

**I. Preamble**

The Chairperson of the PAC, W. Greiner, welcomed the PAC members, in particular the new member F. Piquemal, and the *ex officio* members from JINR, and presented the implementation of the recommendations taken at the previous meeting.

JINR Chief Scientific Secretary N. Russakovich informed the PAC about the Resolution of the 108th session of the Scientific Council (September 2010) and the decisions of the Committee of Plenipotentiaries (November 2010).

**II. Reports on the themes completed in 2010 and proposals for their continuation*****“Information, computer and network support of JINR’s activity”***

The PAC takes note of the report on the completed theme “Information, computer and network support of JINR’s activity” presented by V. Korenkov. The PAC highly appreciates the obtained results and notes the availability of the work performed within the development of the JINR network and the unified Grid environment in collaboration with research organizations of the JINR Member States and other countries. The PAC sees a need for an essential increase of the JINR computing capacity and recommends that the LIT Directorate, under the aegis of the JINR Directorate, prepare proposals on the creation of a high-power computer centre which would provide the JINR scientists with adequate computing opportunities in the future.

Recommendation. The PAC recommends continuation and development of the work within this theme until the end of 2013. Special attention should be focused on issues of information protection within the Grid environment. The PAC encourages taking steps for a possible upgrade to Tier1.

***“Mathematical support of experimental and theoretical studies conducted by JINR”***

The PAC takes note of the report on the completed theme “Mathematical support of experimental and theoretical studies conducted by JINR” presented by Gh. Adam and notes the high level, demand and urgency of the performed investigations.

Recommendation. The PAC recommends continuation of the studies within this theme until the end of 2013.

**III. FLNR radiochemical research (present status and seven-year plan)**

The PAC discussed in detail the programme of the Flerov Laboratory of Nuclear Reactions on the radiochemical studies of superheavy nuclei, proposed by S. Dmitriev. The

programme includes investigations of chemical properties of elements 112–114 in the fusion reactions  $^{243}\text{Am}+^{48}\text{Ca}$  and  $^{242,244}\text{Pu}+^{48}\text{Ca}$ , as well as measurements of isotope masses of these elements with the use of the upgraded mass-spectrometer MASHA. The PAC notes that the studies of chemical properties of transactinide nuclei play an important role within the framework of the JINR seven-year plan. The PAC strongly supports the efforts of the FLNR Directorate towards construction of new radiochemical laboratories.

Recommendation. The PAC recommends continuation of the study of the chemical properties of superheavy elements with high priority. The PAC also recommends focusing efforts on designing new radiochemical laboratories.

#### IV. New projects

##### ***“A study of the nucleon spin structure in strong and electromagnetic interactions” (project GDH&SPASCHARM)***

The PAC recognizes the fundamental importance of polarization studies proposed in the GDH&SPASCHARM project presented by Yu. Plis. The aim of this project is to carry out experimental investigations of a wide scope of problems connected with a QCD spin-flavor structure study of protons and neutrons. These experiments require the use of polarized targets and beams which determine the key role of the JINR physicists who developed two frozen spin polarized targets to be used in the proposed experimental programme. Both experiments are presently in the stage of data taking. The PAC would like to hear at a future meeting a more detailed report about the experimental set-ups.

Recommendation. The PAC considers the GDH&SPASCHARM project to be very important and recommends its approval for the years 2011–2013 with high priority.

##### ***“Experimental study of nuclear fusion reactions in the $pt\mu$ system” (project TRITON)***

TRITON is the continuation of the previous CATALYSIS project. The PAC heard with interest the information by D. Demin on this project to study M1 and E0 transitions in the  $pt$ -fusion reaction in the  $pt\mu$  molecule. (It is sufficient that M1 transition is sensitive to MEC influence and E0 to charge distribution in the  $^4\text{He}$  nucleus.) The study of the channel yielding  $e^+e^-$  pairs is of special interest. In the only experiment with  $pt\mu$  molecules these pairs were not registered, and the yields obtained for the other channels ( $\gamma$  and  $\mu$ ) considerably exceed the theoretical expectations. Note that the values of the extracted nuclear matrix elements in the  $A=4$  system are within reach for developing *ab initio* calculations in modern effective field theory. It is basically a test of QED under the influence of many-body problems.

Recommendation. The PAC recommends approval of the TRITON project for the years 2011–2013 with high priority.

#### **V. Visit to the Laboratory of Radiation Biology (LRB)**

The members of the PAC appreciated the visit to LRB and thank Professor E. Krasavin for illustrating the activities of this Laboratory.

#### **VI. Scientific reports**

The PAC highly appreciated the report “Effect of accelerating medium as a general wave phenomenon” presented by A. Frank. These beautiful experiments performed at ILL open new perspectives. This prominent activity should be strongly supported.

The PAC also heard with interest the report “Formation of strongly deformed nuclear states” presented by A. Zubov. Improvements and extensions of these calculations are recommended.

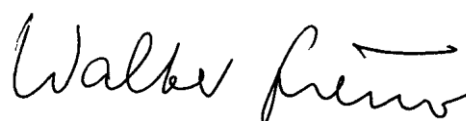
#### **VII. Poster session**

The PAC was particularly pleased with the presentations of new results and proposals by young scientists in the field of nuclear physics research. The best theoretical and experimental poster presentations have been honored. They are “Shear and bulk viscosities for pure glue matter” by A. Khvorostukhin (BLTP) and “ $\mu$ -veto for low-background experiments” by D. Zinatulina (DLNP). This type of presentations should be continued in future.

#### **VIII. Next meeting of the PAC**

The next meeting of the PAC for Nuclear Physics will be held on 16–17 June 2011. Its tentative agenda will include:

- Reports and recommendations on themes and projects to be completed in 2011
- Consideration of new projects
- Status of the GERDA project
- 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