

I. General considerations

The Scientific Council appreciates the progress in implementing the recommendations of the 109th session of the Scientific Council and the decisions of the session of the Committee of Plenipotentiaries of the Governments of the JINR Member States (March 2011) presented in the comprehensive report by JINR Vice-Director M. Itkis.

The Scientific Council is pleased to note the new results obtained by JINR in implementing the research programmes, in developing the accelerator and reactor base of the Institute as well as in the areas of information technology and the education of young scientists in 2011, in particular:

- the power start-up of the modernized IBR-2 reactor and the performance of first experiments with extracted beams;

- the accomplishment of the 43rd run of the Nuclotron-M (February–March 2011), which was mainly devoted to physics experiments, and the vigorous start of the new project Nuclotron-NICA;

- the new results achieved in the synthesis of superheavy elements, in particular the experimental confirmation of the synthesis of Element 117, as well as the recognition of the priority of the Dubna–Livermore collaborations in the discovery of elements with $Z=114$ and 116 in the recently published Technical Report of the International Union of Pure and Applied Chemistry;

- the important results of physics research achieved by JINR scientists in external experiments at CERN, FNAL, and Gran Sasso;

- the essential contributions of JINR specialists to the development of Grid segments in the Member States;

- the use of modern technologies in outreaching the educational activity of the JINR University Centre;

- the active participation of JINR scientists in tests and commissioning of the state-of-the-art equipment for proton therapy in collaboration with the Belgian company IBA.

The Scientific Council congratulates Professors Yu. Oganessian and M. Itkis on the award of the 2010 State Prize of the Russian Federation in science and technology for the discovery of a new region of stability of superheavy elements. This prestigious award, received from President D. Medvedev, is an important recognition of the outstanding achievements of the staff of the Flerov Laboratory of Nuclear Reactions in this field of scientific research.

The Scientific Council congratulates Professor V. Matveev on his election as Director of JINR and wishes him success in leading the Joint Institute for Nuclear Research. The Scientific Council thanks Professor M. Itkis for his successful work as Acting Director of JINR during the past period of time.

The Scientific Council concurs with the vision of the first-priority tasks of the JINR Directorate for the nearest years and supports the basic principles of the scientific policy presented in the report by Professor V. Matveev.

The Scientific Council highly appreciates the visit to JINR of the Prime Minister of the Russian Federation, V. Putin, during the session of the Russian Governmental Commission for High Technology and Innovation, which was held in Dubna on 5 July 2011. The Scientific Council is pleased to note that the NICA project has been included by the Commission in the list of six megaprojects that may receive substantial dedicated support from the Russian Government.

The Scientific Council notes with great satisfaction the attention paid by the Government of the host country of JINR to the international NICA project which is advancing rapidly and has already received strong interest and recognition by scientists in the world. The Scientific Council emphasizes the unique opportunities and discovery potential of this project in the field of studies of new states of superdense baryonic matter, antimatter and strange matter, and of new fundamental laws of the microworld. A timely and successful realization of this project will bring scientific results of Nobel level and will definitely lead to new technological breakthroughs.

The Scientific Council expresses its profound gratitude to Prime Minister V. Putin and to the Russian Government for their interest in this megaproject and regards it as one more evidence of the new policy of the Russian Federation towards the support of fundamental science and its integration into the world research infrastructure. Without doubt the NICA project deserves such support.

The Scientific Council also highly appreciates the visit of the Prime Minister of the Republic of Kazakhstan, K. Massimov, to JINR on 11 July 2011. An example of the scientific and technological cooperation with this Member State is the development by JINR and delivery for the National Nuclear Centre in Astana of the DC-60 cyclotron whose first five years of successful operation will be celebrated on 21 September 2011. Special interest in the Educational Programme of JINR has been expressed during the visit.

II. Recommendations on reported activities

The Scientific Council takes note of the report “Preparation of the IBR-2 modernized reactor for the start of experiments in 2011” presented by FLNP Director A. Belushkin. The Scientific Council appreciates the progress in commissioning the reactor to the design power and the beginning of first experiments with extracted beams. It recommends focusing of efforts on the completion of the activities for the power start-up of the reactor in the current year, on the obtaining of a license for the routine exploitation of this basic facility within shortest possible time, and on the start of implementation of the user programme in 2012. The Scientific Council reiterates the critical importance of an early launching of the cryogenic moderator, which will greatly expand the experimental capability of the IBR-2 modernized reactor.

The Scientific Council takes note of the report “Effectiveness of the proton therapy delivered at JINR and plans for wide application in cooperation with other international centres” presented by DLNP Director A. Olshevskiy. The Scientific Council notes the high quality and social significance of the research conducted at JINR in the field of hadron therapy. It supports the plans for construction of specialized medical equipment and for deployment of hadron therapy methods into wide medical practice.

The Scientific Council takes note of the report “Ongoing developments at JINR related to the ILC” presented by JINR Chief Engineer G. Shirkov. The Scientific Council appreciates the important results achieved by JINR in the various fields of ILC activity, which concern work on photo injector prototype, beam diagnostics systems, design and construction of cryomodules. In particular, scientists of JINR and Belarusian research centers have developed and are starting to implement a complex programme to reproduce niobium cavity fabrication technology for cryogenic accelerator systems, which can be used for the ILC itself and will be requested for other applications, e.g. in accelerator physics, medical beam therapy, isotope production, etc. The Scientific Council encourages extension of the activities related to the future accelerators including the development of the CLIC facility and would like to be informed about the progress of these activities at its future sessions.

The Scientific Council takes note of the report “JINR–GSI collaboration in the field of relativistic heavy-ion physics” presented by VBLHEP Director V. Kekelidze. The Scientific Council highly appreciates this collaboration, based on complementarity of the scientific objectives, and welcomes the proposals for its intensification, which concern the joint programme of research with extracted beams at the Nuclotron-M, the preparation and implementation of research programmes at NICA and at FAIR (experiment CBM) as well

as activities in the field of applied research at the VBLHEP accelerator complex. The Scientific Council welcomes the timely and important integration of JINR and GSI for joint studies of strongly compressed baryonic matter in heavy-ion collisions in the so far poorly explored energy range, in which new states and most dramatic changes of behaviour of the created matter are predicted. The Scientific Council strongly recommends that the JINR Directorate provide the programme of research with extracted beams at the Nuclotron-M with high-priority funding.

The Scientific Council takes note of the reports “JINR’s participation in experiments at the LHC” presented by the leaders of the JINR groups in the ALICE, ATLAS, and CMS experiments A. Vodopyanov, V. Bednyakov, and A. Zarubin. The Scientific Council highly appreciates the efforts already taken by the Dubna teams of these collaborations to secure the reliable operation of the detectors and notes the significance of the first scientific results produced by them. The Scientific Council looks forward to regular presentations of reports about the contributions of the JINR groups to data analysis at its future sessions, especially by young scientists. It also reiterates its wish to be informed about the plans for JINR’s participation in the programme of upgrades of the LHC detectors for future experiments with higher luminosity and possibly with higher energy of colliding proton beams.

The Scientific Council supports the measures proposed in the report “Possibilities for further intensification of the JINR Educational Programme” by UC Director S. Pakuliak. In particular, they include the use of the experience in training of Kazakhstan’s Bachelors and Masters in future programmes for students from other Member States, the extension of the programmes of international summer student practical courses and more active involvement of the JINR laboratories in the process, the update of the JINR Fellowship Programme, and the continuation of educational work with high-school teachers of physics. The need to improve the living infrastructure for visiting students was also mentioned. The Scientific Council welcomes the efforts towards further development of the JINR Educational Programme.

III. Recommendations in connection with the PACs

The Scientific Council concurs with the recommendations made by the PACs at their June 2011 meetings as reported at this session by the Chairperson of the PAC for Particle Physics, E. Tomasi-Gustafsson, by the Chairperson of the PAC for Nuclear Physics, W. Greiner, and by the Scientific Secretary of the PAC for Condensed Matter Physics, O. Belov.

Particle Physics Issues

The Scientific Council highly appreciates the progress that has been made in developing elements of the NICA complex, in particular the successful construction and tests of the superconducting magnet prototypes, of the ion and polarized particle sources as well as in designing the collider lattice. It endorses the detailed recommendations taken by the Machine Advisory Committee (MAC) for the Nuclotron-NICA accelerator complex and thanks the MAC for providing valuable expertise for this project.

The Scientific Council appreciates the significant progress of the ongoing work to prepare the White Paper dedicated to the research programme of the NICA project and notes the broad international involvement in the preparation of this document.

The Scientific Council also appreciates the substantial progress achieved in designing the MPD detector and welcomes the start of prototyping its subsystems.

The Scientific Council emphasizes that the realization of the research programme to be performed by using the Nuclotron extracted beams is extremely important. Due to the intensive schedule for the commissioning of the experimental set-ups, the Scientific Council supports the PAC's recommendation on the preparation of a project to study hot dense baryonic matter at the Nuclotron to be presented at the next PAC meeting.

The Scientific Council recognizes the scientific significance of the results being obtained with the active participation of JINR physicists in the ATLAS, ALICE, and CMS experiments, and encourages these groups to strengthen their efforts in the data analysis and in the presentation of the results at international conferences.

The Scientific Council supports the PAC's recommendations on the continuation of the current activities in particle physics within the suggested time scales, as well as on the closure of four projects, as outlined in the PAC report.

Nuclear Physics Issues

The Scientific Council welcomes the FLNP plans concerning the speed-up in bringing the parameters of the IREN source up to highest possible standards of equivalent facilities in Europe, and acknowledges the importance of doing so for the realization of the JINR scientific programme and for attracting scientists from Member States.

The Scientific Council supports the FLNR proposal on the synthesis of heavy neutron-rich nuclei formed in low-energy multi-nucleon transfer reactions and recommends that the Laboratory start to work on the details of this proposal.

The Scientific Council recognizes the fundamental importance in neutrino physics of searching for the neutrinoless double-beta decay of ^{76}Ge and supports the continuation of the GERDA project with high priority.

Condensed Matter Physics Issues

The Scientific Council appreciates the efforts being taken by FLNP to upgrade the IBR-2 spectrometer complex, in particular the neutron inelastic scattering spectrometer DIN-2PI and the DN-6 diffractometer. It also supports the approval of the RTD Diffractometer project for implementation in 2012–2015 with first priority.

The Scientific Council notes the high quality of the research within the framework of the themes reviewed at the PAC meeting: “Novel Development and Creation of Equipment for the IBR-2M Spectrometer Complex”, “Investigations of Nanosystems and Novel Materials by Neutron Scattering Methods”, and “Research on the Biological Effect of Heavy Charged Particles with Different Energies”, and supports the recommendations on the continuation of these themes until the end of 2014.

The Scientific Council welcomes the initiative to establish an inter-institute radiobiological basis at JINR intended for experimental research on the radiation safety of long-time space flights and for fundamental and applied studies in general and space radiobiology, which was proposed at the Round Table “Topical Issues of Radiation Safety of Long-Term Space Flights” (Dubna, 25–26 April 2011), dedicated to the 50th anniversary of the first manned space flight.

IV. Memberships of the PACs

As proposed by the JINR Directorate, the Scientific Council appoints Professor A. Ereditato (University of Bern, Switzerland) as a new member of the PAC for Particle Physics for a term of three years to replace Professor N. Walker. The Scientific Council thanks Professor N. Walker for his successful work as member of this PAC.

V. Scientific reports by young scientists

The Scientific Council appreciates the scientific reports presented by young scientists: “Asymmetric quasifission in reactions with heavy ions” by G. Knyazheva, “Microbial synthesis of silver nanoparticles by *Streptomyces glaucus* and *Spirulina platensis*” by I. Zinicovscaia, “Structure peculiarities of α -crystallin studied by small-angle neutron and X-ray scattering” by T. Murugova, and “Design of the Nuclotron booster in the NICA project” by A. Tuzikov, and thanks the speakers.

VI. JINR Awards

The Scientific Council endorses the proposal of the JINR Directorate to award the title “Honorary Doctor of JINR” to Professors L. Pikelner and L. Zolin, in recognition of their outstanding contributions to the advancement of science and the education of young scientists.

The Scientific Council congratulates the laureates of the JINR prizes for 2010 — winners of the annual scientific research competition in the fields of theoretical physics, experimental physics, physics instruments and methods, and applied physics.

VII. Next session of the Scientific Council

The 111th session of the Scientific Council will be held on 16–17 February 2012.

M. Itkis

Chairman of the Scientific Council

I. Wilhelm

Co-chairman of the Scientific Council

V. Bednyakov

Secretary of the Scientific Council