**Referee Report to the 49th N.P. PAC at JINR (January 22-23, 2019)**

**“Concepts of new neutron sources at the Frank Laboratory of Neutron Physics and Program of experiments”**

The new neutron source at FLP based on the proton linear accelerator with a Np-237 subcritical target was presented and programs for condensed matter physics and for nuclear and particle physics were discussed. The main parameters of new neutron source are: average thermal neutron flux density is more than 1014 n/(cm2s), instantaneous flux in pulse is more than 1016 n/(cm2s), two ranges of pulse width; 200~300 s and 20~30s, and repetition of 10~30 Hz. They gave a road map from 2016 to 2035 and costs about 30M€ including 500 staff and power consumption costs for the realization of NEPTUN, which is much less than that of other scientific centers in the world.

The construction of NEPTUN will give new opportunities and challenges for industries of JINR member states as well as a source of new scientific opportunities. Authors are gave many subjects in science; in solid state physics, in chemistry, in earth and environmental sciences, in engineering sciences, in soft matter research and in biology and biotechnology. In addition to these, there are many possibilities for studying the nuclear structure and properties of fundamental interactions as well as the precision experiments with low-energy neutron. The extensive field of research will be opened with the UCN source: precision measurement of neutron lifetime, electric dipole moment (EDM) and the structure and dynamics of surfaces at nanoscale, and investigation of dark matter and dark energy.

I find the report on “Concepts of new neutron source at FLNP and program of experiments”very impressive. It was carried out by the FLNP of JINR in cooperation with the Dollezhal Research and Development Institute of Power Engineering.I would like to suggest that they need more study for preparation of the necessary infrastructure and the flagship experiments, which will be most promising.

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