I. General considerations

The Scientific Council takes note of the decisions of the regular session of the Committee of Plenipotentiaries of the Governments of the JINR Member States (November 2011), as well as of the major results obtained by JINR in 2011 and of the activities planned for 2012, as presented in the report by JINR Director V. Matveev.

The Scientific Council notes with satisfaction the growing financial support given by the Member States, which has allowed the JINR budget to be increased by 27.5% in 2012, and looks forward to continued adequate funding of the JINR ambitious programmes in science and technology envisaged by the Seven-Year Plan for JINR Development until 2016.

In the report by Professor V. Matveev, an overview was given of the results of work towards implementing the seven-year plan by the JINR staff during the last two years, which were characterized by the stable operation of all the basic facilities for the needs of experimental programmes and by the production of world-class scientific results.

A major milestone of the seven-year plan has been achieved — the powering-up of the modernized IBR-2 reactor and the accomplishment of first experiments with extracted neutron beams. This paves the way for an exciting research programme in the field of condensed matter physics, in line with the updated user policy of FLNP.

Among other achievements, the advances in the development of the VBLHEP accelerator complex and the substantial progress in the implementation of the Nuclotron-NICA and NICA/MPD projects, based on international scientific and technological expertise, should be mentioned. As was noted at the previous session, in July 2011 Dubna hosted a session of the Russian Governmental Commission for High Technology and Innovation, chaired by the Prime Minister of the Russian Federation, V. Putin, which included the NICA project in the list of six megaprojects that may receive substantial dedicated support from the Russian Government. As a follow-up of these developments, the Scientific Council is pleased to learn about the results of the meeting, held on 17 January 2012, of the Working Group of the Russian Ministry of Education and Science, chaired by Deputy Minister S. Mazurenko, which has confirmed that the NICA project has passed the international expertise that is a precondition for funding, along with two other megaprojects — the PIK reactor and the IGNITOR tokamak.

JINR's achievements in the synthesis and chemistry of superheavy elements are recognized internationally, as marked recently by the discovery and subsequent

confirmation of Element 117 of the Mendeleev Periodic Table as a result of a unique physics experiment. The Scientific Council congratulates the staff of the Flerov Laboratory of Nuclear Reactions and their colleagues at the Lawrence Livermore National Laboratory (USA) for the recognition of their priority in the discovery of elements 114 and 116, and looks forward to the approval by IUPAC of the names proposed by them for these elements — “Flerovium” and “Livermorium”.

As other examples of successful activities of JINR, the Scientific Council wishes to note:

– the important results achieved by JINR scientists in experiments performed elsewhere,

– the active involvement of theoretical physicists in the JINR experimental programmes,

– the significant advances in the development of the JINR infrastructure for massive data processing and the successful start of work to build a Tier-1 centre jointly with the Kurchatov National Research Centre,

– the efforts made by the JINR University Centre to extend its educational programmes based on the JINR Laboratories and links with research institutions of the Member States and other countries.

The Scientific Council endorses the plans for JINR activities in the current year as outlined in the report by Professor V. Matveev, and looks forward to their successful implementation.

II. Recommendations on reported activities

The Scientific Council takes note of the report “Status of the IBR-2 reactor and its cryogenic moderator complex” presented by FLNP Director A. Belushkin, and appreciates the successful completion of work for the physical construction and powering-up of the reactor. The timely resumption of the stable exploitation of the reactor at the rated power of 2 MW and the accomplishment of first physics experiments with extracted neutron beams during two cycles after the power start-up are recognized as very important achievements. The technical and organizational readiness of the reactor for its regular operation has been confirmed by the application prepared by JINR to obtain the license for exploitation of IBR-2. The Scientific Council also recognizes that the work towards building a complex of cryogenic moderators for IBR-2 is proceeding according to schedule, and recommends the focusing of efforts on the installation of a cryogenic moderator for neutron beam channels

7–11 in its planned location at the reactor, and on the performance of necessary tests of the moderator during in-power operation of the reactor in 2012.

The Scientific Council emphasizes the importance of the resumption, in 2012, of regular experiments with neutron beams extracted from the reactor in accordance with the FLNP user policy, of the continued efforts to develop the IBR-2 spectrometer complex, and of the implementation of the planned research programme.

The Scientific Council takes note of the reports “Contributions of the JINR groups to LHC data analysis” presented by participants in the ATLAS, CMS, and ALICE experiments: I. Yeletskikh, S. Shmatov, and L. Malinina. The Scientific Council is pleased to note the ever-growing contributions of JINR scientists, especially young people, to the unique programme of fundamental physics research at the Large Hadron Collider. Participation in such large-scale international experiments is vitally important for the further successful development of JINR. This allows JINR staff to have access to the most advanced technologies, communications and data processing, and also provides a unique opportunity for young scientists to take part in the process of gaining completely new fundamental knowledge and participating in new discoveries. These features help to maintain a high level of professionalism of the JINR staff and motivate more talented young people to be involved in scientific work. The Scientific Council strongly supports the expansion of participation by JINR physicists in LHC data analysis.

III. Recommendations in connection with the PACs

The Scientific Council concurs with the recommendations made by the PACs at their January 2012 meetings as reported at this session by Professors E. Tomasi-Gustafsson, W. Greiner, and P. Alekseev.

Particle Physics Issues

The Scientific Council appreciates highly the progress that has been made in upgrade of the VBLHEP accelerating complex and congratulates the team for the productive Run 44 (November–December 2011) of the Nuclotron.

The Scientific Council appreciates the significant amount of work accomplished in the preparation of the White Paper dedicated to the research programme of the NICA project and notes with satisfaction the emergence of new proposals for both the collider (MPD) and fixed-target (BM@N) experiments.

The Scientific Council also appreciates the substantial progress achieved in realization of the MPD project, and notes with satisfaction that the MPD team and Detector Advisory Committee (MPD-DAC) have begun fruitful collaboration. It thanks the members

of the MPD-DAC for the efforts being undertaken for a detailed evaluation of the realization of the project, including a critical assessment of the NICA-MPD physics programme, the design of the experimental set-up, its performance at start-up and subsequent upgrades, and recent developments in detector simulation.

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. The Scientific Council supports the PAC's recommendations on the submission of detailed projects for the detector upgrades under the general guidance of the JINR Directorate as far as priorities (at CERN and at JINR) and availability of resources are concerned.

The Scientific Council heard with interest about the possibility of studying nucleon spin structure at the NICA accelerator facility proposed by the SPD team, and looks forward to a detailed proposal taking advantage of the opportunity provided by the 20th International Symposium on Spin Physics (SPIN2012) which will take place in Dubna.

The Scientific Council supports the PAC's recommendations on the approval of the new project "Baryonic Matter at the Nuclotron (BM@N)" to study heavy-ion collisions with beams extracted from the Nuclotron.

Nuclear Physics Issues

The Scientific Council appreciates the high quality of investigations within the framework of the theme "Non-Accelerator Neutrino Physics and Astrophysics" which is devoted to search for neutrinoless double-beta decay, experiments with reactor antineutrinos, the search for Dark Matter, and deep-water investigations with the neutrino telescope at Lake Baikal. The Scientific Council supports the PAC's recommendations on the extension of this theme and on continuation of its projects GERDA, GEMMA, DANSS, EDELWEISS and BAIKAL. Due to the successful completion of the NEMO-3 experiment within this theme, the Scientific Council also supports the recommendation to approve the new project SuperNEMO for implementation. The important role of the JINR groups in all these experiments is appreciated.

The Scientific Council notes with satisfaction that the implementation of the DRIBs-III project proceeds according to the Seven-Year Plan for the Development of JINR and the recommendations of the PAC and the JINR Scientific Council. The Scientific Council notes that the SHE-factory will be created on the basis of the new high-current DC-280 cyclotron. This will allow JINR to keep its leading position in the field of the synthesis and study of superheavy nuclei and elements in synergy, if possible, with other major international players through an agreed global strategy. The Scientific Council takes note of the PAC's

recommendation concerning inclusion of the project of reconstruction of the U400 accelerator experimental hall in the Seven-Year Plan for the Development of JINR.

The Scientific Council notes that the new set-up proposed by FLNR to be constructed for on-line separation of reaction products by means of selective laser ionization extends the experimental possibilities of the laboratory in the field of low-energy heavy-ion physics and recommends starting the construction of this set-up in 2012.

The Scientific Council emphasizes the importance of the IREN facility and supports continued efforts towards putting it into operation with the design parameters within the shortest possible time.

Condensed Matter Physics Issues

The Scientific Council appreciates the progress in the development of the modernized IBR-2 reactor and expects that, once the license from the Russian Federal Environmental, Industrial and Nuclear Supervision Service is obtained for the regular operation of the reactor, the programme of regular physics experiments will be resumed in accordance with the JINR Seven-Year Development Plan and with the user policy.

The Scientific Council welcomes the launch of the user programme at the IBR-2 spectrometer complex and highly appreciates the proposals for experiments collected by FLNP. It concurs with the PAC that the resumption of the user programme should be a major activity in 2012. The Scientific Council supports the further extension of the user infrastructure at the IBR-2 spectrometers.

Noting the efforts made in the upgrade of FLNP instruments, the Scientific Council appreciates the progress achieved in construction of the new multifunctional reflectometer GRAINS and in modernization of the SKAT and EPSILON diffractometers. It also endorses the PAC's recommendation on the development of the project for a neutron imaging instrument for the IBR-2 reactor, and emphasizes the importance of further concentration on the instrument modernization programme.

The Scientific Council recognizes the importance of regular organization of conferences and seminars on life sciences at JINR.

Reports by young scientists

The Scientific Council notes with interest the following reports by young scientists, which were selected by the PACs for presentation at this session: "Computer analysis of nanoscale quantum-dimensional model structures in external fields", "Precise measurement of charm dimuon production cross-section in neutrino-nucleon interactions and its various applications", "Influence of proton shell closure on production of new superheavy nuclei", and thanks the speakers: A. Gusev, O. Samoylov, and A. Kuzmina.

The Scientific Council encourages the continuation of similar presentations at its future meetings, and suggests that the speakers should be rewarded.

IV. Scientific reports

The Scientific Council highly appreciates the scientific reports: “Physics of low-energy heavy ions at JINR” presented by Professor M. Itkis, “Life and biosphere on the early Earth” presented by Professor A. Rozanov, “OPERA vs Maxwell and Einstein” presented by Professor J. Ellis, and thanks the speakers. The Scientific Council would be happy if they would provide to JINR written versions of their reports.

V. Awards and prizes

The Scientific Council congratulates Professors L. Pikelner and L. Zolin on the award of the title “Honorary Doctor of JINR”.

The Scientific Council approves the Jury's recommendations on the JINR prizes for 2011 (Appendix) in the annual scientific research competition in the fields of theoretical physics, experimental physics, physics instruments and methods, and applied physics.

The Scientific Council congratulates Professor S. Wojcicki (Stanford University, USA) on the award of the 2011 B. Pontecorvo Prize for his outstanding contributions to the development and construction of the MINOS detector, and for the new results obtained in particle physics, especially in the field of neutrino oscillations. The Scientific Council thanks Professor S. Wojcicki for his impressive presentation.

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

The Scientific Council elected by ballot S. Dmitriev as Director of the Flerov Laboratory of Nuclear Reactions (FLNR) and V. Voronov as Director of the Bogoliubov Laboratory of Theoretical Physics (BLTP), each for a second term of five years.

The Scientific Council announces the vacancies of the positions of Deputy Directors of FLNR and BLTP. The election for these positions will take place at the 112th session of the Scientific Council.

The Scientific Council agrees with the proposal of the JINR Directorate to postpone the election of the Director of the Frank Laboratory of Neutron Physics until the 113th session of the Scientific Council. It also supports the proposal to extend the term of office of A. Belushkin as Director of this Laboratory for one year.

The Scientific Council announces the vacancy of the position of the Director of the Laboratory of Information Technologies. The election for this position will take place at the 113th session of the Scientific Council.

VII. General discussion

The Scientific Council stresses the importance of maintaining a healthy balance between internal and external activities as represented, for example by the collaborations of CERN and FAIR with NICA in the field of heavy-ion physics, and the cooperations between JINR, GSI, and Livermore in research on superheavy elements.

The Scientific Council appreciates highly the wide scale of the collaboration between GSI and JINR in promoting relativistic heavy-ion physics in both laboratories, including both theoretical and experimental studies. It notes, in particular, their cooperation in the construction of modern superconducting accelerators and advanced detectors. Many elements for SIS100 at FAIR are being produced at JINR, and the GSI group is contributing to the BM@N experiment. In addition, there is cooperation in the provision of test beams at the Nuclotron and at SIS18. These bilateral activities involve the contribution of large-scale resources and merit the strong support of both Institutions.

The Scientific Council notes that the CERN Council is currently planning an update of the European Strategy for Particle Physics, and encourages JINR and its physicists to play active roles in the preparation of this update.

The Scientific Council also notes that JINR is active in R&D on ILC and CLIC, and that it maintains its interest in the possibility of hosting the ILC, whilst recognizing that decisions on the construction and hosting of this project are for the future.

The Scientific Council looks forward to receiving at its next meeting a report on JINR plans for participating in upgrades of the LHC detectors and a report from the MPD-DAC.

The Scientific Council expresses its appreciation for the interesting and exciting results obtained in neutrino physics, in particular by the OPERA experiment.

The Scientific Council encourages JINR to discuss with other laboratories active in superheavy element research, with a view to developing an agreed global strategy for this field, and looks forward to receiving a report on this at its next meeting.

The Scientific Council looks forward to receiving at its next meeting reports on JINR activities in condensed matter physics, on progress with IREN, and on JINR plans for future activities related to astrobiology.

The Scientific Council welcomes the initiative to intensify the collaboration between the Laboratory of Radiation Biology and the Russian Academy of Sciences in the field of

life sciences. It also suggests that the JINR Directorate enhance the representation of specialists in this field in the membership of the PAC for Condensed Matter Physics.

VIII. Next session of the Scientific Council

The 112th session of the Scientific Council will be held on 27–28 September 2012.

V. Matveev
Chairman of the Scientific Council

Gh. Stratan
Co-chairman of the session

N. Russakovich
Secretary of the Scientific Council