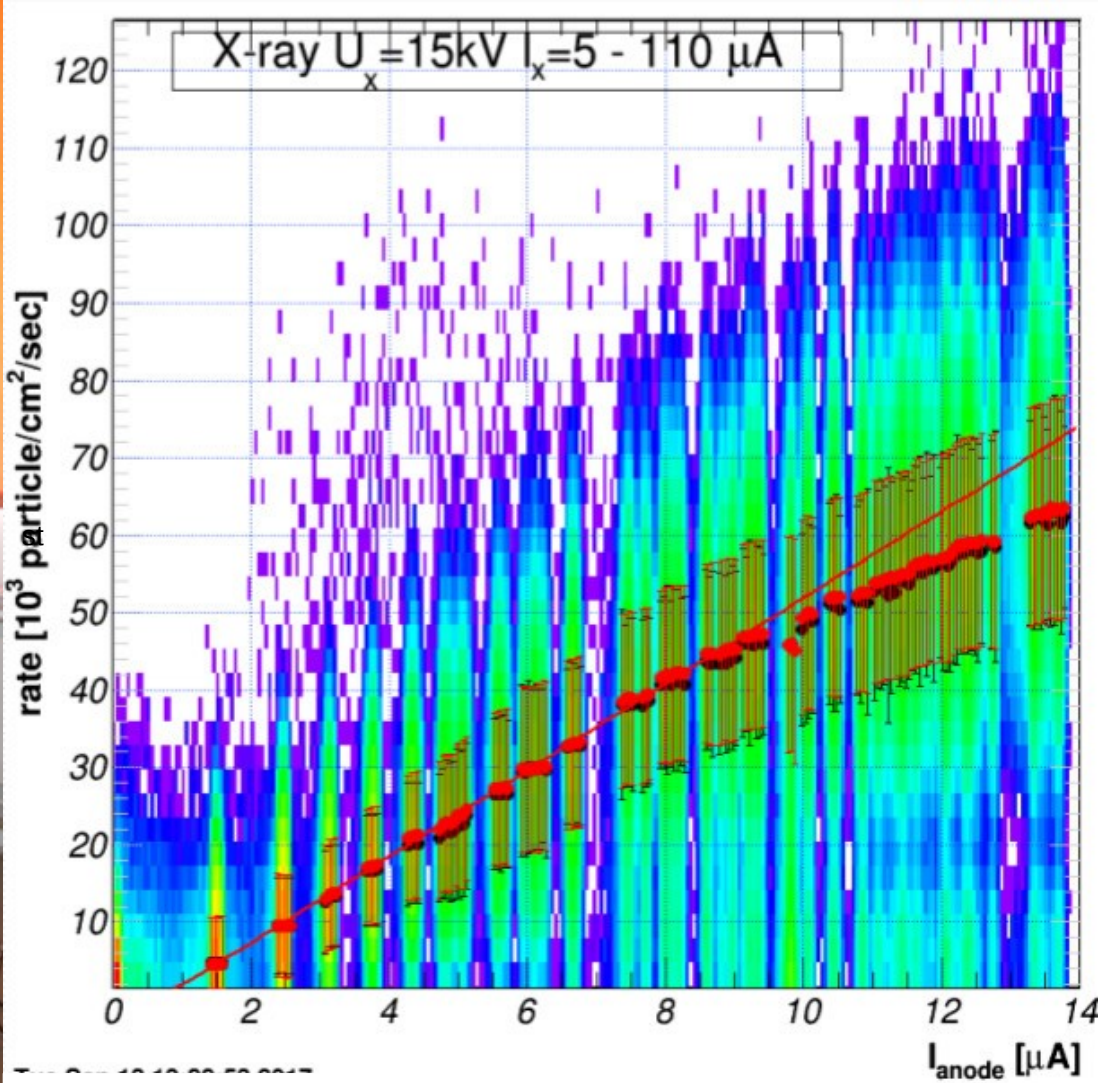
TRD2012 Pad signal
FASP-V.0.1: flat top output



M. Petris et al., Nucl. Instr. Meth. A 714 (2013), 17

X- ray set-up for high counting rate tests

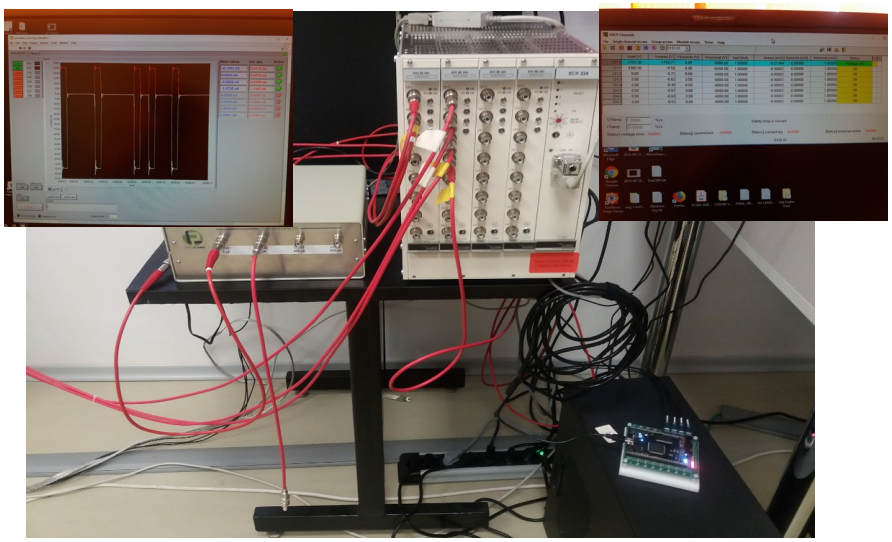




A. Bercuci et al., 31st CBM Collaboration Meeting, GSI Darmstadt, March, 2018

Other useful equipment

HV power supplies & pA/μA meter



Chemical hood

Oven

Optical table

Local manpower

- 3 technicians
- 2 electronics engineers
- 2 mechanical engineers
- 3 physicist
- however, any of them is not available with a full FTE for the project

Outlook

We have the suitable:

- equipment

- man power

- experience

for participating to the construction of the TRDs for CBM experiment.

For more information see our web page: http://niham.nipne.ro


Thank you for your attention!
HADRON PHYSICS DEPARTMENT