REPORT

on the project "Low-energy nuclear dynamics and properties of nuclear systems" (2024-2028)

Many important questions are raised in this project aiming to find proper answers by studies of various dynamical nuclear processes from fusion to capture and breakup. They are supposed to be answered by detailed theoretical studies of nuclear structure and nuclear reactions using newly developed cluster models, but also employing classical models for different issues.

The review made in the presentation of the main theoretical achievements that are published in many excellent papers makes me rather confident for the future development of this project. An important task will be the consideration of the symmetry breaking and symmetry transformation in the light of the related physical effects in finite quantum systems. The investigations of the shell effects in heavy and superheavy nuclei are expected to estimate the stability of the excited heavy nuclei. The need of microscopic calculations of transport coefficients and nucleus-nucleus potentials is pointed out. An important issue will be the search for the most suitable reactions to synthesize new isotopes of superheavy nuclei. The precise theoretical look to the fission processes is of crucial importance in order to meet successfully the expected new experimental data. The close connection with FLNR of JINR will allow the investigations of nuclear excitations above different thresholds.

In the outgoing period 110 papers have been published in high-ranking journals, which is the largest part of publications in the framework of the theme including four projects. This is a clear indication for the level of the scientific staff, which continue expressing their traditional strong experience in different theoretical investigations. The long-standing collaboration with many theoretical groups all over the world, as well as the close contacts of the researchers involved in the project with specialists from other JINR laboratories, serve as an important factor of the achieved and future results. In this respect, one can admire the synergy between the expected theoretical results and the experimental data measured in JINR and world scientific facilities. In conclusion, I fully support the proposed scientific activities within the project in the period 2024-2028 having important goals to achieve new and interesting theoretical results in nuclear systems.