

**Review of proposal for prolongation of the theme 04-05-1031-2017/2021
entitled “Radiation physics, radiochemistry, and nanotechnology
investigations using beams of accelerated heavy ions” for the period 2022-
2023**

The theme 04-05-1031-2017/2021 is dedicated to a wide range of applied research united by a common idea - the opportunities presented by the use of high-energy beams of multiply charged ions. As follows from the submitted documents, the theme under consideration is part of the 7-year plan of the Laboratory of Nuclear Reactions of JINR and is closely coordinated with the development of the fundamental facilities and the equipment park of FLNR.

The research plan includes the main directions which were developed in the framework of the theme 04/05/1031-2017/2021, and the suggested studies constitute a logical extension for the period 2022-2022. Significant progress in the level of the experimental capabilities, a number of high quality scientific results, and an orientation towards problems in applied science and new technologies which are currently in demand are the arguments which the referee considers a strong basis for supporting the proposal for the theme prolongation. The research is of multidisciplinary nature and includes many directions, in particular, the combining the theory, modeling and experiment for track formation process. These are the studies of the effects caused by heavy ions in matter, aimed at the testing the radiation resistance of materials under the influence of multiply charged ions; development of nanotechnology applications of accelerated ion beams; controlled modification of materials and exploring the potentialities of the ion track technique as the method to create nano- and nanoporous materials, including membranes for new separation processes. Since the high intensity energetic ion beams are of primary importance for this field of applied science, a further progress in the framework of this theme requires new approaches to development of accelerator instrumentation. The plan for the next two years implies the creation of three specialized beam lines at the DC140 dedicated cyclotron that will deliver ion beams suitable for radiation physics investigations, testing of radiation resistance of materials and the targeted modification of materials, including the nano- and microporous membranes for versatile applications. Therefore I believe that the plan of work extended for the period 2022-2023 is well-balanced and based on the reasonable criteria.

The team of researchers and the technical personnel are qualified to carry out the planned work.

The requested volume of funding is justified. At the same time, given the large volume of tasks, additional extra-budgetary funds are obviously needed and in fact indicated in the proposal for the theme extension.

The broad international cooperation and interest expressed by many member countries and associate members of JINR provide confirmation that the proposed subject matter is in demand and will be supported by the scientific community.

Based on the above arguments, I propose to support the prolongation of the theme for the period 2022-2023 years.

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