**I. Preamble**

The members of the PAC for Particle Physics commemorated the Director of the Joint Institute for Nuclear Research, Alexei Sissakian, with a minute of silent appreciation. A prominent scientist and talented organizer of scientific research, he has made an outstanding contribution to the development of JINR as a large international centre for fundamental research, education of young scientists and innovative activities, and has played a leading role in the formulation of the JINR current and future research programmes based on the road map for JINR strategic development. In particular, he initiated and headed the largest project of JINR for the construction of the NICA heavy-ion collider. A. Sissakian has also greatly contributed to the promotion of the international cooperation of JINR and of its attractiveness for the Member States and other partners. Since the establishment of the PAC for Particle Physics in 1994 up to 2006, as Vice-Director of JINR A. Sissakian coordinated the activity of this PAC and afterwards as Director he continued to take a keen interest in its work. The members of the PAC deeply regret the sad loss of Academician A. Sissakian.

The PAC takes note of the information presented by JINR Vice-Director R. Lednický on the Resolution of the 107th session of JINR Scientific Council (February 2010) and on the decisions of the JINR Committee of Plenipotentiaries (March, May 2010).

The PAC is pleased to note that the Committee of Plenipotentiaries (CP) appreciated the significant progress in upgrading the Nuclotron-M/NICA accelerator complex. In particular, the CP noted that during the 40th and 41st runs of the Nuclotron-M (2009–2010) the physics research programme was fulfilled completely and stable operation of the accelerator complex at high intensity was demonstrated. For the first time at the Nuclotron, the acceleration of ions with q/A ~ 1/3 was accomplished, and xenon ions (A = 124) were accelerated up to the energy 1.5 GeV/nucleon. Stable work of the magnetic system at 1.8 T was shown. Also for the first time a new operation mode for the ring was successfully tried and tested to allow long runs with routine breaks to be carried out without helium losses and without increasing liquid nitrogen consumption.

The PAC is also pleased to note the decision of the CP concerning JINR's participation in data taking in the LHC experiments (ATLAS, ALICE and CMS). The PAC joins the CP in recognizing the successful fulfillment of the obligations in the construction and the commissioning of these detectors as well as the active involvement of JINR staff members in the first data analysis.

The PAC highly appreciates the new efforts of the Directorate towards further development of the JINR partnership programmes, in particular the bilateral agreements signed by JINR in January–March 2010 with CERN, the Budker Institute of Nuclear Physics, the Brookhaven National Laboratory, the Fermi National Accelerator Laboratory, and the Moscow Engineering Physics Institute. It looks forward to the successful collaboration with these centres in particle physics research.

The PAC takes note of the decision taken at the extraordinary session of the CP to appoint JINR Vice-Director M. Itkis as Acting Director of JINR until the election of a new director of the Institute at a future session of the CP.

**II. Recommendations on the progress towards realization of the Nuclotron-M/NICA projects**

The PAC takes note of the report on the status of the Nuclotron-M/NICA projects, presented by G. Trubnikov, and appreciates the significant progress in upgrading the VBLHEP accelerator complex and the rigorous implementation of the work schedule for the Nuclotron-M and NICA projects. The PAC is pleased to note that the spring run of the Nuclotron-M was successful and joins the CP in congratulating the Directorate and the staff for the achieved goals.

The PAC welcomes the recent signature of the protocols and agreements with CERN, the Budker Institute of Nuclear Physics, and GSI concerning collaboration on the NICA project.

The PAC concurs with the Nuclotron-M/NICA MAC about essential advancement in the Technical Design Report for the NICA collider and looks forward to being presented a proposal for the next step of realization of the Nuclotron-M/NICA project at its future meeting. The PAC also notes the importance of further work to start infrastructure upgrade in 2011.

The PAC encourages the JINR management to publish an international call for experiments at the Nuclotron-M as soon as reliable performance figures can be presented qualifying for an outstanding physics programme.

The PAC thanks the VBLHEP Directorate for the organization of the visit to the Nuclotron-M and appreciates the detailed explanations given by G. Trubnikov.

**III. Recommendations on the progress towards the NICA White Paper**

The PAC takes note of the report by A. Sorin on the ongoing preparation of the white paper for the NICA programme on the mixed phase and spin physics. The PAC notes the

progress achieved in this direction and recommends continuation of the work to elaborate a competitive research programme in view of its complementarity with studies planned at CERN, RHIC, and FAIR.

**IV. Recommendations for activities at JINR related to the ILC**

The PAC takes note of the report by G. Shirkov on the progress for ongoing developments at JINR related to the ILC and recommends further participation in this work.

**V. Recommendations for new projects**

The PAC takes note of the proposal for JINR's participation in the CBM project, presented by A. Malakhov and P. Senger, and recommends its approval until the end of 2015. It encourages the JINR group to select and focus on specific R&D applications to be developed in close connection with MPD.

The PAC takes note of the proposal of the project "MultiPurpose Detector to study properties of hot and dense baryonic matter at the NICA collider (MPD)", presented by V. Kekelidze, and recommends its approval until the end of 2015. The PAC notes the importance of the proposed scientific programme, the progress in the organization of the international collaboration, and the great interest from a wide scientific community. The PAC is pleased to see the first version of a comprehensive CDR.

The PAC will closely follow the progress on these projects through regular reports and if necessary by appointing external referees.

The PAC takes note of the proposal of the TRANSMUTATION project, presented by S. Tyutyunnikov, and recommends its approval until the end of 2013. The PAC notes the practical importance of the proposed studies.

**VI. Recommendations on the reports of the JINR groups about first scientific results in LHC experiments**

The PAC takes note of the reports by JINR groups on the first scientific results in the ALICE, ATLAS, and CMS experiments, presented by A. Vodopyanov, V. Bednyakov and S. Shmatov respectively, and highly appreciates the obtained results. The PAC looks forward at its future meetings to regular presentations of JINR's participation in data analysis focusing on JINR physicists' contributions and activities.

**VII. Recommendations on activities previously approved for completion in 2010 and proposed for continuation**

The PAC takes note of the report on the theme “Mathematical support of experimental and theoretical studies conducted by JINR“, presented by Gh. Adam, notes the high level, the necessity, and the good prospects of the ongoing research and recommends continuation of this activity until the end of 2013.

The PAC takes note of the report on the theme “Information, computer and network support of JINR's activity“, presented by V. Ivanov, highly appreciates the obtained results, regards this work as very promising and in high demand, and recommends continuation of this activity until the end of 2013. The PAC sees the need for an important increase in the computing power of JINR. It recommends that LIT, with the support of the JINR management, prepare a proposal for a High Power Computing Centre at JINR which would provide the JINR scientists with adequate computational capacity in the future.

The PAC takes note of the report on JINR’s participation in the BES-III project, presented by A. Zhemchugov, highly appreciates the received results and the importance of this work, and recommends continuation of this activity until the end of 2013.

**VIII. Poster presentations by young scientists in the field of particle physics research**

The PAC notes with interest the poster presentations in particle physics presented by young scientists from VBLHEP and BLTP and recommends that this form of presentations be included in the agenda of its future meetings. The PAC encourages the publication in the journal “Physics of Elementary Particles and Atomic Nuclei, Letters“ of the reports delivered at this session as poster presentations.

**IX. Scientific reports**

The PAC notes with interest the reports “Observation of a First Tau Neutrino Candidate Event in the OPERA Experiment in the CNGS beam”, presented by Yu. Gornushkin, “Spin Structure of the Nucleon”, presented by G. Mallot, “NA61/SHINE at the CERN SPS”, presented by M. Gadzicki, and thanks the speakers.

**X. Recommendations on first-priority activities**

The list of the themes and projects in the JINR programme on particle physics and relativistic nuclear physics having first priority in 2011 is presented in the Appendix.

## XI. Next meeting of the PAC

The next meeting of the PAC for Particle Physics is planned to be held on 25–26 January 2011.

The following items are proposed to be included in the agenda:

- Consideration of new projects and themes
- Reports and recommendations on the projects to be completed in 2010
- Status report on the Nuclotron-M/NICA and MPD projects
- Report from the Nuclotron-M/NICA Machine Advisory Committee
- Report on plans for future scientific activity and proposals of experiments at the Nuclotron-M/NICA complex
- Report on progress towards the NICA White Paper
- Reports on the JINR contributions to the scientific results of the LHC experiments.

E. Tomasi-Gustafsson
Chairperson of the PAC

Appendix

## List of First–Priority Activities

The following activities are noted to have first priority in the JINR Programme of Particle Physics and Relativistic Nuclear Physics for the year 2011:

- Theory of elementary particles
- Modern mathematical physics: gravitation, supersymmetry, integrability
- Research and education project “Dubna International Advanced School of Theoretical Physics”
- International Linear Collider: accelerator physics and engineering
- Development of the JINR basic facility for generation of intense heavy-ion and polarized nuclear beams aimed at searching for the mixed phase of nuclear matter and investigation of polarization phenomena at the collision energies up to $\sqrt{S_{NN}}$ = 11 GeV (Nuclotron-M/NICA)
- MPD
- Projects HADES (JINR’s participation), NA49/61 (JINR’s participation), BECQUEREL
- Search for non-nucleon degrees of freedom and spin effects in few-nucleon systems. Projects DSS, ALPOM-2
- Study of the nucleon and baryon structure at CERN (COMPASS) and DESY (HERMES, H1) (JINR’s participation)
- Projects CDF, D0 (JINR’s participation)
- Charmed and strange quarks in hadronic reactions (project NA62, CERN) (JINR’s participation)
- Study of neutrino oscillations (projects OPERA, Daya Bay, BOREXINO) (JINR’s participation)
- Project HyperNIS
- DIRAC (JINR’s participation)
- ATLAS (JINR’s participation)
- CMS (JINR’s participation)
- ALICE (JINR’s participation)
- NN&GDH
- STAR (JINR’s participation)
- Investigation at the GSI accelerating complex (JINR’s participation)

- PANDA (JINR's participation)
- CBM (JINR's participation)
- Study of $e^+e^-$ interactions, physics and detectors (projects SANC, BES-III (JINR's participation))
- Development of prototype units for a Complex of Carbon Radiotherapy
- Project TUS (JINR's participation)
- Physics and engineering of feedback systems in synchrotrons
- Mathematical support of experimental and theoretical studies conducted by JINR
- Information, computer and network support of JINR's activity
- Organization, support and development of the education process at JINR.