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**Report on the new theme
“Theory of complex systems and advanced materials”**

Theoretical studies in the field of condensed matter physics are traditional for JINR. There are certain directions where the Bogoliubov Laboratory of Theoretical Physics (BLTP) has both a high expertise in the development of methods and approaches, and important results. Among them one can mention the physics of strongly correlated systems, statistical mechanics, and materials science. The new theme suggests further research in these areas with an emphasis on modern trends in condensed matter physics.

In particular, I was attracted (mainly during my five-year work period at BLTP, between 1991 and 1996), by the problems associated with the study of the phenomenon of high-temperature superconductivity, the electronic structure of low-dimensional materials including possible applications, and exactly solvable models of statistical physics. Of particular interest is the study of the structure of complex hierarchical systems among which are surface fractals and multifractals, where I am pleased to note the active participation of scientists from Romania.

I remark the fact that the project includes notable cooperation with two experimental laboratories of JINR (Frank Laboratory of Neutron Physics and Flerov Laboratory of Nuclear Reactions) and with the Laboratory of Information Technologies. In my opinion, such cooperation is very useful and productive. Very attractive is the list of participating countries, institutes and organizations, which includes almost all JINR member states (Romania in particular, through Horia Hulubei National Institute of Physics and Nuclear Engineering from Măgurele-Bucharest, Technical University of Cluj-Napoca and West University of Timișoara), associate members as well as a wide range of leading scientific groups from around the world.

For the implementation of the project, adequate funds are requested, mainly for salaries. Considering the high professional qualification of the participants from JINR and from partner institutions, one can confidently expect the successful fulfillment of the stated tasks within the planned schedule and the full scope.

In conclusion, I strongly support the opening of the new theme “Theory of complex systems and advanced materials” within the Topical Plan for JINR Research and International Cooperation for the period 2019-2023.



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