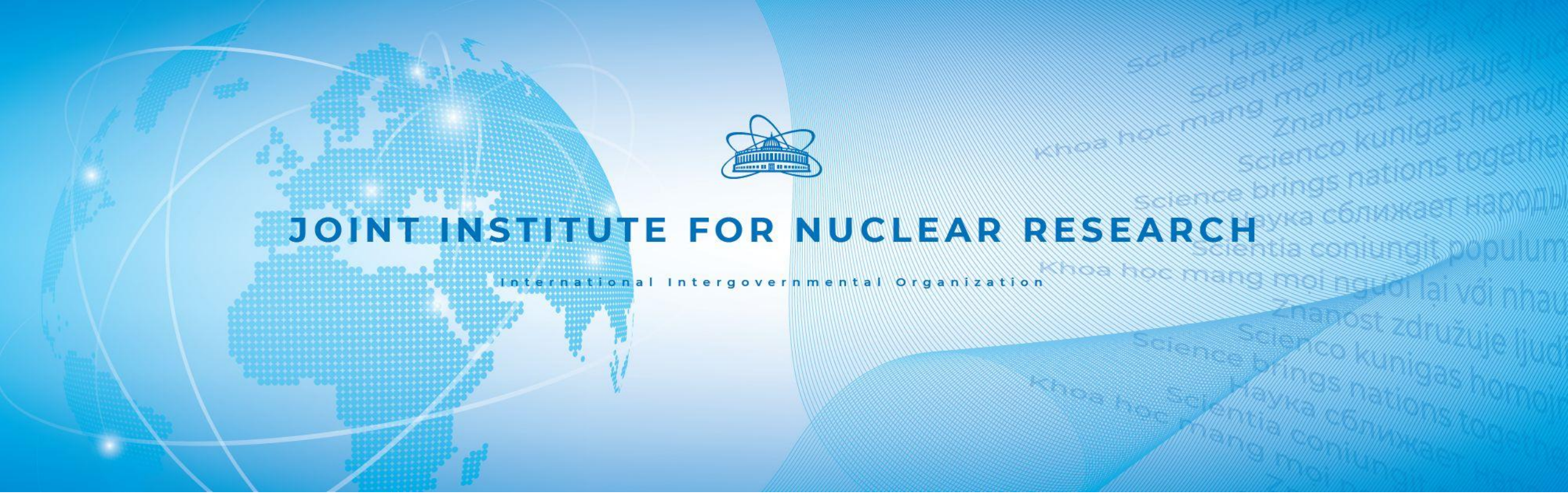


137th Session of the JINR Scientific Council

Director's Report: News, Science, Prospects

Acad. Grigory V. Trubnikov

13 February 2025, Dubna

Information on the Resolution of the Session of the JINR Committee of Plenipotentiaries

15–16 November 2024, Minsk (Belarus)

Chair of the Committee of Plenipotentiaries — Plenipotentiary of Georgia A.Khvedelidze

Session of the JINR Committee of Plenipotentiaries

15–16 November 2024

AGENDA

1. Director’s Report: News, Science, Prospects

Speaker — G.Trubnikov

2. On the progress of work on launching the basic configuration of the NICA Complex and decisions of the NICA Project Supervisory Board

Speaker — V.Kekelidze

3. Draft budget of JINR for the year 2025, provisional contributions of the Member States for the years 2026, 2027, 2028

Speaker — N.Kalinin

4. Results of the meeting of the JINR Finance Committee

Speaker — A.Omelchuk

5. On approval of the List of JINR officials

Speaker — A.Khvedelidze

6. Recommendations of the 136th session of the JINR Scientific Council

Speaker — S.Nedelko

7. Changes in the membership of the JINR Scientific Council

Speaker — G.Trubnikov

8. Scientific report “Institute for Nuclear Problems, Belarusian State University: main research directions and potential for cooperation”

Speaker — S.Maksimenko

The Committee of Plenipotentiaries took note of the information from the JINR Directorate about the implementation of the **current Seven-year Plan for the Development of JINR**, the **efforts of the Member States** towards realization of JINR's major projects, the **new scientific and technological results** obtained, and about the **most important events** related to scientific and educational activities and the development of JINR as an international scientific research organization.

The CP endorsed the **systematic activities of JINR** to strengthen cooperation with research organizations of the JINR Member States and Associate Members. The CP noted with particular satisfaction the growing level and effectiveness of cooperation between scientific and scientific and educational organizations of the Republic of Belarus and JINR, as well as the active role of Belarus in the implementation of the Institute's flagship projects, primarily, the NICA megaproject.

The Committee of Plenipotentiaries noted with gratitude the **high level of attention of the Russian Federation** to the creation of favourable conditions for the work of JINR and the implementation of the international megascience project NICA. Evidence of this was the **visit of the President of the Russian Federation V.Putin** in June 2024 to JINR and his expressed strategic support for the activities of JINR.

The CP accepted with satisfaction the **decision of the CERN Council not to terminate the agreement on international cooperation with JINR**, and to express hope for the earliest possible resumption of full-scale participation of JINR in CERN activities, as well as CERN in JINR activities.

The CP expressed particular satisfaction with the signing of the **agreement between JINR and the Ministry of Science and Technology of the People's Republic of China** on the launch of eight joint projects, and to strongly support the strengthening of cooperation with government bodies, scientific organizations, and universities in Mexico and **India**.

The CP welcomed the signing of a **cooperation agreement between the National Nuclear Energy Commission (CNEN) of Brazil and JINR**, which opens up great prospects for increasing the level of Brazil's participation in JINR.

The Committee of Plenipotentiaries noted with satisfaction the **progressive development of the accelerator complex** of VBLHEP.

The CP welcomed the **progress of the experimental programme** in the field of nuclear physics and the modernization of the accelerator complex of **FLNR**.

The CP noted **progressive development of the Baikal-GVD** deep-water neutrino telescope in 2024 and significant improvement of the Baikal-GVD shore infrastructure.

The CP emphasized the **importance of the Institute's contribution to the work of major international collaborations** (CERN collaborations at LHC, JINR group in the first phase of the COMET experiment at J-PARC (Japan).

The Committee of Plenipotentiaries noted with satisfaction the **efficient operation and development of the JINR MICC**, including the Govorun supercomputer. The CP took note with satisfaction of the **information on obtaining a license** from the supervisory authority for the operation **of the IBR-2 reactor**.

The CP noted **new interesting results in the field of theoretical physics**, oriented towards the JINR experimental programmes; the development of the interlaboratory programme of fundamental and applied research **in the field of life sciences**.

The CP approved the **Director's initiative** to organize a programme for the support of interlaboratory innovative projects with the aim of stimulating applied scientific research and innovative developments at JINR.

The Committee of Plenipotentiaries agreed with the **proposals of the JINR Directorate** for the development of an attractive and competitive remuneration system in the Institute.

The CP approved the **JINR budget for 2025** with the income amounting to US$ 229,017.7 thousand and the expenditure amounting to US$ 276,600.3 thousand with the closing negative balance amounting to US$ 47,582.6 thousand.

The CP authorized the JINR Director **to make adjustments to the JINR budget for 2025** including adjustments to the personnel remuneration and costs for international cooperation within the approved budget in compliance with the Regulations for the Introduction of Adjustments to the Budget of JINR.

Meetings of the JINR Programme Advisory Committees

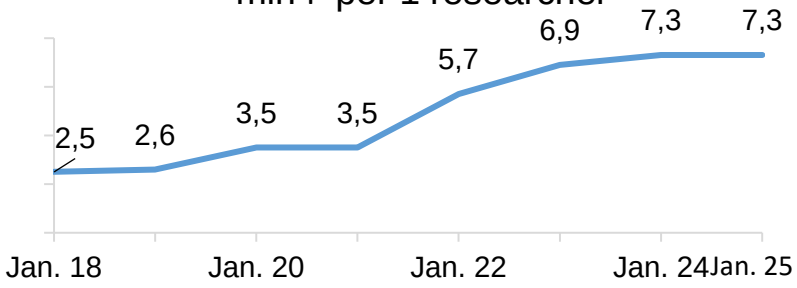
20 January, Dubna.
61st meeting of the PAC for Particle Physics
Chair of the Programme Advisory Committee for Particle Physics I.Tserruya opened the meeting with a talk on the implementation of the recommendations of the 60th meeting of the PAC PP. The Institute's Vice-Director V.Kekelidze presented information on the Resolution of the 136th session of the JINR Scientific Council (September 2024) and the decisions of the Committee of Plenipotentiaries of the Governments of the JINR Members States (November 2024).

23–24 January, Dubna.
60th meeting of the PAC for Nuclear Physics
Chair of the PAC for Nuclear Physics V.Nesvizhevsky opened the event. He informed the PAC members about the implementation of the previous meeting's recommendations. JINR Vice-Director S.Dmitriev presented the Resolution of the 136th Scientific Council session and the decisions of the Committee of Plenipotentiaries of the Governments of the JINR Member States.

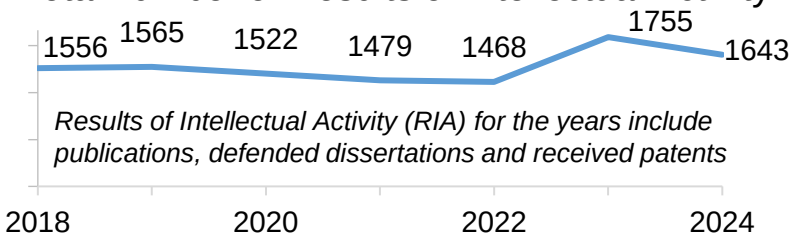
27 January, Dubna.
60th meeting of the PAC for Condensed Matter Physics
Chair of the PAC for Condensed Matter Physics D.L.Nagy opened the meeting with a talk on the implementation of the 59th PAC meeting recommendations. JINR Vice-Director L.Kostov spoke about the Resolution of the 136th session of the Scientific Council (September 2024) and the decisions of the Committee of Plenipotentiaries of the Governments of the JINR Member States (November 2024).

Monitoring Performance Indicators

Cost of basic facilities and equipment in mln ₽ per 1 researcher



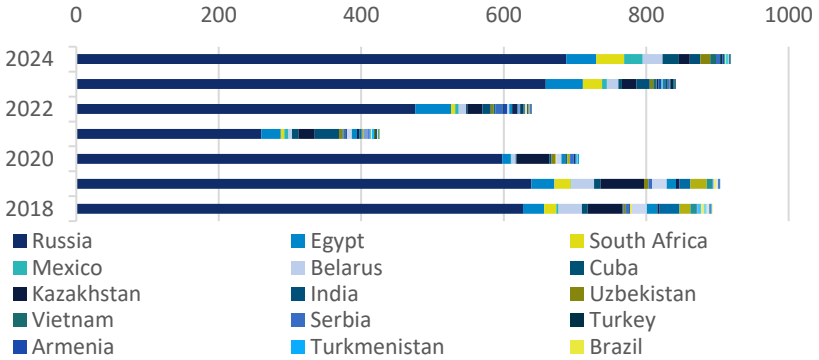
Total number of Results of Intellectual Activity



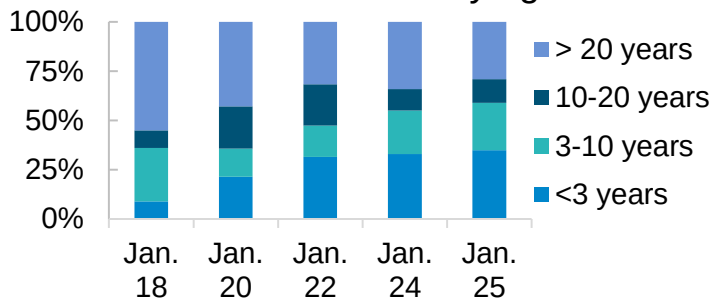
Results of Intellectual Activity (RIA) for the years include publications, defended dissertations and received patents

	2021	2022	2023	2024
Number of publications by Scopus	1454	1350	1419	1399

Number of JINR University Centre programmes participants

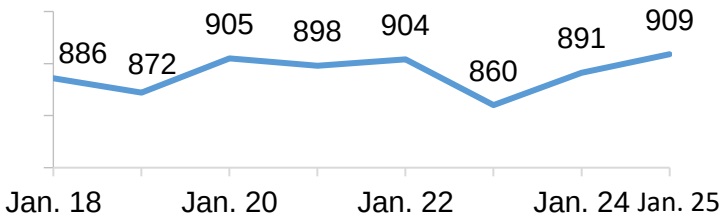


Breakdown of number of basic facilities by age

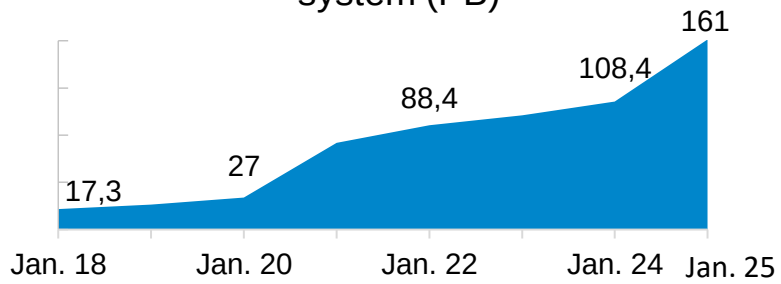


Age distribution

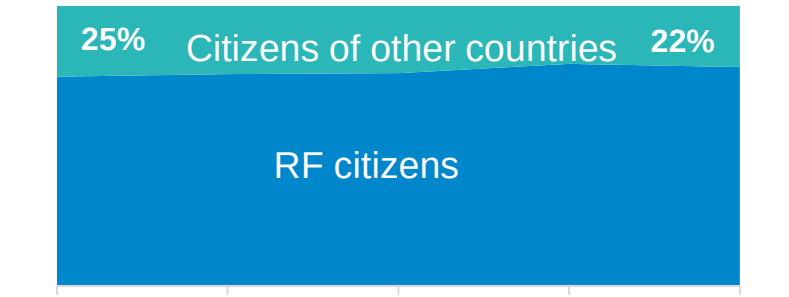
Number of staff with academic degrees



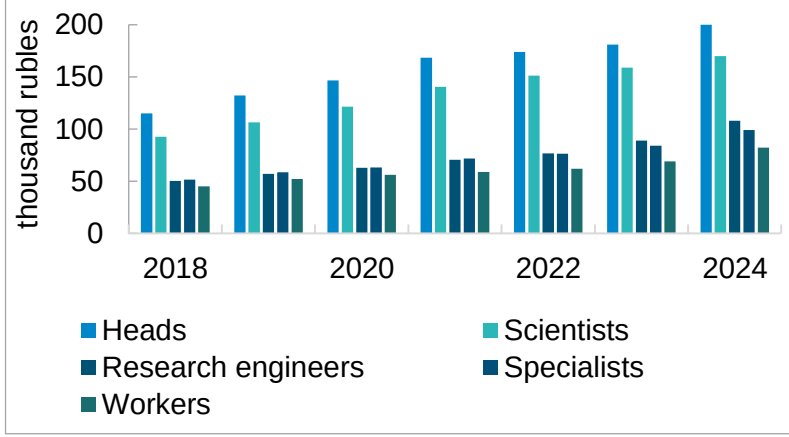
Total amount of data in the JINR storage system (PB)



Distribution of scientists by citizenship



Average monthly income



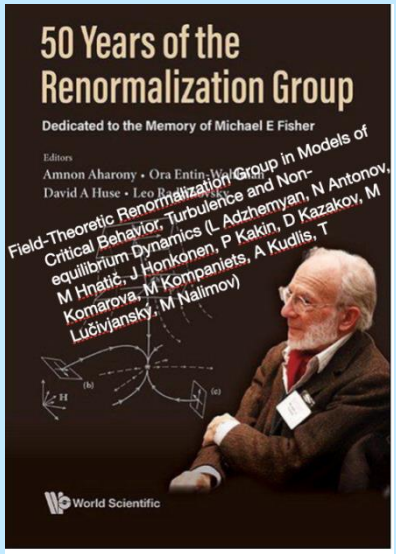
Bogoliubov Laboratory of Theoretical Physics in 2024

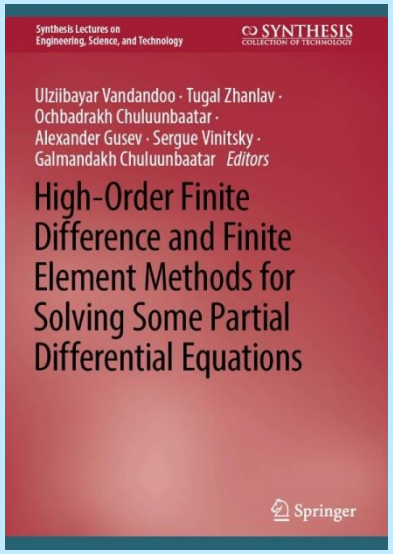
210 researchers from 20 countries (12 Member States, 8 Non-member States)

Publications 2024:

Journal articles – ***340***;
Large collaboration articles – ***98***;
Conference proceedings – ***90***.

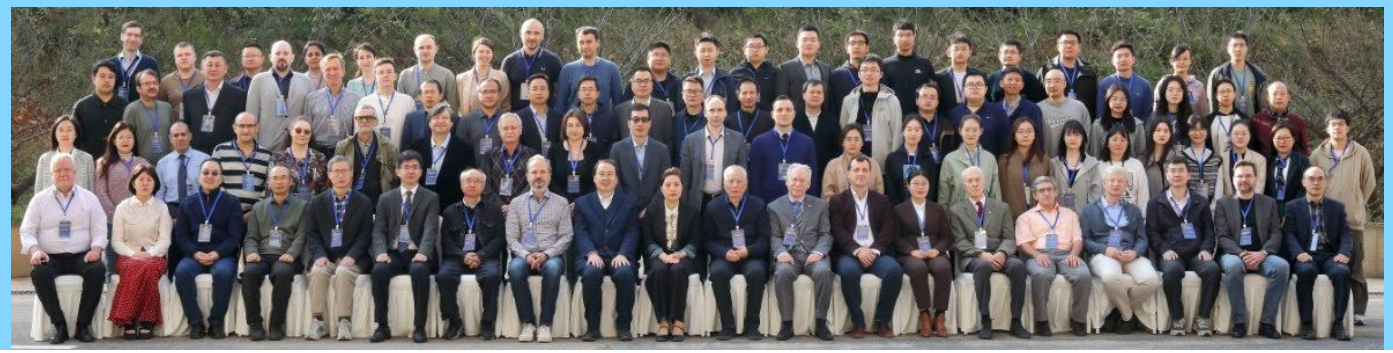
2 Monographs:





11 events organized, including:

- **3** student schools;
- Scientific session of Nuclear Physics section of Physics Division of **RAS**;
- 74th International Conference on Nuclear Physics ***NUCLEUS-2024***;
- Joint Workshop with Key Laboratory of Theoretical Physics **CAS** (China) *"Physics of strong interacting systems".*



BLTP dissertation council:

5 *Candidates* and ***3*** *Doctors* – BLTP staff;
2 *Candidates* – other Institutions.

Cooperation agreements were signed with:

Institute of Theoretical Physics CAS (Beijing)

Federal University of Juiz de Fora (Brazil)

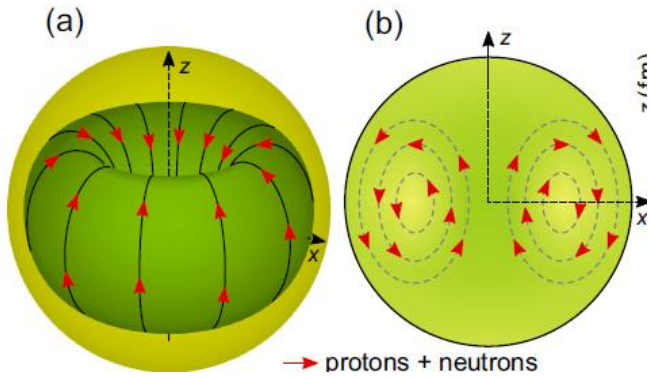
PHYSICAL REVIEW LETTERS **133,** 232502 (2024)

Editors' Suggestion | Featured in Physics

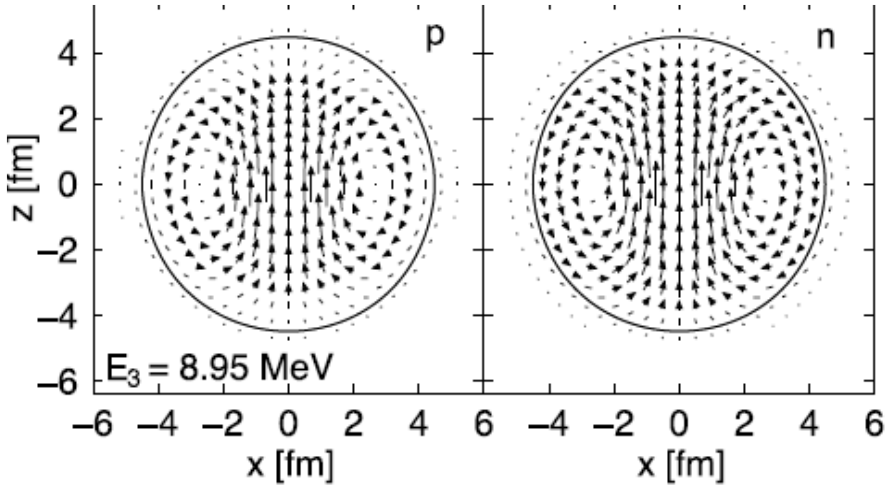
Candidate Toroidal Electric Dipole Mode in the Spherical Nucleus ^{58}Ni

P. von Neumann-Cosel,[1,*] V. O. Nesterenko,[2,3,†] I. Brandherm,[1] P. I. Vishnevskiy,[2,4] P.-G. Reinhard,[5] J. Kvasil,[6] H. Matsubara,[7,8] A. Repko,[9] A. Richter,[1] M. Scheck,[10,11] and A. Tamii[7]

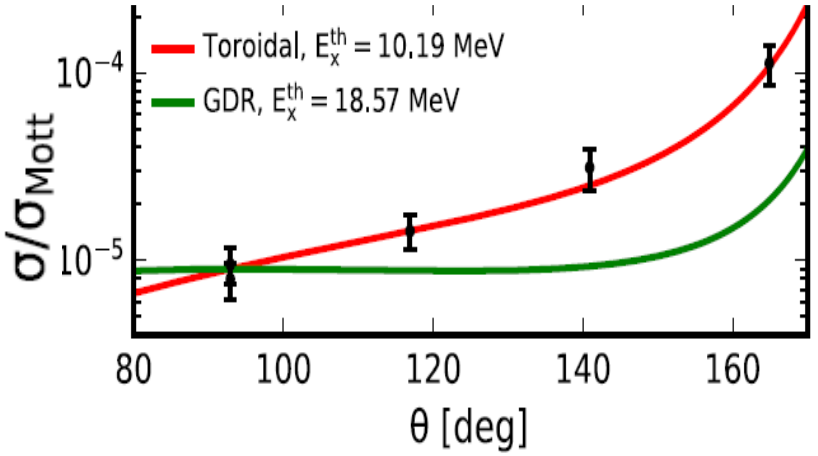
(Czech Republic-Germany-Great Britain-Japan-Kazakhstan-Russia-Slovakia)



Schematic image of the **toroidal flow** in nuclei (small oscillations of nucleons along the stream lines on the torus surface)



Calculated proton and neutron currents in 8.95-MeV state in 58Ni demonstrate a clear toroidal flow



(Unlike irrotational E1 states (GDR) the toroidal mode describes a **large slope in (e,e') cross section at large scattering angles**

Decomposition of the nuclear current In dipole excitation:

$$\delta\mathbf{j}(\mathbf{r}) = \underbrace{\nabla\phi(\mathbf{r})}_{\text{irrot E1}} + \underbrace{\nabla\times[\mathbf{r}\psi(\mathbf{r})]}_{\text{M1}} + \underbrace{\nabla\times\nabla\times[\mathbf{r}\chi(\mathbf{r})]}_{\text{toroidal E1}}$$

Anomalous Transport: Emergent Gravity in Heavy-ion Collisions

R. Khakimov, G. Prokhorov, O. Teryaev and V. Zakharov, Phys. Rev. D 109, 105001 (2024)

The relationship between phenomena in a **relativistic fluid** and in **curved space** is shown.

Relativistic fluid (*flat space*)

Examples: matter in collisions of heavy ions (QGP, hadron plasma).

Features: has vorticity ω_μ and acceleration a_μ, but space is flat.

Considered phenomena:

– Novel nondissipative transport effect in the axial current

$$j^A_\mu = \lambda_1 \omega^2 \omega_\mu + \lambda_2 a^2 \omega_\mu$$

"Kinematical Vortical Effect" (KVE)

Curved space

Examples: early Universe, black holes.

Features: finite curvature.

Considered phenomena:

– Famous gravitational chiral anomaly

$$\nabla j_A = \mathcal{N} \epsilon^{\mu\nu\alpha\beta} R_{\mu\nu\rho\sigma} R_{\alpha\beta}{}^{\rho\sigma}$$

– New effect of **cosmological constant** Λ

$$j^A_\mu = \lambda_\Lambda \Lambda \, \omega_\mu$$

- The **gravitational chiral anomaly** controls the effect in the **vortical accelerated fluid**:

  *(generalization of **[Prokhorov, Teryaev, Zakharov, PRL, 2022]** to the case with **nonzero Ricci tensor**)*

- The relationship between the effects of **acceleration** and **cosmological constant**:

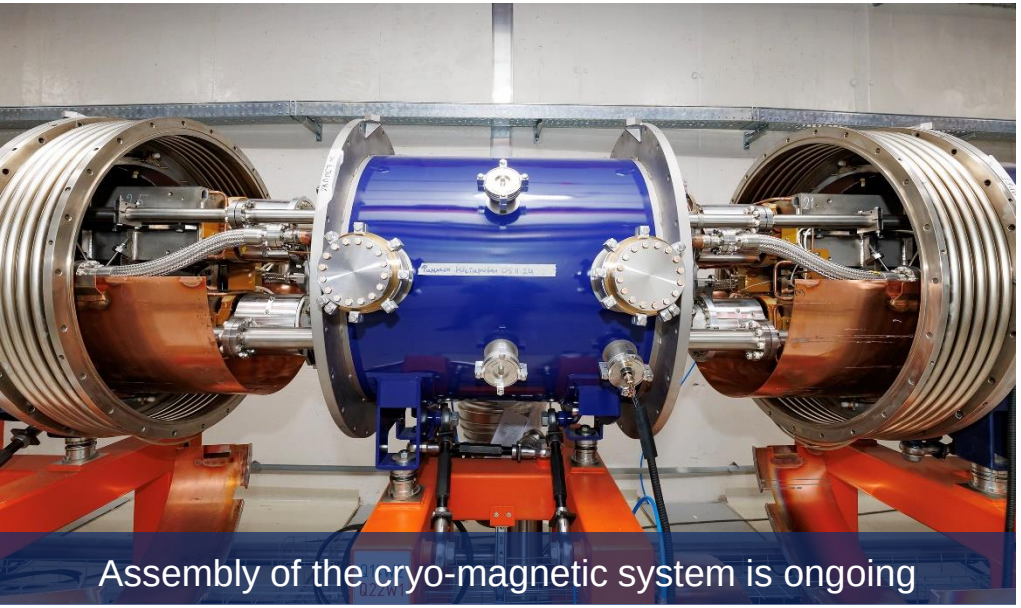
Dualities for conductivities λ :

$$\lambda_1 - \lambda_2 = 32\mathcal{N}$$

$$\lambda_2 = -3\lambda_\Lambda$$

NICA Nuclotron-based Ion Collider fAcility

Preparation for the NICA Collider Commissioning



Assembly of the cryo-magnetic system is ongoing

Assembly of the transport lines from Nuclotron is in progress, expected date of completion – May 2025

November 2024 – Applied research channels are ready for the Nuclotron extracted beams

SIMBA station

December 2024 – final successful commissioning of GPP1 from Rostekhnadzor

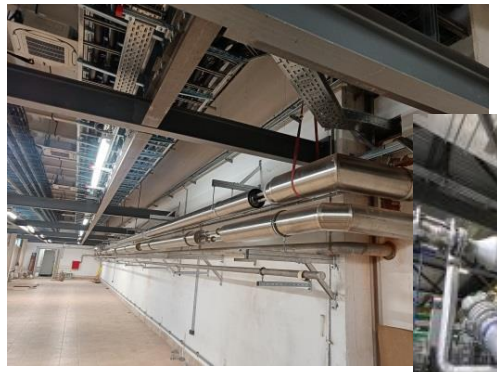
Progress in Assembly of the Cryo-magnetic System

Already installed:

- the collider magnetic cryostat system,
- RF stations and final focusing lenses,
- the merging of the high-vacuum volume sections in the West arc,
- cryogenic equipment and power supplies in the collider building,
- connection of power lines and energy evacuation system.

Cryogenic complex of the collider

Cryogenic LHe, LN2, warm straight and return pipelines



Energy evacuation system

New compressor

Schedule of the Collider Commissioning

16 January – 31 March 2025:

Booster operation

- adjusting cryogenics and power supply units,
- tuning of electron cooling,
- optimization of the beam dynamics,
- beam accumulation at injection energy.

April – May 2025:

Booster + Nuclotron operation

- minimization of particle loss,
- tuning of the slow extraction,
- testing fast extraction system,
- running BM@N & ARIADNA programme.

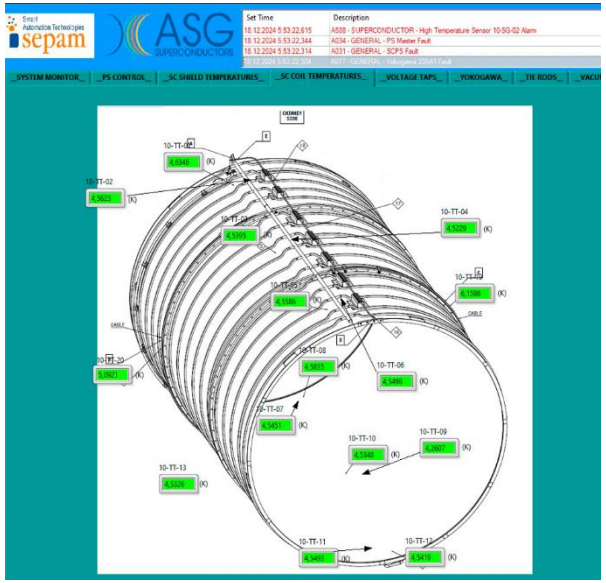
June – August 2025:

Booster + Nuclotron + Collider operation

- tuning the Nuclotron – collider beam line,
- beam injection into collider,
- first collisions with internal target.

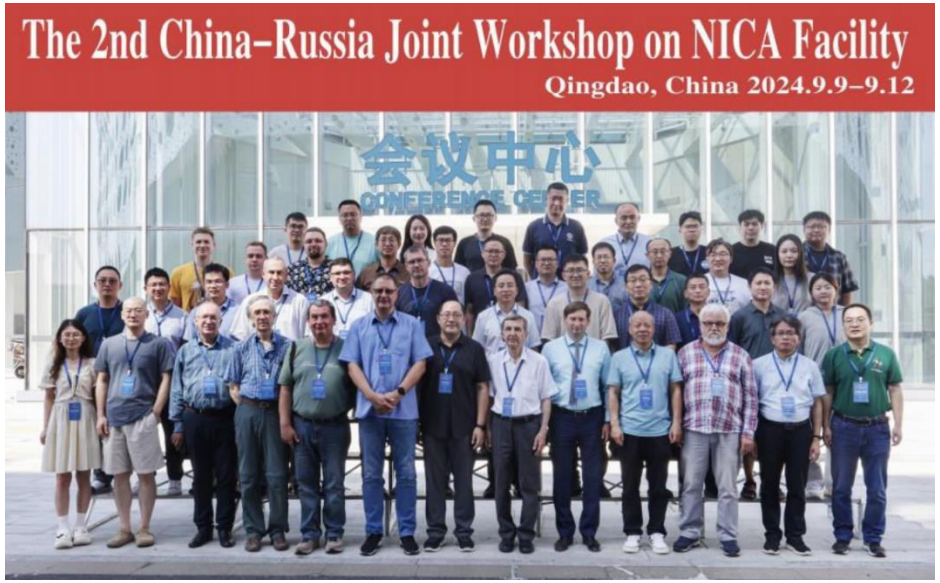
Collider is expected to be ready for beam tests in June 2025

Realization of the MPD Project



Already DONE:

- Completion of work on the installation of the Southern platform;
- Assembly of the second FHCal;
- Test installation of FHCal into a pole;
- Solenoid cable routing;
- Cleaning the cooling system pipes;
- Restoring the shape of the frame;
- Installation of TPC rails;
- Test of the ToF Installation into Support Frame.



In December 2024, cooling of the MPD solenoid was performed to an operating temperature of 4.5K.

Discussions continue on the most recent progresses, plans and opportunities of the NICA facility.

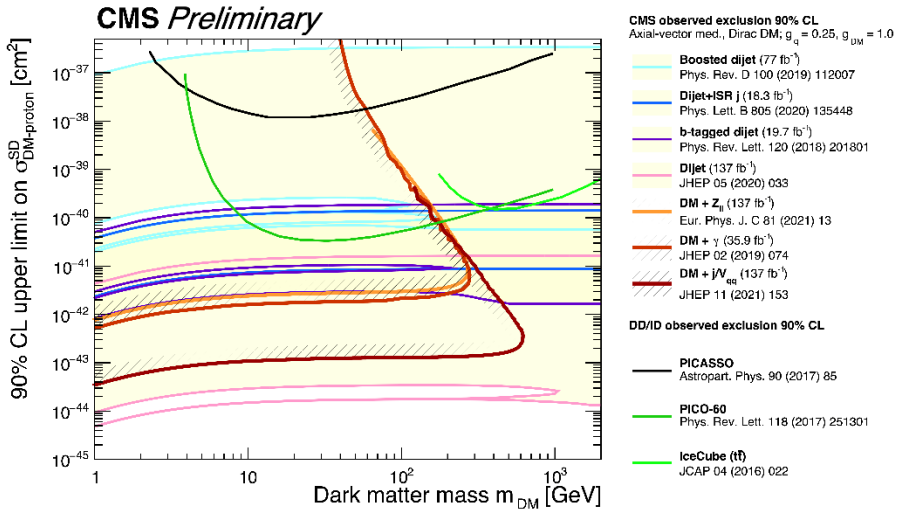
MPD schedule – 2025: Starting detector commissioning in late 2025 remains the main priority

January	Solenoid and Correction Coils Power Supplies control system
February	Solenoid Safety regimes of emergent energy evacuation working out
	Development of algorithms of cooling on base of experience with manual regime
	Cooling down of the Solenoid to the working temperature 4K
March	Installation Magnetic Field Mapper, Calibration, preparation for measurements of Field
June	Magnetic field measurements on nominals: 0.2T, 0.3T, 0.4T, 0,45T, 0.5T, 0,55T
	TPC mechanical body is assembled, leak test and HV test are finished
	Support Frame installation

July	Installation FHCal into poles
August	Ecal installation
	Installation TOF modules (access from both sides)
November	TPC installation
	Cabling
December	Beam pipe installation
	Moving on the beam line
	Readiness for the Data taking

Participation in the Experiments at CERN

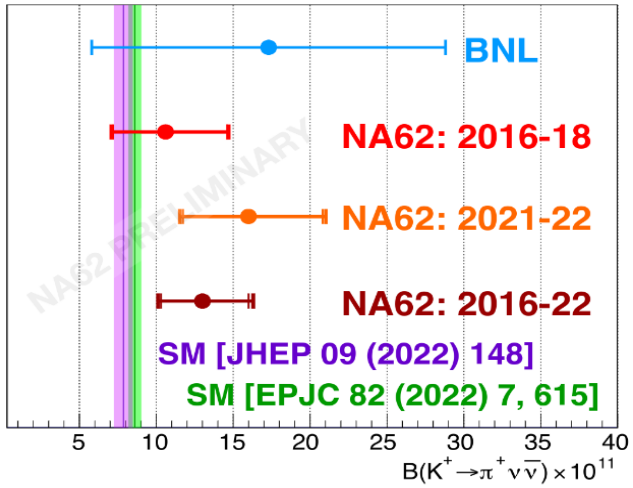
Dark matter searches with the CMS experiment



Upper limits (95% CL) for cross section of DM-nucleon interactions via axial-vector mediator

arXiv:2405.13778v1 [hep-ex]

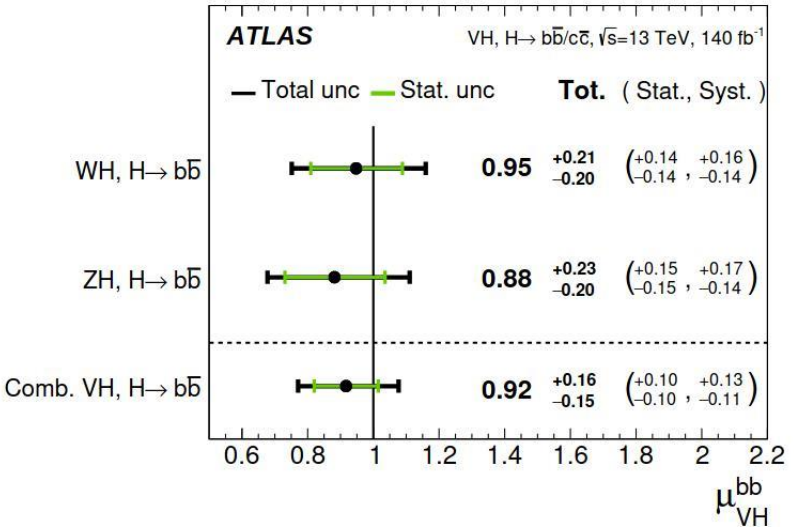
Registration of rare decay $K^+ \to \pi^+ \nu\bar{\nu}$ in NA62

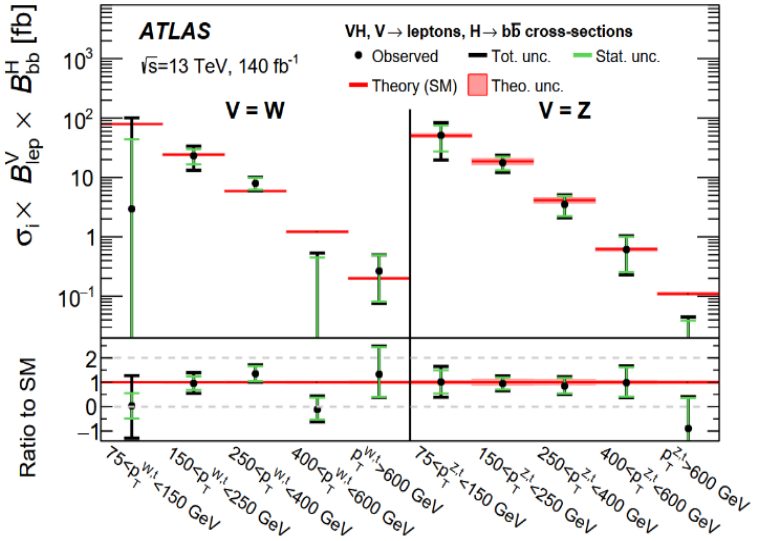


Higgs boson study with the ATLAS experiment

Signal strength $\mu=\sigma_{exp}/\sigma_{SM}$ measured for the Higgs boson decays into pair of *b*-quarks

arXiv:2410.19611v1 [hep-ex]

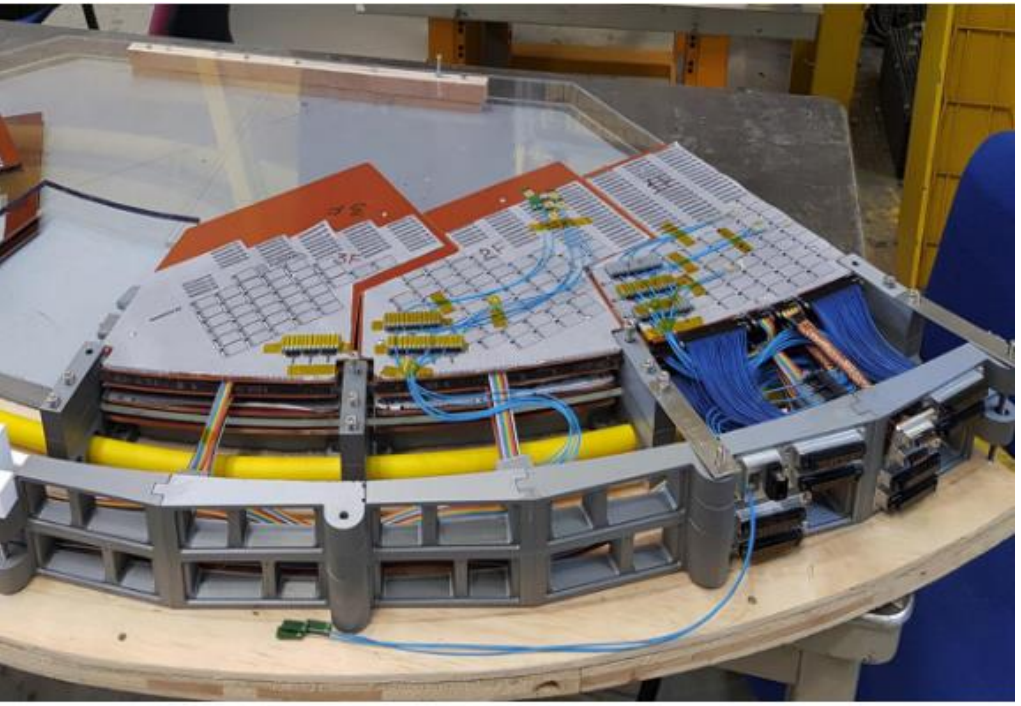


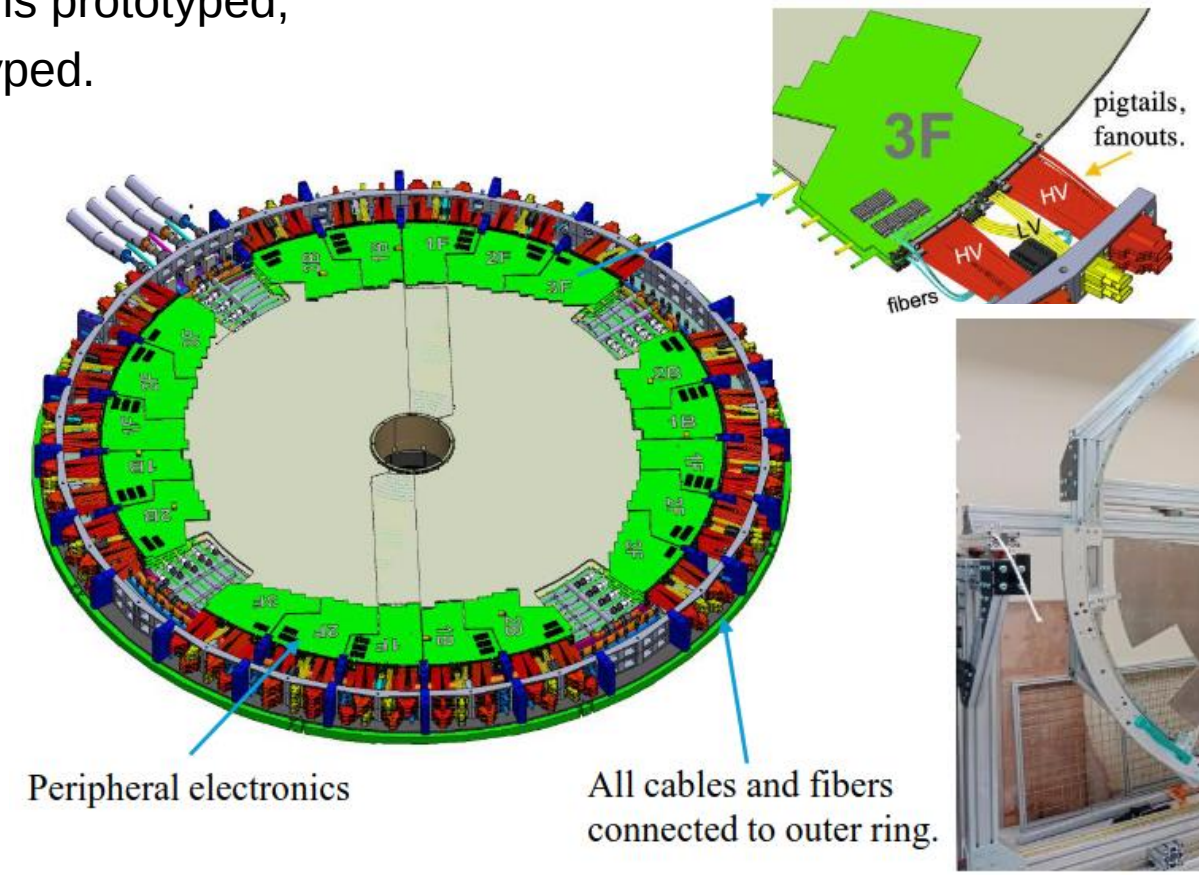


JINR in ATLAS Upgrade

JINR takes active part in the new HGTD (High Granularity Timing Detector) development and production:

- Layout of the electrical and optical services inside the HGTD designed;
- Systems for temp., humidity and pressure monitoring designed;
- 3D model of services is developed and prototyped;
- Dedicated tool for half-disks assembly is prototyped;
- Cable routing is developed and prototyped.





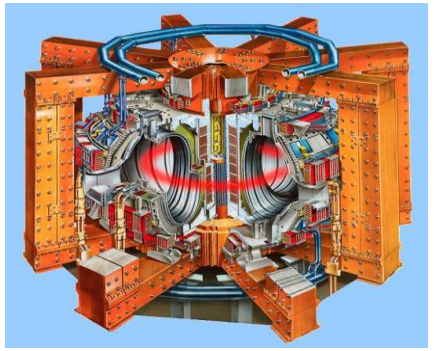
Development of Sample Environment Equipment for ARIADNA Target Stations at NICA

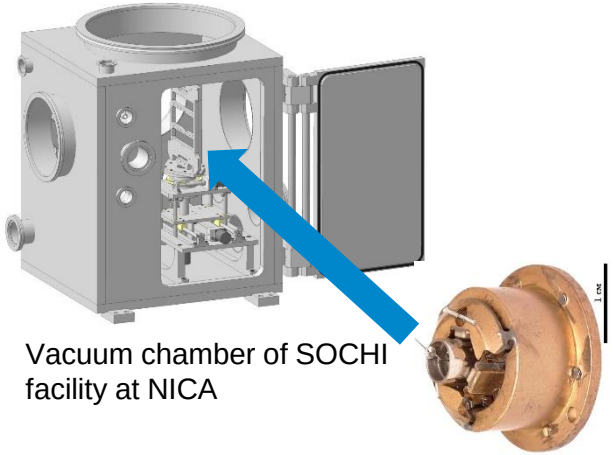
Development of systems for real-time investigation of surface radiation defects during irradiation using scanning probe microscopy methods.

The scanning head of a microscope can operate both in an air and in vacuum conditions; it is highly resistant to radiation.

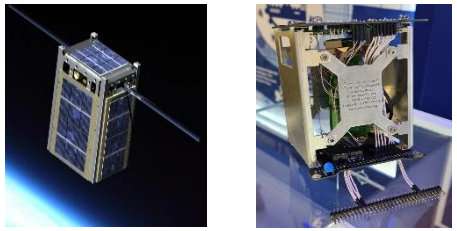
Experience of operating the microscope scanning head in extreme conditions:
- on the inner wall of the TOKAMAK,
- in open space conditions.

“SMM-2000-REM”



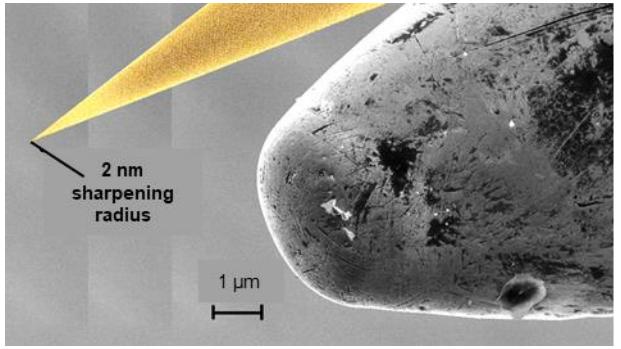


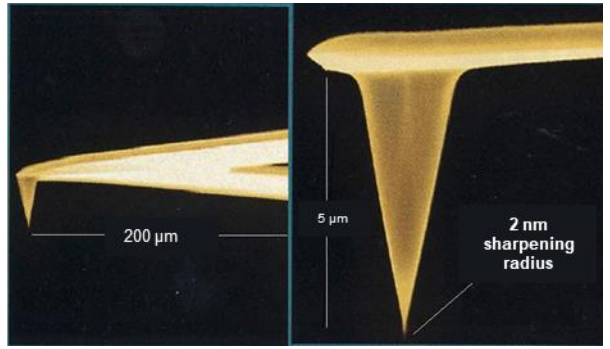
Vacuum chamber of SOCHI facility at NICA



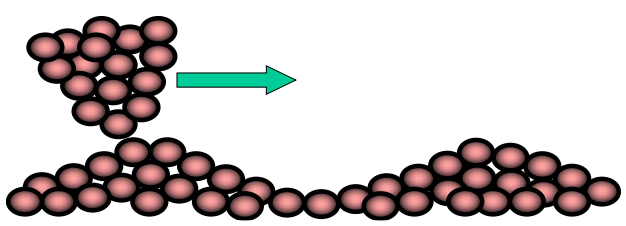
Probe microscope head manufactured by JSC Proton Plant and MIET

Scanning probe microscopy

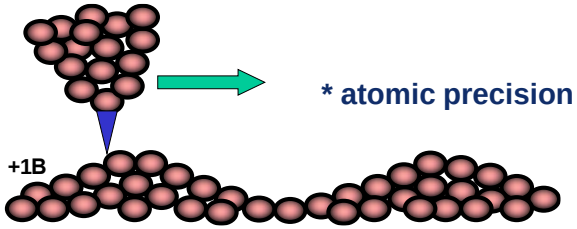




A needle moves along the relief and takes a profile

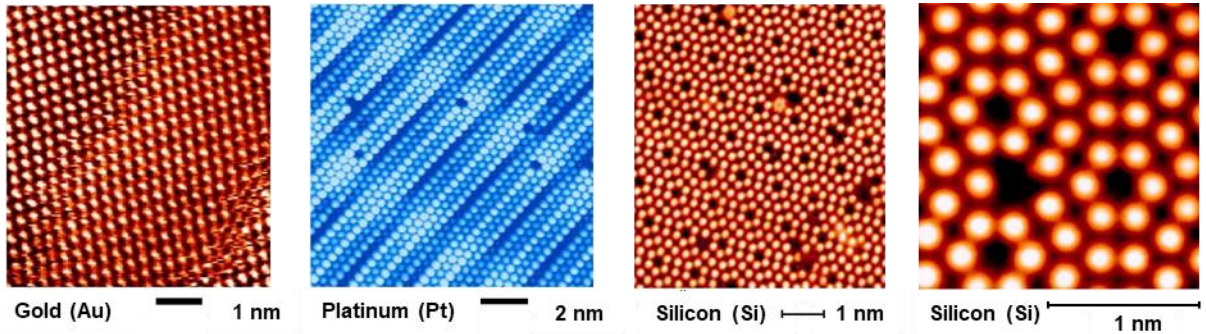


Atomic force microscopy



*** atomic precision**

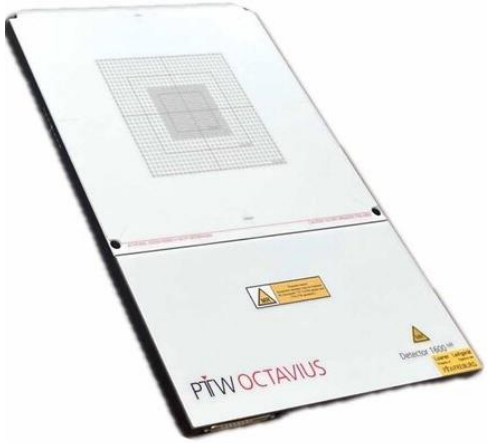
Scanning tunnelling microscopy

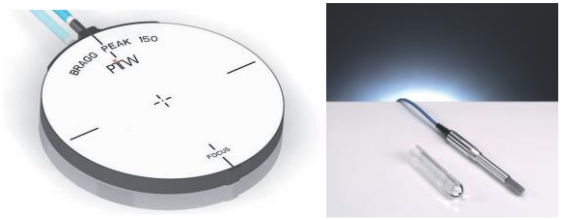


Subsystems for High-energy Beam Diagnostics and Dosimetry at ARIADNA Target Stations

Development of experimental techniques at ARIADNA target stations requires equipping them with various sample environment systems, as well as improving existing detector systems for high-energy beam diagnostics

Dosimetry complex based on ion chamber matrix





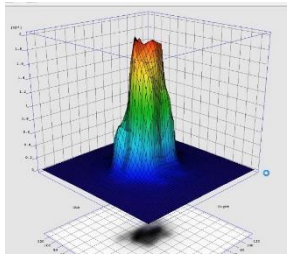
Reference ion chambers

The OCTAVIUS Detector 1600XDR is a high resolution ion chamber matrix for quality control of irradiation and dose measurements with protons or heavy ions.

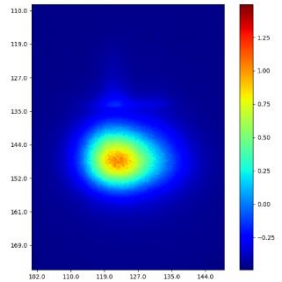
OCTAVIUS Detector 1600 XDR

Dosimeter (electrometer) PTW Unidos Webline

- **1521 ion chambers, providing a maximum field size of 15 x 15 cm²;**
- **2.5 mm x 2.5 mm x 2 mm in size and the centre-to-centre spacing is 2.5 mm in the central area of 6.5 x 6.5 cm² and 5 mm in the area surrounding it;**
- **100% field coverage in the central region;**
- **Read out cycles of 100 ms provide the basis for real-time analysis of beam profiles.**



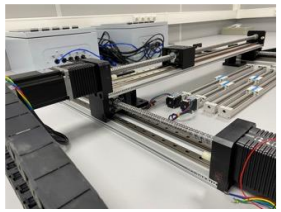
3D-map of irradiation



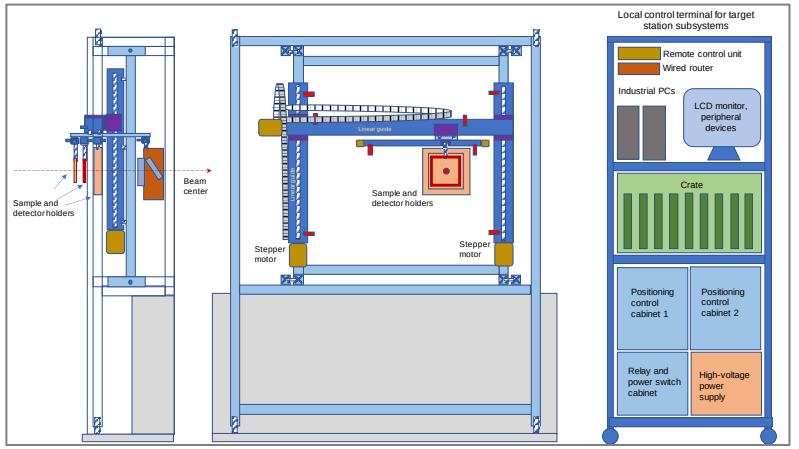
Radiation dose distribution map

Activities in the field:

- Development of detector systems used in diagnostics of high-energy ion beams;
- Development of readout equipment for detector systems;
- Development of precise mechanic systems for sample positioning.



ARIADNA Long-Term Exposure station behind the BM@N facility

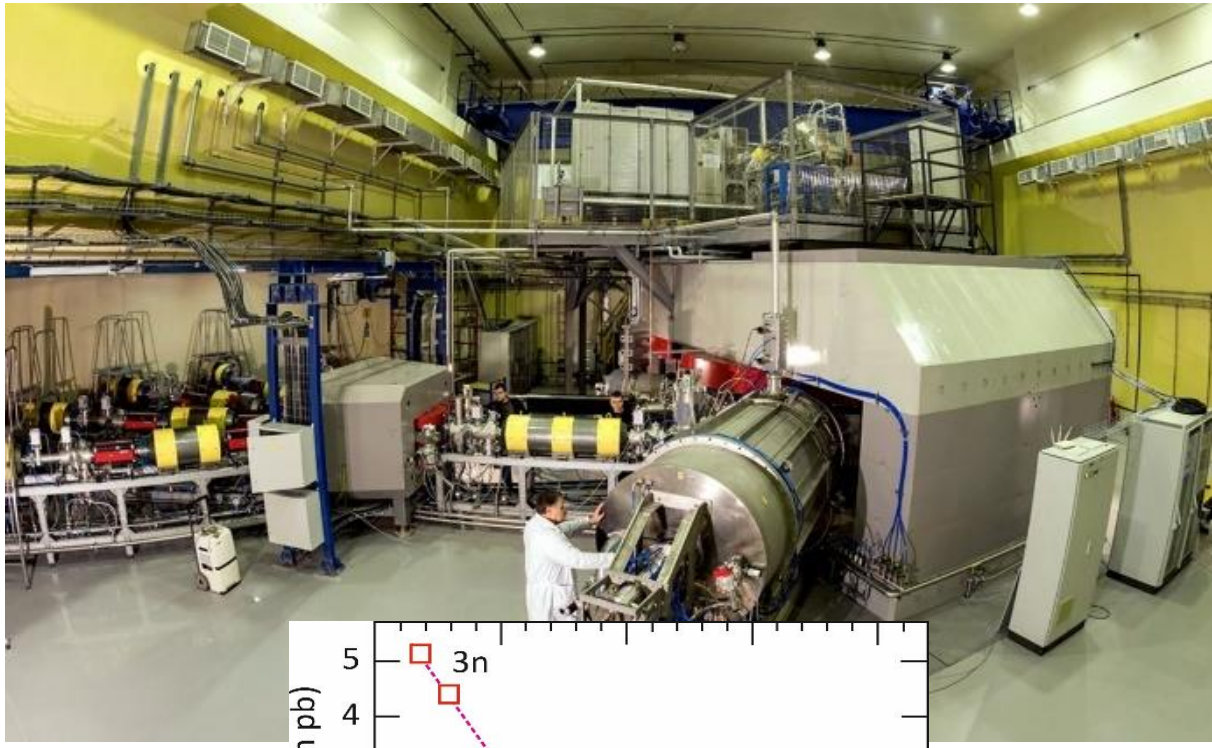


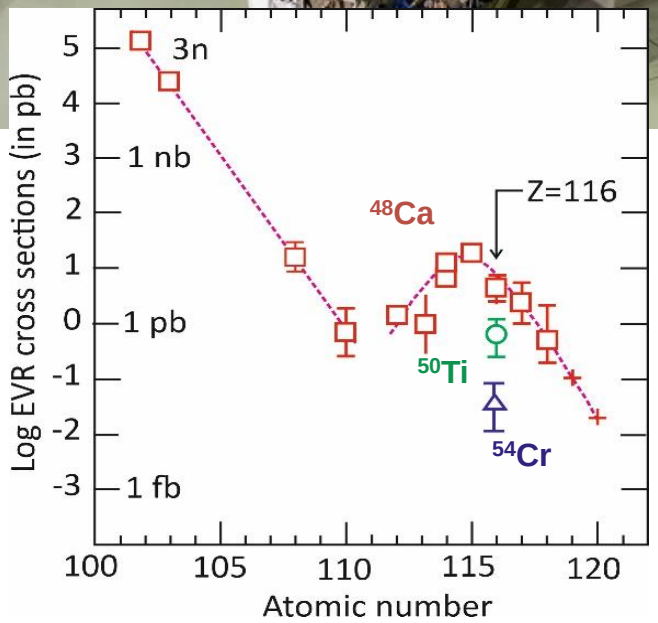
Experiments @ Superheavy Element Factory

DC-280 Beam time in 2024: 4050h

Main tasks for 2024-2025:

- Continuation of experimental programme;
- Preparation of experiments on synthesis of new elements 119 and 120;
- In 2024, experiments were carried out on the synthesis of ^{116}Lv using beams of ^{50}Ti and ^{54}Cr. It was found that the cross section decreases by ~10 times (^{50}Ti) and ~150 times (^{54}Cr) compared to the reaction in the ^{48}Ca beam. The data obtained is exteramly important for palnning the experiments on the synthesis of element 119.
- New isotopes were observed in the experiments: ^{288,289}Lv and ^{280}Cn.
- The first experiment has been prepared on the spectroscopy of isotopes of element ^{114}Fl and their decay products produced in the ^{48}Ca+^{242}Pu reaction. Several hundreds of events are expected with the use of new target unit having diameter of 480 mm.





FLNR Accelerator Complex

U-400M cyclotron: radioactive ion-beam research

Commissioning works are continued on U-400M with the purpose of optimizing different regimes of acceleration and production of secondary beams.

In the fall of 2024, the first experiment was carried out to study di-neutron correlations in the reaction ^{4}He(^{8}He,^{8}He)^{4}He at the energy of 25÷35 AMeV. Data analysis is ongoing.

Obtained intensity of primary beam
^{15}N (E=51.4 MeV/n): **1pμA**

of secondary beams **^{6}He**: 1.8x10^{6} pps
^{8}He: 2.0x10^{4} pps
^{12}Be: 5.0x10^{4} pps

DC-140 cyclotron: applied research

- Construction and repair works in the hall of the new DC-140 cyclotron is being completed;
- The installation of accelerator systems will start in the first half of 2025;
- Commissioning works are expected to be carried out in the second half of 2025.

New Experimental Hall for U-400R

Progress in construction:

- Concrete works on the construction of the building have been completed;
- At the next stage, finishing works and installation of the building's engineering systems will be carried out. Completion of construction is expected in 2026;
- Design of new experimental set-ups to be placed in the new building is ongoing.

Heating system

Experimental cabin

New Experimental Hall, January 2025

International Conferences on Low-energy Nuclear Physics

International Conference **50 Years of Cold Fusion**
19–24 November, 2024
Yerevan, Armenia

Organized by the National Academy of Sciences of the Republic of Armenia and JINR

Participants: representatives of 13 countries and JINR

The Topics of the Conference:

- Synthesis of superheavy elements (SHE);
- Structure and properties of superheavy nuclei;
- Chemical properties of SHE;
- Fission of superheavy nuclei;
- Production mechanisms of SHE.

2nd International African Symposium on Exotic Nuclei
9–13 December, 2024
iThemba LABS, Cape Town, South Africa

Organized by iThemba LABS and JINR

The Topics of the Symposium:

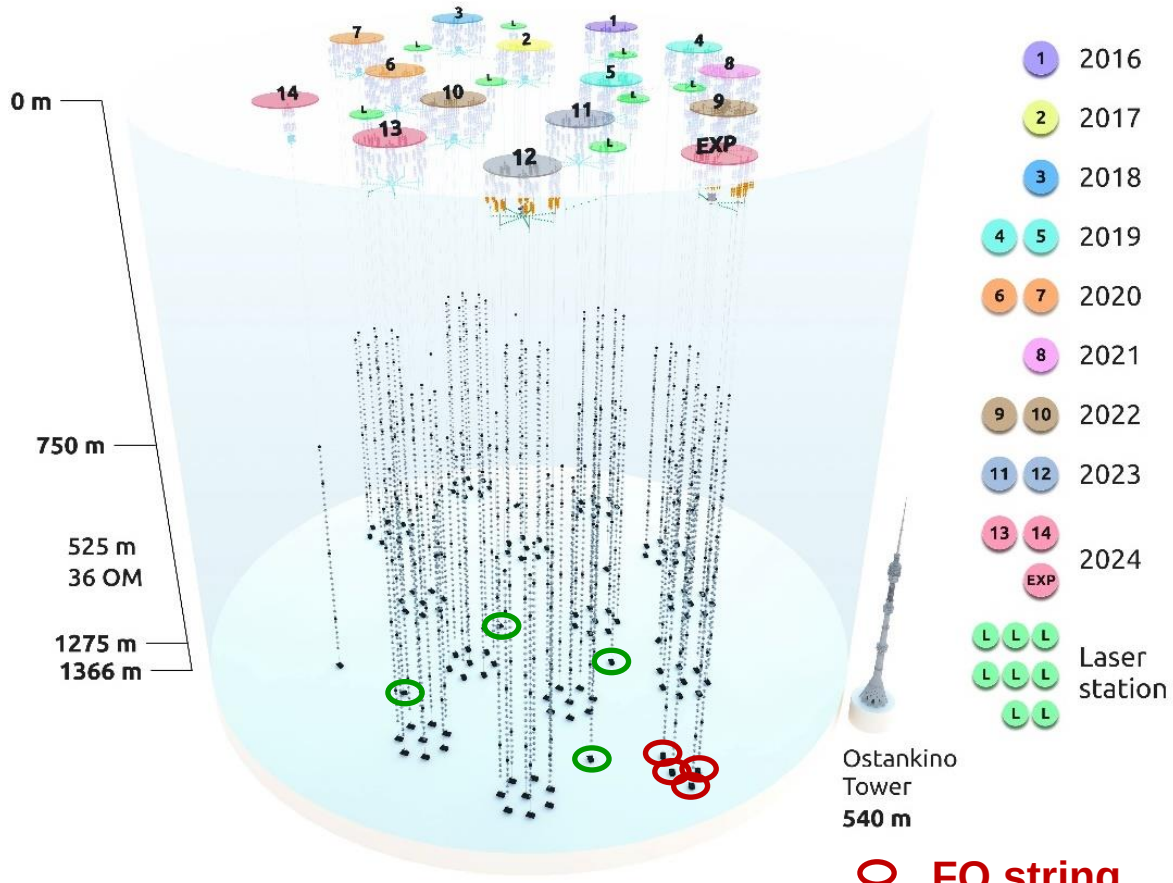
- Production of Exotic Nuclei / Rare Ion Beams;
- Fundamental Research with Radioactive Ion Beams;
- …
- Isotopes in Nuclear Medicine.

Status of the Neutrino Detector Baikal-GVD

- Currently, the deployment of the Baikal-GVD neutrino telescope is successfully underway. 13 full clusters are installed. The underwater structure of the installation contains just over 4,100 photodetectors;
- The production and technical base of the Baikal project ensures the deployment of **two clusters annually**;
- GVD has **developed shore infrastructure:** control centre, laboratories, workshops, deployment tools, living quarters and continues it expansion;
- GVD is **testing ground** for the development the systems for next-generation telescope:
  - 4 strings with fiber-optic DAQ,
  - 4 inter-cluster strings,
  - 1 prototype string with new optical modules and new DAQ system in direction of the next generation detector development together with IHEP (Beijing).

Nearest plans:

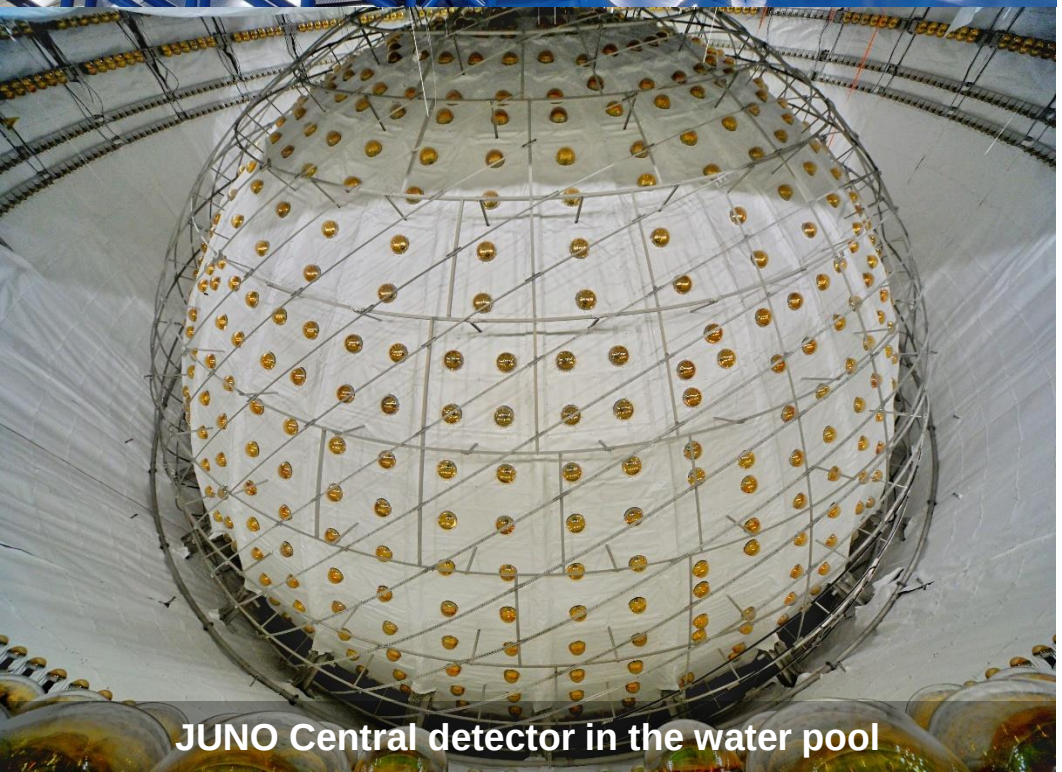
- About 660 optical modules will be assembled for deployment in 2025;
- The collaboration is planning to install additional 2 new clusters, 2 additional inter-cluster strings and one full prototype string for the next generation detector with in case a good external conditions (weather and ice).



Total: 4,104 OM + 8 laser stations

JUNO: Reactor Antineutrino Oscillations


Top tracker installation


JUNO Central detector in the water pool

20 kt liquid scintillator detector, 26.6 GW_{th} reactors, 52.5 km baseline: 47 $\bar{\nu}_e$/day.
Neutrino Mass Ordering (NMO): 3σ in 7.1 years.

JUNO status:

- Central detector: assembled. Water filling in progress. Commissioning in progress. Data taking;
- Liquid scintillator filling from February till August;
- Physical data taking starts in August;
- First physics results by 2026.

Top Tracker veto system:

- First plastic scintillator “wall” installed in January;
- Active participation of JINR scientists.

Near detector TAO status:

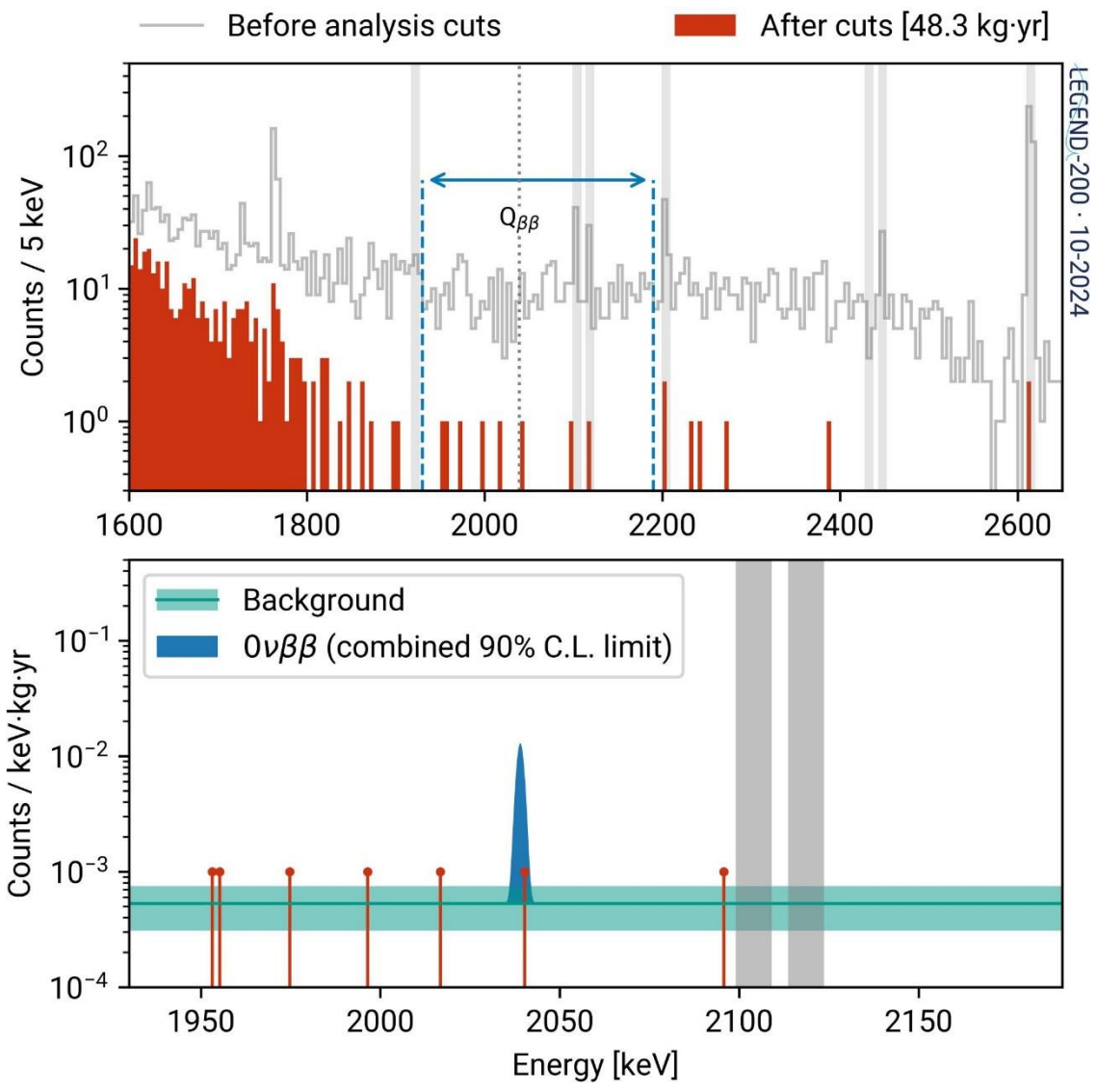
- Detector installation ongoing;
- Filling and cooling in February. Commissioning in March;
- Significant contribution from JINR scientists on all stages.

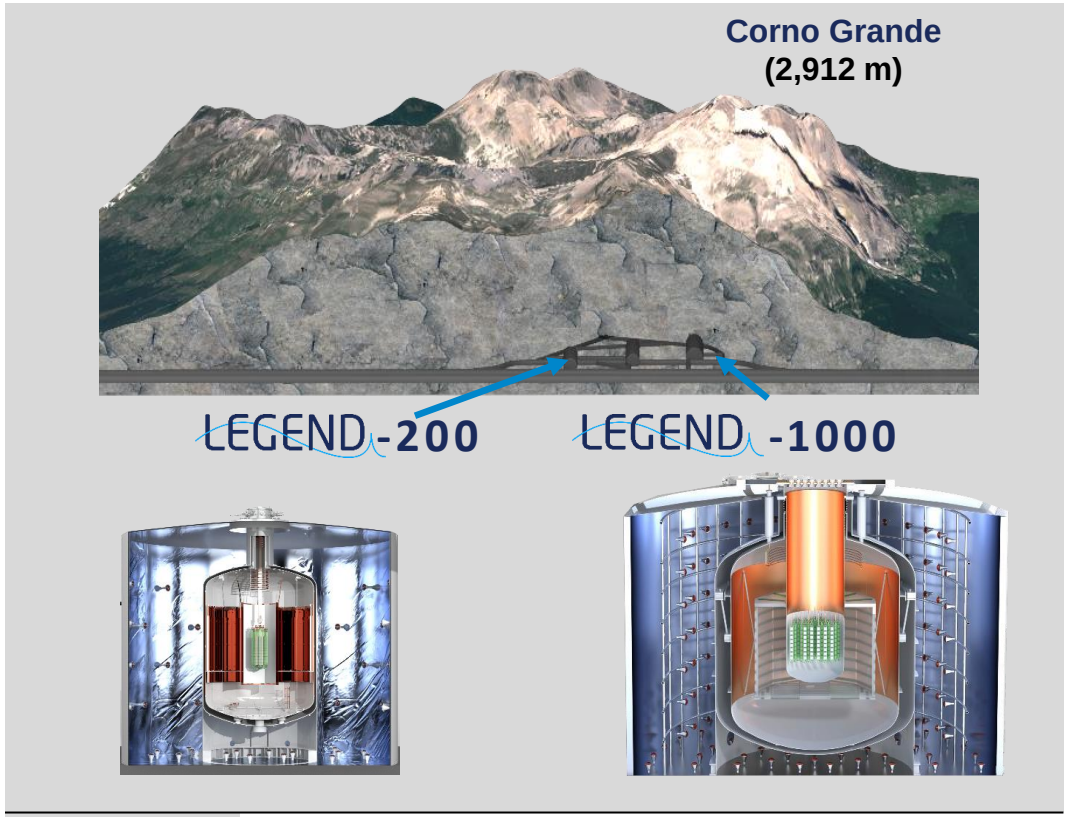
Analysis:

- Preparation to the physics data taking;
- Comprehensive study of the sensitivity to NMO accepted to CPC: to be finally published soon.

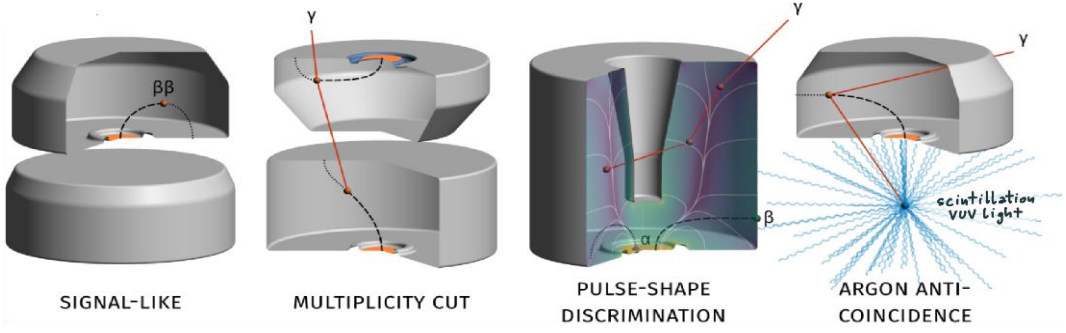

Detector TAO

LEGEND: Designed for Discovery, First Results





active mass	200 kg	1,000 kg
target exposure	1 ton yr	10 ton yr



First NOvA + T2K Joint Analysis

Performed with significant contribution from JINR personnel. Based on the latest published analyses of NOvA and T2K.

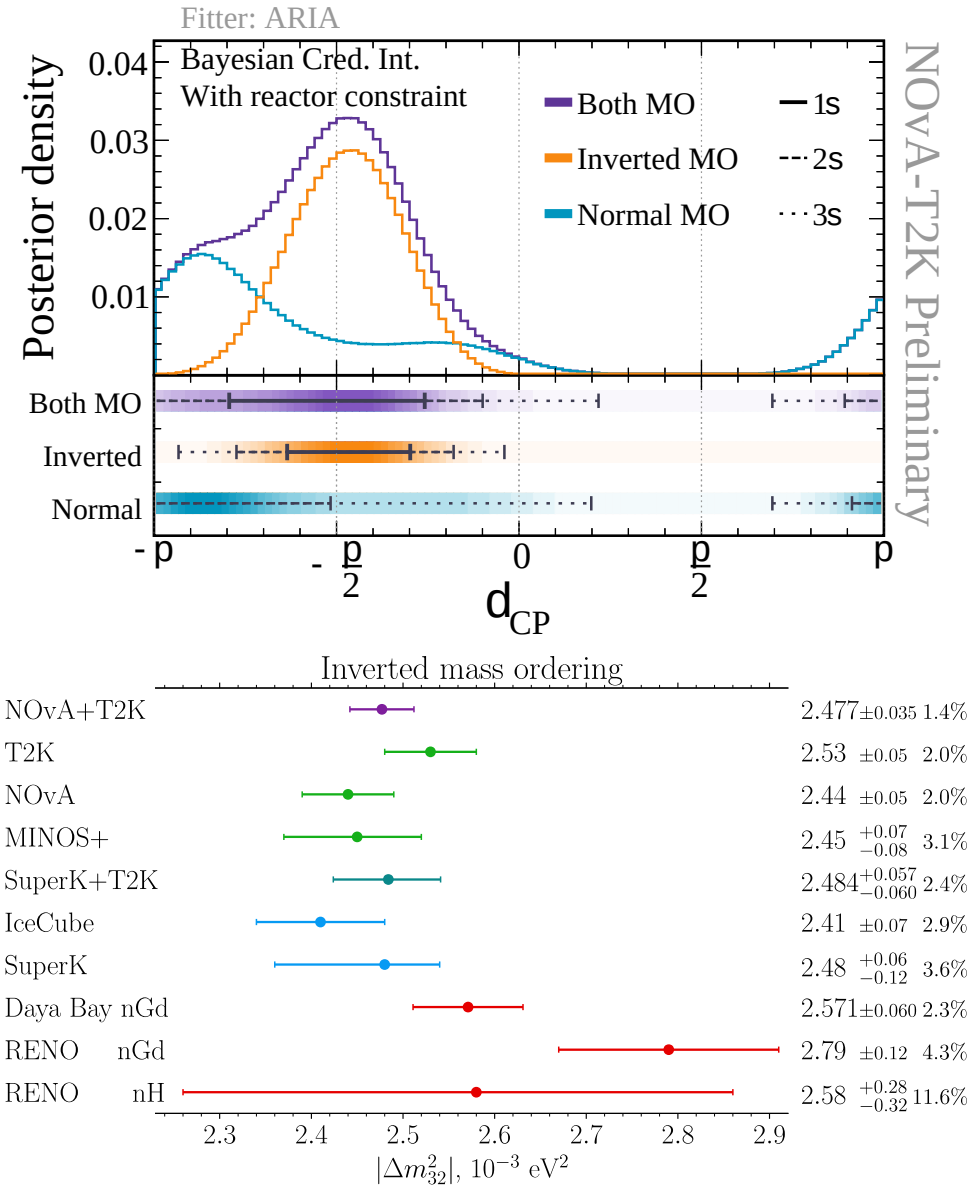
Full-fledged joint fit produced by both collaborations:

- Unique effort for neutrino physics;
- Use complementary features of both experiments.

Results:

- More precise measurement of oscillation parameters if compared to individual results;
- Strong constraint on Δm^2_{32}, disfavor CP conservation in Inverted neutrino mass ordering at >3σ;
- Firm foundation for future NOvA+T2K analyses.

Publication prepared for Nature is under review by both collaborations.



Project TAIGA, January 2025

Installation of two clusters with SiPM in the camera

Installing some of the mirrors on the telescope and adjusting them to test new equipment

On 12 February, the beam was successfully passed through the LINAC-200 sections. The inauguration will be held by Members of the JINR Scientific Council on 13 February 2025

Electron beams for various tasks

- **Particle detectors R&D** (NICA, COMET, DLNP, FLNR, Serbia, Egypt, Sarov, Novosibirsk, Tomsk)
- **Education** (JINR University Centre)
- **Electron beam diagnostics, R&D and fundamental tasks**
- **Nuclear physics experiments** (DLNP, FLNR…)
- **Applied research and Life Sciences** (LRB)

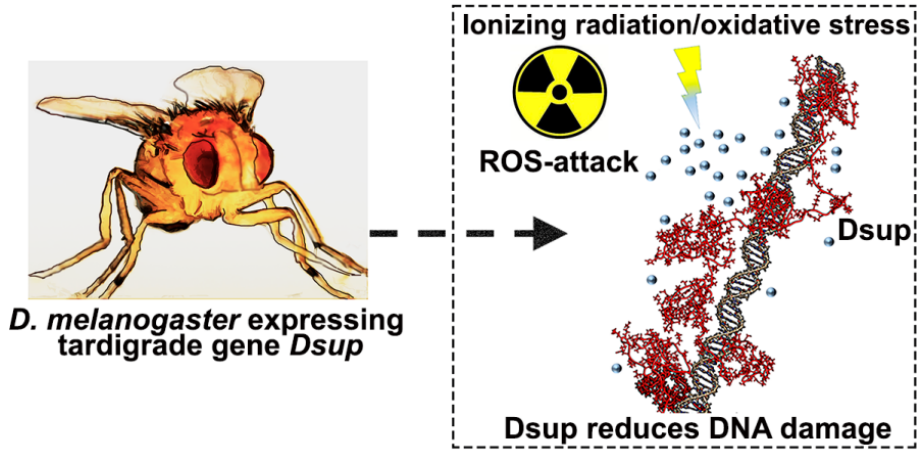
TARDISS – Search for New Protective Mechanisms and Technologies Inspired by Extremophiles

Tardigrades:

- most radioresistant animal: LD_{50} > 6000 Gy;
- survive in outer space > 10 days;
- candidate organism for astrobiology;
- unique source of new radioprotection mechanisms due to unique tardigrade proteins.

Tardigrade Dsup protein (Damage suppressor) – extremely effective DNA-protector

Dsup increases the survival of human cell cultures and Drosophila after exposure to gamma rays and protons (DLNP)



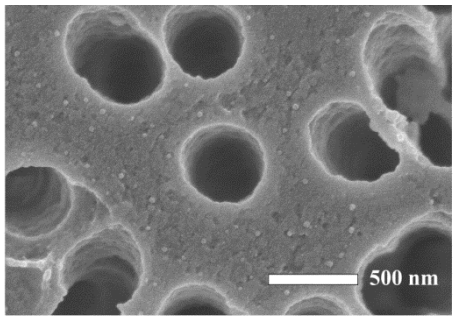
D. melanogaster expressing tardigrade gene *Dsup*

Omics approach: effects of Dsup were validated by transcriptome analysis

iScience (Q1), 2023,doi:10.1016/j.isci.2023.106998

Material design inspired by tardigrades

(DLNP, FLNR Centre for Applied Physics)

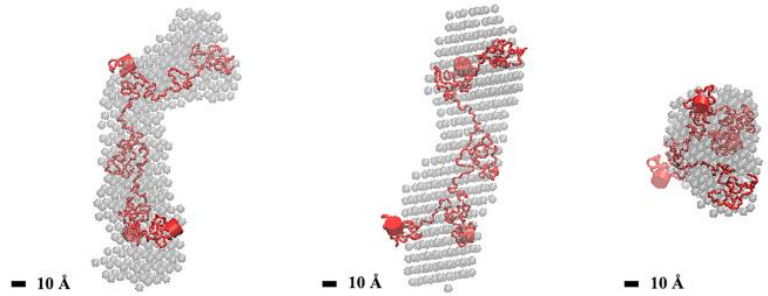


Track membranes functionalized with Dsup for cell-free DNA isolation

Biotechnology Progress (Q2), 2024, doi.org/10.1002/btpr.3478

Structural biology of Dsup (size, structure, complex with DNA)

(DLNP, FLNP and MIPT)



Scientific Reports (Q1), 2024, doi:10.1038/s41598-024-74335-2

IBR-2 Reactor

On 24 December 2024, an addendum to the license was received from Rostekhnadzor. It permits bringing the IBR-2 to power.

- By the end of 2024, the work on replacing the Na-Air heat exchangers **was fully completed.**
- Test cycle of the reactor operation with a gradual increase in power and first **experiments** are planned for **17 February 2025.**
- In spring 2025, operation cycles will be carried out for researchers from JINR and on the basis of **rapid-access beamtime requests.**
- Resumption of the **User Programme** is scheduled for autumn 2025.

ФЕДЕРАЛЬНАЯ СЛУЖБА
ПО ЭКОЛОГИЧЕСКОМУ, ТЕХНОЛОГИЧЕСКОМУ
И АТОМНОМУ НАДЗОРУ

УТВЕРЖДАЮ
Руководитель Федеральной службы по экологическому, технологическому и атомному надзору
_____ А.В. Трембицкий
«24» декабря 2024 г.

ИЗМЕНЕНИЕ № 1

План-график подготовки исследовательской ядерной установки ИБР-2 к возобновлению работы на мощности для физических экспериментов

Разрешительные документы: лицензия Ростехнадзора № ГН-03-108-4629 от 25.04.2024 г. на право эксплуатации исследовательской ядерной установки (объект ИЯУ ИБР-2) с изменением № 1 в условия действия лицензии

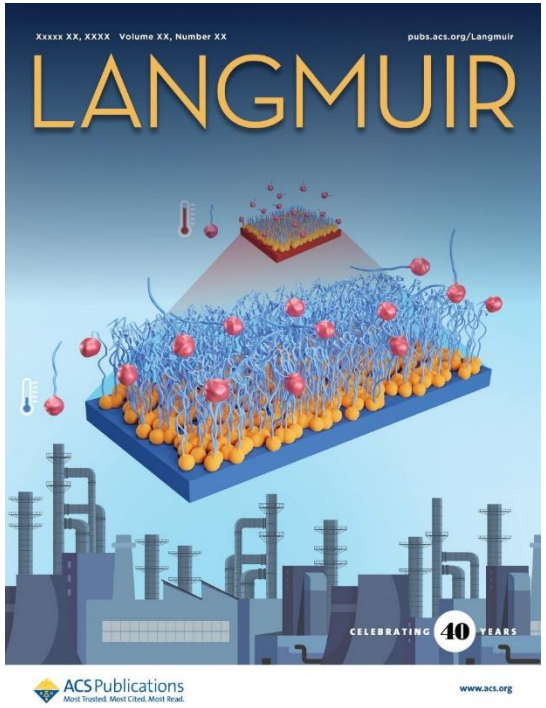
№	Мероприятие	Срок окончания исполнения
1.	Подготовка Распоряжения ЛНФ о проведении проверок и испытаний систем реактора и об образовании комиссии по проверке соответствия состояния ядерной, радиационной и технической безопасности ИЯУ ИБР-2 требованиям норм и правил в атомной энергетике, а также технического состояния реактора после длительной остановки.	17.01.2025 г.
2.	Проведение проверок и испытаний систем реактора, оформление соответствующей документации	03.02.2025 г.
3.	Комиссионная проверка ИЯУ ИБР-2 после проведения работ по п.2. Оформление Акта комиссии.	06.02.2025 г.
4.	Подготовка приказа ОИЯИ о проведении контрольного вывода реактора на мощность и проведении цикла работы реактора на мощности в соответствии с «Программой работ по выводу реактора ИБР-2 на мощность после длительной остановки».	10. 02.2025 г.
5.	Контрольный вывод реактора на мощность до 250 кВт	12.02.2025 г.
6.	Проведение цикла работы реактора на мощности в соответствии с «Программой работ по выводу реактора ИБР-2 на мощность после длительной остановки» с проверкой готовности физического оборудования к проведению экспериментов на выведенных пучках нейтронов.	17.02. – 07.03. *Шиберa нейтронных пучков открываются по согласованию с руководителем группы ядерной безопасности и главным инженером ИБР-2.*
7.	Подготовка Расписания работы ИБР-2 на мощности для физических экспериментов на март и апрель.	10.03.2025 г.
8.	Подготовка Отчета о результатах выполнения «Программы работ по выводу реактора на мощность после длительной остановки» и направление Отчета в Ростехнадзор.	31.03.2025 г.

Е.В.Лычагин
А.В.Виноградов
15.01.25

Страница 1 из 2

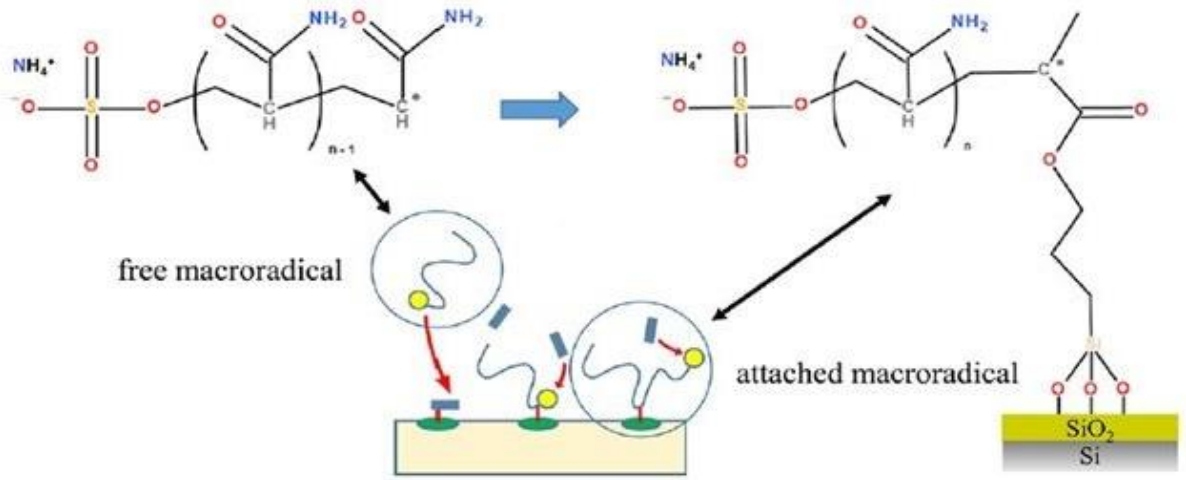
Scientific Highlights

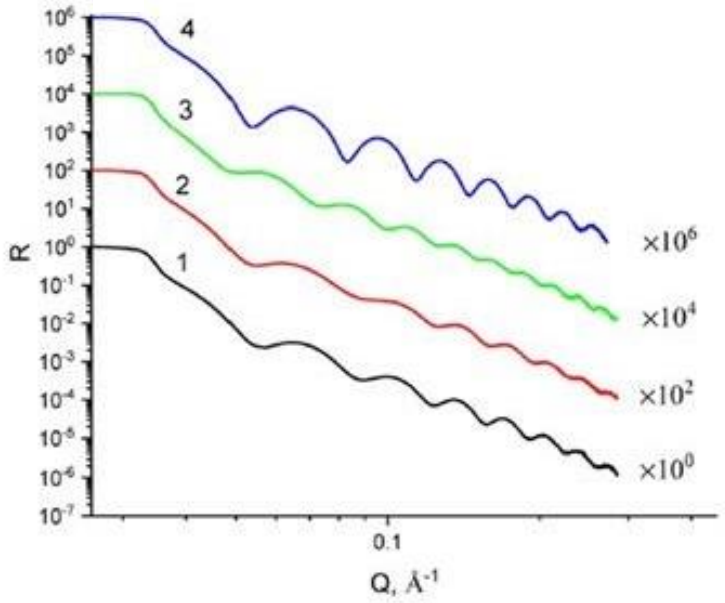
Polymer Brushes Synthesized by “Grafting-through” Approach



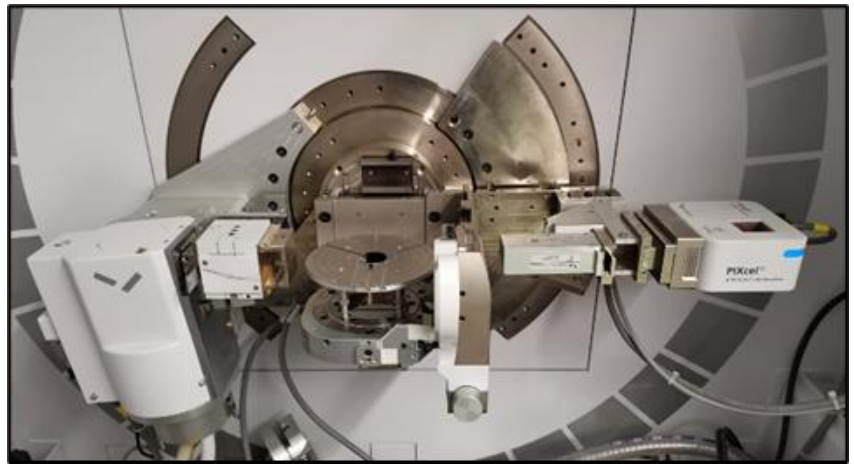
M.M.Avdeev, Yu.E.Gorshkova et al.
Langmuir 40, 23918 (2024)

“Grafting Through” –
a promising method
for developing special
(e.g. antibacterial) **coatings**



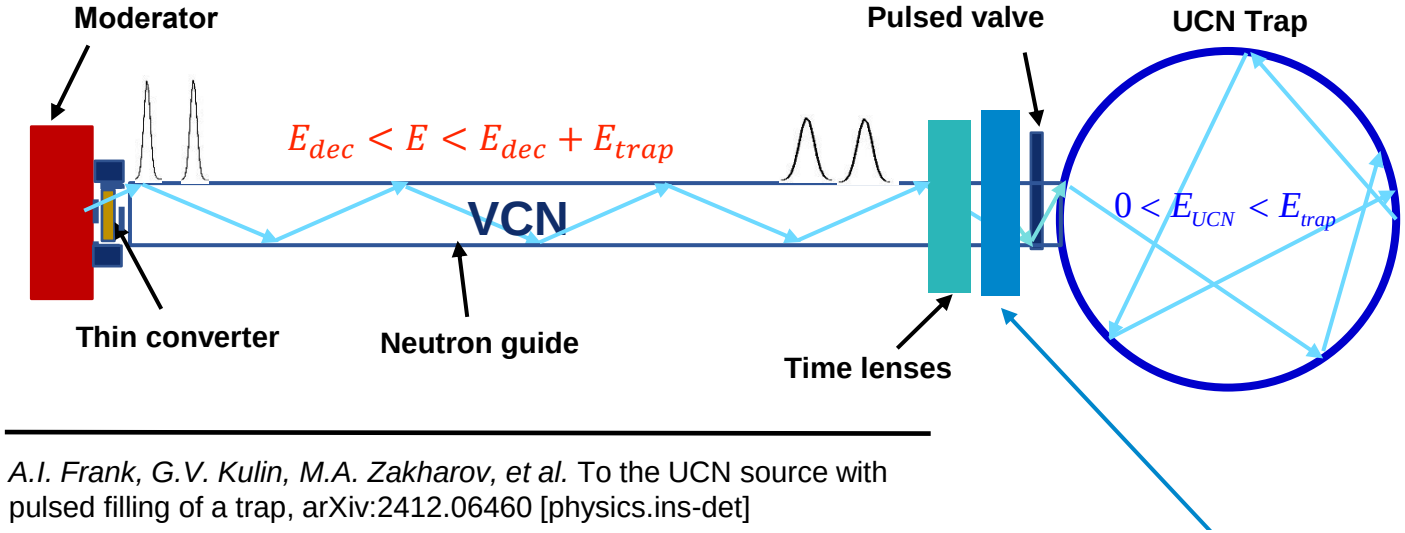


X-ray reflection curves confirming the homogeneity of grafted-through coatings



X-ray reflectometer
PANalytical Empyrean (FLNP)

UCN Source with Pulsed Accumulation of UCN in a Material Trap



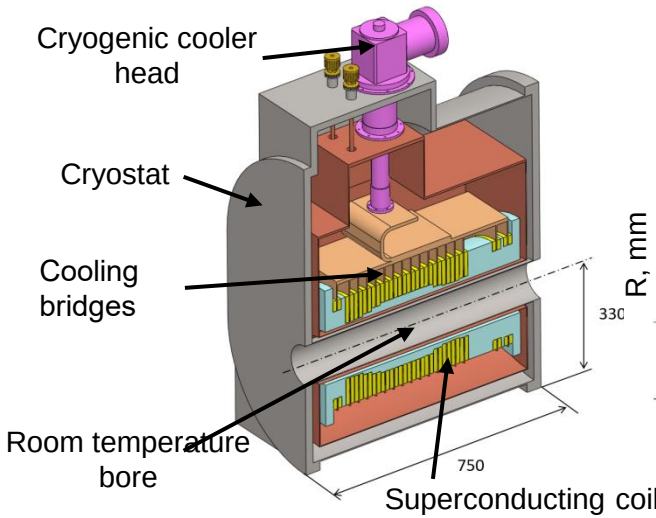
A.I. Frank, G.V. Kulin, M.A. Zakharov, et al. To the UCN source with pulsed filling of a trap, arXiv:2412.06460 [physics.ins-det]

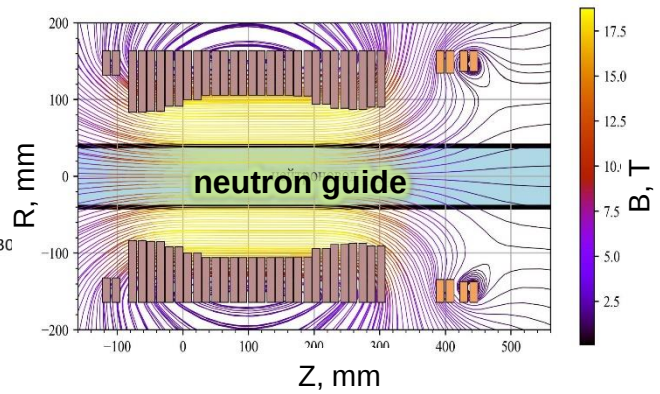
Specific features of future UCN source:

- Deceleration of VCN to UCN by a gradient spin-flipper with a strong magnetic field;
- During deceleration, all neutrons change their energy by the same amount;
- The flux of neutrons, which can be trapped after deceleration has a pulsed structure;
- Time lenses are needed to compensate for the spread in flight times with the deceleration time difference.

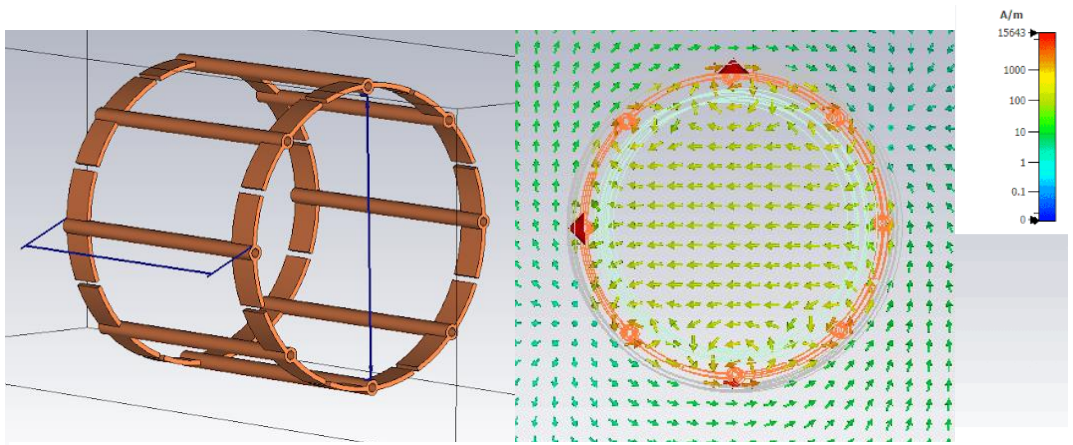
Flipper-decelerator ($E - E_{dec} \rightarrow UCN$)

Superconducting magnetic system with a field of B ≈ 18T





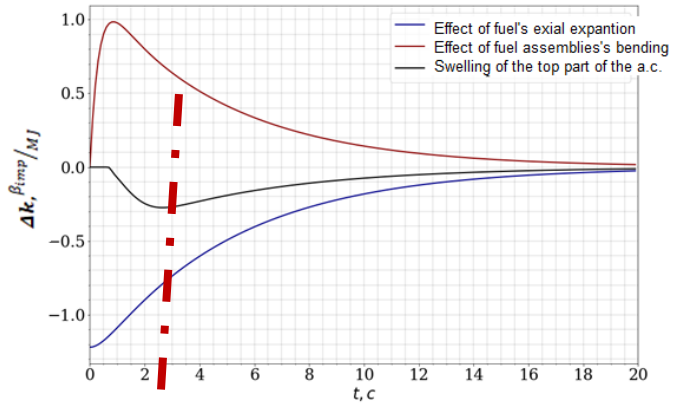
A “birdcage” resonator forms a high-frequency rotating magnetic field inside the flipper

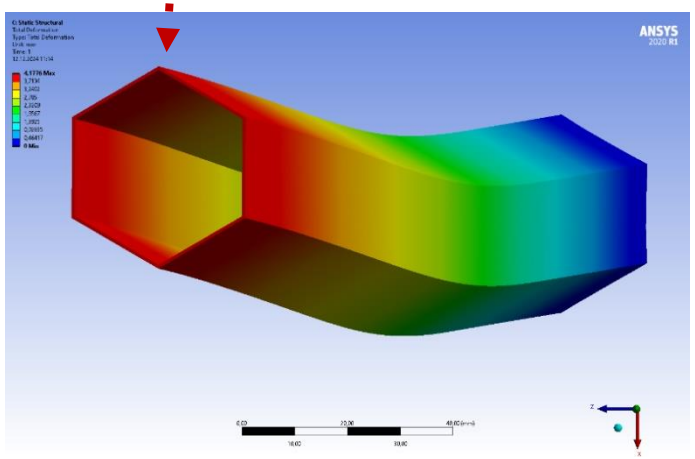


New Neutron Source

The effects influencing the stable operation of the IBR-2 reactor (positive and negative power feedback) **have been determined within the framework of the developed model of pulsed reactor dynamics**.

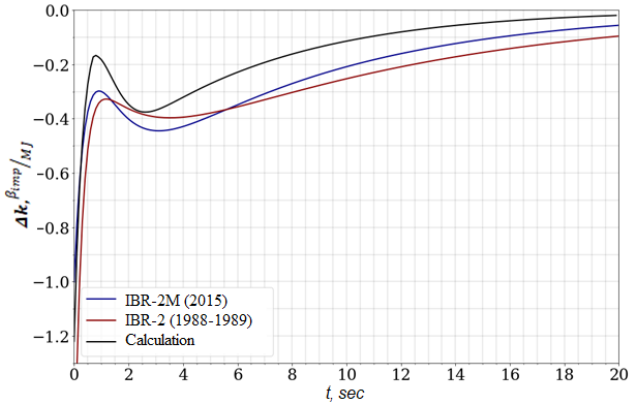
The theoretical course of three components of the pulse response feedback of the IBR-2M reactor

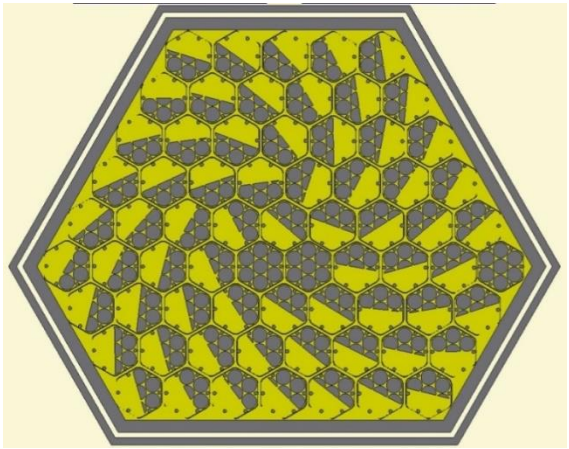




Thermal mechanical calculations

The course of the total pulse response of the power feedback of the IBR-2M reactor





Neutron physics calculations

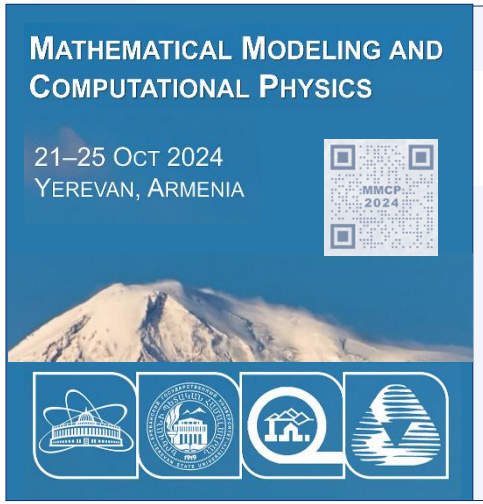
Meshcheryakov Laboratory of Information Technologies in Numbers

42.53 PB	**incoming traffic to the JINR network in 2024**
> 10 mln	tasks run on JINR grid Tier1 and Tier2 in 2024
6.2 million	tasks run on Govorun in 2024
800	virtual machines in the JINR Cloud in 2024
497,000	tasks run by DIRAC in 2024
17.5 PB	EOS storage allocated for users in 2024
12.2 PB	data stored at Tapes in 2024
1,890	publications of JINR staff members for 2024 automatically entered into the JINR Publications Repository
29,699	appeals to Digital JINR in 2024

In 2024, with the decisive participation of MLIT staff members, over **200 scientific papers**,
4 monographs, and **more than 100 articles** within international collaborations were published, **over 150 reports** at international and Russian conferences were presented.

60 **participants**
32 reports

13 Countries: Armenia, Belarus, Bulgaria, Great Britain, Georgia, Egypt, India, Kazakhstan, Moldova, Romania, Russia, Serbia, the Czech Republic



150 **participants**
21 plenary reports
110 sessional reports

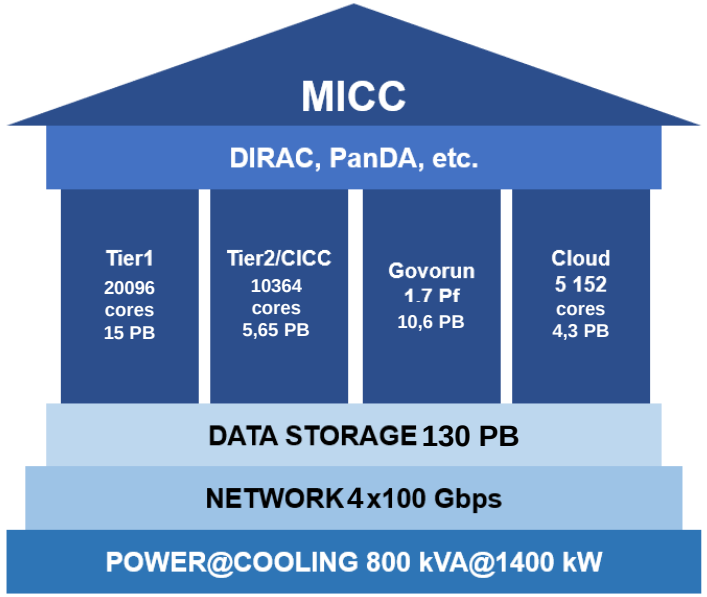
18 Countries: Armenia, Belarus, Bulgaria, Canada, the Czech Republic, Egypt, France, Georgia, Iran, Kazakhstan, Mongolia, New Zealand, Poland, Romania, Slovakia, Tajikistan, Uzbekistan and a large number of Russian research centers and universities

58 **students from Russian universities participated in the IT School**

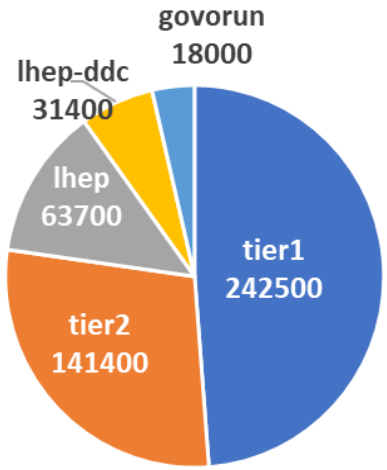
2 **successful defenses of young MLIT specialists for an academic degree of Ph.D.**

12 young scientists and specialists were hired

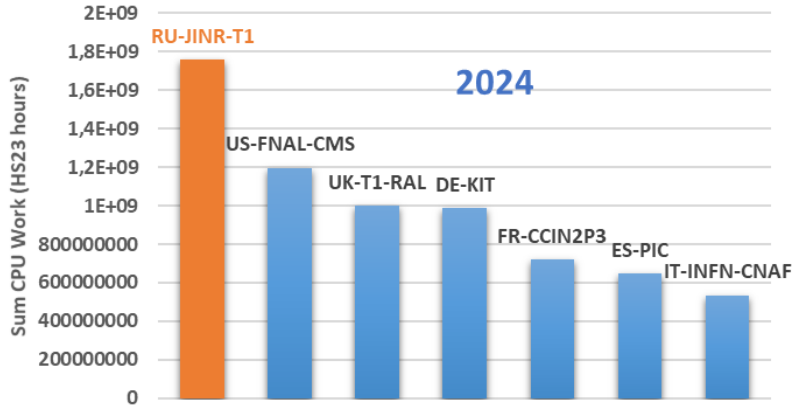
JINR Multifunctional Information and Computing Complex

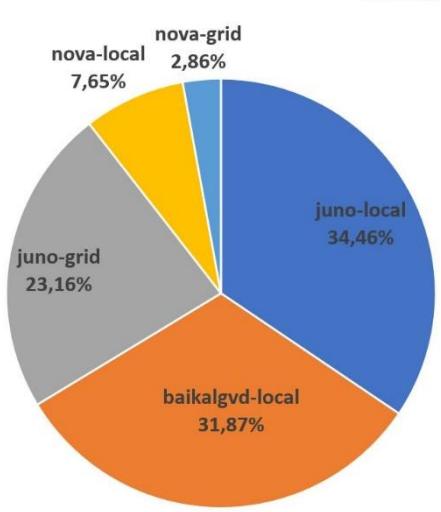


Number of tasks completed on the MICC via the DIRAC platform



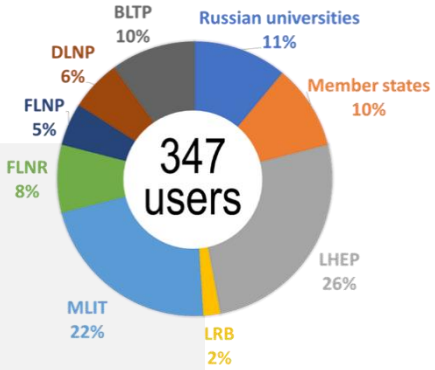
Tier1 – first among Tier1 centres for **CMS LHC**
Tier2 – the most productive in **RDIG**
(**90.7%** of the total RDIG processor time)

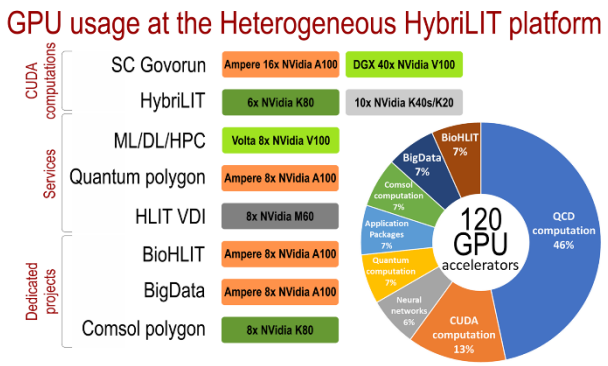


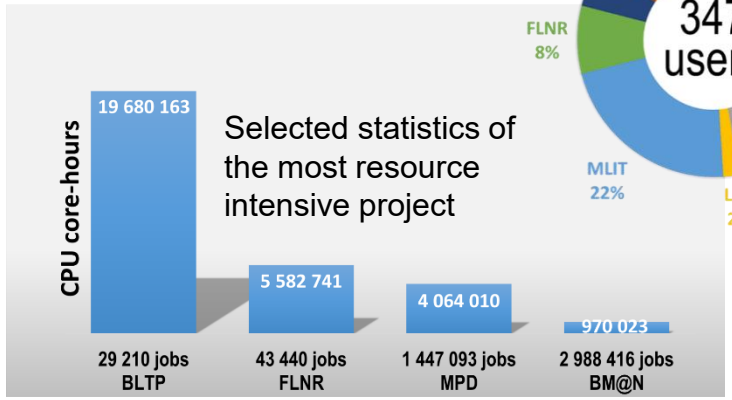


In 2024, the neutrino computing platform (Baikal-GVD, JUNO, NOvA), which is a segment of the JINR cloud infrastructure, provided 12,125,668 CPU hours.

In 2024, Govorun supercomputer users successfully computed **6.2 million tasks**, which corresponds to **32 million core-hours.**

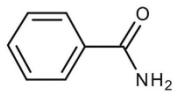




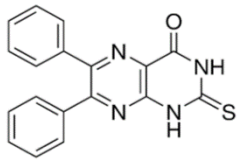


Radiation Biology

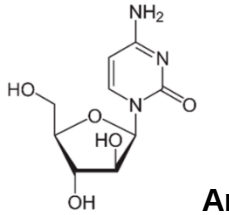
Molecular mechanisms of new classes of compounds and their combinations to increase the efficiency of tumor radiotherapy have been studied.



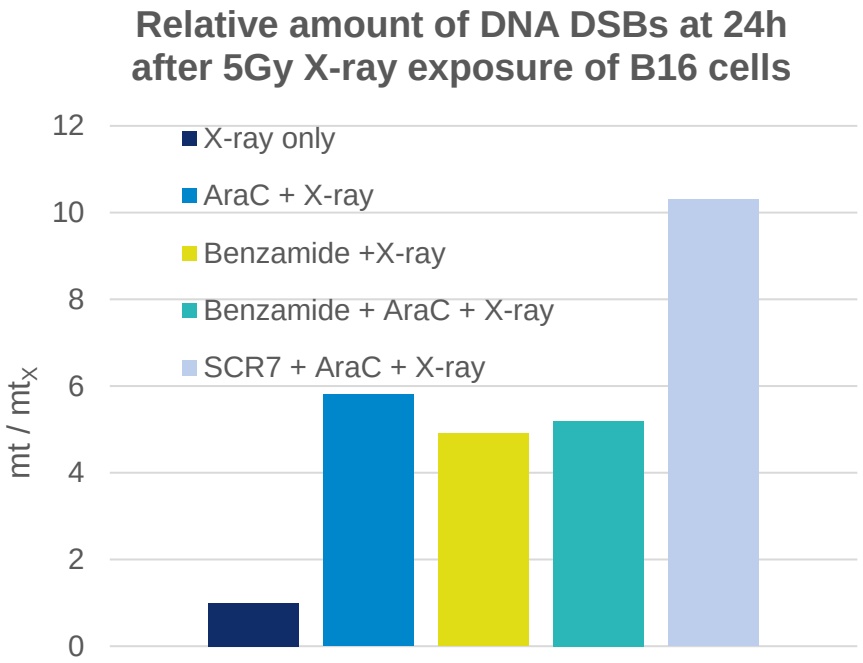
Benzamide
PARP1 inhibitor



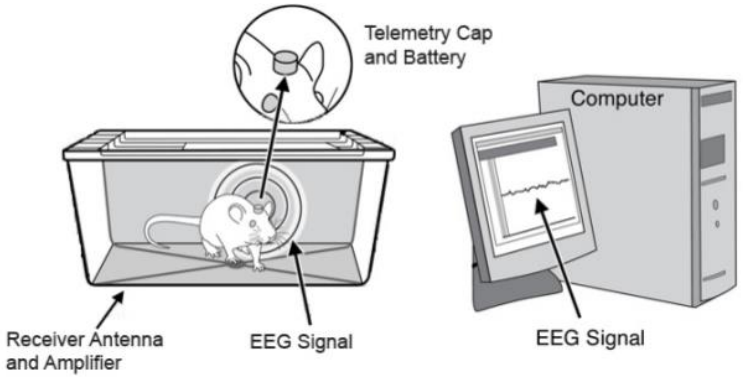
SCR7 pyrazine
ligase IV inhibitor

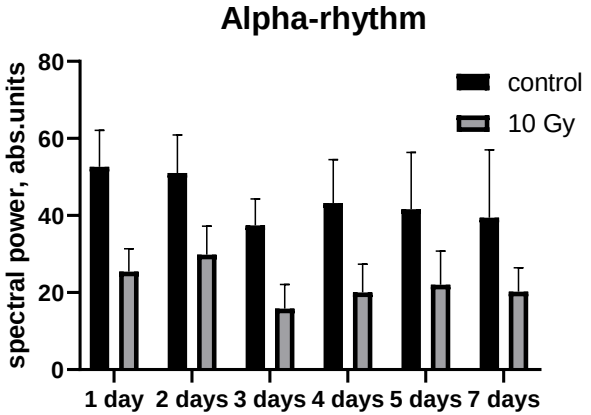


AraC
DNA synthesis inhibitor



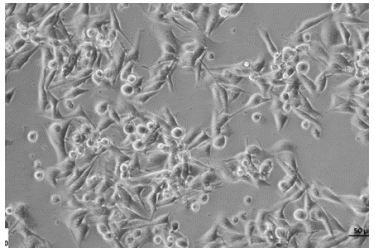
Disorders in the functional activity of the rat brain (EEG rhythms) after X-ray exposure have been analyzed.



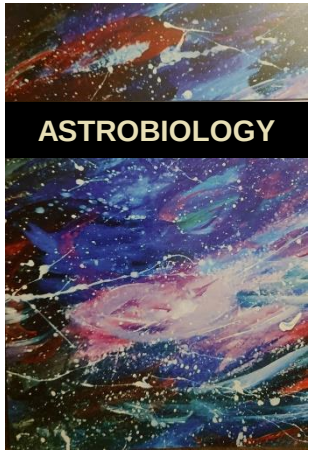


Electroencephalography (EEG) signal

Melanoma B16 tumor cell culture



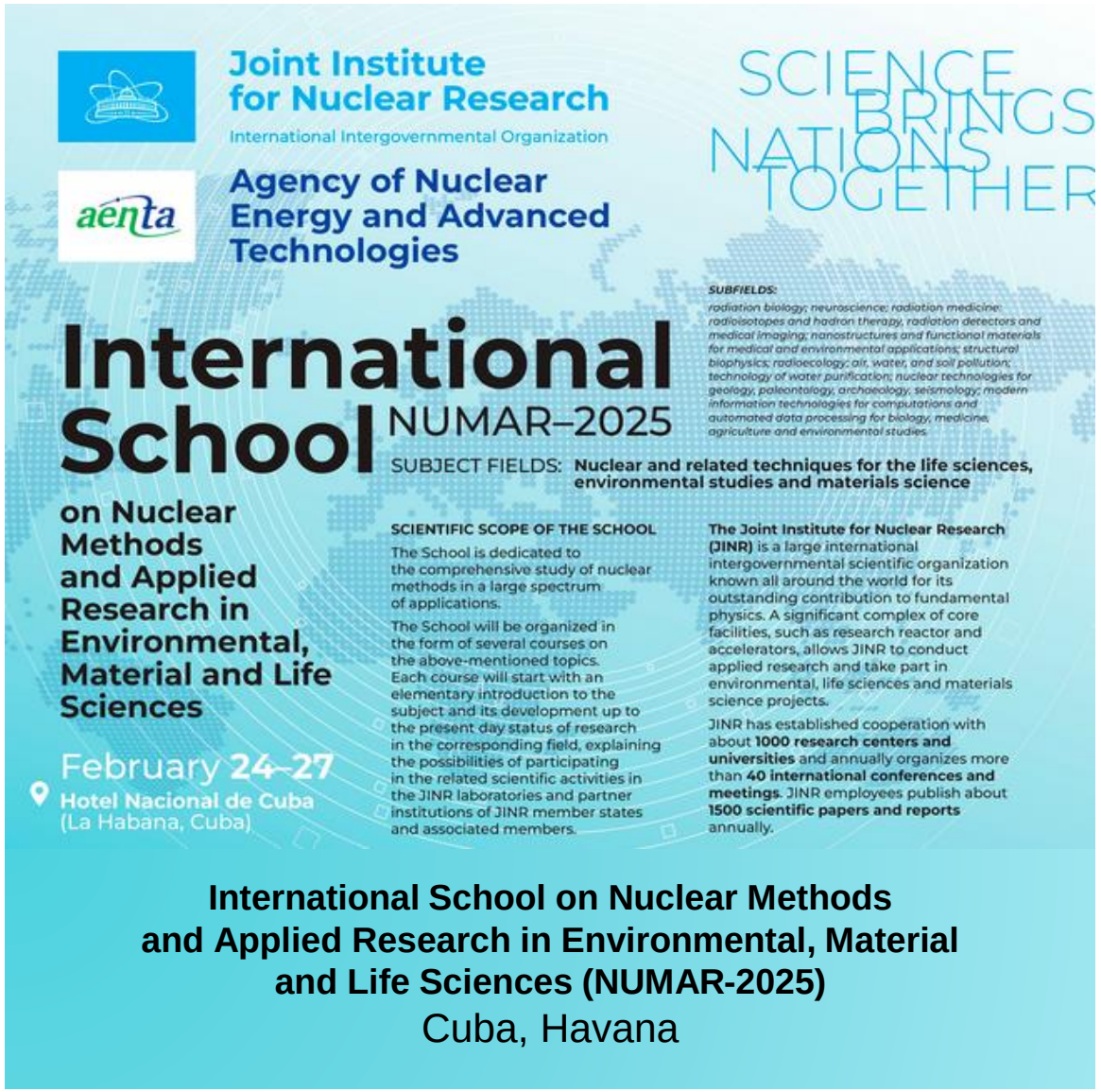
New book “ASTROBIOLOGY”: prebiotic chemistry & search for life in the Universe



Radiation Biology

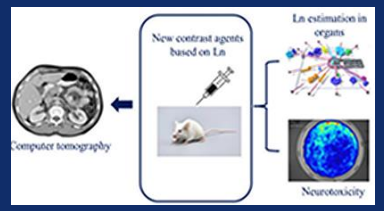
JINR–VAST Workshop
Annual International Conference
“Actual Problems of Radiation Biology”
Modification of Radiation-Induced Effects
16–18 October, 2024

International Conference on Radioprotective Drugs

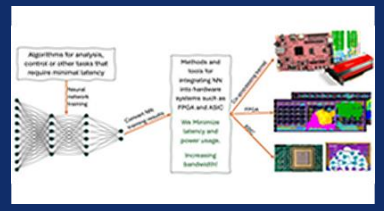


International School on Nuclear Methods and Applied Research in Environmental, Material and Life Sciences (NUMAR-2025)
Cuba, Havana

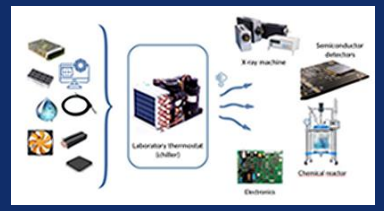
Development of gamma-visors and micro-SPECT systems



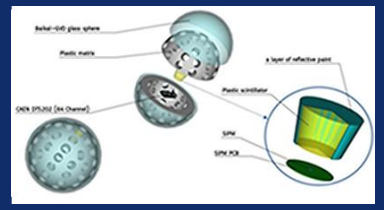
Accumulation and toxicity assessment of rare earth element based X-ray contrast agents



Integrating algorithms and neural networks into FPGA for low latency data preprocessing



Development of portable chillers



Design and development of a spherical modular muon detector

JINR R&D Activities Competition 2025

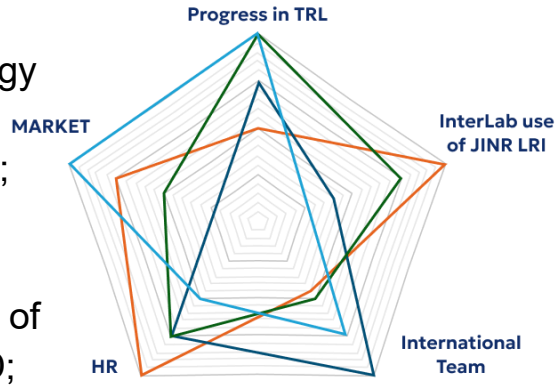
First CALL – February 2025 | **Summing Up – June 2025** | **5–10 Teams** | **2–4 million rubles per team**

In Focus:

- Support for innovative product-oriented R&D;
- Consistent project approach implemented by young leaders;
- International, Interlaboratory and Interdisciplinary teams;
- Technology agenda relevant for Member States;
- Development of HR: young leaders, students and postgraduates involved (leader & 70% of team members – under 39 years old);
- Annual reporting (a brochure).

Special Criteria:

- Increase of TRL;
- Prospects for technology transfer (Market, IP, Industrial partner, etc.);
- International, interlaboratory and interdisciplinary nature of using JINR LRI in R&D;
- Importance for HR development.



Back Office of the Competition (DIIP & AYSS)

- Organization of Competition;
- Assistance in preparation of applications;
- Transfer of results;
- IP protection;
- Monitoring of projects implementation.

Expert Committee

- Competition rules;
- Stage of face-to-face presentations;
- Summing Up;
- Project performance evaluation.

Expert Committee

Boris **Gikal**
Igor **Lensky**
Pavel **Apel**
Ayagoz **Baymukhanova**
Alexey **Zhemchugov**
Sergey **Kostromin**
Elena **Kravchenko**
Sergey **Mertz**
Konstantin **Mukhin**
Vasily **Semin**
Alexander **Uzhinsky**
Vladimir **Chausov**
Valery **Shevtsov**

Student Programmes September 2024 – February 2025

JINR-attached students,
471 undergraduate and 33 postgraduate.

Advanced Engineering practicum
64 participants from Russia, Kenya, Mexico, Poland, RSA + offsite training at RSA for 20 students.

International Student practice:

Stage 2, RSA, Vietnam, Mexico, etc.
September, 40 participants.

Stage 3, Egypt November, 18 participants.

START
Summer session'24, June-November, 61 participants.
Winter session'25, February-June, 16 participants.

INTEREST
Wave 11, November-December, 28 participants.

Scientific Schools for Teachers and School Students

6 physics teachers from Rosatom cities,
October-November.

16 physics teachers from Belarus, December.

School Students from Kazakhstan and Dubna
November, 11 participants.

JINR–South Africa: Maintaining Close Cooperation

9 December 2024

JINR's first **Information Centre** (IC) in the Southern Hemisphere was **opened at NRF: iThemba LABS**.
The centre's objective is to strengthen scientific ties and expand cooperation with research and educational organisations of the Republic of South Africa and its neighbouring countries.
The workshop dedicated to the opening brought together leading scientists and top managers from JINR, iThemba LABS, South African and Russian universities. On the sidelines of the workshop, two **Memoranda of Understanding** were signed: one **for the participation of the Republic of South Africa in the NICA SPD Collaboration** and one between Dubna State University (Russia) and the University of Zululand (RSA).

9 December 2024

23rd JINR-South Africa Joint Coordination Committee at NRF: iThemba LABS (South Africa)

The co-chairman of the JCC were JINR Director Grigory Trubnikov and Deputy Director of the National Research Foundation of South Africa (NRF) Angus Paterson. Members of the JCC discussed the programme of events aimed at further strengthening the partnership in view of the upcoming 20th anniversary of South Africa's associate membership in JINR and the 70th anniversary of the Institute's foundation, as part of which Days of South Africa at JINR are planned for June 2025.

11 December 2024

On the sidelines of the IC opening, **JINR representatives visited the University of the Western Cape, the Cape Peninsula University of Technology, and the University of Cape Town** to hold meetings with the leadership of scientific faculties and specialised departments and discuss matters of current and potential cooperation.
Along with representatives of JINR and director of the new IC Richard Newman, the delegation included **Dean of the Faculty of Physics and Technology of the North Ossetian State University A.Daurova**, **Director of the Irkutsk State University Research Institute of Applied Physics A.Tanaev**, and **Vice-Rector of Dubna State University O.Anisimova**.

9–13 December 2024

Second International African Symposium on Exotic Nuclei (IASEN-2024)

Organised by the South African accelerator centre NRF: iThemba LABS and the Joint Institute for Nuclear Research, IASEN-2024 was held in Cape Town. The main focus of the event was modern research of atomic nuclei in extreme states, in particular, at the boundaries of nuclear stability. **More than 120 specialists from Europe, Africa, Asia, North and South America took part in the symposium**.

International Cooperation

16–20 September 2024

A delegation of the Joint Institute for Nuclear Research, led by Vice-Director Latchesar Kostov, took part in the **68th General Conference of the International Atomic Energy Agency** (IAEA) as observers.

On 18 September, the JINR delegation met with **IAEA Deputy Director General M.Chudakov**. Both parties noted the improvement of cooperation and the regular interactions between the organizations, particularly the participation of IAEA representatives as observers at the JINR CP sessions.

International Cooperation

Strengthening Partnerships

10–14 October 2024

The delegation of the Joint Institute, consisting of JINR Director Academician Grigory Trubnikov and JINR Director's Special Representative for cooperation with international and Russian scientific organizations Academician Boris Sharkov, took part in the meetings of the 33rd General Assembly of the International Union of Pure and Applied Physics (IUPAP) in Haikou city on Hainan Island (China).

On the sidelines of the General Assembly, the JINR leadership held meetings and contacts with the leaders of major scientific organizations, the heads of major global and national infrastructure projects, with outstanding scientists, including Nobel Prize laureates in physics Barry Barish (gravitational waves), Takaaki Kajita (neutrino oscillations) and Samuel Ting (discovery of the J/ψ meson).

At the General Assembly, Boris Sharkov was re-elected for a second term as Vice-President with the function of treasurer, and three JINR candidates were elected to participate in IUPAP commissions.

Richard Lednický, Chief Researcher at the VBLHEP, will represent the Institute in the Commission on Elementary Particle Physics. Galina Knyazheva, a senior researcher at the FLNR, was sent and elected to the Commission on Nuclear Physics on the recommendation of the Laboratory of Nuclear Reactions, and Alexander Bugay, LRB Director, joined the commission on Biophysics and Radiobiology.

International Cooperation

Strengthening Partnerships

7–10 October 2024

The JINR hosted the first “Introduction for the Plenipotentiaries’ Offices and Officials Responsible for Liaison with JINR” programme, which gathered representatives of the JINR Member States and Associate Members responsible for cooperation with the Institute.

During the five days, the participants got acquainted with the laboratories and the largest research facilities of the Institute through tours, listened to lectures by representatives of the offices and departments, participated in discussions and meetings with laboratory directors and heads of the national groups. On the last day of the course, a round table with representatives of Institute’s leadership took place.

The main goal of the event was to provide representatives of the offices of the Plenipotentiary Representatives (PR) of the JINR Member States with the most complete information about the establishment and implementation of the Institute’s research policy, various aspects of its administrative and organizational activities, research and social infrastructure, educational programmes, and innovative projects. During the course, the participants visited the Laboratories of Nuclear Reactions, High Energy Physics, and Information Technologies.

International Cooperation

Member States

18 November 2024

Ambassador Extraordinary and Plenipotentiary of the Republic of Azerbaijan to the Russian Federation **Rahman Mustafayev** and accompanying persons visited the JINR.

At the meeting in the JINR Directorate, the parties discussed the issues of enhancing cooperation between Azerbaijan scientific institutions and JINR, with special attention paid to training highly qualified personnel for the Republic of Azerbaijan and developing interactions in digital technologies and big data studies.

25–27 November 2024

A delegation of JINR headed by the Institute Director had a working visit to the Republic of Azerbaijan, during of that, meetings were held with **Arif Hashimov**, the Plenipotentiary Representative of the Government of the Republic of Azerbaijan in JINR, Vice-President of the **National Academy of Sciences of Azerbaijan** and Director of the **Institute of Physics of the Ministry of Education and Science of Azerbaijan**, as well as meetings with **Firudin Gurbanov**, Deputy Minister of Science and Education of the Republic of Azerbaijan, and **Isa Gabbibeyli**, President of the **National Academy of Sciences of Azerbaijan**. The Institute's delegation visited a number of leading scientific organizations and universities in Azerbaijan. A significant event of the visit programme was the signing of the agreement on cooperation between the **University of Khazar** and JINR.

International Cooperation

Member States

26 September 2024

A Vietnamese delegation headed by the Minister of Science and Technology of the Socialist Republic of Vietnam (SRV) **Huỳnh Thành Đạt** visited JINR.

A meeting of the Joint Coordinating Committee (JCC) on JINR–Vietnam scientific projects was held at the ICH JINR. The main topics were the training of personnel for the research reactor planned in Vietnam, the involvement of Vietnamese employees in key JINR projects and JINR's support for the project to create an accelerator complex in Hanoi.

The meeting reported on the results of a meeting on accelerator technologies held at JINR in September with the participation of Vietnamese specialists. The organization and conduct of the JEMS course for representatives of Southeast Asian countries and Vietnam's participation in other JINR educational programmes were discussed.
At the meeting, diplomas on completion of the international student internship, held in September, were also awarded to its graduates from Vietnam. The planning of bilateral visits and the holding of a number of events were discussed. The report of the head of the Vietnamese community in JINR was heard.

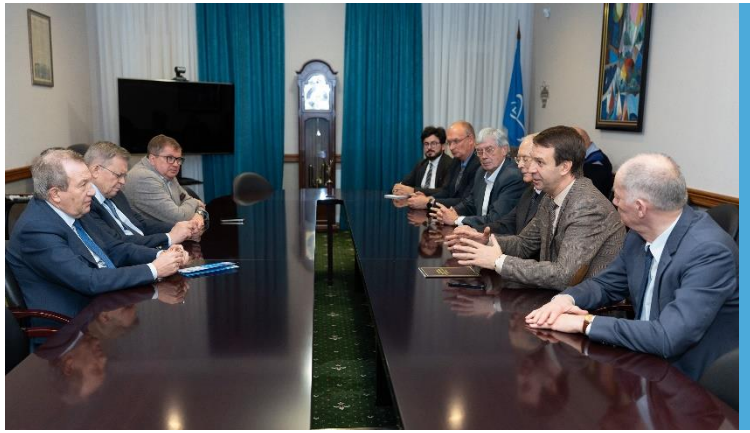
International Cooperation

Member States

6 November 2024

The Ministry of Science and Higher Education of the Russian Federation hosted a meeting of the **Supervisory Board of the NICA Project** dedicated to discussing the progress of the megascience project of the Joint Institute for Nuclear Research. Following the meeting, the board members approved an updated work plan for the construction and launch of the basic configuration of the VBLHEP JINR accelerator complex, confirming the Institute's intentions to complete the project on time.

The next meeting is scheduled for April 2025. The agenda of the upcoming meeting will include an analysis of possible funding sources to ensure further development of the project and presentation of its updated cost.



22 November 2024

President of the Russian Academy of Sciences (RAS) **Gennady Krasnikov** visited the Joint Institute for Nuclear Research. The RAS delegation included Vice Presidents of the Academy **Vladislav Panchenko** and **Stepan Kalmykov**.

During the visit, the RAS representatives discussed cooperation issues with the Joint Institute Directorate and toured two of the largest JINR scientific infrastructure facilities: the NICA Accelerator Complex, including the Synchrophasotron hall, the MPD Detector pavilion at VBLHEP, and the Superheavy Element Factory at FLNR. In addition, they got acquainted with plans of large–scale physical experiments at these facilities.

International Cooperation

Member States

16 September 2024

Ambassador Extraordinary and Plenipotentiary of the Republic of Belarus to the Russian Federation **Alexander Rogozhnik** visited the JINR. At the meeting with the leadership of the Institute, the parties discussed prospects for the development of comprehensive cooperation between JINR and Belarus.

14 November 2024

Ahead of the session of the Committee of Plenipotentiaries, Director of the JINR **Grigory Trubnikov** met with **Rector of Belarusian State University (BSU) Andrei Karol** at the BSU. The parties discussed the prospects of joint scientific projects and a double degree programme.

17 September 2024

A round table was held at the JINR Scientists' Club with the participation of representatives of the **National Academy of Sciences of Belarus**.

The meeting discussed issues of expanding cooperation with organizations subordinate to the NAS of Belarus, including joining the collaborations of the Institute's megascience projects, applied research and development and participation in the JINR educational programme.

10–15 November 2024

A delegation of JINR headed by Director Grigory Trubnikov visited the **National Academy of Sciences of Belarus** in Minsk.

On 13 November, a round table discussion was held dedicated to prospects of development of JINR cooperation with NAS of Belarus participated by the leaders of the Academy and its organizations and directors and leading scientists of the JINR Laboratories. Following the event, **Grigory Trubnikov** and Chairman of the Presidium of the National Academy of Sciences of Belarus **Vladimir Gusakov** signed a Protocol of Intent to strengthen cooperation between Belarusian scientific centres and JINR in a number of areas of mutual interest.

International Cooperation

Member States

7–11 October 2024

The 5th International Scientific Forum entitled "Nuclear Science and Technology" was held at Al-Farabi Kazakh National University (KazNU). Staff members of the JINR actively participated in the forum. During the forum, the Joint Institute' employees delivered more than 50 reports, covered topical areas of fundamental and applied nuclear physics, nuclear energy, radiation ecology, and the application of radiation technologies in medicine and industry.

The meeting was organized with the participation of the Ministry of Energy, the Ministry of Science and Higher Education, and research and educational institutions of the Republic of Kazakhstan (RK), CERN and leading scientific centres and educational organizations of RK.

19–22 September 2024. The JINR delegation visited Mongolia. JINR representatives took part in an international conference dedicated to the **50th anniversary of the Institute of Mathematics and Digital Technology of the Mongolian Academy of Sciences**.

The JINR delegation visited a number of Mongolian scientific centres. During discussions with the heads of institutes and members of the MAS a series of agreements were reached on intensifying interaction between JINR and Mongolian research teams, participation in educational programmes and using opportunities to attract associate staff.

International Cooperation

Deepening Ties with Latin America

15 October 2024

Two new cooperation agreements were signed at the Joint Institute for Nuclear Research with the **National Nuclear Energy Commission of Brazil (CNEN)** and the **Federal University of Southern Bahia (UFSB)**.

During the visit to JINR, representatives of the higher educational institutions of the Federative Republic of Brazil got acquainted with the scientific infrastructure of the Institute and discussed cooperation prospects, including joint research and experience exchange.

14–25 October 2024

Brazilian Synchrotron Light Laboratory (LNLS) hosted SyncLight 2024, the international school of advanced science in Campinas, Brazil. It was dedicated to the application of modern experimental synchrotron technologies.

Brazilian Centre for Research in Energy and Materials (CNPEM) invited young scientists from the Joint Institute for Nuclear Research to participate in the event. They contributed to the discussion of current scientific problems and the development of international partnership.

International Cooperation

Associate Members

25 November 2024

Representatives of the Joint Institute paid a visit to the University of Debrecen (Hungary), as part of which a trilateral agreement was signed with the University of Debrecen and the Institute of Nuclear Research (ATOMKI). The document is aimed at strengthening ties in personnel training, academic mobility programmes, collaborative research, and organization of joint events, including training courses and conferences.

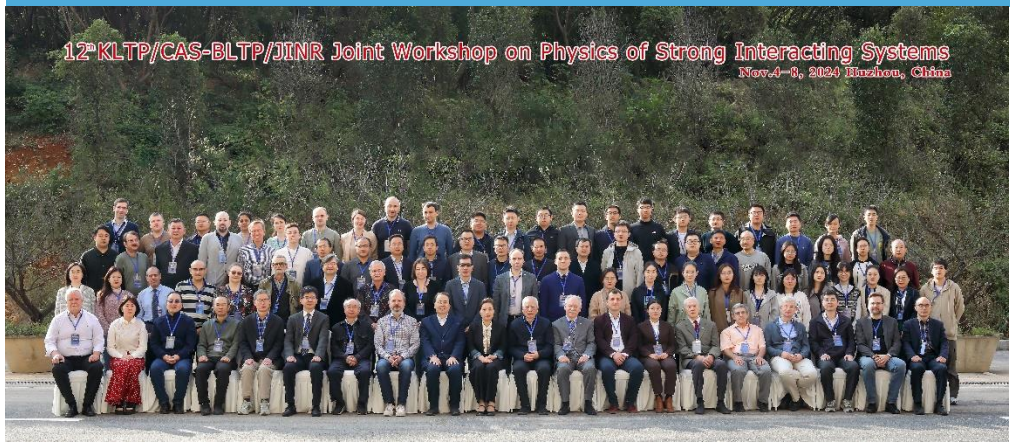
On behalf of JINR, Chief Scientific Secretary of the JINR S.Nedelko and Deputy Director of the Laboratory of Neutron Physics for Scientific Work S.Kulikov attended the meeting. The University of Debrecen was represented by Pro-Rector General K.Pető, Director for Coordination and Strategy O.Kiszil, and Dean of the Faculty of Science and Technology F.Kun. Deputy Director of the Institute for Nuclear Research G.Lévai also attended the event.
In the frames of the event, JINR representatives visited the Faculty of Science and Technology of the University of Debrecen and the Institute of Nuclear Research.

International Cooperation

Strengthening Partnerships

4–8 November 2024

The 12th Workshop on Physics of Strongly Interacting Systems took place at Huzhou (China), organized by the Institute of Theoretical Physics of the Chinese Academy of Sciences and the JINR Laboratory of Theoretical Physics. The event gathered more than 100 scientists representing JINR (BLTP, FLNR, and MLIT) and scientific centres in China, Germany, Japan, Kazakhstan, Poland, and South Africa.

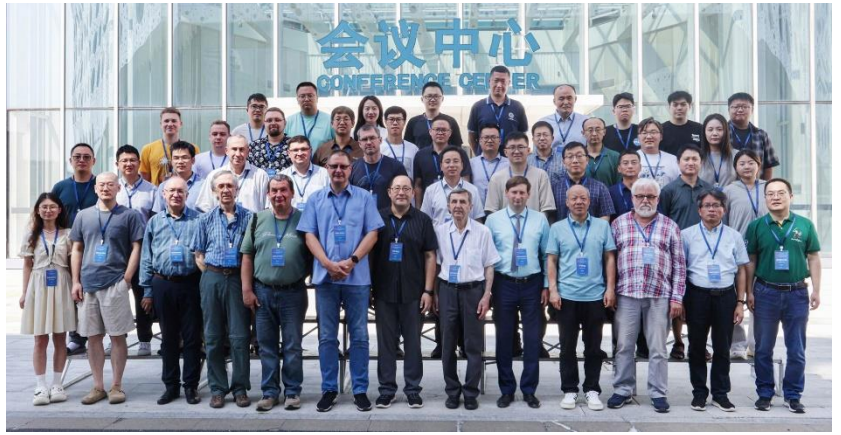


15–19 September 2024

A China-JINR workshop on the organization and development of data processing and analysis methods in future high-energy physics (HEP) experiments was held on the shore of Lake Baikal in the Listvyanka village.

10–13 September 2024

China hosted the 2nd joint Russian-Chinese seminar dedicated to discussing the NICA project. The event was organized with the support of a Chinese consortium of organizations participating in an international collaboration created to build and conduct experiments on the multipurpose MPD detector at the NICA collider.



26 September 2024

A workshop on superconducting resonators and fast-cycling magnets was held at VBLHEP in the framework of cooperation between JINR and the Institute of Modern Physics of the Chinese Academy of Sciences. The parties discussed the creation of new technologies and the prospects for the development of projects for the NICA and HIAF (High Intensity Heavy Ion Accelerator Facility) accelerator complexes.

Congratulations to Ana María Cetto Kramis – Laureate of the Tate Medal for International Leadership in 2025

On 23 January, the Board of Directors of the **American Institute of Physics** unanimously approved the nomination of **Ana María Cetto Kramis** for the award.

The citation reads:

"For her outstanding contributions to the promotion of science, and scientific outreach and cooperation worldwide; including transforming open access through Latindex, championing gender equity through the Organization for Women in Science for the Developing World, and advancing peaceful progress through science including at the International Atomic Energy Agency and in other international fora."

The Medal, established in 1959, recognizes leadership and service to the physics community on an international level by non-US physicists. Services that further international understanding and exchange are considered to be of primary importance. The award consists of a bronze medal, a certificate, and a cash award of $10,000. AIP staff will be in touch with you to identify an appropriate event at which to present the award.

Previous winners of the Tate Medal, presented every two years, include Mahouton Norbert Hounkonnou, Catherine Cesarsky, Fabiola Gianotti, Neil Turok, Jean Tran Thanh Van, Gustav-Adolf Voss, Yu Lu, Erio Tosatti, Herwig Franz Schopper, Willibald Jentscke, Roald Sagdeev, Edorado Amaldi, Pierre Aigrain, and Abdus Salam.

JINR Scientists Received Prizes of Governor of Moscow Region

On 29 October, the winners of the annual ***Moscow Region Governor's Prize*** were announced. Young scientists and specialist were awarded for their endeavours in science, technology, engineering, and innovation. Among the fifteen prizewinners are two representatives of the Joint Institute for Nuclear Research:

Candidate of Technical Sciences, Head of the VBLHEP Scientific and Experimental Department of Superconducting Magnets and Technologies ***Dmitry Nikiforov*** presented the research titled "Advanced cryogenic systems for the NICA Accelerator Complex".

Candidate of Physics and Mathematics, a researcher at the BLTP Sector of Nuclear Reactions and Core Structure ***Evgeny Mardyban*** for the study of the structure and properties of atomic nuclei within the framework of collective nuclear models.

Academician Sergey Kilin was Awarded the Order of Friendship of the Russian Federation

On 24 January 2025, the decree of the President of the Russian Federation “On awarding State awards of the Russian Federation” was signed.

S. Kilin, Academician of the Belarusian and Russian Academy of Sciences was awarded a high award for his great contribution to the development of scientific and technical cooperation between Russia and Belarus.

Academician S.Kilin, Professor, Belarusian State University, National Academy of Sciences of Belarus (Minsk, Belarus). Member of the Scientific Council from the Republic of Belarus since 2013.

S.Kilin has been Co-chairman of the JINR Scientific Council.

Commemorative Seminar in Honour of the 80th Anniversary of Alexey Norairovich Sissakian's Birth

On 18 October, the JINR Scientists' Club hosted a seminar dedicated to the 80th anniversary of the birth of the outstanding scientist and organizer of science, Director of JINR in 2006–2010, Academician **Alexei Norairovich Sissakian**.

On this day, many warm words were said about a man who is loved, respected and remembered at the Institute for his great achievements and kind attitude towards people.

In Memory of LHE JINR Co-founder Ivan Vasilievich Chuvilo

9 October 2024 marked the centenary of the birth of a talented scientist in nuclear and particle physics, one of the founders of the JINR Laboratory of High Energy (currently VBLHEP), LHE Director in 1966–1968, Professor **Ivan Vasilievich Chuvilo** (09.10.1924–16.03.2001).

In May 1954, at the invitation of V.Veksler, I.Chuvilo became his Deputy for Scientific Work at the Electrophysics Laboratory of the USSR Academy of Sciences. After the founding of the Joint Institute for Nuclear Research in 1956, it became the JINR Laboratory of High Energy.

On 20 December, the JINR Museum of the History of Science and Technology hosted a presentation of a book-album released by the “RMP” Publishing House to mark the centenary of the birth of Ivan Vasilievich Chuvilo. The book reveals the scientist’s life path, the formation of his strong-willed character, the formation of which was greatly influenced by participation in the Great Patriotic War. The book belongs to the series “A Portrait at a Time of an Epoch”, in which a number of publications about outstanding JINR scientists have already been published.

Operation of JINR Dissertation Councils

Since 1 September 2019, **121 dissertations** were defended in the JINR Dissertation Councils, including **93 PhD theses** and **28 Dr. Sc. theses.**

In 2024, **27 dissertations** were defended, including **20 PhD theses** and **7 Dr. Sc. theses**.

The JINR Qualification Committee pays special attention to self analysis of processes of getting academic degrees at JINR and acts in close coordination with the Higher Qualification Committee under the Ministry of Science and Higher Education of the Russian Federation.

JINR Qualification Committee holds round tables on the experience of independent awarding academic degrees.

On 11 July 2024, the a **Round Table with scientific secretaries of the JINR dissertation councils** was held. It was focused on the feedback of laboratories regarding the activity of local dissertation councils as well as on best practices in solving organizational issues.

On 19 December 2024, the Round Table with diploma awardees took place, where **100th JINR Diploma was awarded**. A senior researcher at the Konstantinov Petersburg Institute of Nuclear Physics of Kurchatov Institute, **Evgeny Kryshen** was the hundredth awardee defended in the new JINR Dissertation Councils.

JINR Established New Scientific Journal

The Resolution of the Committee of Plenipotentiaries (March 2024) and the JINR Decree No.559 (July 2024) initiated the establishment of a new journal.

First issue with 7 articles was published in 2024

Natural Science Review, an international, peer-reviewed, full open-access journal specializing in natural and technical sciences.

JINR Scientific Leader, Academician V.Matveev is the Editor-In-Chief.

Key concepts:

- Platinum open access: free foe readers and authors;
- Online journal, no hard copy;
- 4 issues per year, English language, special issues are possible;
- Scientific articles, reviews, intellectual products, and TDR/CDR are accepted for publication;
- All expenses are covered by JINR.

Prompt publication process:

- 2 weeks for one round of review (but good quality of reviewing is a priority);
- 1 week for editing after being accepted;
- Articles are published once they appear on the website.

Website: nsr-jinr.ru or nsr-jinr.int (alias)

JINR
DOSCIENCE@DUBNA

Danke
Rahmat
Շնորհակալություն
Благодаря
감사합니다
جزيلاً
شكرًا
Mulțumesc
Спасибо
Gracias
Ďakujem
Thank you
Mulțumesc
Grazie
Рақмет
Дзякуй
谢谢
გმადლობთ
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