

I. General considerations

The Scientific Council takes note of the comprehensive report by JINR Director V. Matveev, presenting an in-depth analysis of the role and place of JINR in the world's fundamental nuclear physics science and covering the decisions of the latest session of the JINR Committee of Plenipotentiaries (March 2017), the progress in implementing the JINR scientific programme in the first, starting year of the new seven-year plan, and major events in the activities of JINR and its international cooperation.

The Scientific Council is pleased to note the important strategic plans for JINR to achieve new scientific and technological results of high significance in 2017–2023, in particular, in the process of realizing and launching the NICA megaproject and the Factory of Superheavy Elements (SHE), and in expanding the spectrometer complex of the IBR-2 reactor and the User Programme at this facility.

The Scientific Council highly appreciates the efforts undertaken by the JINR Directorate towards developing the Institute's research infrastructure and integrating it into the European scientific landscape. It notes, in particular, the inclusion, in 2017, of the NICA accelerator complex and the SHE Factory in the NuPECC long-range plan "Perspectives in Nuclear Physics".

The Scientific Council congratulates JINR on the inauguration of the names of the new superheavy elements moscovium, tennessine and oganesson synthesized at the Flerov Laboratory of Nuclear Reactions, which was held in Moscow on 2 March 2017.

The Scientific Council welcomes the signing of the new Agreement on cooperation between JINR and INFN, which took place in Moscow on 12 April 2017 in the presence of the President of the Italian Republic, S. Mattarella.

The Scientific Council would like to stress the importance of the elaboration of JINR's new strategic plan based on long-term future of the JINR Laboratories and looks forward to being informed about the strategic planning process and timeline.

The Scientific Council takes note of the appointment of A. Sorin as Chief Scientific Secretary and B. Gikal as Chief Engineer of JINR. The Scientific Council thanks their predecessors, N. Russakovich and G. Shirkov, for their long-term successful work.

The Scientific Council is pleased to learn of the appointment of G. Trubnikov, Deputy Minister of Education and Science of the Russian Federation, as Plenipotentiary of the Government of the Russian Federation to JINR and wishes him successful work in these two responsible positions.

The Scientific Council appreciates the new brochures on JINR's activities and facilities recently published and distributed at the session and encourages further efforts to enhance the international visibility of JINR's science and communications.

II. Progress of the SHE Factory

The Scientific Council takes note of the report by FLNR Director S. Dmitriev "Status of the Factory of Superheavy Elements and its future prospects". The Scientific Council is pleased to note that Phase 1 of construction of the SHE Factory has entered its final stage. Civil construction is planned to be completed at the end of 2017. A complete range of installation work for the DC-280 cyclotron, the new ECR-ion source, and for the engineering systems is planned to be finished in December 2017. The installation and adjustment of the new gas-filled recoil separator GFS-2 is to be completed during November 2017–June 2018. First experiments are planned for the second half of 2018.

Given the high priority of the research work on the synthesis of superheavy elements and study of their properties, the Scientific Council recommends that the JINR and FLNR Directorates ensure the implementation of programmes on the further development of the SHE Factory (construction of new and upgrade of the existing physics instruments for the studies of chemical and nuclear properties of superheavy elements).

III. Progress of the NICA project

The Scientific Council takes note of the report by VBLHEP Director V. Kekelidze "Progress of the NICA project". The Scientific Council notes with satisfaction the very good progress in implementing this flagship project of JINR which has been recognized as an important element of the European research infrastructure.

The Scientific Council is pleased to note the successful development of the Nuclotron-NICA accelerator complex, including the recent production of polarized proton beams with the new source of polarized particles; is satisfied with the ongoing construction of the Booster, for which the electron cooling system was manufactured by the Budker INP (Novosibirsk) and delivered to JINR, and is also satisfied with the progress of civil construction for the collider. A large amount of work is being done by the BM@N and MPD collaborations to develop the detectors and their subsystems; efforts have been undertaken to enhance these collaborations by new participants. The

Scientific Council looks forward to new results expected to be obtained with BM@N during the next, 55th run of the Nuclotron at the end of 2017.

On the whole, the Scientific Council commends the dynamic progress of the NICA project, encourages further expansion of the international collaborations around the planned experiments and hopes that the challenging work for the NICA complex will be successfully continued.

IV. Scientific reports

The Scientific Council highly appreciates the scientific reports “The quest for phase transitions in strongly interacting matter” and “Probing dense matter at NICA energies with dileptons: prospects and challenges” and thanks Professors A. Rustamov and I. Tserruya for their presentations inspiring new ideas and suggestions for the NICA physics programme.

V. Recommendations in connection with the PACs

The Scientific Council takes note of the recommendations made by the PACs at their meetings in June 2017 as reported at this session by I. Tserruya, Chairman of the PAC for Particle Physics, M. Lewitowicz, Chairman of the PAC for Nuclear Physics, and D. L. Nagy, member of the PAC for Condensed Matter Physics. The Scientific Council proposes that the JINR Directorate should take these recommendations into account in preparing the JINR Topical Plan of Research and International Cooperation for 2018.

Particle Physics Issues

The Scientific Council appreciates the significant progress achieved in the Nuclotron operation during Run 54 when a beam of polarized protons was accelerated for the first time. The Scientific Council is very pleased with the beginning of the commissioning of the Booster electron cooling and with the preparations for the Booster construction. It shares the PAC’s concern about the availability of sufficient manpower for the efficient Booster construction and urges the JINR management to take corrective actions.

The Scientific Council welcomes the significant advance in the yoke construction for the MPD magnet. It appreciates the ongoing efforts for the detector development and appreciates the progress and efforts toward defining the participation and commitments of groups from China and Mexico in the MPD experiment.

The Scientific Council is very pleased with the progress towards realization of the BM@N experiment and acknowledges the achievements in the recent runs with

deuteron and carbon beams. The Scientific Council shares the PAC's concern about the lack of manpower to analyse the data collected in these runs and urges the project and laboratory management to undertake the necessary steps to attract external groups to the BM@N experiment. The Scientific Council is pleased with the proposal to extend the BM@N physics programme to "Probing Short-Range Correlations", involving groups from Tel Aviv University, MIT, GSI, and CEA together with the BM@N collaboration. This is the first outside proposal to use the BM@N facility. It is a pioneering measurement that can only be performed at the Nuclotron and aims at studying short-range correlations in the carbon nucleus using inverse kinematics of a carbon beam incident on a hydrogen target.

The Scientific Council appreciates the work accomplished by the Machine Advisory Committee and Detector Advisory Committees for the MPD and BM@N experiments in assisting the realization of the Nuclotron-NICA project.

The Scientific Council supports the PAC's recommendations on the approval of new projects and the continuation of ongoing projects in particle physics within the suggested time scales, as outlined in the PAC recommendations. It welcomes, in particular, the revised proposal for JINR's participation in the COMPASS-II project but also supports the PAC's request to take the necessary measures to significantly reduce the group size and the travel budget. A similar concern was expressed regarding JINR's participation in the Daya Bay/JUNO project: it was recommended that the team and laboratory management reconsider whether the large manpower and corresponding large travel budget are justified.

Nuclear Physics Issues

The Scientific Council is impressed with the progress of work for the DC-280 cyclotron (Dubna cyclotron, K-factor 280), which is the central device of the Factory of Superheavy Elements. The cyclotron and all its subsystems are in the installation phase. The main cyclotron magnet has been mounted and magnetic measurements are completed. The ECR-type ion source (DECRIS-PM) is ready to be installed at the SHE Factory.

The manufacturing of the new gas-filled separator GFS-2 is under completion. Documentation for the new target unit designed for GFS-2 has been prepared, and a detection system for recording rare events of formation of superheavy elements with a high position and energy resolution is under development.

The Scientific Council looks forward to the completion of all installation work on schedule (December 2017) and to the commissioning of the cyclotron in the period from January to April 2018.

In order to meet the deadlines of the start-up and putting into operation of the SHE Factory, the PAC recommends that the JINR and FLNR Directorates ensure coordinated implementation of the schedule of civil construction, installation and commissioning work for the accelerator, separator, target and detector systems. The FLNR Directorate should focus on the preparation of day-one experiment, with special attention to be given to the timely provision of the SHE Factory complex with engineering and technical personnel. The Scientific Council also recommends that a careful quality control be ensured during the installation and commissioning of all SHE Factory components in order to guarantee the reliable operation of the facility at its optimal performance.

The Scientific Council is pleased with the start-up of the new fragment-separator ACCULINNA-2 and welcomes the programme of first experiments to investigate ${}^7\text{H}$, ${}^{13}\text{Li}$, ${}^{17}\text{Ne}$ and ${}^{26}\text{S}$ decaying via 3n, 4n and 2p emissions.

The Scientific Council supports the recommendations of the PAC for Nuclear Physics on extension of the TANGRA project “Design and development of the tagged neutron method for determination of the elemental structure of materials and nuclear reaction studies” and of the E&T&RM project “Study of deeply subcritical electronuclear systems and possibilities of their application for energy production, transmutation of radioactive waste and research in the field of radiation material science” until the end of 2019.

The Scientific Council notes the endorsement by the PAC of the final reports on the results obtained in the MEG-PEN, TRITON, and PAINUC experiments on the theme “Physics of Light Mesons” and supports the PAC recommendation on the continuation of the participation in the upgraded MEG-II frontier experiment in the search for lepton flavour violation.

Condensed Matter Physics Issues

The Scientific Council takes note of the results of the discussion, held at the meeting of the PAC for Condensed Matter Physics, of plans for the preparation of a concept for JINR’s new neutron source replacing IBR-2 after the decommissioning of the reactor. The Scientific Council agrees that starting the strategic planning of a possible project for a new source is an important task and welcomes further follow-up of this activity by the PAC. The first step in the planning process should be a

comprehensive paper containing a clear science case and identifying the specific added value of the future JINR neutron source within the global and the European neutron source landscapes as well as the realistic user needs. The Scientific Council appreciates the intention of the PAC to be involved in preparing this document, noting that, regarding the principal parameters of the new facility, already in the preliminary design phase attention should be paid to the needs of the scientific community.

The Scientific Council acknowledges the high quality of the implementation of the IBR-2 User Programme that made this basic JINR facility one of the world's leading open-access neutron sources. The successful operation of the IBR-2 User Programme and the enhancement of its performance through instrumentation upgrades is a prerequisite to a new JINR neutron source.

The Scientific Council supports the PAC's recommendations on the continuation of ongoing activities and the opening of new themes and projects in condensed matter physics and related fields, appreciating the scientific and technical results obtained. In particular, the Scientific Council welcomes the progress in upgrading the IBR-2 spectrometers and in developing the PTH sample environment system for the DN-12 diffractometer as well as recent achievements in the fields of Raman microscopy, development of novel semiconductor detectors for fundamental and applied research, positron annihilation spectroscopy, and radiobiology. Among new proposals considered by the PAC, the Scientific Council notes the development of a wide-aperture backscattering detector for the HRFD diffractometer, which improves its capabilities and enhances in-house capacity in detector construction, and the designing of an additional sample environment system enabling *operando* neutron monitoring and diagnostics of materials and interfaces for electrochemical energy storage devices at the IBR-2 facility.

Reports by young scientists

The Scientific Council appreciates the following reports by young scientists which were selected by the PACs for presentation at this session: "Investigation of exotic states in light nuclei" and "Neurochemical alterations in central nervous system of rodents after exposure to different radiation modalities", and thanks the speakers: D. Janseitov (BLTP) and K. Belokopytova (LRB). The Scientific Council welcomes similar reports in the future.

VI. Memberships of the PACs

As proposed by the JINR Directorate, the Scientific Council appoints D. L. Nagy (Wigner RCP, Budapest, Hungary) as Chairman of the PAC for Condensed Matter

Physics and P. Mikula (INP, Řež, Czech Republic) as a new member of this PAC, each for a term of three years.

The Scientific Council also appoints L. Musa (CERN, Geneva, Switzerland) as a new member of the PAC for Particle Physics for a term of three years.

VII. Awards and prizes

The Scientific Council congratulates Professors Yifang Wang (IHEP, Beijing, China), Soo-Bong Kim (Seoul National University, Korea) and Koichiro Nishikawa (KEK, Tsukuba, Japan) on the award of the B. Pontecorvo Prize for their outstanding contributions to the study of the neutrino oscillation phenomenon and to the measurement of the θ_{13} mixing angle in the Daya Bay, RENO and T2K experiments. The Scientific Council thanks them for their excellent presentations.

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.

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

After clarification of the election procedure, the Scientific Council elected D. Kazakov as Director of the Bogoliubov Laboratory of Theoretical Physics (BLTP) for a term of five years. The Scientific Council thanks V. Voronov for his successful tenure as Director of this Laboratory.

The Scientific Council announces the vacancies of positions of Deputy Directors of BLTP. The Scientific Council asks the Committee of Plenipotentiaries to allow the endorsement of appointments of the Deputy Directors to be held at the 123rd session of the Scientific Council (February 2018) and to approve the following amendment to the corresponding paragraph of item 2 in the Regulation for the Election of Directors and for the Endorsed Appointment of Deputy Directors of JINR Laboratories (Appendix to the Rules of Procedure of the JINR Scientific Council):

“The announcement of a vacancy for the position of a Laboratory Deputy Director is made by the Scientific Council *with subsequent endorsement of the appointment to this position at the session following the session which announced the vacancy*, is published in the Resolution of the Scientific Council and is sent out in written form by the Secretary of the Scientific Council to the Plenipotentiaries of the JINR Member States”.

The Scientific Council announces the vacancies of positions of the Director of the Dzhelepov Laboratory of Nuclear Problems and of the Director of the Flerov Laboratory of Nuclear Reactions. The elections will take place at the 124th session of the Scientific Council in September 2018.

IX. In memory of Valeriu Kantser

The Scientific Council deeply regrets the sad loss of Professor V. Kantser (Republic of Moldova), Chairman of the JINR Programme Advisory Committee for Condensed Matter Physics during 2008–2017, who made outstanding contributions to the development of JINR and its international cooperation.

X. Next session of the Scientific Council

The 123rd session of the Scientific Council will be held on 22–23 February 2018.

V. Matveev

Chairman of the Scientific Council

M. Waligórski

Co-chairman of the Scientific Council

A. Sorin

Secretary of the Scientific Council