I. General considerations

The Scientific Council takes note of the comprehensive report by JINR Director V. Matveev, covering the recent achievements of JINR in its major research directions, the progress in developing physics facilities within JINR's large projects, the decisions of the latest session of the JINR Committee of Plenipotentiaries (March 2019), as well as events in JINR's international cooperation and in the field of training highly qualified scientific personnel.

The Scientific Council supports the efforts of the JINR Directorate towards constructing the basic configuration of the NICA complex, noting the completion of the main systems of the Booster synchrotron and of the fabrication of the yoke of the solenoidal magnet for the MPD detector. The Scientific Council appreciates the first physics results produced in the BM@N experiment and the continued analysis of the data taken earlier in this experiment. The Scientific Council also notes the commissioning of the updated computer cluster at VBLHEP to meet the challenges of the NICA complex.

The Scientific Council takes note of the holding at JINR, on 17 April 2019, of the 3rd Joint Meeting of the MPD and BM@N Collaborations, which covered the physics programmes of the MPD and BM@N experiments, and progress in detector subsystems work and in analysis of experimental data.

The Scientific Council notes with satisfaction the opening of the experimental building of the Factory of superheavy elements (SHE) at the Flerov Laboratory of Nuclear Reactions and the launching of the Factory's main facility — the DC-280 cyclotron. The Scientific Council highly appreciates the scientific and technological quality of the realization of the project to build the DC-280 cyclotron and the participation of most JINR Member States. The Scientific Council takes note of obtaining by JINR the permission to commission the Factory's experimental building issued by the Ministry of Housing Policy of Moscow Region, and of the Sanitary and Epidemiological Conclusion on the compliance of the SHE Factory's facilities with radiation safety requirements.

The Scientific Council notes the holding at JINR, on 30–31 May 2019, of the International Symposium "Present and Future of the Periodic Table of Chemical Elements", which was attended by representatives of UNESCO, IUPAC, and IUPAP together, with eminent scientists from institutes and universities of JINR Member States and other countries. This symposium was organized at the highest international level and largely

contributed to enhancing the awareness of the international community concerning JINR's achievements in the field of synthesis of superheavy elements.

The Scientific Council notes the commissioning of two new clusters of the BAIKAL-GVD detector under construction, the effective volume of which has now reached ~ 0.25 km^3. The Scientific Council also notes the further development of the neutrino experiments at the Kalinin Nuclear Power Plant.

The Scientific Council takes note of the broadening of international ties and prospects for cooperation with relevant ministries of the Republic of Armenia, the Republic of Poland, and the Republic of Cuba as well as with the National Academy of Sciences of Belarus and research organizations of the Socialist Republic of Vietnam, the People's Republic of China, and the Republic of Korea.

The Scientific Council supports the efforts being taken by the JINR Directorate to train highly qualified scientific personnel. In particular, the Scientific Council welcomes the beginning of operation at JINR, from 1 September 2019, of new dissertation councils on the basis of JINR's right to independently confer academic degrees in the Russian Federation. Implementation of this right will further attract young scientists from Member States to JINR.

The Scientific Council congratulates JINR Director V. Matveev for his comprehensive presentation and appreciates the emerging results which follow from choosing a good strategy and from selection of coherent priorities which distinguish JINR as a world-class international scientific research organization.

II. Preparation of the draft Strategic plan for the long-term development of JINR

The Scientific Council takes note of the reports concerning the current preparation of the draft Strategic plan for the long-term development of JINR in its major sections, presented by DLNP Deputy Director D. Naumov (particle physics), VBLHEP Deputy Director R. Tsenov (relativistic heavy-ion physics and spin physics), FLNR Scientific Secretary A. Karpov (nuclear physics at low and intermediate energies), by FLNP Directorate Adviser A. Ioffe (condensed matter physics and neutron nuclear physics), by LRB Senior Researcher E. Nasonova (radiobiology), and by LIT Researcher N. Voytishin (information technology).

The speakers informed the Scientific Council of new scientific research and experiments prepared and to be carried out over the period 2023–2030 and beyond. They also suggested what scientific and technological results should be achieved, what research infrastructure should be developed, and what are the future staffing needs.

In addition, information was given about the memberships of the thematic subgroups and the organization of their work (meetings, workshops, videoconferences, etc.).

The Scientific Council recommends that the international Working Group ensure the preparation of a single, integrated document based on materials presented by the thematic subgroups describing the overall strategy with its flagship projects and partnership priorities and inform the Committee of Plenipotentiaries, at its session in November 2019, about the progress in preparing the Strategic plan for the long-term development of JINR.

The Scientific Council looks forward to discussing the draft document which should also contain a strategy to increase the attractiveness of JINR priority activities to young people.

III. Recommendations in connection with the PACs

The Scientific Council takes note of the recommendations made by the PACs at their meetings in June 2019, as reported at this session by I. Tserruya, Chairman of the PAC for Particle Physics, by JINR Vice-Director M. Itkis on behalf of M. Lewitowicz, Chairman of the PAC for Nuclear Physics, and by D. L. Nagy, Chairman of the PAC for Condensed Matter Physics. The Scientific Council requests the JINR Directorate to consider these recommendations while preparing the JINR Topical Plan of Research and International Cooperation for the year 2020.

Particle physics

The Scientific Council is pleased to note the active work on the mounting of the Booster magnets and that commissioning with beam is expected to be completed by the end of 2019. The Scientific Council supports the request to improve the diagnostics of the accelerator complex in order to deliver pure well-defined beams to the users. The Scientific Council acknowledges the efforts of the Laboratory to reduce the delay in the construction work schedule for the infrastructure of the collider complex.

The Scientific Council welcomes the admission of two new institutions to the MPD collaboration, the magnitude and quality of simulations being carried out, and the collaboration efforts to complete the first stage of the detector by 2021. The Scientific Council congratulates the BM@N team for the presentation of first physics results on the production of lambda hyperons and appreciates the ongoing efforts for the preparation of the BM@N set-up for heavy-ion beams in 2021.

The Scientific Council supports the PAC’s approach for the evaluation of the JINR’s participation in the LHC experiments. In particular, it supports the recommendation to the JINR Directorate for each of the three LHC themes (ALICE, ATLAS and CMS) to combine the project concerning physics analysis and operations and the project concerning detector upgrade and associated R&D into one single project. Thus, better monitoring and regulating

the execution of the so far distinct projects will be achieved. The Scientific Council also supports the proposal to have a thorough yearly review of all three LHC experiments at the same PAC meeting, followed 6 months later by a brief status report.

The Scientific Council congratulates the JINR CMS group on the quality of the work carried out in various detector subsystems with major JINR responsibilities and on the progress in physics studies with direct participation of JINR members. It also seconds the PAC's recommendations to make larger efforts towards a higher productivity in terms of physics analysis and scientific publications, commensurate with the global contribution of JINR to CMS. A physics analysis plan should be prepared which includes subjects that would allow the group to achieve higher visibility, with identified JINR responsibilities and an increased number of young researchers and students involved. In this regard, the presence of a large number of participants with 0.1 FTE is a matter of concern.

The Scientific Council appreciates the progress in many physics analyses with JINR responsibility in the ATLAS experiment. The Scientific Council notes with pleasure the large number of scientific publications with direct participation of JINR members and the consistency of the research subgroups involving several young researchers. It supports the PAC's recommendations to concentrate on studies for which the group could achieve a leadership role with a visible impact within the ATLAS collaboration, in terms of coordination roles, involvement of new young researchers, and presentations at major conferences.

The Scientific Council takes note of the involvement of the ALICE group at JINR in physics analyses, the group's contribution to the GRID-ALICE system and to the photon spectrometer upgrade. The Scientific Council shares the PAC's concern about the relatively low visibility of the JINR team working in ALICE as reflected for example by the lack of talks at major conferences in the field. The group, with several senior scientists, needs rejuvenation. The group leader should take actions to attract young scientists and students into the project aiming at its stronger impact and visibility.

The Scientific Council supports the PAC's recommendations on the continuation of JINR's participation in the CMS, ATLAS and ALICE projects for the period 2020–2023, with first priority, pending the setting in place of corrective actions to address the above-mentioned concerns.

The Scientific Council supports the PAC's recommendations on the continuation of ongoing projects in particle physics. In particular, it endorses the recommendation on continuation of the SCAN-3 project for the period 2020–2022 with first priority, making sure that it does not interfere with NICA operation. It also supports the PAC's decision to postpone any recommendation on the NA64 project till the authors present to the PAC a revised

proposal where the recommendations made at the joint session of two PACs — to improve the ratio of FTE to participants, to attract students and to get involved in data analysis — are properly addressed. Till then the JINR management shall provide sufficient resources to the group to allow continuation of their work and commitments.

The Scientific Council seconds the PAC's evaluation of the FASA project and the request that the authors submit an improved proposal, better focusing its scientific content, taking into account data obtained 40 years ago at Fermilab, CERN-PS, Bevatron and Bevalac, and presenting a convincing argument on how they can solve the still open question of break-up or thermalization in the multifragmentation of nuclei.

The Scientific Council draws to the attention of the leaders of the BOREXINO, PANDA and COMET projects to be concluded in 2019 that they should present their reports at the meeting of the PAC in February 2020.

Nuclear physics

The Scientific Council appreciates FLNP's outstanding achievements in the research of fundamental symmetries with polarized neutrons, the wide range of excellent results in the field of applied research within international programmes, and the importance of the work for the development of the accelerator facility carried out at IREN.

The Scientific Council supports the recommendation of the PAC for Nuclear Physics to extend the theme "Investigations of Neutron Nuclear Interactions and Properties of the Neutron" for 2020–2022 with first priority for further research activities in nuclear physics using FLNP's neutron facilities: the highly intense pulsed neutron source IREN and the IBR-2 pulsed reactor. The FLNP Directorate is advised to focus on the modernization of experimental halls and pavilions with beams of the IREN facility, on the construction of a polarized nuclear target for the work with polarized neutrons at IREN, and on the upgrade of the EG-5 electrostatic generator. Special attention should be given to the beam delivery systems in order to increase neutron fluxes.

The Scientific Council recognizes the importance of the project "Research and development of the tagged neutron method for identification of the elemental structure of matter and studies of nuclear reactions (TANGRA)" and supports the PAC's recommendation to extend this project for 2020–2022, with first priority.

The Scientific Council takes note of the work under the GDH&SPASCHARM&NN project, which consists in fact of three independent experimental activities connected by the study of the nucleon spin structure in strong and electromagnetic interactions, and technically strongly supported by the frozen spin polarized proton and deuteron targets built and

maintained by JINR's group. The Scientific Council acknowledges the important role of the Dubna group in all three experiments and supports the PAC's recommendation to extend this project for 2020–2022, with first priority.

The Scientific Council supports the PAC's recommendation on the opening of a new project "Construction of a prototype of the initial section of a high-current heavy-ion linear accelerator aimed at producing intense radioactive ion beams for basic research" for the period 2020–2021. The proposed work plan aims at constructing a prototype of the initial section of the linear accelerator and at designing the LINAC-100 accelerator. This work should be supported both in terms of manpower and financial resources, but so that the just starting research programme at the Factory of superheavy elements is not perturbed.

Condensed matter physics

The Scientific Council notes the importance of activities within the theme "Development of the IBR-2 Facility with a Complex of Cryogenic Neutron Moderators" and project "Construction of a complex of cryogenic moderators at the IBR-2 facility" and supports their extension for 2020–2022.

The Scientific Council takes note of the status of the cooperation between JINR and the SOLARIS National Synchrotron Centre (Kraków, Poland) focusing on the development of a joint facility for structural research using synchrotron X-rays. The Scientific Council supports the recommendation of the PAC for Condensed Matter Physics on the opening of a new theme "Development of the SOLCRYS Structural Research Laboratory at the SOLARIS National Synchrotron Centre" for 2020–2022 and takes note of the interest of several organizations from JINR Member States in taking part in this activity.

The Scientific Council welcomes the results of discussion of the inelastic neutron scattering instruments at IBR-2 within the context of the current trends in neutron spectroscopy worldwide. Considering that the two spectrometers reviewed by the PAC are the only inelastic neutron scattering instruments available at JINR, the Scientific Council supports the development of new inelastic neutron scattering instruments and FLNP's intention to present a proposal for opening a new project to further develop the two existing instruments.

The Scientific Council is satisfied with the progress of the project "A system for neutron operando monitoring and diagnostics of materials and interfaces for electrochemical energy storage devices at the IBR-2 reactor" and supports the PAC's recommendation on its continuation.

The Scientific Council appreciates the results obtained in the development of new mathematical methods, algorithms, and software packages for condensed matter physics, which are represented, on the one hand, through high-class computer support of the data acquisition and processing at IBR-2 spectrometers and, on the other hand, through important computer developments for the numerical solution of theoretical models describing either dynamic phenomena or structural properties of complex materials. The Scientific Council supports the PAC's recommendation on further extension of the theme "Methods, Algorithms and Software for Modeling Physical Systems, Mathematical Processing and Analysis of Experimental Data" for 2020–2023, with the understanding that the basis for future developments within this theme will to the extent possible to realize the opportunities offered by the heterogeneous computing platform HybriLIT through its Govorun supercomputer and its education and testing site.

The Scientific Council, together with the PAC, is pleased with the results achieved by DLNP's Medico-Technical Complex both in the field of clinical research on proton radiotherapy applications for the treatment of different diseases and in the field of radiobiology. Particularly, it should be stressed that the clinical research has entered a new phase, in which the statistical analysis of the treatment results becomes possible and the effectiveness of the proton radiotherapy techniques realized at JINR is seen. The Scientific Council supports extension of the theme "Biomedical and Radiation-Genetic Studies Using Different Types of Ionizing Radiation" and the projects "Further development of methods, technologies, schedule modes and delivery of radiotherapy" and "RADIOGENE: The molecular genetics of radiation-induced changes at the gene, genome and transcriptome level in *Drosophila melanogaster*" for 2020–2022.

The Scientific Council agrees with the PAC's recommendation on extension of the concluding theme and project "Research on Cosmic Matter on the Earth and in Space; Research on the Biological and Geochemical Specifics of the Early Earth" for 2020–2022, expecting that research in the fields of this theme would make a remarkable contribution to astrobiology.

Common issues

The Scientific Council looks forward to being informed of the decision concerning the Neutrino programme evaluated by the joint session of the PAC for Particle Physics and of the PAC for Nuclear Physics in January 2019 and to knowing when and how this programme will be re-evaluated. In general, the Scientific Council recommends that better allotment of scientific themes to respective PACs be made.

The Scientific Council notes the significant progress achieved in developing a technical justification for the concept of a new neutron source at JINR and supports the recommendations made by the PAC for Condensed Matter Physics and the PAC for Nuclear Physics on the opening of a theme “Development of the Conceptual Design of a New Advanced Neutron Source at JINR” for 2020–2022. At the same time, special attention should be paid towards developing the scientific programme for the new source in the field of condensed matter physics and nuclear physics as well as to defining a management structure and a time schedule, specifying milestones and expected results of this new theme.

The Scientific Council supports the development of JINR information systems aimed at providing information and software support for the JINR research and management activities within the theme “Information and Computing Infrastructure of JINR”. The Scientific Council appreciates LIT’s efforts to achieve development and upgrade of the JINR telecommunication and network infrastructure; modernization of the MICC engineering infrastructure, increase in performance of computing resources and data storage systems. The Scientific Council supports the recommendations of the PAC for Nuclear Physics and of the PAC for Condensed Matter Physics to extend the theme “Information and Computing Infrastructure of JINR” and the MICC project for 2020–2023, with first priority.

The Scientific Council recommends that more attention should be given to the participation of female scientists in the Scientific Council and in the PACs and more generally in the life of JINR at all levels.

Reports by young scientists

The Scientific Council appreciates the following reports by young scientists, selected by the PACs for presentation at this session: “Neutrino oscillation analysis in the NOvA experiment” and “Investigations of polystyrene-fullerene nanocomposite thin films by neutron and X-ray reflectometry”, and thanks the respective speakers: L. Kolupaeva (DLNP) and T. Tropin (FLNP). The Scientific Council welcomes such selected reports in future.

IV. Memberships of the PACs

On the proposal of the JINR Directorate presented by JINR Vice-Director R. Lednický, the Scientific Council appoints Fuqiang Wang (Purdue University, West Lafayette, USA) as a new member of the PAC for Particle Physics for a term of three years. The Scientific Council thanks the outgoing member Nu Xu for his successful work in this PAC.

The Scientific Council appoints M. Kozak (Adam Mickiewicz University, Poznań, Poland) as a new member of the PAC for Condensed Matter Physics for a term of three

years. The Scientific Council thanks the outgoing member J. Wąsicki for his successful work in this PAC.

V. Prizes and awards

The Scientific Council congratulates F. Halzen (University of Wisconsin, Madison, USA) on the award of the B. Pontecorvo Prize for his leading role in the construction of the IceCube detector and experimental discovery of very-high-energy cosmic neutrinos. The Scientific Council thanks F. Halzen for his excellent presentation.

The Scientific Council congratulates the winners of JINR annual prizes for best papers in the fields of scientific research, instruments and methods, and applied research.

The Scientific Council congratulates LRB Director E. Krasavin on the award of the Diploma of Doctor Honoris Causa of the National University of Mongolia, presented at this session.

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

In the elections of the Director of the Veksler and Baldin Laboratory of High Energy Physics, the nominated candidate has not obtained the required majority of votes. As proposed by JINR Director V. Matveev, the Scientific Council will announce new elections at the 129th session in February 2021.

The Scientific Council elected A. Bugay as Director of the Laboratory of Radiation Biology (LRB) for a term of five years. The Scientific Council thanks E. Krasavin for his successful tenure as Director of this Laboratory.

The Scientific Council announces the vacancies of positions of LRB Deputy Directors. The endorsement of appointments will take place at the next session of the Scientific Council in February 2020.

VII. Appreciation

The Scientific Council congratulates the Veksler and Baldin Laboratory of High Energy Physics on the commissioning of the NICA Computing Centre. This is a landmark event on the way to realizing the NICA complex and an important element of its research infrastructure.

The Scientific Council thanks V. Cavasinni, Coordinator of the Bruno Pontecorvo Centre of the Physics Department of the University of Pisa (Italy), for his report on the status

of this centre and future collaboration with JINR, and wishes the Bruno Pontecorvo Centre success in its activity.

VIII. Rules of procedure of the Scientific Council

The Scientific Council discussed the amendments proposed by JINR Director V. Matveev to the Regulations for the election of Directors and for the endorsed appointment of Deputy Directors of JINR Laboratories, which are part of the Rules of procedure of the JINR Scientific Council, and decided to continue their consideration at the next session.

IX. Next session of the Scientific Council

The 127th session of the Scientific Council will be held on 20–21 February 2020.

V. Matveev

Chairman of the Scientific Council

C. Borcea

Co-chairman of the Scientific Council

A. Sorin

Secretary of the Scientific Council