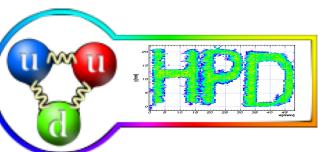




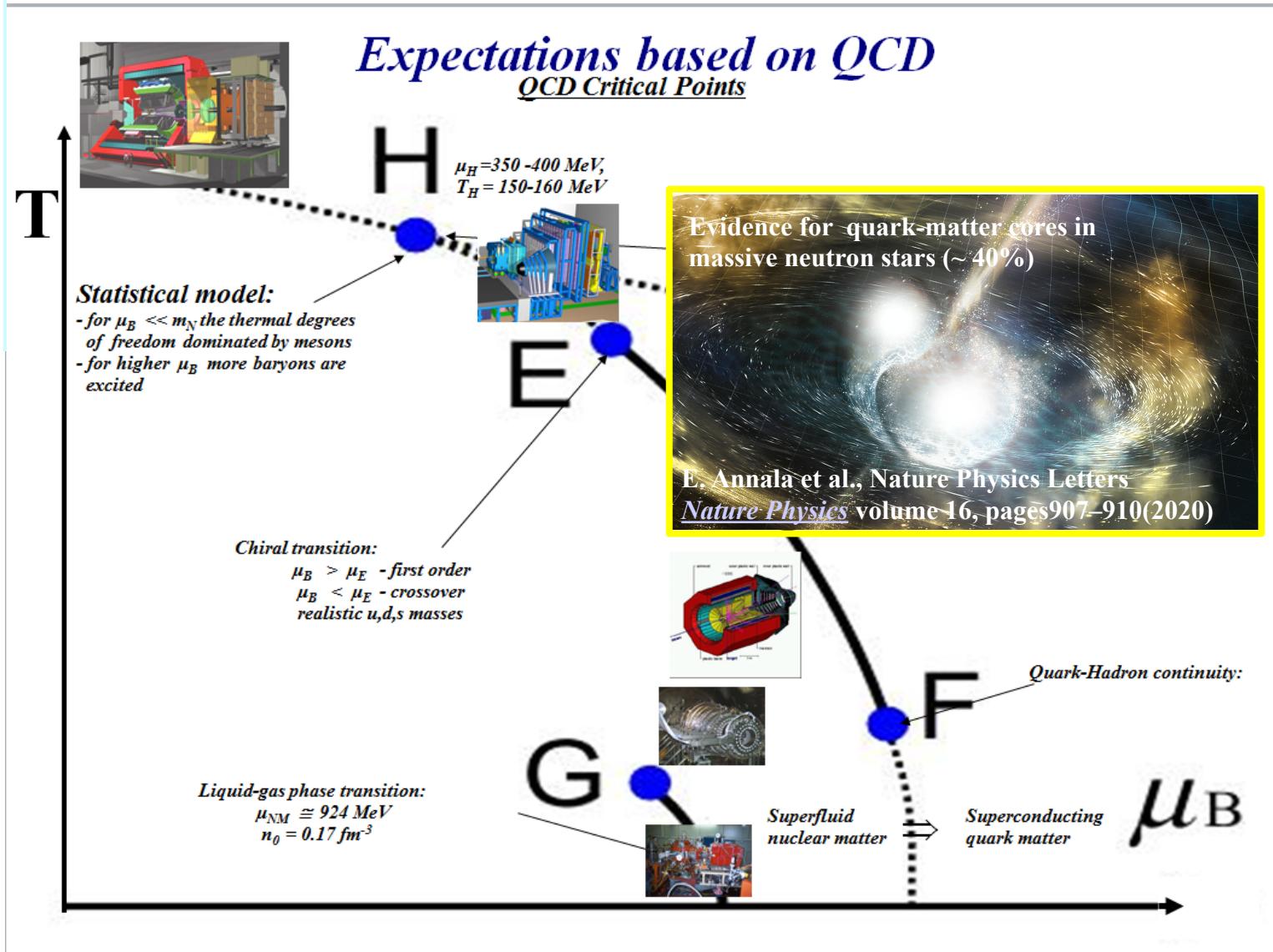
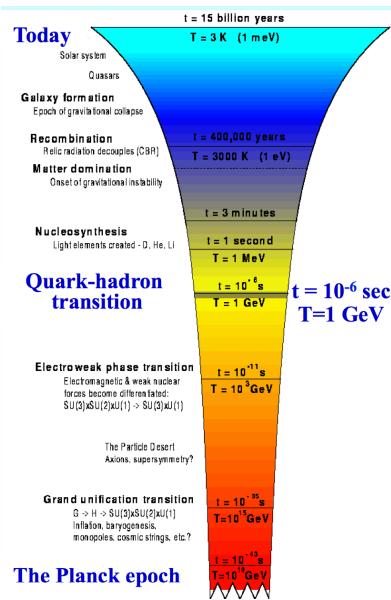
- *Objectives and Results 2016-2019*
- *Publications, Presentations, Contributions to CBM - Progress Reports*
- *Summer Student Program and Outreach*
- *Financial aspects*



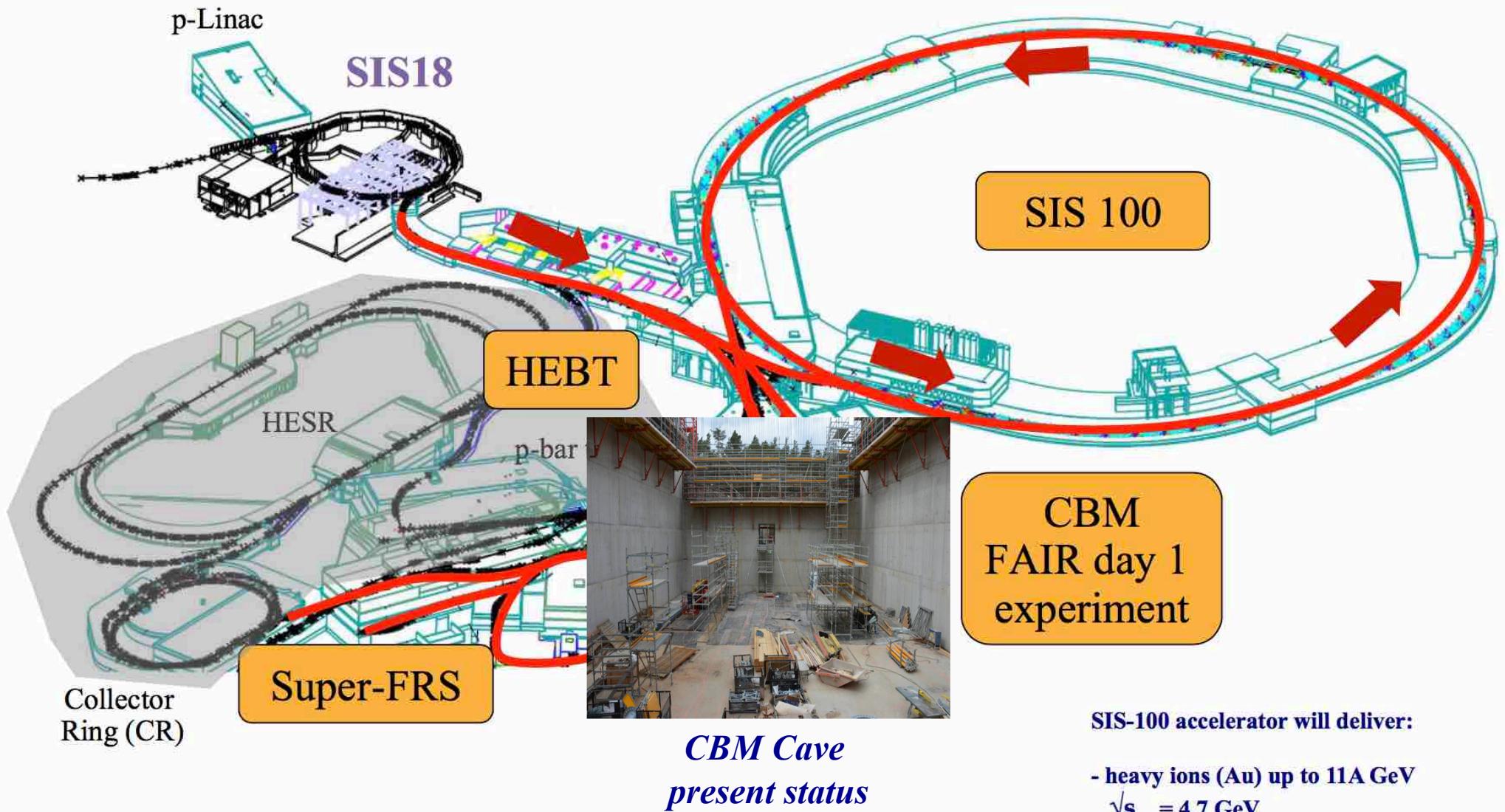
HADRON PHYSICS DEPARTMENT

National Institute for Physics and Nuclear Engineering - IFIN-HH

Motivation



GSI/FAIR strategy: Staged realization along the beam towards MSV

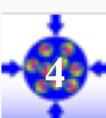
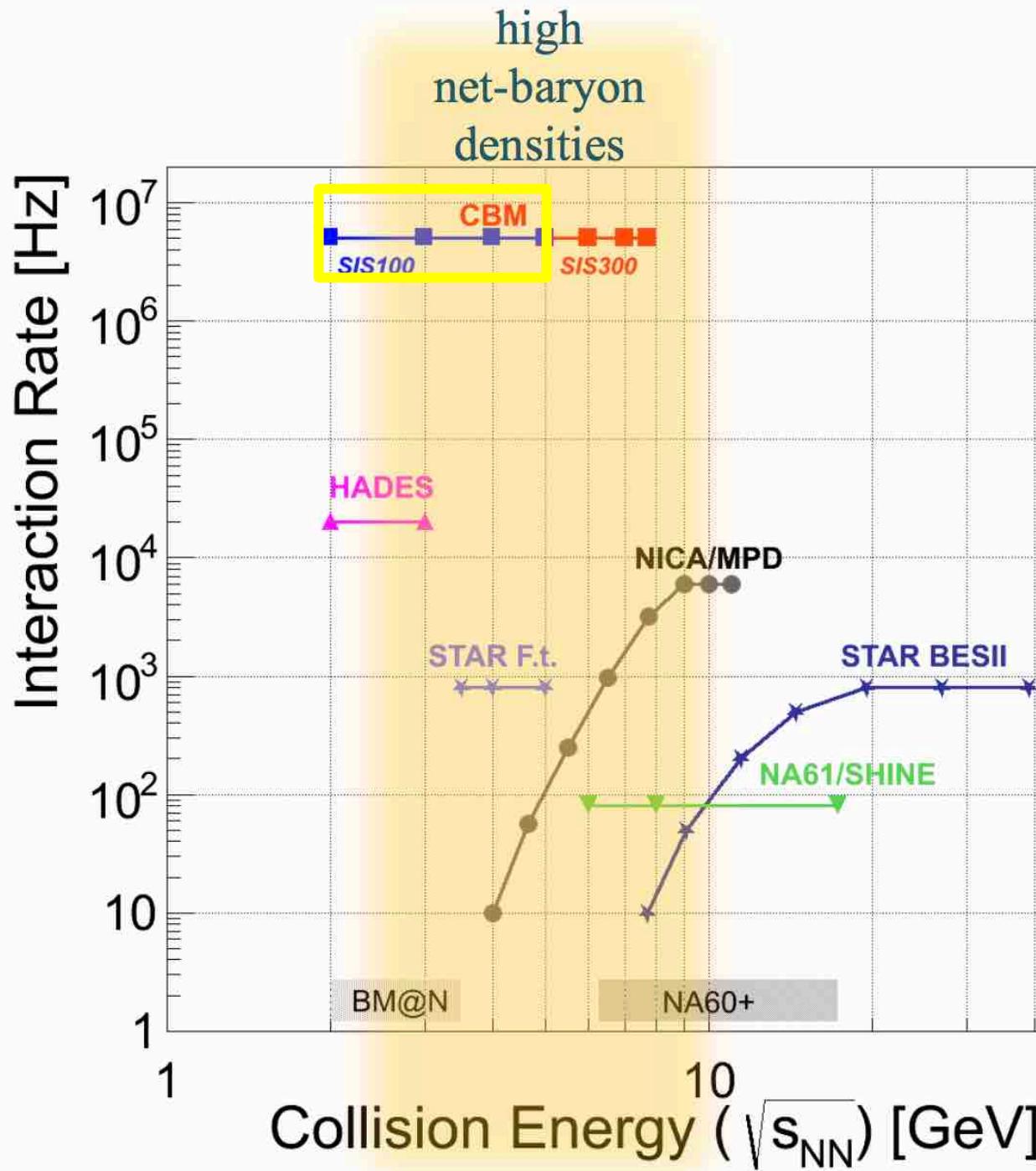


SIS-100 accelerator will deliver:

- heavy ions (Au) up to 11A GeV
 $\sqrt{s_{NN}} = 4.7 \text{ GeV}$
- light ions (e.g. Ca) up to 14A GeV
 $\sqrt{s_{NN}} = 5.3 \text{ GeV}$
- protons up to 29 GeV
 $\sqrt{s} = 7.5 \text{ GeV}$

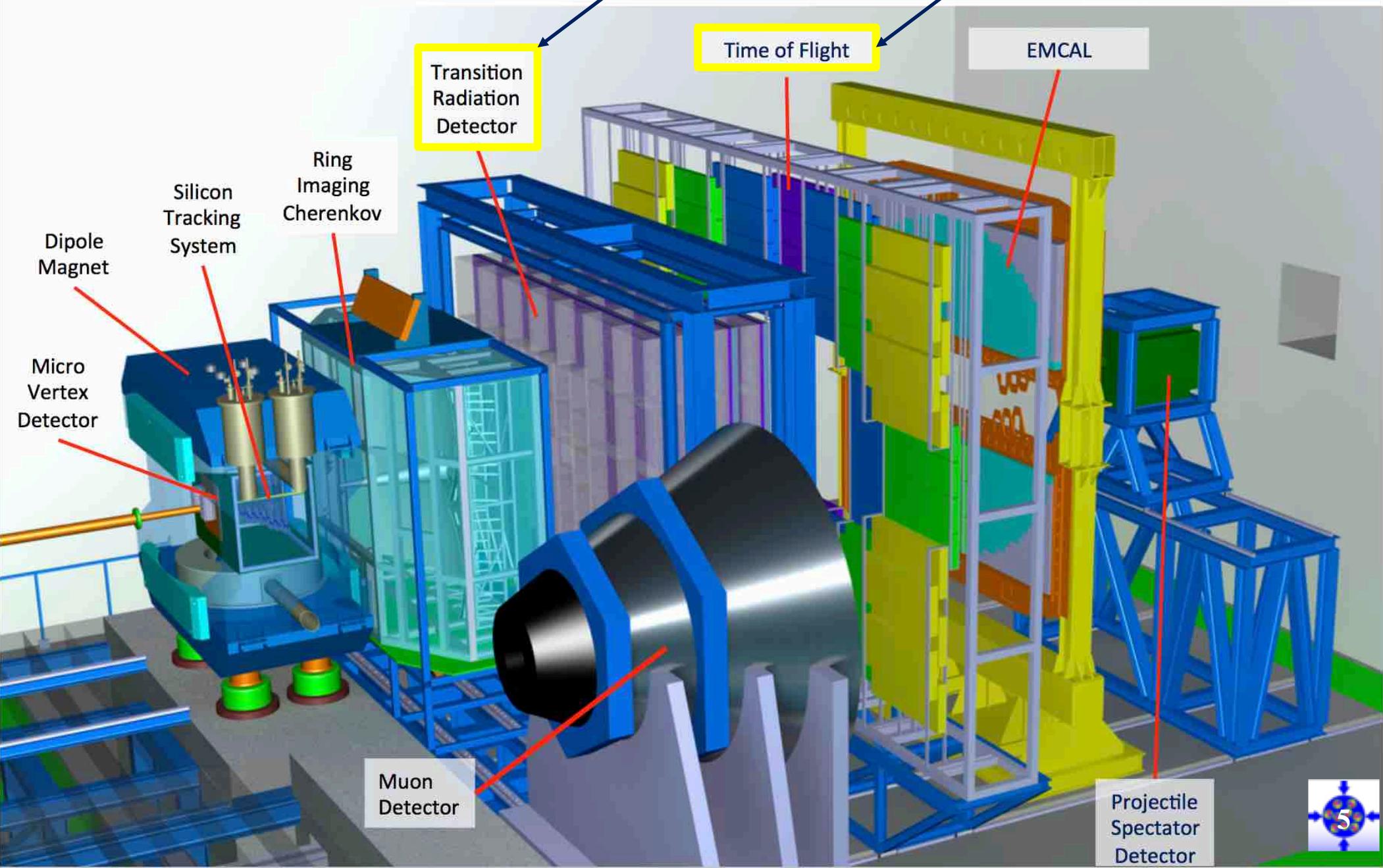


Experiments exploring dense QCD matter



CBM at SIS 100

Our contribution to:



CBM requirements & challenges

Requirements:

Tracking: STS, TRD

Vertexing: STS

Hadron ID : TOF

Electron ID: RICH, TRD, ECAL

γ , n: ECAL

The Challenges:

- very rare probes in Au+Au at reaction rates up to 10^7 events/sec

- Rates from 1 kHz/cm^2 (27) to $20 - 100 \text{ kHz/cm}^2$ (3) at the detector level

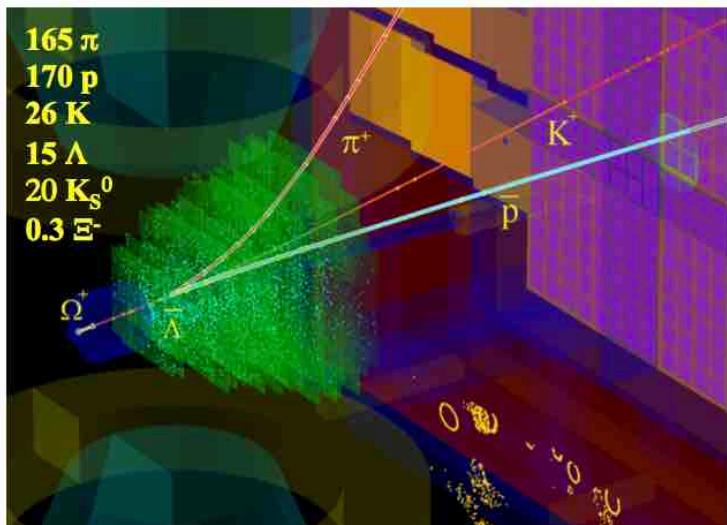
- ~ 1000 charged particles/event

- Hit density from $6 \cdot 10^{-2}/\text{dm}^2$ to $1/\text{cm}^2$

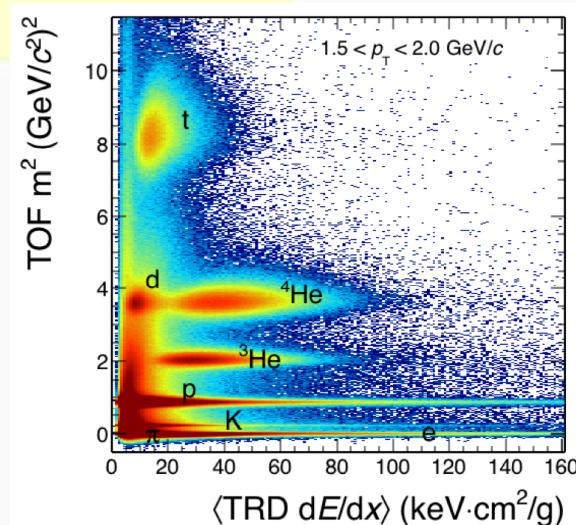
- fast and radiation hard detectors

- free-streaming readout electronics

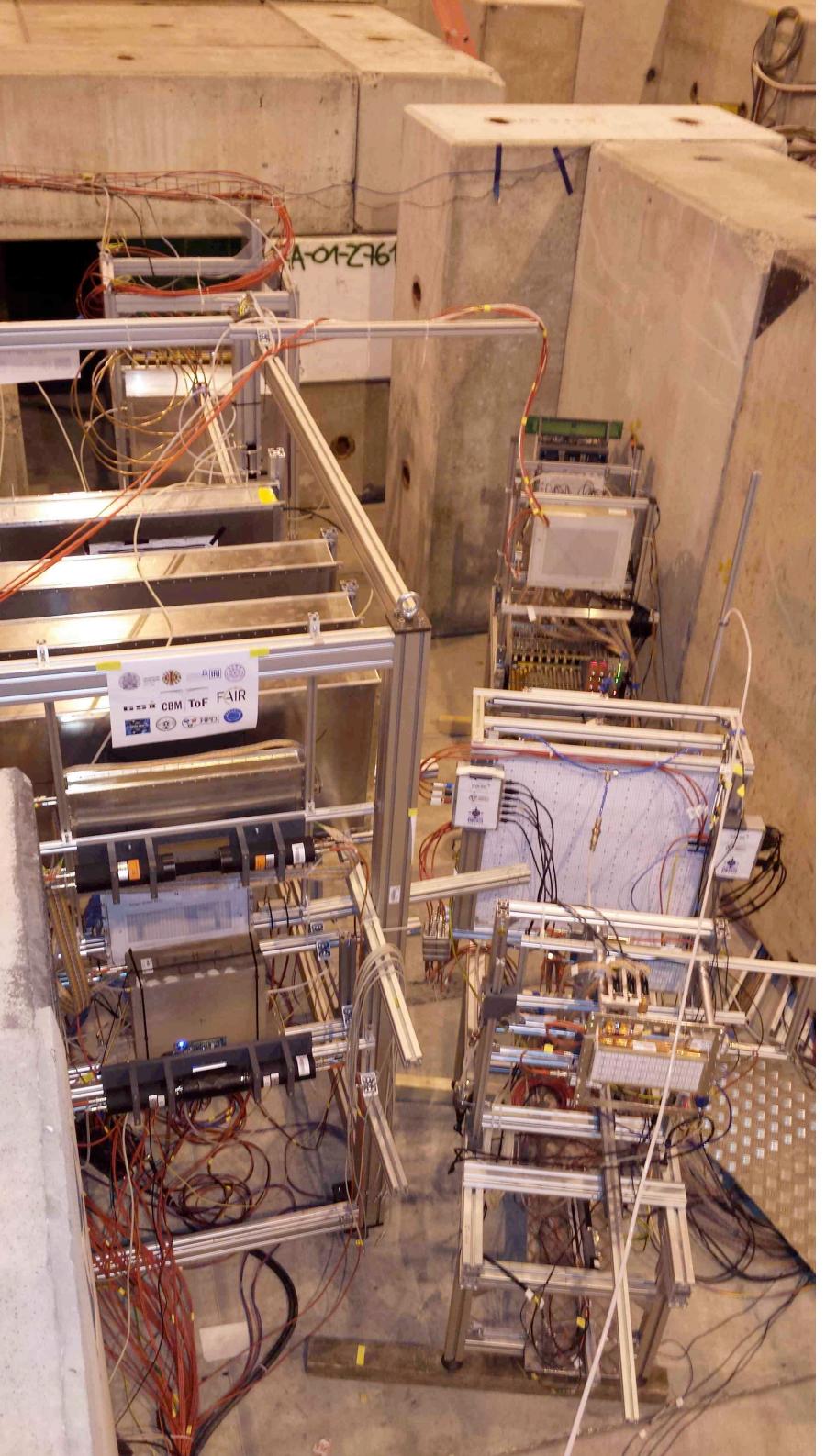
- online event selection



KF Particle Finder with ToF track ID: Au+Au @ 10AGeV SIS100

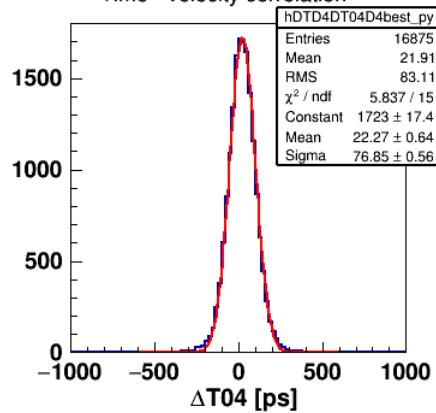


In-beam tests @ SPS, Nov.-Dec. 2015

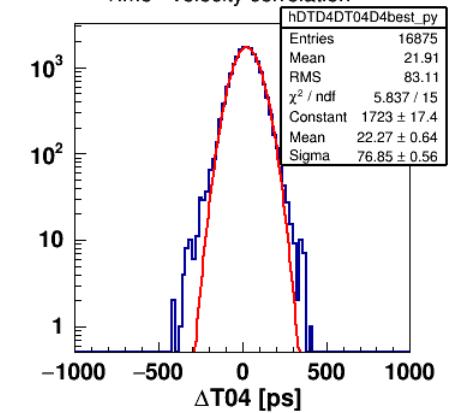


MGMSRPC time resolution and efficiency

Time - velocity correlation



Time - velocity correlation

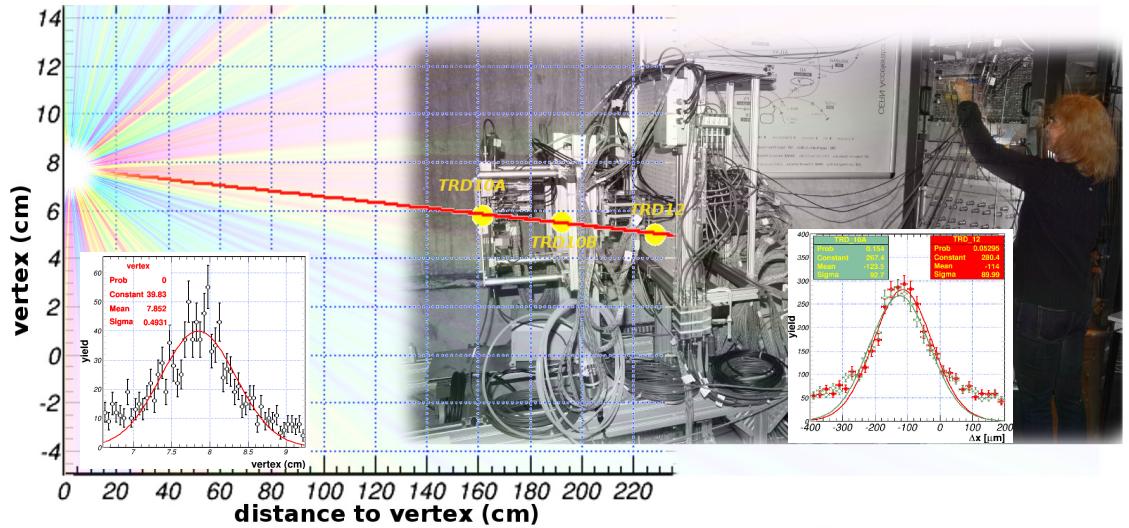


$\delta t \sim 50\text{-}60 \text{ psec}$

Cluster size $\sim 1.8\text{-}2$ strips

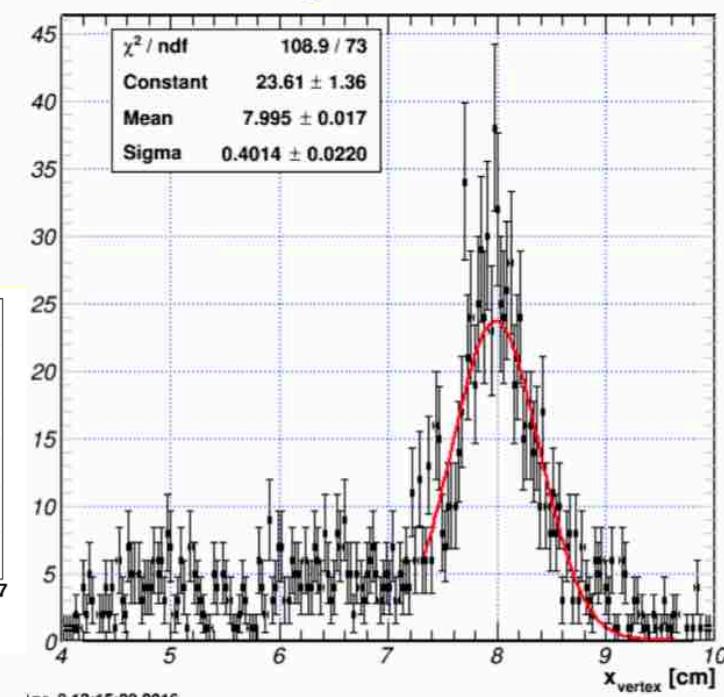
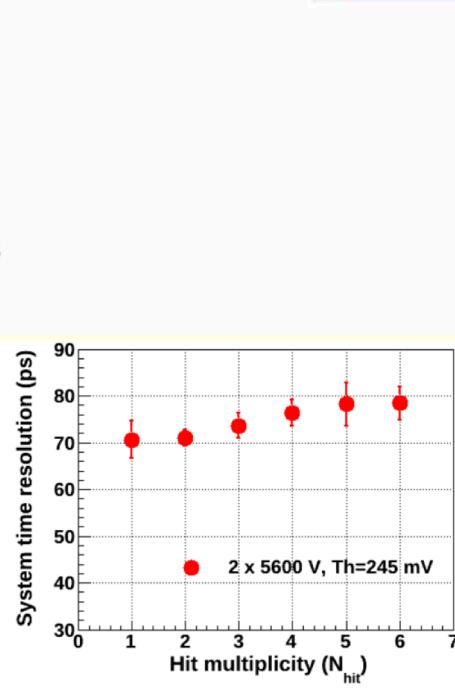
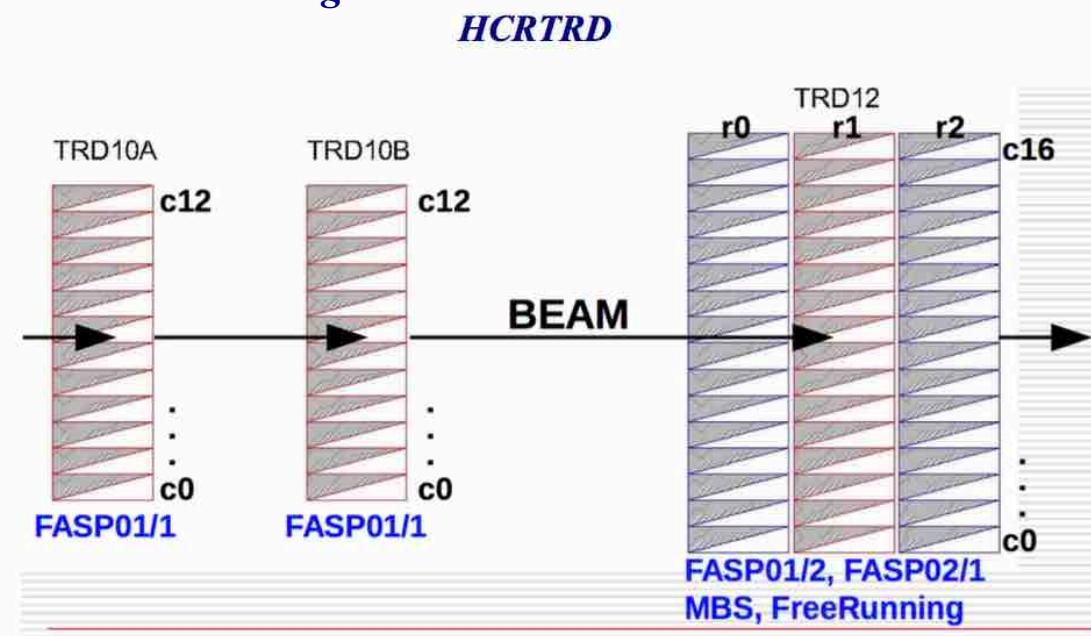
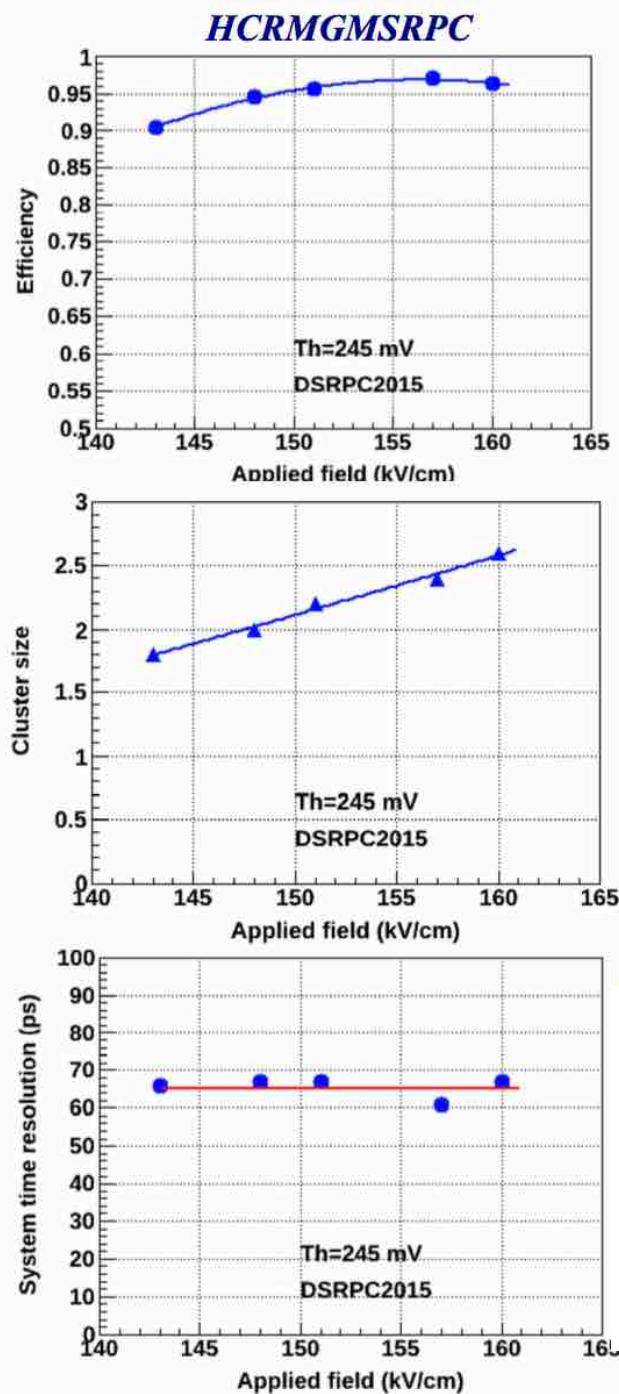
$\epsilon \geq 90\%$

TRD - tracking and position resolution



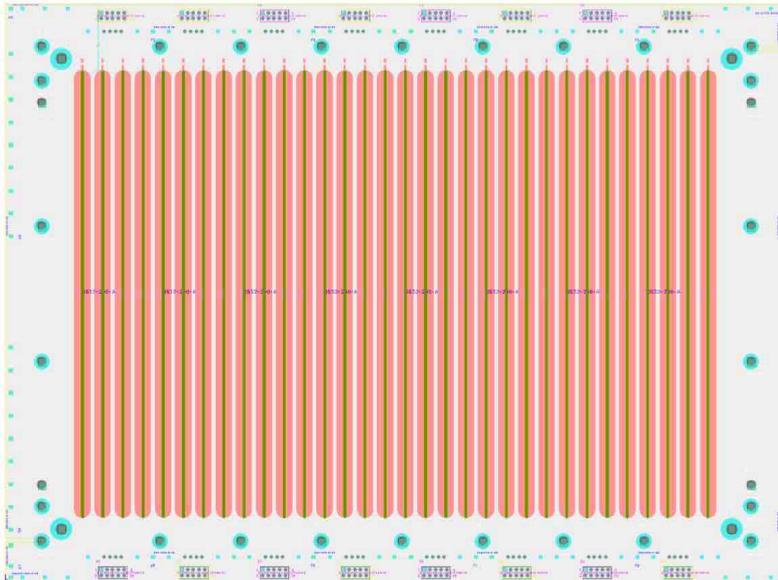
Calibration & analysis of November-December 2015 in-beam tests @ SPS

Pb beam of 30A GeV on a Pb target



Integration of Bucharest RPC in mCBM Experiment @ SIS18 FAIR Phase0

New RPC2017DS prototype design



Readout electrode: 9.02 mm pitch= 1.27 mm width + 7.75 mm gap
 High Voltage electrode: 9.02 mm pitch= 7.37 mm width + 1.65mm gap

APLAC simulation of transmission line impedance

PULSE=0 1 n 10p 10p 1n 20n

R=194

Output1

V1

-

K

A

MLS

MultiLayerStruct

2xHV

194

Output4

Output3

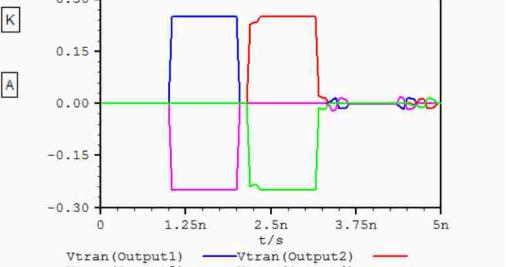
Output2

K

A

2017-proj-1/2-DS-RPC TRAN Analysis

APLAC 8.10 Student version FOR NON-COMMERCIAL USE ONLY



Input/Output signals are recorded for different values of the readout strips width

If $R = Z_0 = Z_L \rightarrow$ the transmission line is matched;

APLAC predicted 194 Ω for 1.27/7.4 mm readout/HV strip width

The two stacks in parallel will have an equivalent impedance of 97 Ω

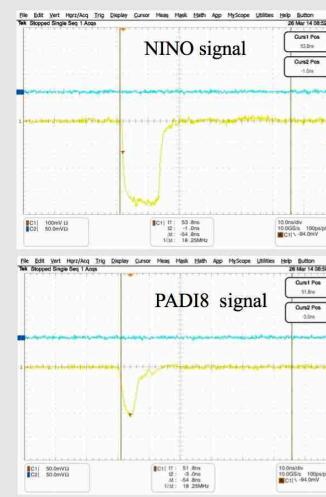
D. Bartos et al., arXiv:1708.02707v1

Signals delivered by NINO and PADI FEE (March 2014)

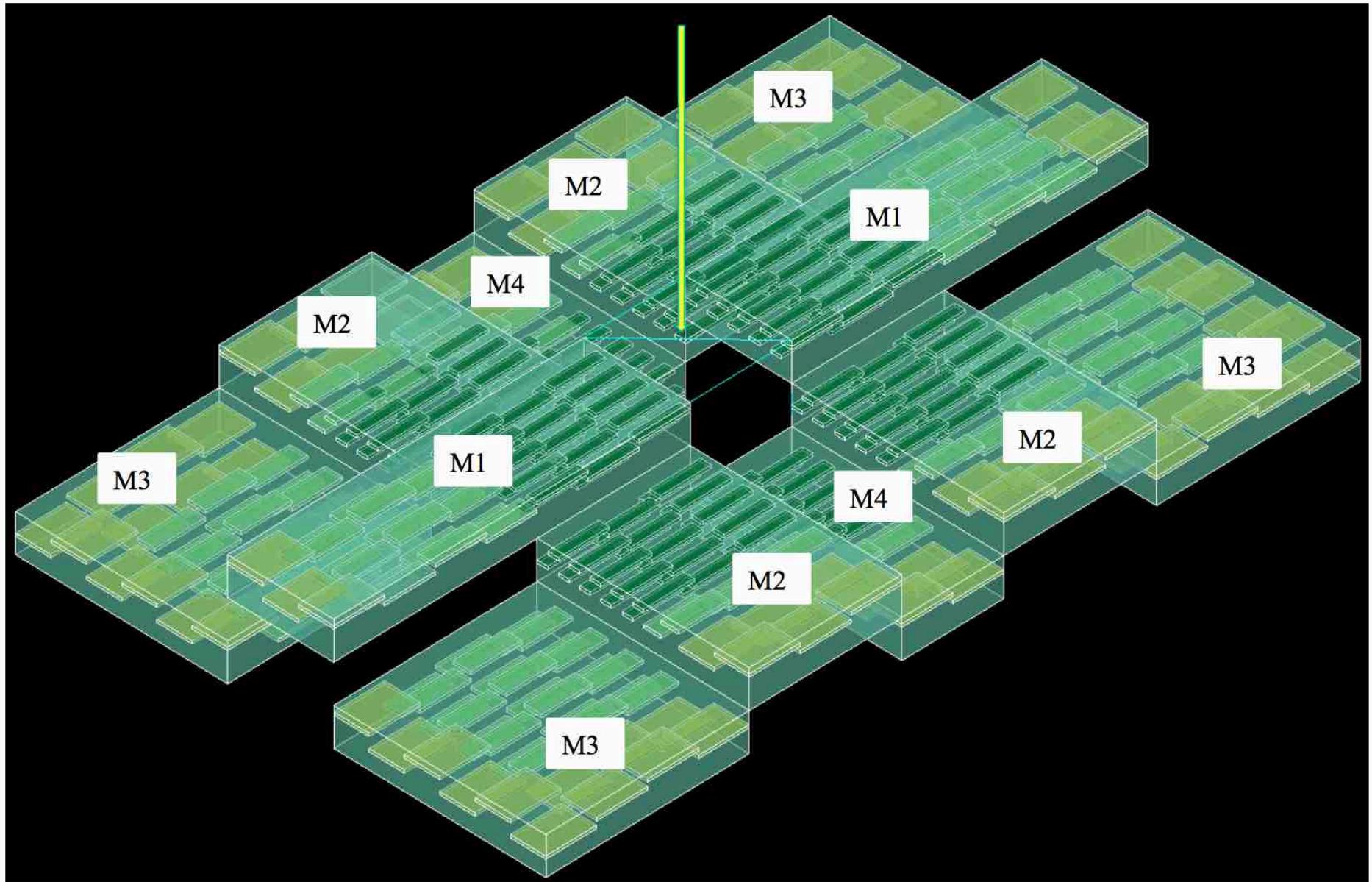
RPC2012 prototype



CAEN TDCs cannot process PADI signals for both leading and trailing edges.

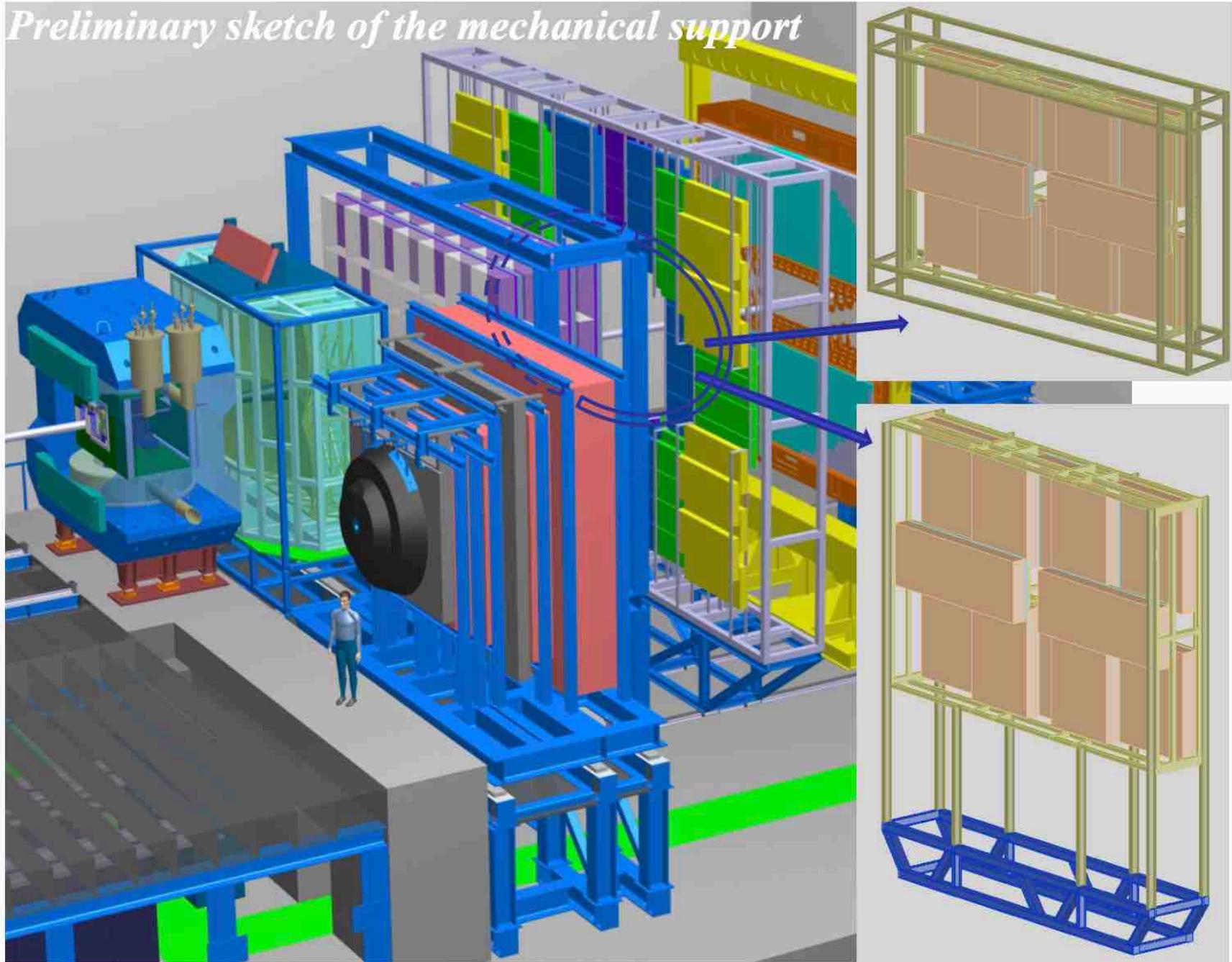


Inner zone of the CBM-ToF



Inner zone of the CBM-ToF

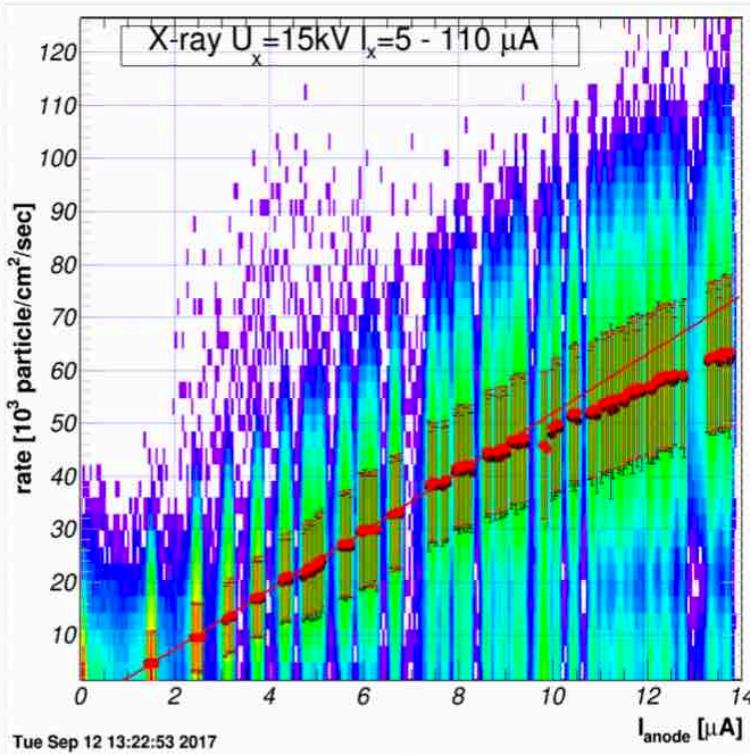
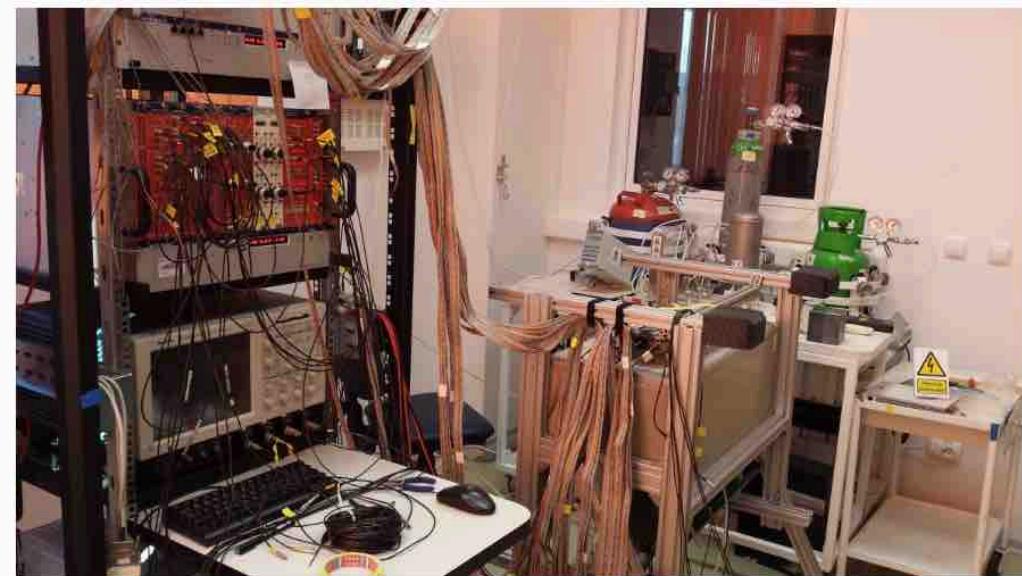
Preliminary sketch of the mechanical support



TRD

In-house tests

RPC



$$\text{eff} = \frac{\text{RPC} \& \text{PMT}(1\&2) \& \text{PMT}(3\&4)}{\text{PMT}(1\&2) \& \text{PMT}(3\&4)}$$

$$\text{eff} = \frac{84 \text{ events}}{90 \text{ events}} = 93.3 \%$$

Assembling & Tests of important components of large scale experiments

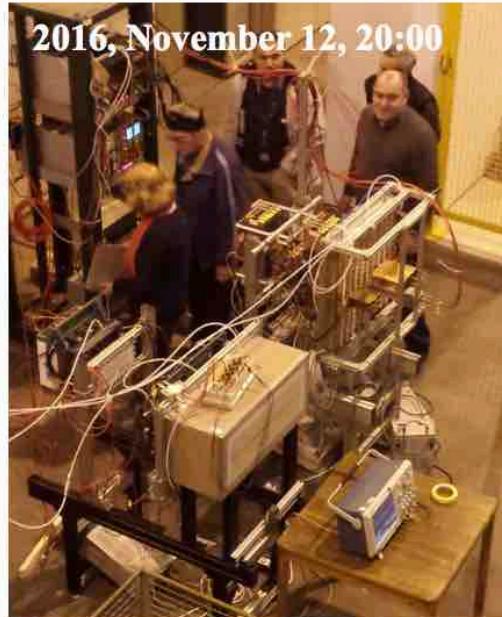
Upgrading the DetLab ceiling



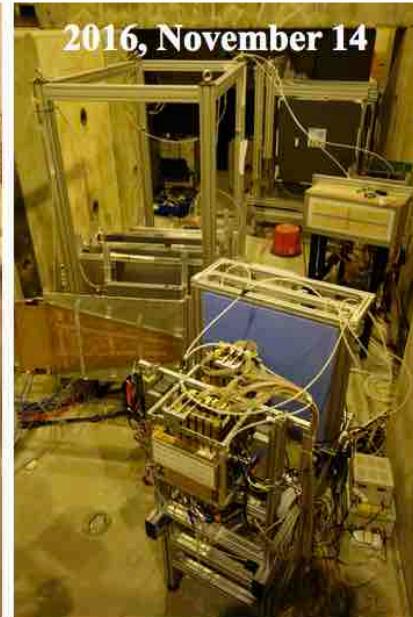
November-December 2016 in-beam tests @ SPS



2016, November 2nd



2016, November 12, 20:00



2016, November 14



2016, November 16



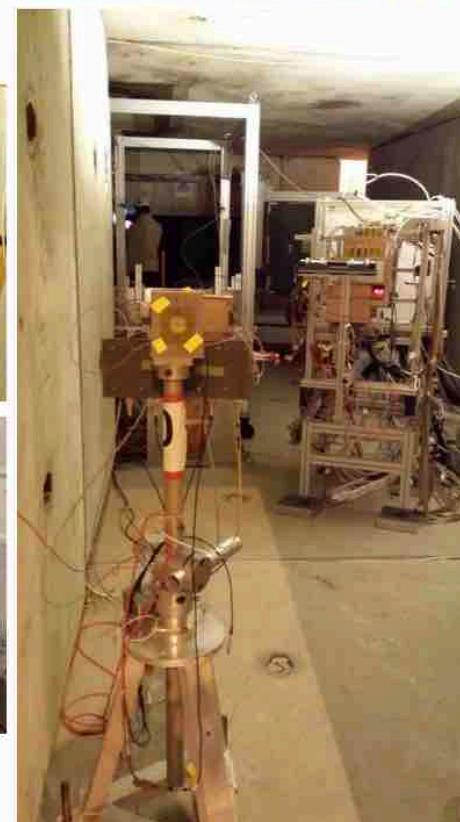
2016, November 2nd



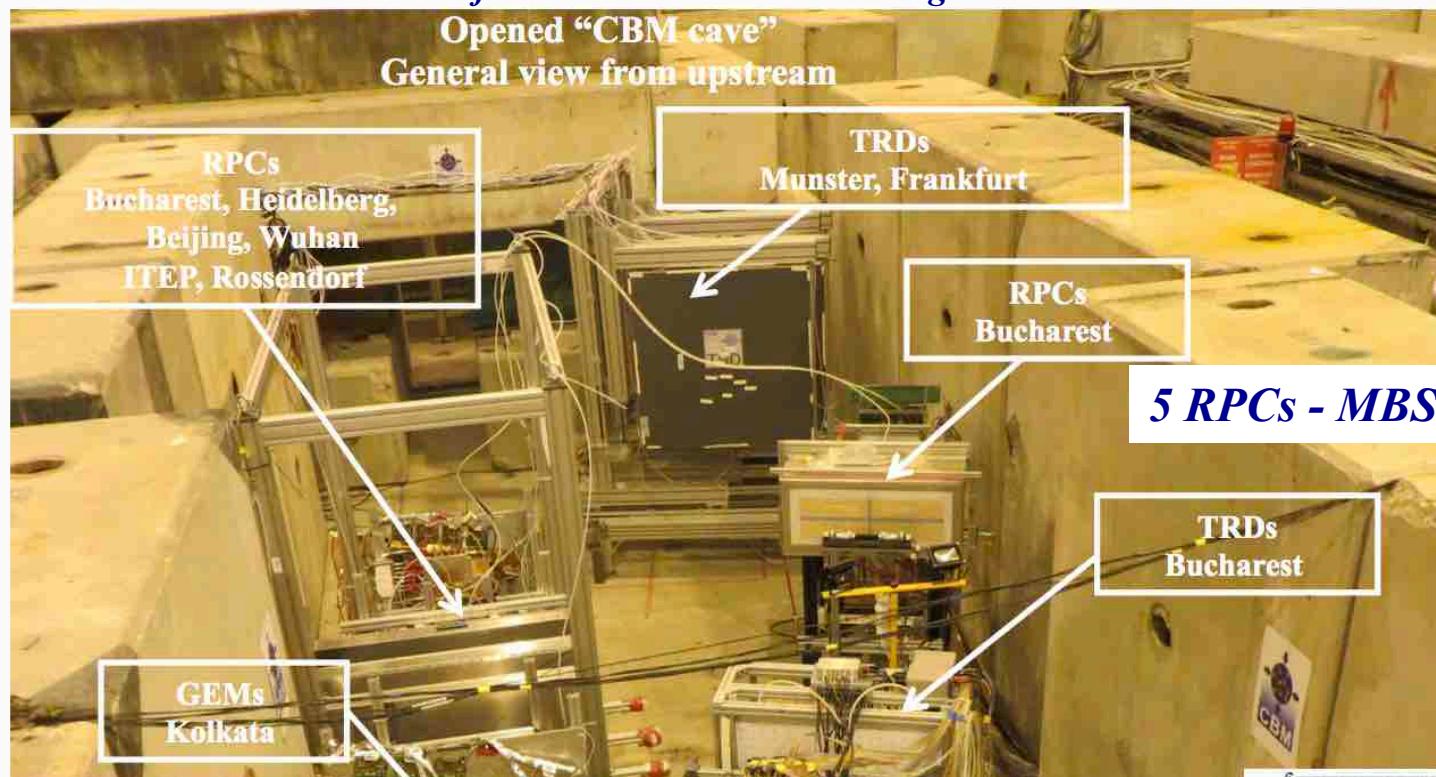
2016, November 10, 10:00 a.m.



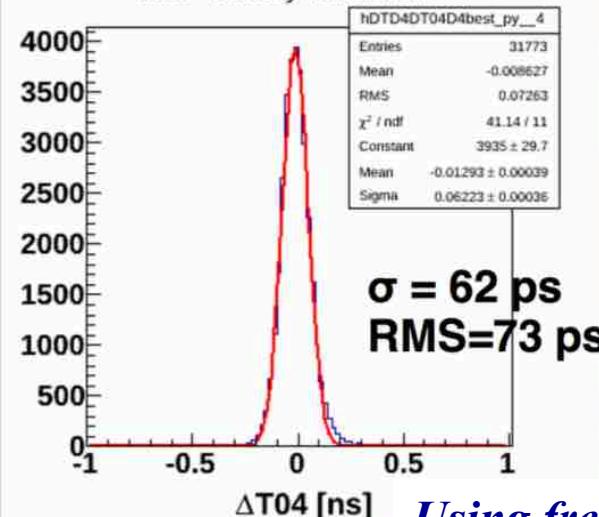
2016, November 17



November-December 2016 in-beam tests @ SPS
Pb beam of 13/30/150 AGeV on a Pb target

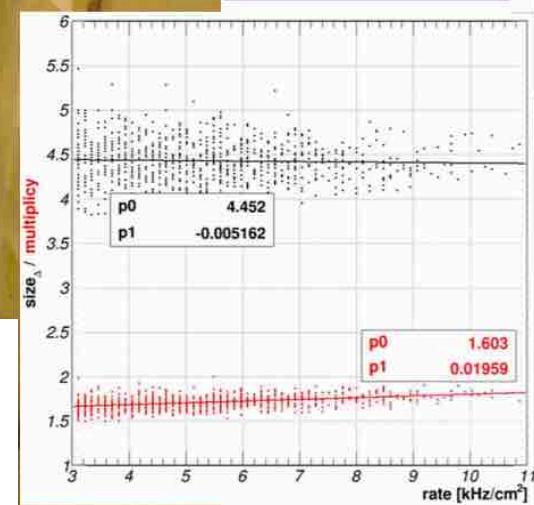


Time - velocity correlation



Using free trigger less DAQ
GET4 TDCs

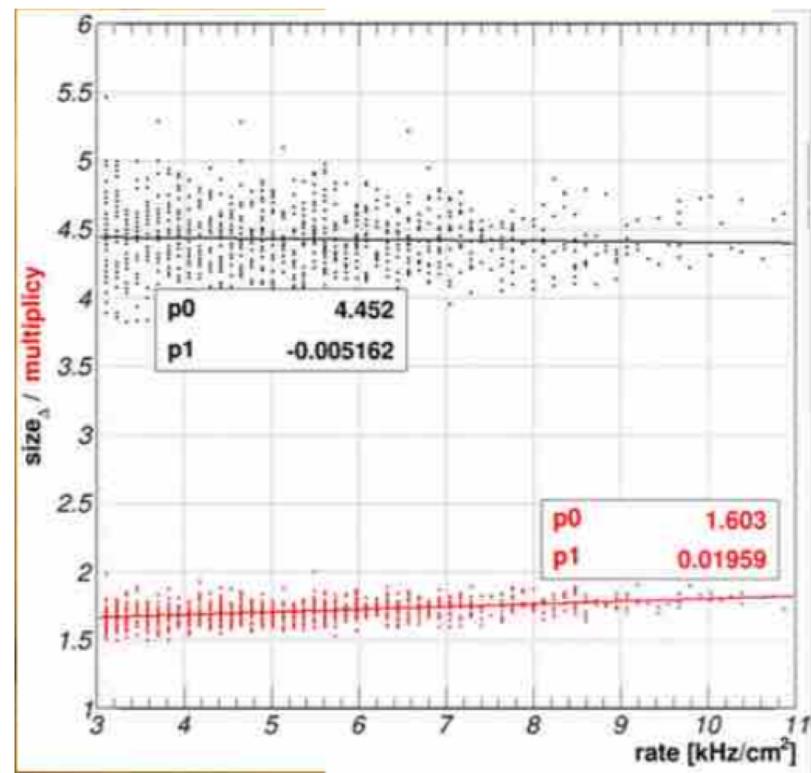
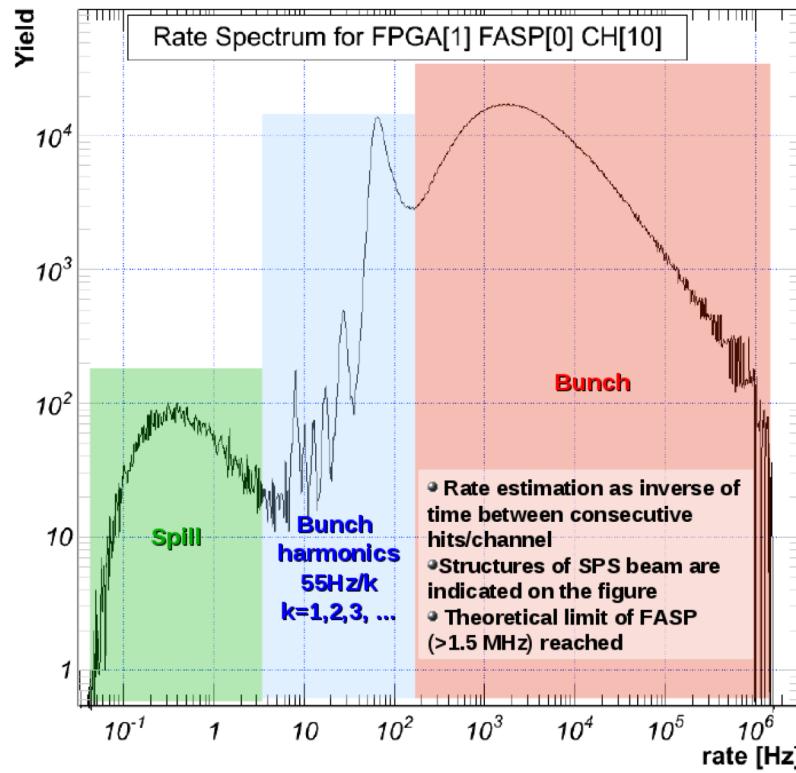
3 TRDs
FASP FEE &
- MBS
- 2 trigger less
DAQs



2016, December 12, 10:00 a.m.

TRD Prototype Performance : Signal - Particle Rates

*in-beam results measured
@ CERN-SPS for Pb-Pb
150 AGeV*



*Feeding pulser signals to the DAQ through
- anode wires/FASP/ADC/GETS
- tested up to 1.3MHz/channel without data corruption*

Assembling and tests of 2 new RPC prototypes

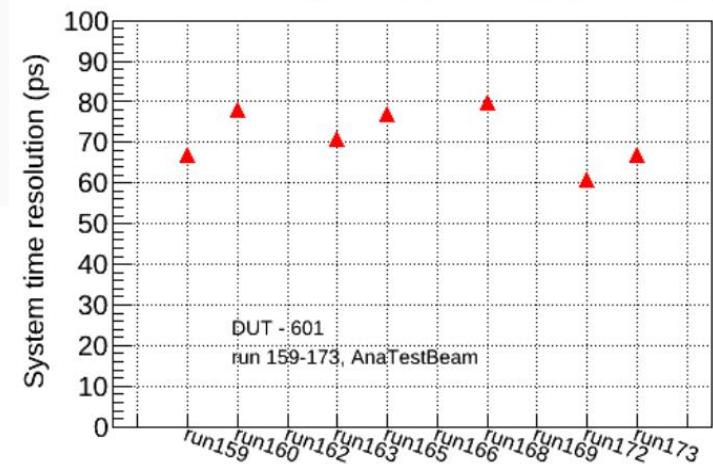
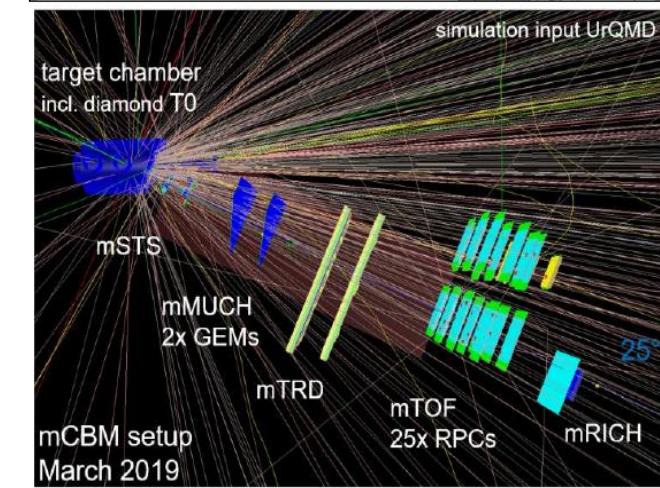
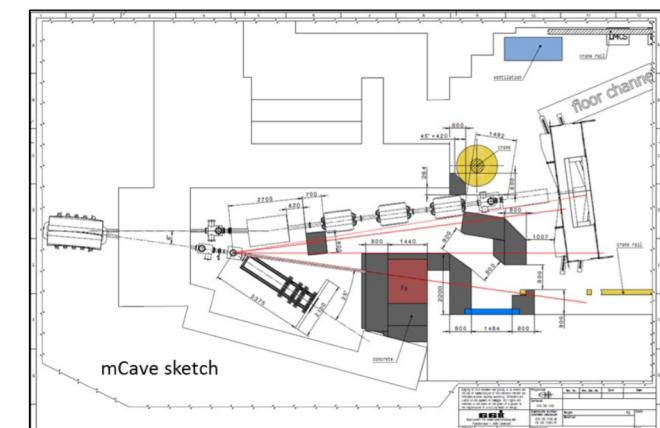
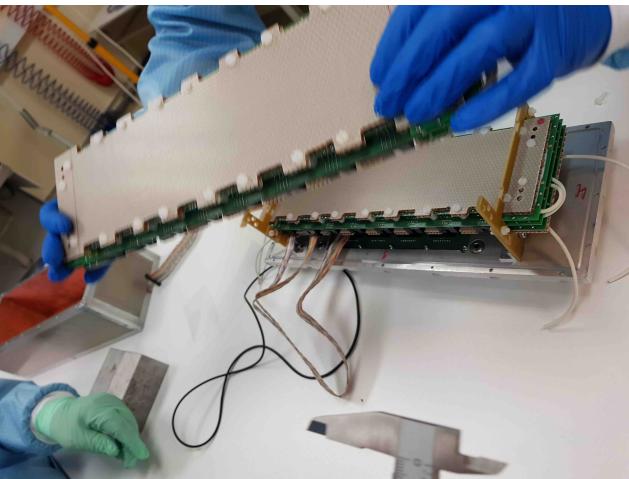
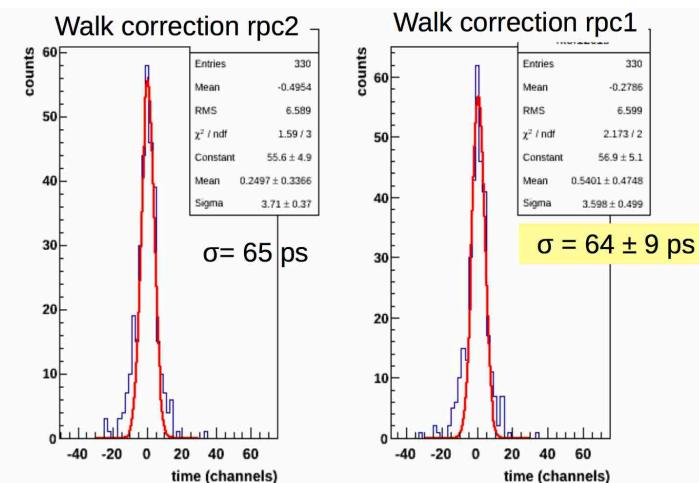
20

In mCBM

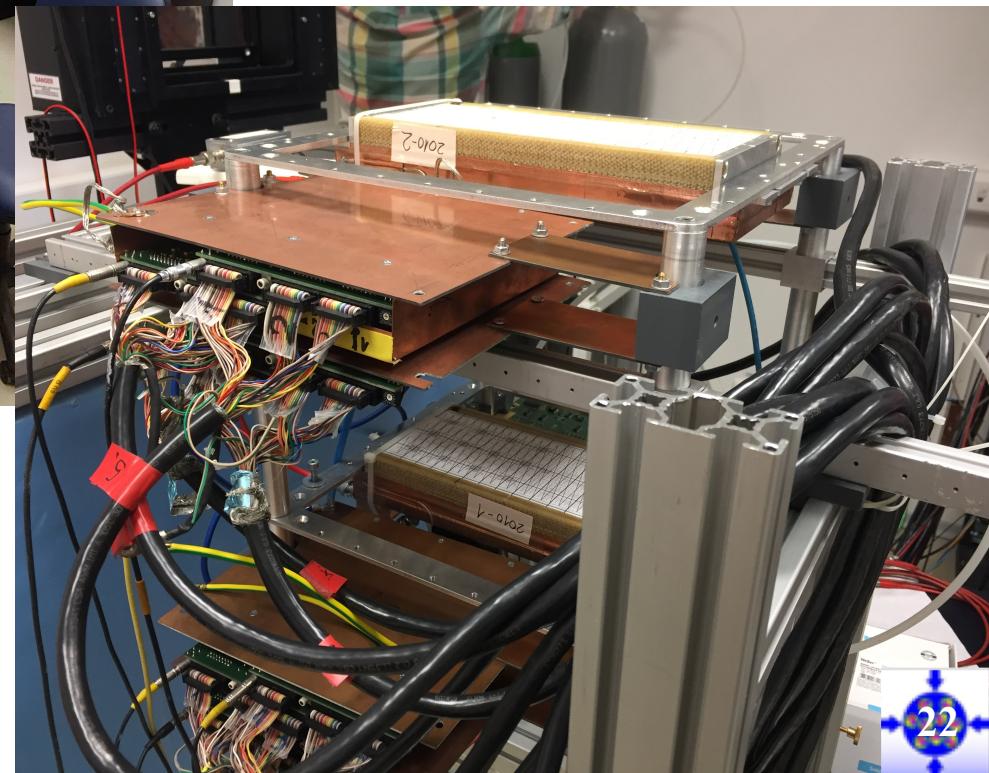
FAIR Phase0 @ SIS18



In house tests

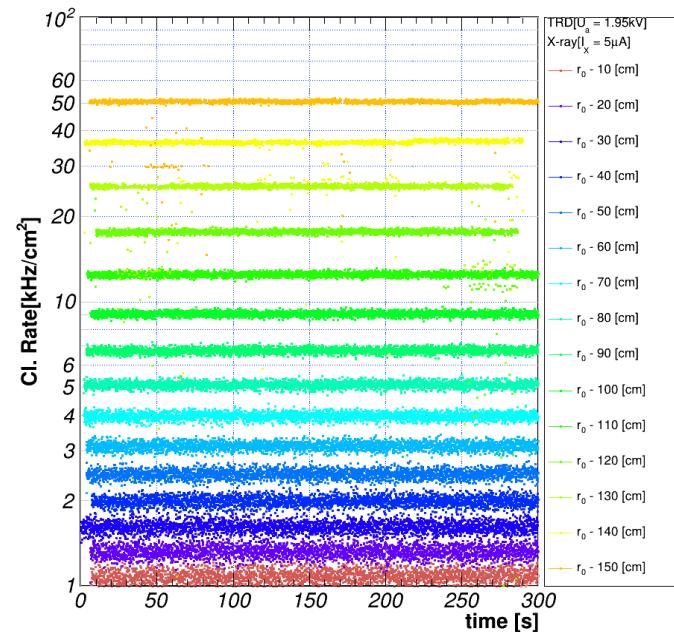
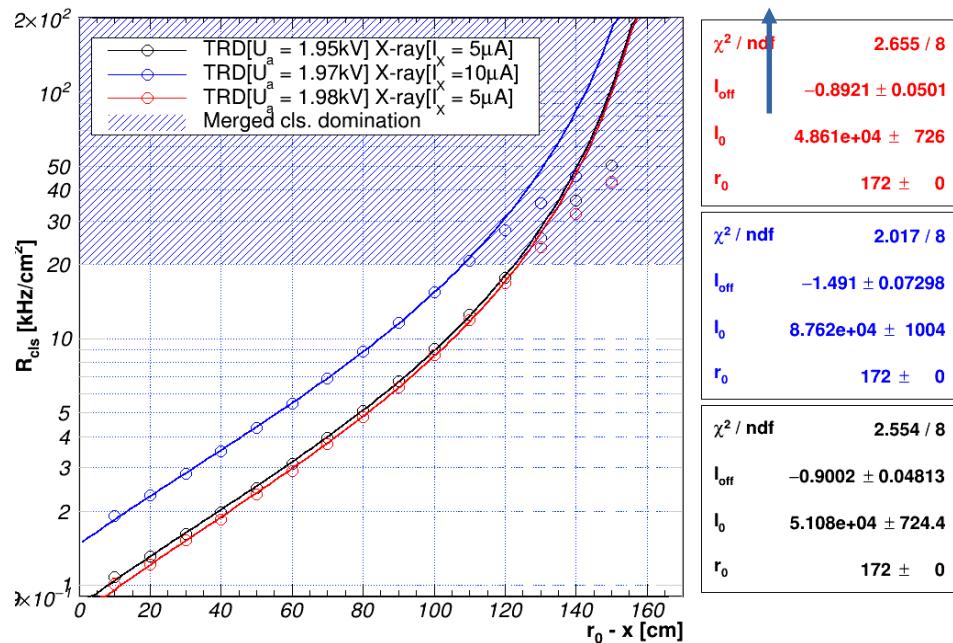


HCR-2D position sensitive TRD



Prototype Performance : Signal - Particle Rates

*laboratory results measured for X-rays
irradiation of constant intensity @
variable distance*



FASP-FEE & free running mode DAQ

CADENCE design

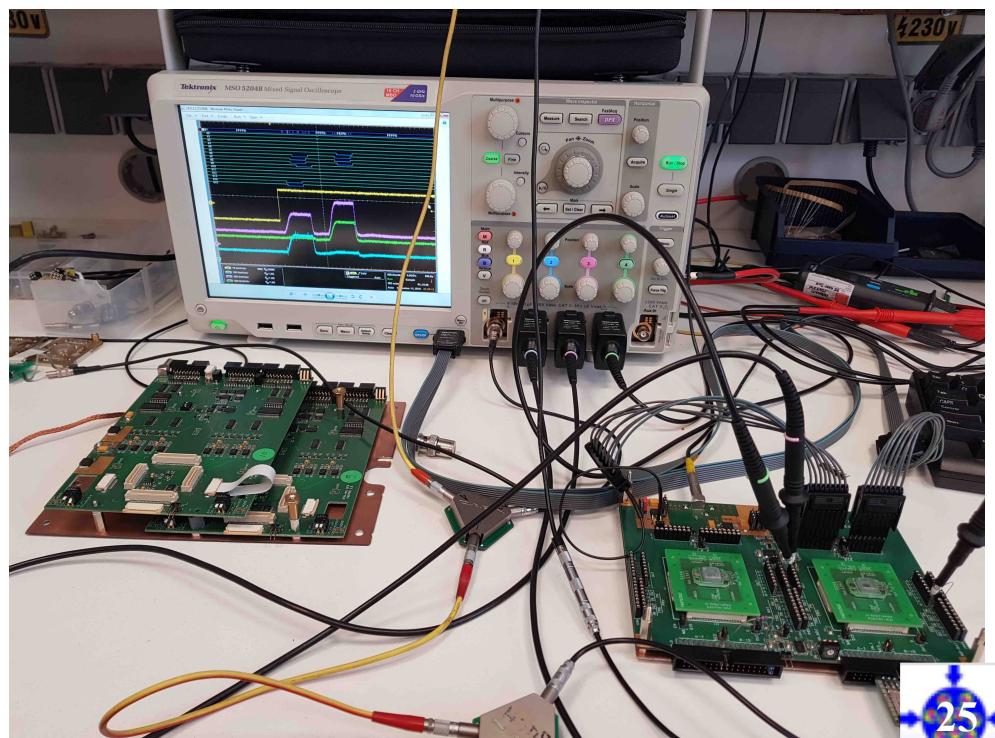
FASP_01



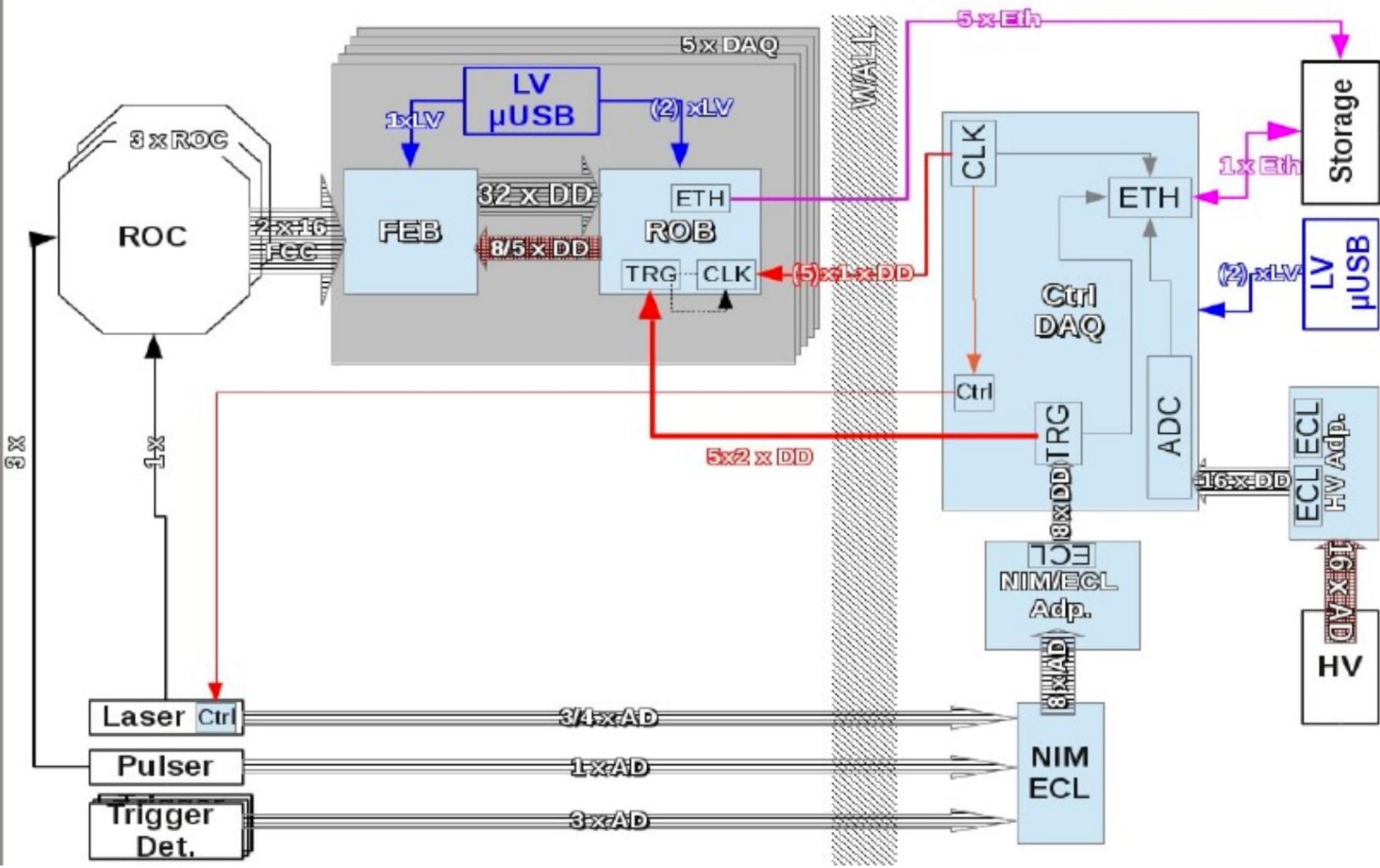
FASP_02



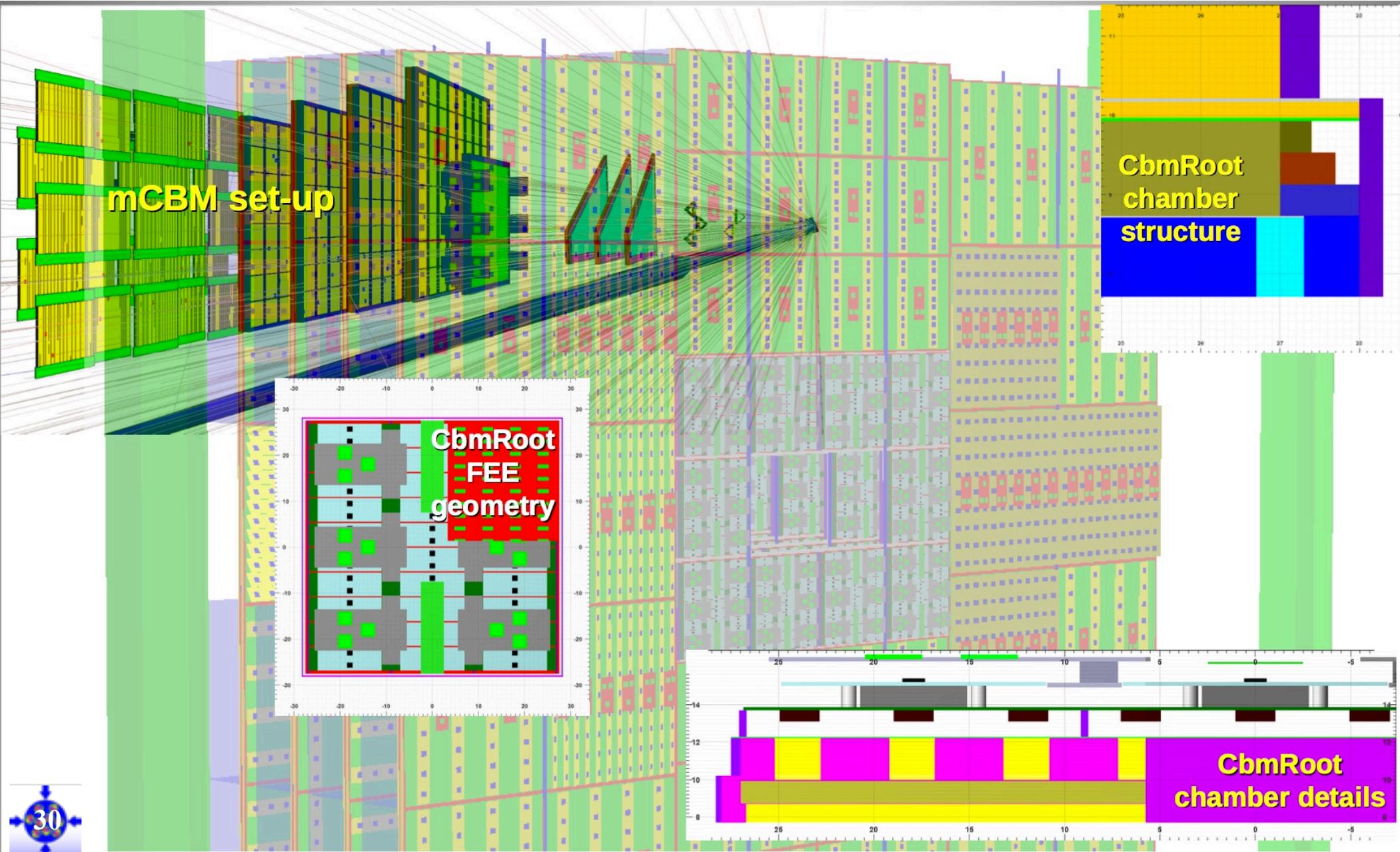
FASP_03



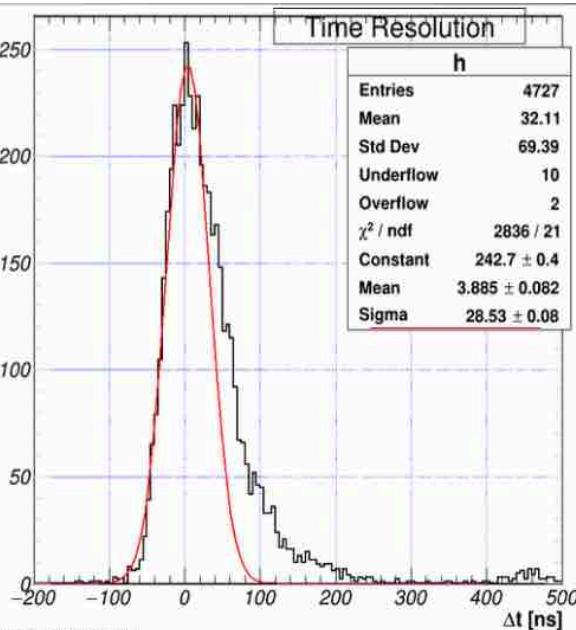
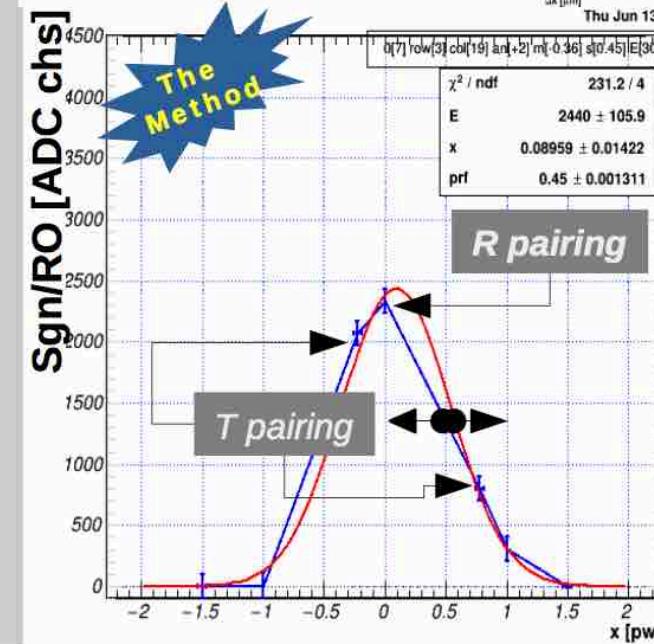
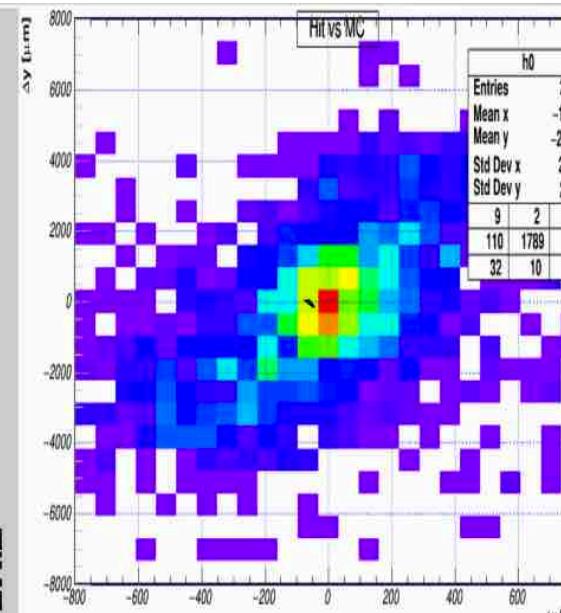
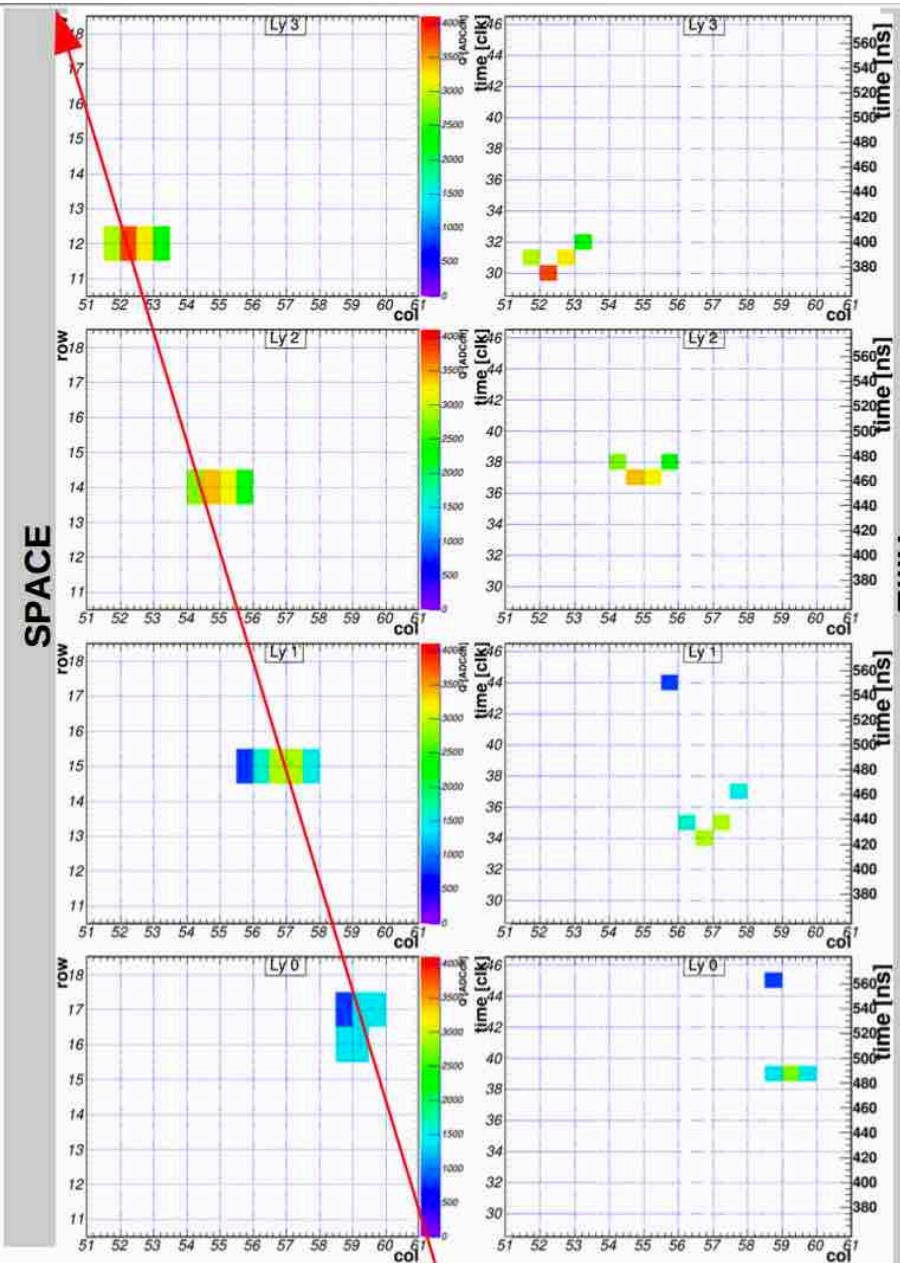
Free running mode DAQ



Buch-TRD geometry and chamber + FEE signal characteristics integration in CbmRoot



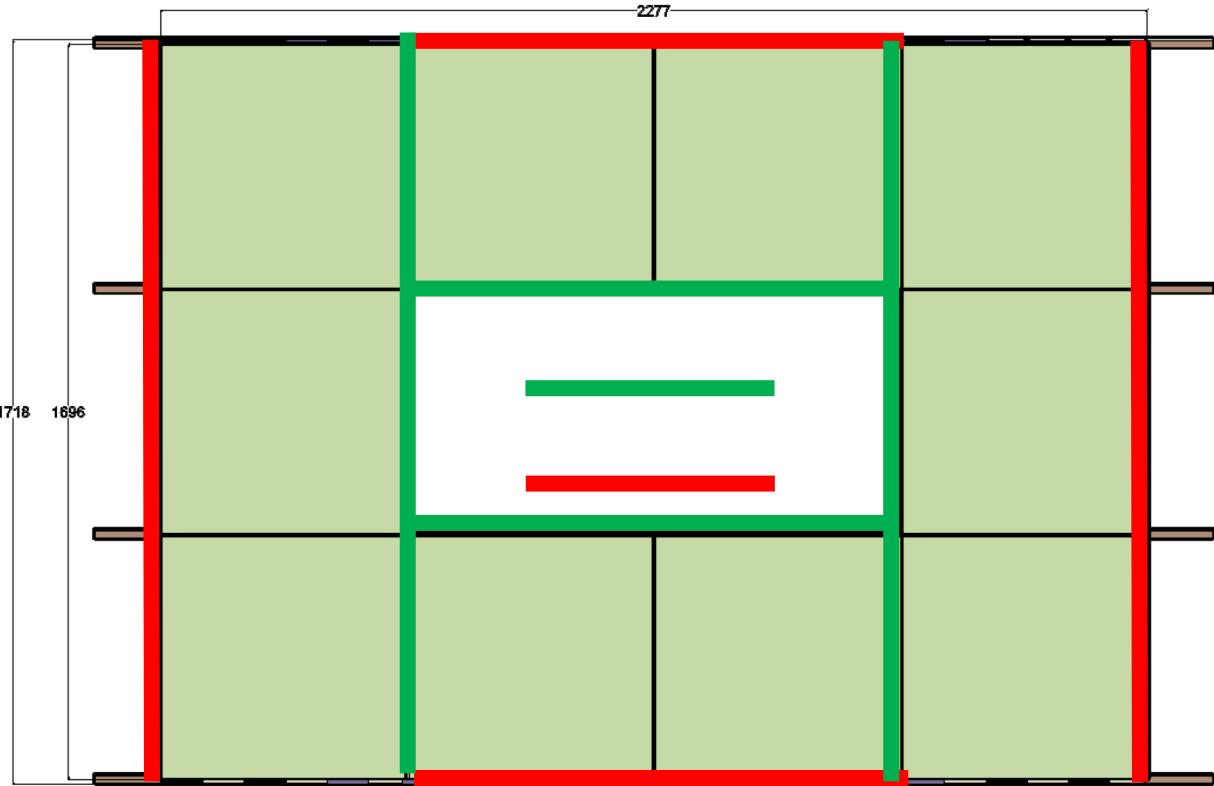
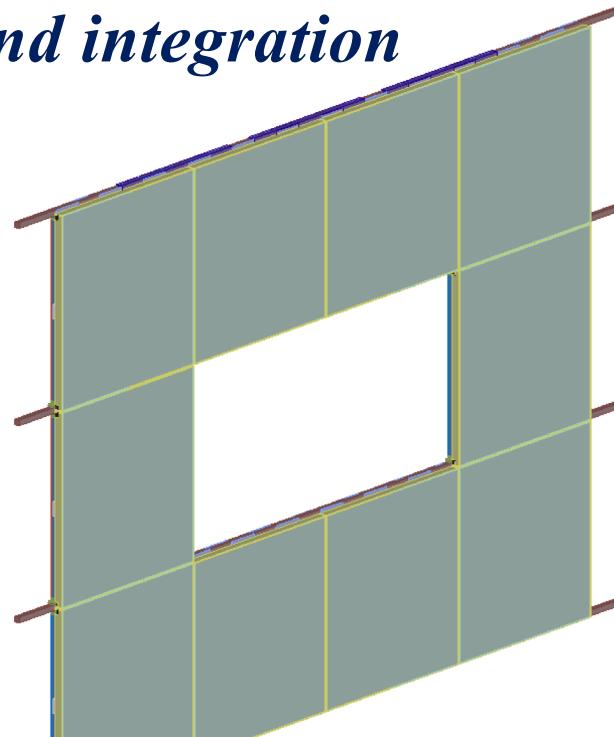
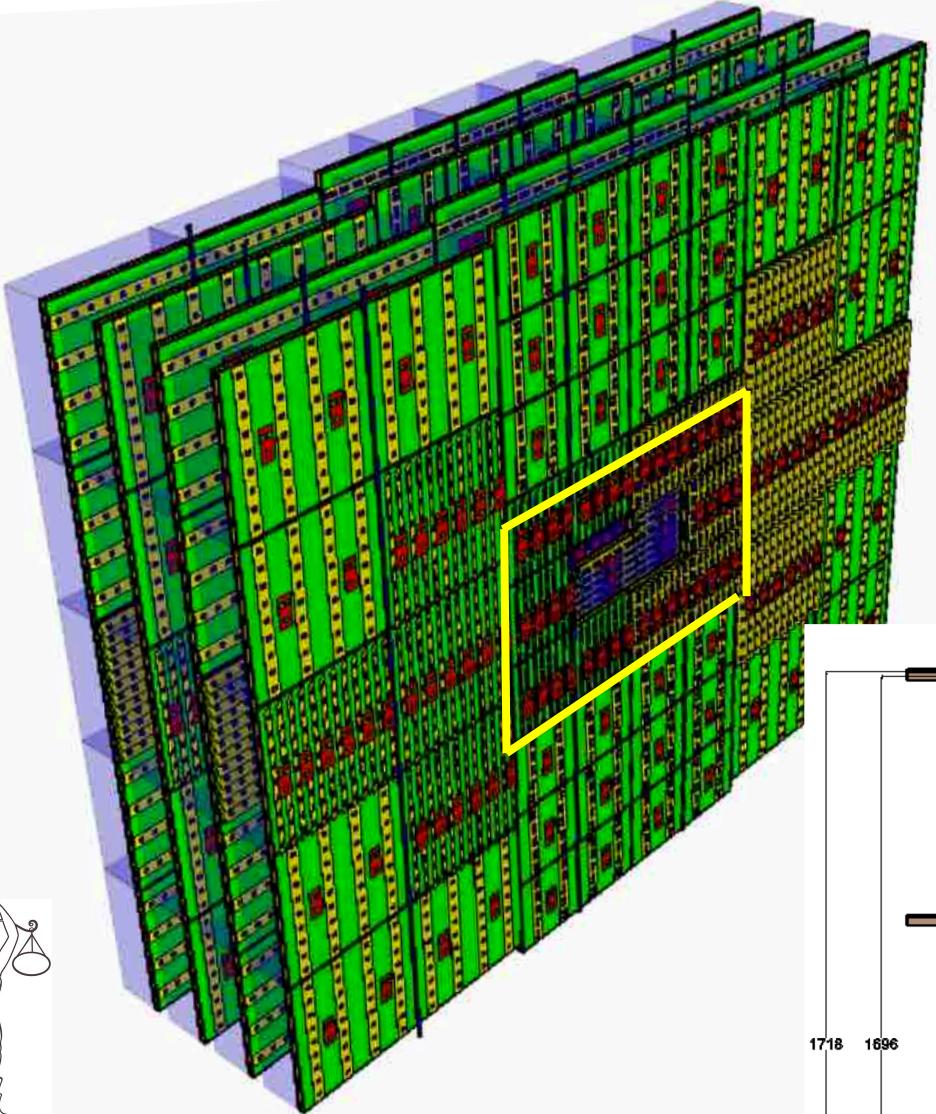
Hit reconstruction performance



✓ $\sigma_x = 114 \mu\text{m}$ single-row
 ✓ $\sigma_y = 1.6 \text{ mm}$ single row
 ✓ $\sigma_y = 0.9 \text{ mm}$ row cross
 ✓ $\sigma_t = 30 \text{ ns}$

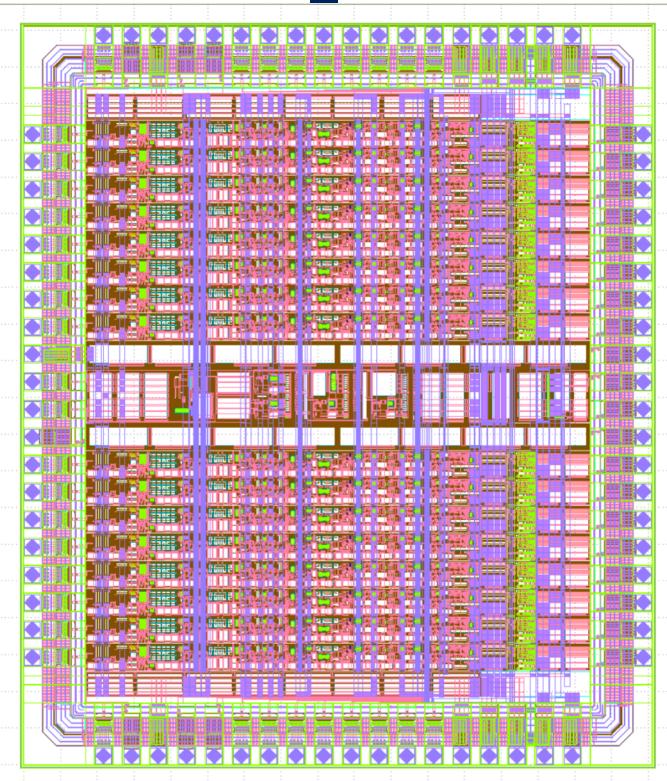
wrt MC info !

CBM-TRD inner zone design and integration

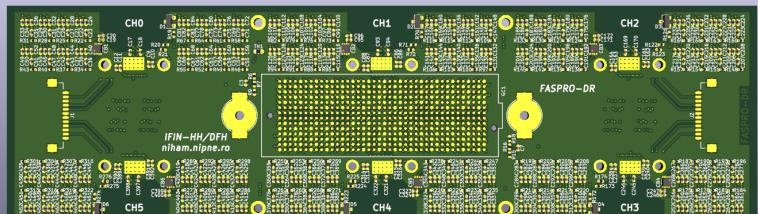
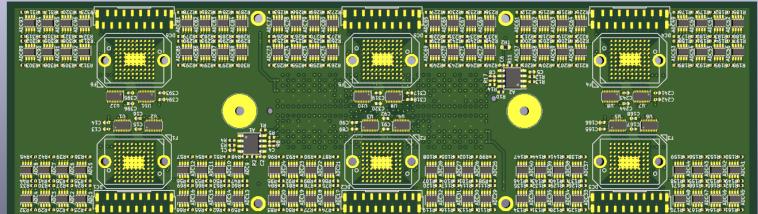


HCR-2D position sensitive TRD – FEE & DAQ

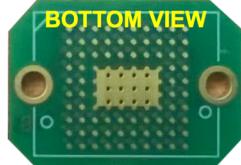
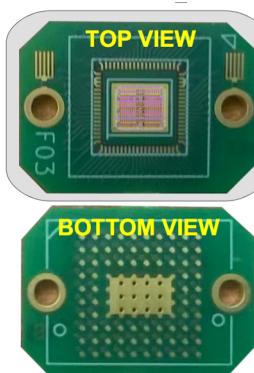
FASP_03



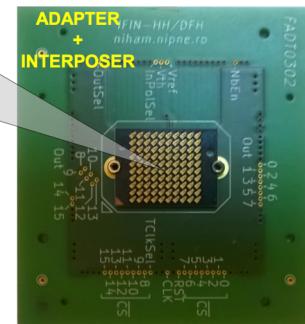
FASPRO - FASP Read Out



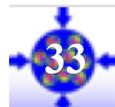
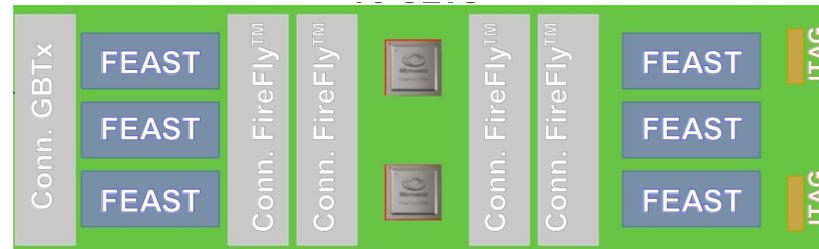
FASP board



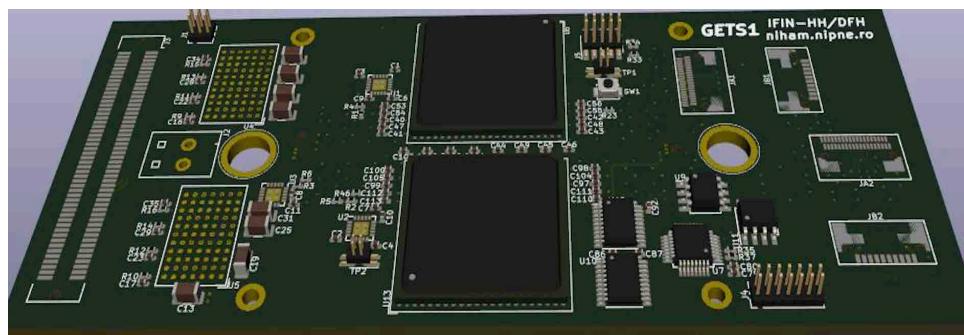
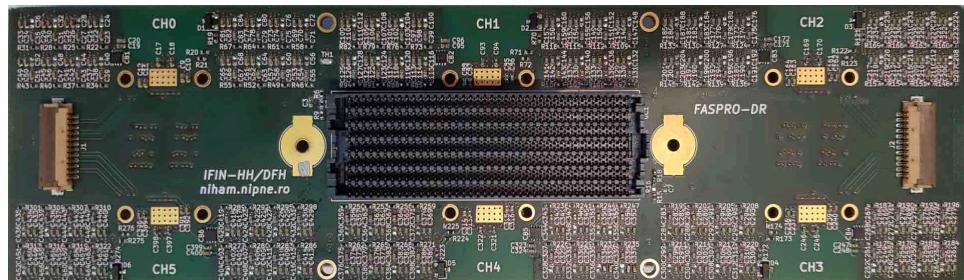
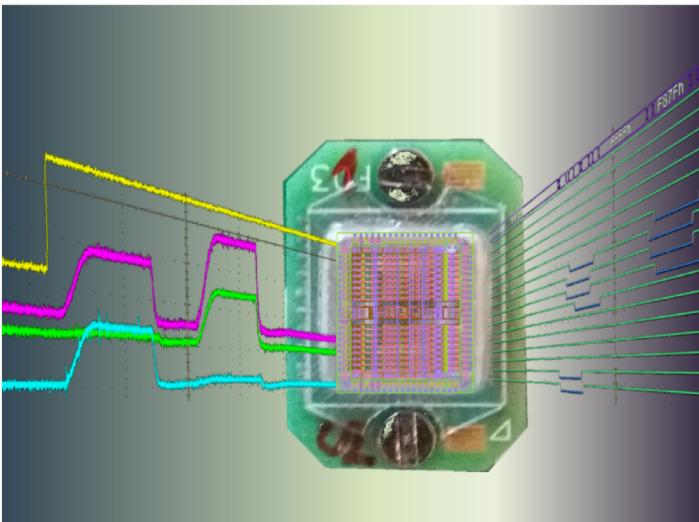
FASP adaptor



GETS - General Event Time Serializer



Hdw chain (PCBs) to connect FASP FEE to the C-ROB3 and their realization status



■	ready
■	in progress
■	missing

FASP : Production ready for up to 80 pcs (45 % of 1 module)
Bonding in progress

FASPRO : tested, fixed, 9 pcs available.

GETS : Design ready; components available (PolarFire)
Production ready (details solved)

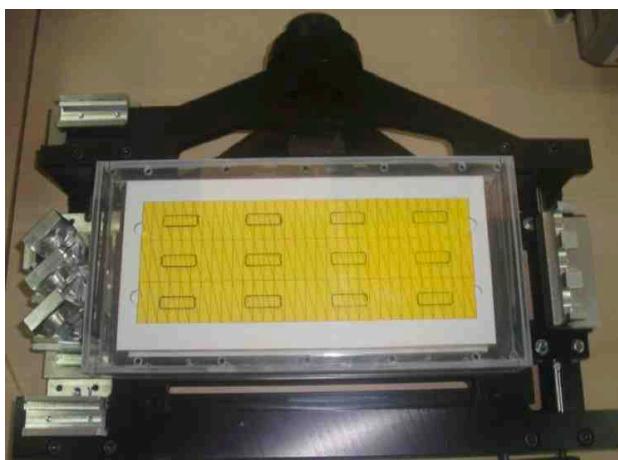
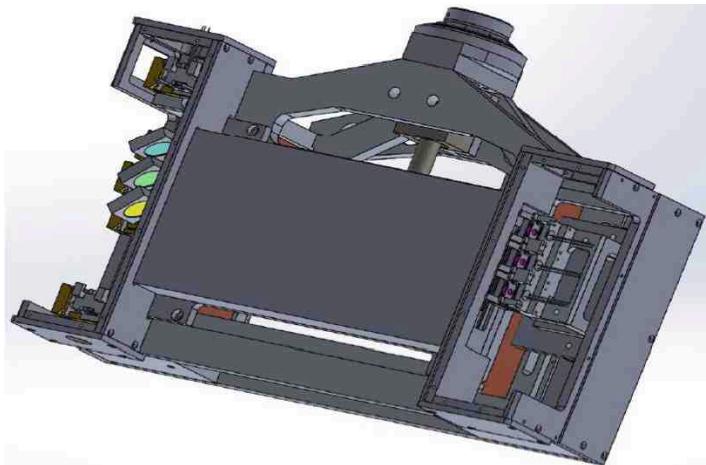
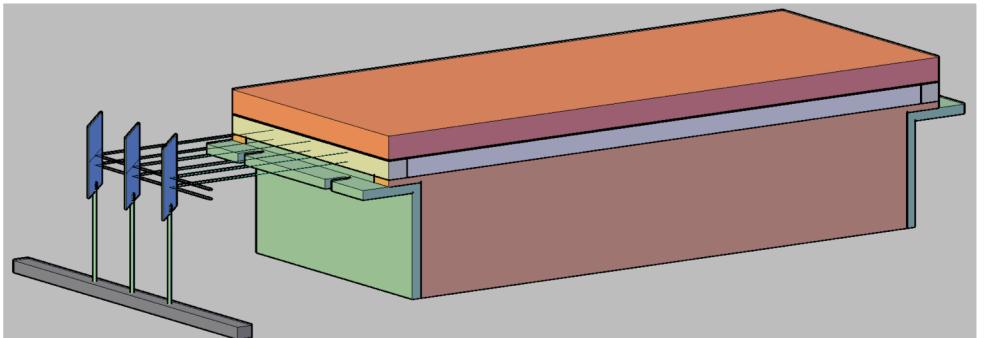
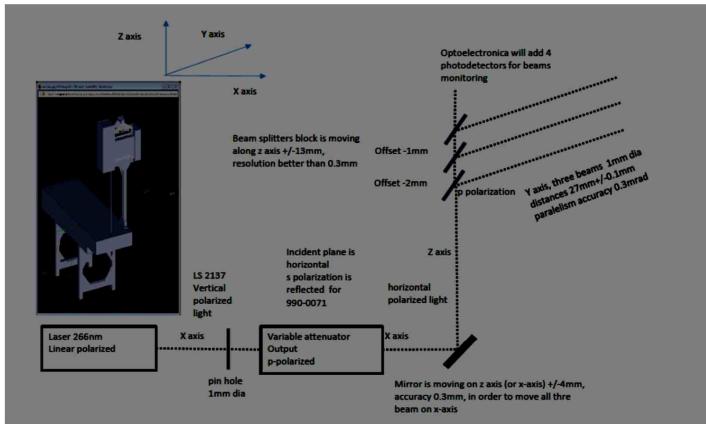
GETS2SATA : Connector board

Convert I/O to 4 SATA cables
Design not started (1 month)

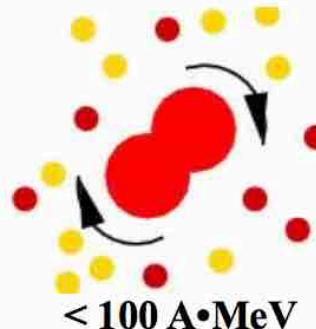
C-ROB Adapter : Maps 5x4 SATA input cables to FMC connector on C-ROB
Design not started (1 month)

C-ROB3 : 1 pcs available in Bucharest
We might need another one

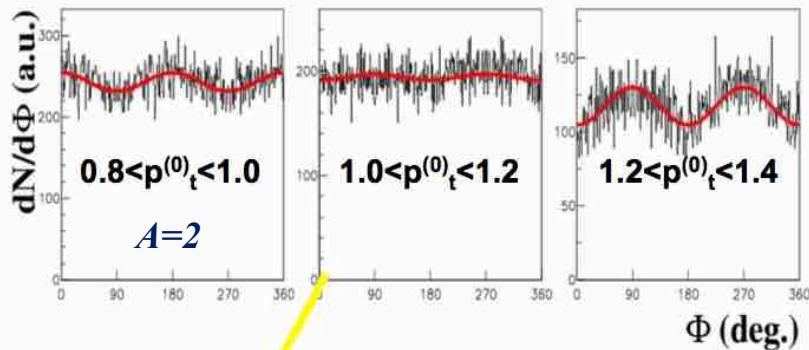
Laser system



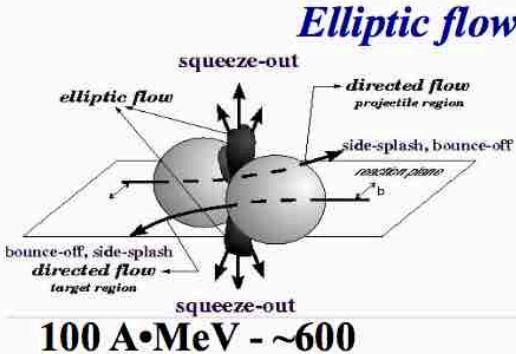
HPD Physics within CBM



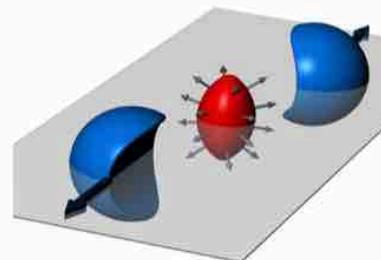
Au+Au 120 MeV/u, CM3



A. Andronic, G. Stoica, M. Petrovici & FOPI Coll. NPA679(2001)765



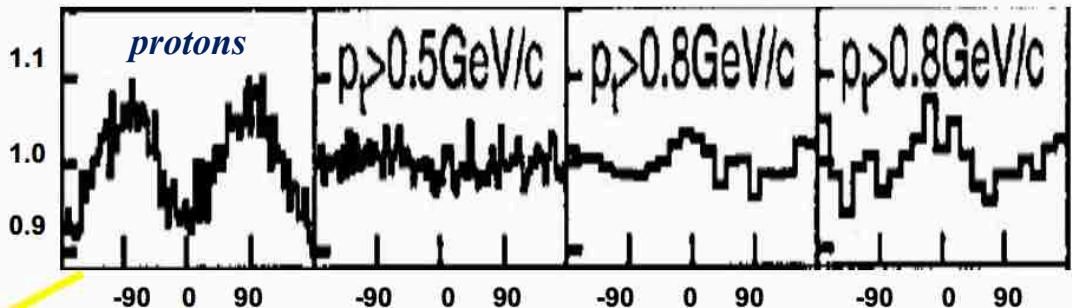
100 A·MeV - ~600 A·MeV



~4 A·GeV

- heavy ions (Au) up to 11A GeV $\sqrt{s_{NN}} = 4.7$ GeV
- light ions (e.g. Ca) up to 14A GeV $\sqrt{s_{NN}} = 5.3$ GeV
- protons up to 29 GeV $\sqrt{s_{NN}} = 7.5$ GeV)

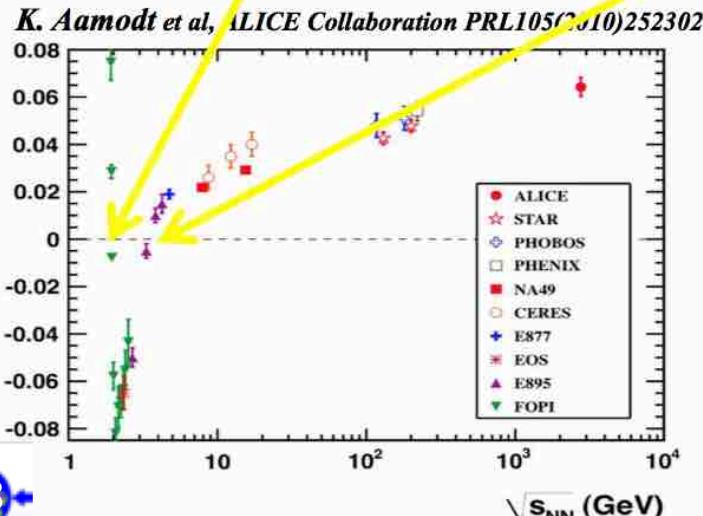
2 A·GeV 4 A·GeV 6 A·GeV 8 A·GeV



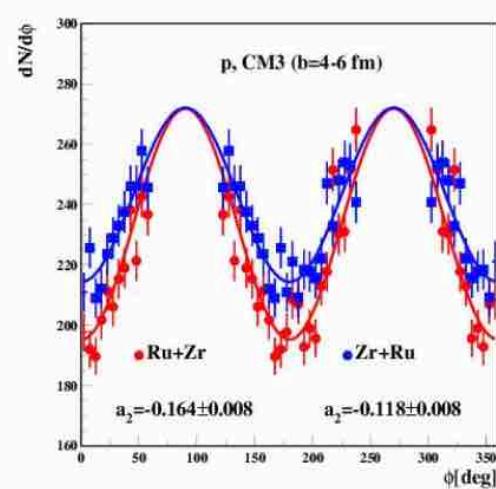
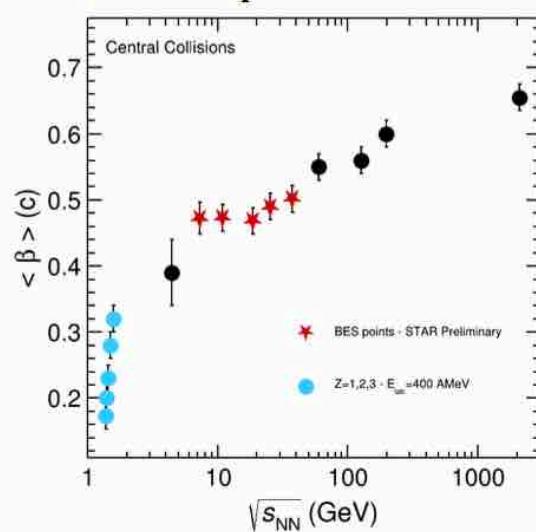
C. Pinkenburg & EOS Coll. Phys.Rev.Lett. 83(1999)1295

“Radial flow”

M. Petrovici Carpathian Summer School 2007

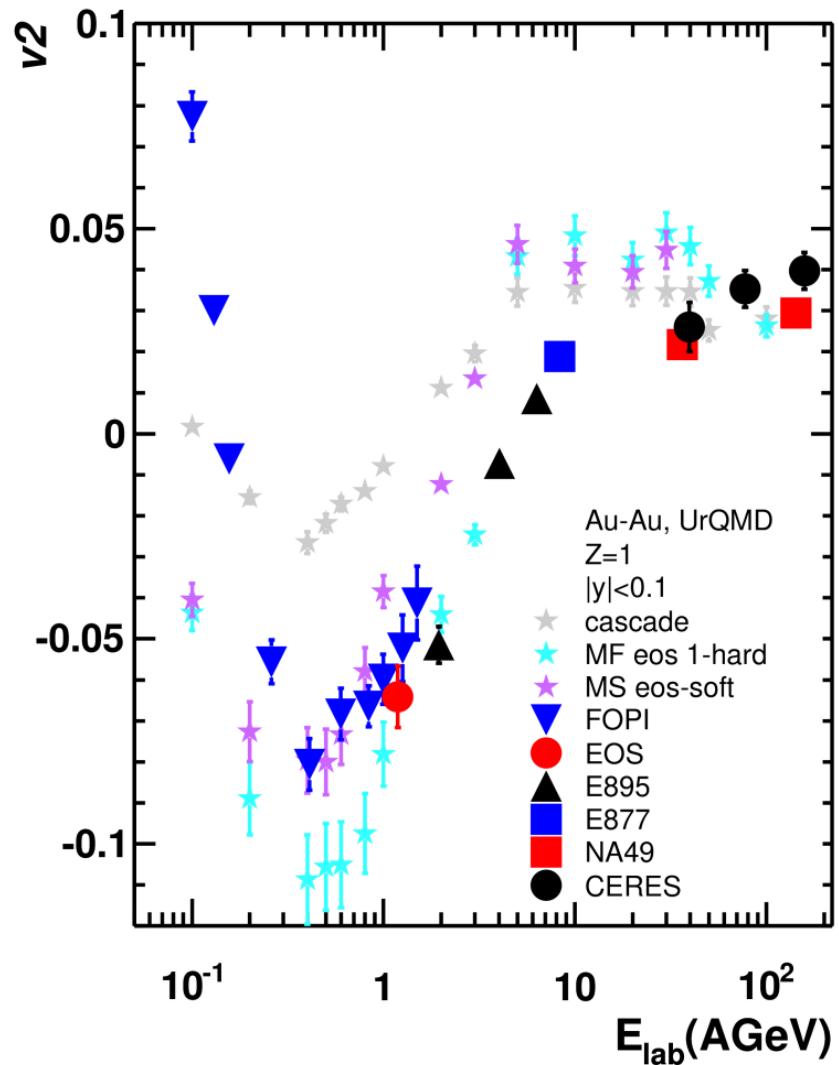


K. Aamodt et al., ALICE Collaboration PRL105(2010)252302



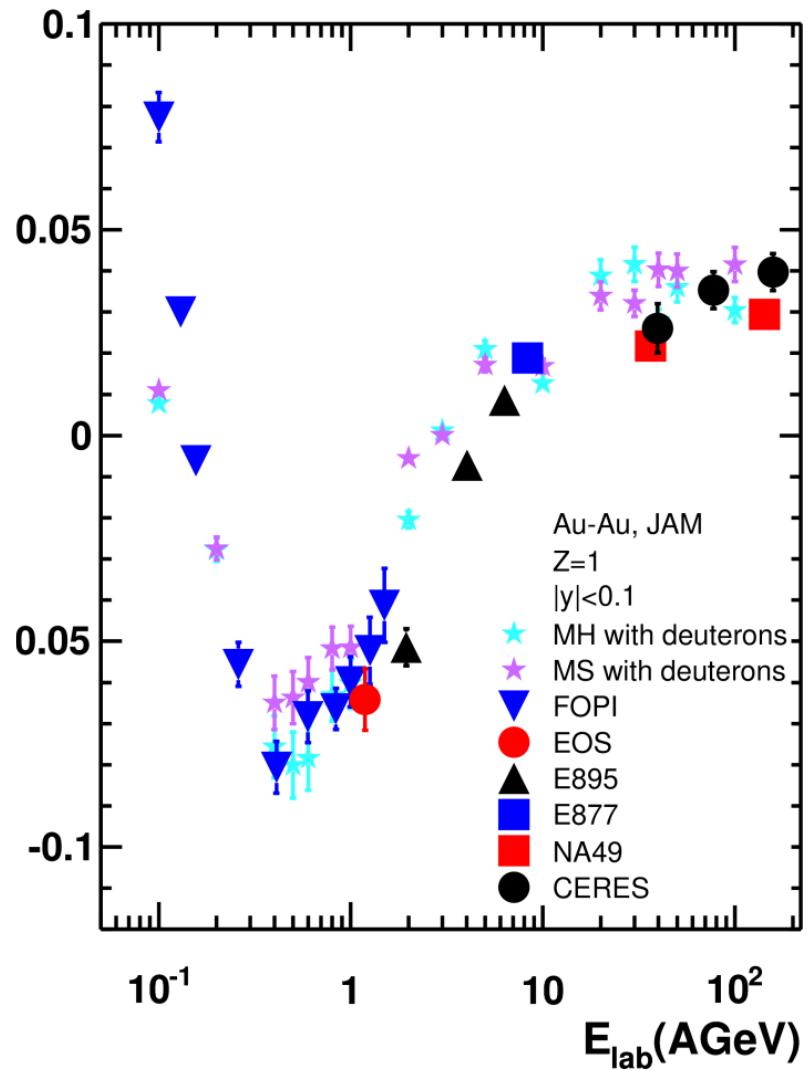
Physics topics prepared for data analysis @ CBM

Au-Au



UrQMD

- M.Bleicher et al., J.Phys. G25(199)1859

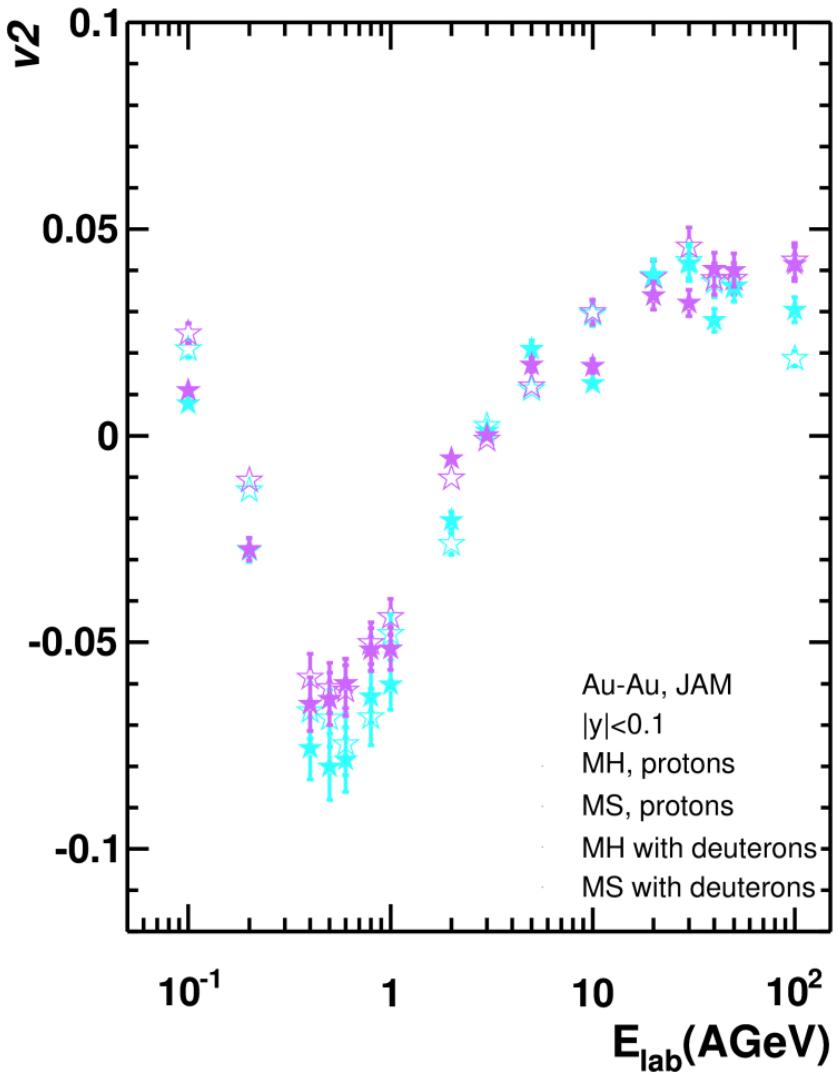
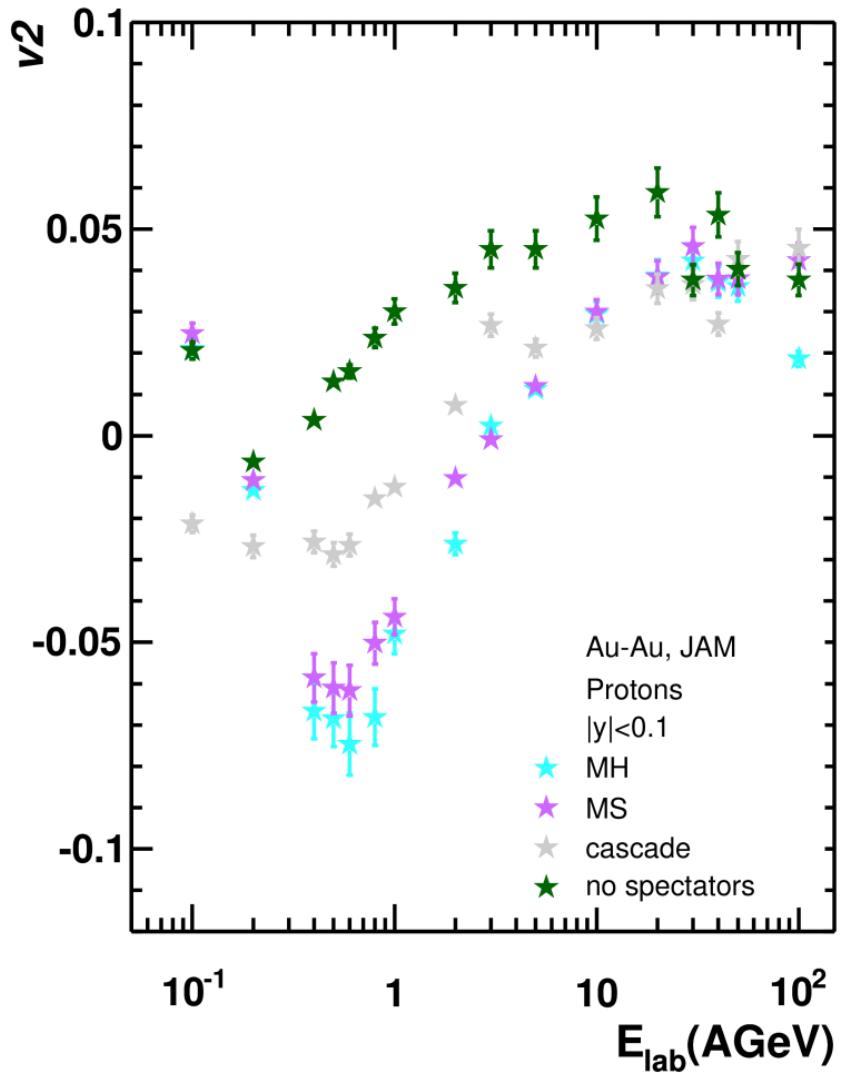


JAM

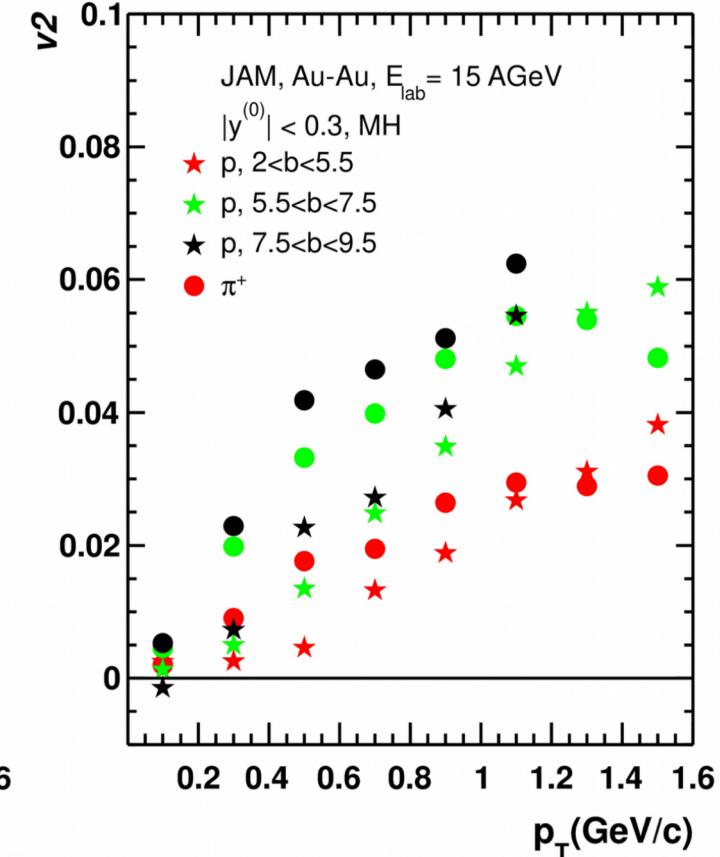
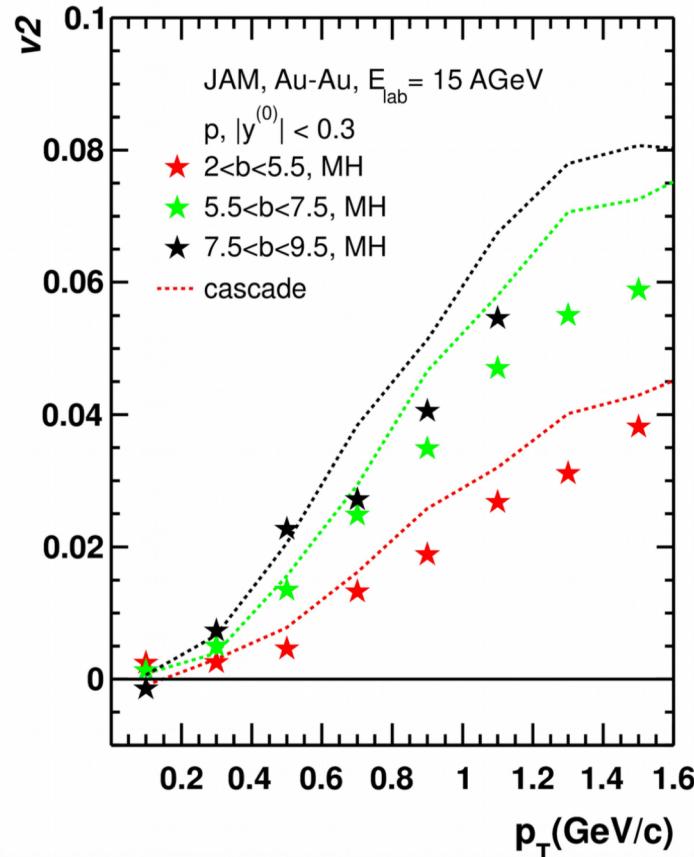
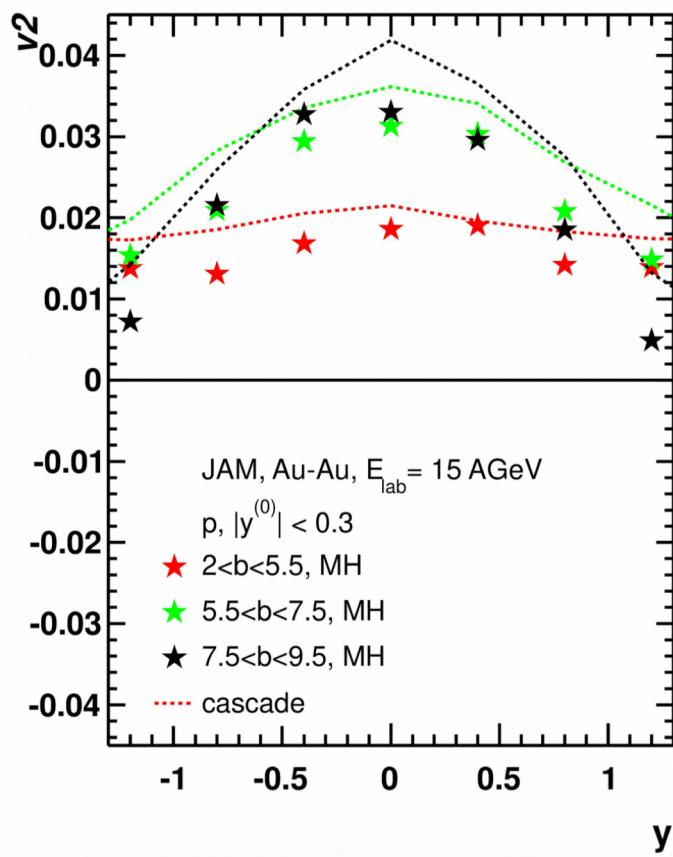
- Y.Nara, EPJ Web of Conf. 208(2019)11004
- M.Isse et al., Phys.Rev. C72(2005)064908
- C. Zang et al., Eur.Phys.J Phys.Rev. C97(2018)064913
- Y.Nara et al., Eu.Phys.J. A54(2018)1

Physics topics prepared for data analysis @ CBM

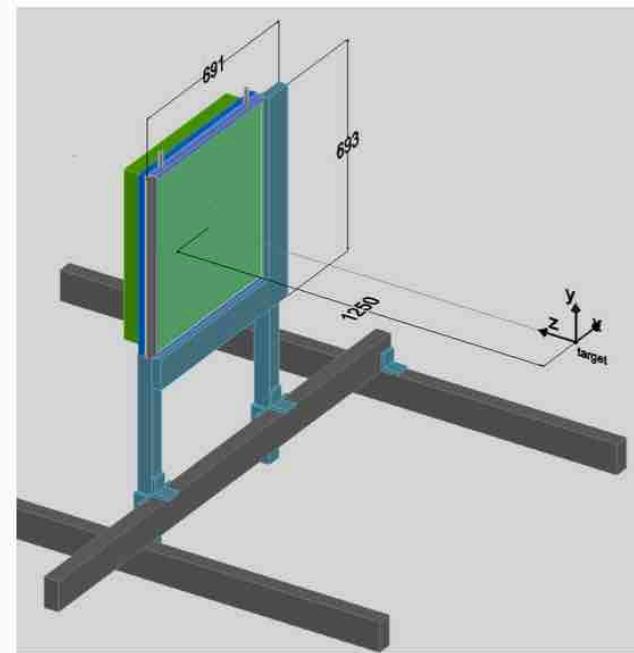
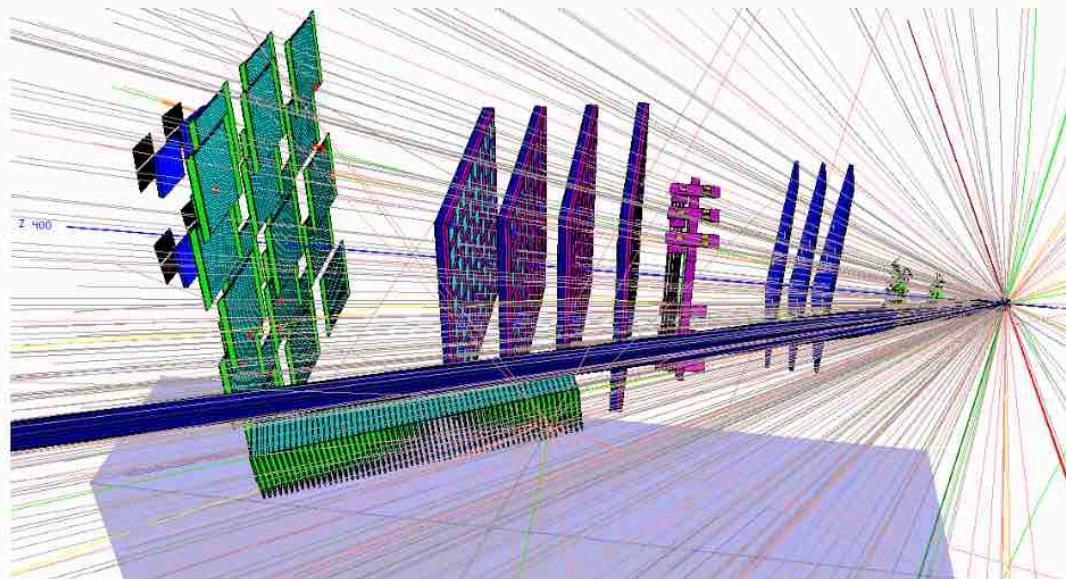
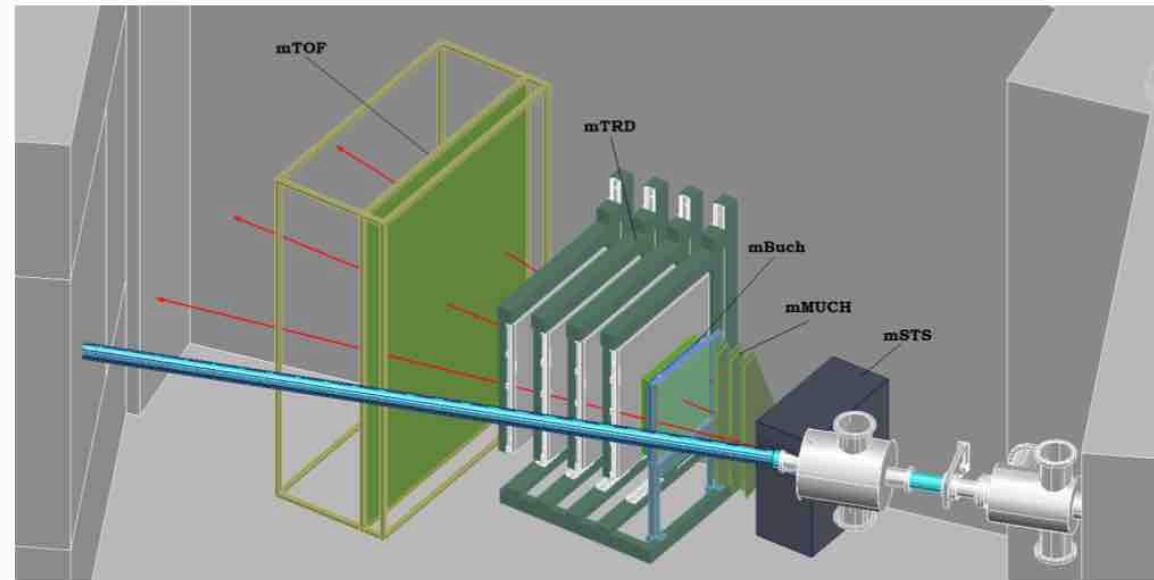
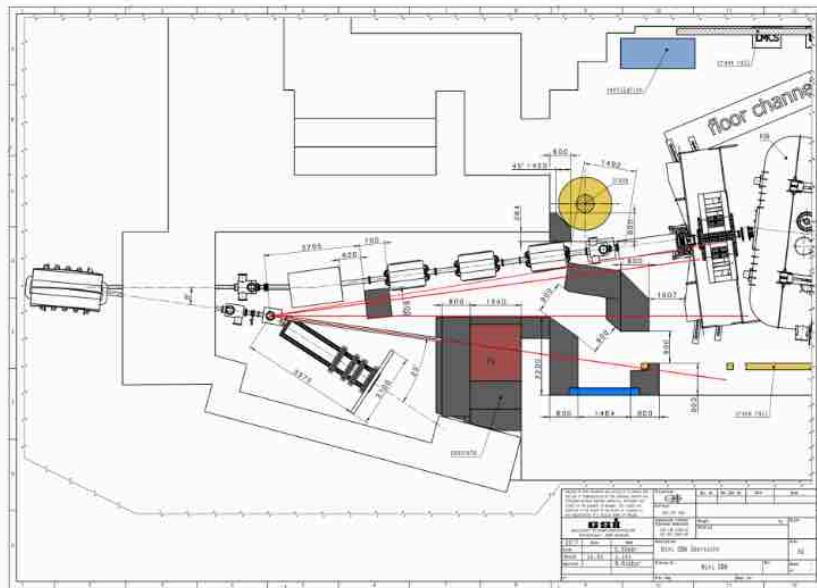
Au-Au



Physics topics prepared for data analysis @ CBM

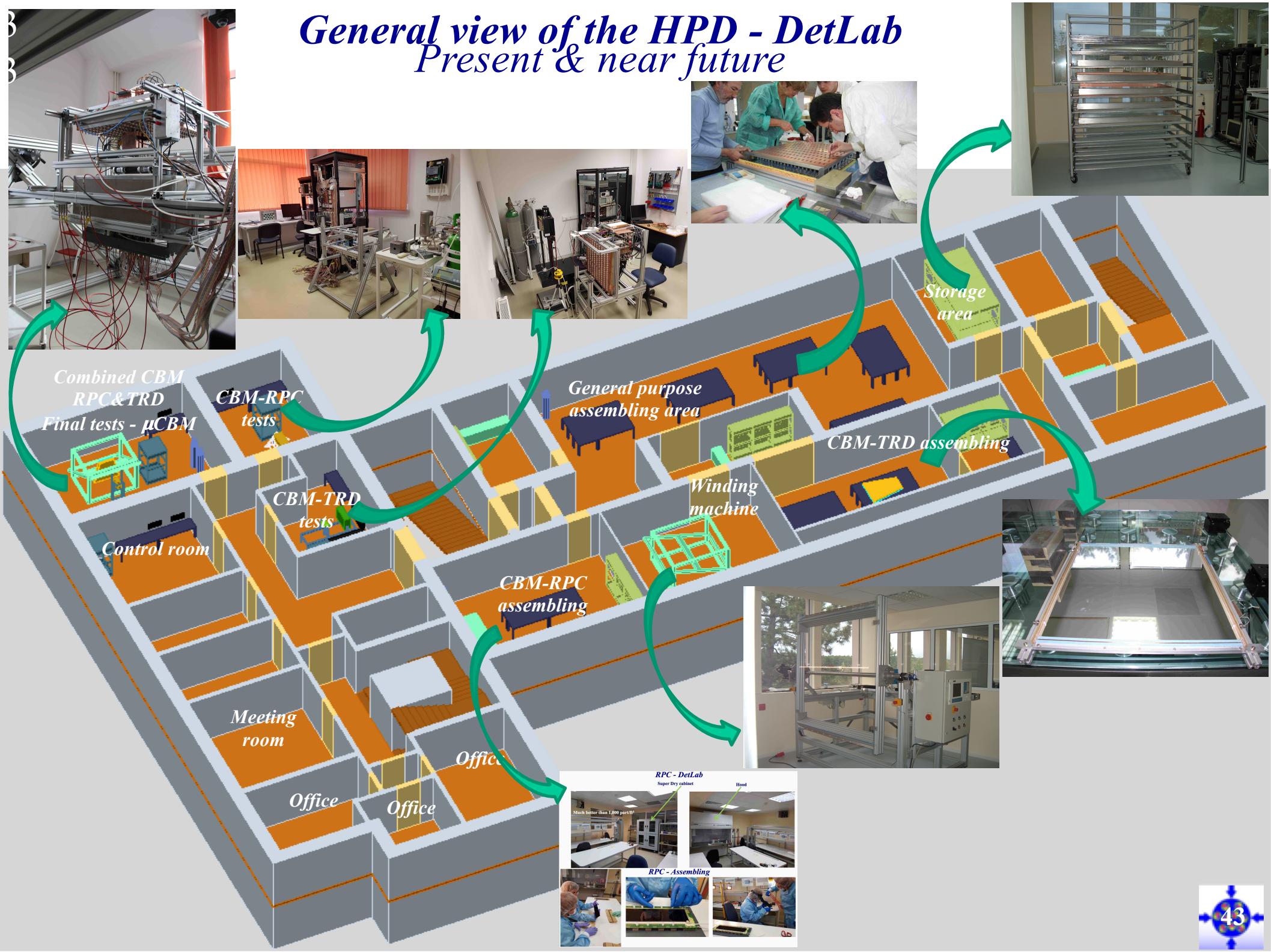


Integration of Bucharest TRD in mCBM Experiment @ SIS18 FAIR Phase0

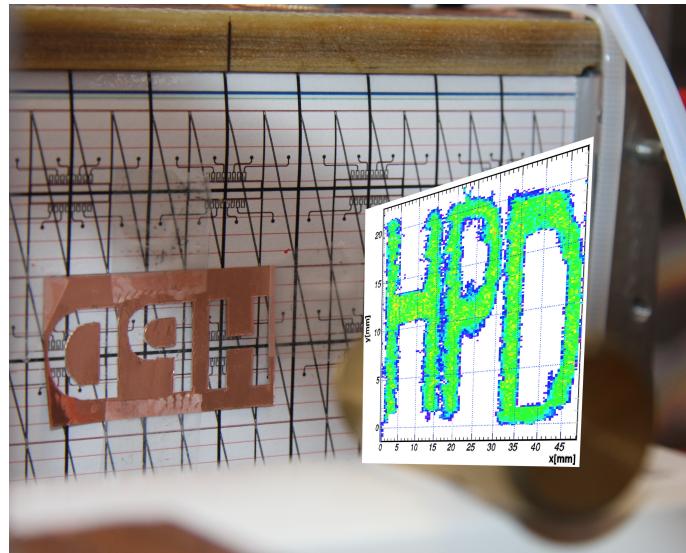


General view of the HPD - DetLab

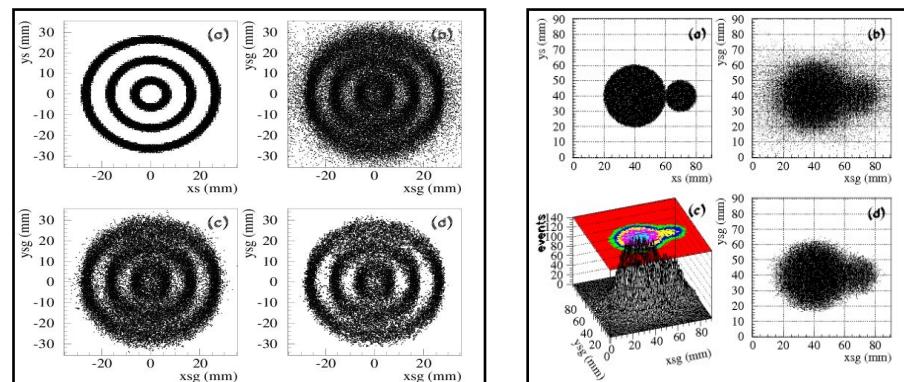
Present & near future



Application: high sensitivity whole-body PET imaging.



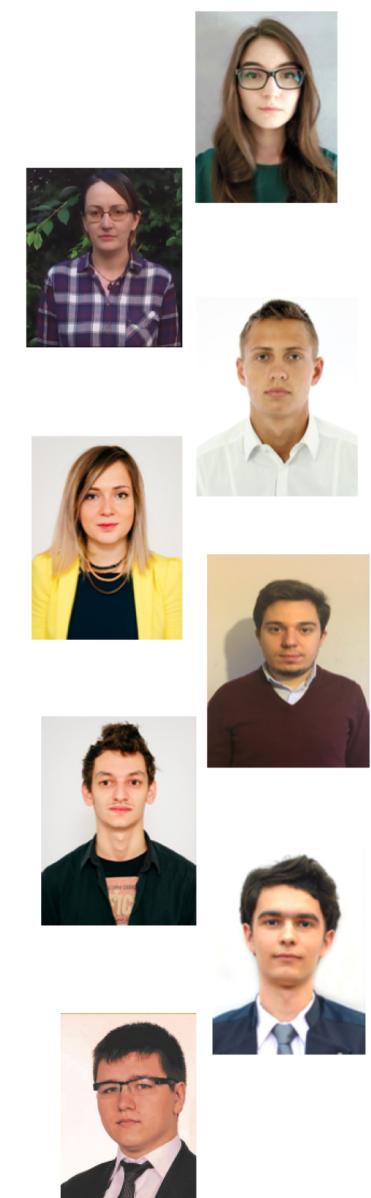
MC simulations based on the measured performance



$\epsilon_{MIP} > 95\%$

$\epsilon_\gamma \sim 2\text{-}3\%$

Teaching & Summer Student Program



Training & teaching



Outreach

Paolo Giubellino,
Managing Scientific Director GSI/FAIR



***Ursula Bassler, Deputy Director IN2P3
President of the CERN Council | CERN***



Training & teaching



Would you like to contribute to understand the secrets of the Universe?

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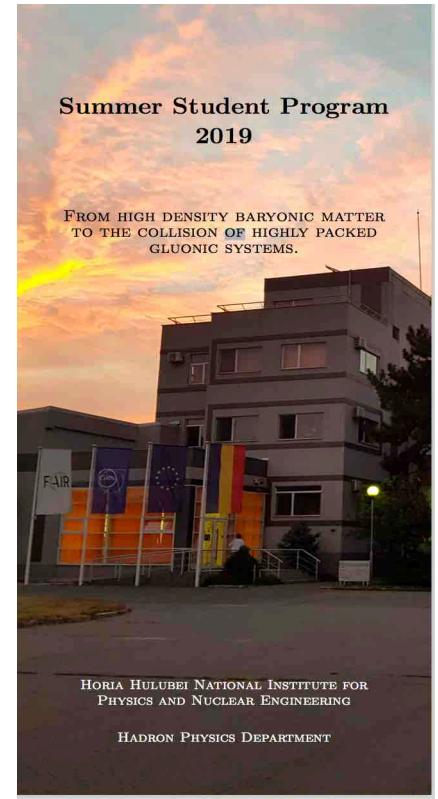
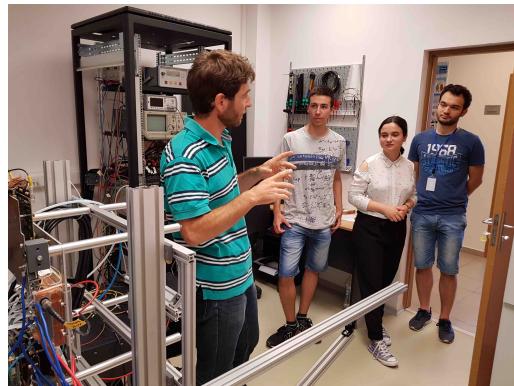
Summer Student Program 2019

Dedicated to advanced undergraduate level (3rd to 5th year of study,
i.e. last year of Bachelor or during Master studies)

Organized by: Hadron Physics Department
Horia Hulubei National Institute of Physics and Nuclear Engineering

Duration: July 15 - September 15 / Deadline for application: March 31, 2019
Contact: 0404 21-4040/135, mpreto@nihm.nipne.ro
For further information visit the Training /Summer Student Program at
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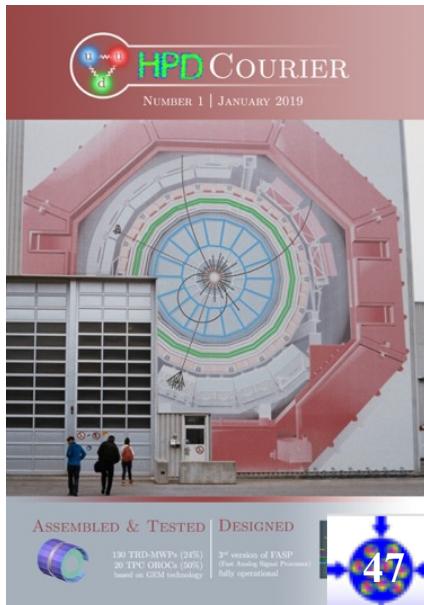


Outreach

http://niham.nipne.ro/HPD-Courier_electronic-version.pdf

CERN Courier January 24, 2019

ALICE revitalised



Social events



Outreach

- *Interview on TVR International*



- *Numerous visits of Romanian and foreign delegations, gymnasium pupils, students of the Romanian Physics Faculties network*



- *Posters at Researchers Night, September 2017*

HPD Courier

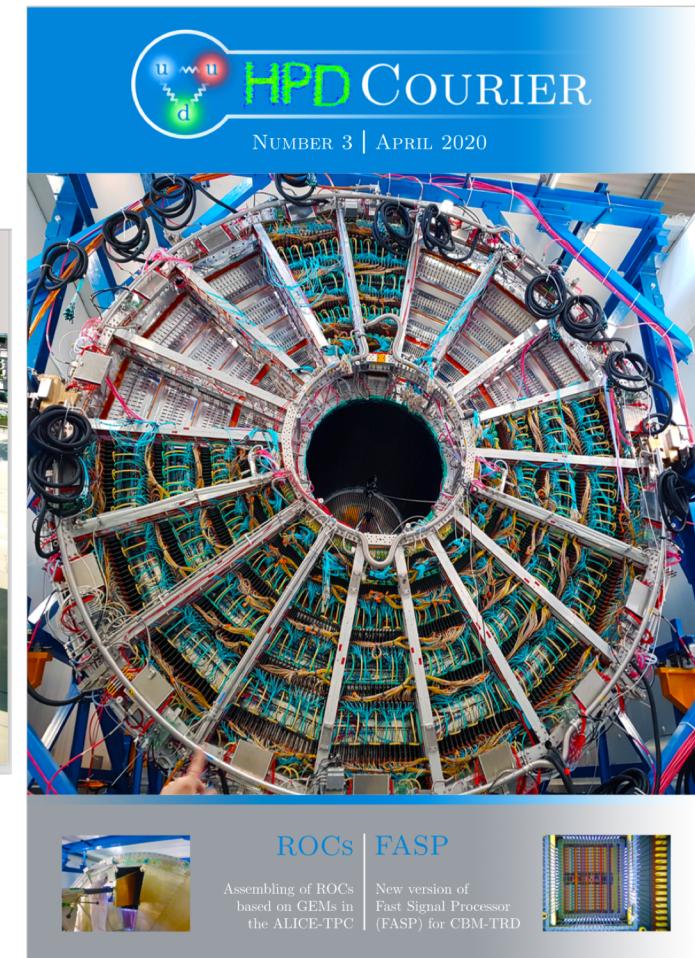
https://niham.nipne.ro/HPD_Courier.html

HPD COURIER
NUMBER 1 | JANUARY 2019

ASSEMBLED & TESTED | DESIGNED

130 TRD-MWPs (24%)
20 TPC OROCs (50%)
based on GEM technology

3rd version of FASP
(Fast Analog Signal Processor)
fully operational



Publications

1. M. Petris, D. Bartos, G. Caragheorgheopol, F. Constantin, M. Petrovici, L. Radulescu, V. Simion , I. Deppner, N. Herrmann, C. Simon , J. Fruehauf, M. Kis, P-A. Loizeau

“Prototype with the basic architecture for the CBM-TOF inner wall tested in close to real conditions”,

Journal of Physics: Conference Series 724 (2016) 012037,

<http://iopscience.iop.org/1742-6596/724/1/012037>

2. M. Petris, D. Bartos, G. Caragheorgheopol, I. Deppner, J. Fruenhauf, N. Herrmann, M. Kis,, P-A. Loizeau, M. Petrovici, L. Radulescu, V. Simion, C. Simon,

**“Time and position resolution of high granularity, high counting rate MRPC for the inner zone of the CBM-TOF wall”,
*Journal of Instrumentation, Volume 11, September 2016 (2016 JINST 11 C09009)***

<http://dx.doi.org/10.1088/1748-0221/11/09/C09009>

3. CBM Collaboration

**“Challenges in QCD matter physics - The scientific programme of the Compressed Baryonic Matter experiment at FAIR”,
*Eur. Phys. J. A 53, 60 (2017) (DOI: 10.1140/epja/i2017-12248-y)***

4. D. Bartos, M. Petris, M. Petrovici, L. Radulescu, V. Simion

**“A method to adjust the impedance of the transmission line in a Multi-Strip Multi-Gap Resistive Plate Counter”
*Romanian Journal of Physics 63, 901 (2018)***

5. M. Petris, D. Bartos, M. Petrovici, L.Radulescu, V.Simion, I Deppner, N. Herrmann, C. Simon, J. Fruehauf, M. Kiss, P.Loizeau
“In-beam test of the RPC architecture foreseen to be used for the CBM-TOF wall”
Journal of Physics:Conference Series, Vol. 1023 (2018), 012007

6. M.Petris D. Bartos, M. Petrovici, L. Radulescu, V. Simion, J. Fruenhauf, M. Kis, P-A. Loizeau, I. Deppner, N. Herrmann, C. Simon
“Performance of a two-dimensional position sensitive MRPC prototype with adjustable transmission line impedance”
Nucl. Instr. And Meth. A , 920(2019), 100

7. M. Petris, D. Bartos, M. Petrovici, L. Radulescu, V. Simion, J. Fruenhauf, P-A. Loizeau, I. Deppner, N. Herrmann, C. Simon
“Performance tests of the MSMRPCs using a free streaming readout”
PoS ICHEP2018(2019) 663 (SISSA (2018-11-15)
DOI: 10.22323/1.340.0663

Conferences

1. M. Petris, D. Bartos, G. Caragheorgheopol, I. Deppner, J. Fruenhauf, N. Herrmann, M. Kis,, P-A. Loizeau, M. Petrovici, L. Radulescu, V. Simion, C. Simon,

**“Time and position resolution of high granularity, high counting rate MRPC for the inner zone of the CBM-TOF wall”,
13th Workshop on Resistive Plate Chambers and Related Detectors, 22-27 February, 2016, Ghent, Belgium**

2. L.Radulescu, M. Petris, M. Petrovici, V. Simion

“CBM-TOF wall, Six scenario for the Inner Zone Architecture”

16th International Balkan Workshop on Applied Physics and Material Science, July 7 – 9, 2016, Constanta, Romania

3. L.Radulescu, M. Petris, M. Petrovici, V. Simion

“CBM-TOF inner wall design for SIS100 “

17th International Balkan Workshop on Applied Physics and Material Science, 11-14 July, 2017, Constanta, Romania;

<http://ibwap.univ-ovidius.ro/2017/articles/program>

4. Mariana Petris

“Performance of the strip readout MRPC prototypes for the inner zone of CBM-TOF wall”

XXII International School on Nuclear Physics, Neutron Physics and Applications, 10-16 September, 2017, Varna, Bulgaria;

<http://www.inrne.bas.bg/international-school-varna/>

5. M.Petris et al.

“Performance in heavy -ion beam tests of a high time resolution and two-dimensional position sensitive MRPC with transmission line impedance matched to the FEE”

XXXIX International Conference on High Energy Physics (ICHEP2018), July 4-11, 2018, Seoul, Korea;

<https://indico.cern.ch/event/686555/contributions/2973828/>

6. L.Radulescu et al.

“Integration of the HPD detectors in the mCBM experiment using CAD”

18th International Balkan Workshop on Applied Physics and Material Science, July 10-13, 2018, Constanta, Romania.

<http://ibwap.ro/#program>

7. M. Petris, D. Bartos, M. Petrovici, L. Radulescu, V. Simion, J. Fruehauf, I. Deppner, N. Herrmann

**“High time resolution, two-dimensional position sensitive MSMGRPC for high energy physics experiments”, EPS-HEP2019,
Ghent, Belgium, 10 – 17 July, 2019**

https://indico.cern.ch/event/577856/contributions/3420134/attachments/1878453/3094031/MPetris_eps-hep2019_Ghent.pdf

8. 2D Imaging in High Rate Environment with HPD-TRD for CBM@FAIR

Laura RADULESCU, Alexandru BERCUCI, Mihai PETROVICI

19th International Balkan Workshop on Applied Physics, IBWAP, Constanta, July 16-19, 2019

CBM-Collaboration Meetings

1. M. Petris, D. Bartos, G. Caragheorgheopol, I. Deppner, J. Fruenhauf, N. Herrmann, M. Kis, P-A. Loizeau, M. Petrovici, L. Radulescu, V. Simion, C. Simon,
“In beam test performance of MGMSRPC prototypes”
27th CBM Meeting, 11-15 April 2016, GSI Darmstadt
2. A Bercuci, D. Bartos, G. Caragheorgheopol, V. Catanescu, F. Constantin, M. Petris, M. Petrovici, C. Schiaua, V. Simion
“Bucharest TRD prototype. Detector & FEE in HCR”
27th CBM Meeting, 11-15 April 2016, GSI Darmstadt
3. M. Petris, D. Bartos, G. Caragheorgheopol, I. Deppner, J. Fruenhauf, N. Herrmann, M. Kis, P-A. Loizeau, M. Petrovici, L. Radulescu, V. Simion, C. Simon
“SPS – CERN in-beam test performance of Bucharest MGMSRPC prototypes”
28th CBM Meeting, 25-30 September 2016, Tuebingen, Germany
4. A. Bercuci, D. Bartos, G. Caragheorgheopol, V. Catanescu, F. Constantin, M. Petris, M. Petrovici, C. Schiaua, V. Simion, D. Prelipceanu, R. Amariei
“Bucharest TRD prototype response to HCR background. SPS and lab tests.”
28th CBM Meeting, 25-30 September 2016, Tuebingen, Germany
5. A. Bercuci, G. Caragheorgheopol, V. Catanescu, M. Petris, M. Petrovici, C. Schiaua
“Alternative Readout ASIC Test Beam Results”
CBM TRD TDR Review 14 – 15 March 2017
<https://indico.gsi.de/conferenceDisplay.py?confId=5654>
6. M. Petris et al.,
“Alternative Chamber Design”
CBM TRD TDR Review, 14 – 15 March 2017, GSI Darmstadt
<https://indico.gsi.de/conferenceDisplay.py?confId=5654>
7. A. Bercuci, G. Caragheorgheopol, V. Catanescu, C. Schiaua
“The free-running system developed for FASP-02”
29th CBM Collaboration Meeting GSI-Germany 20-24 March 2017.
<https://indico.gsi.de/event/4759/session/16/contribution/95>
8. A. Bercuci, V. Aprodu, D. Bartos, G. Caragheorgheopol, V. Catanescu, F. Constantin, M. Petris, M. Petrovici, L. Prodan, A. Radu, and C. Schiaua
“HCR measurements at SPS and X-ray tube in free-running mode”
29th CBM Collaboration Meeting GSI-Germany 20-24 March 2017
<https://indico.gsi.de/event/4759/session/16/contribution/96>

CBM-Collaboration Meetings

9. M. Petris et al.

“In-beam test performance of Bucharest – MGMSRPC prototypes”

CBM Collaboration Meeting, 20 – 24 March 2017, GSI Darmstadt

<https://indico.gsi.de/event/4759/session/9/contribution/124>

10. A. Bercuci, G. Caragheorgheopol, V. Catanescu, M. Petris, M. Petrovici, C. Schiaua

“The performance of the Bucharest TRD prototype up to 105 particles/cm²/sec rate and beyond ...”

30th CBM Collaboration Meeting Wuhan-China 22-29 September 2017

<https://indico.gsi.de/event/4760/session/6/contribution/58>

11. M. Petris et al.

“Performance of the Bucharest MSMRPC prototypes in a trigger-less mode operation”

30th CBM Collaboration Meeting, 24-28 September, Wuhan, China

<https://indico.gsi.de/event/4760/session/5/contribution/85>

12. Laura Radulescu et al.,

“Mechanical solutions for the inner zone of the CBM-TOF”

30th CBM Collaboration Meeting, 24-28 September, Wuhan, China

<https://indico.gsi.de/event/4760/session/5/contribution/101>

13. A. Bercuci et al.

“Status of TRD software”

31st CBM Collaboration Meeting GSI-Darmstadt, Germany 19-23 March 2018.

<https://indico.gsi.de/event/5862/session/14/contribution/76>

14. A. Bercuci, et al.

“FASP based FEE- Status and Performances”

31st CBM Collaboration Meeting GSI-Darmstadt, Germany 19-23 March 2018.

<https://indico.gsi.de/event/5862/session/21/contribution/32>

15. A. Bercuci, et al.

“Hitting the 100k particle/cm²/s rate - Detector performance”

31st CBM Collaboration Meeting GSI-Darmstadt, Germany 19-23 March 2018.

<https://indico.gsi.de/event/5862/session/21/contribution/38>

16. M. Petris et al.

“Status of CBM-TOF RPC activities in HPD”

31st CBM Collaboration Meeting, GSI-Darmstadt, Germany 19-23 March 2018.

<https://indico.gsi.de/event/5862/session/18/contribution/111>

CBM-Collaboration Meetings

17. A. Bercuci et al.

“Bucharest TRD prototype for mCBM - status and timeline”

32nd CBM Collaboration Meeting, GSI-Darmstadt, Germany, 1 – 5 October 2018

<https://indico.gsi.de/event/5863/session/25/contribution/28>

18. A. Bercuci et al.

“Characterization of the BU TRD prototype - laboratory tests and software”

32nd CBM Collaboration Meeting, GSI-Darmstadt, Germany, 1 – 5 October 2018

<https://indico.gsi.de/event/5863/session/25/contribution/28>

19. M. Petris et al.

“MGMSRPC 2018 prototype for the inner zone of the CBM-TOF wall”

32nd CBM Collaboration Meeting, GSI Darmstadt, 01-05 October 2018

<https://indico.gsi.de/event/5863/session/17/contribution/133>

20. Laura Radulescu et al.,

“TOF Inner Zone – structure, services, mechanical support”

32nd CBM Collaboration Meeting, GSI Darmstadt, 01-05 October 2018

<https://indico.gsi.de/event/5863/session/17/contribution/134>

21. M. Petrovici et al.

“TOF IFIN IKC”

32nd CBM Collaboration Meeting, GSI Darmstadt, 01-05 October 2018

<https://indico.gsi.de/event/5863/session/17/contribution/125>

22. M. Petris et al.

“Lessons learned from building and testing 24% of ALICE-TRDs and 50% of ALICE-OROCs”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/0/contribution/11>

23. M. Petris et al.

“Laboratory infrastructure in Bucharest”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/6/contribution/4>

CBM-Collaboration Meetings

24. L. Radulescu, A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, C. Schiaua, V. Simion

“Inner-zone of the TRD wall - Construction details for the Bucharest-solution”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/0/contribution/12>

25. L. Radulescu, A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, C. Schiaua, V. Simion

“Structural analysis of the TRD assembly procedure and gas flow operation for the Bucharest-solution”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/5/contribution/13>

26. A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, L. Radulescu, C. Schiaua, V. Simion

“FASP based data acquisition”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/12/contribution/22>

27. A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, L. Radulescu, C. Schiaua, V. Simion

“Measurements, Results & Performances for the Bucharest-solution of the CBM-TRD”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/10/contribution/15>

28. A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, L. Radulescu, C. Schiaua, V. Simion

“Simulating the Bucharest-solution for the mCBM setup”

CBM-Retreat Meeting, 27 – 29 March 2019, Schloss Waldthausen, Mainz, Germany

<https://indico.gsi.de/event/8186/contributions>

<https://indico.gsi.de/event/8186/session/13/contribution/16>

CBM-Collaboration Meetings

29. A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, L. Radulescu, C. Schiaua, V. Simion

“Cluster reconstruction in high counting rate environment”

33rd CBM Collaboration Meeting, 1 – April 2019, GSI Darmstadt, Germany

<https://indico.gsi.de/event/8068/other-view?view=nicecompact>

30. L. Radulescu, A. Bercuci, V. Aprodu, D. Bartos, Ch. Caragheorgheopol, V. Catanescu, V. Duta, M. Petris, M. Petrovici, L. Prodan, A. Radu, C. Schiaua, V. Simion

“Buch-TRD chamber and wall geometry”

33rd CBM Collaboration Meeting, 1 – April 2019, GSI Darmstadt, Germany

<https://indico.gsi.de/event/8068/other-view?view=nicecompact>

31. M. Petris, V. Aprodu, D. Bartos, Gh. Caragheorgheopol, V. Duta, M. Petrovici, L. Prodan, L. Radulescu, V. Simion, J. Fruenhaufer, I. Deppner, N. Herrmann, N. Heyer

“In-house cosmic-ray test of the MGMSRPC2018 prototype for the inner zone of the CBM-TOF wall”

33rd CBM Collaboration Meeting, 1 – April 2019, GSI Darmstadt, Germany

<https://indico.gsi.de/event/8068/other-view?view=nicecompact>

32. M. Petrovici, V. Aprodu, D. Bartos, Gh. Caragheorgheopol, V. Duta, M. Petris, L. Prodan, L. Radulescu, V. Simion

“CBM-ToF Inner Wall – in-kind contract and beyond”

33rd CBM Collaboration Meeting, 1 – April 2019, GSI Darmstadt, Germany

33. M. Petris et al.,

[Status of the activities for the inner zone of the CBM-TOF wall](#)

34th CBM Collaboration Meeting, 29 September – 3 October 2019, Kolkata, India

34. Alexandru Bercuci, Gheorghe Caragheorgheopol, Vasile Catanescu, Mariana Petris, Mihai Petrovici, Laura Radulescu, Claudiu Schiaua

Physics Motivation for an Optimized Position Resolution design in the TRD Inner-Zone [for the TDR Addendum]”

34th CBM Collaboration Meeting 29 Sep → 3 Oct 2019, Bose Institute, Kolkata, India

<https://indico.gsi.de/event/7101/contributions/32165/attachments/23198/29088/TRD-Buch-Phys.pdf>

35. L. Radulescu, D. Bartos, A. Bercuci, M. Petrovici

Towards the engineering design of the 2D position sensitive inner zone for the TRD-TDR addendum”

34th CBM Collaboration Meeting 29 Sep → 3 Oct 2019, Bose Institute, Kolkata, India

https://indico.gsi.de/event/7101/contributions/32264/attachments/23126/28992/2019_TRD_Protoype_for_TDR_addendum_tel.pptx

CBM-Collaboration Meetings

36. *Alexandru Bercuci, Gheorghe Caragheorgheopol, Vasile Catanescu, Mariana Petris, Mihai Petrovici, Laura Radulescu, Claudiu Schiaua Software Integration and Performances of the Optimized Position Resolution design for the TRD Inner-Zone [for the TDR Addendum]"*
34th CBM Collaboration Meeting 29 Sep → 3 Oct 2019, Bose Institute, Kolkata, India
<https://indico.gsi.de/event/7101/contributions/32232/attachments/23184/29071/TRD-Buch-QA.pdf>
37. *Alexandru Bercuci, Gheorghe Caragheorgheopol, Vasile Catanescu, Mariana Petris, Mihai Petrovici, Laura Radulescu, Claudiu Schiaua FASP FEE Integration and Readiness for CBM DAQ [for the TDR Addendum]"*
34th CBM Collaboration Meeting 29 Sep → 3 Oct 2019, Bose Institute, Kolkata, India
<https://indico.gsi.de/event/7101/contributions/32268/attachments/23219/29121/TRD-Buch-FEE.pdf>
38. *Laura Radulescu, Daniel Bartos, Alexandru Bercuci, Vasile Catanescu, Mariana Petris, Mihai Petrovici, Claudiu Schiaua Chamber and inner zone architecture"*
CBM-TRD Retreat, 19-21 August 2020,Haus Mariengrund, Münster, Germany
https://indico.gsi.de/event/11003/contributions/46405/attachments/32308/41203/Chamber_and_inner_zone_architecture.pptx
39. *A. Bercuci, D. Bartos, G. Caragheorgheopol, F. Constantin, V. Duta, M. Petris, M Petrovici, L. Prodan, A. Radu, L. Radulescu, V. Simion, M.Tarzila Status of CBM compatible DAQ chain (alternative)"*
CBM-TRD Retreat, 19-21 August 2020,Haus Mariengrund, Münster, Germany
<https://indico.gsi.de/event/11003/contributions/46406/attachments/32330/41238/TRD-Buch-FEE.pdf>
40. *M. Petris, D. Bartos, A. Bercuci, G. Caragheorgheopol, F. Constantin, V. Duta, M Petrovici, L. Prodan, A. Radu, L. Radulescu, V. Simion, M.Tarzila A short review related to the e/π rejection performance using different entrance windows and radiators - based only on experimental data"*
CBM-TRD Retreat, 19-21 August 2020,Haus Mariengrund, Münster, Germany
<https://indico.gsi.de/event/11003/contributions/46404/attachments/32318/41217/e-pi-discrimination-Bucharest-TRD.pdf>
41. *A. Bercuci, D. Bartos, G. Caragheorgheopol, F. Constantin, V. Duta, M. Petris, M Petrovici, L. Prodan, A. Radu, L. RADULESCU, V. Simion, M.Tarzila Steps towards CBM-TRD Addendum".*
CBM-TRD Retreat, 19-21 August 2020,Haus Mariengrund, Münster, Germany
<https://indico.gsi.de/event/11003/contributions/46407/attachments/32307/41202/TRD2D-Motivation.pdf>
42. *A. Bercuci, M Petrovici, L. Radulescu, C. Schiaua Status of Inner zone CBM-TRD"*
TB Meeting on 16 June 2020 (ZOOM)
https://indico.gsi.de/event/10746/contributions/44942/attachments/31552/39912/TRD_inner_zone-present_status_TB_160620_Final_1.pptx

CBM-Collaboration Meetings

43. M. Petris et al.,

Bucharest - Current status and next steps

35th CBM Collaboration Meeting, 23 – 27 March 2020, GSI Darmstadt, Germany

<https://indico.gsi.de/event/8628/contributions/42825/>

45. M. Petris et al.

A short review related to the e/π rejection performance using different entrance windows and radiators - based only on experimental data

CBM-TRD retreat meeting, 19-21 August 2020, Haus Mariengrund, Germany

Contributions to CBM Progress Reports

1. M. Petris et al.,

“CERN-SPS in-beam performance test of the new strip readout MRPC prototypes for the inner zone of the CBM-TOF wall”
CBM Progress Report 2016 (2017), 129/ GSI Scientific Report 2016 (2017), RESEARCH-NQM-CBM-6

2. M. Petris et al.,

“CERN-SPS in-beam performance test of the new strip readout MRPC prototypes for the inner zone of the CBM-TOF wall”
CBM Progress Report 2016 (2017), 131/GSI Scientific Report 2016 (2017), RESEARCH-NQM-CBM-15

3. A. Bercuci, G. Caragheorgheopol, V. Catanescu, M. Petris, and M. Petrovici

“Laboratory tests of the Bucharest TRD prototype performance in High Counting Rate environment”
CBM Progress Report 2016 (2017) 122.

4. A. Bercuci, D. Bartos, G. Caragheorgheopol, V. Catanescu, M. Petris, and M. Petrovici

“Tracking with the Bucharest TRDs at the CERN-SPS test beam in 2015”
CBM Progress Report 2016 (2017) 121.

5. A. Bercuci, V. Aprodu, D. Bartos, G. Caragheorgheopol, V. Catanescu, F. Constantin, M. Petris, M. Petrovici, L. Prodan, A. Radu, and C. Schiaua

“Bucharest RPC and TRD prototypes at CERN-SPS test beam in 2016”
CBM Progress Report 2016 (2017) 118.

6. A. Bercuci, G. Caragheorgheopol, V. Catanescu, M. Petris, M. Petrovici, and C. Schiaua

“Tests of the FASPRO Free-Running DAQ for the Bucharest TRD prototypes at the CERN-SPS test beam in 2016”
CBM Progress Report 2016 (2017) 114.

7. A Bercuci et al.

Time Based CbmRoot simulations of the Bucharest prototype for mCBM
CBM Progress Report 2017 ISBN 978-3-9815227-5-4, (2018) 186;

8. A Bercuci et al.

“Laboratory tests of the TRD Bucharest prototype in close to realistic high counting rates environment”
CBM Progress Report 2017 ISBN 978-3-9815227-5-4, (2018) 89;

9. M. Petris et al.,

“Performance tests of the MGMSRPCs using a free streaming readout”
CBM Progress Report 2017 ISBN 978-3-9815227-5-4, (2018), 102;

Contributions to CBM Progress Reports

10. L. Radulescu et al.

“Mechanical design of the CBM-TOF inner wall”

CBM Progress Report 2017 ISBN 978-3-9815227-5-4, (2018), 107;

11. L. Radulescu et al.

“CAD integration of the mCBM systems”

CBM Progress Report 2017 ISBN 978-3-9815227-5-4, (2018), 176;

12. M. Petris et al.

“High granularity timing RPC prototype for the inner zone of the CBM TOF wall”

CBM Progress Report 2018 ISBN 978-3-9815227-6-1, (2019),

13. A. Bercuci et al.,

FEE readiness of Bucharest TRD chamber for mCBM”

CBM Progress Report 2018 ISBN 978-3-9815227-6-1 (2019), 79

14. A. Bercuci et al.,

Data format and long term tests for FASP/GETS FEE in view of mCBM integration”

CBM Progress Report 2018 ISBN 978-3-9815227-6-1 (2019), 81

15. A. Bercuci et al.,

Energy resolution and gain measurements for the TRD chamber configuration proposed for the inner zone of the CBM-TRD”

CBM Progress Report 2018 ISBN 978-3-9815227-6-1 (2019), 87

16. A. Bercuci et al.,

Realistic response of the Bucharest TRD for mCBM simulations at top rates”

CBM Progress Report 2018 ISBN 978-3-9815227-6-1 (2019), 92

17. M. Petris et al.

“Test results of high granularity MSMGRPC prototype for CBM – TOF wall”

CBM Progress Report 2019 ISBN 978-3-9815227-8-5, (2020), 131

18. V. Aprodu et al.

“Efficiency investigation of a high granularity MSMGRPC prototype for the inner zone of the CBM – TOF wall”,

CBM Progress Report 2019 ISBN 978-3-9815227-8-5, (2020), 132

Contributions to CBM Progress Reports

19. *V. Duta et al.*,
"Update of the CBM-TOF inner wall design"
CBM Progress Report 2019 ISBN 978-3-9815227-8-5, (2020), 134
20. *L. Radulescu et al.*,
"Studies of mechanical stress for the high resolution TRD"
CBM Progress Report 2019 ISBN 978-3-9815227-8-5 (2020), 112
21. *A. Bercuci et al.*,
"Reconstruction performance of High position Resolution TRD, modelled in CbmRoot framework"
CBM Progress Report 2019 ISBN 978-3-9815227-8-5 (2020), 116

Team:

- Prof. Dr. Mihai Petrovici (physicist) - team leader
- Scientific Researcher III Dr. Cristian Andrei (physicist)
- Senior researcher III Daniel Bartos (physicist)
- Senior researcher II Dr. Alexandru Bercuci (physicist)
- Senior researcher II Gheorghe Caragheorgheopol (electronics engineer)
- Senior researcher II Dr. Vasile Catanescu (electronics engineer)
- Senior researcher II Dr. Florin Constantin (physicist)
- Senior researcher II Viorel Duta (mechanical engineer)
- Scientific Researcher III Dr. Andrei Herghelegiu (physicist)
- Senior Engineer I Dr. Gheorghe Mateescu
- Senior researcher II Dr. Mariana Petris (physicist)
- Prof. Dr. Alexandrina Petrovici (physicist)
- Senior researcher I Dr. Amalia Pop (physicist)
- Senior engineer II Dr. Laura Radulescu (mechanical engineer)
- Senior researcher II Dr. Victor Simion (physicist)
- Computing coordinator Claudiu Schiaua (physicist)
- PhD student Madalina Tarzila (physicist)
- Technician Valerica Aprodu
- Technician Lucia Prodan
- Technician Andrei Radu
- Technician Constanta Dinca
- Turner Dima Gheorghe
- Financial coordinator Georgiana Toma (economist)