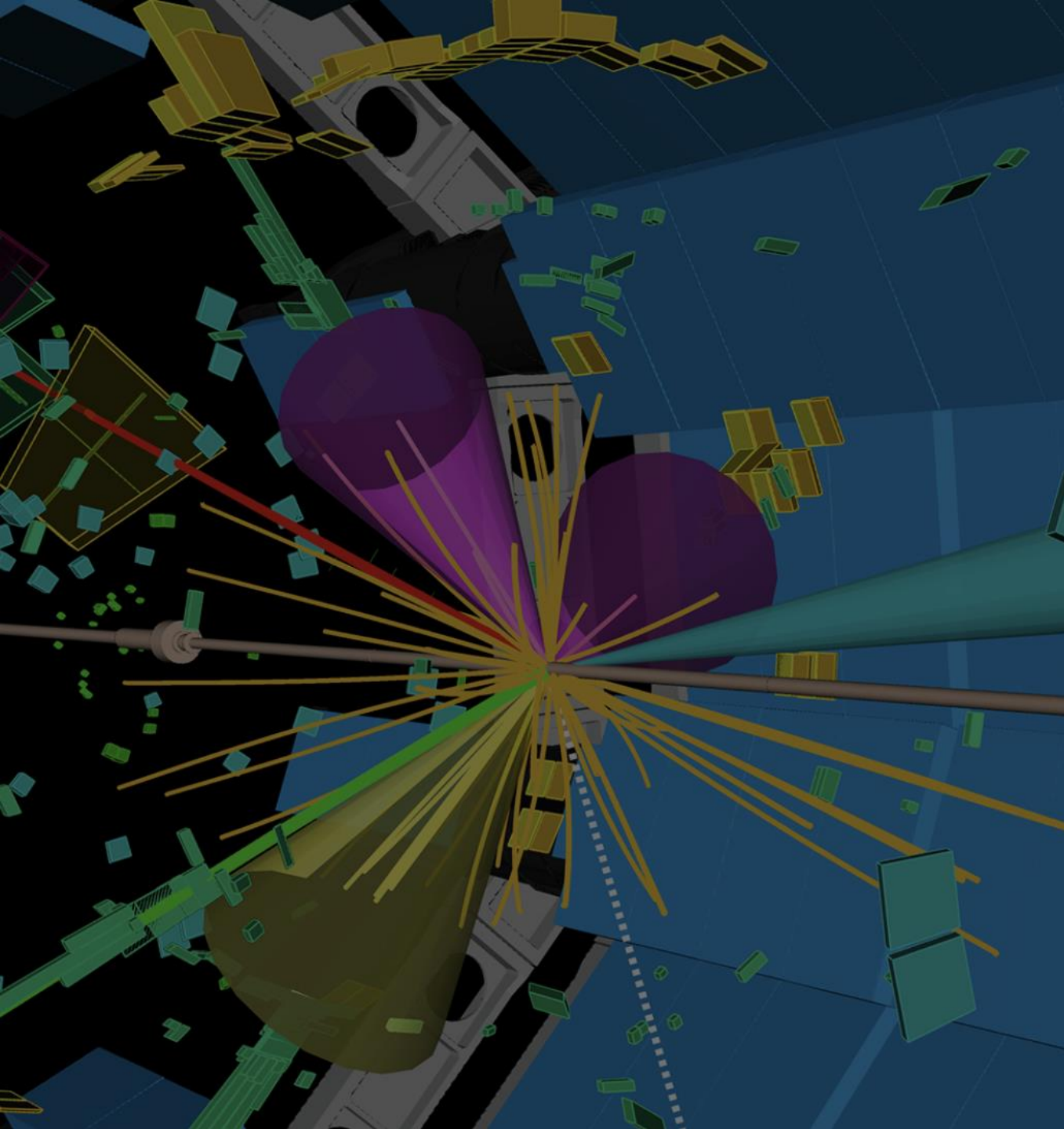




F9 Strategy 2026–2030

Experimental Particle Physics Department (F9)
Jožef Stefan Institute

Yearly retreat · Krvavec, 28.-30.9.2026
Rok Pestotnik

F9 research areas

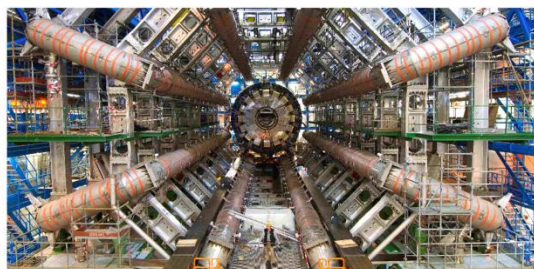
Collaboration in leading HEP experiments

Energy frontier: ATLAS @ CERN

Intensity frontier: Belle II @ KEK in LHCb @ CERN

Cosmic frontier: Pierre Auger, CTAO

Developing solutions for high-performance computing and particle detectors.



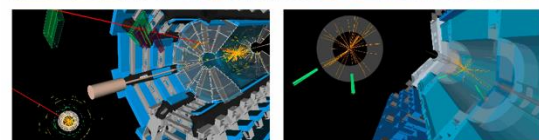
Energijsko obzorje
The Energy Frontier



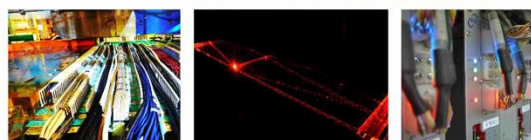
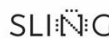
Obzorje pogostosti
The Intensity Frontier



Kozmično obzorje
The Cosmic Frontier



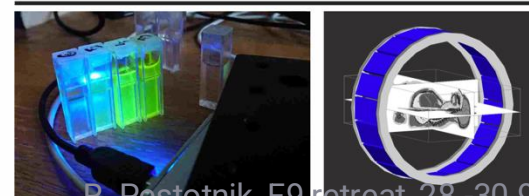
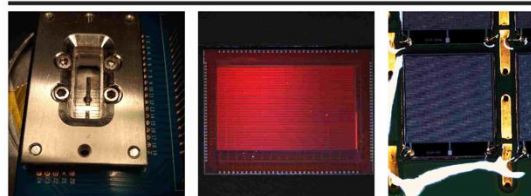
Superračunalništvo
Supercomputing



Razvoj detektorjev
Detector development



Medicinska fizika
Medical physics



F9 is the central Slovenian experimental-particle-physics unit, operating at the junction of international collaborations, detector technology, computing and medical applications.

F9 Research pillars

International collaboration

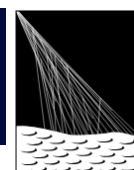
Collaboration	Participants	Institutions	Countries
ATLAS	5500+	~180–240	~40–45
LHCb	1600+	100+	22
Belle II	1223	126	28
Pierre Auger	400+	90	17
CTAO	~1500	200+	25

Collaboration in Slovenia

- University of Ljubljana:
 - Faculty of Mathematics and Physics,
 - Faculty of Electrical Engineering,
 - Faculty of Mechanical Engineering,
 - Veterinary Faculty,
- University of Maribor:
 - Faculty of Chemistry and Chemical Technology
- University Medical Center Ljubljana
- Spin-off company: Particulars d.o.o.
- Patents: flat-panel detectors for PET, FPGA radiation monitor

Participation in planning, construction, and operation

- Detector development: DRD3, DRD4, for medical applications
- Advanced analytics: AI, LLM, HPC
- Application of particle physics methods: medical imaging and computing (WLCG Tier 2 Center Signet)



PIERRE
AUGER
OBSERVATORY

Infrastructure:

- International Infrastructure: ATLAS, LHCb, Belle II, CTAO.
- Infrastructure at the Department:
 - Silicon Detector Laboratory
 - Photon Detector Development Laboratory
 - Cleanroom for the production of components for ATLAS ITk.
- Infrastructure at the IJS: TRIGA / Neutron Irradiation Reference Center
- HPC Infrastructure: SLING, VEGA, etc.

Starting points

- F9 is committed to scientific excellence
- Foundation—excellent leadership since its inception:
 - Prof. Dr. Aleš Stanovnik (1990–1993)
 - Prof. Dr. Gabrijel Kernel (1993)
 - Prof. Dr. Marko Mikuž (1993–2022)
 - Prof. Dr. Borut Paul Kerševan (2022–2026)
- The prominent role of researchers in the scientific and administrative bodies of international collaborations
- Slovenia is a full member of CERN (2025): an opportunity and a responsibility.
 - 4% of voting rights / influence on decisions regarding the direction of research
 - Infrastructure owner: IJS has assumed responsibility for its maintenance
- CERN policy: research exclusively for peaceful purposes
- The HEP community is entering a crucial period: HL-LHC, CTAO.
 - May 22, 2026: Update to the European Particle Physics Strategy approved—first option: construction of the FCC (~91 km)
- We need strategy:
 - stable
 - focused
 - ethical

What lies ahead for us in the coming years?

- 2026 – completion of the first phase of LGAD detector development for the ATLAS HGTD
- 2026 – introduction of AI methods and LLMs into data analysis
- 2026 – start of the installation of flexible printed circuits and LGADs in ATLAS and the LHCb upgrade
- 2027 – LHCb data analysis
- 2027–2028 – data analysis using new technologies (AI, LLM)
- 2028 – First CTAO measurements
- 2029–2030 – Completion of integration and initial commissioning of the upgraded ATLAS and LHCb systems (HL-LHC, Run 4 → Run 5).
- 2031–2032 – Start of full data acquisition at the HL-LHC (ATLAS, LHCb) and stable operation of Belle II.
- 2032 /2034 – Upgrade of Belle II and LHCb
- 2036 – Systematic data acquisition for ATLAS and LHCb (Run 5); application of the latest generation of new technologies in data acquisition, simulation, reconstruction, and analysis (AI, quantum computing).
- 2040 → FCC-ee
- 2070 → FCC-hh

- Research excellence requires the coordinated efforts of the entire institute and a well-defined strategy.
- The IJS administration must ensure:
 - effective leadership and stable support
 - clear work processes, and
 - transparent, non-arbitrary criteria
 - the development of full research potential.
- Researchers must be relieved of administrative burdens through digitization, IT support, and expert assistance.
- Regular analysis of activities and external evaluation serve as incentives for improvement.

Two registered research groups

Vrednotenje bibliografskih kazalcev raziskovalne uspešnosti po metodologiji ARIS

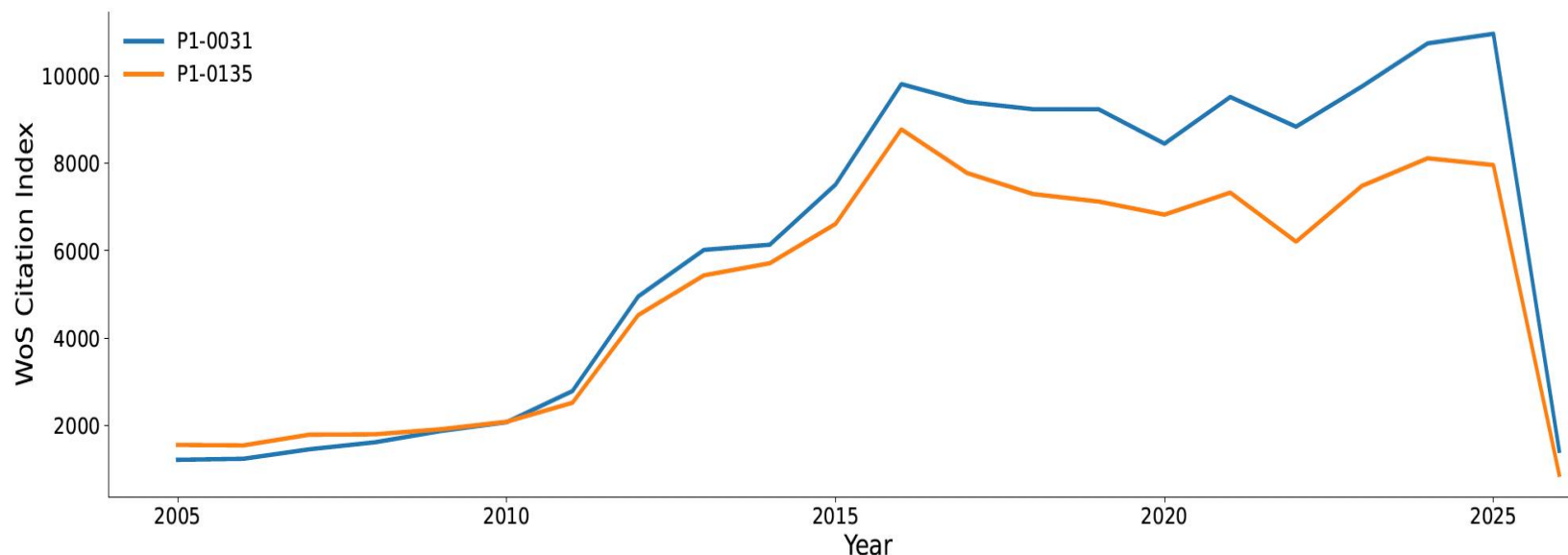
Upoš. tč.	A''	A'	A1/2	CI10	CI _{max}	h10	A1	A3
25.232,08	4.920,84	19.639,09	23.213,13	98.672	5.234	124	99,13	8,57

P1-0135 Experimental particle physics

Vrednotenje bibliografskih kazalcev raziskovalne uspešnosti po metodologiji ARIS

Upoš. tč.	A''	A'	A1/2	CI10	CI _{max}	h10	A1	A3
6.646,98	814,54	4.212,4	4.623,47	123.786	5.234	139	24,14	4,17

P1-0031 Multi-messenger physics



Stable scientific production with some fluctuations due to Covid-19

Human resources

51

co-workers

38

full-time

31

with PhD

14

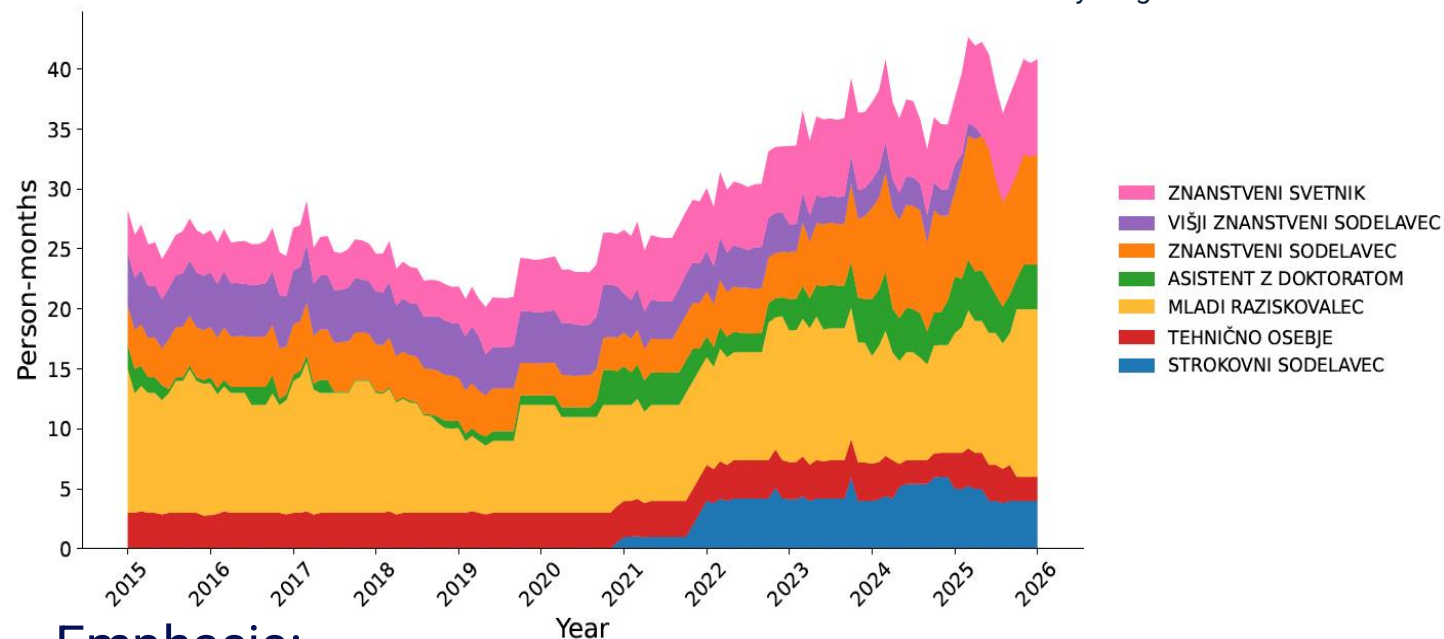
young researchers

~15

students

8

international staff



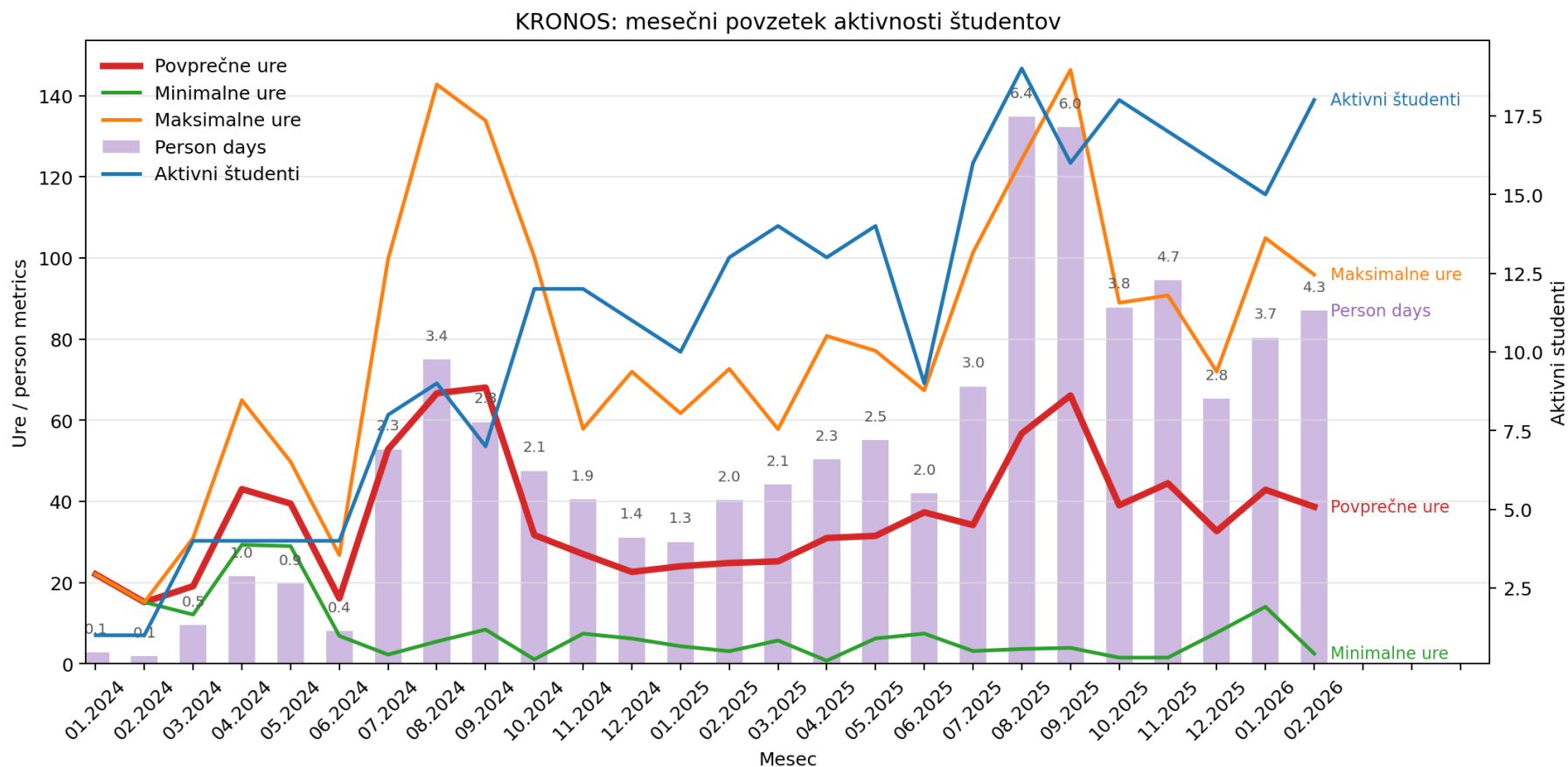
Emphasis:

- supervision and mentoring of PhD students,
- international mobility,
- involvement of early-career researchers in leading analyses and detector development.

Challenge: slow process to obtain work permits

Category	Number
Total number of staff	51
– full-time employees	38
– supplementary/part-time employment	13
– students	~15
Breakdown by career stage	
– staff with a PhD	31
– early-stage researchers / PhD researchers	14
– professional and technical staff	5
– administrative secretary	1
International composition*	
– international staff	8

Students in the department



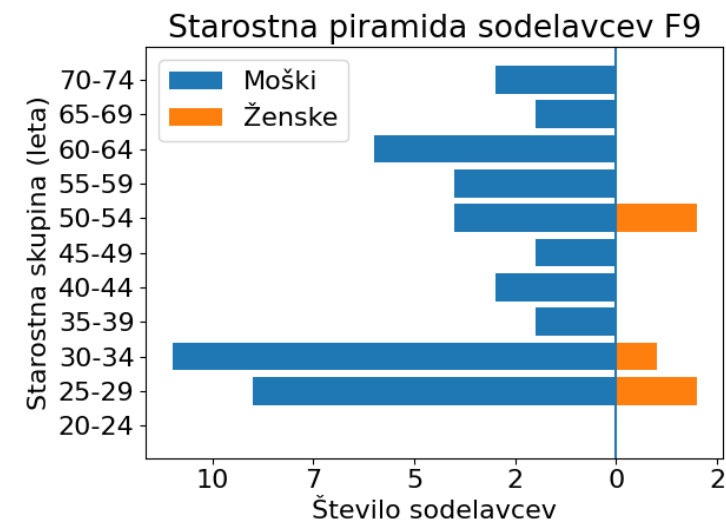
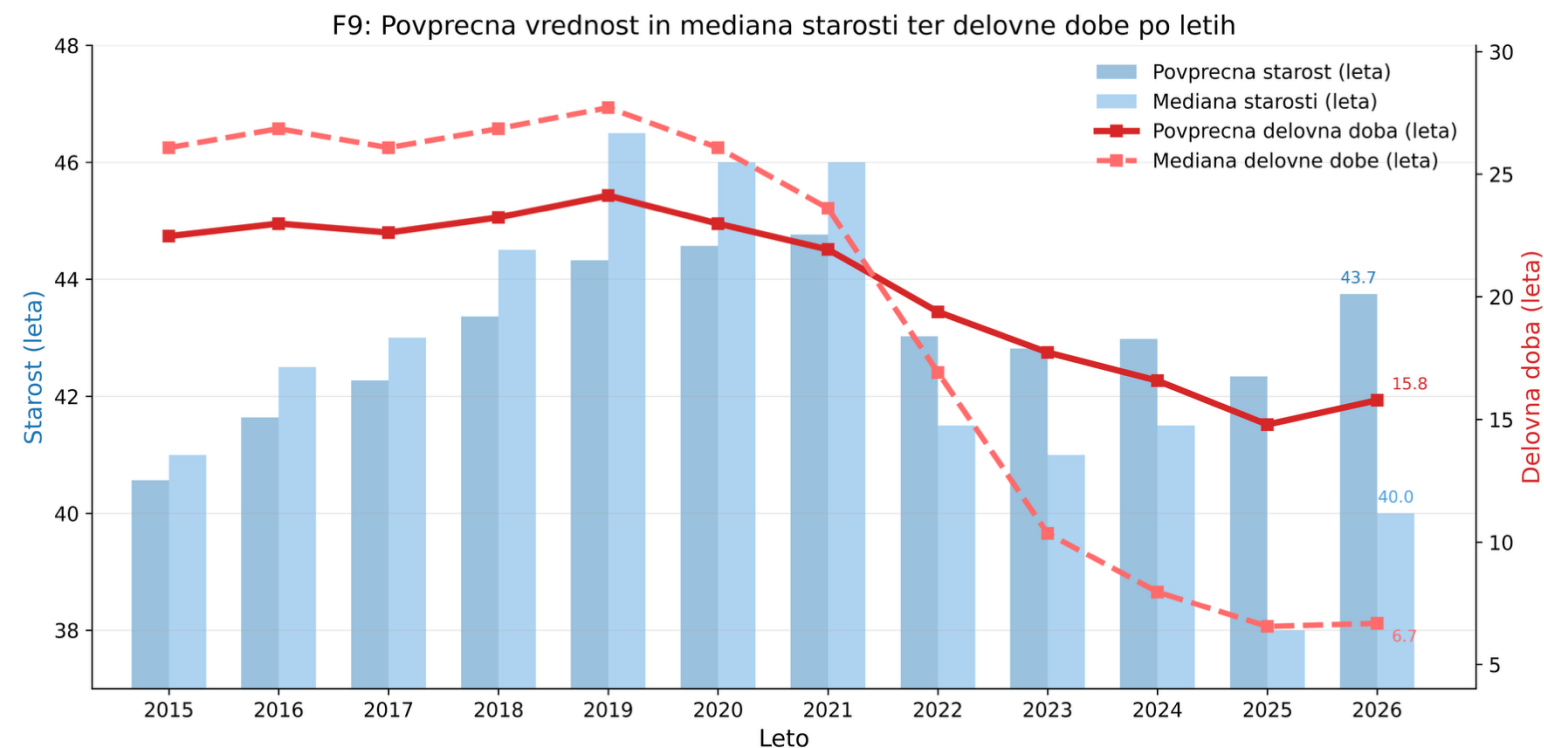
15 students on average

Number of students increased in the last two years.

Age structure of the department

On the one hand, the department is ageing, but the recruitment of young researchers is contributing to a noticeable rejuvenation.

A clear generational gap remains.



F9 – the strongest HEP group in the region.

- Strong identity: major international experiments combined with detector development.
- A department with sustained long-term scientific growth.

Main objectives

- Reliable delivery of the research programme.
- Stable funding and continuity of personnel.
- International credibility and strong networking capacity.

Principles

- Clear goals and clear responsibilities.
- Trust in researchers and technical staff.
- Minimum bureaucracy, maximum scientific efficiency.

Strengthening the role of IJS in **HEP**

- **Societal impact:** transfer of technologies to medicine and industry.
- Responsible, visible, and professional science communication.

- Research groups with clearly defined leads.
- Strengthening technical and engineering support.
- Transparent internal processes and realistic workload planning.
- Training staff in research management and scientific leadership.

Key principles:

- Scientific excellence
- Open communication of research results
- Increasing the societal impact of research

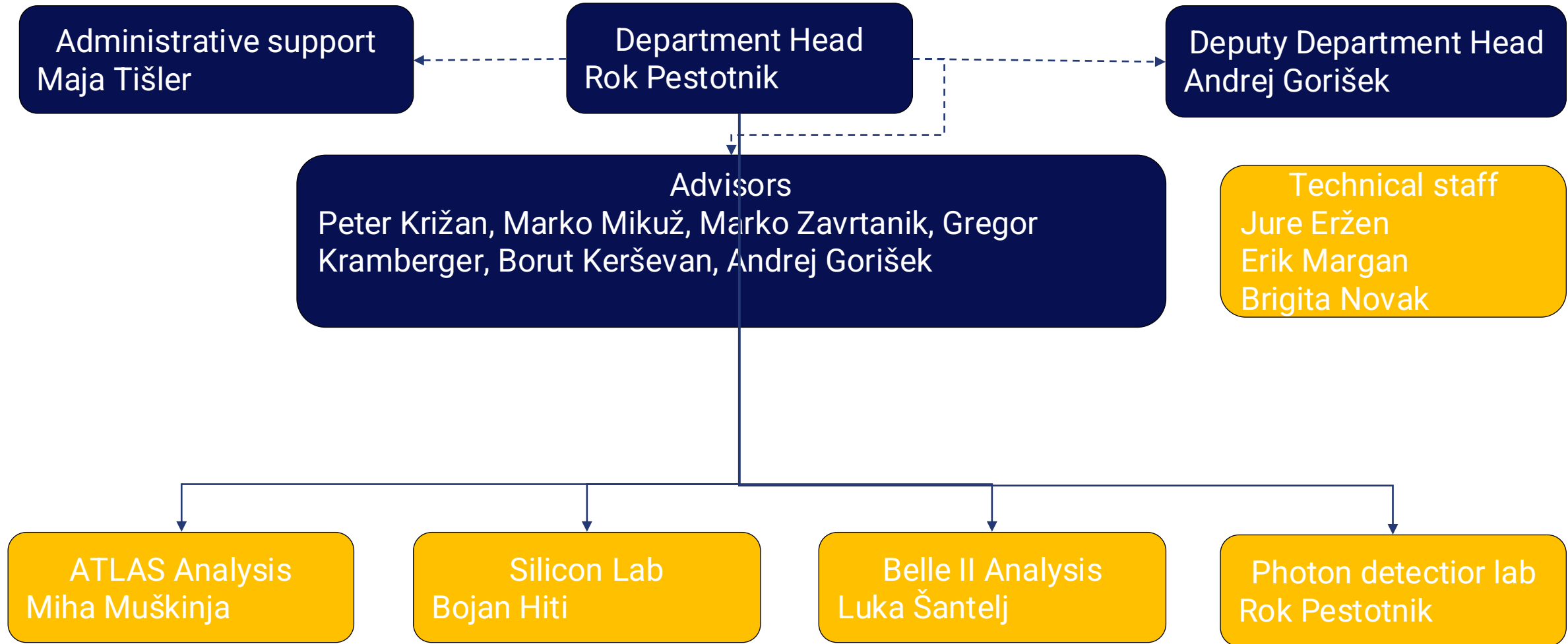
Organisation:

- Monthly research staff meetings
- Bi-monthly Early stage researchers meeting
- Regular communication with research group leaders
- Transparent planning of research priorities
- Coordination of national and European projects
- Systematic monitoring of scientific performance
- Annual department retreat
- Yearly Interviews with all the employees

Focus to:

- project proposals and funding applications (ARIS, ERC, EIC, Horizon Europe),
- efficient management of research infrastructure, data, outputs and results.
- active communication of scientific results to the public,
- systematic involvement of early-career researchers in international collaborations,
- preparing the younger generation for future leadership roles.
- Career development and follow-up - performance bonus

F9 Organisation structure



Department roles

Outreach -
Tadej Novak

Infrastruktura &
Safety
Bojan Hiti

Administrative support
Maja Tišler

Web page
Andraž
Tomšič

Radiation
protectioni-
Igor Mandič

Seminars-
Blaž Leban

CNC & 3D
printing-
Jure Eržen

Masterclass-
Marko Bračko

Electrical design
Erik Margan

TT coord.
Andrej Seljak

Chip Wire
Bonding
Brigita Novak

Software &
Computing -
Dejan Lesjak

JSI Roles

JSI Scientific Council - Borut
Kerševan

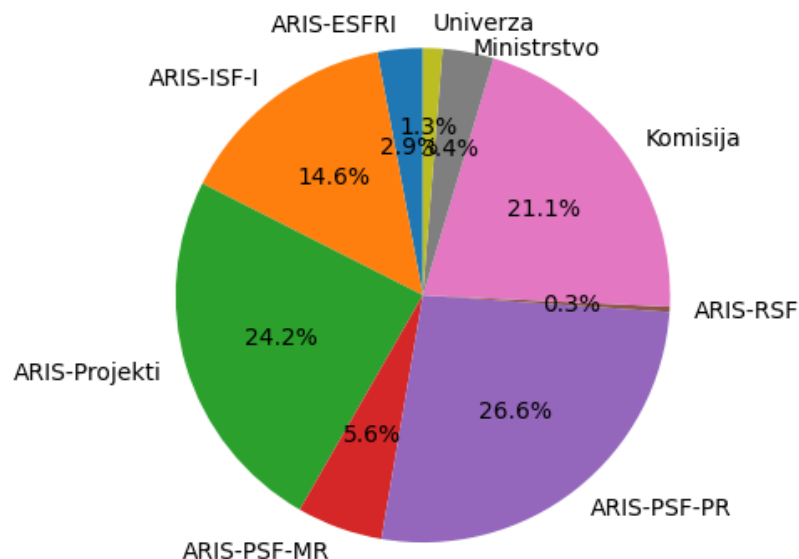
JSI Board of Governors - Gregor
Kramberger

JSI Early Career Researchers
Council - candidates Miha Muškinja
& Bojan Hiti

Current and expected funding

F9 – public financing (2025: 4.1 MEUR)

Delež javnega financiranja po virih (skupaj 4,070,370 €)



Base funding: stable funding

Projects: ARIS, Horizon Europe, ERC, EIC

Goal: continuous execution of at least one ERC or EIC project.

Part of the funding is allocated to:

maintenance, and contributions to the operating costs of international research infrastructure.

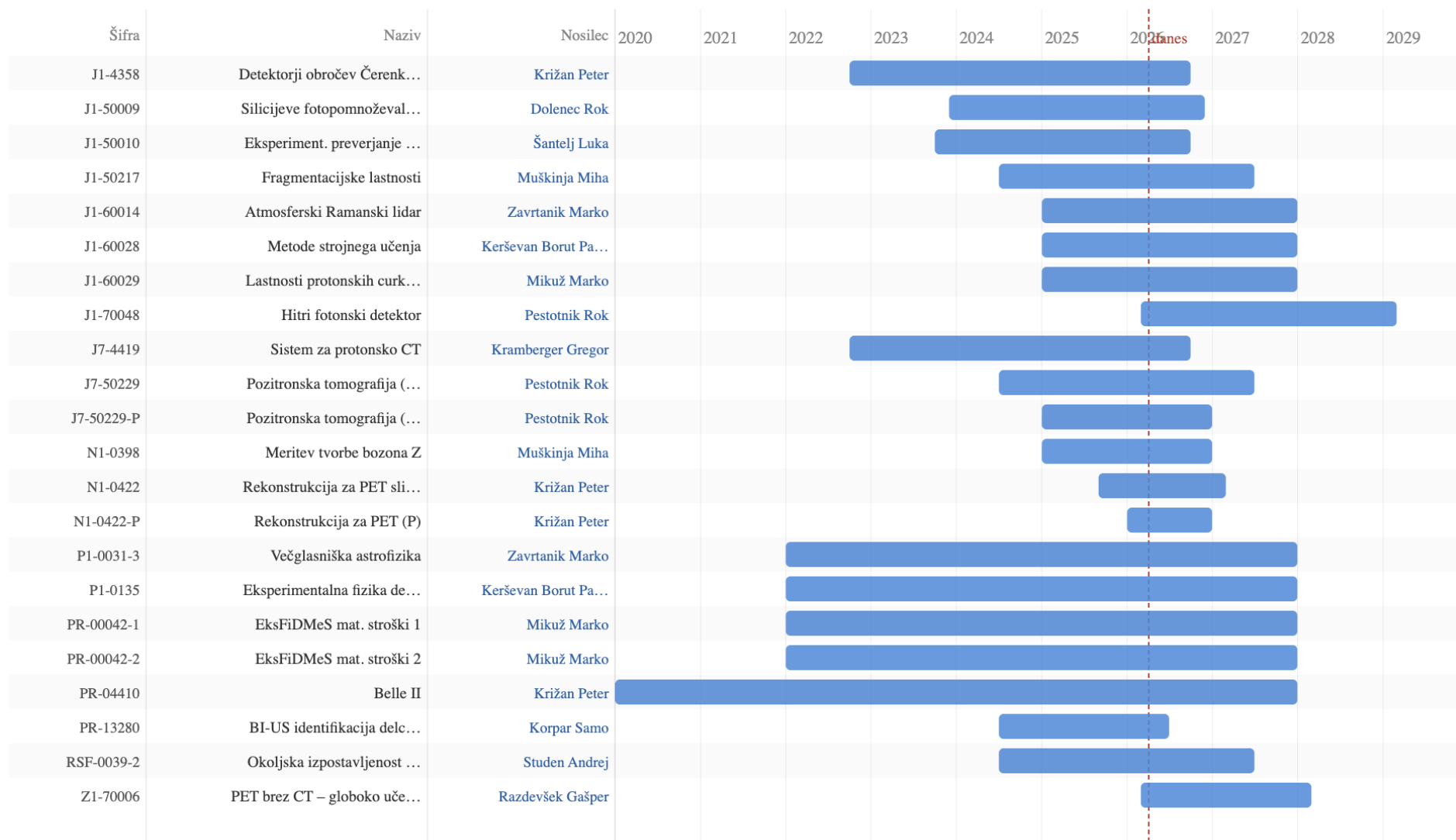
Funding structure	
– stable funding	PSF programmes P1-0135 and P1-0031, ISF-I
– infrastructure	Belle II ARIS
– national projects	13 ARIS projects
– European projects	10 projects
– major projects	ERC Advanced Grant FAIME (P. Križan), EIC Pathfinder PetVision (R. Pestotnik)
Changes in 2026	
– projects ending	3 ARIS + 2 European projects
– new projects	2 ARIS research projects ongoing, +1 ARIS ERC complementary project
Planned applications	
– ERC projects	7 applications: Starting Grants and Consolidator Grants
– HE Otello	1 additional European project

Funding objective

Protect long-term scientific continuity while retaining the capacity to invest in infrastructure and people.

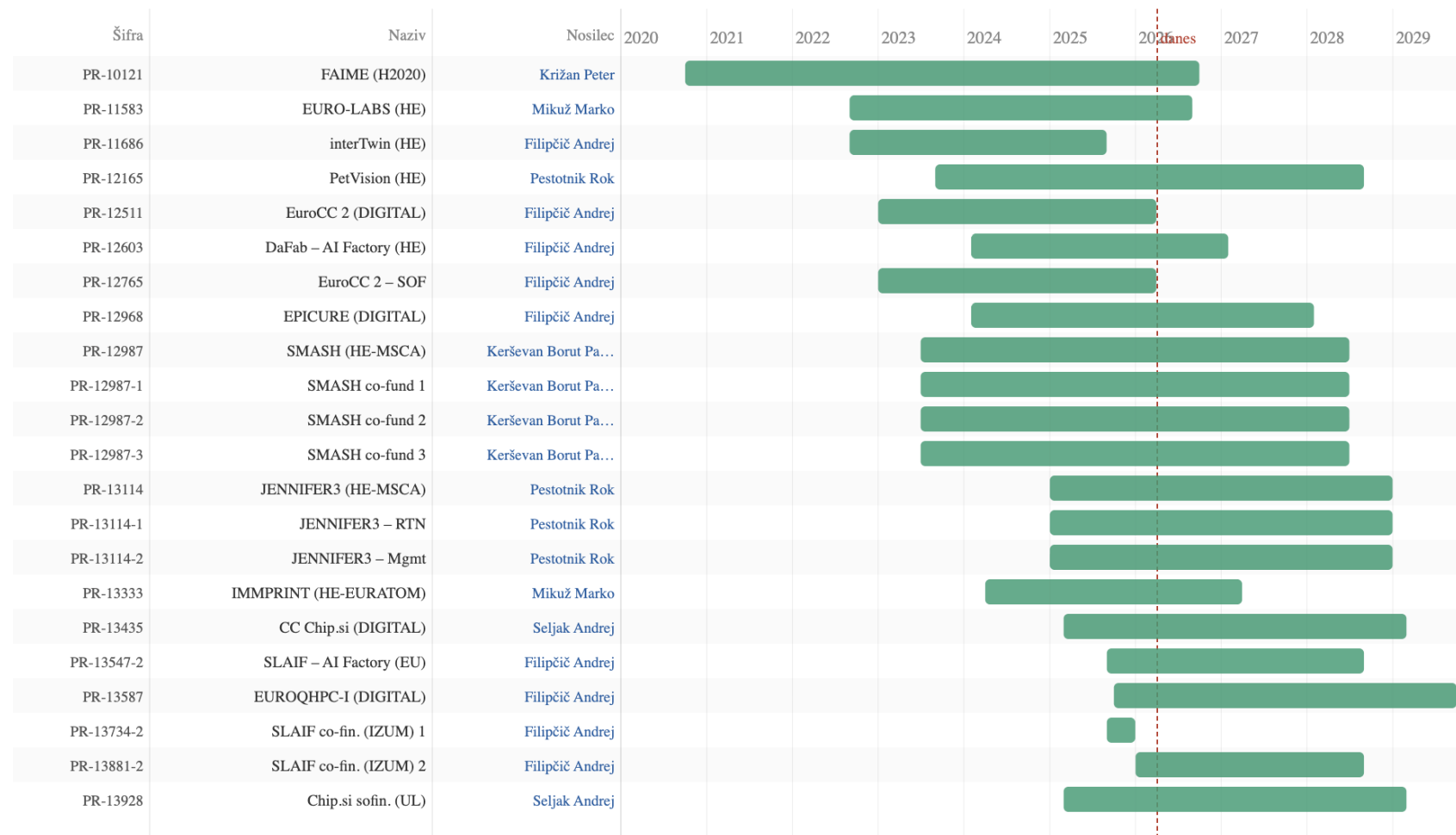
ARIS Projects

■ ARRS projekti ■ EU projekti ■ Mladi razisk. ■ Drugo



EU Projects

■ ARRS projekti ■ EU projekti ■ Mladi razisk. ■ Drugo



Income statement January -July 2026

Izkaz uspeha zbirno po enotah													
Obdobje:	01.01.2026 - 31.07.2026												
	</												

Cash flow January -July 2026

Denarna sredstva 2026										
Obdobje: 1.1.2026 - 31.07.2026										
US										
Datum: 20. avgust 2026										
		emičnin	Nabava nepremičnin	Izkaz uspeha ARIS	Izkaz uspeha ostala JAVNA	Izkaz uspeha LASTNA	Izkaz uspeha skupaj	Prenosi v obdobju	Rezervirana sredstva ZN	Končno stanje
Enota	Naziv enote	(15)	(16)	(17)	(18)	(19)=(16)+(17)+(18)	(20)	(21)	(22)=(1)+(2)+(7)+(12)+(13)+(14)+(15)+(19)+(20)+(21)	
ICB3	Center za prenos znanja na področju informacijskih	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-873,421.32	
ICS1	Znanstveno informacijski center	0.00	0.00	0.00	-13,493.05	389,516.26	376,023.21	0.00	-163.93	330,391.38
ICS3	Rektorski infrastrukturni center	0.00	0.00	15,918.74	-5,639.40	48,619.68	58,899.02	0.00	-7,566.00	-597,251.65
ICS4	Center za elektronsko mikroskopijo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ICS5	Center za mrežno infrastrukturo	0.00	0.00	9,985.69	-71,618.98	0.00	-61,633.29	0.00	-68,779.00	172,578.81
ICS6	Center za elektronsko mikroskopijo in mikroanalizo	0.00	0.00	-473,990.15	0.00	-9,554.98	-483,545.13	0.00	-16,724.77	-3,035,843.30
ICT1	Center za prenos tehnologij in inovacij	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120,838.09
ICT4	Raziskovalno-razvojni center Pomurje	0.00	0.00	80,878.06	0.00	-3,149.06	77,729.00	0.00	0.00	53,199.64
ICT5	Center za energetsko učinkovitost	0.00	0.00	-18,594.76	-150,146.15	18,196.35	-150,544.56	0.00	-5,258.00	320,474.65
ICT6	Center za Pametna mesta in skupnosti	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-38,715.63
ICT7	Center - Tovarne prihodnosti	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-148,209.15
ICT8	Center za razvojno inovacijsko partnerstvo	0.00	0.00	0.00	-3,988.28	-20,572.33	-24,560.61	0.00	0.00	-145,973.72
ICT9	Mednarodni razis. center za umetno inteligenco	0.00	0.00	-3,526.20	-36,814.24	-194,876.33	-235,216.77	0.00	-2,624.02	-267,243.13
IOB1	Odsek za biokemijo, molekularno in strukturno	0.00	0.00	17,716.07	1,196.15	2,620.25	21,532.47	0.00	-23,434.34	-21,347.75
IOB2	Odsek za molekularne in biomedicinske znanosti	0.00	0.00	-75,651.80	-4,680.82	-9,262.77	-89,595.39	0.00	-10,504.02	152,568.39
IOB3	Odsek za biotehnologijo	0.00	0.00	-84,362.78	-6,439.32	-7,881.23	-98,683.33	0.00	-18,487.07	239,440.71
IOE1	Odsek za avtomatiko, biokibernetiko in robotiko	0.00	0.00	-105,831.61	-5,776.59	66,805.33	-44,802.87	0.00	-151,382.05	1,031,866.73
IOE2	Odsek za sisteme in vodenje	0.00	0.00	198,810.18	-36,830.44	54,520.97	216,500.71	0.00	-8,541.30	1,946,124.82
IOE3	Odsek za umetno inteligenco	0.00	0.00	-34,593.05	-96,485.39	217,566.53	86,488.09	0.00	-163.93	510,466.54
IOE5	Samostojni laboratorij za odprte sisteme in mreže	0.00	0.00	-2,982.60	-4,291.32	-886.70	-8,160.62	0.00	0.00	771,042.12
IOE6	Odsek za komunikacijske sisteme	0.00	0.00	-55,515.02	1,294.89	-122,703.35	-176,923.48	0.00	-5,929.50	-287,330.72
IOE7	Odsek za računalniške sisteme	0.00	0.00	4,322.61	-193,703.61	-4,219.50	-193,600.50	0.00	-56.50	-389,644.03
IOE8	Odsek za tehnologije znanja	0.00	0.00	264,980.50	6,444.71	-3,657.13	267,768.08	0.00	-2,566.00	1,639,932.22
IOE9	Odsek za inteligentne sisteme	0.00	0.00	-37,327.98	-23,494.13	-16,934.32	-77,756.43	0.00	-478,445.86	49,046.84
IOF1	Odsek za teoretično fiziko	0.00	0.00	-80,332.18	-37,709.25	-470.70	-118,512.13	0.00	-1,019,443.99	-433,182.24
IOF2	Odsek za fiziko nizkih in srednjih energij	0.00	0.00	-172,995.25	-34,647.81	-44,911.75	-252,554.81	0.00	-41,370.10	-157,450.12
IOF3	Odsek za tanke plasti in površine	0.00	0.00	27,777.10	-6,136.10	-19,444.17	2,196.83	0.00	-50.00	1,658,962.94
IOF4	Odsek za tehnologijo površin	0.00	0.00	-40,186.16	-4,858.29	4,462.85	-40,581.60	0.00	-14,648.47	931,256.56
IOF5	Odsek za fiziko trdne snovi	0.00	0.00	70,162.40	-81,278.21	8,848.75	-2,267.06	0.00	-1,436,206.10	-67,933.44
IOF6	Odsek za plinsko elektroniko	0.00	0.00	-48,295.86	-19,989.12	-1,215.91	-69,500.89	0.00	-234,538.56	-449,559.62
IOF7	Odsek za kompleksne snovi	0.00	0.00	35,161.67	-33,136.17	0.00	2,025.50	0.00	-774,491.11	-550,963.56
IOF8	Odsek za rektorsko fiziko	0.00	0.00	-7,379.73	-102,602.81	-64,346.68	-174,329.22	0.00	-430,240.68	1,169,561.62
IOF9	Odsek za eksper. fiziko osnovnih delcev	0.00	0.00	388,868.52	-20,414.59	19,726.45	388,180.38	0.00	-222,772.65	967,771.54
IOK1	Odsek za anorgansko kemijo in tehnologijo	0.00	0.00	-76,763.03	-10,010.76	-37,000.50	-123,774.29	0.00	-117,852.00	-289,903.29
IOK2	Laboratorij za kemijo pod ekstremnimi pogoji - EC	0.00	0.00	-94,640.17	-9,029.25	1,877.91	-101,791.51	0.00	0.00	87,570.03
IOK3	Odsek za fizikalno in organsko kemijo	0.00	0.00	-8,357.43	-11,459.52	9,758.26	-10,058.69	0.00	-1,209.00	795,924.86
IOK5	Odsek za elektronsko keramiko	0.00	0.00	28,470.34	2,539.06	36,016.09	67,025.49	0.00	-105,707.44	1,349,826.92
IOK6	Odsek za inženirsko keramiko	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
IOK7	Odsek za nanostrukturne materiale	0.00	0.00	-53,775.69	-89,162.81	40,547.70	-102,390.80	0.00	-152,443.38	-17,478.17

How to increase impact ?

- Build impact into **ARIS, Horizon Europe, ERC and EIC projects** from the proposal stage
- Increase visibility of results through **professional science communication**
- Strengthen participation in **international research infrastructures and collaborations**
- Engage researchers in **policy, education and public outreach**
- Support technology transfer, spin-offs, IP protection and exploitation of research results where appropriate

Strategic objective

- **Increase the scientific, technological and societal impact of F9 by connecting fundamental research, detector development and real-world applications.**

Target stakeholders

- **Scientific community**
- **Funding bodies & policymakers** – ARIS, ministries, European Commission, ERC, EIC
- **Students & young researchers** – recruitment, education and development of future scientific leaders
- **General public & media** – understanding the value of fundamental research and its applications
- **Industry & Healthcare**

Strengths

- Central pillar of Slovenian CERN presence
- Internationally recognised excellence
- Detector, data, semiconductor/photon and AI/HPC know-how
- Access to TRIGA, SiGNET, Vega, CERN and KEK

Opportunities

- Full CERN membership
- HL-LHC and FCC preparation
- AI, HPC, semiconductors and medical imaging
- ERC, EIC, Horizon Europe, EURO-LABS, DRD, Chip.si

Weaknesses

- Small personnel base for the activity volume
- Limited PhD, postdoctoral and technical posts
- Strong dependence on project funding

Threats

- Insufficient long-term national funding
- International competition for young researchers
- Delays or uncertainties in major international projects

Strategic conclusion: people, stable funding and shared technical platforms to increase our impact.

Date	Event	Number of participants	F9 relevance
8.-9.3. 2027	RECFA	~30	External HEP evaluation
June 2027	ISOTDAQ, Instrumentation school	~120	Detectors, electronics
September 2028	TWEPP, Topical Workshop on Electronics In PP	~200	Detectors, electronics
16.-20.4.2029	TIPP, Technology in Particle Physics	300-500	Detectors
2028	LHCb week	~300	Flagship HEP results

Senior researchers covering the fields are included in the local organization committees.

Performance pay: assessment criteria and distribution rule

Summary for staff: the principles used when selecting a limited number of well-substantiated awards.

ASSESSMENT PRINCIPLES USED

1 Taking responsibility

Actively helping with activities that go beyond one's direct duties or the unit one leads.

2 Proactivity

Making proposals and independently moving agreed activities towards implementation.

3 Early problem-solving

Detecting risks early, removing bottlenecks and helping others find workable solutions.

4 Professional communication

Communicating with colleagues in a timely, clear, respectful and professional manner.

CORE RULE

There is no automatic or equal distribution.

The purpose is not that everyone receives at least something. Because the available amount is limited, a small number of cases must be selected from many valuable contributions.

Decision basis

Awards linked to concrete additional contribution, responsibility, initiative, reliability and constructive cooperation.

Key message: Recognition of additional contribution to shared work, responsibility and collaborative culture.

Institutional rule: funding envelope and safeguards

What the internal instructions add: how the pool is formed, what must be paid, and why awards remain individual.

HOW MUCH FUNDING IS ALLOCATED?

Current transition rule

2% of basic salary funds

until 31 Dec 2027; pay group B is excluded from this base.

General rule

3% of basic salary funds

after the transition period, again excluding pay group B.

Annual mandatory payout

The Institute must pay the full base allocation and at least 50% of identified salary savings caused by absences or vacant posts. The director may decide to pay more than 50% of those savings.

Project funds

May be used only where the contract, funder rules and financial plan allow it. They are not part of the mandatory annual payout; for both 2026 assessment periods they are not used as a source.

ALLOCATION SAFEGUARDS

Individual, documented decision

The amount is set individually, within the available pool, on the basis of substantiated fulfilment of the prescribed criteria. A reasoned proposal records the criteria, amount by month and explanation.

No automatic entitlement

The institutional duty to pay the annual envelope does not create a right for each employee to an equal or proportional share.

Maximum monthly amount

The award may not exceed 30% of the employee's gross basic salary for an individual month.

Timing

Performance is assessed for two half-year periods and paid after the procedure for each period is completed.

Practical consequence: the rule defines a limited institutional envelope; the distribution still depends on concrete, evidenced above-standard contribution.

- **F9 is currently in stable conditions**
- We should work together on:
 - continuity,
 - trust,
 - encouragement,
 - results.

To retain the scientific excellence without internal friction and
to strengthen the reputation of F9 and IJS nationally and internationally.



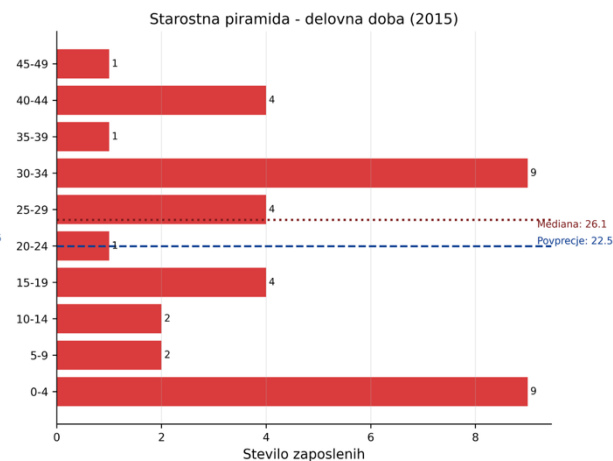
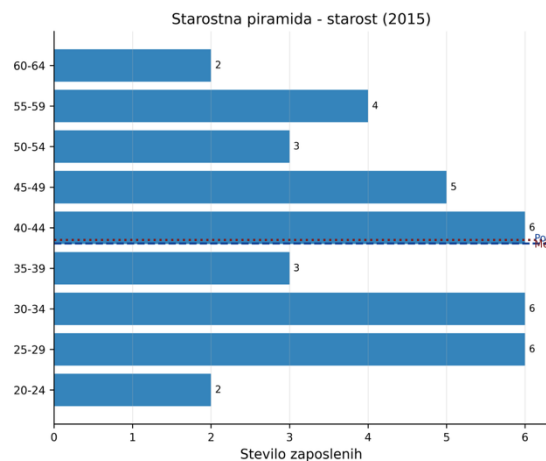
Age pyramids over the years



Institut "Jožef Stefan", Ljubljana, Slovenija

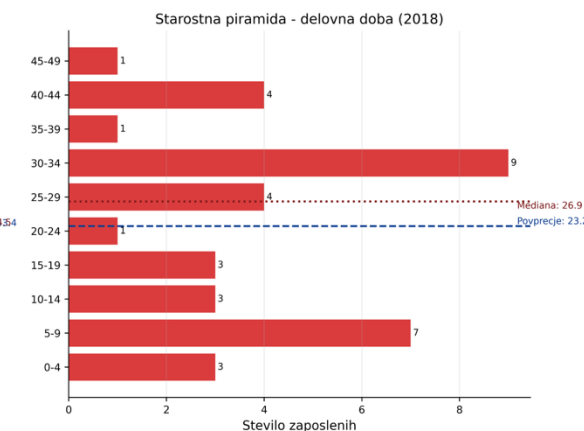
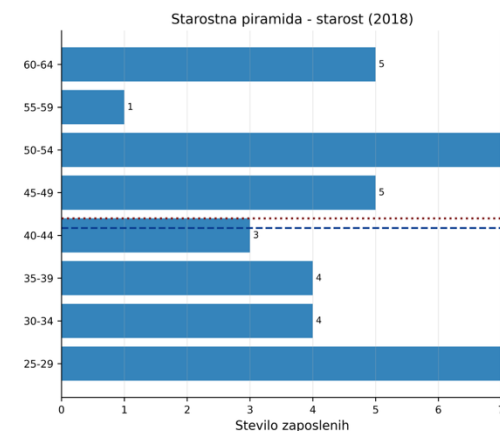
2015

F9 - porazdelitev starosti in delovne dobe (2015)



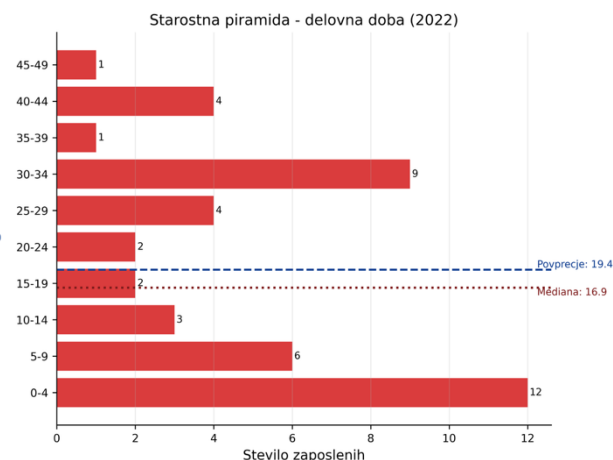
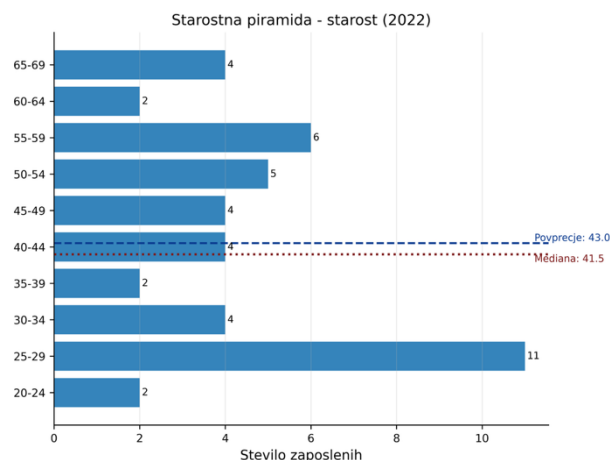
2018

F9 - porazdelitev starosti in delovne dobe (2018)



2022

F9 - porazdelitev starosti in delovne dobe (2022)



2026

F9 - porazdelitev starosti in delovne dobe (2026)

