1. Cover Page

- Project team :

- Prof. Dr. Mihai Petrovici (physicist) – team leader
- Senior 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 Viorel Duta (mechanical engineer)
- Senior researcher III Dr. Andrei Herghelegiu (physicist)
- Master student Amelia Lindner (physicist)
- 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 Lucica Prodan
- Technician Andrei Radu
- Technician Constanta Dinca
- Financial coordinator Georgiana Toma (economist)
- Visiting senior scientist Dr. Vasile Pop Topor (physicist)
- Lathe and milling machine operator, Gheorghe Dima (mechanical worker)

- Specific scientific focus of the group :

- Multiplicity and event shape analysis in pp collisions – subject proposed by our group within ALICE Spectra-PAG PWG-LF since 2009 (https://twiki.cern.ch/twiki/bin/view/ALICE/PWGLFPAGSPECTRAMultiplicityEventShapePP7). The aim is to evidence collective type phenomena in high charged particle multiplicity and close to azimuthal isotropy events in pp collisions at LHC energies and understand their origin.

- Highlights of accomplishments in the last year:

- Studies for obtaining $p_T$ spectra simultaneously conditioned on multiplicity, directivity and within same-side, away side and in between relative to the leading particle for identified charged hadrons in pp collisions at $\sqrt{s}$ = 7 TeV.
- Finalization of the charged particle $p_T$ spectra as a function of multiplicity in pp collisions at $\sqrt{s}$ = 7 TeV which are included in the long paper on multiplicity dependence.
- Studies of two charged particles correlations as a function of multiplicity, and directivity or sphericity in pp collisions at $\sqrt{s}$ = 7 TeV

- Core-corona interplay in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV
  M. Petrovici, I. Berceanu, A. Pop, M. Târzila, and C. Andrei; Phys.Rev. C96(2017)014908
- Extracting information on core contribution at LHC and RHIC energies – in progress
- GRID activities: maintaining NIHAM in a leading position among Tier2 ALICE GRID Centers.
- upgrading different working areas of the DetLab in terms of clearness class
- construction of OROC in-house test boxes and a prototype of a transport box
- procurement of different equipments , instruments, consumables for starting the activity of assembling and testing the OROCs
- TPC upgrade contribution – assembling an OROC at GSI.
- Participation to detector operation : 18 shifts till now.
- A Summer Student Program with 8 participants was successfully accomplished. A master student joined us this summer
- Outreach activities
- 12 presentations in ALICE meetings

2. Scientific goals (2 pages) - narrative stating in more detail

As it is well known by now, A Large Ion Collider Experiment (ALICE) at CERN is a general-purpose heavy-ion experiment designed to explore the ultra-dense energy region of the Phase Diagram of Quantum Chromodynamics (QCD), far above the critical temperature where a transition to a deconfined matter, formed by its basic constituents, i.e. quarks and gluons, is predicted to happen in nucleus-nucleus collisions at LHC energies. In addition to heavy systems, the ALICE experiment is devised such that collisions of lighter combinations, p-A and pp, can be also studied. Such studies turned out not only to provide reference data for the nucleus–nucleus collisions, a number of genuine pp physics becoming of primary interest once the new data became available from the first experiments at $\sqrt{s}$=7 TeV. Multiparton interactions and re-scatterings could contribute to a large energy transfer in a collision volume of proton size and a close to equilibrium deconfined initial state could be expected in very high energy pp collisions. A piece of matter of proton size, with a radius of few times larger than the mean free path of the constituents of a deconfined medium, expands hydrodynamically once the energy transfer is significantly large, i.e. low impact parameter - high charged particle multiplicity.
Preliminary results obtained in Run1 at which our group had a significant contribution seem to support such a scenario. Run2, with a gain in energy of a factor of two for pp and Pb-Pb collision and higher luminosity will create premises to perform such studies in a differential way, to extend them at even higher charged particle multiplicities and other species than identified charged hadrons and hyperons.
Another important aspect worth to be studied is the possibility to discriminate between hard and soft processes. Preliminary studies performed by us along the possibility to select events close to azimuthal isotropy using global event shape observables like Directivity, Sphericity, Thrust or Fox-Wolfram moments have shown their performance in selecting soft, nearly azimuthal isotropic events. Although the correlation of each of these global event shape variables with multiplicity is rather good, at the largest multiplicities the global

event shape variables have a rather broad distribution. Thus, a two dimensional condition in multiplicity and different event shape variables could significantly contribute in selecting events with specific azimuthal distribution for a given multiplicity. Correlation techniques are powerful tools which can provide essential information on the nature of the medium produced in ultra-relativistic heavy-ion collisions. The idea is to select a sample of high $p_T$ particles, referred to as leading particles or "triggers" and then to study the correlation between the leading particle and all other particles in the same event, called associated particles. The first studies of two-particle correlation functions in the highest-multiplicity pp collisions at the LHC performed by the CMS Collaboration showed an enhanced production of pairs of particles at $|\Delta\eta,\Delta\varphi| \sim 0$, with the correlation extending over a wide range in $\Delta\eta$, a feature frequently referred to as a "ridge". These structures can be quantified by azimuthal Fourier coefficients, mostly of second (v2) and third (v3) order. Many of the physics mechanisms proposed to explain the pp ridge include multiparton interactions, parton saturation and collective expansion of the final state.

This information plays a crucial role in understanding the features observed in p-Pb and Pb-Pb collisions at LHC energies. Therefore, a special attention is given to the comparison of dependence of different observables as a function of the collision violence among the three systems.

In order to extract signals originating from multiparticle interactions it is mandatory to remove, as much as possible, based on experimental information, the contribution coming from single collisions in case of Pb-Pb and p-Pb or low density hadronic matter overlap in case of pp, known as corona contribution. Systematic studies on core-corona interplay and the dependence on the centrality of the extracted core contribution for different observables will give the possibility to evidence different scalings suggested by QCD inspired models.

In order to increase the ALICE capability for running in high luminosity conditions foreseen to be the case in Run3, a major upgrade program of the experiment is on the way. We embarked on two topics of the ambitious ALICE upgrade program, i.e.: the Time Projection Chamber (TPC) upgrade and new TRD online calibration software.

The amount of data obviously will increase and therefore a special attention will be given to the computing power and storage capacity delivered by the worldwide distributed ALICE-GRID infrastructure. Two new cooling infrastructures will be installed in the near future, as well as a significant percentage of the present computing and storage capacity will be replaced.

## 3. Scientific achievements in the last three years corresponding to the actual program funding (2 pages)

Up to now, our group proposed and worked out a physics topic, i.e. studies of hadrons transverse momentum distributions as a function of charged particle multiplicity and event

shape in pp collisions, which turned out to be one of the most interesting phenomena to be studied in detail at LHC energies. Transverse momentum distributions and their ratios for π, *K* and p at mid rapidity (|y| <0.5) for different charged particle multiplicities in pp collisions at $\sqrt{\mathbf{s}}$ **=** 7 TeV show an enhanced depletion of heavier species relative to the lighter ones in the low $p_T$ region with increasing charged particle multiplicity. The quality of simultaneous fits of the experimental spectra using a Boltzmann-Gibbs Blast Wave (BGBW) expression and the dynamics of the extracted kinetic freeze-out temperature $T_{kin}$, average transverse expansion velocity $<\beta_T>$ and its profile n as a function of multiplicity have been shown to be similar with those obtained in heavy ion collisions.

We started to extend these studies towards multi-differential analyses complemented by correlation studies.

A detailed comparison of pp ($\sqrt{s}$ = 7 TeV), p-Pb ($\sqrt{s_{NN}}$ = 5.02 TeV) and Pb-Pb ($\sqrt{s_{NN}}$ = 2.76 TeV) based on ratios of $p_T$ spectra at different multiplicity/centrality relative to the $p_T$ spectra for the minimum bias pp collision at the same collision energy, each of them normalized to the corresponding average charged particle density, free of any model assumption, has been done. The strong similarities between the three very different systems in the low region of $p_T$ and the observed trends as a function of charged particle density/centrality and mass of the analysed species point to a similar boost type dynamics.

In the last year the group activity focused on:

- *Experimental data analysis:*

- Studies of efficiency corrections for obtaining $p_T$ spectra for simultaneous cuts in multiplicity, directivity and Δφ relative to the leading particle for a multi differential analysis of identified charged hadron spectra properties. The obtained $p_T$ distributions were fitted and compared within the Blast Wave Boltzmann-Gibs and Tsallis phenomenological models. Very preliminary results were presented in the High-Multiplicity mini-workshop, 5 May 2017, CERN, Geneva.

- The results for the inclusive charged particles were presented in five SPECTRA, PWGLF and Long Paper meetings. The study of the charged particle transverse momentum distributions as a function of centrality was finalized and the results were approved as preliminary in the ALICE Physics Forum and were included in the paper "Multiplicity dependence of light flavour hadron production in pp collisions at $\sqrt{s}$ = 7 TeV". This paper is currently evaluated by the internal review committee - IRC. The study of the charged particles is now being extended by using several event shape observables (sphericity, thrust, directivity and modified Fox-Wolfram moments) in parallel with attempts to increase the analysis speed on local computers.

- Two-particle correlation studies as a function of charged particle multiplicity and event shape selection based on directivity and sphericity for pp collisions at 7 TeV data taken by the ALICE experiment at LHC is currently investigated. Complete ΔηΔφ-correlation pattern for various combinations of trigger and associated particles and event shapes requires a huge amount of information which has to be handled at the same time.

- In order to obtain a meaningful information on the behaviour of different observables in pp, p-Pb and Pb-Pb collisions at LHC energies, trivial effects like core-corona interplay have to be understood. We have done a systematic study of the core-corona interplay as a function of impact parameter ($N_{part}$, $dN_{ch}/d\eta$) for Pb-Pb at $\sqrt{\mathbf{s}}$ = 2.76 TeV and the preliminary results were published in Phys.Rev. C96(2017)014908. We continue the investigations and presently we are working on extracting different observables attributed to the core in Pb-Pb at LHC and Au-Au at RHIC and on the possibility to evidence different scalings .

- GRID activities

NIHAM Data Centre continues to be one of the most efficient Tier2 components of ALICE GRID. This is a result of a continuous effort to improve the monitoring tools, in due time interventions, replacement of failing hardware components, efficient interaction with offline ALICE experts. Formalities for procurement of a rather significant computing and storage capacity and two cooling units were finalized.
The internet connection was upgraded from 10 to 40 GB.

- *TPC upgrade contribution:*

The necessary infrastructure in terms of cleanliness of different rooms of the Detector Laboratory, equipment, tools and specific consumables were finalized. An OROC was assembled at GSI by a joint German-Romanian team. The components of other 2 OROCs arrived, they were properly prepared and fixed in order to start the assembling and tests. Significant progress is expected until the ISAB meeting. The expectation for this year is to assemble and test 5 OROCs.
Up to now we produced three OROC in-house test boxes, one is in use for testing an OROC in the pit of ALICE Experiment, the second is in use at GSI and the 3rd one is in our DetLab.
The construction and test of other in-house test boxes is in progress. Three new special top covers for these boxes were produced and a prototype of a transport box was designed, realised and successfully tested.

- *Participation to detector operation*

In parallel with the above mentioned activities which are keeping rather busy all members of our group, we are trying to fulfil also the duties related to the shifts necessary to run the ALICE experiment. This year we booked 48 shifts as Shift Leader, Detector Control System and Data Acquisition Control System operators and made 18 until now, according to the schedule.

4. Group members

| Name | Analysis (%) | R&D (%) | Detector operation (%) | Detector construction (%) | Infrastructure Planning Financial issues Outreach Contracts (%) |
|---|---|---|---|---|---|
| Mihai Petrovici | 20 | 5 | | 12 | 6.27 |
| Daniel Bartos | | 20 | | 50.11 | |
| Alexandru Bercuci | | 27.14 | | | |
| Gheorghe Caragheorgheopol | | 20 | | 14.93 | |
| Vasile Catanescu | | 11.91 | | 30 | |
| Viorel Duta | | 20 | | 39.62 | |
| Mariana Petris | | 12 | | 12.93 | |
| Alexandrina Petrovici | | | | | 13.88 |
| Amalia Pop | 27 | | 5 | | 1.07 |
| Laura Radulescu | | 17.95 | | | |
| Victor Simion | | 33.6 | | | |
| Claudiu Schiaua | | | | | 39.34 |
| Andrei Cristian | 13.41 | | 5 | | |
| Andrei Herghelegiu | 21.38 | | 5 | | |
| Madalina Tarzila | 52.14 | | 5 | | |
| Amelia Lindner | 6.96 | | | | |
| Topor-Pop Vasile | 4.17 | | | | |
| Valerica Aprodu | | 21.78 | | 30 | |
| Lucica Prodan | | 22.30 | | 40 | |

| | | | | | |
|---|---|---|---|---|---|
| Andrei Radu | | 30 | | 30 | 11.72 |
| Constanta Dinca | | | | 10 | 32.79 |
| Gheorghe Dima | | | | 19.16 | |
| Georgiana Rosu | | | | | 35.81 |

- List of PhD/Master students and current position/job in the institution.

| Name | | Present status |
|---|---|---|
| Madalina Tarzila | PhD student | Research assistant IFIN-HH |
| Amelia Lindner | Master student | Temporary employment |

5. Papers and talks in last year
   - List papers (journal or conference proceeding or note) with role of group member(s) – split on categories, do not mix journal papers with conference notes etc.

• <u>Papers:</u>

- Institutional review

*Our group studies*

- Core-corona interplay in Pb-Pb collisions at √sNN=2.76 TeV
M. Petrovici, I. Berceanu, A. Pop, M. Târzilă, and C. Andrei
Phys. Rev. C 96(2017) , 014908

*GRID (computation and storage) and detector operation support:*

- Measurement of azimuthal correlations of D mesons and charged particles in pp collisions at $\sqrt{s}$ =7 TeV and p-Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV, ALICE Collaboration, Eur. Phys. J. C 77 (2017) 245
- Anomalous broadening of the near-side jet peak in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV, ALICE Collaboration, Phys.Rev.Lett. 119 (2017) 102301
- Azimuthally differential pion femtoscopy in Pb-Pb collisions at $\sqrt{s_{NN}}$=2.76 TeV, ALICE Collaboration, Phys. Rev. Lett. 118 (2017) 222301

- Centrality dependence of the pseudorapidity density distribution for charged particles in Pb-Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV
ALICE Collaboration, Phys.Lett. B 772 (2017) 567-577
- Charged-particle multiplicities in proton-proton collisions at $\sqrt{s}$= 0.9 to 8 TeV, ALICE Collaboration, Eur. Phys. J. C 77 (2017) 33
- Determination of the event collision time with the ALICE detector at the LHC, ALICE Collaboration, Eur. Phys. J. Plus 132 (2017) 99
- Energy dependence of forward-rapidity J/ψ and ψ(2S) production in pp collisions at the LHC, ALICE Collaboration, Eur. Phys. J. C 77 (2017) 392
- Enhanced production of multi-strange hadrons in high-multiplicity proton-proton collisions, ALICE Collaboration, Nature Physics 13 (2017) 535-539
- Evolution of the longitudinal and azimuthal structure of the near-side jet peak in Pb-Pb collisions at $\sqrt{s_{NN}}$ =2.76 TeV, ALICE Collaboration, Phys. Rev. C 96 (2017) 034904
- Flow dominance and factorization of transverse momentum correlations in Pb-Pb collisions at the LHC, ALICE Collaboration, Phys. Rev. Lett. 118 (2017) 162302
- Insight into particle production mechanisms via angular correlations of identified particles in pp collisions at $\sqrt{s}$ =7 TeV, ALICE Collaboration, Eur.Phys.J. C77 (2017) 569
- φ-meson production at forward rapidity in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV and in pp collisions at sqrt(s) = 2.76 TeV, ALICE Collaboration, Phys. Lett. B 768 (2017) 203-217
- J/ψ suppression at forward rapidity in Pb-Pb collisions at $\sqrt{s_{NN}}$=5.02 TeV, ALICE Collaboration, Phys. Lett. B 766 (2017) 212-224
- K∗(892)0 and φ(1020) meson production at high transverse momentum in pp and Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV, ALICE Collaboration, Phys. Rev. C 95 (2017) 064606
- Linear and non-linear flow modes in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV, ALICE Collaboration, Phys.Lett. B773 (2017) 68
- Measurement of D-meson production at mid-rapidity in pp collisions at $\sqrt{s}$=7 TeV, ALICE Collaboration, Eur.Phys.J. C77 (2017) 550
- Measurement of electrons from beauty-hadron decays in p-Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV and Pb-Pb collisions at $\sqrt{s_{NN}}$ =2.76 TeV, ALICE Collaboration, JHEP 07 (2017) 052
- Measurement of the production of high-pT electrons from heavy-flavour hadron decays in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV,
ALICE Collaboration, Phys. Lett. B 771 (2017) 467-481
- Production of π0 and η mesons up to high transverse momentum in pp collisions at 2.76 TeV, ALICE Collaboration, Eur. Phys. J. C 77 (2017) 339

- Production of Σ(1385)± and Ξ(1530)0 in p-Pb collisions at $\sqrt{s_{NN}}$=5.02 TeV, ALICE Collaboration, Eur. Phys. J. C 77 (2017) 389
- Production of muons from heavy-flavour hadron decays in p-Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV, ALICE Collaboration, Phys. Lett. B 770 (2017) 459-472
- Searches for transverse momentum dependent flow vector fluctuations in Pb-Pb and p-Pb collisions at the LHC, ALICE Collaboration, JHEP 09 (2017) 032
- W and Z boson production in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
ALICE Collaboration, JHEP 02 (2017) 077

Conferences:

- From pp to AA ultra-relativistic collisions
M. Petrovici, A. Pop, C. Andrei, I. Berceanu, A. Bercuci, A. Herghelegiu and M. Tarzila, AIP Conference Proceedings **1852**, 050003 (2017); doi: http://dx.doi.org/10.1063/1.4984864

- Overview of Light-Flavor Hadron Production at ALICE,
33rd Winter Workshop on Nuclear Dynamics - WWND2017 (Snowbird Resort, Utah, USA, 2017-01-08)
- Transverse momentum spectra of primary charged particles in pp collisions measured by ALICE at the LHC - poster, QM 2017 (Chicago, USA, 2017-02-06)
- Multiplicity dependence of identified particle production in pp collisions with ALICE, QM 2017 (Chicago, USA, 2017-02-06)
- Energy and multiplicity dependence of the inclusive charged particle production in pp collisions, QM 2017 (Chicago, USA, 2017-02-06)
- The ALICE TPC Upgrade Project, QM 2017 (Chicago, USA, 2017-02-06)
- Light flavour results in pp, p-Pb and Pb-Pb collisions at ALICE,
QCD challenges in pp, pA and AA collisions at high energies (ECT*, Trento, 2017-02-27)
- Multiplicity dependence of identified particle production and strangeness in pp collisions with ALICE, Rencontres de Moriond (QCD) 2017 (La Thuile, Aosta valley, Italy, 2017-03-25)
- Light-flavour particle production in pp, p-Pb and Pb-Pb collisions with ALICE at the LHC, 2017 KPS Spring Meeting (Daejeon Convention Center in South Korea, 2017-04-19)
- Multiplicity dependence of particle production,
The fifth annual Large Hadron Collider Physics (LHCP2017) conference (Shanghai, 2017-05-15)
- New results on collectivity with ALICE,

The fifth annual Large Hadron Collider Physics (LHCP2017) conference (Shanghai, 2017-05-15)

- New results on the multiplicity and centre-of-mass energy dependence of identified particle production in pp collisions with ALICE
European Physical Society Conference on High Energy Physics 2017 (EPS-HEP) (Venice, Italy, 2017-07-05)
- Energy and multiplicity dependence of inclusive and identified particle production, 17th International Conference on Strangeness in Quark Matter (SQM 2017) (Utrecht University, 2017-07-10)
- Multiplicity dependence of pion, kaon and proton production in pp collision at $\sqrt{s}$ = 7 and 13 TeV-poster, 17th International Conference on Strangeness in Quark Matter (SQM 2017) (Utrecht University, 2017-07-10)
- Energy and multiplicity dependence of strange and non-strange particle production in pp collisions at the LHC with ALICE, 17th International Conference on Strangeness in Quark Matter (SQM 2017) (Utrecht University, 2017-07-10)
- Small systems at the LHC, 17th International Conference on Strangeness in Quark Matter (SQM 2017) (Utrecht University, 2017-07-10)
- Collectivity and blast-wave in pp, p-Pb and Pb-Pb collisions with the ALICE experiment, 4th International Conference on the Initial Stages in High-Energy Nuclear Collisions (Cracow, Poland, 2017-09-18)
- ALICE results on small systems, 4th International Conference on the Initial Stages in High-Energy Nuclear Collisions (Cracow, Poland, 2017-09-18)

- List talks of group members (title, conference or meeting, date)

- "Multi-differential analysis of pT spectra of π, K and p in pp collisions at 7 TeV", C. Andrei, High-Multiplicity 'mini-workshop', 5 May 2017, CERN, Geneva

-"Two-particle correlations in pp collisions at 7 TeV measured with ALICE at LHC", M. Tarzila, Scientific Communications Session of the Bucharest Faculty of Physics, June 3rd 2017

ALICE PWG-s

Data Analysis:

- Charged particle pT spectra as a function of multiplicity in pp collisions at 7 TeV
A. Herghelegiu, C. Andrei, I. Berceanu, A. Bercuci, M. Petrovici, A. Pop
PWG-LF meeting, December 12th 2016
https://indico.cern.ch/event/592525/contributions/2391768/

- Charged particle pT spectra as a function of multiplicity in pp collisions at 7 TeV
A. Herghelegiu, C. Andrei, I. Berceanu, A. Bercuci, M. Petrovici, A. Pop
Long Paper meeting, December 9th 2016
https://indico.cern.ch/event/594220/contributions/2401609/
- Charged particle pT spectra as a function of multiplicity in pp collisions at 7 TeV
A. Herghelegiu, C. Andrei, I. Berceanu, A. Bercuci, M. Petrovici, A. Pop
Long Paper meeting, December 2nd 2016
https://indico.cern.ch/event/591686/contributions/2392100/
- Charged particle pT spectra as a function of multiplicity in pp collisions at 7 TeV
A. Herghelegiu, C. Andrei, I. Berceanu, A. Bercuci, M. Petrovici, A. Pop
PWG-LF meeting, November 21st 2016
https://indico.cern.ch/event/586662/contributions/2363596/
- Charged particle pT spectra as a function of multiplicity in pp collisions at 7 TeV
A. Herghelegiu, C. Andrei, I. Berceanu, A. Bercuci, M. Petrovici, A. Pop
Spectra meeting, November 19th 2016
https://indico.cern.ch/event/589439/contributions/2376714/

TPC Upgrade:

- OROC assembly and commissioning – 29.08.2017
https://indico.cern.ch/event/653116/contributions/2696256/attachments/1515035/2364028/2017-08-29.pdf
- Reconditioning of the OROC test box in Bucharest – 22.08.2017
https://indico.cern.ch/event/651102/contributions/2697357/attachments/1510963/2356275/in-house-test-box_with__extra_drift_electrode_220817.pdf
- 1st OROC assembly in GSI – 04.07.2017
https://indico.cern.ch/event/651095/contributions/2649952/attachments/1487387/2310508/2017-07-04.pdf
- Status of the polycarbonate transport box – 23.05.2017
https://indico.cern.ch/event/623136/contributions/2603465/attachments/1533391/2401026/transport_box_300517.pdf
- OROC transportation box: flange, vessel, design/order – 16.05.2017
https://indico.cern.ch/event/623135/contributions/2594211/attachments/1460452/2255638/new_design_alu_flange.pdf
- Progress report from HPD Bucharest – 11.04.2017
https://indico.cern.ch/event/623130/contributions/2553491/attachments/1443021/2401028/changes_test_box.pdf

6. Further group activities (1 page)

- Collaborations, local synergies, education, outreach

R&D activities for a new generation of high counting rate RPC and TRD detectors, associated frontend electronics and free running mode data processing
- a successful in-beam test at SPS was done, November-December 2016
- a new TRD prototype and a laser monitoring system were finalized, installed and the first results in high intense X-ray tube flux were obtained
- a new architecture of the inner zone of the CBM-ToF was designed
- 5 presentations at CBM Collaboration meetings

Summer Student Program:
Quite successful, i.e. 8 participants: 2 students from Birmingham University, 2 from Oxford University, 2 from "Babes-Bolyai" University - Cluj - Romania, 1 from Bucharest Technical University and 1 from Physics Faculty of Bucharest University were involved in our activities in this summer. They participated in physics analysis for heavy-ion collisions at ultrarelativistic energies (2), TRD and RPC for CBM (3) CBM experiment design (1) TRD front-end electronics (1), nuclear structure and dynamics (1). Their activity was finalized with presentations. A booklet and a poster will be issued. Presentations concerning the detection and identification methods in nuclear and particle physics, data analysis using ALICE, introduction to heavy ion physics, two-particle correlations in pp collisions at 7 TeV, RPC for CBM were given by members of our group .

Outreach:

- Numerous visits of Romanian and foreign delegations, Romanian pupils winners of International Competitions in Physics, students of the Romanian Physics Faculties
- Pentagon - network

- "My experience within the ALICE experiment at LHC"
A. Herghelegiu
Summer School for pupils, prepared for International Competitions in Physics
Busteni, July 25-26, 2017

- Interview for TVR International
Corina Dobre vă prezintă cercetătorii români care fac istorie în cadrul Organizaţiei Europene pentru Cercetare Nucleară.