I. Preamble

The members of the Programme Advisory Committee for Nuclear Physics commemorated JINR Director Alexei Sissakian with a minute of silent appreciation. As distinguished scientist and organizer of scientific research he has made outstanding contributions to the development of JINR and of its cooperation with research centres of the Member States and other partners. The members of the PAC deeply regret the sad loss of Academician A. Sissakian. He will be sorely missed by the scientific community at Dubna and worldwide.

The Chairperson of the PAC, W. Greiner, welcomed the PAC members and the ex-officio members from JINR, and presented the implementation of the recommendations taken at the previous meeting.

JINR Acting Director M. Itkis informed the PAC about the Resolution of the 107th session of the Scientific Council (February 2010) and the decisions of the Committee of Plenipotentiaries (March, May 2010).

II. Applied research and innovative activities at JINR

The PAC heard the report “Applied research and innovative activities at JINR”. It emphasizes the considerable importance and impact of this area of JINR work and highly appreciates JINR’s experience and potential in a wide range of applied fields. The PAC considers that such kind of activities should continue and their possible development and extension arising from the basic research should be followed.

III. Concluding theme “Nuclear Physics with Neutrons — Fundamental and Applied Investigations” and new theme “Investigations in the Field of Nuclear Physics with Neutrons”

The PAC appreciates the results obtained within the framework of the theme “Nuclear Physics with Neutrons — Fundamental and Applied Investigations”, in particular experiments on neutron optics, asymmetry of α particles and γ-quanta emission in neutron capture by light nuclei, the start-up of Phase 1 of the IREN facility and first experiments with it.

Recommendation. The PAC recommends completion of the theme “Nuclear Physics with Neutrons — Fundamental and Applied Investigations” by the end of 2010.

The PAC supports continuation of the FLNP research programme in neutron nuclear physics under a new theme “Investigations in the Field of Nuclear Physics with Neutrons” during 2011–2013 with first priority. The upgrade of IREN should be accelerated in order to rapidly reach the project intensity of 10^{14} n/s. The improvement of the experimental base at the IREN and IBR-2M facilities is strongly supported. The development of the programme for nuclear data measurements for innovative reactor technologies in the IREN facility is also recommended.

IV. Project SPRING

The PAC heard with interest a report about studies of nucleon-nucleon interactions at intermediate energies 0.5–2.0 GeV with formation of $^1S_0$ proton pairs in the final state, carried out with the ANKE set-up at COSY (Jülich). The reactions studied comprise the deuteron break-up in pd, neutral pion production, hard bremsstrahlung production and inclusive multipion production in pp. The results are analyzed on the basis of various models.

Recommendation. The PAC highly appreciates the results of investigations of the reactions with formation of proton pairs and recommends continuation of the SPRING project in 2011–2012, including experiments with polarization.

V. New project “Investigation of the interaction of polarized muons with matter” (MUON)

The PAC noted with interest the new results obtained in the MUON project during the last three years, particularly investigations of ferrofluids with magnetic nanoparticles with the μ^+SR method, and the study of magnetic properties in semiconductors (Si, Ge) and in diamonds using the μ^-SR method. The new project will continue the investigations in semiconductors, the study of nanomagnetic systems, the study of rare earth intermetallic compounds, and μSR spectroscopy in strong magnetic fields.

Recommendation. The PAC notes that the MUON project is an almost pure solid-state physics programme that should be addressed by the PAC for Condensed Matter Physics. It should be presented there at the next opportunity. For the meantime — given the high international reputation of the MUON collaboration — the PAC recommends continuation of this project and its financing.

VI. New set-ups of FLNR proposed in the seven-year plan for 2010–2016

The PAC discussed the projects of two new facilities proposed within the framework of the DRIBs-III programme. Scientific plans and technical details of the next generations of both in-flight fragment-separator ACCULINNA-2 and gas-filled separator for heavy nuclei were examined. The PAC states that further progress in experimental studies of reactions with radioactive beams and properties of superheavy elements depends on the chosen parameters of both separators at the Flerov Laboratory that should meet modern requirements in accordance with the JINR seven-year plan.

Fragment separator ACCULINNA-2

The ACCULINNA collaboration has been quite successful and productive for the last 15 years. In particular, they have obtained high-quality results, although still preliminary on the proton-rich ^{6}Be and ^{26}S nuclei that clearly demonstrate how the in-flight RIB separation technique is a competitive method. Due to the moderate size of the team and financial restrictions of FLNR, the PAC would appreciate a scientific programme more focused on a couple of experiments to be unique around the world and possible in the low-energy domain.

Recommendation. The PAC recommends starting a more detailed technical design of the fragment-separator ACCULINNA-2 by reconsidering its initial broad scientific programme at its next meeting.

Universal gas-filled separator for studies of heavy nuclei

The PAC heard with greatest interest a report about R&D of a new multi-purpose gas-filled on-line electromagnetic recoil separator for investigation of heavy-ion induced reactions, spectroscopic studies and chemical investigations. The PAC appreciated the high efficiency (for both symmetric and asymmetric entrance channels), its simplicity and the relatively low costs of the chosen design.

Recommendation. The PAC strongly supports approval of the project of this universal gas-filled separator and recommends continuation of discussions on the final project at its next meeting.

VII. Scientific report “Multimodal nuclear fission”

The PAC heard with interest a scientific report on the description of the symmetric and asymmetric fission valleys in ^{226}Th. This theoretical study is closely connected with the experimental research of the mass distribution of fission fragments performed at FLNR.

VIII. Poster session

The PAC was particularly pleased with the presentations of new results and proposals by young scientists in the field of nuclear and particle physics research and looks forward to such type of presentations at its future meetings.

IX. Next meeting of the PAC

The next meeting of the PAC for Nuclear Physics will be held on 20–21 January 2011.

Its tentative agenda will include:

- Reports and recommendations on themes and projects to be completed in 2010 (LIT)
- Consideration of new projects
- Poster presentations of new results and proposals by young scientists in the field of nuclear physics research
- Scientific reports.

Walter Greiner
Chairperson of the PAC