EUROPEAN LABORATORIES FOR ACCELERATOR BASED SCIENCE

WP5.4 Training

Livius Trache

Report for the EURO-LABS Second Annual Meeting

Krakow, Oct. 9-11, 2023

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101057511.

Training Scientific Board

Purpose of this subtask to forge a **coherent, stable, and predictable system of training and formation schools and events** that uses the strengths and capabilities of all partners.

TSB selection was the first activity scheduled for WP5.4

The TSB was selected after discussions and meetings end 2022 – beginning 2023

- *1. Livius Trache - IFIN-HH, Romania – Task 5.4 Leader (Chair)*
- *2. Maria J.G. Borge – IEM-CSIC, Spain – WP5 Coordinator (Co-chair)*
- *3. Rosanna Depalo - INFN and contact with ChETEC-INFRA, Italy*
- *4. Ilias Efthymiopoulos - HEP Accelerators (CERN), Switzerland*
- *5. Hanna Franberg-Delahayes – GANIL, France*
- *6. Magdalena Kowalska - CERN/ISOLDE, Switzerland*
- *7. Pawel Napiorkowski (Urszula Gryczka), Poland*
- *8. Christoph Scheidenberger – GSI/FAIR, Germany*
- *9. Marcel Stanitzki - HEP Detectors (DESY), Germany*

Details in: **MS38 (M.5.4.1) "SELECTION OF THE TRAINING SCIENTIFIC BOARD" (20/02/2023)**

Plans proposed

- **the Basic Training School of 2023** will be organized at IFIN-HH, in Sept. 2023. It will have a majority of hands-on activities. The organizers have applied and obtained from the PAC of the tandem accelerator complex of IFIN-HH beamtime at the 3 MV and 9 MV tandems for use during the school. Up to 15-20 students will be selected for a period of 12 days. Organizer: Livius Trache and his team
- **the Basic Training School of 2024** will be organized jointly in Warsaw by the Heavy Ion Laboratory, University of Warsaw and the Institute of Nuclear Chemistry and Technology. The working schedule is June 2024. About 20 participants for the 10 days school will be selected. The workshop will be intended for PhD students starting their thesis. Organizers: Piotr Napiorkowski (HIL) and Urszula Gryczka (INCT).

- **EURO-LABS' Advanced Training School** will be organized at CERN (CLEAR, ISOLDE, SPS). **Title**: "Advanced Training Sessions in the operation of High-Energy accelerators at CERN". Period: Spring 2024. Organizers: Ilias Efthymiopoulos and his team.
- **TSB notes the proposal that GANIL organizes an Advanced training school for the technical and engineering staff in 2026.**
- **EURO-LABS could support the participation of** up to 6 **students** and 1 teacher at the NPA school organized by ChETEC-INFRA & HZDR Dresden in 2024 if the conference were to fulfil the conditions requested by the TSB. This will be publicized in our next meeting.
- **TSB will analyse the proposals of CERN, DESY, LNL and GSI/FAIR to support students** to the training and Early Career Researchers schools they plan for 2023 and 2024.
- **TSB will work with Project's Management to search and implement procedures** that simplify the organizational steps for these events, minimize the bureaucracy involved, and assist constructively the teams that will organize the events.
- **TSB members will meet primarily online** during their mandate. In-person meetings will happen whenever its members participate to EURO-LABS events or to the training events.

Basic Training School 2023 @ IFIN-HH

- Bucharest-Magurele, 13-23 Sept 2023 (financially in P2)
- Excellent response:
  - 19 students from Europe
  - 4 form outside the continent: Brasil, Mexico, South Africa, India – paid their travel
  - 4 from Bucharest: UB and UPB
- Program: hands-on, 2 exps at 3 and 9 MV tandems; 3 days each
- 3 working groups of 9 (too large!)
- Visit at the microBequerel lab, salt mine Slanic-Prahova
- Visits to some large installations of IFIN-HH: Hadron Physics Dept, RoAMS, ELI-NP, IRASM …
- Report sesion - results – maximum seriosity

Details

- Safety and health procedures as standard in IFIN-HH
- Accomodation in one of institute's guest houses "Doctoranzi II"
- Lunches in institute – payed in advance 30 euro/day
- Accommodation 23 persoane = 6.400 eur;
- subsistence 23 persoane = 8.820 eur;
- transport (plane tickets) 18 persoane = 5.052 eur;
- other organizational expenses= 1871 (2 joint lunches + acces salt mine + transport Slanic) + 3200
- Total: ~25.5k euro
- Local trainers
- Organizers: Razvan Lica, C. Mihai, Dana State, Alex Spiridon, Nicoleta Florea, M. Straticiuc, L. Stan, L.T. et al.
- **Thanks:** DG, M. Petrovici, D. Ghita, R. Margineanu …

Questionaire (rate 1 – 5)

	Phase / Activity	Av rate
1	Event announcement	4.04
2	Response to your application	4.83
3	Final directions for arrival	4.87
4	Accommodation	4.39
5	Meals	4.09
6	Timetable	4.30
7	Content of lectures	4.17
8	Quality of presentations	4.26
9	Interactions with peers	4.83
10	Leisure time	4.22
11	**Overall satisfaction**	**4.52**

- I have enjoyed a lot the experience of the school and I think it has given me an experience very difficult to get in other circumstances. Also, the other students I have met here were very nice and we could work pretty well as a team. For me, this has also been a great opportunity to make new bonds and connections between studens for future collaborations. I would like to take the time to congratulate the organizers for all the effort on this event and say thanks for the opportunity to be part of it.
- It was a great experience to be here, I learned a lot, and enjoyed my visit to each facility.
- Even though we sometimes need additional material, Dana, Alexandra and all the others provided everything on the spot. Big respect that they managed everything.
- More time to perform the data analysis to present on the students report. Also, it would be better to have a lecture about the steps we must follow to succesfully complete it. Maybe 3 sessions spread throughout the school would be good to check the preliminary results and guide the students. Also, more hands on activities... I would like to have more time for creating and studying the targets.

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GROUP 1
GROUP 2
GROUP 3

BASIC TRAINING SCHOOL 2023

STUDENTS REPORT – YELLOW TEAM

13-23 September 2023, Bucharest-Magurele (Romania)

A little about us...

Continents (5): North America, South America, Europe, Africa and Asia

Countries (8): South Africa, Mexico, Brazil, Serbia, Turkey, Greece, Hungary, India

Education (3): Bachelor, Master and Ph.D

WHAT HAVE WE DONE?

3 MV Experiment

1 MV AMS Visit

ELI-NP Visit

Hadron Physics Department Visit

Multipurpose Irradiation Facility Visit

Field trip to the underground laboratory of IFIN-HH from Slanic Prahova

Lectures on Nuclear Physics from different perspectives

9 MV Experiment

Detectors and DAQs in Nuclear Physics Lectures

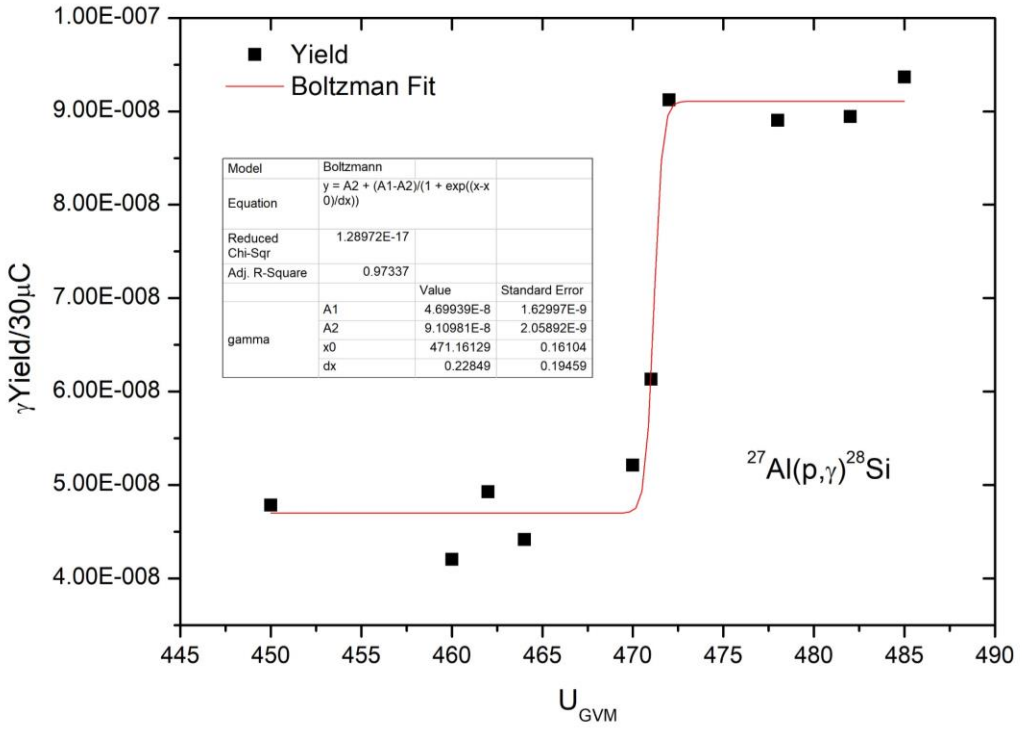
Target Preparation Lecture

3 MV RBS Experiment

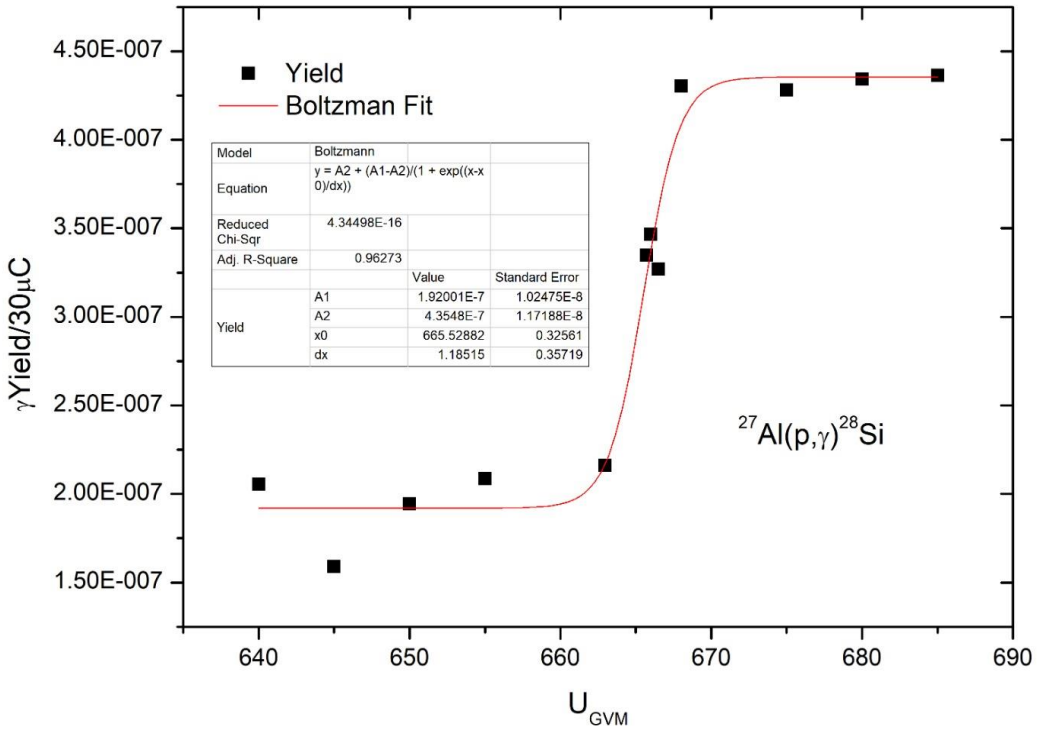
3 MV Tandetron - Experimental setup

BEGA

ACCELERATOR CALIBRATION



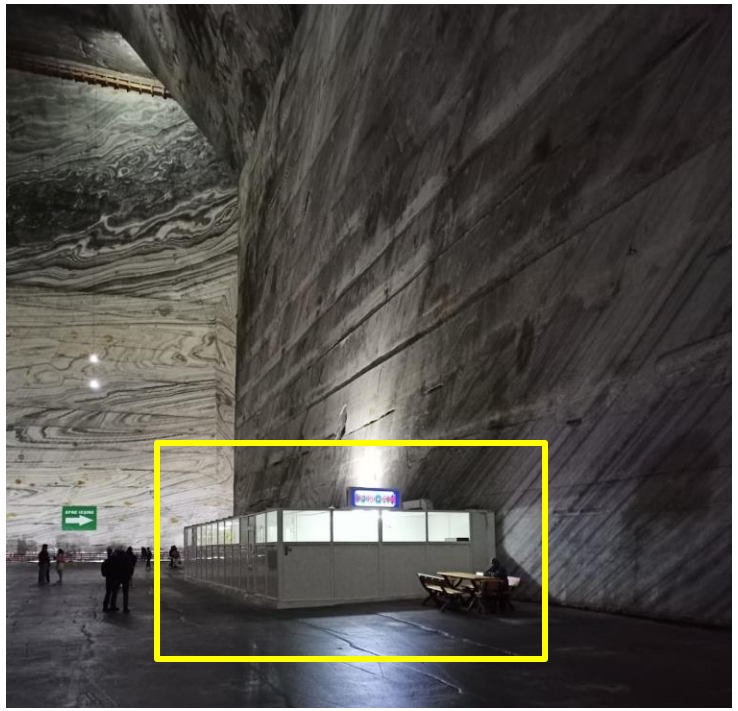
992 keV resonance



1381 keV resonance

EXPERIMENTAL PROCEDURE - SETUP

- De-activation measurements



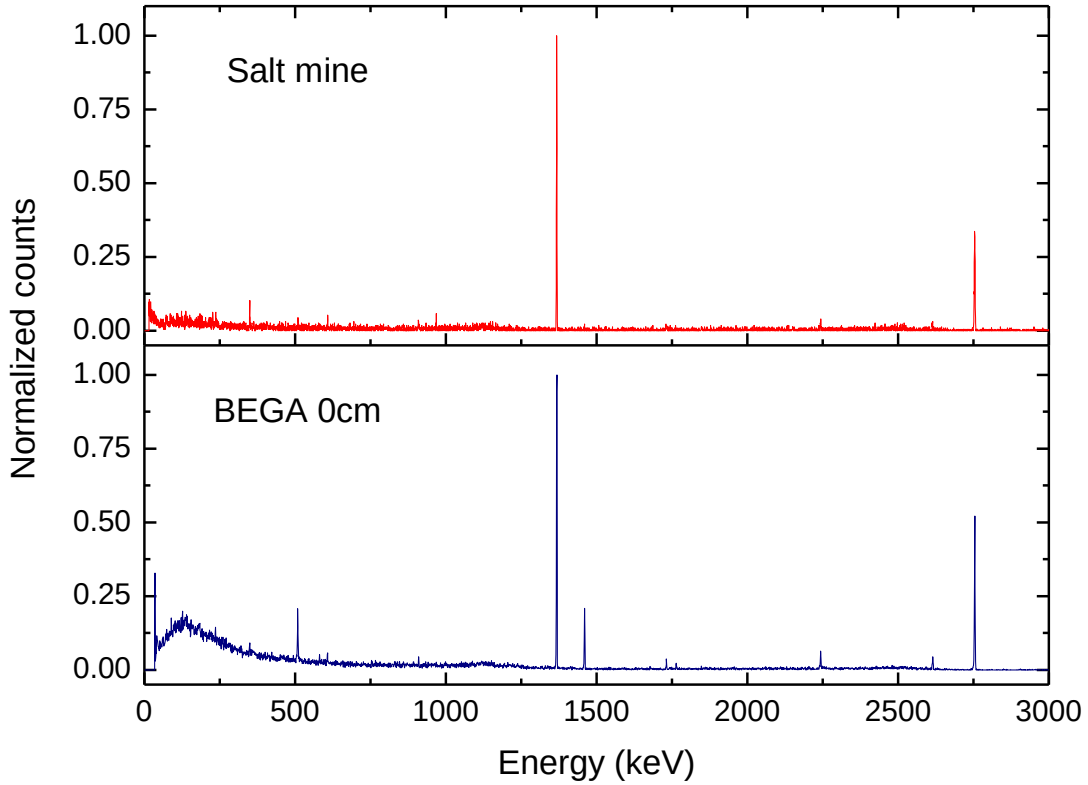
BEGA station

μBq Lab (Slanic Prahova salt mine)

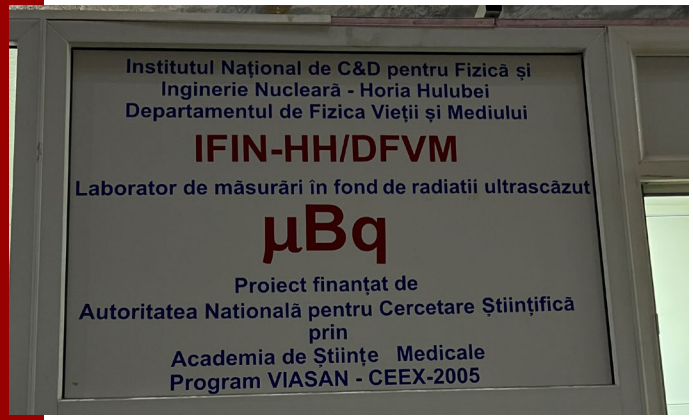
SPECTRUM MEASUREMENTS – BACKGROUND RADIATION

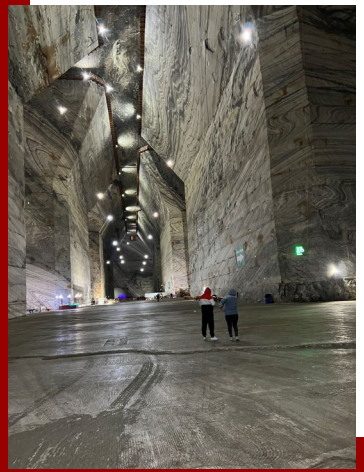
Comparison of the spectra from different measurements of 9.0 MeV irradiated sample:

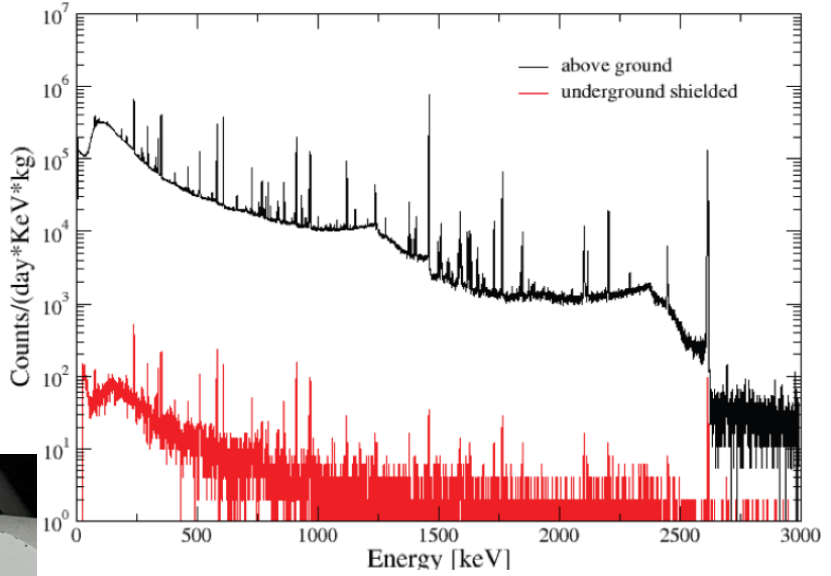
- BEGA deactivation measurement.
- Slanic Prahova salt mine: ultra-low (μBq) background laboratory deactivation measurement.



Ultra-low background laboratory in Slanic-Prahova







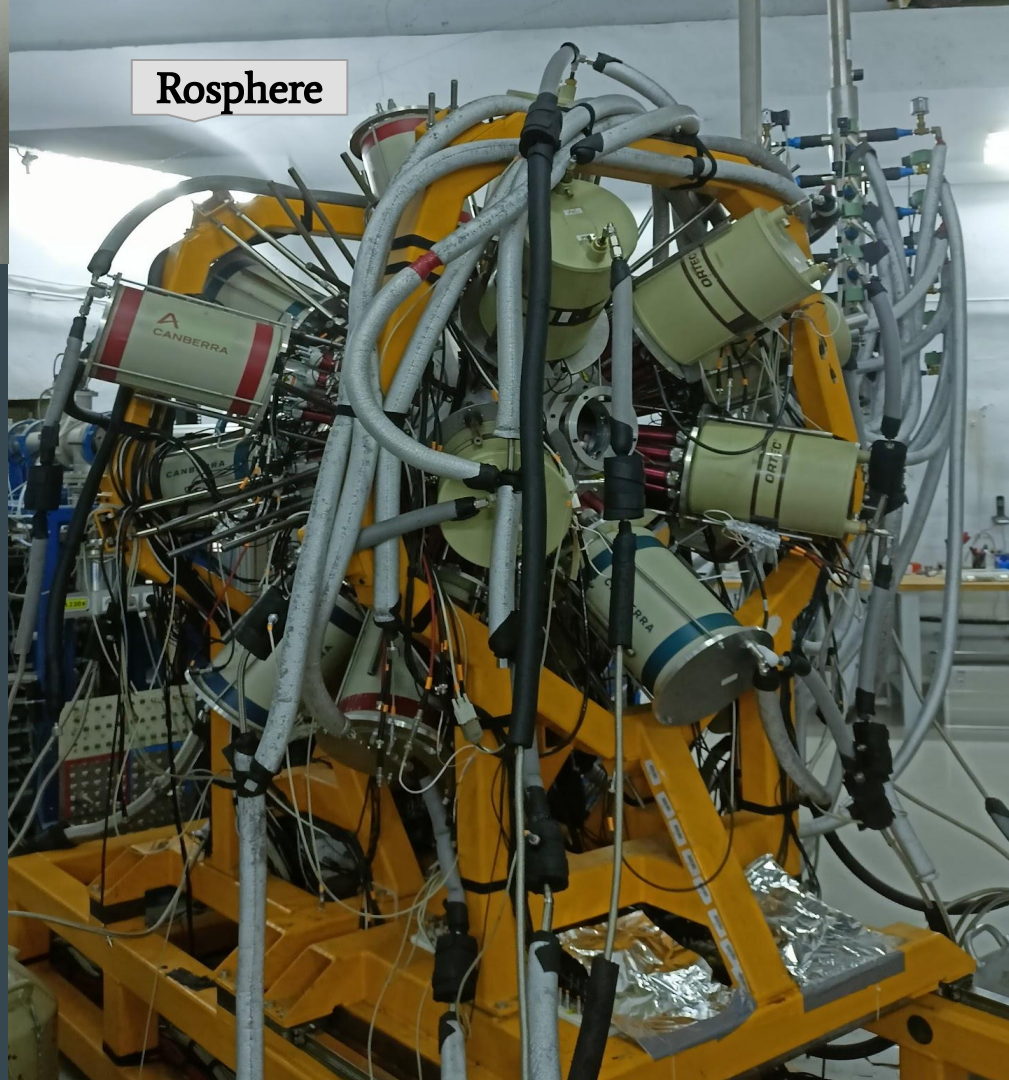
4000 times lower background radiation!

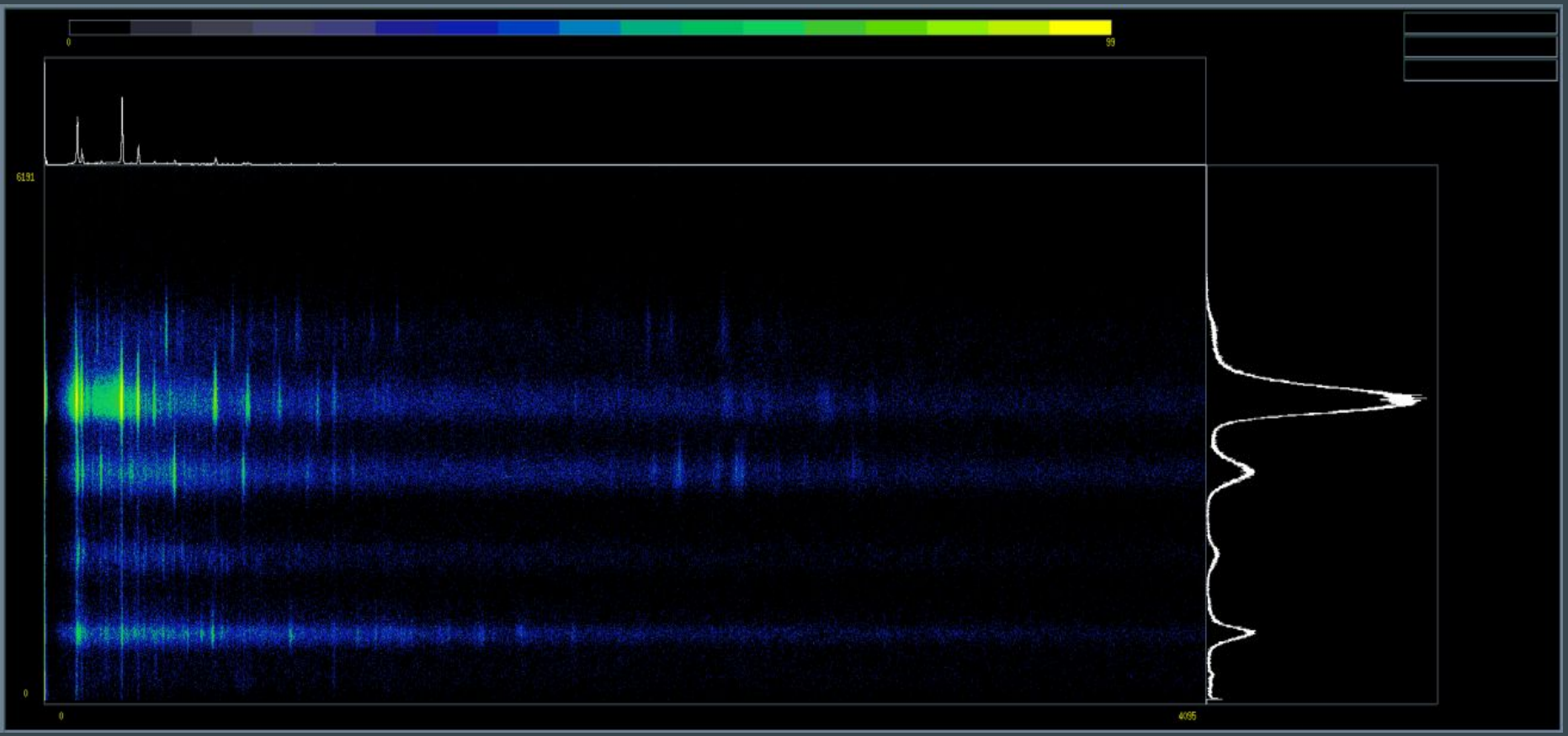
VISITS

9 MV Pelletron - Experimental setup

ROSPHERE

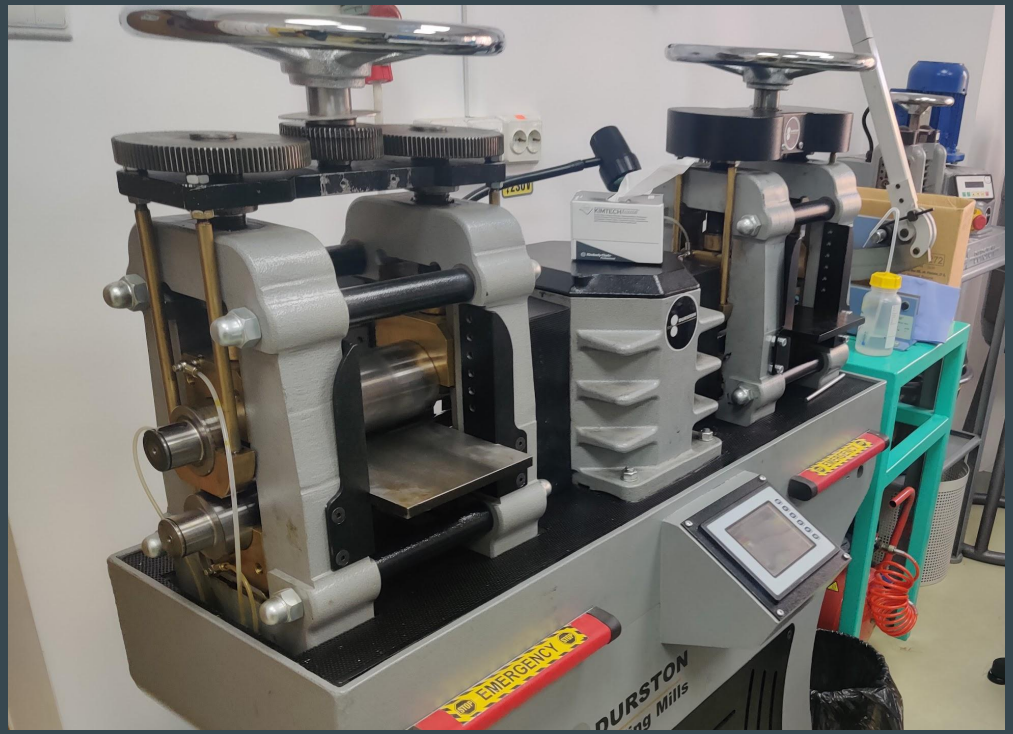
A little about detectors

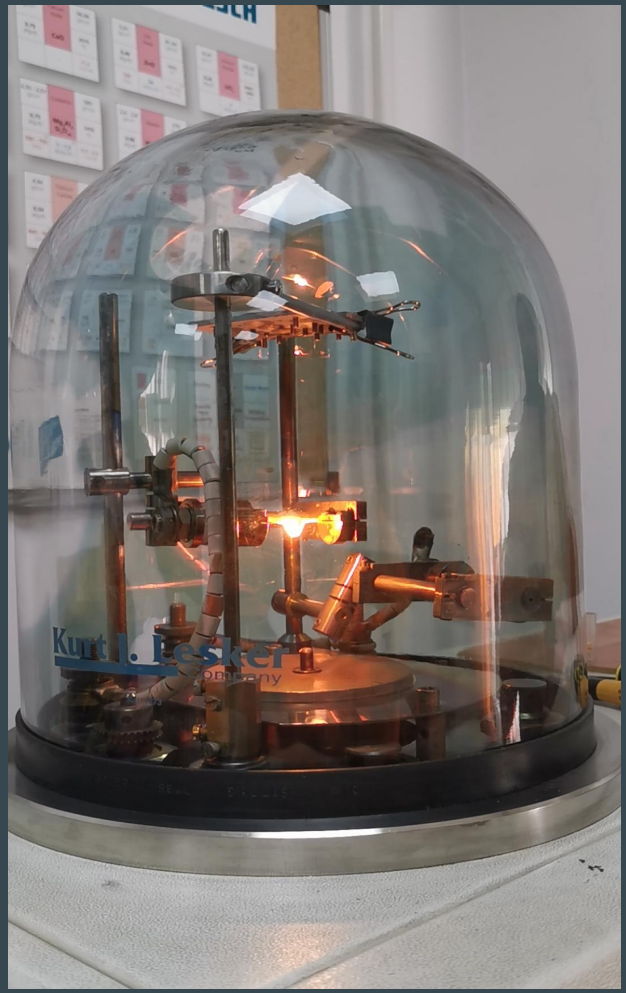




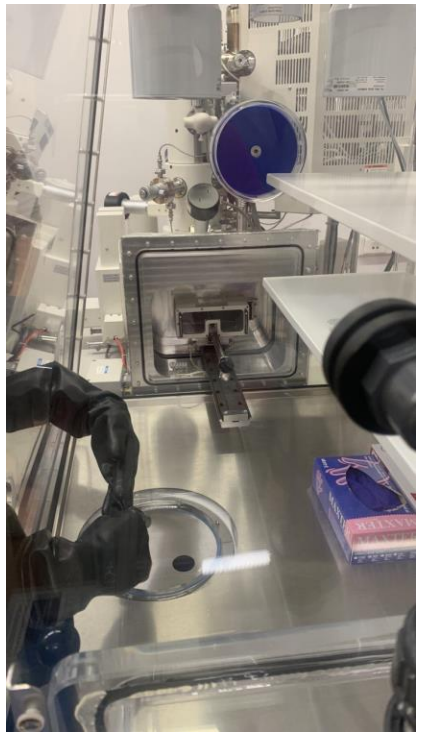
Correlation plot between Charged Particles Energy with Gamma Energy

Target preparation



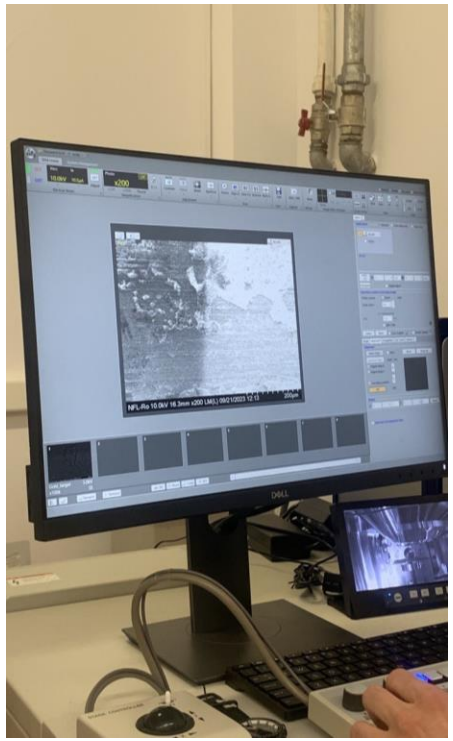


COMPOSITION ANALYSIS

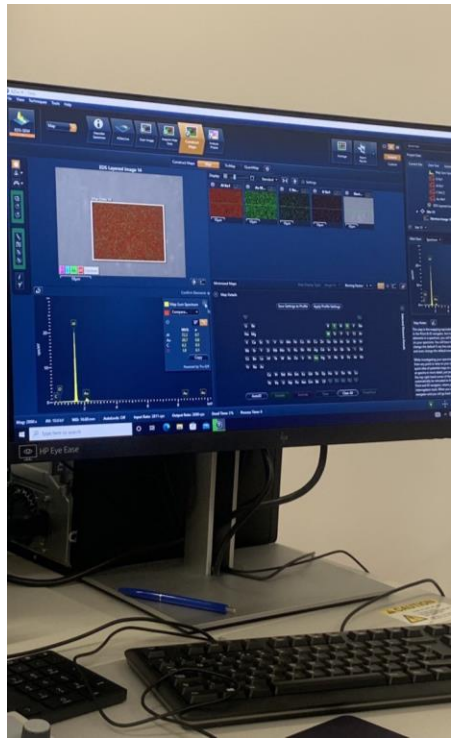


Target placement

SEM/EDX



Chosen area



Composition

Facilities

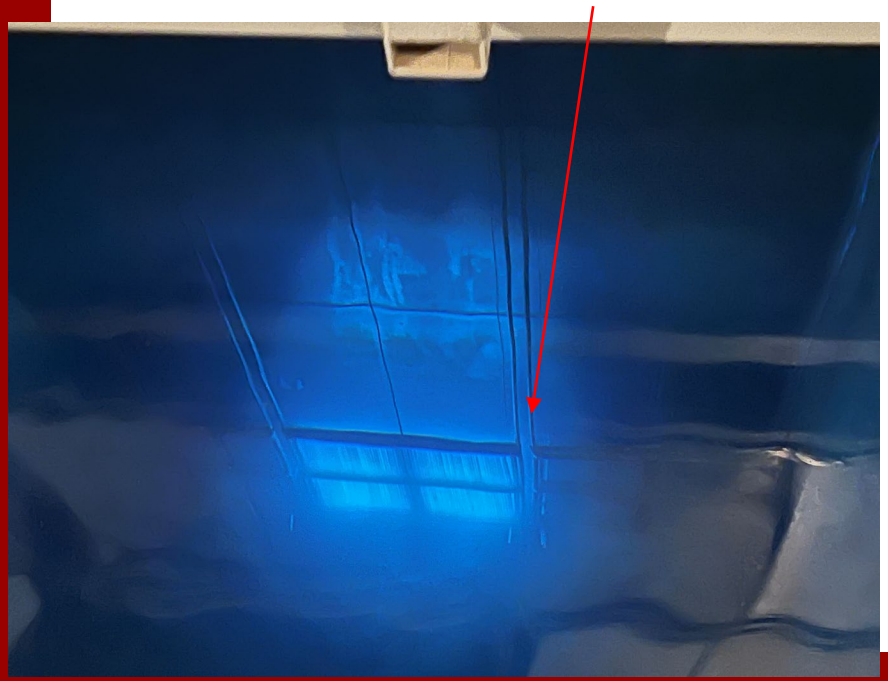
5. AMS

6. RBS

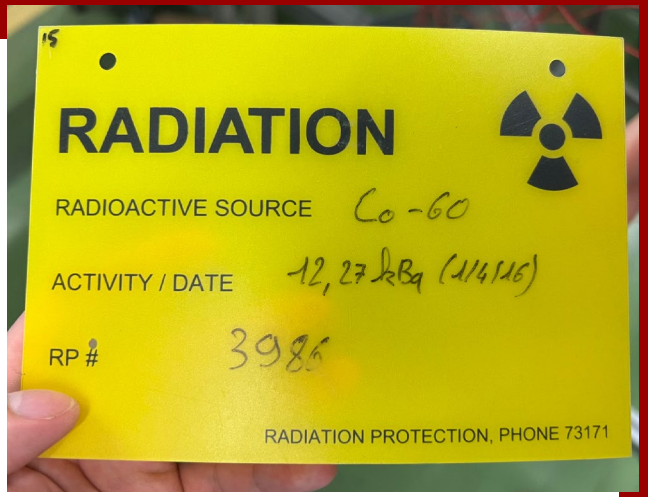
Multipurpose Irradiation Facility

200 Curie ^{60}Co source!!!

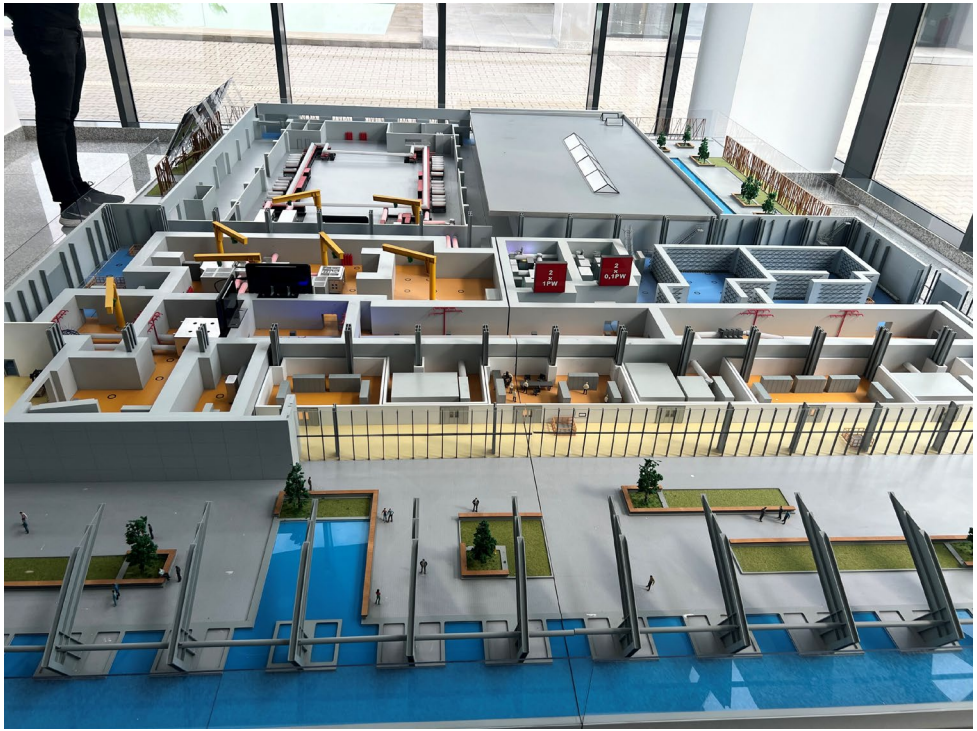
Cherenkov radiation



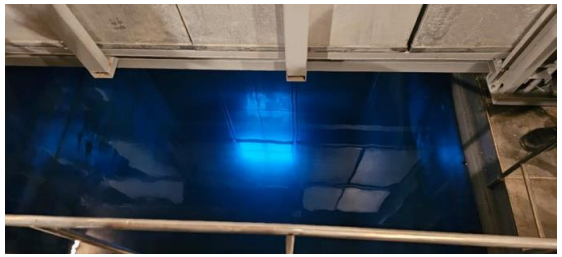
x600000000

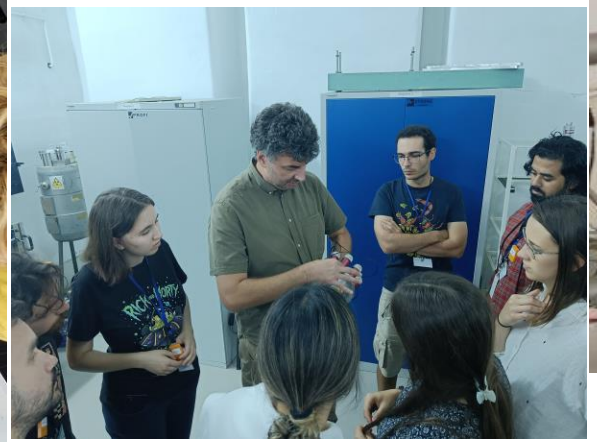


Extreme Light Infrastructure (ELI-NP)



1PW Laser!






Aaaw, so tired…
hope nobody sees
me…

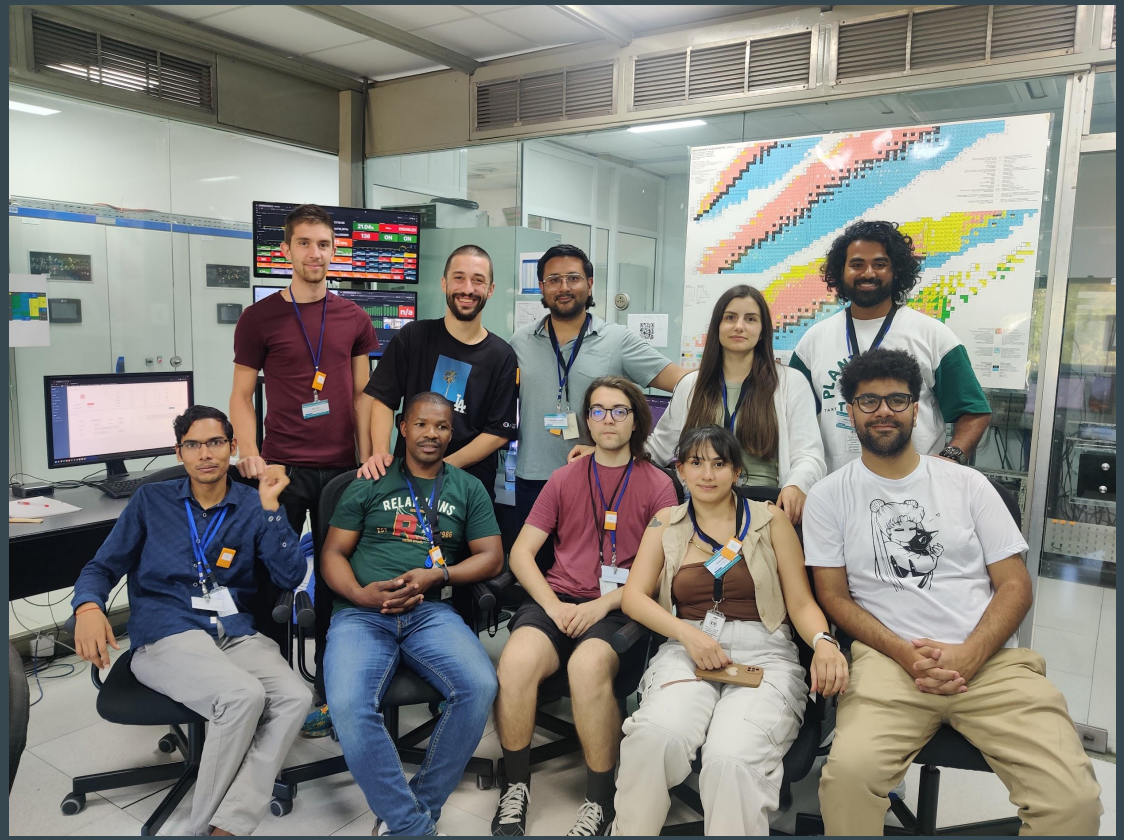
Conclusions

BTS23 was able to provide the following:

- A deep insight of the nuclear physicist work
- From target manufacturing to detectors
- From analysis of detectors' data and interpretation of results
- From types of detectors used to detect high energy particles
- From working principles of detectors, measurement techniques and sensitivities.
-

- Learnt:
  - Behaviours of atomic nuclei and their constituents - nuclear reactions, nuclear decay mechanisms and structure of atomic nuclei.
  - About design and how to conduct experiments - laboratory skills, data analysis and the use of various scientific instruments.

Thanks for your attention!!! Multumesc!!!!!!



*If you have any questions.....you know.....Dana or Alex!!!!

Thank you for your listening!
Advanced Training School in Bucharest?
Any questions?