

**I. General considerations**

The Scientific Council takes note of the comprehensive report presented by JINR Director V. Matveev which concerns the decisions taken at the recent session of the Committee of Plenipotentiaries (November 2016), the scientific results produced in 2016 and the major events in the activities of JINR and its international cooperation.

The Scientific Council appreciates the approval by the Committee of Plenipotentiaries of the Seven-year plan for the development of JINR for 2017–2023 which will determine the strategy of JINR in the coming period and which will be updated on a yearly basis with the actual financial situation taken into account.

The Scientific Council is pleased to note the establishment of a Supervisory Board of the NICA project, which is an important step taken after the recent signing of the Agreement between the Government of the Russian Federation and JINR on the construction and exploitation of the NICA complex of superconducting rings for heavy-ion colliding beams.

The Scientific Council congratulates the JINR Directorate for the successful realization of the idea of an All-Russia Open Lesson on the NICA Project on 8 February 2017 and suggests its wider distribution.

The Scientific Council recognizes the significant progress in implementing the priority projects of the JINR scientific programme and the high-quality organizational work being done by the JINR Directorate.

The Scientific Council highly congratulates the Institute for the approval by IUPAP and IUPAC of the names of the new superheavy elements moscovium, tennessine and oganesson synthesized at the Flerov Laboratory of Nuclear Reactions and looks forward to celebrations of these important discoveries.

The Scientific Council supports the development of a long-range strategy for JINR beyond the approved Seven-year plan at least up to 2030.

**II. Results of the Seven-year plan for the development of JINR (2010–2016) and plans for 2017–2023**

The Scientific Council highly appreciates the results of implementation of the Seven-year plan for the development of JINR (2010–2016) and the plans of activities for 2017–2023 in the fields of particle physics and high-energy heavy-ion physics, and Information Technology presented by Vice-Director R. Lednický and in the fields of low-

and intermediate-energy nuclear physics, nuclear physics with neutrons, and condensed matter physics presented by Vice-Director M. Itkis. The Scientific Council wishes the Directorate and staff of JINR success in realizing these ambitious plans aimed at constructing unique basic facilities (NICA, SHE Factory, Baikal-GVD), upgrading the existing facilities of JINR, integrating them into the European and global research infrastructures, and at accomplishing an extensive programme of fundamental and applied research in the various fields of modern physics based on broad international cooperation.

### **III. Recommendations in connection with the PACs**

The Scientific Council takes note of the recommendations made by the PACs at their meetings in January 2017 as reported at this session by I. Tserruya, Chairperson of the PAC for Particle Physics, M. Lewitowicz, member of the PAC for Nuclear Physics, and O. Belov, Scientific Secretary 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 joins the PAC for Particle Physics in appreciating the progress towards realization of the Nuclotron-NICA project, including the successful commissioning of the linear accelerator of heavy ions HILac, the preparations for the Booster construction, the official start of the assembly and testing line for superconducting magnets, the progress in the civil construction work of the collider building, and the significant achievements in the Nuclotron operation during the 53rd run, with a record duration of stable operation. A beam of polarized deuterium nuclei was accelerated for the first time after a hiatus of 15 years and was delivered to the experiments with a polarization up to 60% and an intensity up to  $7 \cdot 10^8$  ions.

The Scientific Council notes the ongoing efforts of the MPD team on the preparation of the technical design reports and mass production of detector elements. It congratulates the MPD management for the progress in attracting new outside collaborators. The Scientific Council congratulates the BM@N team for the first successful run with a set-up that included all subsystems. The Scientific Council takes note of the PAC's concern by the six-month delay in the project realization that resulted also from the low availability of beam test. The Scientific Council appreciates the work

accomplished by the Detector Advisory Committees of the MPD and BM@N experiments in assisting the realization of the detectors.

The Scientific Council appreciates the progress towards the development of the COMET experiment, which is under preparation at the J-PARC accelerator and is aimed at searching for muon-to-electron conversion. The participants from JINR have made important technical contributions by constructing a straw-tube detector and by supplying and testing scintillating crystals for the COMET calorimeter. The Scientific Council recommends continuation of this project until the end of 2019 and encourages the team to take active roles in physics analysis.

The Scientific Council takes note of the new project on JINR's participation in the fixed target NA64 experiment at the CERN SPS. The proposed contribution of JINR to NA64, an interesting project with high scientific potential, is the delivery and operation of a straw-tube tracking detector, with modest resources requested for the next three years. The Scientific Council recommends approval of this project until the end of 2019.

#### Nuclear Physics Issues

The Scientific Council supports the recommendations of the PAC for Nuclear Physics concerning the theme "Physics of Light Mesons", in which significant results were obtained in the SPRING project, and in the TRITON and MEG experiments, in particular: to extend this theme until the end of 2017 in order to complete all the studies and activities, and to hear final reports on the results obtained in the MEG-PEN, PAINUC and TRITON experiments. The Scientific Council takes note of the recommendations of the PAC to continue the  $\mu \rightarrow e\gamma$  search in the MEG-II project and to provide funding for the GDH&SPASCHARM project until the end of 2019.

The Scientific Council appreciates the progress of construction of the Factory of Superheavy Elements (SHE) and of the installation of the DC-280 cyclotron with its major technological systems. In accordance with the schedule, the accelerator commissioning will start in December 2017. Implementation of such a tight schedule will require maximum concentration of financial and human resources of the Flerov Laboratory. The Scientific Council recommends that the FLNR Directorate take all necessary measures to ensure the launch of the SHE Factory as scheduled. Monitoring of the construction phase of the facility through a more detailed evaluation of the key components of the SHE Factory, namely the DC-280 cyclotron including the ion source, the high-power target and detection systems is recommended.

### Condensed Matter Physics Issues

The Scientific Council appreciates the scientific results achieved at IBR-2 instruments in 2016 and notes their interdisciplinary character. It also welcomes the recent instrumentation developments at the reactor which will increase the quality and level of forthcoming studies, extend the research areas and provide more attractive conditions for the IBR-2 user community. The Scientific Council is pleased with the progress of implementation of the FLNP User Programme at the IBR-2 spectrometers and supports its further development.

The Scientific Council welcomes initiated discussions on the development of a concept for a new neutron source of JINR to be used beyond 2032. Since the construction of a neutron source takes significant time, the Scientific Council finds it timely to consider a proposal for a new facility at the moment. At the same time, the Scientific Council shares the opinion of the PAC for Condensed Matter Physics on the urgency of addressing a number of issues such as mobilizing a large scientific community, considering complementarity and competitiveness with other neutron sources to be available after 2032 both in Russia and elsewhere in Europe, clarifying ideas on the instruments and novel technologies to be used at the new source, and identifying the relevant user community both at JINR and outside. The Scientific Council agrees with the PAC's recommendation that a proposal for the development of a new neutron facility be submitted to the Committee for Long-Term Strategy Planning being currently established at JINR.

Recognizing the new scientific results in the field of information technology and the recent achievements in the development of the JINR educational programme, the Scientific Council supports the PAC's recommendations on continuation of these activities within the considered themes and projects, as outlined in the PAC report.

### Common Issues

One of the reports at the meeting of the PAC for Nuclear Physics concerned the support of young scientists at JINR. The Scientific Council notes with interest the recommendations of this PAC that the JINR Directorate should extend the training PhD programme for all the Member States and Associate Member States and that a postdoctoral fellowship programme should be implemented at JINR in order to address the growth of early-career researchers. The Scientific Council highly appreciates the efforts of the JINR Directorate to support young scientists and wishes to hear a report on this subject at a future session.

The Scientific Council appreciates the participation of the PACs in updating the governing regulations of the PACs and the evaluation procedures of projects submitted to the PACs. As a general comment, the Scientific Council is pleased with the increased interaction and coordination between the three PACs and the Directorate.

#### 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: “Multimedia educational resources”, “Charmonium-like states at COMPASS”, “Fusion reactions with light neutron-rich nuclei: a pathway to synthesize new heavy nuclei”, “Simulation of radiation damage to different neuronal structures with Geant4-DNA toolkit” and thanks the respective speakers: N. Sidorov (VBLHEP), A. Gridin (DLNP), V. Rachkov (FLNR), and L. Bayarchimeg (LRB). The Scientific Council welcomes similar reports in the future.

#### **IV. Memberships of the PACs**

As proposed by the JINR Directorate, the Scientific Council appoints M. Lewitowicz (GANIL, Caen, France) as Chairperson of the PAC for Nuclear Physics for a term of three years.

The Scientific Council also appoints R. Hall-Wilton (ESS, Lund, Sweden) as a new member of the PAC for Condensed Matter Physics for a term of three years.

The Scientific Council thanks the outgoing member A. Ceccucci (CERN, Geneva, Switzerland) for his successful work as a member of the PAC for Particle Physics.

#### **V. Regulation for the JINR PACs**

The Scientific Council takes note of the amendments to the “Regulation for the JINR Programme Advisory Committees” presented in detail by Chief Scientific Secretary N. Russakovich. An updated version of the Regulation provides an extended description of the PAC functions, enabling the PACs to establish their operating procedures and develop specific methods of the evaluation of projects. The revised Regulation also encourages the PACs to appoint one or two of its members to perform continuous monitoring of a specific project, allows the PAC members to carry out the evaluation of projects by means of electronic communications and includes a number of minor corrections suggested by the JINR Directorate and PACs. The Scientific Council approves the amended text of this document (Appendix 1).

## **VI. Scientific report**

The Scientific Council highly appreciates the report “Status of the FAIR project at the end of 2016 and prospects for the FAIR–JINR cooperation”, and thanks JINR Deputy Director B. Sharkov for his informative presentation. Based on the reported FAIR time schedule, the Scientific Council emphasizes the need for a timely and successful completion of the NICA project with broad international cooperation. This will enable complementarity among the projects.

## **VII. Awards and prizes**

The Scientific Council congratulates Professor F. Dydak (Austria) on the award of the diploma “Honorary Doctor of JINR”, in recognition of his outstanding contributions to the advancement of science and the education of young scientists.

The Scientific Council congratulates Professor Ju. Budagov (JINR) on the award of the V. Dzhelepov Prize for the development and construction of a unique laser metrology system for measuring the angular oscillation of the Earth’s surface.

The Scientific Council approves the Jury’s recommendations on the award of the B. Pontecorvo Prize to a group of authors including: Professor Yifang Wang (IHEP, Beijing, China), Professor Soo-Bong Kim (Seoul National University, South Korea) and Professor Koichiro Nishikawa (KEK, Tsukuba, Japan), for their outstanding contributions to the study of the neutrino oscillation phenomenon and to the measurement of the  $\theta_{13}$  mixing angle in the Daya Bay, RENO and T2K experiments.

The Scientific Council approves the Jury’s recommendations on the award of JINR annual prizes for best papers in the fields of scientific research, instruments and methods, and applied research (Appendix 2).

## **VIII. Election of the Co-chairman of the Scientific Council**

The Scientific Council re-elected M. Waligórski as Co-chairman of the Scientific Council until the completion of the current membership of the Scientific Council (March 2018).

## **IX. Elections and announcement of vacancies in the directorates of JINR Laboratories**

The election of the Director of the Bogoliubov Laboratory of Theoretical Physics took place at the session. Since none of the candidates has obtained the required

majority of votes, the Scientific Council announces new elections for this position to be held at the next session of the Scientific Council in September 2017.

The Scientific Council announces the vacancies of positions of the Director of the Frank Laboratory of Neutron Physics and of the Director of the Laboratory of Information Technologies. The elections for these positions will take place at the 123rd session of the Scientific Council in February 2018.

#### **X. In memory of Ovsat Abdinov and Walter Greiner**

The Scientific Council deeply regrets the sad loss of Professor O. Abdinov (Azerbaijan), member of the JINR Scientific Council during 2009–2016, and Professor W. Greiner (Germany), Chairperson of the JINR PAC for Nuclear Physics during 2007–2016, who made outstanding contributions to the development of JINR and its international cooperation.

#### **XI. Next session of the Scientific Council**

The 122nd session of the Scientific Council will be held on 18–19 September 2017.

V. Matveev

Chairman of the Scientific Council

M. Waligórski

Co-chairman of the Scientific Council

N. Russakovich

Secretary of the Scientific Council