MINISTERUL CERCETĂRII, INOVĂRII ŞI DIGITALIZĂRII

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End of the year Seminar

2023 achievements

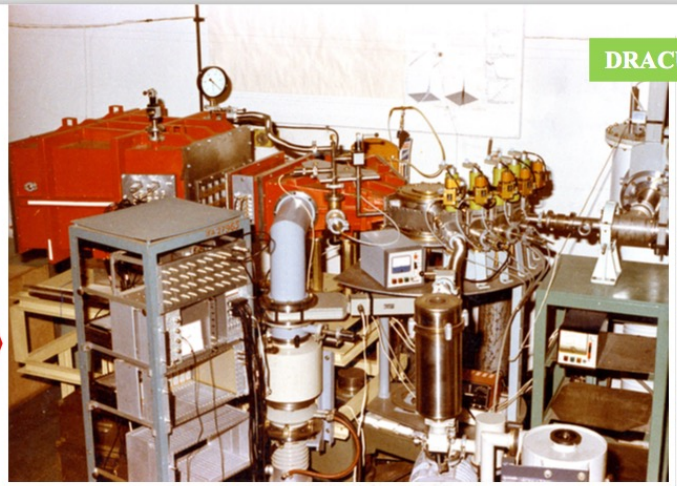
Hadron Physics Department

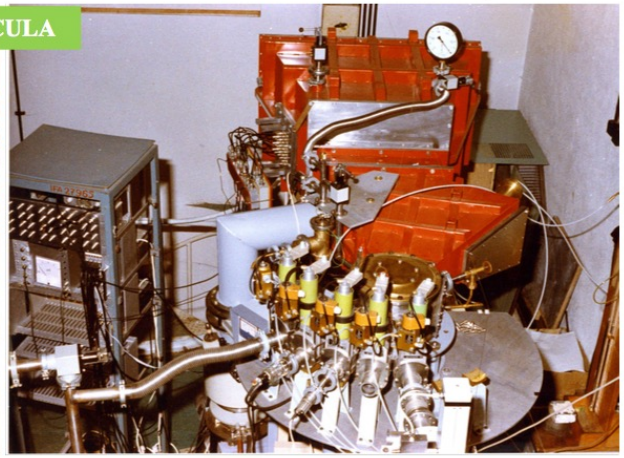
HPD Conference Hall, 10:00 a.m.

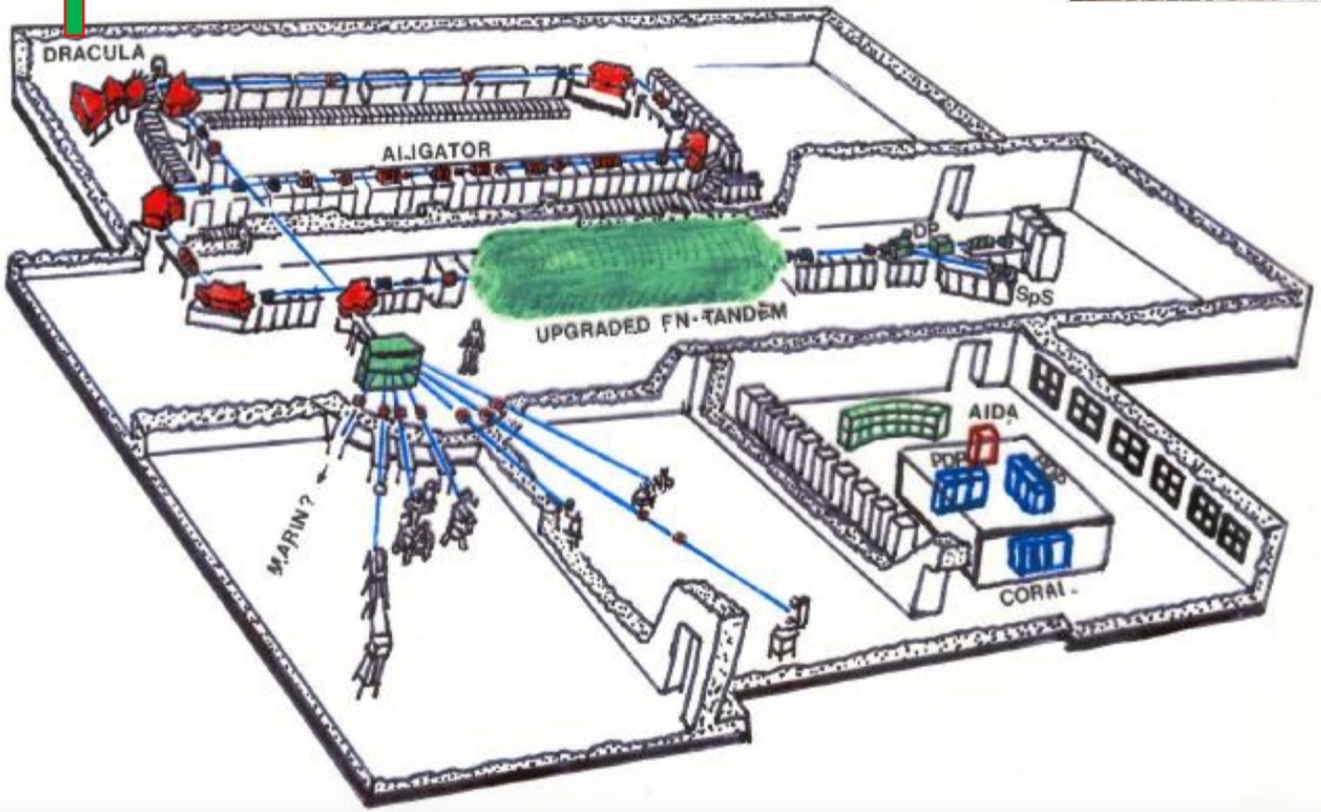
December 19, 2023

Where/When our achievements' celebrations started

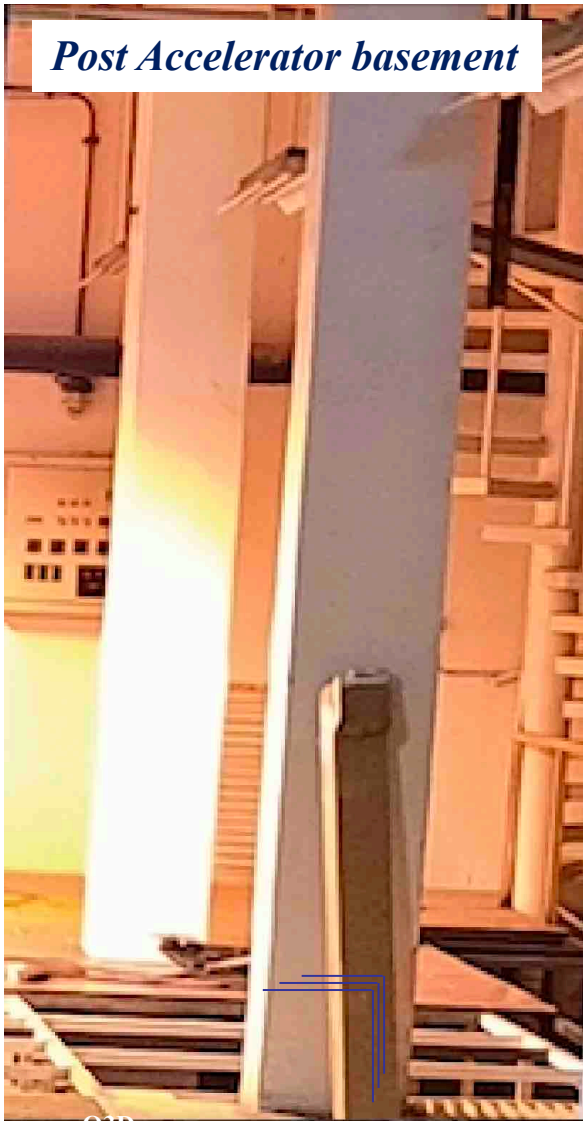
1984 - 1989







Where/When our achievements' celebrations started

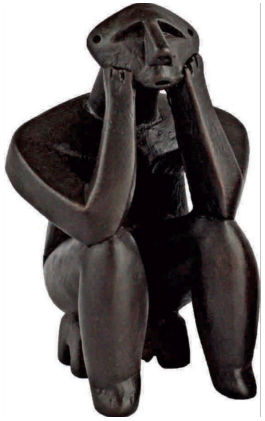


Outlook

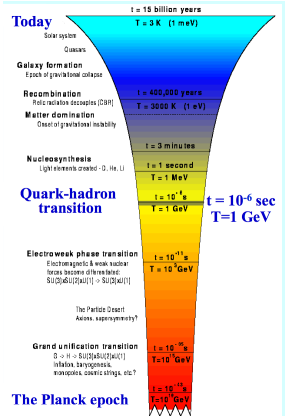
- ***Introduction***
- ***Physics***
  - ***Nuclear Structure and Dynamics***
  - ***Strongly Interacting Matter***
- ***R&D related to the CBM Experiment at FAIR***
  - ***Physics motivation***
  - ***Multi-strip multi-gap RPCs ⇒ CBM-ToF***
  - ***TRD-2D ⇒ CBM-TRD***
- ***Applied Physics & Technological Transfer***
- ***Training & Teaching***
- ***Outreach***
- ***Final considerations***

"Our goals can only be reached through a vehicle of a plan, in which we must fervently believe and upon which we vigorously act. There is no other rout of success"
Pablo Picasso

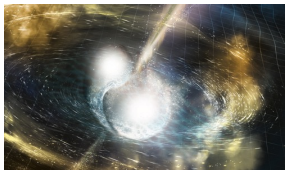
"The philosophies and religions of the planet Earth will come and go, but the ultimate questions will be always alive and relevant"
James Leonard Park



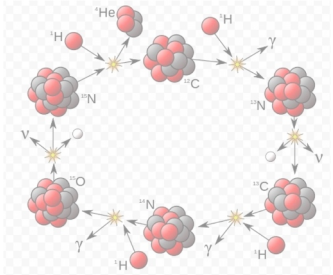
Big-Bang



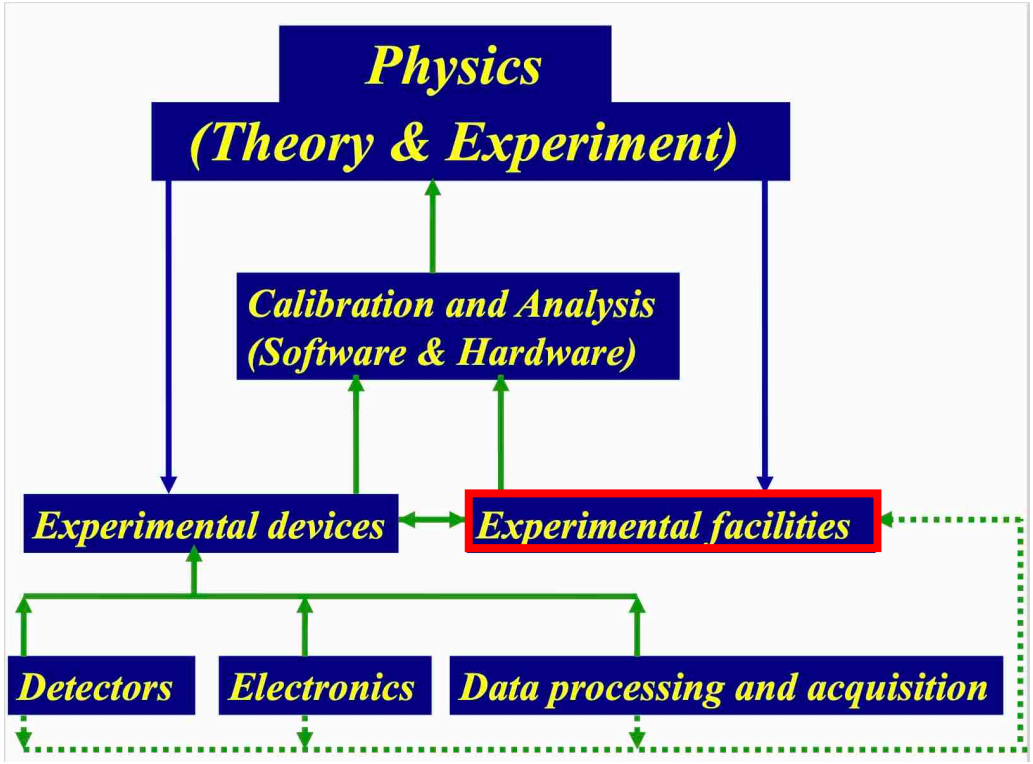
Neutron Stars



Nucleosynthesis



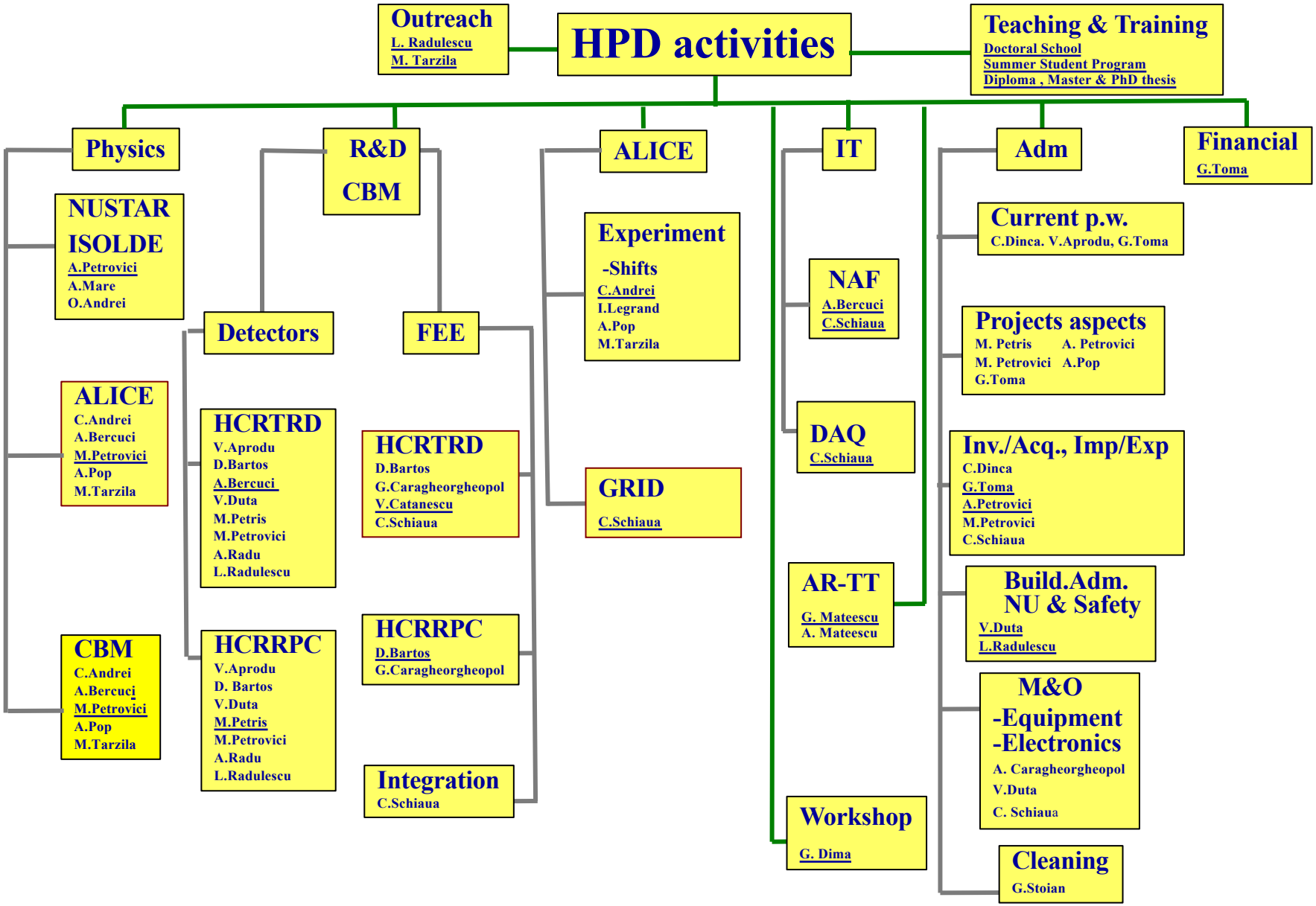
Hadron Physics Department strategy and present manpower



HPD Staff

3 - CS1
5 - CS2
1 - IDT1
2 - IDT2
2 - CS3
1 - CS
1 - Administrator IT
2 - Asistenti cercetare
1 - Fizician
3 - Ingineri
4 - Tehnicieni
1 - Frezor/Strungar
1 - Economist
1 - Ingrijitor

Organizational chart of Hadron Physics Department



2023 achievements

Nuclear Structure and Dynamics

Nuclear Physics **A504** (1989) 277–299
North-Holland, Amsterdam

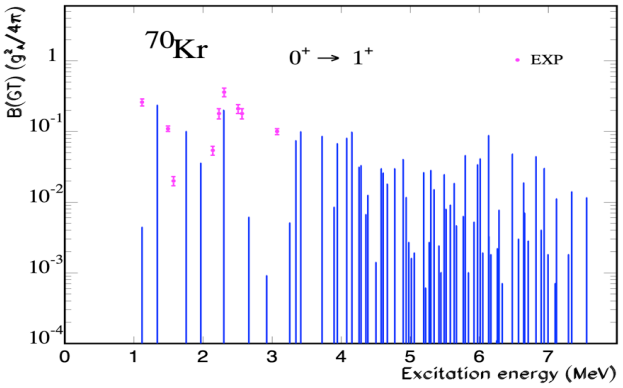
SHAPE COEXISTENCE AT HIGH SPINS IN THE NUCLEI ^{68}Ge AND ^{72}Se*

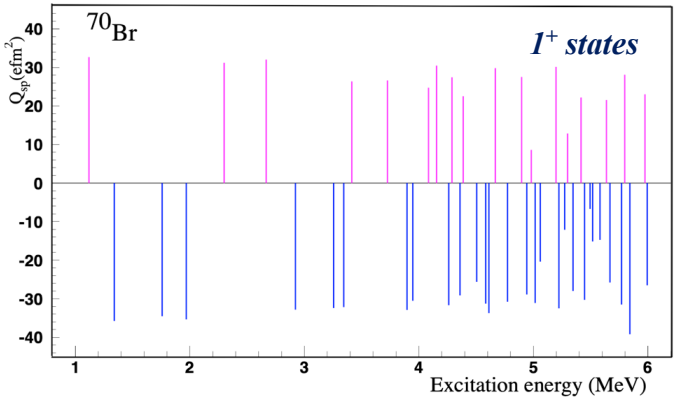
A. PETROVICI[1,2], K.W. SCHMID[2], F. GRÜMMER[3] and Amand FAESSLER[2]

[1] *Institute for Physics and Nuclear Engineering, Bucharest, Romania*
[2] *Institut für Theoretische Physik, Universität Tübingen, Fed. Rep. Germany*
[3] *Institut für Kernphysik, Kernforschungsanlage Jülich, Fed. Rep. Germany*

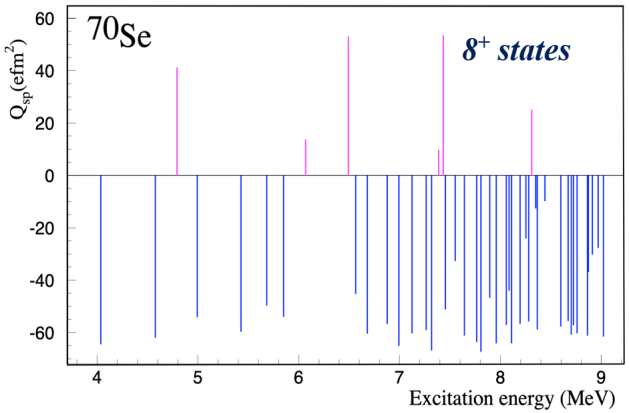
Multifaceted impact of shape coexistence in proton-rich and neutron-rich nuclei within the beyond-mean-field complex Excited Vampir model. Effects on structure, allowed and first-forbidden beta decay of nuclei with relevance for the nucleosynthesis and antineutrino anomaly.

^{70}Kr -> ^{70}Br (GT)

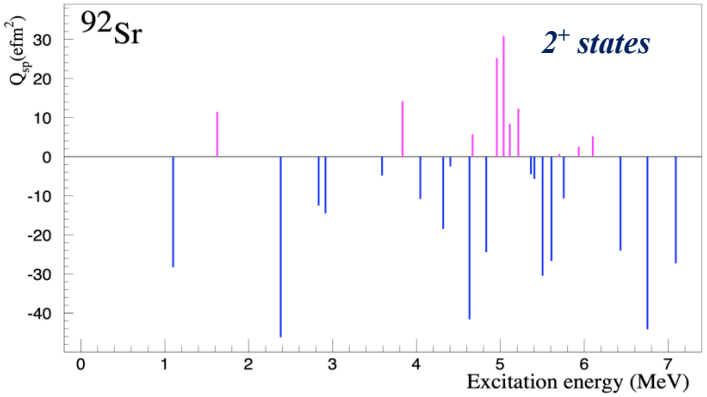




^{70}Br -> ^{70}Se (GT)



^{92}Rb -> ^{92}Sr (first-forbidden decay)



- ***2 papers submitted for publication***

- *3 talks at International Conferences*

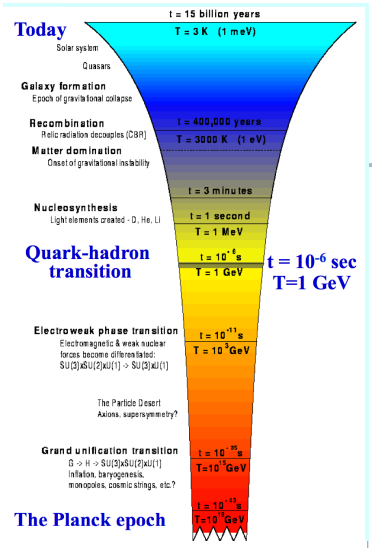
Carpathian Summer School of Physics, 2-15 July Sinaia

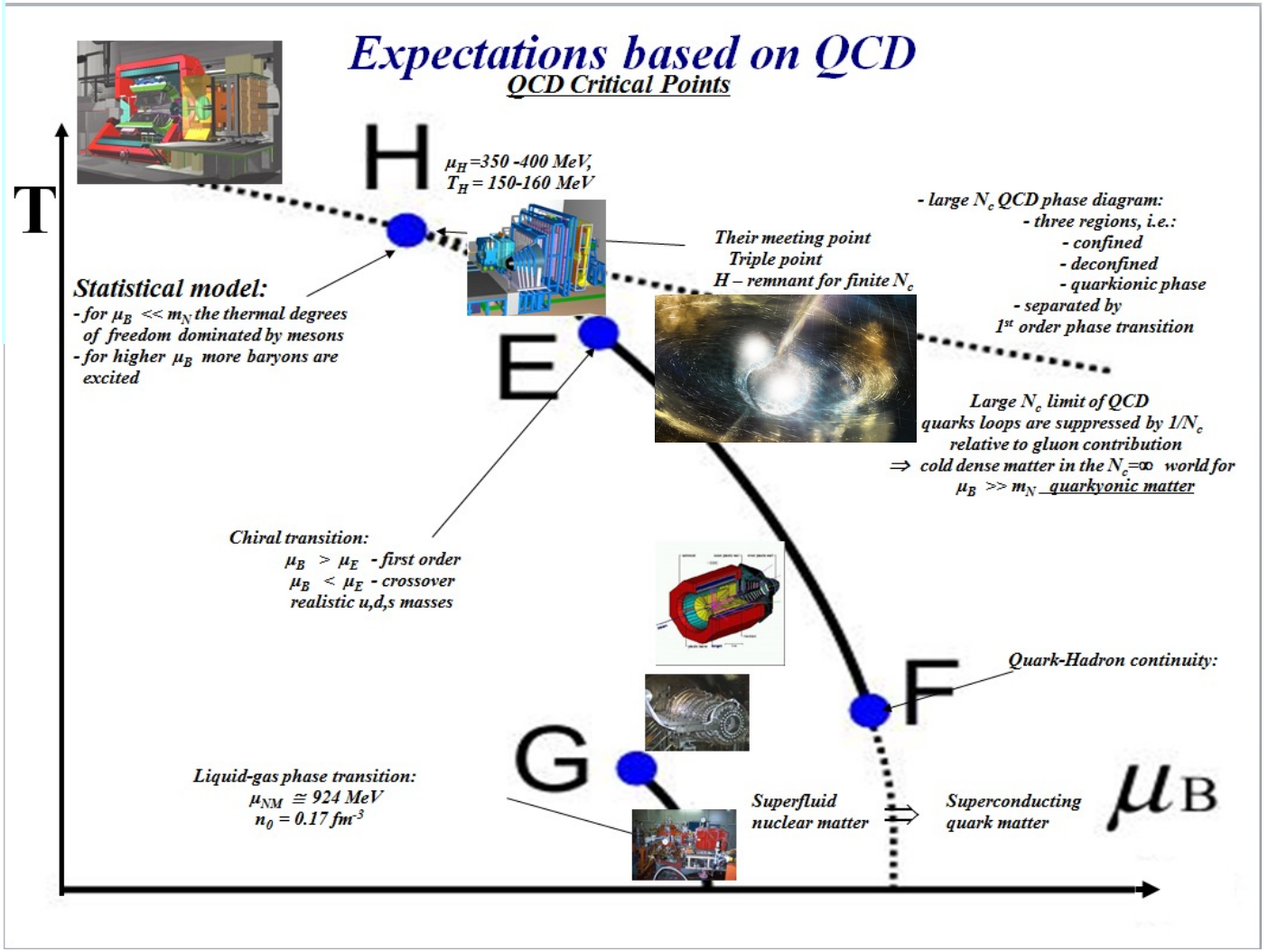
The 17th International Symposium on Capture Gamma-Ray Spectroscopy and Related Topics, CGS17 is the seventeenth in the CGS conference series. Minatec in Grenoble from 17 - 21 July 2023

The NUSTAR Week 2023, October 10-13, IFIN-HH, Magurele, Romania.

Strongly Interacting Matter

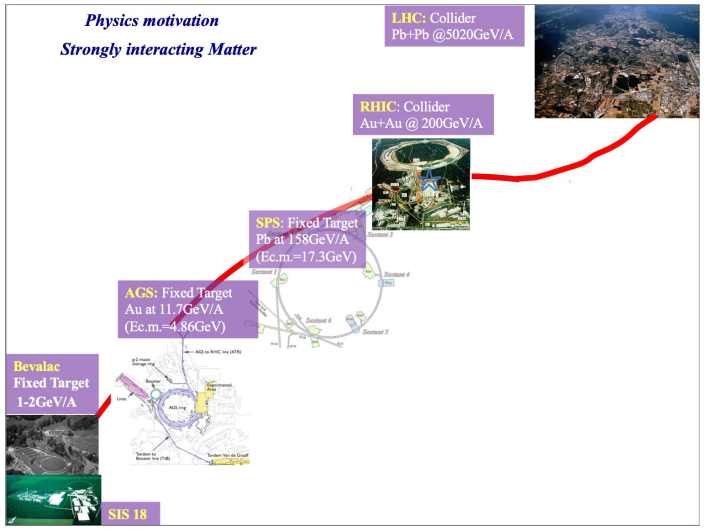
Motivation

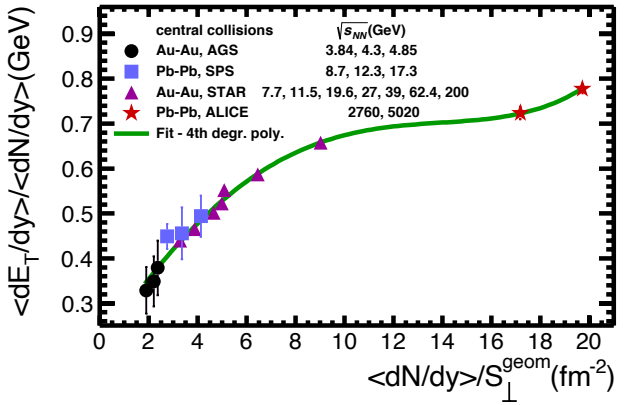

t = 15 billion years
Today
T = 3 K (1 meV)
Solar system
Quasars
Galaxy formation
Epoch of gravitational collapse
Recombination
Relic radiation decouples (CBR)
t = 400,000 years
T = 3000 K (1 eV)
Matter domination
Onset of gravitational instability
t = 3 minutes
Nucleosynthesis
Light elements created - D, He, Li
t = 1 second
T = 1 MeV
Quark-hadron transition
t = 10⁻⁶ sec
T=1 GeV
Electroweak phase transition
Electromagnetic & weak nuclear forces become differentiated: SU(3)xSU(2)xU(1) -> SU(3)xU(1)
The Particle Desert
Axions, supersymmetry?
Grand unification transition
G -> H -> SU(3)xSU(2)xU(1)
Inflation, baryogenesis, monopoles, cosmic strings, etc.?
The Planck epoch

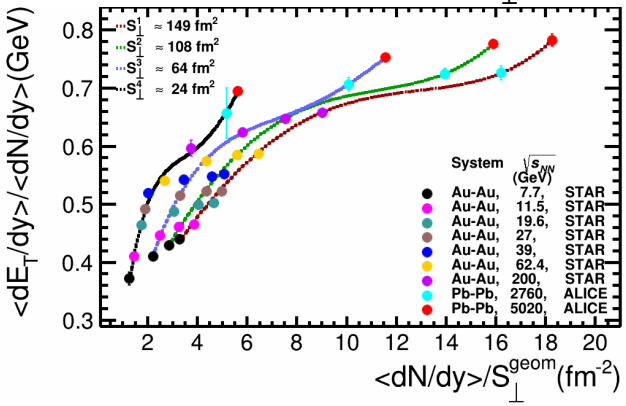

Expectations based on QCD
QCD Critical Points
T
H
μ_H=350 -400 MeV,
T_H = 150-160 MeV
Their meeting point
Triple point
H – remnant for finite N_c
- large N_c QCD phase diagram:
- three regions, i.e.:
- confined
- deconfined
- quarkionic phase
- separated by
1st order phase transition
Statistical model:
- for μ_B << m_N the thermal degrees of freedom dominated by mesons
- for higher μ_B more baryons are excited
E
Large N_c limit of QCD
quarks loops are suppressed by $1/N_c$
relative to gluon contribution
⇒ cold dense matter in the N_c=∞ world for
μ_B >> m_N quarkyonic matter
Chiral transition:
μ_B > μ_E - first order
μ_B < μ_E - crossover
realistic u,d,s masses
Quark-Hadron continuity:
F
G
Liquid-gas phase transition:
μ_{NM} ≅ 924 MeV
n_0 = 0.17 fm^{-3}
Superfluid nuclear matter
Superconducting quark matter
μ_B

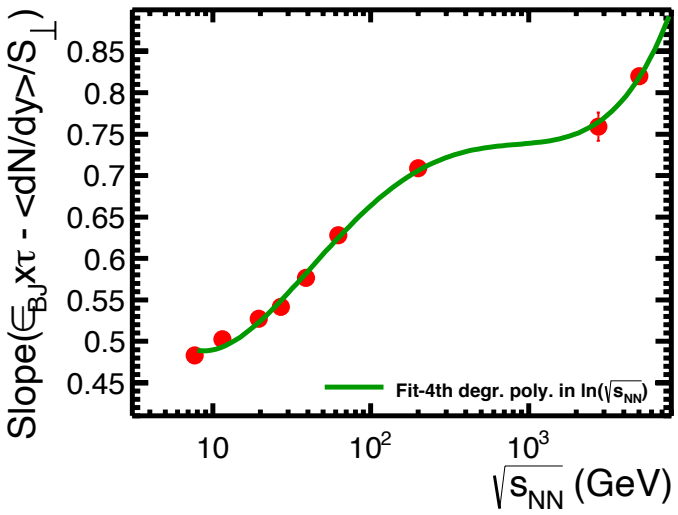
Features of hadronic and deconfined matter from AGS to LHC energies

M.Petrovici and A.Pop, Phys.Rev. C107(2023)034913



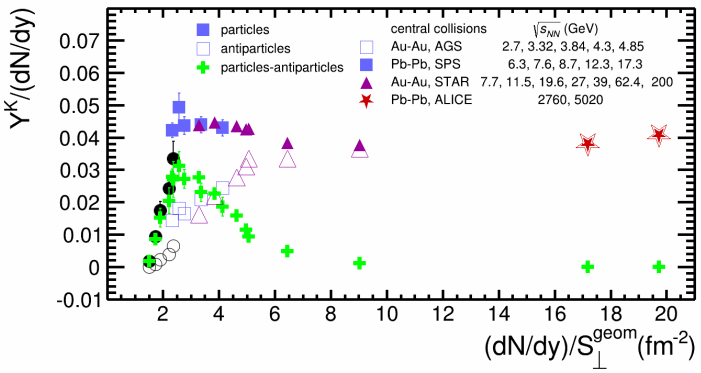


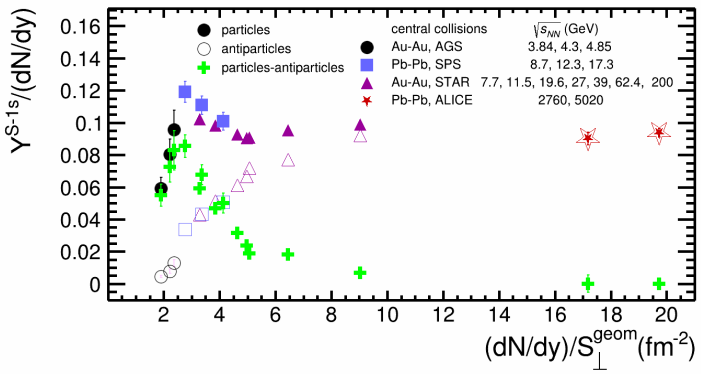


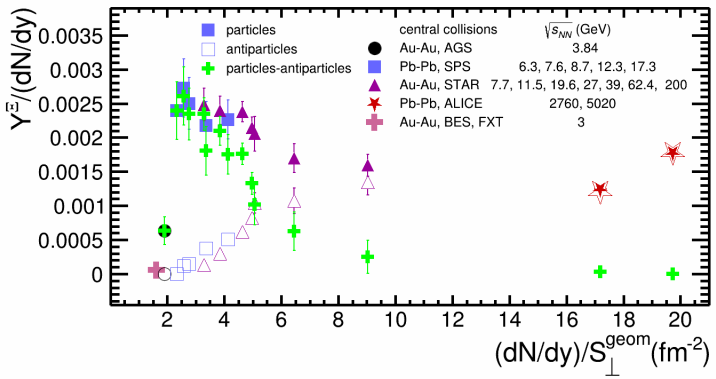


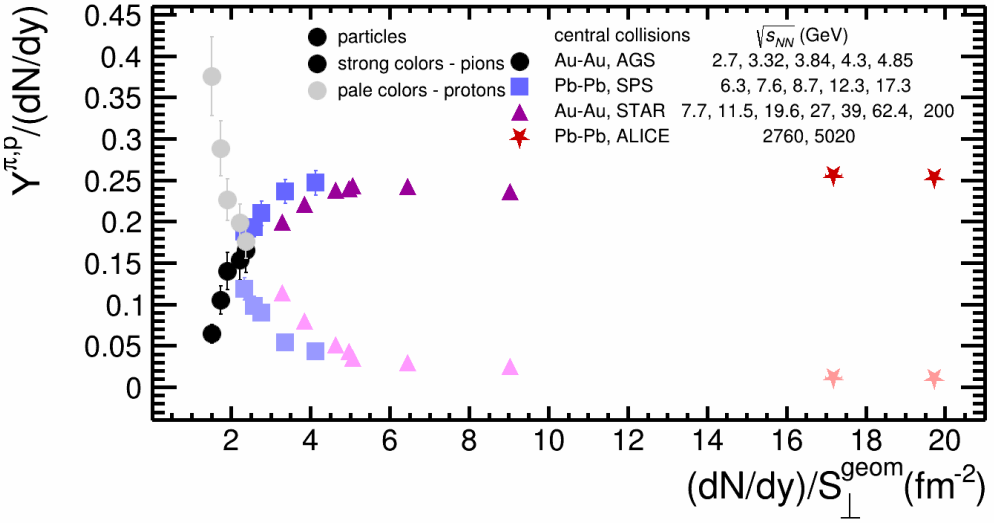
Features of strangeness production in pp and heavy ion collisions

- paper draft close to be finalized

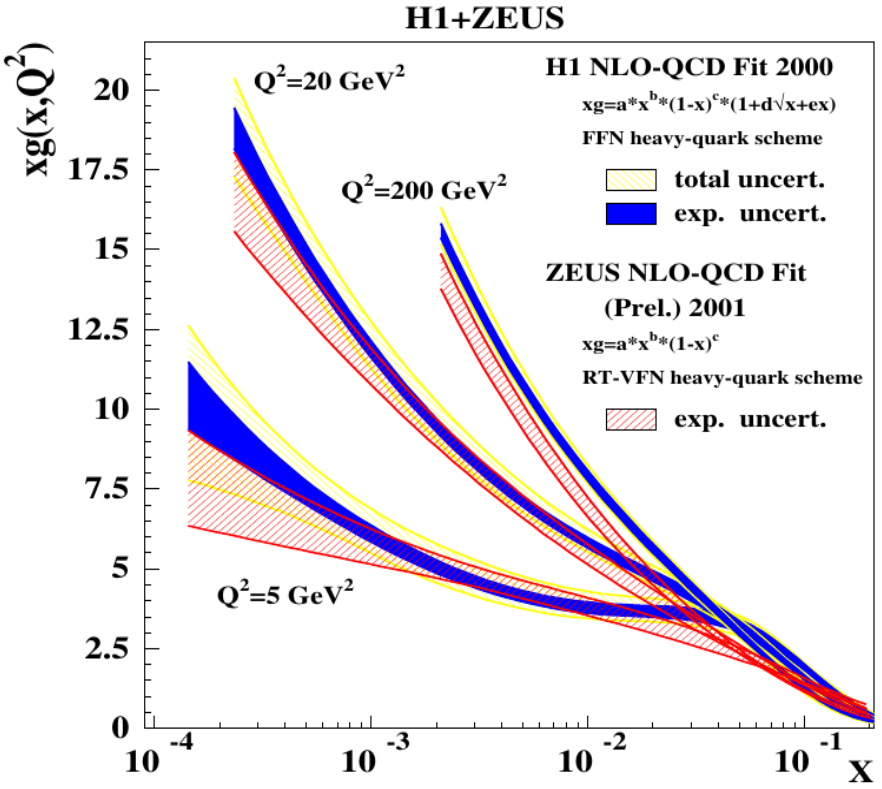




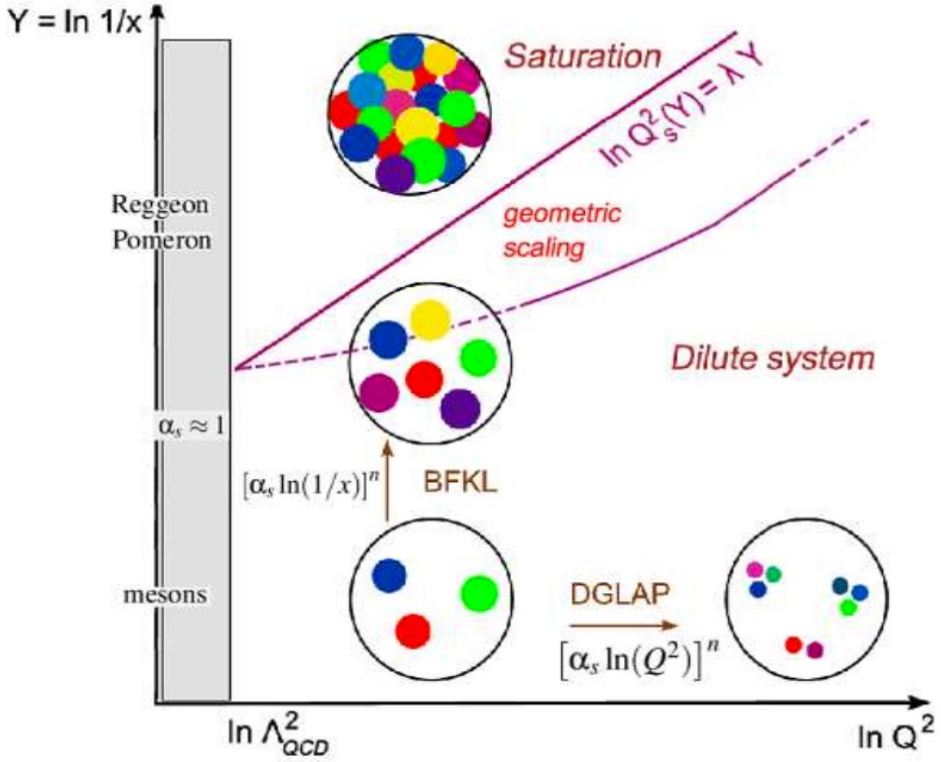




Physics motivation



M.Dittmar et al., Proceedings HERA-LHC Workshop
arXiv:[hep-ph]0511119



D. d'Enterria, Eur.Phys.J. A31(2007)816

Following A.H. Mueller approximations NP A715(2003)20

System	*Au-Au*	*Pb-Pb*	*Pb-Pb*	*pp*
$\sqrt{s}(GeV)$	*200*	*2700*	*5020*	*7000*
$\frac{dN_g^{in}}{dyd^2b}(fm^{-2})$	≈4.7	≈11.8	≈15.9	≈18.7
f_{in}^g	≈0.9	≈2.3	≈3.1	≈3.6

Two charged particle correlations in pp collisions at 13 TeV

charged particles multiplicity and sphericity dependence

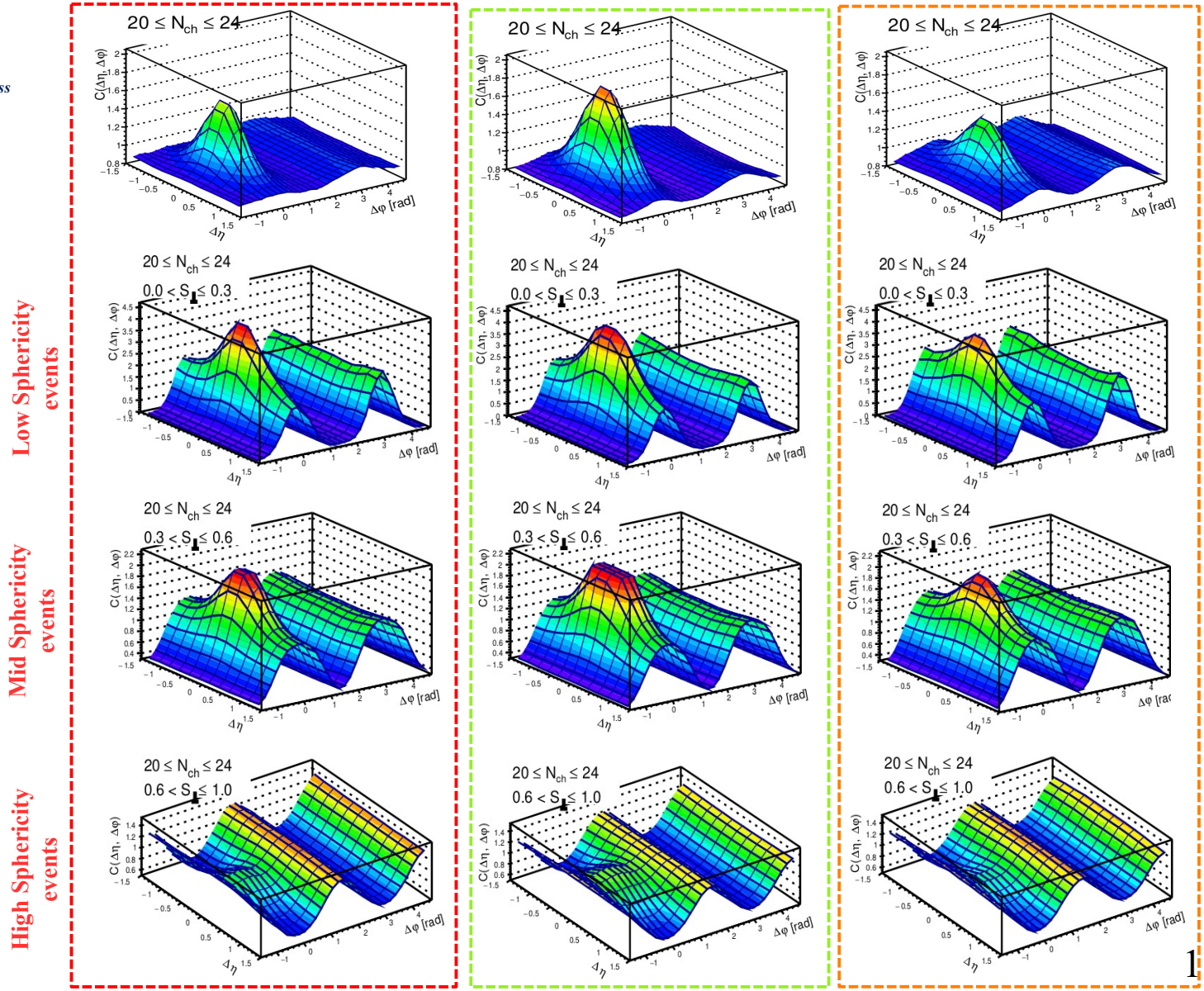
1 GeV/c <p_T^{trig}=$p_T^{leading}$<2 GeV/c,
1 GeV/c<p_T^{ass}<2 GeV/c, $p_T^{trig} > p_T^{ass}$

N_{ch}^{mult} for |η|<0.8;
p_T spectra in |η|<0.5

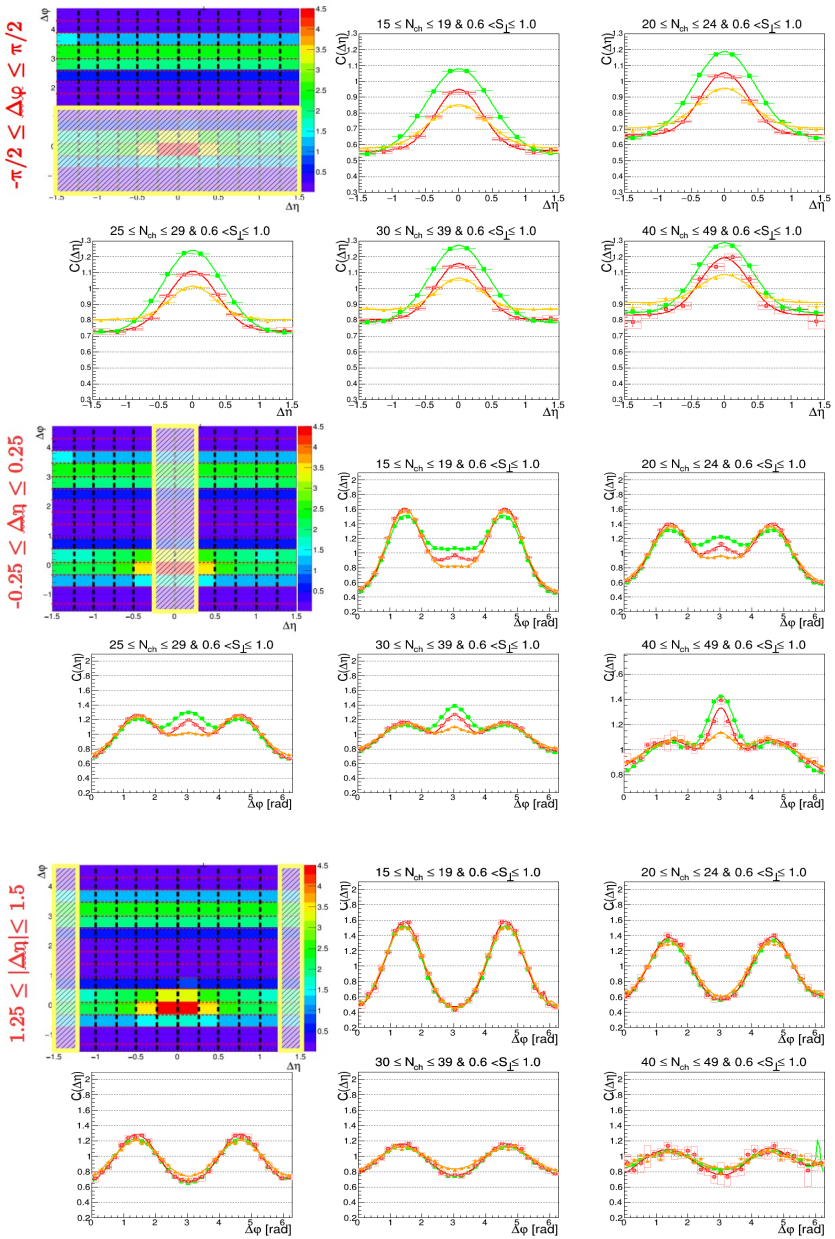
Corrected ALICE data

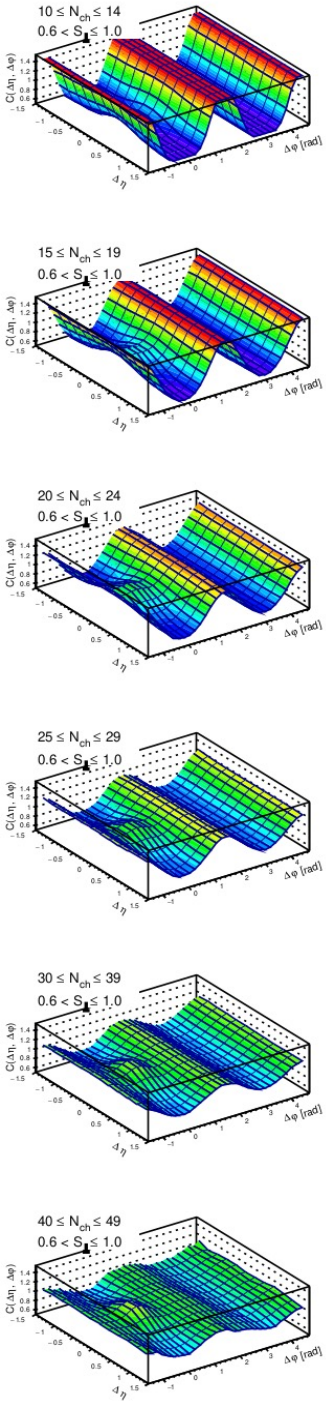
PYTHIA generated

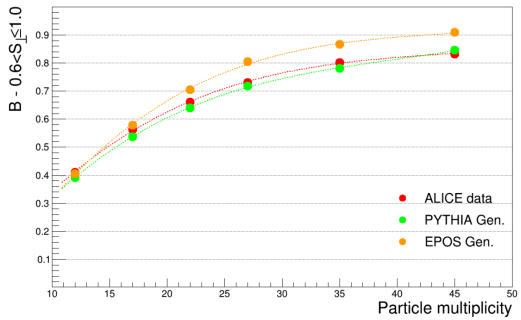
EPOS generated

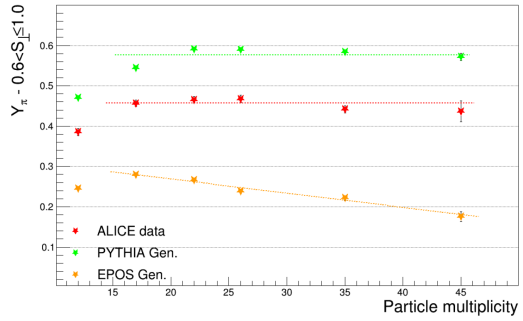


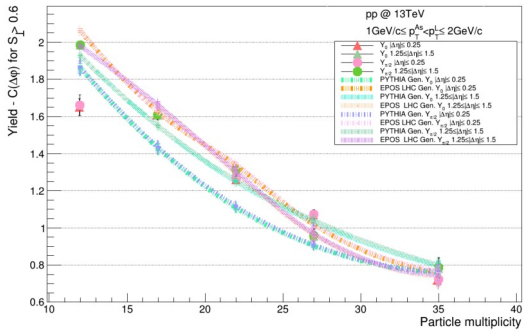
High Sphericity events – MC comparison

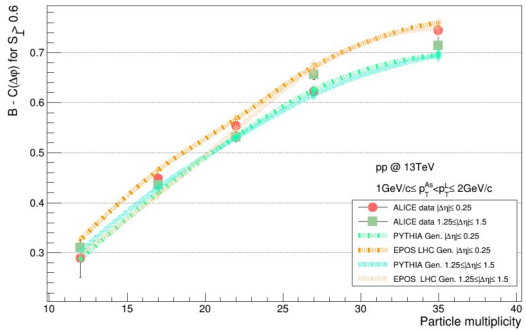




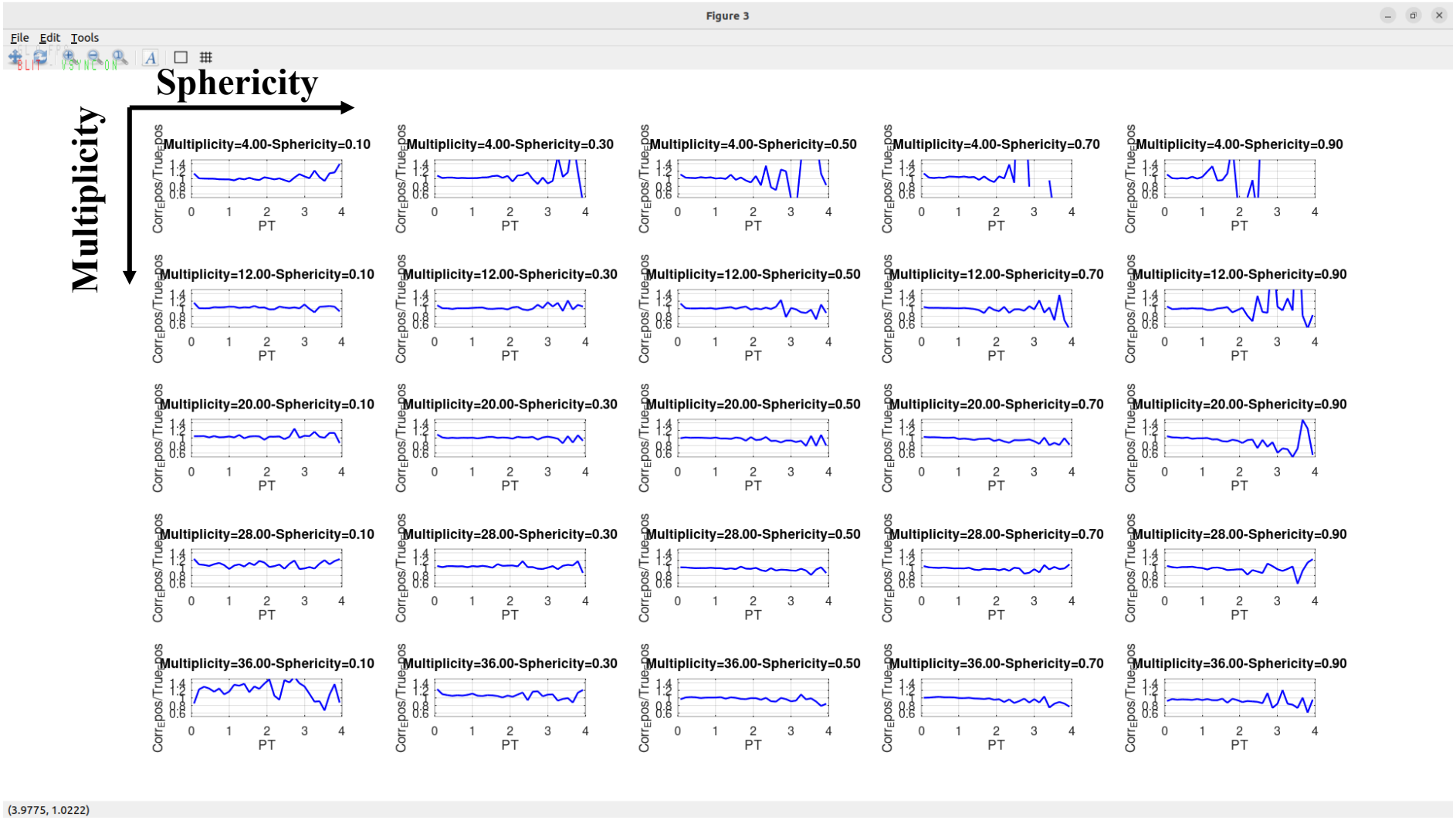






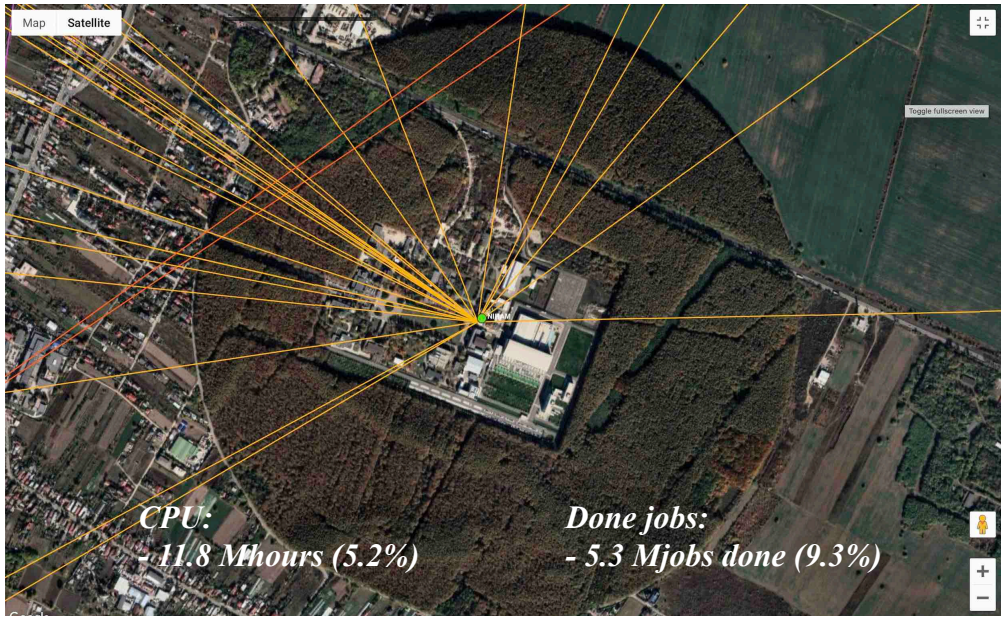


Charged particle p_T spectra - multiplicity & event shape dependence in pp collisions at 13 TeV (closure test)



NIHAM Data Centre

Contribution to ALICE GRID



- *NIHAM Data Centre continued to be one of the most efficient among Tier2s ALICE GRID centre.*
- *NIHAM Data Centre is consider to join the analysis data centers.*
- *Several maintenance and upgrade activities were done in order to keep its performance at the highest standards.*

Run coordinator presentation

Experimental measurements with the ALICE detector:

- *39 (79 %) Run manager (1 block)*
- *shifts at the ALICE Experiment: SL (5 blocks) and DCS (1 block)*
- *Activities of general interest for the ALICE experiment: "service work": 0.5 (FLP) + 0.167 (Run Manager).*

ALICE-TPC Upgrade Party

Talks, papers, conferences, reviews

- ***What is really new at LHC energies***
  M. Petrovici, C.Andrei, A.Herghelegiu, A.Lindner, A.Pop and M.Tarzila
  World Quantum Day, April 27, 2023, IFIN-HH

- ***What is really new at LHC energies***
  M. Petrovici, C. Andrei, A. Herghelegiu, A. Lindner, A. Pop, M. Tarzila, V. Topor Pop
  Invited talk at Carpathian Summer School of Physics, July 2-15, 2023, Sinaia https://indico.nipne.ro/event/230/sessions/43/#20230711

- ***A short journey through heavy ion physics, Experimental results vs. Expectations based on theory***
  M. Petrovici
  Invited lecture at the CBM Juniors' day, September 24, 2023 https://indico.gsi.de/event/18056/

- ***ALICE upgrades during the LHC Long Shutdown, ALICE Collaboration, arXiv:2302.01238[physics.ins-det]***

- ***ALICE 3: potential Romanian contribution(s) M. Petrovici (IFIN-HH), A. Dobrin (ISS)***
  ALICE Upgrade Week May 8th, 2023
  https://indico.cern.ch/event/1267757/contributions/539373/attachments/2644 436/4577095/auw_100523.pdf

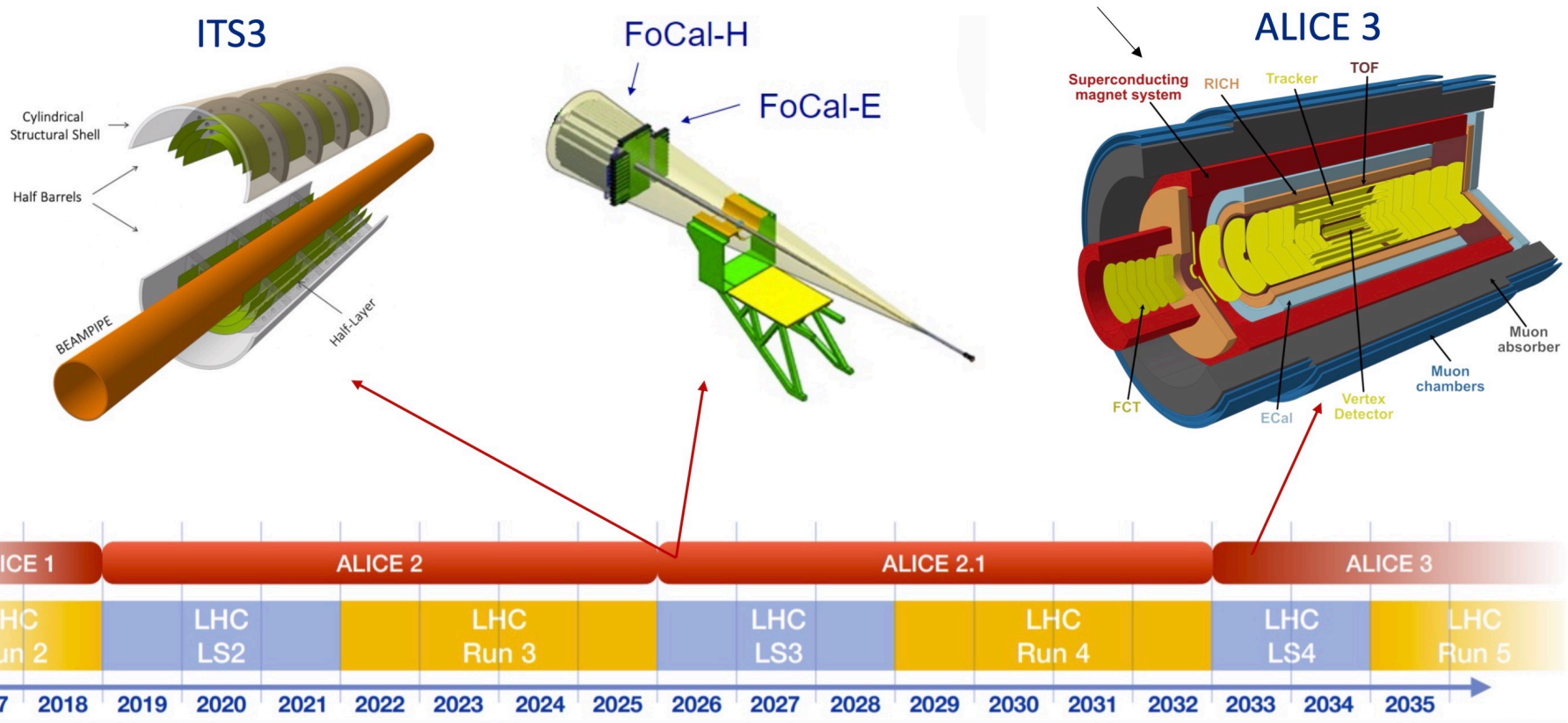
- ***Co-authors to 57 ALICE published papers***

- ***Contribution to 14 conference presentations on behalf of ALICE Collaboration***

- ***2 institutional reviews for 2 ALICE papers were done***

- ***Review committee members for 3 Analysis Notes***

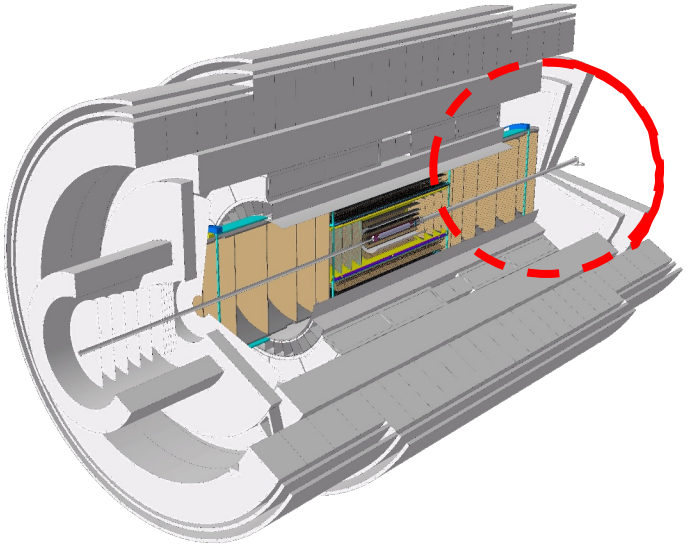
ALICE future



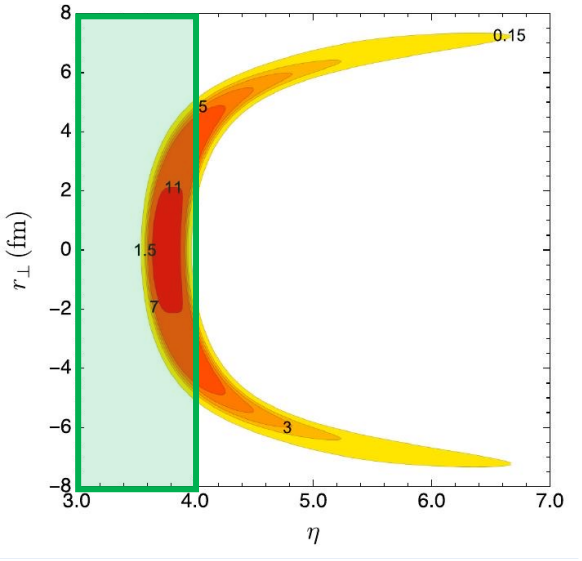
Our proposal (in collaboration with ISS)

Large Baryon densities outside the central rapidity region

Forward rapidity tracker and ToF

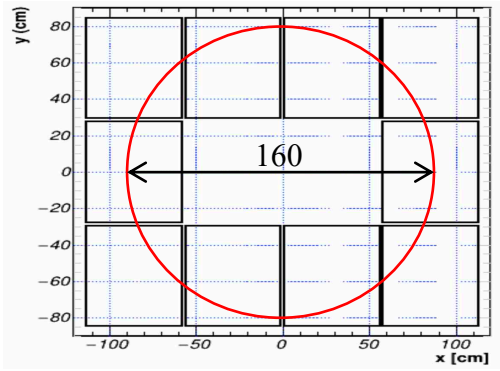


Pb-Pb at $\sqrt{s_{NN}} = 2.76$ TeV

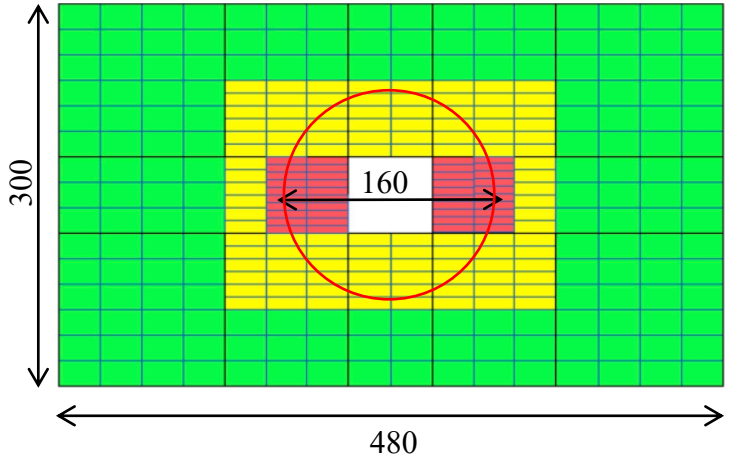


M. Li and I. Kapusta, PHYS.REV. C99(2019)014906

Inner zone of CBM-TRD based on MWPC-2D



Inner zone of CBM-ToF based on MSMGRPCs



Fondazione Bruno Kessler
Custom Silicon Photomultipliers

Detector-grade clean-room, 6 inches, class 10 and 100

Silicon Photomultipliers account for a significant portion of the detectors fabricated here.

Private Research Foundation

- ~400 researchers in different fields, ranging from Microelectronics to Information Technology
- 50% funding from local government
- 50% self-funding rate
  - 25% from publicly funded research
  - 25% from collaboration with companies

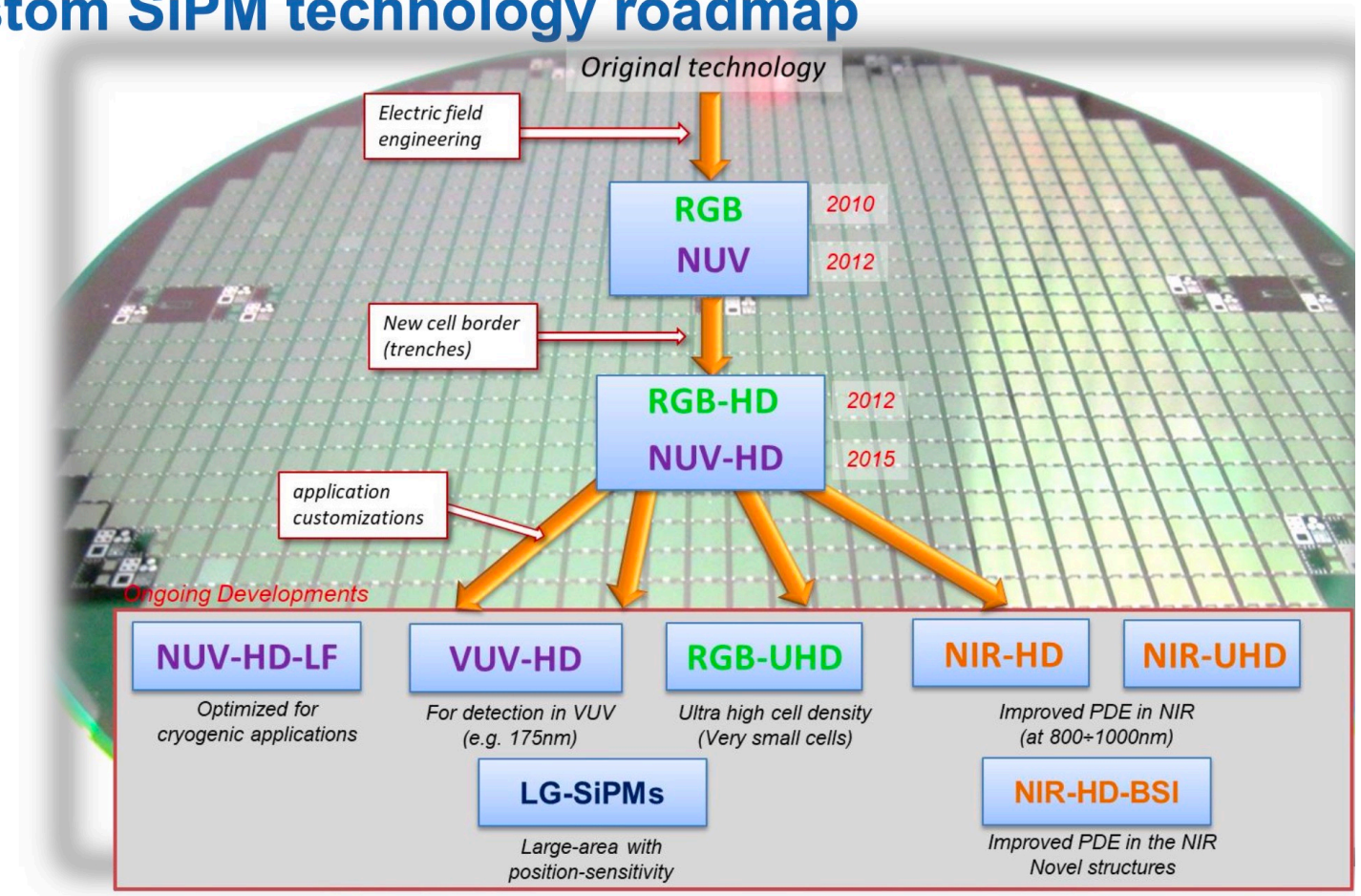
FBK is typically interested in R&D activities and collaborations to improve and customize SiPM technology for specific applications.

Large area productions can be carried out in FBK (up to ~5 sqm) or relying on external partners (low cost): success stories of technology transfers.

LFOUNDRY
Solutions for great visions

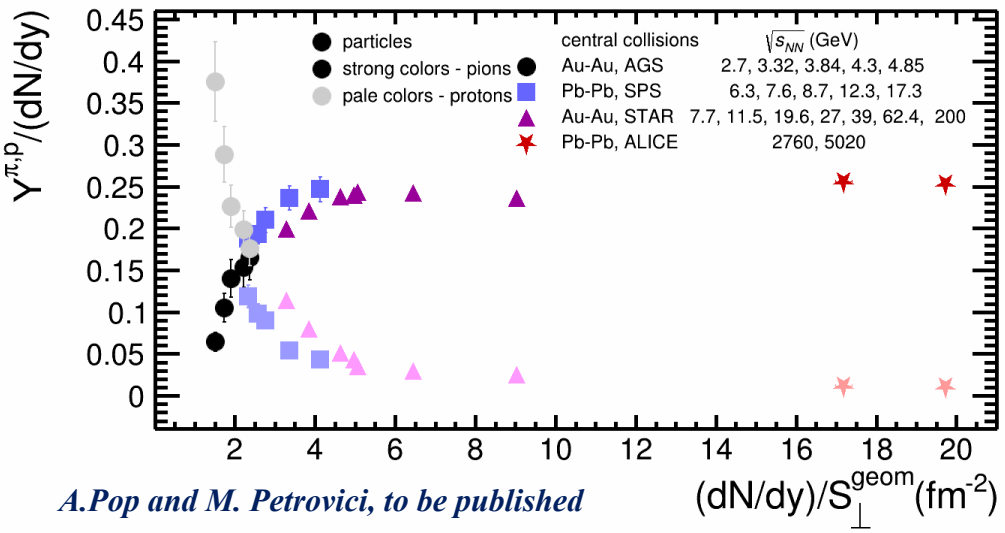
BROADCOM

Fondazione Bruno Kessler
Custom SiPM technology roadmap



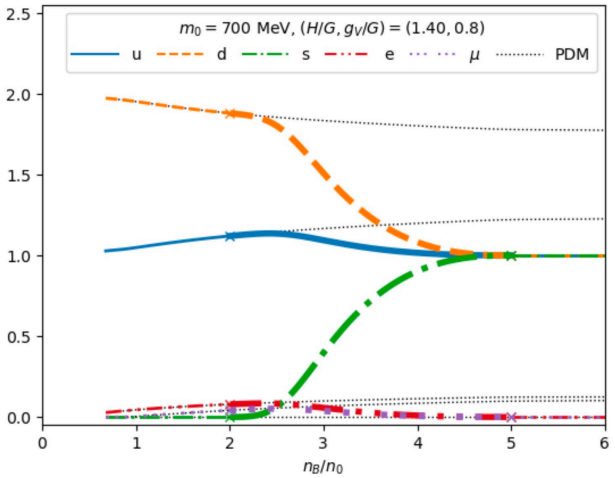
R&D Activities
&
Steps towards construction & tests
of
CBM ToF & TRD subdetectors
for
CBM Experiment @ FAIR

Why CBM Experiment @ FAIR (SIS100)

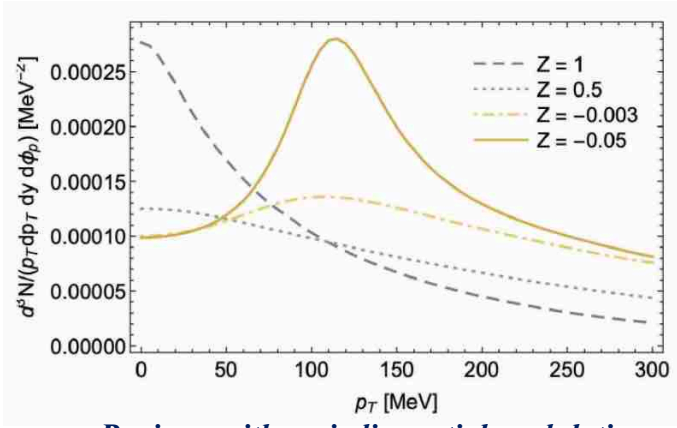


A.Pop and M. Petrovici, to be published

Matter composition n_f/n_B ($f = u, d, s$) and n_l/n_B as functions of the baryon density.

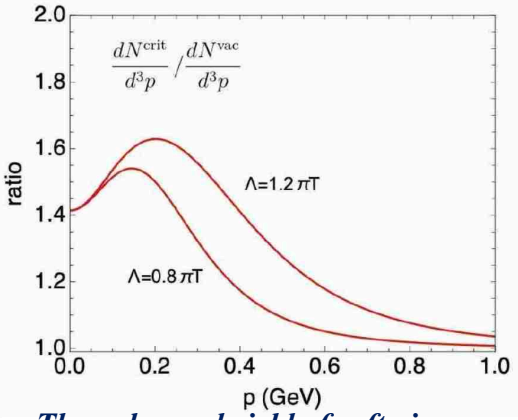


M.Takuya et al, Symmetry, March 17, 2023



Regimes with periodic spatial modulations can occur at high μ_B

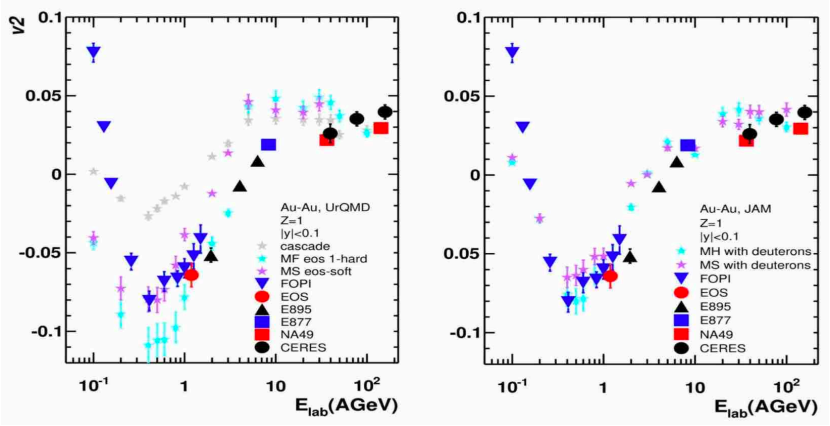
R.D. Pisarski and F. Rennecke, Phys.Rev.Lett. 127(2021)152302



The enhanced yield of soft pions near the chiral critical point

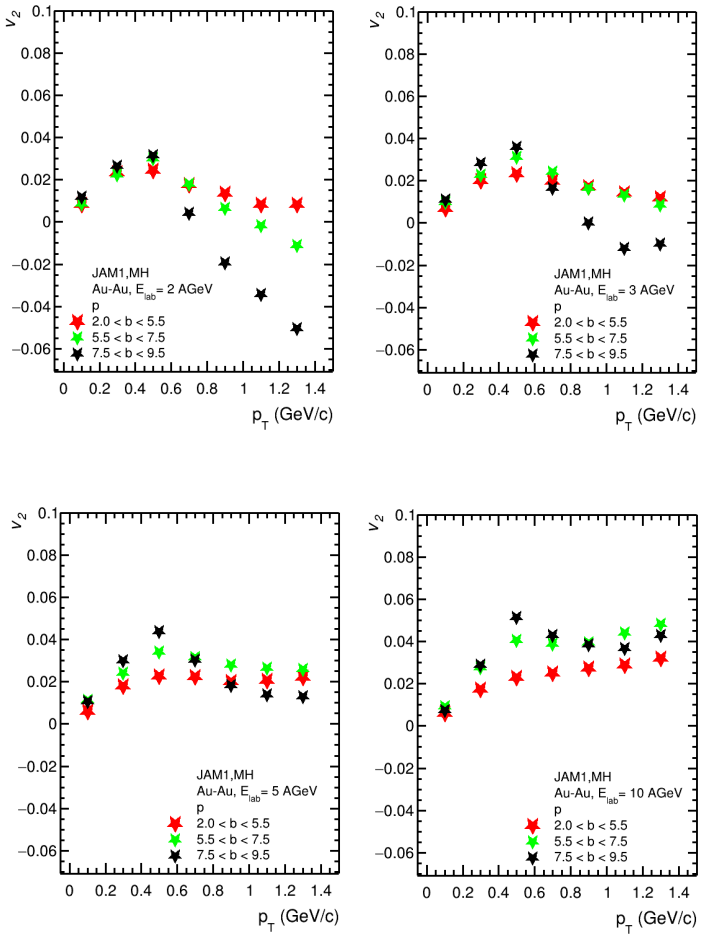
E.Grossi et al., arXiv:2101.10847[nucl-th]

Why CBM Experiment @ FAIR (SIS100)

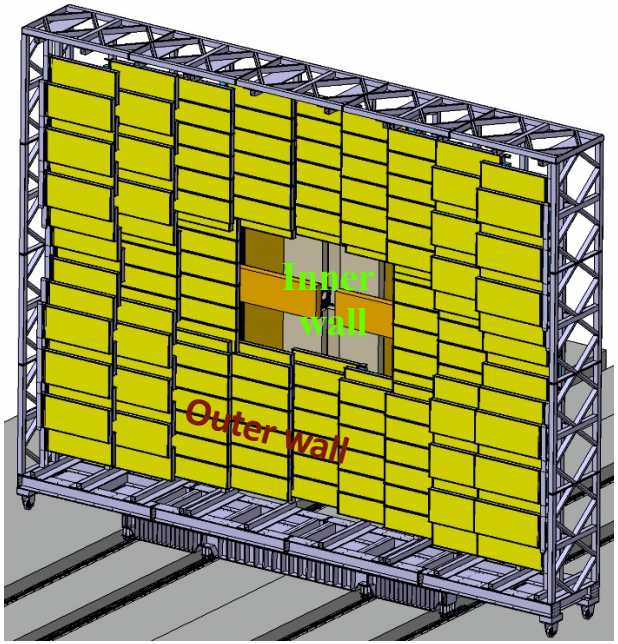


Elliptic flow v2, for Z=1 particles as a function of collision energy

v_2 - collision energy, centrality and p_T dependence

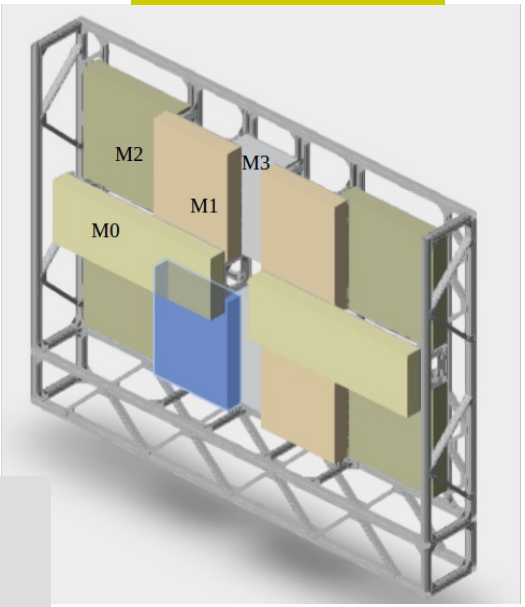


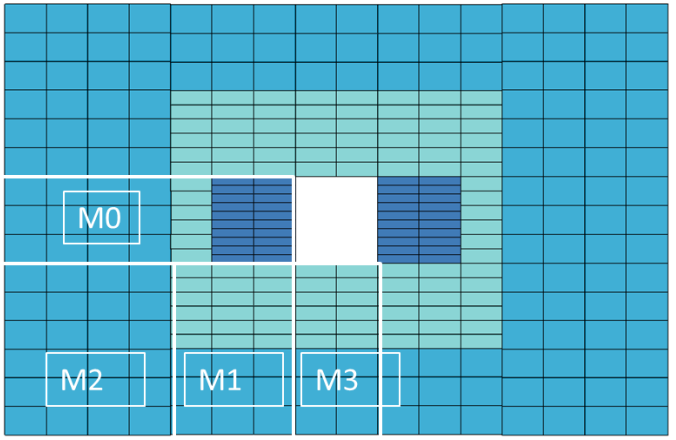
CBM – TOF inner wall

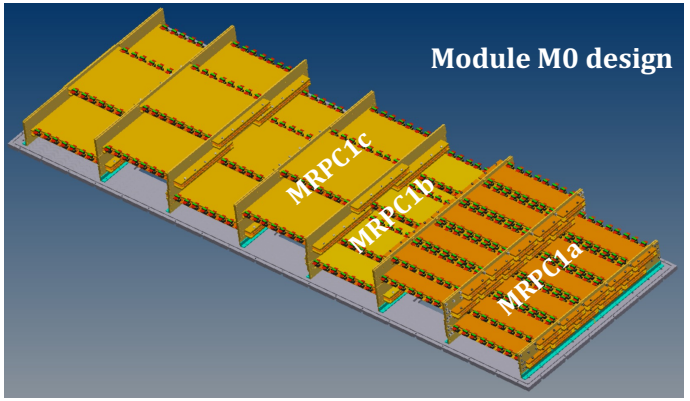


CBM – TOF Technical Design Report, October 2014

CBM-TOF inner wall
- ~15 m² area
  - 12 modules
  - 4 types







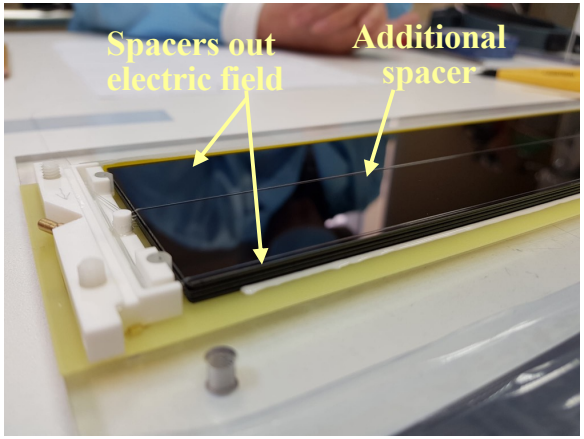
CBM-ToF Requirements

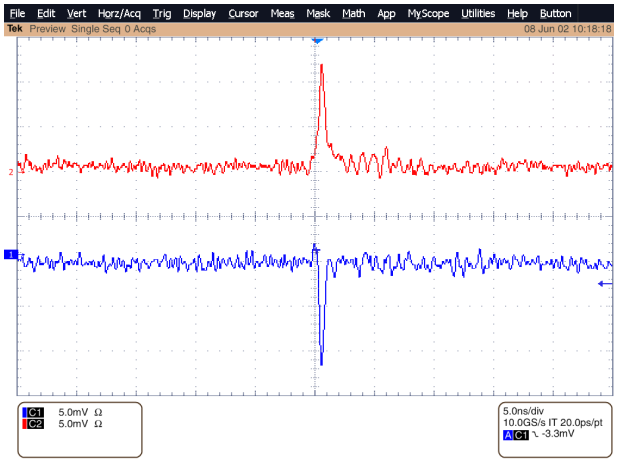
- Full system time resolution $\sigma_T \sim 80$ ps
- Efficiency > 95%
- Rate capability ≃ 50 kHz/cm²
- Polar angular range 2.5° – 25°
- Active area of 120 m²
- Occupancy < 5%
- Low power electronics (~120.000 channels)
- Free streaming data acquisition

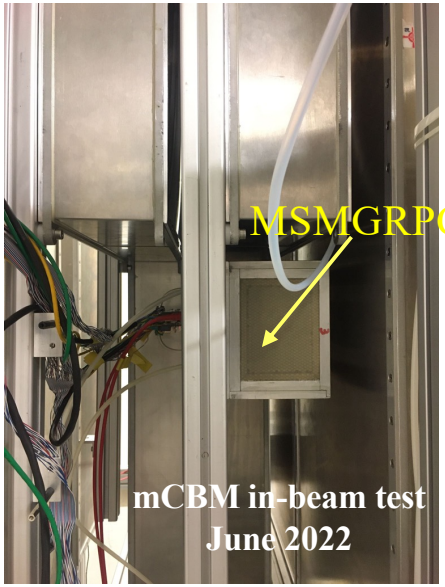
Our R&D activity → MSMGRPCs for the inner wall

:	MRPC1c (196 mm)	MRPC1b (96 mm)	MRPC1a (56 mm)	Total
No. RPCs	168	108	40	316
No. channels	10752	6912	2560	20,224

Prototype with a directed flow – 100% gas transmission



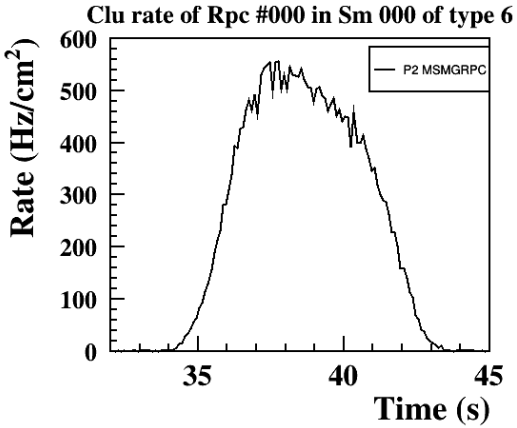


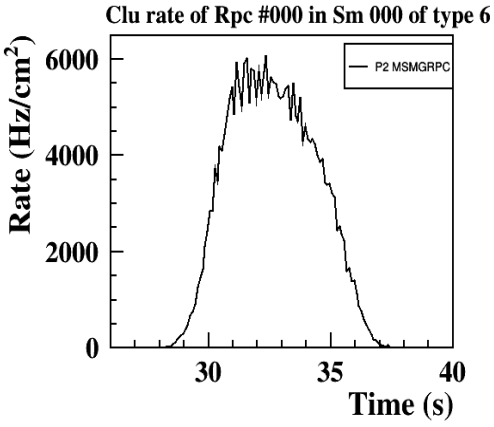


Dark current up to 2 x 6.4 kV
before HR test < 10 nA
after HR test <10 nA

Negligible dark counting rate after HR test

Data analysis in progress





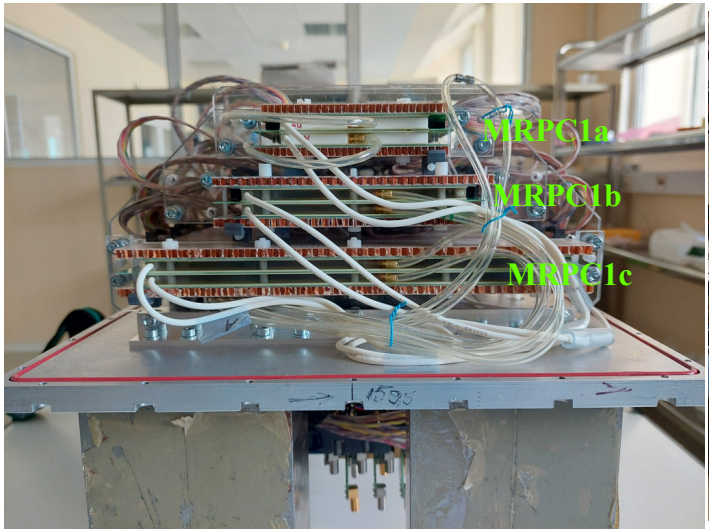
Au(65+) + Au at 1.13 AGeV, 2.5mm Au target/0.4mm/4mm Ni target

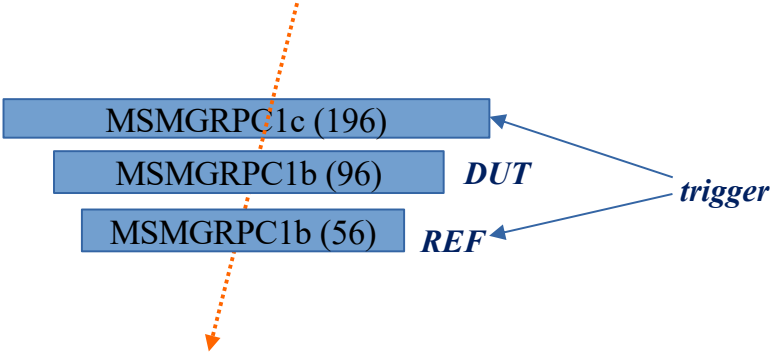
Rate scan (HR) -> intensity per spill: 1x10^7, 3x10^7, 1x10^8, 3x to 4x10^8

Exposure to the highest delivered counting rate for ~8 hours

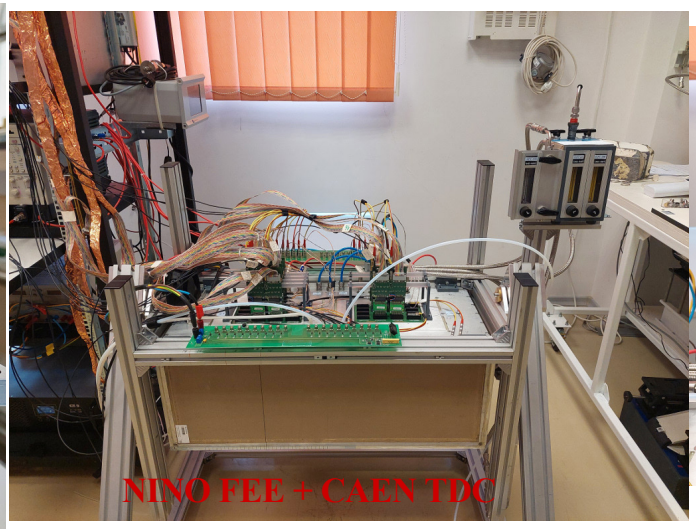
Cosmic - ray tests of the direct flow prototypes

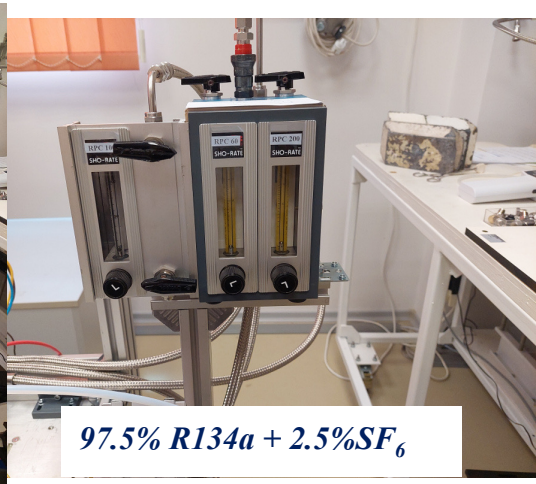
Direct flow MSMGRPC stack

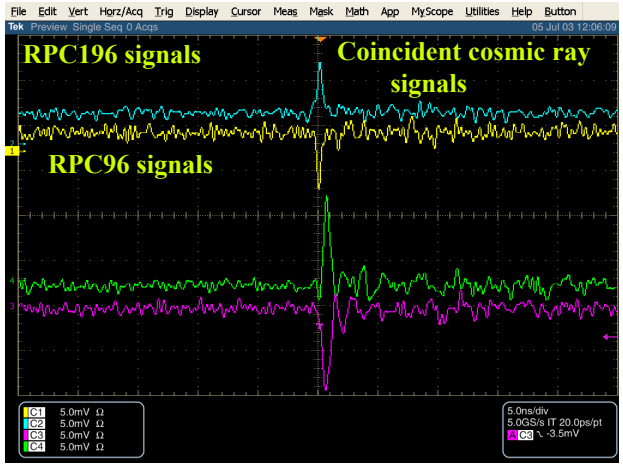


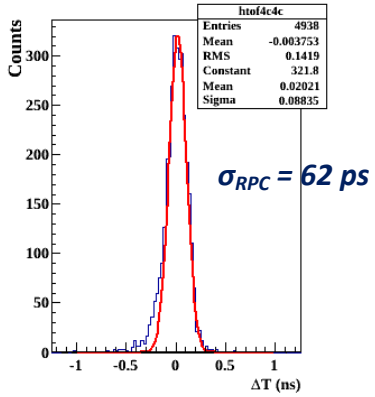


Experimental setup for cosmic rays test







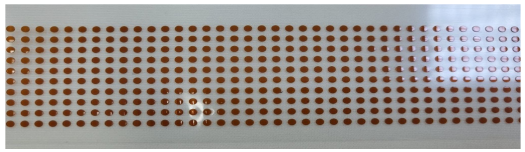


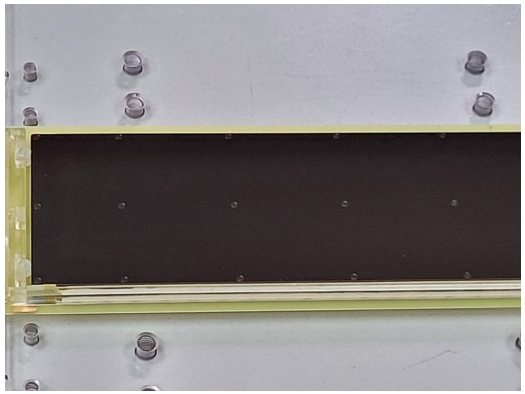
Efficiency = 94.8%

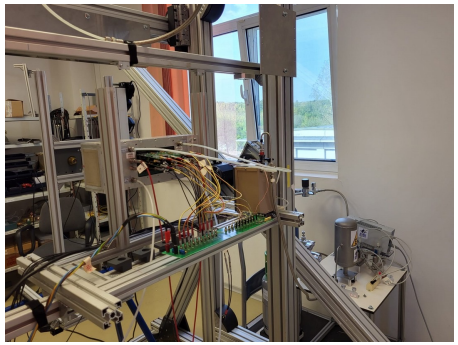
Cosmic - ray tests of the direct flow prototypes

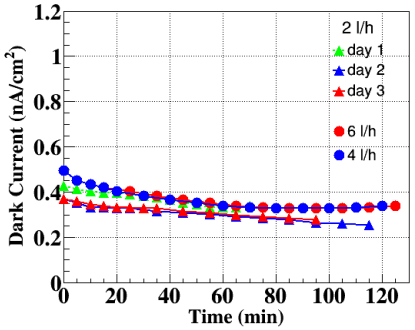
Home made rectangular discrete spacers
2 mm x 2 mm, 200 µm thickness

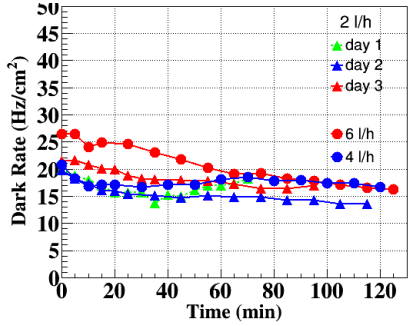
Disk geometry discrete spacers
ϕ=2 mm, 170 µm thickness

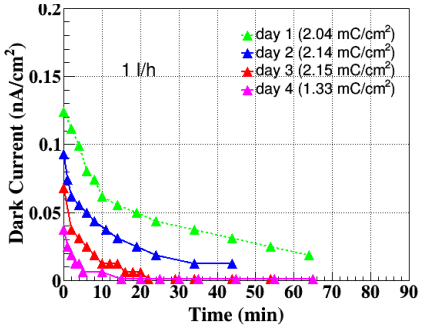


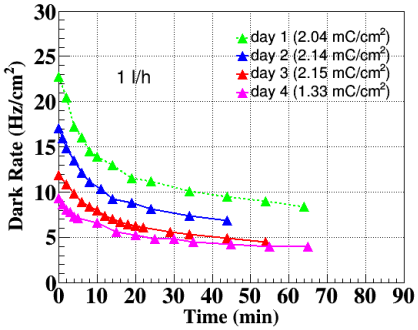








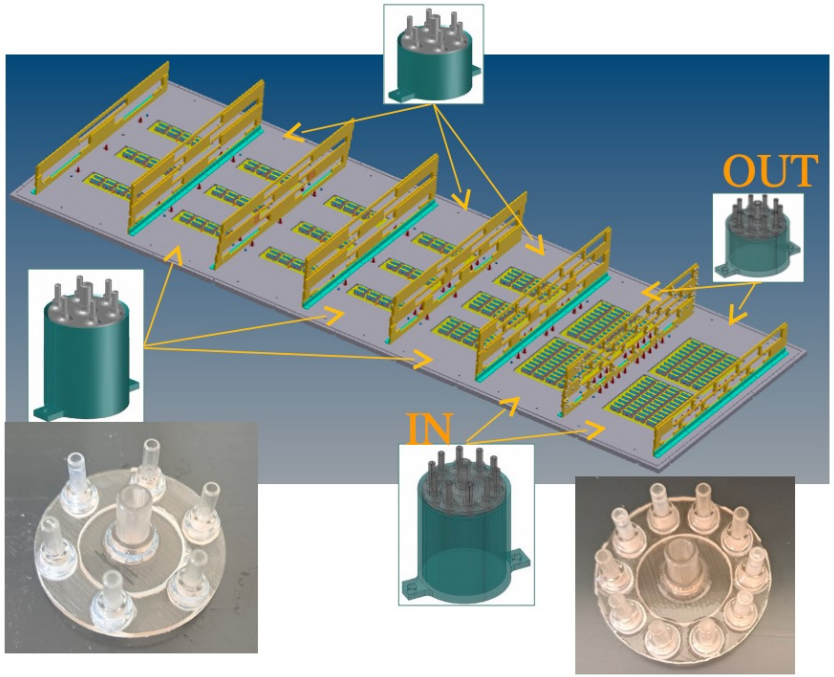




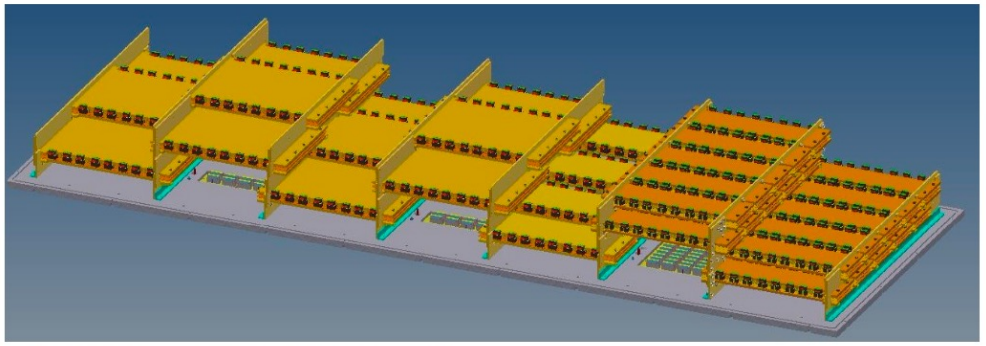
Installed & waiting for beam @ mCBM

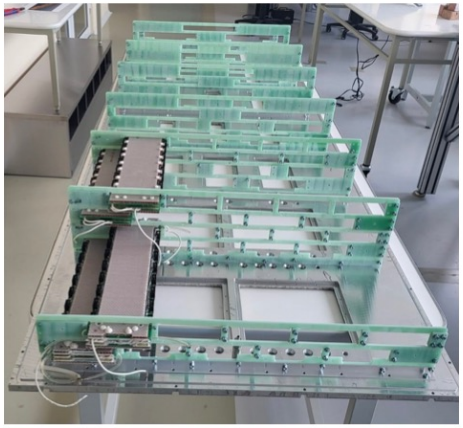
CBM – TOF inner wall

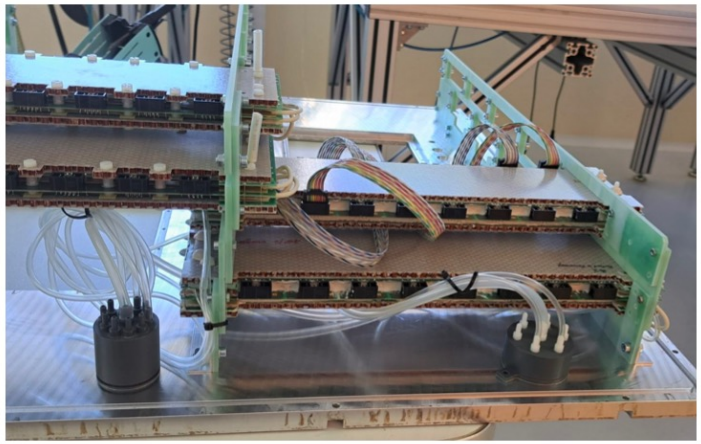
M0 structure and components

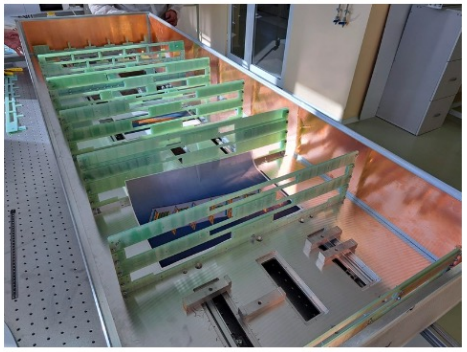


Six/ten gas pipes distributors printed 3D









➢ *Papers*

1. M. Petris et al., High time resolution, two-dimensional position sensitive MSMGRPC for high energy physics experiments, Nucl. Instrum. Meth. A, 1045, (2023), 167621

2. V. Aprodu et al.,Aging suppression, high time resolution and 2D-position sensitive Multi-Strip Multi-Gap Resistive Plate Counter for high rate experiments, Nucl. Instrum. Meth. A, 1049 (2023), 168098

➢ *Conferences*

1. M.Petris et al., Aging suppression timing Multi-Strip Multi-Gap Resistive Plate Counter for high counting rate experiments, 3 International Aging Conference on Detector Stability and Aging Phenomena in Gaseous Detectors, 6 – 10 November 2023, CERN, Geneva.

➢ *Contributions at CBM Progress Reports*

CBM Progress Report 2022 (2023):https://dx.doi.org/10.15120/GSI-2023-00384

1. M. Petris et al., In-beam test in the mCBM setup of the high time resolution and 2D-position sensitive MSMGRPC for high rate experiments, pg. 125

2. V. Aprodu et al., Aging suppression for high time resolution and 2D-position sensitive Multi-Strip Multi-Gap Resistive Plate Counter in high irradiation dose, pg. 123

➢ *Presentations at CBM Collaboration meeting*

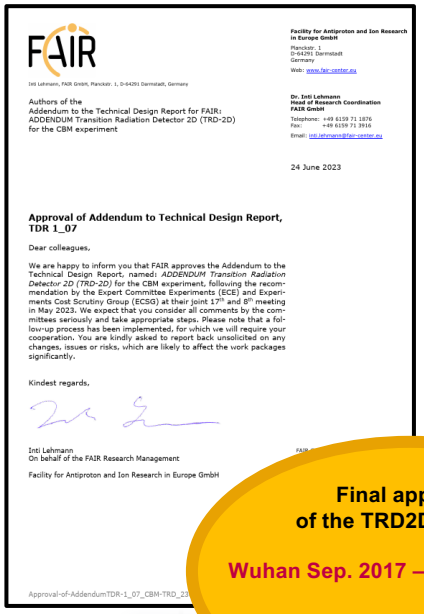
1. M. Petris et al.,
Status and plans for the CBM-TOF inner wall
41st CBM Collaboration Meeting, 6 – 10 March 2023, Darmstadt, Germany.

2. D. Dorobantu et al.
Latest results on aging studies of MSMGRPC for the inner zone of the CBM – TOF
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

3. M. Petris et al.
In-house tests of the direct gas flow prototypes for the CBM-TOF inner wall
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

4. L. Radulescu et al.
Status of the M0 module construction
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

TRD-2D – first results



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Authors of the
Addendum to the Technical Design Report for FAIR:
ADDENDUM Transition Radiation Detector 2D (TRD-2D)
for the CBM experiment

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FAIR GmbH
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Fax: +49 6159 71 3916
Email: inti.lehmann@fair-center.eu

24 June 2023

Approval of Addendum to Technical Design Report, TDR 1_07

Dear colleagues,

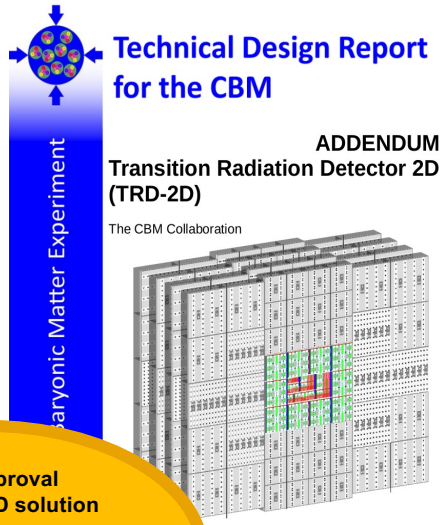
We are happy to inform you that FAIR approves the Addendum to the Technical Design Report, named: *ADDENDUM Transition Radiation Detector 2D (TRD-2D)* for the CBM experiment, following the recommendation by the Expert Committee Experiments (ECE) and Experiments Cost Scrutiny Group (ECSG) at their joint 17th and 8th meeting in May 2023. We expect that you consider all comments by the committees seriously and take appropriate steps. Please note that a follow-up process has been implemented, for which we will require your cooperation. You are kindly asked to report back unsolicited on any changes, issues or risks, which are likely to affect the work packages significantly.

Kindest regards,

Inti Lehmann
On behalf of the FAIR Research Management

Facility for Antiproton and Ion Research in Europe GmbH

Approval-of-AddendumTDR-1_07_CBM-TRD_23



Baryonic Matter Experiment

Technical Design Report for the CBM

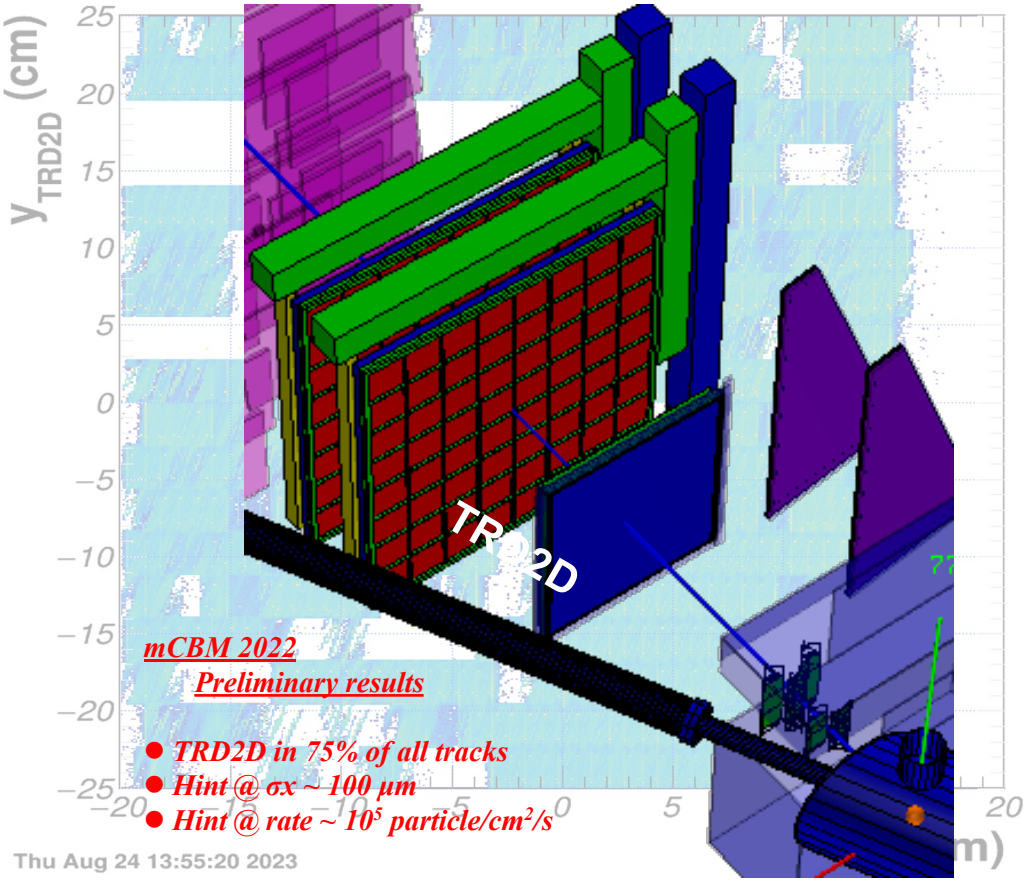
ADDENDUM
Transition Radiation Detector 2D (TRD-2D)

The CBM Collaboration

Final approval of the TRD2D solution

Wuhan Sep. 2017 – Buch Sep. 2023

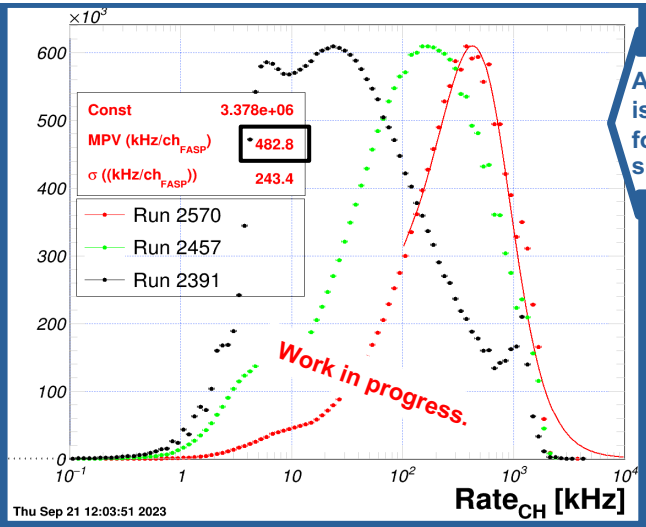
for the inner region of the TRD wall



42th CBM Collaboration Meeting 24-29 Oct 2023

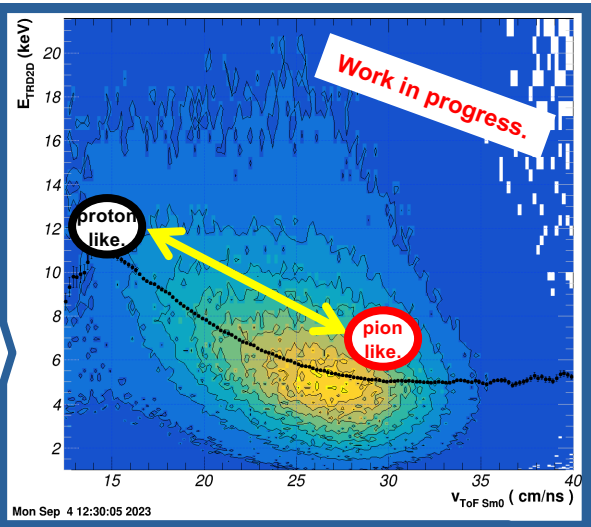
- ***2 contribution*** *mCBM* ***plenary*** *session*
- ***1 contribution*** *Software* ***parallel*** *session*
- ***1 contribution*** *DAQ* ***parallel*** *session*
- ***1 contribution*** *Detector* ***parallel*** *session*

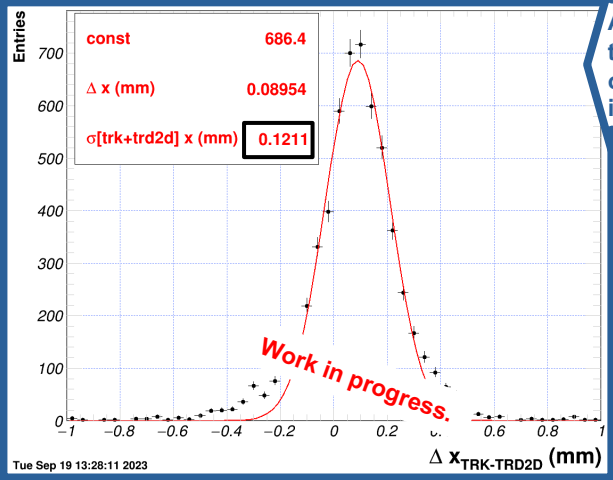
TRD2D @ mCBM 2022 preliminary performances



A particle rate of 10^5 cm^{-1}s^{-1} is achievable for average cluster size smaller than 5.

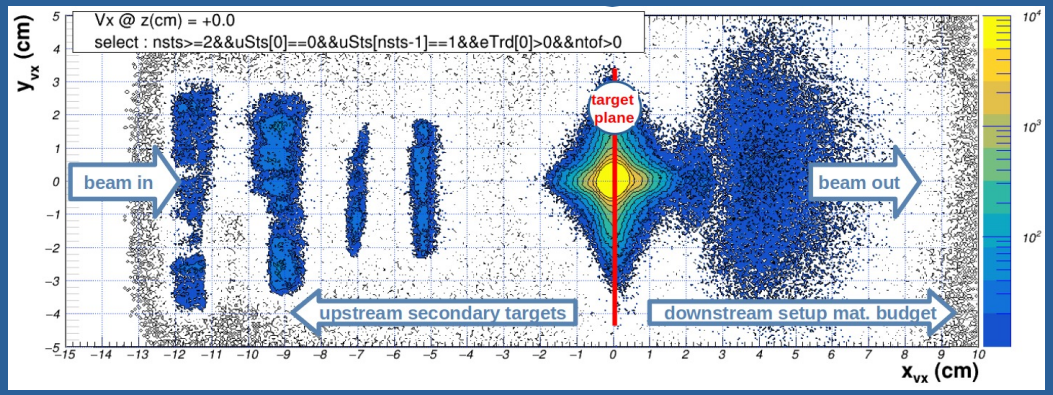
Particle IDentification (PID) based on correlating TRD2D dEdx info with ToF velocity. Using "primary" "long" tracks in run 2391 (Ni-Ni 1.93 AGeV) and 0,0,0 target alignment.





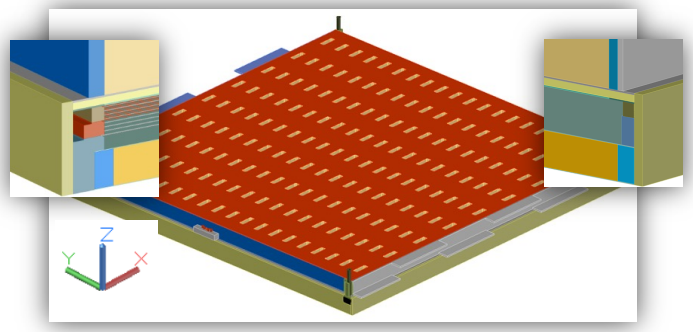
A resolution on the level of σx ~ 100 μm on the x coordinate is achievable.

mCBM long track projections on a 25 x 10 cm^2 area on the target plane. The constructive details of the target chamber (secondary targets) are visible as track projection clusterizing to the left while details of the STS support are seen to the right `

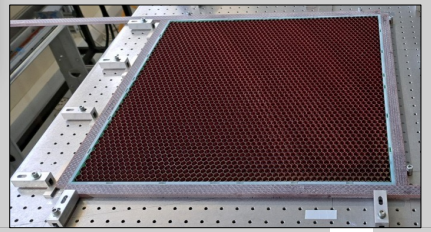


Infrastructure for TRD-2D construction

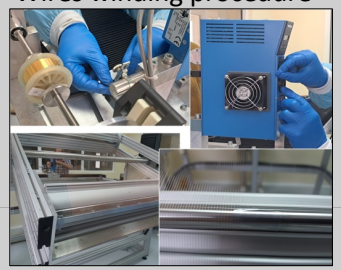
Maintenance and update of the infrastructure in view of TRD-2D prototype construction



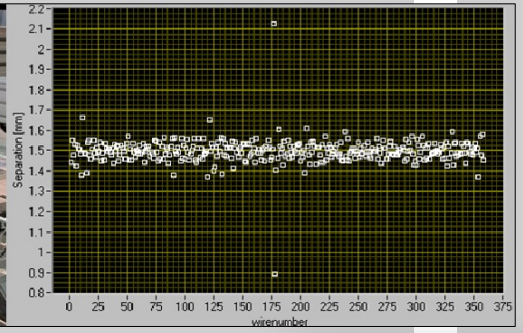
Entrance window assembly



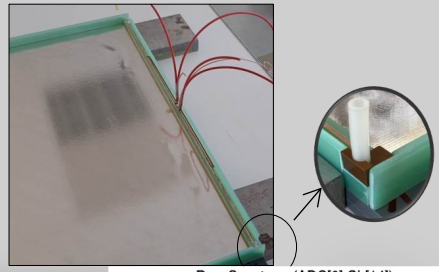
Wires winding procedure



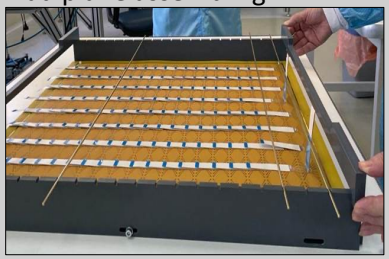
Wires tension measurement

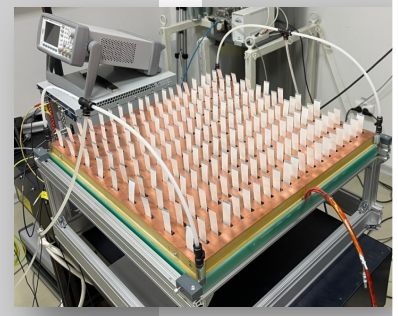


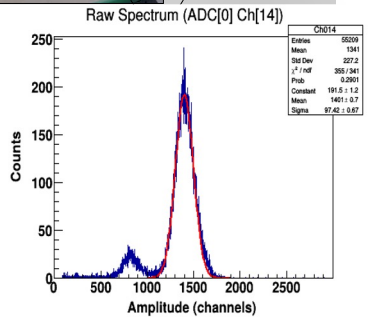
Chamber frame



Pad plane assembling







A list of some items required for the specific architecture of the TRD-2D chambers have been identified in terms of design requirements, QA devices and sub-components providers

➢ *CBM-TRD Addendum approved by the FAIR ECE&ECSG*

➢ *Contributions at CBM Progress Reports*

CBM Progress Report 2022 (2023): *https://dx.doi.org/10.15120/GSI-2023-00384*

1. A. Bercuci et al., TRD-2D as intermediate tracker for the CBM experiment, pg 108

2. C. Andrei et al., TRD-2D prototype for the Production Readiness Review, pg 110

➢ *Presentations at CBM Collaboration meetings*

1. A Bercuci
Alignment in mCBM
41st CBM Collaboration Meeting, 6 – 10 March 2023, Darmstadt, Germany.

2. A Bercuci
Alignment tools
41st CBM Collaboration Meeting, 6 – 10 March 2023, Darmstadt, Germany.

4. M. Petris et al.,
TRD-2D QA Tests
41st CBM Collaboration Meeting, 6 – 10 March 2023, Darmstadt, Germany.

5. A Bercuci et al.
Applying the CA tracker to mCBM 2022 data
v42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

6. A Bercuci et al.
Performance studies with TRD-2D and TRD-1D
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

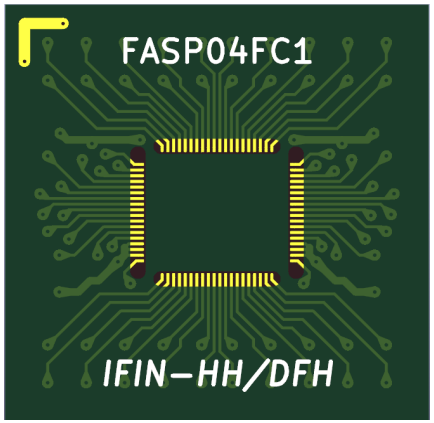
7. A Bercuci et al.
Recent developments: TRD software
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

8. A. Bercuci et al.
TRD2D Status & Perspectives
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

CBM - TRD-2D FEE

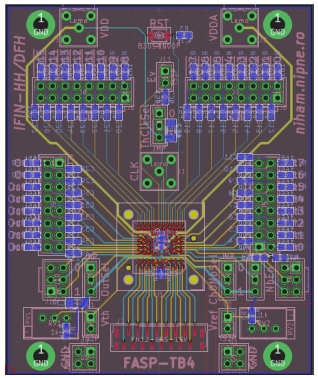
New FASP packaging

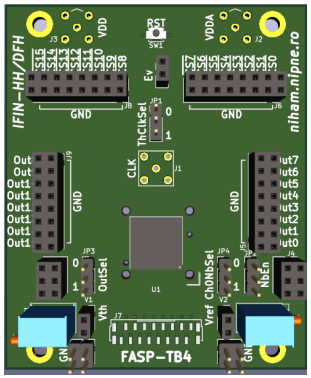
- *New flip-chip BGA packaging (11 mm x 11 mm) designed and produced.*
- *Reduced footprint → better integration, reduced material budget.*
- *500 dies produced and packaged.*

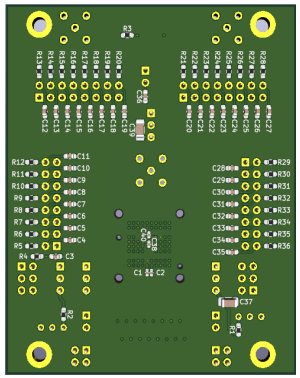


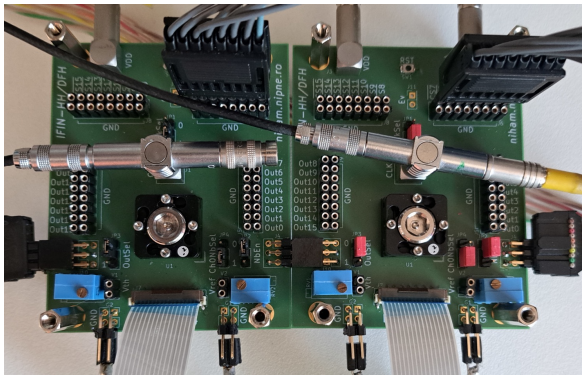
New Test Board

- *As pinout changed, new test board was required.*
- *New simple test board (FASP-TB4) designed and produced.*
- *Newly packaged FASPs were tested using the new test board: ~ 82 % ok.*





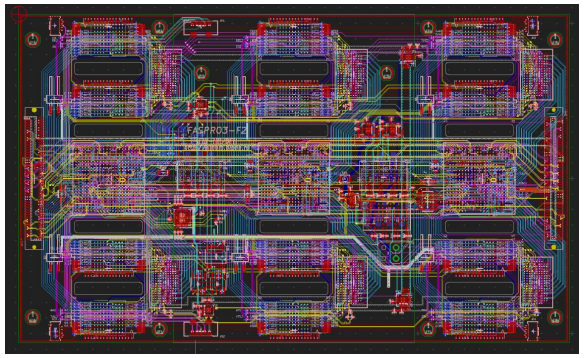


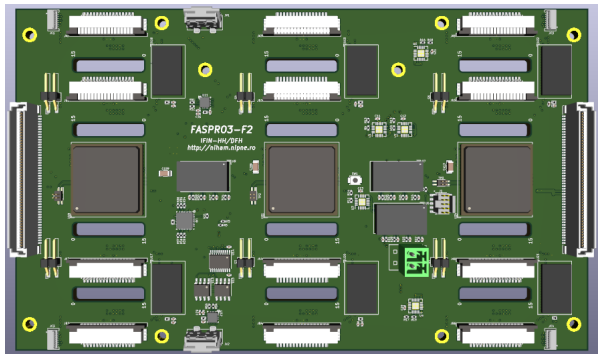


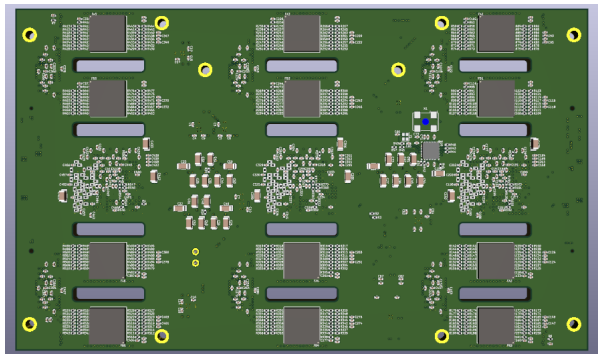
CBM - TRD-2D FEE

New FEE board (FASPRO3-F2)

- *Design complete, production inquiry ongoing*
- *Complex (18 layers), integrated board.*
- *12 FASPs (new package), 6 ADC chips (32 channes each), 3 PolarFire FPGAs.*
- *Side connectors for various configurations. Compatible with previously developed and produced card G-A-01 => current (CROB-based) DAQ chain should be easy to adapt to the new board.*
- *Other (more efficient) methods to connect to CRI should be possible (to be developed).*
- *Various auxiliary cards (to be installed in the side connectors) currently under development.*







Firmware-related activities

- *On the FEE (PF) side: due to the physical constraints in PolarFire FPGA, several test firmware configurations had to be developed during the design of FASPRO3-F2 in order to verify the viability of the intended pin usage.*
- *On the CRI side: CRI1 firmware was fully (without TFC) ported (build system, PCIExpress bifurcation, GTY usage for gbt-fpga, software, etc.) to HTG-Z922 card used as CRI for local tests.*

➢ *Contributions at CBM Progress Reports*

CBM Progress Report 2022 (2023): *https://dx.doi.org/10.15120/GSI-2023-00384*

1. ***A. Bercuci and C. Şchiaua, TRD-2D at mCBM – Data quality for the benchmark run 58Ni + 58Ni at Tlab = 1.93 AGeV, pg. 113***
2. ***A. Bercuci et al., TRD-2D at mCBM, FEE and DAQ for the mCBM 2022 campaign, pg. 119***

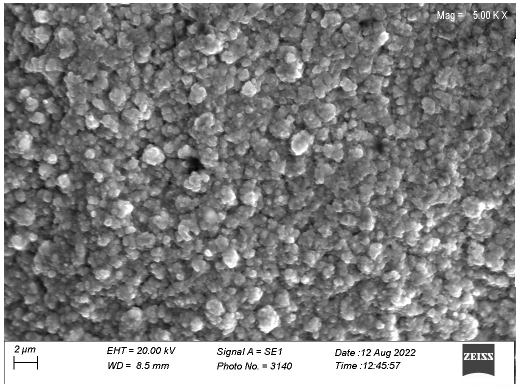
➢ *Presentations at CBM Collaboration meetings*

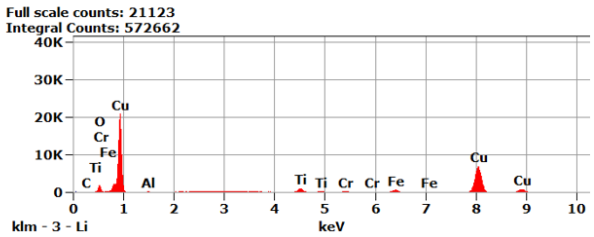
C. Schiaua et al.
Progress on the TRD-2D DAQ chain
42nd CBM Collaboration Meeting, 24 – 29 September 2023, Bucharest, Romania

Applied Research & Technological Transfer

TiO_2+graphene nano-materials deposited on stainless steel substrate

GRAFTID, contract 29/2020-2024
IFIN partner
within EAA & Norway Grants





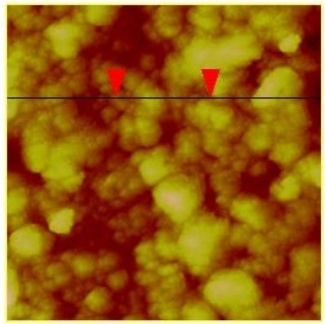
➢ *In progress*

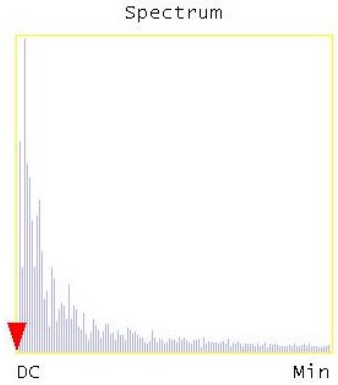
- 1 patent

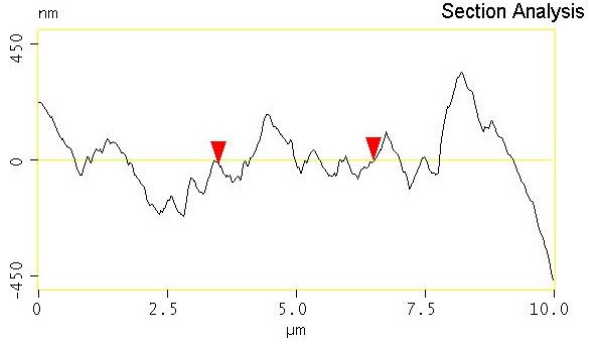
- 2 papers:

- Improvement of Mechanical and Wear Resistance Properties for Multicomponent Tribological Coatings deposited by Magnetron Sputtering from WC, TiB_2, Ti, and WS_2 Target

- Deposition of nanomaterials mixtures with metallic content by electrophoretic and aerosol spraying methodts







➢ *Conferences*

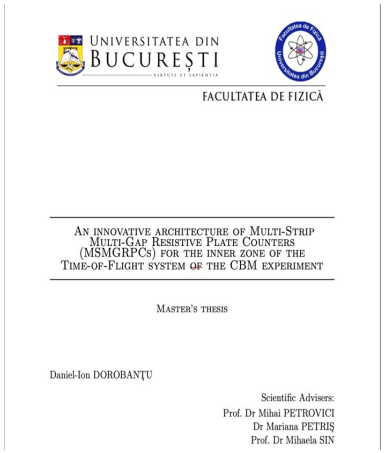
21th International Balkan Workshop on Applied Physics, IBWAP 2023

*1 "**SEM-EDS, AFM and RBS investigations of TIO_2+graphene oxide*** **nanopowders deposited on metallic substrate by electrophoretic method for evaluation of their immobilization level" – autori Alice-Ortansa Mateescu, Gheorghe Mateescu, Paul-Emil Mereuta, Cristina Burducea, Ion Burducea, Marcela-Corina Rosu, Crina Socaci**

2. "Functionalized surfaces of TIO_2 nanotubes/ graphene-based nanomaterials and metallic nanoparticles for the treatment of emerging organic pollutants" – autori Alice-Ortansa Mateescu, Gheorghe Mateescu, Paul-Emil Mereuta, Cristina Burducea, Ion Burducea, Marcela-Corina Rosu, Crina Socaci, Kaiying Wang

Training & teaching

2 master thesis finalized



UNIVERSITATEA DIN BUCUREŞTI

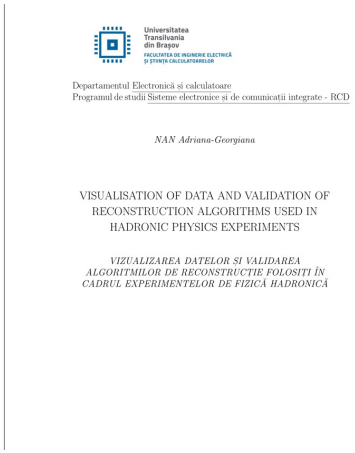
FACULTATEA DE FIZICĂ

AN INNOVATIVE ARCHITECTURE OF MULTI-STRIP MULTI-GAP RESISTIVE PLATE COUNTERS (MSMGRPCS) FOR THE INNER ZONE OF THE TIME-OF-FLIGHT SYSTEM OF THE CBM EXPERIMENT

MASTER'S THESIS

Daniel-Ion DOROBANŢU

Scientific Advisers:
Prof. Dr Mihai PETROVICI
Dr Mariana PETRIŞ
Prof. Dr Mihaela SIN



Universitatea Transilvania din Braşov

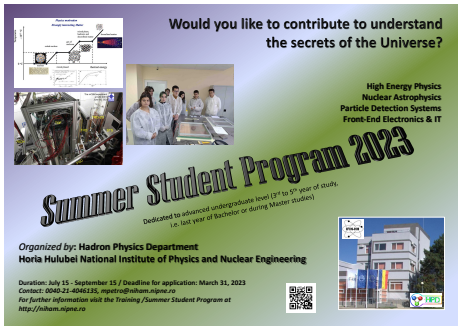
FACULTATEA DE INGINERIE ELECTRICĂ ŞI ŞTIINŢA CALCULATOARELOR

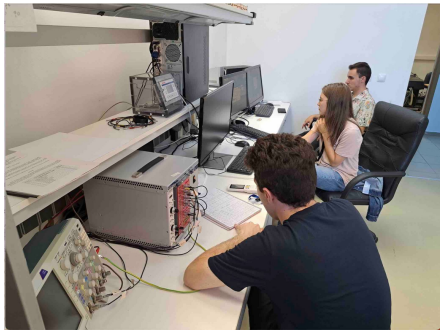
Departamentul Electronică şi calculatoare
Programul de studii Sisteme electronice şi de comunicaţii integrate - RCD

NAN Adriana-Georgiana

VISUALISATION OF DATA AND VALIDATION OF RECONSTRUCTION ALGORITHMS USED IN HADRONIC PHYSICS EXPERIMENTS

VIZUALIZAREA DATELOR SI VALIDAREA ALGORITMILOR DE RECONSTRUCTIE FOLOSITI ÎN CADRUL EXPERIMENTELOR DE FIZICĂ HADRONICĂ





Visits

Students from Technical University, Bucharest

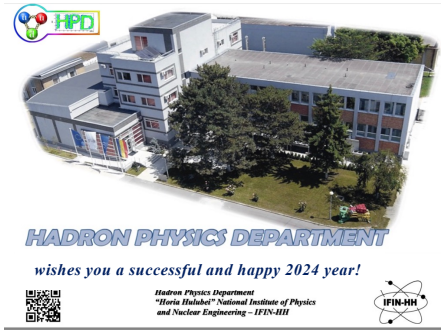
Visit of HPD DetLabs by the students participating to the EuroLab School

Juniors' day - CBM Collaboration
2 lectures and visit in the HPD Labs

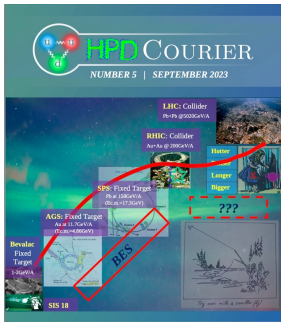
Outreach

Visit of the CERN Council President, Prof. Dr. Eliezer Rabinovici

HPD Calendar



HPD Courier no.5



2 movies with the assembling and tests of the MSMGRPC and TRD-2D

42nd CBM Collaboration Meeting

- Overview
- Timetable
- Important dates
- Payment details
- Contribution List
- Speaker List
- Registration
- Participant List
- Venue details
- Bus lists
- Accommodation
- Travel
- Visa Information
- Sponsors
- Photos
- Social Program

Contact
mpetro@nipne.ro
mpetris@nipne.ro
0040747231895

CBM Meeting Committee:

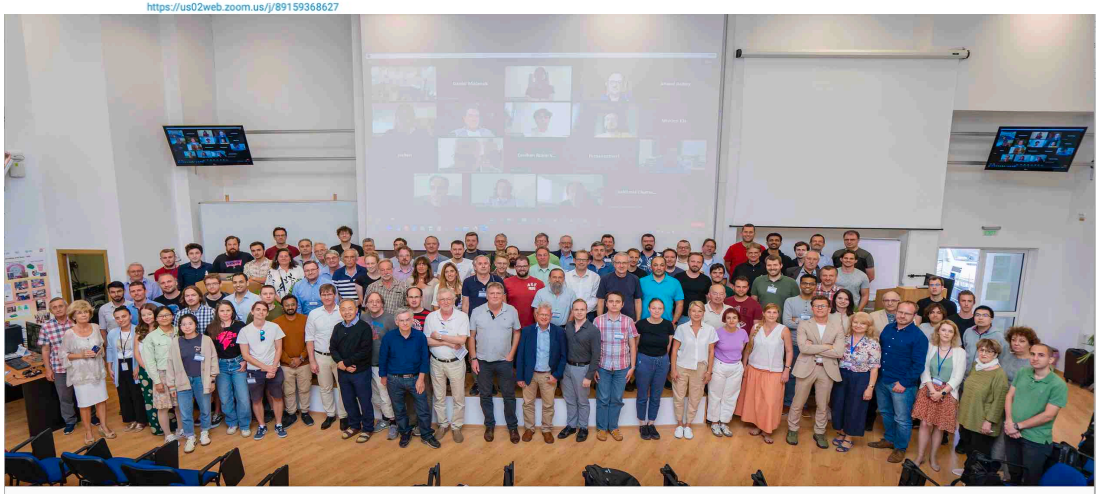
- Dr. Juergen Eschke
- Dr. Volker Friese
- Prof. Dr. Norbert Herrmann
- Prof. Dr. Mihai Petrovici

Local organizing Committee:

- Dr. Cristian Andrei
- Mrs. Denisa Cranganu - Secretary
- Mrs. Alexandra Olteanu - Financial Manager
- Dr. Mariana Petriș
- Prof. Dr. Mihai Petrovici
- Mr. Adrian Socolov - Graphic designer
- Dr. Mădălina Târzilă

Application
Sie sind für diese Veranstaltung angemeldet. / You are registered for this event.
140
Details anzeigen / See details

Information for Zoom access:
Plenary Sessin & Parallel Session 1 (CH1)
https://us02web.zoom.us/j/89159368627



42nd CBM Collaboration Meeting
Bucharest , Romania
September 24-29, 2023

RO-CERN - suggestions for Outreach Project

- How to become visible and competitive in Large Scale International Collaborations ?

- Developed and produced in Romania for CERN

- Would you like to operate by yourself some of the detectors used in CERN experiments ?

Etaj 2 (Room 203)

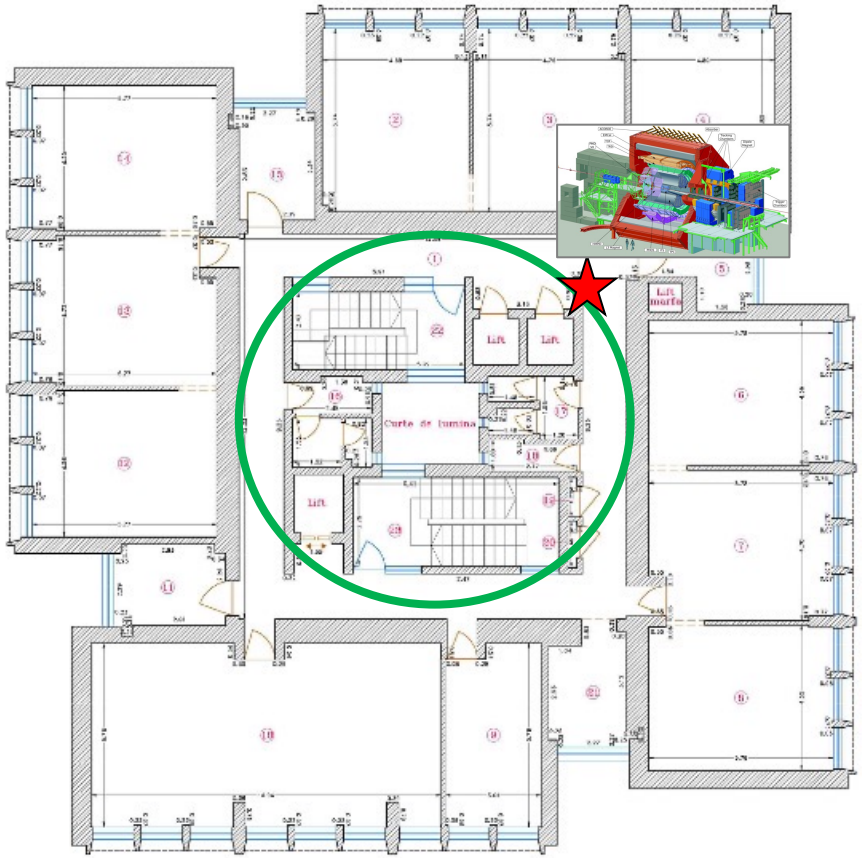
In close and efficient collaboration with ALICE group from ISS

RELEVEU C1 - ETAJ 2

SCARA 1:100

Nr. cadastral	Suprafața utilă	Adresa imobilului
	428.0 mp	Strada Atomiștilor nr.407, Oraș Măgurele, Județ Ilfov

Carte Funciară colectivă nr.		UAT	Măgurele
Cod unitate individuală (U)		CF individuală	



Nr. Încăpere	Denumire încăpere	Suprafață (mp)
1	Coridor	64.1
2	Cameră	26.2
3	Cameră	26.8
4	Cameră	26.2
5	Hol	6.6
6	Cameră	26.2
7	Cameră	26.7
8	Cameră	26.2
9	Cameră	17.1
10	Cameră	62.9
11	Hol	8.9
12	Cameră	26.2
13	Cameră	26.8
14	Cameră	26.1
15	Hol	8.6
16	Grup sanitar	6.4
17	Grup sanitar	4.9
18	Spațiu administrativ	2.5
19	Spațiu tehnic	0.3
20	Spațiu tehnic	0.4
21	Hol	8.8
	Suprafața Utilă = 428.0 mp	
22	Scara A	13.1
23	Scara B	17.6
	Suprafața Totală = 458.7 mp	

Executant: S.C. ZOOMACAD S.R.L.
Prin: Dipl.Ing Chetraru Ioan Alexandru
Tel.: 0784.266.266

Data
Iunie
2021

Acceptanul

Data

CERTIFICAT DE ATESTARE Seria RO-2-1 Nr. 2017 S.C. ZOOMACAD S.R.L. CLASA 1

CERTIFICAT DE ATESTARE CHETRARU

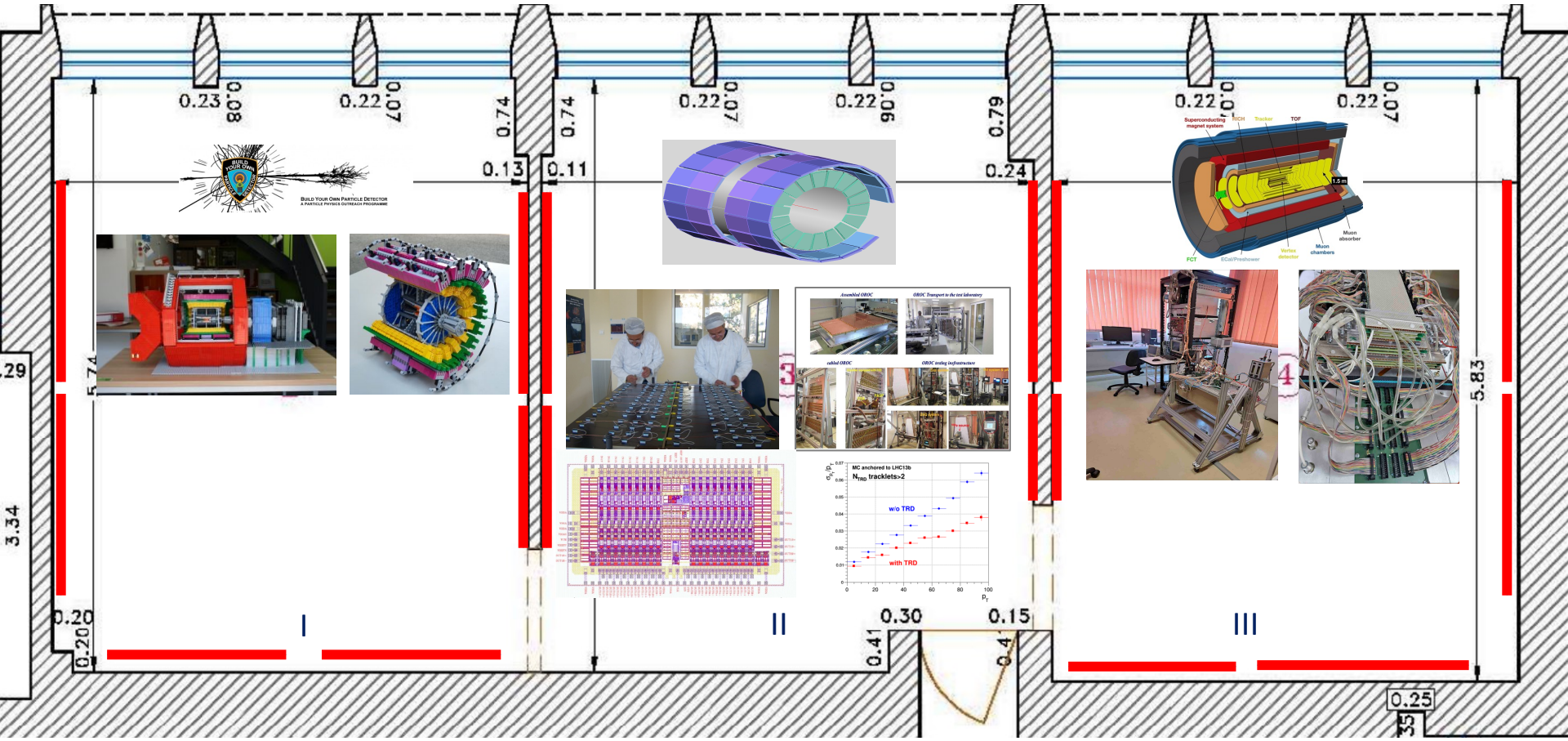
Ioan-Alexandru Chetraru

Claudiu Burduja

Digitally signed by Claudiu Burduja
Date: 2021.08.17 10:43:10 +03'00'

Etaj 2 (Room 203)

In close and efficient collaboration with ALICE group from ISS

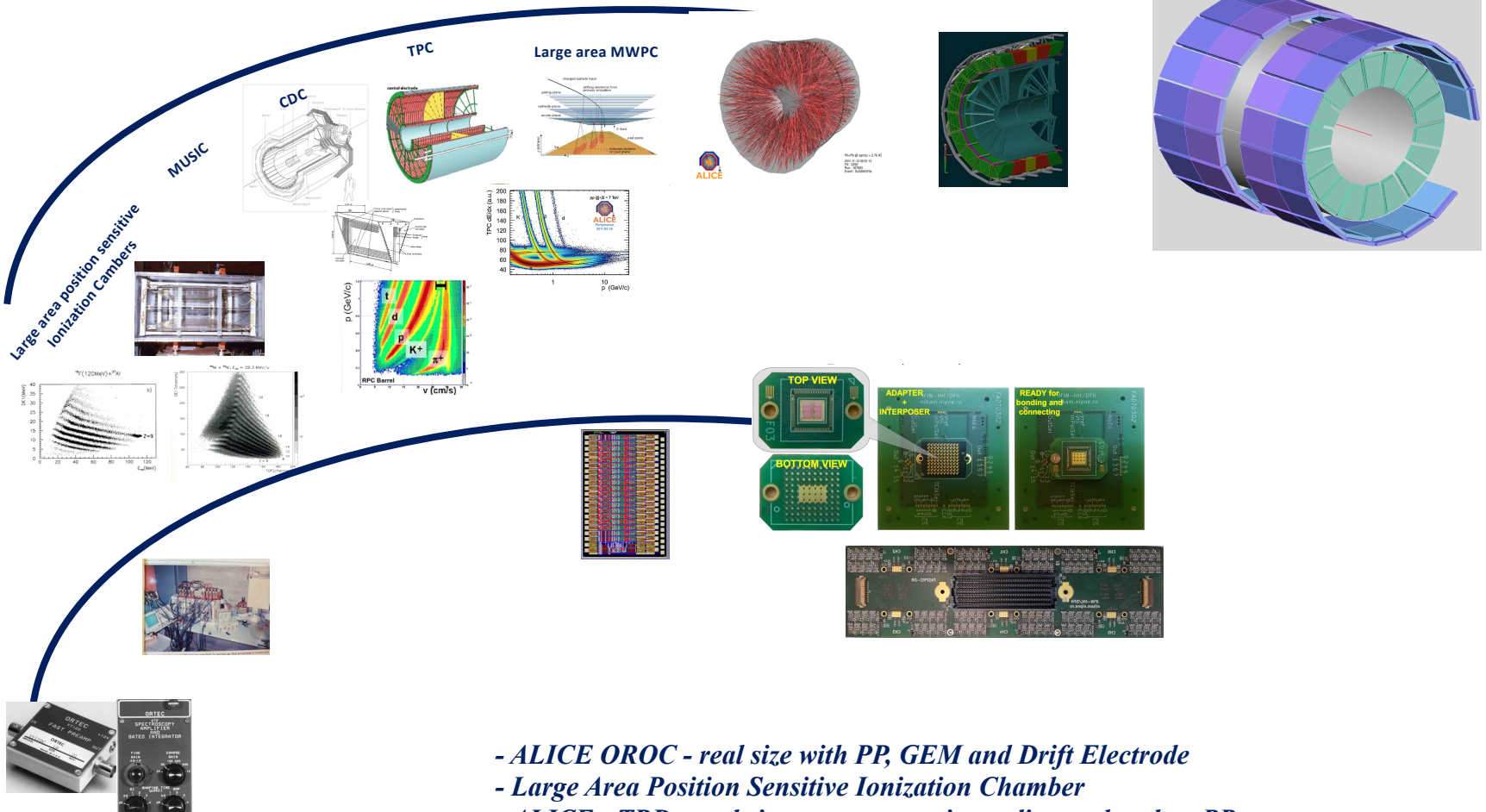


posters/large monitors

II

From precursors up to the state of the art detectors used in the ALICE Experiment at LHC for which development, construction and operation the Romanian groups had and have an essential contribution

In close and efficient collaboration with ALICE group from ISS



- *ALICE OROC - real size with PP, GEM and Drift Electrode*
- *Large Area Position Sensitive Ionization Chamber*
- *ALICE - TRD - real size components, i.e. radiator, chamber, PP*
- *samples of electronics and a microscope to see bonded CHIPS*

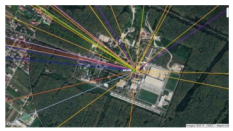
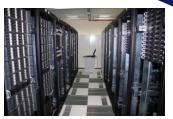
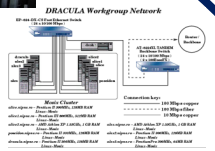
explanatory posters/large monitors - detectors; movies - assembling and tests

explanatory posters/large monitors - evolution DAQ and computing

II

From precursors up to the state of the art detectors used in the ALICE Experiment at LHC for which development, construction and operation the Romanian groups had and have an essential contribution

In close and efficient collaboration with ALICE group from ISS

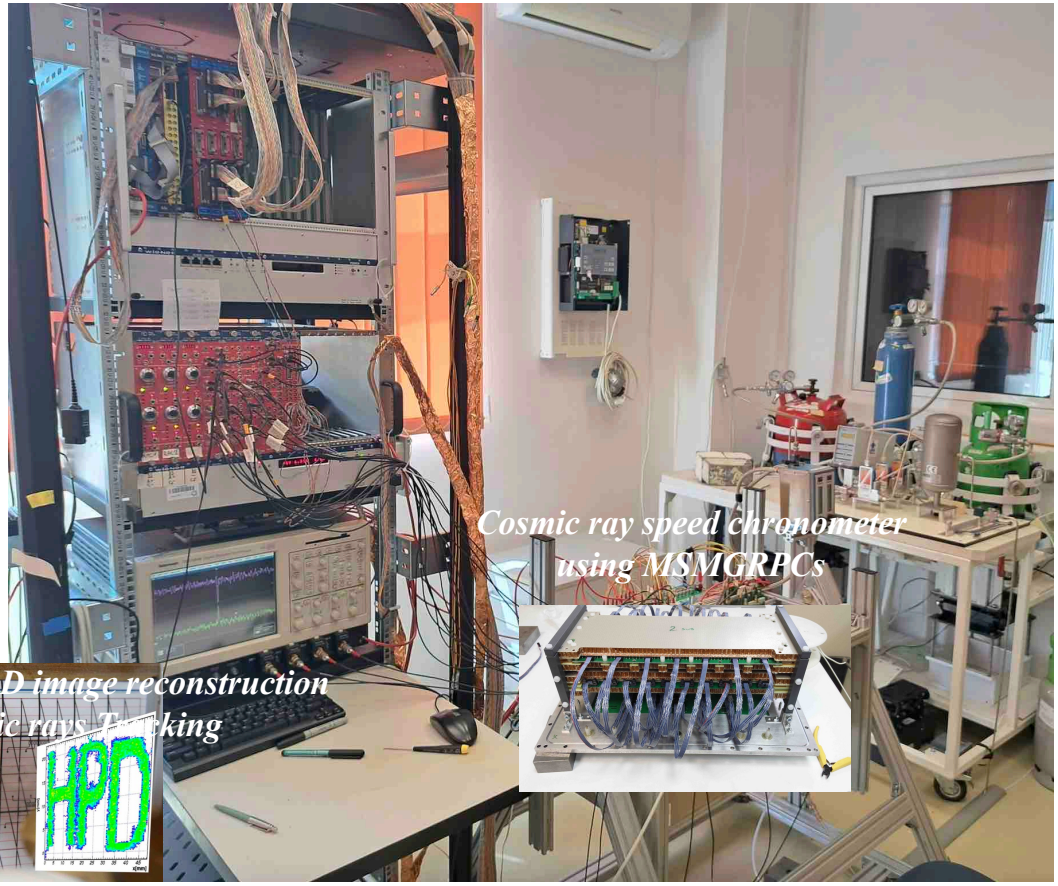



explanatory posters/large monitors - evolution DAQ and computing

III

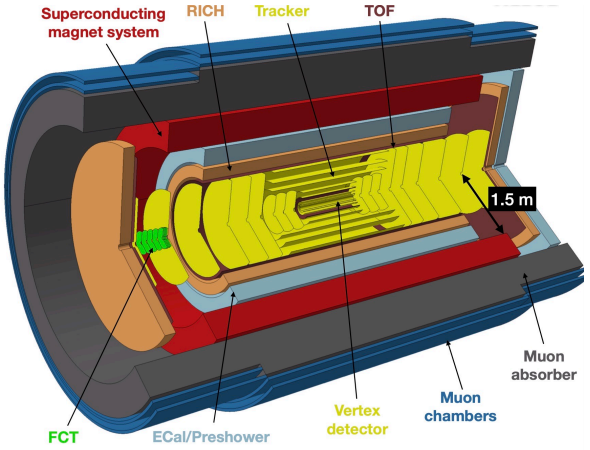
Experimental stand

In close and efficient collaboration with ALICE group from ISS



TRD-2D & MSMGRPC candidates for ALICE3 -large rapidity PID

Physics motivation



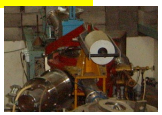
explanatory posters/large monitors
- movies - assembling and testing
TRD-2D & MSMGRPC

explanatory posters/large monitors - ALICE3

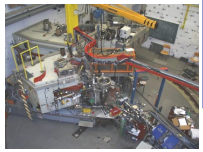
Awarding a Half a Century Adventure

The roots of our Hadron Physics Department trace back close to 50 years ago, when the Tandem accelerator of the Institute for Atomic Physics, follow-up of the Institute for Physics of Romanian Academy founded by Horia Hulubei 70 years ago, was in the commissioning phase. Few months later, spring 1973, the first experiments started, based on ORTEC type reaction chambers and silicon detectors. The Tandem column has been destroyed by a severe earthquake in 1977.
Supported by French community, we proposed and performed measurements at the Saclay Tandem using the Q3D magnetic spectrometer.
1981 was the year when our collaboration started with GSI- Darmstadt. The experiments performed at UNILAC were based on large size spherical and cylindrical reaction chambers housing experimental configurations close to 4π geometries in the center of mass, based on large area position sensitive ionization chambers, position sensitive parallel plate avalanche counters, plastic scintillators and silicon telescopes.
With such an experience, we initiated in Bucharest a rather ambitious project to build a versatile experimental set-up DRACULA foreseen to be used at the Bucharest Tandem+Post Accelerator based on room temperature resonators.

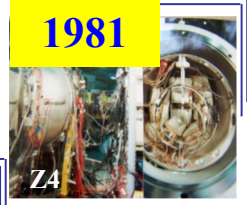
1972

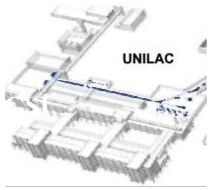


1978

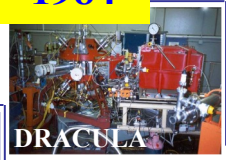


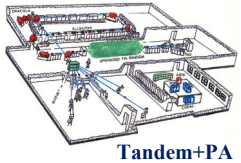
1981

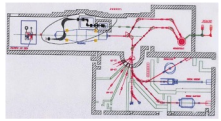




1984







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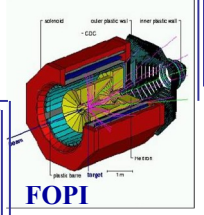

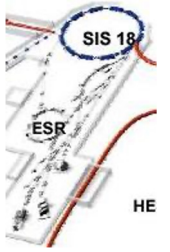

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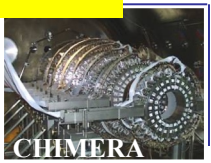

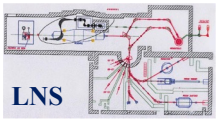

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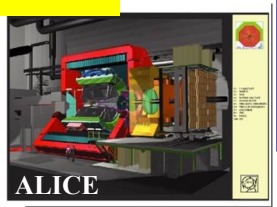

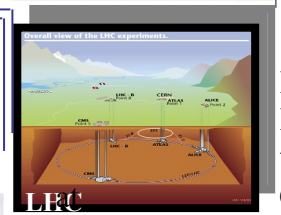

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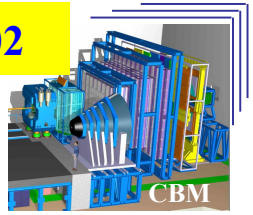

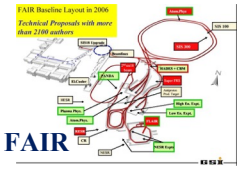

Late 1990, DRACULA was transported at LNS Catania and mounted on a dedicated beam line of the Tandem.
Following the fruitful collaboration with GSI, in 1987 we joined from the very beginning the FOPI Collaboration who built the FOPI Experiment at SIS18 for studying the heavy ion collisions at energies up to 2 A·GeV. In the same period we joined for couple of years CHIMERA Collaboration at LNS.
As a natural follow-up, in 1999 we became member of ALICE Collaboration at CERN, a dedicated experiment to study heavy ion collisions at ultra-relativistic energies foreseen to be delivered by Large Hadron Collider (LHC), the main physics motivation being the production of deconfined matter and study the dynamics and properties of this new state of matter supposed to be characteristic at few **µ**sec after Big-Bang.
Although the Facility for Antiproton and Ion Research (FAIR) Project officially started by Fall 2007, the idea of an heavy ion experiment for mapping the QCD Phase Diagram in the region of phase transition and critical point was launched in 2002. Members of Hadron Physics Department joined this CBM Collaboration from the very beginning.

In the following are reviewed the HPD main contributions over the years in developing detection systems, associated front electronics and DAQ, assembling and testing significant components of different LARGE SCALE experiments using HPD infrastructure, computing, physics, training and organization of international events in Romania.

Awarding a Half a Century Adventure

HPD COURIER

NUMBER 2 | DECEMBER 2019

70th IFAR Anniversary

https://niham.nipne.ro/HPD_NR_2_Dec_2019.pdf

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Merry Christmas, Season's greetings
and
A happy, healthy and successful
2024 !