

# **Programme Advisory Committee for Condensed Matter Physics**

**58th meeting, 25 January 2024**

## **Recommendations**

### **I. Preamble**

The Chair of the PAC for Condensed Matter Physics D. L. Nagy, welcomed the PAC members, the ex officio members from JINR, including the new member, Ochbadrakh Chuluunbaatar, appointed from MLIT, as well as the members of the JINR Directorate. The Chair presented an overview of the implementation of the recommendations made at the previous PAC meeting concerning the JINR research in the area of condensed matter physics.

JINR Vice-Director L. Kostov informed the PAC about the resolution of the 134th session of the JINR Scientific Council held in September 2023 and the decisions of the Committee of Plenipotentiaries of the Governments of the JINR Member States in November 2023.

### **II. On current activities at the IBR-2 facility**

The PAC took note of the information on the status of obtaining a license to operate the IBR-2 facility and on preparatory work to replace the air heat exchangers of the second cooling circuit of the reactor, presented by E. Lychagin. At present, the plan of the FLNP Directorate is to restart the reactor operation in the autumn of this year.

Recommendation. The PAC appreciates and supports FLNP's plans and efforts to restart the operation of the IBR-2 facility in 2024–2025.

### **III. Development of the concept for a new neutron source at FLNP**

The PAC took note of the report presented by M. Bulavin on the results of activities in 2023 and work plans for 2024 within the project "New advanced neutron source at JINR" and the subproject "Research and development for the justification of the draft design of the new advanced neutron source at JINR – NEPTUN pulsed fast reactor" being implemented within the LRI "Pulsed neutron source and the complex of spectrometers". The PAC recommends continuing work on the project of a new neutron source – the pulsed fast reactor NEPTUN. In particular, the PAC recommends the continuation of activities on verifying the dynamics model of pulsed reactors, on selecting the optimal configuration of the active core and optimizing the design of the reactor vessel and reactivity modulator. The PAC also welcomes the ongoing development of a list of R&Ds to create a full-scale model of the reactor reactivity

modulator and appreciates the continuation of developing the concept of a system for fast changing the working substance in the chamber of the cryogenic moderator of the reactor. The PAC also welcomes the development of the scientific programme of the NEPTUN reactor.

Recommendation. The PAC supports the ongoing activities within the LRI “Pulsed neutron source and the complex of spectrometers”.

#### **IV. Status report on the Fourier stress diffractometer FSD**

The PAC took note of the report by G. Bokuchava on the current state of the Fourier stress diffractometer FSD at beamline 11A of the IBR-2 reactor. The PAC believes that the achievements of FLNP in the development of the correlation diffractometry method will be very useful for creating instruments at new long-pulse neutron sources.

Recommendation. The PAC supports the further development of high-resolution neutron correlation diffractometry at long-pulse neutron sources.

#### **V. Scientific reports**

The PAC heard with interest the scientific reports “Mechanisms of membrane protein crystallization in “bicelles”” and “Scientific and methodical programmes of research with the LINAC accelerator (JINR): FLAP collaboration”, presented by T. Murugova and P. Karataev respectively. The PAC thanks the speakers for the excellent reports.

#### **VI. Discussion of the project assessment template at JINR**

The PAC discussed the procedures applied to assess projects at JINR. The PAC took note of the new rules for the preparation of projects introduced at JINR in 2023 and analyzed the experience of the reviewing procedure, which was applied at the 57th meeting of the PAC for Condensed Matter Physics.

Recommendation. The PAC considers the current procedures for the assessment of projects at JINR to be appropriate and recommends their application in future meetings.

#### **VII. Virtual presentations by young scientists**

The PAC reviewed 17 virtual presentations made by young scientists in the field of condensed matter physics and related fields. The virtual poster presentation “Origin of high-pressure phase transition in the  $\text{Ln}_2\text{Ti}_2\text{O}_7$  (Ln = La, Nd, Pr) Carpy-Galy phases” made by A. Asadov was selected as the best presentation of the session. The PAC also noted two

more virtual poster presentations of a high level: “DNA DSB formation kinetics in mature neurons of primary rat hippocampal cell culture after exposure to ionizing radiation with different physical characteristics” by T. Hramco and “Structural features of the fragment of cast iron cauldrons of Medieval Golden Horde: neutron tomography data” by V. Smirnova. All three authors will be awarded diplomas of the PAC.

Recommendation. The PAC recommends the poster “Origin of high-pressure phase transition in the  $\text{Ln}_2\text{Ti}_2\text{O}_7$  (Ln = La, Nd, Pr) Carpy-Galy phases” to be presented at the session of the JINR Scientific Council in February 2024.

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

The next meeting of the PAC for Condensed Matter Physics is scheduled for 24–25 June 2024.

The preliminary agenda for the next meeting of the PAC includes:

- report by the PAC Chair on the implementation of the recommendations above;
- report by the JINR Directorate on the sessions of the Scientific Council in February 2024 and of the Committee of Plenipotentiaries in March 2024;
- progress in the development of the concept for a new neutron source of JINR;
- status reports on the upgrade of FLNP instruments;
- information about scientific meetings;
- scientific reports (not more than three);
- poster (or virtual presentation) session.

D. L. Nagy  
Chair of the PAC  
for Condensed Matter Physics

O. Belov  
Scientific Secretary of the PAC  
for Condensed Matter Physics