

I. Preamble

The Programme Advisory Committee for Particle Physics takes note of the information presented by JINR Vice-Director R. Lednický on the Resolution of the 121st session of the JINR Scientific Council (February 2017) and on the decisions of the JINR Committee of Plenipotentiaries (March 2017).

The PAC is pleased to note that all recommendations of its previous meeting have been accepted by the JINR Scientific Council and Directorate. In particular, the Scientific Council:

- joined the PAC in appreciating the progress towards the realization of the Nuclotron-NICA project, including the successful commissioning of the linear accelerator of heavy ions HILac, the preparations for the Booster construction, the official start of the assembly and testing line for superconducting magnets, the progress in the civil construction work of the collider building, and the significant achievements in the Nuclotron operation during Run 53, with a record duration of stable operation;

- congratulated the MPD management for the progress in attracting new external collaborators and the BM@N team for the first successful run with a set-up that included all subsystems. It also took note of the PAC's concern by the six-month delay in the BM@N project realization that resulted from the low availability of beam test and lengthy tendering procedures;

- supported the PAC's recommendations on the approval of new projects and the continuation of ongoing projects in particle physics within the suggested time scales, as outlined in the PAC report;

- appreciated the participation of the PAC in updating the governing regulations of the PAC and the evaluation procedures of projects submitted to the PAC. As a general comment, the Scientific Council was pleased with the increased interaction and coordination between the three PACs and the Directorate.

The PAC joins the Scientific Council in congratulating the JINR Directorate for the realization of the all-Russian "Open Lesson on NICA" in high schools on Russia's Science Day on 8 February 2017 and encourages the JINR Directorate to continue this kind of outreach activities.

II. Reports on the Nuclotron-NICA project

The PAC takes note of the report on the progress towards realization of the Nuclotron-NICA project presented by A. Sidorin. The Committee appreciates the significant progress in the Nuclotron operation achieved during Run 54 and supports the proposal to extend its operation until March 2018. The PAC is very pleased with the beginning of the commissioning of the Booster electron cooling and with the preparations for the Booster construction. The PAC expresses concern about the availability of sufficient manpower for the efficient Booster construction and urges the JINR management to take corrective actions.

The PAC takes note of the report presented by the coordinator of the experimental programme with Nuclotron beams, E. Stokovsky. The PAC is pleased to note that a beam of polarized protons was accelerated for the first time in the Nuclotron Run 54. All requests from the beam users were satisfied including a beam of carbon nuclei for the BM@N experiment and a beam of polarized deuterons for the ALPOM-2 experiment.

The PAC takes note of the report on the infrastructure developments at VBLHEP, including the Nuclotron facility, presented by N. Agapov. The PAC is pleased to learn that the closed circulating water system for the VBLHEP cryogenic complex is now operational, making possible the non-stop testing of the superconducting magnets. The Committee also encourages the efforts being undertaken by the laboratory management to increase the site electric power up to 40 MW. The PAC reiterates its concern about the lengthy tendering procedures.

The PAC takes note of the progress towards realization of the NICA/MPD project presented by V. Kolesnikov. The PAC welcomes the significant advance in the yoke construction for the MPD magnet. It appreciates the ongoing efforts for the development of the MPD-NICA interface, the important decision on the selection of the ECAL projective geometry, and further efforts towards completion of the technical design reports for different subsystems foreseen in Stage 1. The PAC appreciates the progress and efforts toward defining the participation and commitments of groups from China and Mexico in the MPD experiment.

The PAC appreciates the report presented by M. Kapishin on the progress towards realization of the BM@N project and acknowledges the results of the experiment in recent runs with deuteron and carbon beams. The PAC expects further development of the project and new results from the next run of the Nuclotron with heavier ion beams. The PAC is concerned by the lack of manpower to analyse the data

recently collected and urges the project and laboratory management to undertake the necessary steps to attract external groups to the BM@N experiment.

The PAC is very pleased to hear the proposal to extend the BM@N physics programme to “Probing Short-Range Correlations” presented by E. Piassetzky and involving groups from Tel Aviv University, MIT, GSI, and CEA together with the BM@N collaboration. This is the first outside project proposal to use the BM@N facility. It is a pioneering measurement that can only be performed at the Nuclotron and aims at studying short-range correlations in the carbon nucleus using inverse kinematics of a carbon beam incident on a hydrogen target. The PAC recommends its approval for the period of the BM@N experiment operation until 2021.

The PAC appreciates the work accomplished by the Machine Advisory Committee and Detector Advisory Committees for the MPD and BM@N experiments in assisting the realization of the Nuclotron-NICA project.

III. Reports on the projects approved for completion in 2017 and proposed for continuation

The PAC takes note of the reports on the NA61 experiment presented by M. Gazdzicki and V. Kireyev. NA61 is expected to complete the data-taking phase in 2018, and the NA61 collaboration is considering the possibility to extend its programme for the period 2021–2024. The PAC appreciates the role of the JINR group in data taking, detector and software maintenance but considers that the impact on physics analyses is not commensurate to the group size and would like to see a larger involvement in leading physics analyses. The PAC recommends continuation of the JINR participation in the NA61 experiment with the current group size until the end of the NA61 data-taking phase in 2018. Continuation of the JINR team activities within NA61 on data analysis or R&D beyond 2018 would require submitting a new proposal.

The PAC takes note of the report on JINR’s participation in the COMPASS-II project presented by A. Nagaytsev. At the previous meeting, the PAC considered it unjustified to have two proposals for JINR’s participation in the same experiment. The Committee recommended resubmitting one single proposal and requested detailed information about the project organization, manpower involved and corresponding expenses. The PAC recognizes that these issues are addressed in the revised proposal. The PAC is pleased to see that the two groups from VBLHEP and DLNP laboratories have merged and presented a common proposal with a well-defined management structure, strategy and objectives. However, the PAC considers that no

compelling reason was presented to justify the group size with a total of 49 members (or 28.2 FTE) and the correspondingly large budget. The PAC requests the team and laboratory management to take the necessary measures to significantly reduce the group size and the travel budget. Assuming that this request is accepted and in order to avoid any further delays in the approval process, the PAC recommends continuation of the participation of the JINR group in the COMPASS-II experiment until the end of 2020.

The PAC heard with interest the report “Study of Neutrino Oscillations in the JUNO and Daya Bay Experiments” presented by D. Naumov. The PAC appreciates the efforts and scientific achievements of the JINR team in the Daya Bay and JUNO experiments. The PAC recognizes that the group took sizable responsibilities in the JUNO experiment on production of the PMTs’ high-voltage units. The JINR team also contributed to the development of the JUNO concept, detector engineering, development of the analysis software tools, and to the collaboration management. The work on the JUNO PMT system must have first priority as the flagship hardware contribution from JINR. The PAC recommends continuation of JINR’s participation in the Daya Bay/JUNO project until the end of 2020. The PAC also recommends the team and laboratory management to reconsider whether the large manpower and corresponding large travel budget are justified.

The PAC takes note of the report on JINR’s participation in the study of neutrino oscillations in the NOvA experiment presented by O. Samoylov. The contributions from the JINR group since the start of the experiment in 2014 have been important and visible. The relatively young group was able to substantially contribute to the data taking via Virtual Control Room. The hardware contributions were complemented by studies on the readout electronics, also performed at a full test bench infrastructure in house. The JINR researchers have addressed several physics items that will be continued in the next years and extended whenever possible. Taking into account the high potential of the NOvA experiment and the broad scope of the JINR involvement, the PAC recommends continuation of this activity until the end of 2020.

The PAC heard the report “Search for New Physics in Experiments with the Fermilab High-intensity Muon Beams” presented by V. Glagolev. The new beam facility and the experiments are making very good progress on the way to their timely completion. The JINR group has made significant contributions to this success and is playing a visible and important role in both experiments. The Committee recommends continuation of the JINR participation in the Mu2e and Muon g-2 experiments until the end of 2020.

The PAC takes note of the report “Astrophysical Studies in the Experiment TAIGA” presented by L. Tkatchev. TAIGA can make a significant contribution to the understanding of the origin of cosmic rays in the region around the knee in the energy spectrum. A number of interesting results have been obtained, demonstrating good quality of the hardware and data processing algorithms. The PAC notes the importance of the JINR obligations in the TAIGA collaboration and encourages the JINR group and in particular young researchers to increase their participation in the data analysis. The PAC recommends extension of the project until the end of 2020.

IV. Scientific reports

The PAC takes note of the report “Search for muon-to-electron conversion: the Mu2e experiment at Fermilab” presented by J. Miller and the report “Weak decays of B mesons in the light of the search for new physics” presented by M. Ivanov, and thanks the speakers for their presentations.

V. Young scientists at JINR

The PAC reviewed 12 poster presentations in particle physics by young scientists from DLNP and VBLHEP Laboratories. The PAC is very pleased with the overall very good quality of the posters. The Committee has selected the poster “The TUS space experiment” presented by M. Lavrova to be reported at the session of the Scientific Council in September 2017. The PAC recommends the management of laboratories to consider the possibility of presenting the young scientists work using multimedia presentation of a maximal three-minute duration in addition to static posters.

VI. Next meeting of the PAC

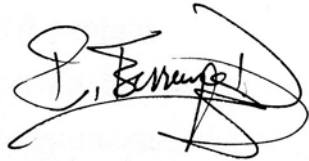
The next meeting of the PAC for Particle Physics will be held on 31 January – 1 February 2018.

Starting with the next PAC meeting the following procedure shall be adopted: new proposals or proposals seeking continuation should submit their request with all the necessary documentation at least two months prior to the PAC meeting. This should allow the PAC member assigned to review the proposal to ask questions or additional material to the proponents before submitting his report.

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

– follow-up on the to-do-list from this PAC meeting;

- consideration of new projects;
- reports and recommendations on the projects to be completed in 2018;
- status report on the Nuclotron-NICA project;
- status report on the MPD project including simulation results;
- status report of SPD;
- status report on infrastructure issues including Nuclotron;
- report from the Coordinator of the experimental programme with Nuclotron beams;
- report on the BM@N project including simulation results and new addendum to the physics programme;
- reports on the results of the LHC experiments;
- posters from young physicists.



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