Izglītības un zinātnes ministrija

Latvia - CERN: state-of-play

Prof. Toms TORIMS
CERN National Contact point of Latvia

CBG General Meeting, Tallinn, 18.10.2024

Ministry of
Education and Science
Republic of Latvia

researchLatvia
Value Through Knowledge

Latvia is a reliable and honest partner of CERN

Latvia – CERN Strategy

Latvia - CERN strategy

Publicly available, including its English translation

- Approved by Government in Dec 2022
- Has very clear and detailed implementation plan
- Is being successfully **coordinated** by CERN National Contact Point of Latvia and **implemented by all** involved parties
- Benefits from **comprehensive** public **funding** mechanism and **stakeholder engagement**
- The main **goals are** being **steadily assured**
  1. Meaningful and coordinated participation of Latvia at CERN in the Associate Member state status
  2. To become Full Member state within 2-3 years

Example of CMS shifts

By Country — Proposal 2 (updated Oct 13)

Country	Region	# of Authors	Central Shifts expected	Central Shifts	Central Shifts/Expected
ARMENIA	Russia and Dubna Member States	2.69	23.07	22.50	0.98
AUSTRIA	Other CERN Member States	16.86	144.66	101.50	0.70
BELGIUM	Other CERN Member States	54.74	469.73	450.00	0.96
BRAZIL	Other States B	37.28	319.87	339.50	1.06
BULGARIA	Other CERN Member States	13.00	111.54	162.29	1.45
CERN	CERN	79.81	684.81	736.50	1.08
CHILE	Other States B	2.79	23.66	113.00	4.74
CHINA	Other States A	43.22	370.79	398.00	1.07
COLOMBIA	Other States B	10.30	88.40	311.71	3.53
CROATIA	Other States B	13.00	111.54	128.00	1.15
CYPRUS	Other States B	10.14	87.02	101.50	1.17
ECUADOR	Other States B	1.00	8.60	8.00	0.93
EGYPT	Other States B	4.00	34.59	0.00	0.00
ESTONIA	Other States B	7.12	61.07	0.00	0.00
FINLAND	Other CERN Member States	16.31	139.98	111.50	0.80
FRANCE	France	72.01	617.81	472.50	0.76
GERMANY	Germany	177.51	1523.02	1526.50	1.00
GREECE	Other CERN Member States	7.91	67.89	33.00	0.49
HUNGARY	Other CERN Member States	17.04	146.24	56.50	0.39
INDIA	Other States A	79.14	679.04	650.00	0.96
IRAN	Other States A	8.00	68.64	8.00	0.12
IRELAND	Other States B	2.00	17.14	88.00	5.14
ITALY	Italy	250.53	2149.29	1716.00	0.80
KOREA	Other States A	43.62	391.44	271.00	0.69
KUWAIT	Other States B	0.55	4.69	0.00	0.00
LATVIA	Other States B	8.64	74.10	166.00	2.24
LEBANON	Other States B	0.00	0.00	0.00	0.00
LITHUANIA	Other States B	4.00	34.32	99.50	2.03
MEXICO	Other States B	14.74	126.50	83.57	0.66
MONTENEGRO	Other States B	2.00	17.16	57.00	3.90
NEW ZEALAND	Other States A	0.00	0.00	57.14	0.00
NIGERIA	Other States B	0.00	0.00	0.00	0.00
PAKISTAN	Other States A	5.00	42.90	0.00	0.00
POLAND	Other CERN Member States	11.85	101.67	300.50	2.96
PORTUGAL	Other CERN Member States	12.17	104.44	42.50	0.41
RUSSIA	Russia and Dubna Member States	52.70	452.14	340.50	0.75
SERBIA	Other CERN Member States	6.74	57.81	42.00	0.73
SPAIN	Other CERN Member States	57.20	490.82	391.36	0.80
SWITZERLAND	Switzerland	56.37	483.62	241.21	0.50
TAIWAN	Other States A	24.27	208.19	26.00	0.12
THAILAND	Other States A	3.00	25.74	100.00	3.89
TURKEY	Other States B	38.14	335.86	311.00	0.93
UNITED KINGDOM	United Kingdom	68.16	584.78	504.50	0.86
USA	United States of America	662.68	5683.80	4278.71	0.75

The Compact Muon Solenoid Collaboration
confers on

Karlis Dreimanis

Riga Technical University - Latvia

a

CMS 2023 Award

For great support and enthusiasm in CMS P5 operations as Run Field Manager

The Collaboration Board Chairperson
(Elisabetta Gallo)

Elisabetta Gallo

The Experiment Spokesperson
(Patricia Mc Bride)

June 24th, 2024

researchLatvia
Value Through Knowledge

I.

Meaningful and coordinated participation of Latvia at CERN in the Associate Member state status

Tasks for associate membership

researchLatvia
Value Through Knowledge

1. To benefit from the **opportunities** at CERN – in the best possible way and at all levels
2. To provide sustainable contribution in attaining the **State priorities** in education, science, economic development and R&D
3. To foster environment of the **scientific excellence and industrial leadership**
4. To concentrate available and to attract new **human resources** / to use strategically available **financial instruments**
5. Within the next years to achieve "**well balanced country**" status and to ensure **60/40 proportion** for scientific HR / industrial return

Scientific/research portfolio

Based on the bottom-up initiatives / balance & diversity / strategic approach

CERN based experiments and collaborations

- **CMS** as a **HEP flagship** project (RTU+LU)
- **MEDICIS** (RTU+LU)
- AEgIS (LU)
- ISOLDE (LU)
- Crystal Clear Collaboration (LU)

Development of new projects and technologies at CERN

- Accelerator & Technology Sector /ATS-DO
- Engineering and Technology Departments
- Future Circular Collider study (FCC)
- International Muon Collider Collaboration

EU funded projects CERN coordinated/associated

Riga Technical University (RTU)

- I.FAST
- HITRIplus
- NIMMS

University of Latvia (UL)

- PRISMAP
- QuantHEP

Where we stand?

Benefiting from the **opportunities** at CERN – **in the best** possible **way** and **at all levels -** *participation and contribution*

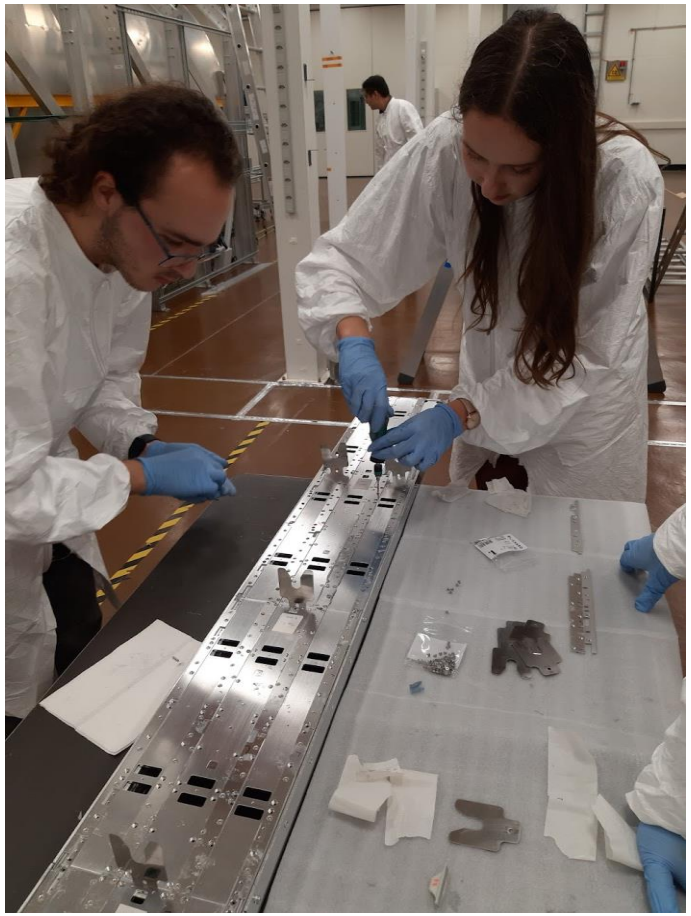
1. Consortium (RTU+LU) in the **CMS experiment – since 2017**
2. Consortium (RTU+LU) in the **MEDICIS experiment – since 2020**
   - The European medical isotope programme: Production of high purity isotopes by mass separation (**PRISMAP**) project **– since 2021**
3. LU in **AEgIS** experiment **– since 2021**
4. LU in **ISOLDE** experiment **– revitalised in 2023**
5. Participation of the RTU in CERN **accelerator technology projects**
   - Future Circular Collider (**FCC**) **– since 2015**
   - International Muon Collider Collaboration (**IMCC**) **– since 2023**
   - Next Ion Medical Machine Study (**NIMMS**) project **– since 2019**
   - Innovation Fostering in Accelerator Science and Technology (**I.FAST**) project
   - Heavy Ion Therapy Research Integration plus (**HITRIplus**) Project **– since 2021**

Where Latvia is today?

Benefiting from the **opportunities** at CERN – **in the best** possible **way** and **at all levels** - *Where you can physically find Latvia @CERN?*

1. Latvia Accelerator Technology team is fully integrated within CERN
   - ATS-DO and @B 584
2. Close collaboration with Groups at CERN: Beams; Cryogenics and Vacuum
3. Leading role in CMS MTD and BTL in particular
   - CMS Tracker Integration Facility (TIF)
4. CMS and CMS Technical Coordination – @B40, @Prévessin site and Point5
5. AEgIS experiment – @Antimatter Factory
6. MEDICIS experiment - @ISOLDE/MEDICIS
7. + groups in Latvia @Riga Technical University and University of Latvia + Tier2 federative partners

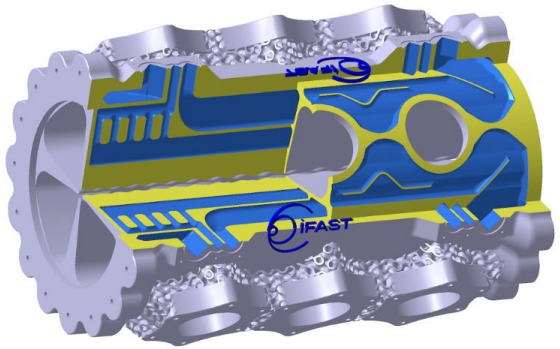
Particle physics - MIP Timing Detector



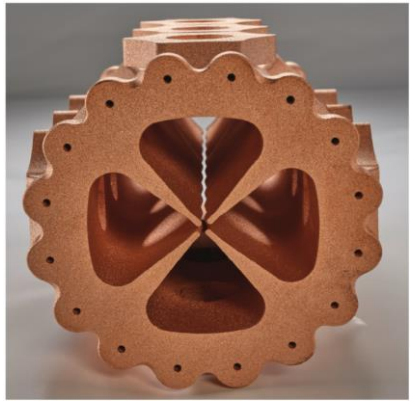
Accelerator projects - I.FAST

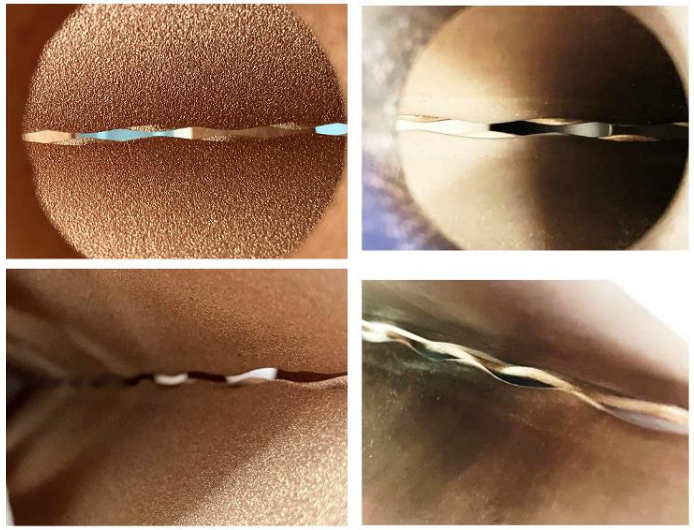
WP10: Advanced Accelerator Technologies (Coordinator RTU)

- Pure Cu (Cu-ETP) RFQ prototypes manufactured by AM



L= 250 mm



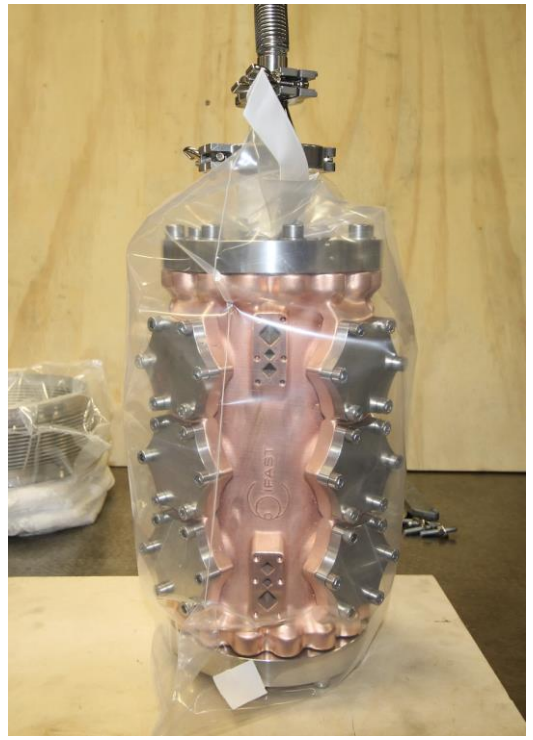


Before After

Post-procesing

Post-procesed and machined

Vacuum tests: The leak detector threshold value was set at $\mathbf{1 \cdot 10^{-10} mbar \cdot l \cdot s^{-1}}$



CERN research in Latvia

Other institutes carrying out CERN related research and projects

University of Latvia

1. Institute of Chemical Physics – Prof. Elina Pajuste group - **CMS** and **MEDICIS/PRISMAP**
2. Faculty of Physics, Mathematics and Optometry - Prof. Mārcis Auziņš group – **AEgIS**
3. Institute of the Solid State Physics – Dr. Anatoli Popov group- **Crystal Clear Collaboration**
4. Institute of Atomic Physics – Dr. Uldis Bērziņš group – **ISOLDE**
5. Quantum Computing group of Prof. Andris Ambainis - **QuantHEP**

Riga Technical University

1. Institute of Particle Physics and Accelerator Technology – **leading national institute** – see following info
2. Department of artificial intelligence and systems engineering - Prof. Agris Ņikitenko group – **I.FAST** + Mechatronics, **Robotics** and Operations section **at CERN**
3. Institute of technical Physics – Prof. Arturs Medvids group – **I.FAST**
4. Students of Institute of Mechanics and Mechanical Engineering - **I.FAST** and **HITRIplus**
5. Leading High Performance Computing (HPC) Centre – **Tier2** project - **WLCG**

Latvia in CERN

Benefiting from the **opportunities** at CERN – **in the best** possible **way** and **at all levels – Latvia joined CERN in Aug 2022.**

1. CERN **Doctoral** Student Programme (DOCT) – 8
2. CERN – Latvia **Doctoral** Programme – 100% paid by Latvia - 5 so far
3. CERN **Technical** Student Programme (TECH) - 2
4. CERN **Summer** Student Programme (2+2 every year) – 27 since 2013
5. **Internship** at CERN (STAG programme) – 2
6. Participation in CERN **Graduate** Programmes
   - Project Graduates (GRAD) - 3
   - Research Fellows (FELL) – 4
7. CERN (**STAF**) - 5 staff

18 with Latvian affiliation today at CERN

+ 29 Users

To continue capacity and competency building in HEP and AT

To maintain strong CERN related scientific institute with multidisciplinary research team and presence at CERN

Dedicated doctoral programme

- In collaboration with CERN Baltic Group – **designed by CBG** Study Programme Working Group
- # of PhD students: 4th y – **6***; 3nd y **4**; 2st y **3**; 1st y **2**;
- Students are **co-supervised by CERN** staff
- Strong presence of **international students**
- Executed in Latvia with mandatory **term at CERN**
- **World class** lecturers: Latvia, CBG, CERN, PSI …
- Balance between **HEP** and **AT**
- International Study Program Council
- Relevant **master programme** is being developed

* one "5th year" student in the process of completing/submitting their thesis

Where Latvia is today?

- To concentrate available and to attract new **human resources** / to use strategically available **financial instruments – 2M+/annum + ILO costs**
- To foster environment of the **scientific excellence and industrial leadership**

1. National **Research Programme** "High-Energy Physics and Accelerator Technologies" **– 300 000 EUR in 2024 – will be doubled at least**
2. CERN **membership** payments **– 1.066 250 CHF in 2024**
3. Comprehensive **public funding** package **- 950 788 in 2024**, of which
   - participation in CERN experiments **– 511 282 EUR**
   - CERN National Contact Point, incl. Outreach and education activities **– 339 506 EUR**
   - Tier2 Computing Center **– 100 000 EUR**

Where Latvia is today?

Providing sustainable contribution in attaining the **State priorities** in education, science, economic development and R&D
Outreach / annual activities – fully paid by Latvia

There were 1000+ LV nationals visiting CERN

1. "**shadowing**" of the LV scientific and technical personnel at CERN - 31
2. High School pupil visits to CERN - 49
3. Pupil visits to CERN – the **School of Young Physicists** - 6
4. The **Riga TechGirls** visits to CERN - 9
5. Master and doctoral student (groups) **educational visits** to CERN - 65
6. Participation in the **CERN Teacher Programme** – 100+ teachers


To commemorate the visit of the iconic
BBC Children's Television Programme
BLUE PETER
during its 60th birthday year in 2018
to the
CMS EXPERIMENT AND LARGE HADRON COLLIDER


CERN

Geneva/CERN based ILO

To ensure meaningful Latvian business participation @CERN

CERN as priority

- ILO KPI's are directly based on industry engagement

Knowledge Transfer

- Technological and knowledge return to Latvia by engaging R&D capable companies

Well-balanced industrial return

- To ensure fulfilment of the current 'quota'
- To prepare industrial portfolio for the full-membership @CERN
- To closely collaborate with Latvian scientific and engineering community at CERN

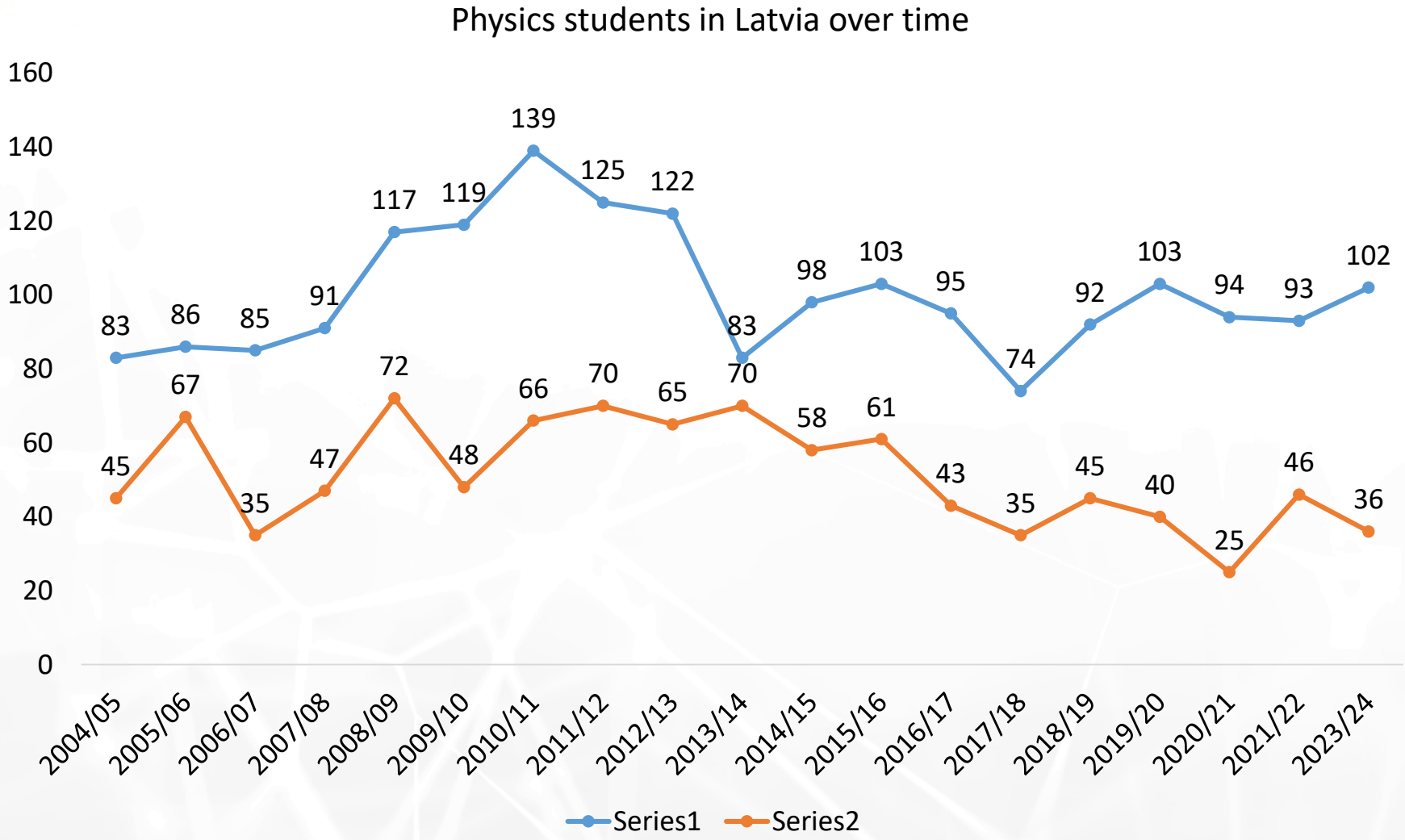
Where Latvia is today?

Providing sustainable contribution in attaining the **State priorities** in education, science, economic development and R&D
- To promote collaboration between Latvia and CERN, scientific groups and entrepreneurs

1. CERN **Latvia** (stakeholder) **Group** and close link with Latvian **staff at CERN – 15th meeting was on 14 Oct @Daugavpils**
2. Joint **doctoral study programme** "Particle Physics and Accelerator Technologies" by the RTU and LU **– up and running – thanks to CBG!**
3. Federated **Tier-2** CERN/CMS computing centre – inauguration
4. **Institute of Particle Physics and Accelerator Technologies – up and running**

Inauguration of federated Tier2 site of Latvia 05.06.2024

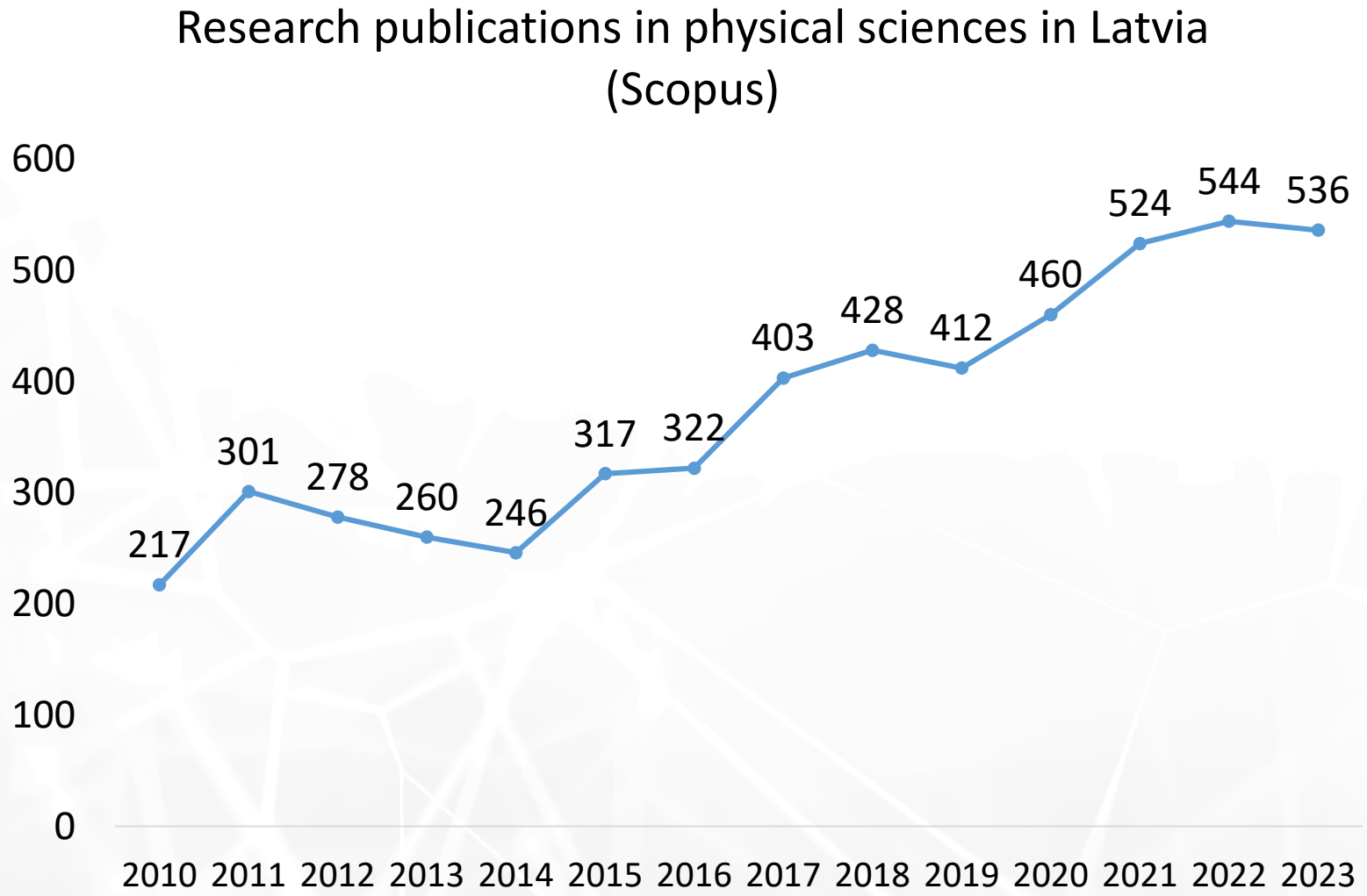
Overall dynamics of physics higher education in Latvia



Sensitive to demographic factors.

Increased enrollment since 2017 (positive effect from CERN)

Overall dynamics of physics research in Latvia



Physics research output has doubled since 2014

It amounts to 16% of total research output in Latvia

Ministry of
Education and Science
Republic of Latvia

researchLatvia
Value Through Knowledge

Latvia – CERN Strategy

Full membership at CERN

Full membership at CERN

Tasks – scientific and technical measures

1. To ensure stable **financial framework** for CERN activities in Latvia – ensuring **50/50 principle** – where proportion of the national funding is gradually exceeding CERN membership
2. To continue **capacity and competency** building in HEP and AT: to maintain strong CERN related **scientific institute** with interdisciplinary research team and presence at CERN; to run master level programme in HEP and AT
3. To facilitate **industrial return** and engagement with CERN; including ILO organised dedicated events in Latvia
4. To cultivate a **positive image** of Latvia – CERN cooperation ***#LatvijaCERN***


1954-2024
YEARS / ANS CERN
Director-General report
Fabiola Gianotti, Council, 26 September 2024
JAPAN
USA
BRAZIL

Engagement of decision-makers and partners

1. To ensure **support from CERN** management and **Member States**
2. To actively participate in the work of the **CERN Council** and committees by forming a positive opinion about Latvia's eligibility for the status of a full-fledged Member State
3. To **coordinate** the participation of Latvia in the work of the CERN Council and its committees
4. To promote coordination at the level of the **Baltic States**, which involves speaking with one single voice in the context of CERN at the level of the **CERN Baltic Group** and **Baltic Assembly**

Premjerministres delegācija CERN
11.10.2024.

Engagement of decision-makers and partners

1. To **ensure** unwavering **support** from the Latvian government, Parliament, scientific community, entrepreneurs, and collaboration partners
2. To promote indirect support from the European Commission
3. Regular high-profile **decision maker and stakeholder** visits to CERN and events in Latvia
4. Strong policy makers **commitment to the 50/50 principle**!

Scientific and technical measures

1. To ensure **stable** State **funding** for CERN activities in Latvia – multi-annual budget planning with the steady growth
2. To **increase the capacity and competence** in the field of high-energy physics and accelerator technologies (done!):
   - Establishment of a scientific institute associated with CERN in LV
   - A stable team of LV scientists operate independently at CERN
3. To promote the awarding of **industrial contracts** from CERN (ILO)
4. To build a **positive image** of collaboration with CERN in Latvia **#LatvijaCERN**

Estimated timeline for full membership

2024 2nd half

Expression of interest - To become Member State

2025

Invitation to submit the application

CERN “Task force” visit

2025

Expected formal invitation to go in pre-stage to the full membership

Cabinet of Ministers decision

CERN decision

2026

Signature of Agreement

Saeima ratifies law on Agreement

2027

Completion of the full cycle Latvia becomes Member State of CERN


CERN's 70th Anniversary
70e anniversaire du CERN
01/10/2024
CERN's 70th Anniversary
70e anniversaire du CERN
01/10/2024
Evika SILIŅA
Prime Minister
Republic of Latvia

Take away messages

Latvia is a reliable and honest partner of CERN

CERN – Latvia membership was and is a very good deed

Latvia has delivering tangible contribution to the CERN scientific programme

Latvia is ready to take the next step – to become a full member of CERN

Latvia is navigating steadily

at cruise speed and with straight-forward course