

I. Preamble

The members of the Programme Advisory Committee for Condensed Matter Physics commemorated Alexei Sissakian, the Director of JINR, who has made an outstanding contribution to the development of JINR as an international centre of excellence for fundamental physics research. The PAC also commemorated František Spurný, a member of this PAC during 2005–2010, who has significantly contributed to the strengthening of collaboration between JINR and Czech research centres. The PAC deeply regrets the sad loss of Academician A. Sissakian and Professor F. Spurný.

The Chairperson of the PAC, V. Kantser, presented a short overview of the PAC report delivered at the session of the JINR Scientific Council in February 2010 and information about the implementation of the recommendations of the previous PAC meeting.

JINR Chief Scientific Secretary N. Russakovich informed the PAC about the Resolution of the 107th session of the JINR Scientific Council (February 2010) and the decisions of the JINR Committee of Plenipotentiaries (March, May 2010). The PAC is pleased to note that most of the recommendations of the previous PAC meeting concerning JINR research in the areas of condensed matter physics have been accepted by the JINR Scientific Council and Directorate.

II. Recommendations on the theme to be completed in 2010 and proposed for continuation

The PAC took note of the new report presented by V. Korenkov on the closing theme “Information, computer and network support of JINR's activity” including information concerning the network and information support of the scientific activity inside JINR, as well as the development of the JINR integrated network and unified Grid telecommunication environment with research institutions in the JINR Member States and other countries. The PAC notes with satisfaction the significant improvement of the proposal, regards it as very promising and in high demand.

Recommendation. The PAC recommends continuation and extension of the research, with special emphasis on data protection, in the Grid environment, within the theme "Information, computer and network support of JINR's activity" in the period 2011–2013.

III. Preparation of the IBR-2M reactor for physical start-up

The PAC was informed by A. Vinogradov about the latest work on the IBR-2 modernization and is pleased to note that it comes to completion in accordance with schedule. The PAC supports the plan concerning the preparation of the reactor for the physical start-up. Taking into account the forthcoming launching of the IBR-2M reactor, the PAC considers that timely and full financing of the planned activities has crucial importance for successful completion of the reactor modernization and expects that comprehensive support by the FLNP and JINR directorates will be continued.

Recommendation. The PAC recommends continuation of efforts for the installation, adjustment and alignment of the new reactor equipment as well as for the project of cryogenic moderators.

IV. Overview of joint investigations in the area of nanoscale physics and nanomaterials

The PAC took note of the overview of research in the area of nanoscale physics and nanomaterials performed by FLNP in collaboration with research institutes of the JINR Member States by neutron scattering methods, presented by D. Kozlenko. The PAC appreciates the wide range of activities, the importance of scientific results and effective collaboration in this research area.

Recommendation 1. The PAC expects that the re-start of the IBR-2 reactor after modernization and realization of the user policy at the spectrometer complex should promote further development and extension of the collaborative research in nanoscale physics, nanomaterials and other condensed matter physics fields with universities and research centres in the Member States and other countries.

Recommendation 2. The PAC recommends that FLNP present at its next meeting an analytical review of the future directions of the development of the neutron scattering technique for the next 10 years at the IBR-2M reactor taking into account the competitiveness and complementarity with synchrotron radiation sources.

The PAC heard with interest the overview of the current research at BLTP concerning the physics of nanosystems presented by V. Osipov. The PAC was impressed by recent results in the field of carbon nanostructures, atomic clusters, quantum dots, and Josephson junctions.

Recommendation. The PAC recommends continuation of theoretical studies in the field of physical processes in nanostructures and new materials, including those related to experimental work at JINR basic facilities.

V. Status reports on the modernization of FLNP instruments

The PAC was informed by D. Kozlenko about the status of the DN-6 diffractometer. It appreciates the progress in the realization of this first-priority project that is underway according to planned schedule.

Recommendation. The PAC recommends completion of the basic configuration of DN-6 by the end of 2011 and regards this work as a major task in the development of the IBR-2M spectrometer complex.

The PAC took note of the information about the current status of the NERA-PR spectrometer presented by I. Natkaniec. The PAC supports all the activities planned for modernization of the NERA-PR spectrometer and considers the financial support within the framework of grants of the Poland's Plenipotentiary to be very important for the full replacement of the NERA-PR neutron mirror guide in 2010–2011. The PAC also appreciates the programme of the first experiments at the IBR-2M reactor using this instrument.

Recommendation. Since the replacement of the NERA-PR neutron mirror guide after September 2010 will require stopping of the experiments, the PAC recommends high priority for this project.

VI. Scientific reports

The PAC heard with much interest the following scientific reports on various fields of condensed matter physics: “The stopping and range of slow heavy ions in light targets”, presented by V. Kuzmin, “Studies of properties and modification of multilayered nanostructures by swift heavy ions”, presented by A. Didyk, “Computer analysis of dynamics of low-dimensional nanostructures in external fields”, presented by A. Gusev, “Resonant mechanisms of optical generation of terahertz radiation and their relation to biological systems”, presented by A. Bugay, “Small-angle scattering from deterministic fractal systems”, presented by E. Anitas, and “Internal dynamics studies in selected steroid hormones”, presented by D. Nowak. The PAC notes the wide spectrum of the scientific directions presented and highly appreciates the quality of research at JINR.

Recommendation. The PAC recommends that guidelines be made available to authors preparing papers for presentation to the PAC. It looks forward to hearing new reports by JINR scientists at its future meetings, with emphasis on the obtained results rather than on detailed methodological aspects.

VII. Information about scientific meetings

The PAC heard with interest the information, presented by V. Krylov, about the Workshop "Application of Charged Particle Accelerators in Studying Radiation Damage in Systems with a High Level of Organization (Space, Medical, Biological, and Technical Aspects)" (29–30 March 2010, Dubna). The PAC emphasizes the importance of taking advantage of JINR's potential for the research focusing on different aspects of the biological effect of high-energy heavy charged particles, the use of nuclear physics methods in investigations of planets and physical calibration of space instruments, and radiation-caused failures of spacecraft electronics.

Recommendation 1. The PAC recommends supporting further regular holding of this Workshop. The PAC also recommends that VBLHEP present at its next meeting information concerning a special beam channel at the Nuclotron-M for medical and radiobiological experiments.

Recommendation 2. The PAC supports the JINR Directorate's initiative to establish an International Joint Scientific Council of the Russian Academy of Sciences on the issues of general and space radiobiology, which would focus on realizing major research projects in this area using charged particle accelerators.

VIII. Poster presentations

The PAC was pleased with the poster presentations by LRB young scientists in the various fields of radiobiology and with the concluding report presented by O. Belov.

The poster "A stochastic approach to the mathematical modeling of the SOS system in *Escherichia coli* bacterial cells under ultraviolet irradiation" presented by M. Lyashko was selected as the best poster at the session. The PAC also noted two other high-quality posters: "Established calibration curves for radiation of different LET for potential retrospective dose estimation", presented by M. Deperas-Kamińska, and "Effects of *rad53* mutation on deletion induction in haploid yeast *Saccharomyces cerevisiae* after UV- and γ -irradiation", presented by A. Kokoreva.

The PAC asks the JINR Directorate to award the authors of these papers at its next meeting.

IX. Next meeting of the PAC

The next meeting of the PAC for Condensed Matter Physics will be held on 27–28 January 2011.

Its tentative agenda will include:

- Information by the PAC Chairperson on the report at the JINR Scientific Council session, and the implementation of the recommendations of the current PAC meeting
- Information by the JINR Directorate on the sessions of the Scientific Council (September 2010) and of the Committee of Plenipotentiaries (November 2010)
- Reports and recommendations on the projects and themes to be completed in 2011 and consideration of new proposals and themes, including the interdisciplinary theme “Nanobiophotonics”
- Information by FLNP on the physical start-up of the IBR-2M reactor and on the first tests as well as on the user policy principles
- Status reports on the modernization of FLNP instruments and experiments initiated in 2011
- Status of the JINR Grid activities and Grid environment of JINR Member States
- Information on the project “Investigation of the interaction of polarized muons with matter” (MUON)
- Scientific reports
- Information by BLTP on the International Conference “Dubna-Nano 2010”
- Poster session.



V. Kantser
Chairperson of the PAC