RIGA TECHNICAL UNIVERSITY

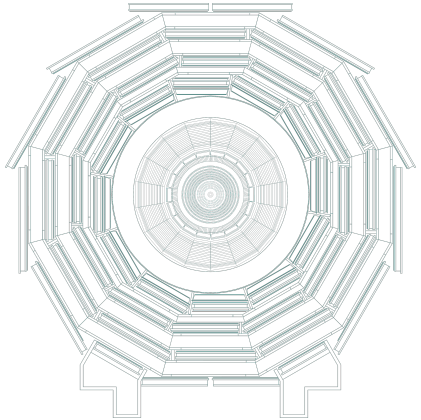
Institute of Particle Physics and Accelerator Technologies

Latvia: state-of-play at RTU

11th CERN Baltic Group General Meeting

Kārlis Dreimanis, Andris Ratkus

04.05.2023



Structural changes at the Riga Technical University

- The long road to towards a dedicated CERN-related research/academic structural unit at RTU is finally at the end;
- **Since April 1st, 2023**, the *RTU Centre of High-Energy Physics and Accelerator Technologies* has been fully transformed into the RTU **Institute of Particle Physics and Accelerator Technologies (IPPAT);**

RĪGAS TEHNISKĀ UNIVERSITĀTE
Daļiņu fizikas un paātrinātāju tehnoloģiju institūts

RIGA TECHNICAL UNIVERSITY
Institute of Particle Physics and Accelerator Technologies

- IPPAT has been founded within the RTU Faculty of Materials Science and Applied Chemistry (as the most natural-sciences-oriented faculty at RTU at this time);
- IPPAT is a direct heir of the HEP Centre, including personnel, study programmes, projects, funds and financial tools, etc.;
- However, the founding of the this new Institute gives us more flexibility (and say) in our scientific endeavours within the University structure;
- We are currently working on developing a new web-presence and visual identity (the existing web and Facebook pages have been simply renamed for now, but watch this space!);

Latvia in CMS

- Latvia participates in the CMS experiment as a **consortium of RTU and UL**, with RTU and **IPPAT as the lead partner**;

- The main scientific direction of the CMS-Latvia team remain unchanged:
  - Top quark physics;
  - Higgs physics;
  - MIP Timing Detector (MTD) project;

- The core **CMS-Latvia team** (as of 04.05.2023):
  - Kārlis Dreimanis, RTU (senior researcher, team leader);
  - Markus Seidel, RTU (senior researcher);
  - Elīna Pajuste, LU (senior researcher);
  - Guntis Pikurs, RTU (researcher, engineer);
  - Jānis Vilcāns, RTU (researcher, engineer);
  - Andris Potrebko, RTU (PhD student, Year 3);
  - Antra Gaile, RTU (PhD student, Year 2);
  - Normunds Strautnieks, LU (PhD student, Year 2);
  - Dace Osīte, RTU (PhD student, Year 1);
  - Dimitrios Kontos, RTU (PhD student, Year 1);
  - Conrado Diaz, RTU (PhD student, Year 1).











CMS authorship

- **As of today, CMS-Latvia has 7 authors on the CMS author list**::
  - **RTU**: K. Dreimanis, M. Seidel, A. Potrebko, A. Gaile, G. Pikurs, V. Veckalns[1];
  - **LU**: N. R. Strautnieks;

- **Reminder, CMS authorship can acquired**:
  - No earlier than 12 months after being registered on CMS;
  - Candidate must perform experiment-useful work (outside their main scientific goals);
  - This work is measured in months, must form a 6-month equivalent and can be a combination of:
    - Central and detector-on–call shifts;
    - Monte-Carlo data generation / validation;
    - Detector development projects;
    - Computing activities, incl. Tier2 site development/maintenance;

      etc.;

- Milestone for Latvia - representation in the Moriod EW 2023, by Markus Seidel;

[1] *legacy* author;

Accelerator physics and technologies

- **Latvian accelerator research group is involved in three large CERN coordinated or CERN associated accelerator development projects:**
  - Innovation Fostering in Accelerator Science and Technologies (I.FAST);
  - Heavy-Ion Therapy Research Integration plus (HITRIplus);
  - Next Ion Medical Machine Study (NIMMS);

Prof. Toms Torims, RTU

Dr. Andris Ratkus, RTU

- IPPAT leads work packages and tasks in the I.FAST project;
  NB! Other researchers from RTU are also involved in I.FAST

- In late 2022 IPPAT accelerator team acquired a new researcher, a *cotutelle* PhD student in conjunction with PoliMi;

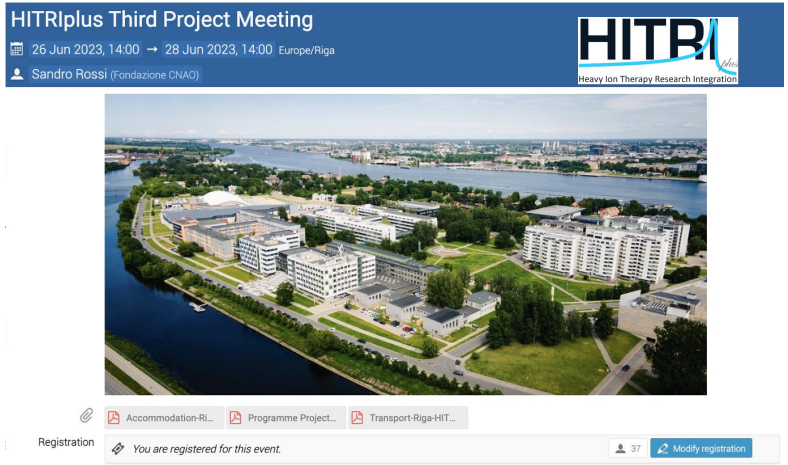
- 6 students are currently working on accelerator projects within IPPAT, 5 doctoral students:
  - Guntis Pikurs;
  - Kristaps Paļskis;
  - Lazar Nikitovič;
  - Luca Piacentini;
  - Tobia Romano;

  - and one master's student:
    - Viesturs Lācis;

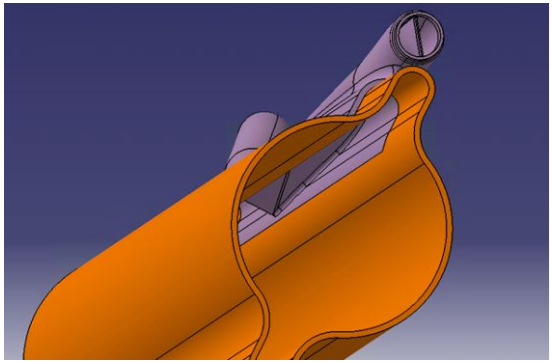
Accelerator physics and technologies

- The 3rd HITRIplus project meeting will be held in RTU this summer →

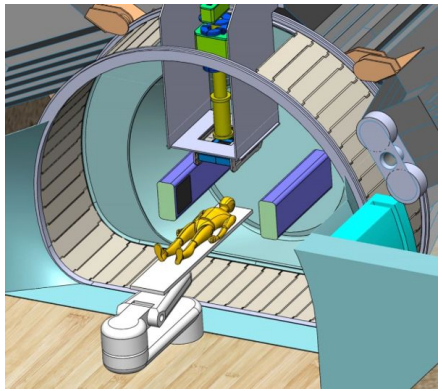
- RTU accelerator research team will have **two projects** in the **2023 CERN summer students' programme**:
  - Additive manufacturing applications for particle accelerator components;
  - Mechanical design of lightweight stiff structures for medical applications of particle accelerators;



FUTURE CIRCULAR COLLIDER



HITRI plus
Heavy Ion Therapy Research Integration



SRP “High-energy physics and accelerator technologies”

- **On december 15th, 2022, we have commenced a the new State Research Programme project**:

  “ High-energy particle physics research at the CMS experiment and the development of advanced accelerator technologies in collaboration with CERN”;

- **Project ID**: VPP-IZM-CERN-2022/1-0001;
- **Project duration**: 48 months;
- **Total budget**: 1’395’000 Eur;

- **Project partners**:
  - RTU, IPPAT (leading partner);
  - UL Institute of Chemical Physics;
  - UL Institute of Solid-State Physics;

- The project is still in relatively early stages, however, the research topics are largely the continuation of the previous call, especially regarding the PhD students involved; this project should result in *quite a few PhD theses*;

Study programmes (briefly, see tomorrow)

- Reminder: RTU/UL are implementing a joint Doctoral Study programme (DSP):
  - Particle Physics and Accelerator Technologies;
  - The total number of currently enrolled students - 11;
- The study direction for this programme was undergoing the accreditation process during 2022, both at RTU and UL;
- As a consortium with 4 other CBG partners, RTU is also developing a master's programme:
  "European Master in High-Energy Physics and Accelerator Technologies for Research and Industry"
- Small European funds (55kEur) have been attracted via Erasmus Mundus Design Measures;
- Aim to successfully bid for the Erasmus Mundus Joint Masters funds in February 2024;