

## Referee report on the project "Nuclear spectrometry for search and investigation of rare phenomena"

Neutrinos and Dark matter are two of the mysteries in these days' particle physics and astrophysics. JINR has many years successful participation in the world leading experiments directed to the studies of rare phenomena associated with the weak interaction by methods of modern nuclear spectrometry. Research directions are:

- investigation of double beta-decay with different calorimetric and treko-calorimetric methods (Gerda, Legened, NEMO-2,3, SuperNEMO, TGV, Cupid-Mo experiments);
- Monument experiment is supplementary to the above double beta decay experiments, as its aim is in experimental study of nuclear matrix elements;
- Direct Dark Matter search within the EDELWEISS experiment.

The JINR team is known for developing new types of the detectors, methods for suppression of backgrounds; participation in the MC and data analysis. Above listed experiments with JINR participation hold unique, continuously developing technologies and techniques of ultra-low background setups. For the next period of the project execution in JINR, single united project named "Nuclear spectrometry for search and investigation of rare phenomena" is proposed. It joints all separated experiment searching for New Physics in the electroweak sector conducted by the Department of Nuclear Spectroscopy and Radiochemistry. It has to be noted that the experiments were logically united, as those different experiments with JINR participation will be conducted with huge overlap in R&Ds, man power and used in the JINR infrastructure.

In whole the project has the aims to search for new physics and is on the edge of the modern since. Exciting results are expected in both directions: neutrino physics and direct Dark Matter search. Thus the project targets the fundamental scientific tasks. The presented project is experimental one together with methodical studies. Description of aims and tasks of the project is well defined. Project's authors have essential scientific and methodological groundwork in the field. Qualification of group's members and their previous works give a strong basis to believe that the project will be successfully accomplished.

As a recommendation, to facilitate the R&D, cooperation with Baksan Neutrino Observatory can be proposed.

In conclusion, considering that the proposed project is aimed at investigating the most interesting physics, I strongly support the project and its approval at JINR with highest priority.

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March 14<sup>th</sup>, 2023