I. General considerations

The Scientific Council takes note of the comprehensive report by the JINR Director, G. Trubnikov, covering the decisions of the latest session of the Committee of Plenipotentiaries of the Governments of the JINR Member States (2–3 December 2025), progress on the implementation of the Seven-Year Plan for the Development of JINR for 2024–2030 as well as recent events in JINR's scientific activities and international cooperation.

The Scientific Council welcomes its new members, Alejandro Ayala, Eduard Boos, Khuyagbaatar Jadambaa, Ivan Logashenko, Satoshi Mihara, and Mahmoud Sakr, who were elected by the Committee of Plenipotentiaries in December 2025.

The Scientific Council appreciates recent achievements of the Institute such as:

— successful and stable Xe beam circulation in both Collider rings of the NICA facility, which was preceded by cooling of both rings of the Collider, as well as the Booster and the Nuclotron, to 4.5 K and their synchronized operation, tuning the power supply system at superconducting load and stable operation of the Collider rings at 5 kA, beam transportation to the Collider injection points at an intensity of up to $2 \cdot 10^7$ ions per cycle, accelerated in the Nuclotron up to the energy of about 2 GeV/u, and commissioning the radiation monitoring and restricted access systems at the NICA complex;

— start of the MPD solenoid magnetic field mapping in a range of 0.2–0.5 T;

— start of the BM@N data taking for a Xe beam energy scan from 1.5 to 3 AGeV;

— progress on the preparation of the initial phase of the SPD experiment, including successful tests of full-scale muon system prototypes, testing the data acquisition system and distributed data processing;

— successful participation of JINR physicists in the data analysis and detector upgrade programme of the LHC experiments;

— active preparations for experiments to synthesize elements 119 and 120;

— carrying out of a major experiment at the DGFRS-2 separator of the SHE Factory to synthesize nihonium isotopes ^{281,282}Nh in the ^{237}Np(^{48}Ca,3-4n) reaction;

— studies of the chemical properties of copernicium (Cn) and flerovium (Fl);

— high-intensity operation of the accelerator complex DRIBs-III to implement the FLNR scientific programme. The U-400 cyclotron worked 6,300 hours per year, providing a wide range of ion beams from ^{22}Na to ^{136}Xe for fundamental and applied research;

— work on the cyclotron U-400M to optimize the acceleration modes for obtaining secondary beams of radioactive ions;

— applied work on the base of the MT-25 microtron, including the irradiation of samples for JINR LRB and for JINR partners in Vietnam. Electronic components have been tested in cooperation with SPE Detector LLC and NIIKP;

— beginning of the final stage of developing the new accelerator complex DC-140 for applied research;

— progress in constructing the new experimental building of the U-400R accelerator complex as well as parallel underway work to develop the new experimental setups SCIF-D and STAR;

— progress in designing the engineering infrastructure of the SPD experiment: development of the subsystems for the first stage of the project, testing of prototype detectors, and preparation for mass production of the main elements;

— progress on the development of the Baikal-GVD deep-water neutrino telescope: this winter campaign has started, during which it is planned to add two new clusters and set up two additional intercluster strings and one complete prototype string for the next-generation detector;

— successful participation of JINR in the DANSS experiment at the Kalinin Nuclear Power Plant: imposition of new limits on the parameters of reactor antineutrino oscillations to sterile states at short distances and the world's first measurement of variations in the ratio of uranium and plutonium isotopes in the reactor core by studying antineutrino spectra;

— successful participation of JINR in the JUNO advanced reactor neutrino experiment and the first measurements of oscillation parameters with a record accuracy;

— JINR's contribution to the ATLAS Collaboration activities at the LHC in the second phase of detector upgrade and in obtaining new results in the measurements of the Higgs boson production in association with the top quark and with the W and Z bosons;

— JINR's contribution to the development of the CRV system of the COMET experiment at J-PARC;

— advances in the construction of the MSC-230 medical superconducting cyclotron: fabrication of the cyclotron yoke, the RF generator, and the coil winding equipment;

— successful work of the Bogoliubov Laboratory of Theoretical Physics in 2025 and interesting selected results in nuclear theory and theory of fundamental interactions;

— successful performance of seven cycles of the IBR-2 pulsed research reactor in 2025 in a nominal operating mode after a long shutdown period;

— active work of the User Programme at IBR-2, which provides access to a unique neutron infrastructure for scientists from JINR Member States and other countries;

— important scientific results obtained at the basic facilities of the Frank Laboratory of Neutron Physics in the field of nuclear physics, condensed matter physics and applied research, as well as the active scientific and organizational activities of the Laboratory, promoting the development of international cooperation;

— progress in developing the conceptual design for the new advanced pulsed neutron source at JINR FLNP;

— recent progress in radiation biology research, including the analysis of radiation-induced complex chromosome aberrations and the analysis of mechanisms of radiation induced brain damage;

— development and operation of the JINR Multifunctional Information and Computing Complex, including the enhancement of computing resources of the “Govorun” supercomputer, resulting in the increase of peak performance to 2.2 PFlops and 58 PFlops for artificial intelligence tasks; expansion of the performance and number of computing cores of the Tier1 grid site, the resources of which are used for modeling, processing, and storing data from the BM@N, MPD, and SPD experiments, as well as from the CMS experiment (LHC); commissioning of dedicated data storages under the management of the EOS distributed file system, with a capacity of 7.2 PB each, for the MPD and SPD experiments;

— elaboration and advancement of mathematical methods and software for modeling physics processes and experimental facilities, processing and analyzing data from experiments in elementary particle physics, nuclear physics, neutrino physics, radiobiology, etc. Highly appreciated contributions have been made to the research programme of the BM@N, MPD, and SPD projects and to the development of algorithms and software for data processing and analysis, as well as for reconstructing physical objects for the Baikal-GVD, JUNO, ATLAS, and CMS projects;

— development of several all-Institute digital services within the JINR Digital Ecosystem: document development management service, publications repository, Dubna EDMS, JINR geographic information system, automated radiation safety testing service, etc.;

— scientific and educational activities of the JINR University Centre as well as the high potential of JINR educational programmes for expanding the Institute's partnerships both in the JINR Member States and beyond.

II. Discussions of the Director's report

After the report by the JINR Director, G. Trubnikov, questions have been addressed by M. Spiro, R. Granada, R. Sahoo, and C. Borcea. All members of the Scientific Council have thanked the JINR Director for his impressive presentation of the Institute's achievements.

M. Spiro has asked about the current state of the relationship between JINR and CERN and whether JINR plans to invite CERN's management to the celebration of JINR's 70th anniversary.

G. Trubnikov has thanked M. Spiro for his personal visit to Dubna and expressed readiness to welcome all JINR's friends to the JINR anniversary, which could become a good opportunity to strengthen relations.

M. Spiro has also noted that all six new members of the JINR Scientific Council were men and recommended a more diverse selection process.

R. Granada has expressed interest in the new neutron facility at IBR-2 and asked whether a decision had been made on its fuel type.

G. Trubnikov, along with FLNP Director E. Lychagin, have responded that the fuel type has not yet been fixed; it could be plutonium or a mixed (plutonium dioxide and neptunium) fuel.

R. Sahoo has noted the progress in JINR-India collaboration, in particular the December 2025 meeting in Bhubaneswar. Furthermore, he has emphasized the achievements of the NICA project and expressed India's readiness to join the NICA Collaboration.

G. Trubnikov has responded by welcoming joint work with India on the NICA project and noting that the Collaboration is already international, with approximately 20 countries participating. JINR Vice-Director V. Kekelidze has added that NICA's fixed-target experiments have begun and welcomed the Indian team's joining the Collaboration as well.

R. Sahoo has also expressed interest in the new proton therapy centre and asked whether it would be possible to perform carbon ion therapy and neutron capture therapy there.

G. Trubnikov has responded that the machine is generally designed for proton therapy and has two unique characteristics: 1) it is superconducting and compact; 2) it operates in flash mode, which reduces the patient's overall radiation exposure. A discussion has taken place on next generation cyclotrons that could be used with carbon and lithium beams.

R. Sahoo has asked whether the beam extracted from the reactor could be used for medical purposes. The JINR Director has replied that the beam's characteristics make it unsuitable for medical purposes.

C. Borcea has inquired about the status of joint work on the FAIR project, noting that continued collaboration on this project is a must. G. Trubnikov has expressed his full agreement on this matter noting that JINR continues to fulfill all its FAIR obligations and maintains good relations with the FAIR management.

The Scientific Council welcomes the holding of an international conference "Fundamental properties of matter" in Dubna at the beginning of 2027 as part of the celebration of JINR's 70th anniversary.

III. Recommendations of the Programme Advisory Committees adopted at the meetings in January 2026

The Scientific Council takes note of the recommendations made by the PACs at their meetings in January 2026, as reported at this session by I. Tserruya, Chair of the PAC for Particle Physics, V. Nesvizhevsky, Chair of the PAC for Nuclear Physics, and D. L. Nagy, Chair of the PAC for Condensed Matter Physics.

Particle physics

The Scientific Council congratulates the entire NICA team and the JINR management on the significant achievement in the Nuclotron-NICA project: injection of a stable beam of ^{124}Xe nuclei into the lower ring of the NICA Collider and its circulation in the entire perimeter of the Collider. This achievement was preceded by a series of successful milestones during the NICA commissioning run:

– completion of assembly of both branches of the Nuclotron–Collider beamline;

– transportation of a xenon beam with an intensity of up to $2 \cdot 10^7$ ions per cycle, accelerated in the Nuclotron up to the energy of about 2 GeV/u, to the Collider injection points;

– completion of the assembly of the Collider's cryomagnetic system, followed by successful vacuum and cryogenic tests;

– cooling of both Collider rings, as well as the Booster and the Nuclotron, to 4.5 K;

– adjustment of the power supply system at superconducting load and stable operation of the rings at 5 kA;

– synchronized operation of three rings: the Booster, the Nuclotron, and the Collider.

The Scientific Council acknowledges the progress in developing the NICA Complex's engineering infrastructure, including the commissioning of the radiation monitoring and access control systems. The Scientific Council congratulates the Cryogenics Department team on their remarkable success in cooling all three NICA rings (the Nuclotron, Booster, and Collider) to operating temperatures of 4.5 K and the stable operation of the cryogenic systems.

The Scientific Council welcomes the beginning of the field mapping of the MPD superconducting solenoidal magnet and continued efforts to achieve the nominal field of 0.5 T. The assembly of the TPC detector is also ongoing, as is the production of the remaining electromagnetic calorimeter elements, scheduled for completion by April. All remaining elements for the first phase of MPD are largely ready for installation, scheduled for March, and expected to be completed in the summer of 2026. The MPD beam and luminosity monitoring detector is already being used to register the first beams in the NICA Collider.

The Scientific Council recognizes the achievements of the SPD Collaboration in implementing the initial phase of the experiment: observing the first stable signals from a full-scale prototype muon system, successfully testing prototype straw detectors at CERN and PNPI, and mastering the assembly of the electromagnetic calorimeter module. The data acquisition system achieved the required performance, and the distributed data processing system is currently operational, utilizing the computing resources of the participating organizations.

The Scientific Council notes progress of the BM@N project, which aims to study the properties of dense baryonic matter. The BM@N team is focused on improving algorithms for track reconstruction, particle identification, and centrality determination in Xe-CsI collisions. Preparations are ongoing for a physics run of the BM@N experiment, scheduled for this year, using a 2–3 AGeV Xe beam. The Scientific Council supports the PAC recommendation to extend the BM@N project for five years, beginning in 2027, with highest priority (ranking A).

The Scientific Council appreciates the new results obtained by the JINR team in the ALICE experiment at LHC on femtoscopic correlations of kaon pairs in p-p, p-Pb, and Pb-Pb interactions; charmonium production in coherent photoproduction processes in ultra-peripheral Pb-Pb collisions; the production of $\Sigma^0/\overline{\Sigma}^0$ hyperons in p-p collisions; and the

modeling of the electromagnetic calorimeter in the future upgrade of the ALICE detector.

The Scientific Council is pleased to note the physics results obtained by the JINR team in the ATLAS experiment in analyzing heavy hadron spectra, precision measurements of the Higgs boson properties, and the theoretical support of the experiment. The measured signal strength of the Higgs boson production associated with a single top quark, 8.1±2.6(stat)±2.0(syst), is higher than expected. Current work is aimed at analyzing new data to achieve higher accuracy of this measurement. The JINR team is actively involved in the Phase-2 upgrade programme of the ATLAS detector.

The Scientific Council acknowledges the results of the JINR group in the CMS experiment. JINR physicists participated in obtaining new stringent constraints on the cross sections of physical processes beyond the Standard Model and on the parameters of new physics scenario models. JINR specialists supported the operation of the endcap muon system and the hadron calorimeter, and ensured the smooth operation of the JINR Tier-1 and Tier-2 grid centres for the CMS experiment. As part of the CMS detector upgrade for efficient operation at the HL-LHC, the JINR team is actively participating in the construction of the high-granularity calorimeter HGCAL and the upgrade of the endcap muon system.

Nuclear physics

The Scientific Council highly appreciates the active preparation of the Flerov Laboratory of Nuclear Reactions (FLNR) for experiments to synthesize the new elements 119 and 120. To carry out the planned experiments on the synthesis of element 119 in the ^{50}Ti + ^{249}Bk reaction, the SHE Factory premises are being upgraded to comply with Class 1 radiation safety regulations. The ^{249}Bk target from RIAR ROSATOM (Dimitrovgrad) is expected to be delivered in May 2026. A crucial stage is the transition to heavier ion beams, such as ^{50}Ti and ^{54}Cr. The experiments carried out at the SHE Factory have shown that the cross sections are lower by a factor of ~10 (^{50}Ti) and ~150 (^{54}Cr) compared to reactions using a ^{48}Ca beam. To determine the maximum of the excitation function, the cross section for the ^{242}Pu + ^{50}Ti reaction, which leads to isotopes of element 116 at various energies of ^{50}Ti ions, was measured. It is shown that the optimal titanium beam energy corresponds to the energy of an excited compound nucleus in the region of 40 MeV. The Scientific Council supports the PAC's recommendation to focus major efforts on preparing for experiments aimed at the synthesis of element 119 in the ^{50}Ti+ ^{249}Bk reaction.

The Scientific Council appreciates the new results of the experiment studying the chemical properties of the ^{287}Fl isotope and its daughter product ^{283}Cn, synthesized in the ^{242}Pu(^{48}Ca,3n) reaction. The analysis of eight registered decay chains provides evidence for two deposition zones of flerovium: one at room temperature and another at approximately –100 ºC. These data agree with the results of previous experiments obtained in the TASCA (GSI) and COLD (FLNR) collaborations. The adsorption of Fl atoms on a gold surface in the cryogenic region shows that relativistic effects have a substantial impact on the chemical behaviour of flerovium. The other observed adsorption zone of flerovium at room temperature is still disputable due to small statistical significance. To study the chemical properties of superheavy elements at the SHE Factory, a cutting-edge experimental complex is being developed, comprising the GASSOL setup, the cryogenic gas ion catcher, and a new chemical setup. First experiments could be carried out after 2028. The Scientific Council shares the PAC's opinion on the importance of continuing work aimed at studying the chemical properties of the heaviest elements at the SHE Factory.

The Scientific Council supports the PAC's recommendation to open a new project "Technological positron annihilation spectroscopy complex PASTech" for a period of two years (2026–2027). As the result of the project, a modern operational complex will be designed, requiring minimal personnel and provided with operational regulations, protocols, certificates, and service support. The Scientific Council is pleased to note that this modern technological complex will not only be a tool for solid-state structure analysis using positron annihilation spectroscopy but also an experimental base for training accelerator engineers. The Scientific Council supports the PAC's recommendation to coordinate the work of this facility with other groups using complementary and alternative methods to investigate materials.

The Scientific Council takes note of the current status of the DANSS experiment to detect reactor antineutrinos conducted at the Kalinin Nuclear Power Plant. The DANSS experiment is an ongoing long-term setup providing continuous data collection at short distances from the reactor and being a unique experimental platform to study reactor antineutrino properties and develop neutrino monitoring methods for different applications. Based on spectral analysis of antineutrino data, the temporal evolution of fractions of the main fissile isotopes of nuclear fuel (^{235}U and ^{239}Pu) has been reconstructed. This demonstrates the feasibility of extracting information about fuel composition directly from antineutrino measurements and highlights the practical potential of the experiment. A modernization of the DANSS setup is planned to improve

the detector energy resolution from the current ~34 % to the level of ~15 % at 1 MeV is expected, as well as an increase of 40–50 % in the effective statistics of registered antineutrino events. The Scientific Council endorses the PAC's recommendations to continue work on the development of the DANSS experiment and supports the planned modernization programme with high priority.

The Scientific Council appreciates the success of the JINR team in world-leading experiments, such as LEGEND and SuperNEMO, which search for neutrinoless double beta decay. The Scientific Council notes with satisfaction the important results of the analyses of sets of the LEGEND-200 experiment. A new observed lower limit on the half-life of neutrinoless double beta decay in ^{76}Ge is $T_{1/2} > 1.9\times10^{26}$ years, which corresponds to an upper limit for the effective Majorana mass in a range of $m_{\beta\beta} < 75-200$ meV depending on the chosen nuclear matrix element. The Scientific Council notes the scientific significance of double beta decay research and recommends continued participation in all mentioned experiments with an emphasis on developing JINR's material base. The Scientific Council supports JINR's decision to participate in the CDEX experiment and highlights the importance of joint research with China. The Scientific Council supports the PAC recommendations to develop the prospects for local experiments, particularly research involving the ^{96}Zr sample at the Baksan Neutrino Observatory.

Condensed matter physics

The Scientific Council is pleased with the results of the first rounds of the user proposal call for the IBR-2 spectrometers after resuming the operation of the reactor. The Scientific Council highly appreciates FLNP's efforts to resume the IBR-2 User Programme. The Scientific Council welcomes the intention of the PAC to assist in attracting additional experts for the thorough review and evaluation of submitted proposals as well as to nominate potential candidates to the group of experts.

The Scientific Council supports the PAC recommendations on the IBR-2 instrumentation development for the period 2026–2030. In particular, the Scientific Council agrees with the PAC that the development of the new inelastic neutron scattering spectrometer in inverse geometry (BJN) with the parameters comparable to those of the best dedicated instruments in advanced world neutron centres will bring the studies of the dynamics of condensed matter to a qualitatively new level, and enable the realization of the internationally competitive research programme in this field. The completion of the basic configuration of the small angle neutron scattering and imaging spectrometer, optimized for experiments with cold neutrons, will provide new opportunities for the

realization of interdisciplinary research in various fields, including biology, biophysics, cultural heritage, materials science, chemistry, and condensed matter physics.

The Scientific Council shares the PAC's opinion that the development and modernization of other operational instruments are essential for the maintenance of research capabilities competitive with other leading neutron centres, as well as for a more effective realization of the FLNP scientific programme and the IBR-2 User Programme.

Together with the PAC, the Scientific Council recommends that the JINR Directorate should start the process of developing proposals for the development of new instruments for further inclusion in the next Seven-Year Plan for the Development of JINR, with a special emphasis on the scientific impact of the facilities. The Scientific Council also supports the PAC's recommendation on taking efforts to complete the high-luminosity inelastic scattering spectrometer BJN at the IBR-2.

Reports by young scientists

The Scientific Council followed with interest the reports by young scientists, selected by the PACs for presentation at this session: "First JUNO results on the solar oscillation parameters" by D. Dolzhikov and "Development of reflectometric studies in oscillating magnetic fields at the REMUR instrument" by E. Kolupaev. The Scientific Council thanks the speakers and welcomes such selected reports in the future.

IV. Scientific reports

The Scientific Council listened with interest to the scientific report "The International Union of Pure and Applied Physics (IUPAP), the International Year of Basic Sciences for Sustainable Development (2022–2023) and the International Decade of (all) Sciences (and all knowledge) for Sustainable Development (2024–2033)", presented by M. Spiro, and to the scientific report "The landscape of nuclear research in Mexico", presented by A. M. Cetto and A. Ayala, and to the scientific report "Towards the synthesis of element 119", presented by Yu. Oganessian, and thanks the speakers.

V. Awards and prizes

The Scientific Council acknowledges the outstanding achievements of Michel Spiro and congratulates him on the award of the Oganesson Prize.

The Scientific Council approves the proposal of the JINR Director, G. Trubnikov, to award the title "Honorary Doctor of JINR" to Chen Hesheng (People's Republic of China)

for his active participation in the formation of plans for joint fundamental research and applied projects, especially in the field of neutron scattering and high-energy physics.

The Scientific Council approves the Jury's recommendations on the award of the B. Pontecorvo Prize to Mikhail Shaposhnikov (Institute of Theoretical Physics, Ecole Polytechnique, Lausanne, Switzerland) for the development of theoretical and phenomenological aspects of the neutrino minimal standard model stimulating its further experimental tests.

The Scientific Council approves the Jury's recommendations presented by Vice-Director V. Kekelidze on awarding the JINR annual prizes for best results in the fields of theoretical and experimental research, methodology and technology research, and applied technology research (Appendix).

VI. Election and announcement of vacancies in the directorates of JINR Laboratories

The Scientific Council endorsed the appointment of A. Baimukhanova as Deputy Director of the Dzhelepov Laboratory of Nuclear Problems for the duration of the term of service of the current DLNP Director, E. Yakushev.

VII. Next sessions of the Scientific Council

The 140th session of the Scientific Council will be held on 24–25 September 2026.

The 141st session of the Scientific Council will be held in February 2027, the dates to be decided at the 140th session.

G. Trubnikov
Chair of the Scientific Council

S. Kilin
Co-chair of the Scientific Council

S. Nedelko
Secretary of the Scientific Council