

Preamble

The Chairperson of the PAC, W. Greiner, welcomed the PAC members, in particular the new members C. Beck, V. Ostashko, O. Zimmer, the expert Z. Vilakazi, the ex-officio members from JINR, and presented the implementation of the recommendations taken at the previous meeting.

JINR Vice-Director M. Itkis informed the PAC about the Resolution of the 103rd session of the Scientific Council (February 2008) and about the decisions of the Committee of Plenipotentiaries (March 2008).

The PAC was pleased to learn about the visit to JINR, on 18 April 2008, of the President of the Russian Federation, D. Medvedev. Together with leaders of government agencies and regions of the host country, the President was presented with information on the research work of the Flerov Laboratory of Nuclear Reactions, in particular on the discovery of superheavy elements, and on other areas of the Institute's activity. This visit took place on the occasion of the meeting, held in Dubna, of the State Council of the Russian Federation, which was chaired by President D. Medvedev, and was dedicated to the "Development of the National Innovation System in the Russian Federation".

Status and prospects of investigations on the theme "Synthesis of New Nuclei and Study of Nuclear Properties and Heavy-Ion Reaction Mechanisms"

The PAC discussed in detail the status and mentioned trends of possible investigations within the theme "Synthesis of New Nuclei and Study of Nuclear Properties and Heavy-Ion Reaction Mechanisms", presented in the report by FLNR Scientific Leader Yu. Oganessian. The PAC endorses the activity of the Flerov Laboratory of Nuclear Reactions, in line with the previous recommendations of the PAC, aimed at modernizing the cyclotrons and extending the experimental potential of the Laboratory. However, taking into account the need of a new perspective of studies of both neutron-rich light nuclei and superheavy nuclei, the PAC invites the Laboratory to work out a long-range programme of further developments of the accelerator complex and of state-of-the-art experimental facilities of the next generation. The main purpose is the quantitative increase of the efficiency of experiments as a whole by at least one order of magnitude to allow the Laboratory to keep its leadership during the next decades.

Recommendation. The PAC strongly recommends to start a detailed consideration of a long-term plan for the development of the FLNR accelerator complex and experimental facilities. It should be presented at the next PAC meeting.

Recommendations on the themes previously approved for completion in 2008

Nuclear Theory

The PAC took note of the report on the closing theme “Nuclear Theory” (01-3-1029-99/2008) and the proposal for a theme “Nuclear Structure and Dynamics”. The PAC highly appreciates the results obtained in the main research directions: nuclear structure far from the stability valley, nucleus-nucleus collisions at low energies, few-body systems, nuclear dynamics at relativistic energies, properties of hot and dense nuclear matter. The PAC also appreciates the educational activities of BLTP and relations of theoretical studies to the JINR experimental programme.

The PAC supports the continuation of nuclear theory activities under a new theme that should incorporate a complex and broad view on the various aspects of nuclear structure and dynamics.

Recommendation. The PAC recommends approval of the new theme "Nuclear Structure and Dynamics" for the years 2009–2013 with first priority.

Educational Programme

The PAC took note of the report on the theme “Organization, Maintenance, and Development of a University-Type Education Process” (06-0-1026-98/2008). The PAC supports the proposal by the UC Director concerning the increase of the budget required to complete the creation of student laboratories and to enlarge the number of PhD students.

Recommendation. The PAC recommends extension of this theme for the years 2009–2013 with first priority. A detailed educational programme including the list of lectures, lecturers and time table should be presented at the next PAC meeting. The possibility for licensing the status of the PhD students, especially for the Member States, should be examined.

IREN

The PAC took note of the report on the theme “Construction of the IREN facility” (03-4-0993-94/2008). The PAC highly appreciates the efforts of the JINR Directorate and the laboratories involved in the implementation of this project. The plans to start up the facility at the end of 2008 seem to be realistic. The PAC also appreciates the efforts of the FLNP Nuclear Physics Department on preparation of the experimental infrastructure at IREN Phase I.

Recommendation. The PAC recommends that the theme “Construction of the IREN facility” be finished in 2008, and the financial resources for the maintenance, operation and development of the IREN facility be kept within the theme “Nuclear Physics with Neutrons – – Fundamental and Applied Investigations”.

Scientific programme for IREN Phase I

The PAC heard with interest the proposed experimental programme for the first stage of IREN. The expected parameters of IREN-1 are far from the record ones; however, they could be sufficient to perform measurements of cross sections for fissile nuclei, constructive materials and nuclear astrophysics, and applied physics as well as some interesting physics experiments such as test and preparatory experiments aimed at searching for P – and T – violation processes.

Recommendation. The PAC recommends concentrating available human, financial and technical resources of the FLNP Nuclear Physics Department mainly on the realization of the proposed scientific programme for IREN-1 and on the development and preparation of the programme for the full-scale IREN facility.

Muon Catalysis experiment

The PAC heard with interest a status report on the theme of muon catalysis experiments at the DLNP Phasotron. The final results about the tritium-tritium fusion were presented in excellent agreement with theory and previous (less precise) experiments. The next step will be the measurement of the $dd\mu \rightarrow {}^4\text{He} + \mu + \gamma$ reaction which was delayed due to the fire accident at the Phasotron, but is now ready for execution.

Recommendation. The PAC supports the continuation of the muon catalysis programme with study of the $dd \rightarrow {}^4\text{He}$ fusion reaction. After that a conclusive run of deuterium-tritium fusion should be considered because of the uniqueness of the tritium facility available at DLNP.

NICA/MPD project

The PAC heard with interest a report about the proposed NICA/MPD project. No concrete plans and budgets were presented.

Poster session

The PAC was particularly pleased with the presentations of new results and proposals by young scientists in the field of nuclear physics research. This type of presentations should be continued in future.

Scientific reports

The PAC heard with interest the report “Reactions with exotic nuclei at FLNR”, presented by V. Zagrebaev. The experiments discussed in the report are strongly connected with the realization of the DRIBs programme, in particular its application to studies of astrophysical importance, also with the use of beams heavier than ${}^6\text{He}$.

The PAC heard with interest the scientific report, presented by V. Belyaev, on the application of few-body methods to the calculation of triple processes in astrophysics. In particular, his evaluation of K capture in $p + {}^7\text{Be}$ process demonstrates the importance of the method for the exact calculation of the solar neutrino flux.

Next meeting of the PAC

The next meeting of the PAC for Nuclear Physics will be held on 22–23 January 2009. Its tentative agenda will include:

- Reports and recommendations on the themes and projects to be completed in 2009
- Consideration of new projects
- Research programme at the LEPTA facility
- Status of the EDELWEISS experiment
- 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