

Study of Neutrino Oscillations in the JUNO experiment (JINR Participation)

Referee report on the project

The JUNO experiment build based on the previous experience with extremely successful Daya Bay experiment where JINR group made a number of major contributions. The experiment is in the phase of active development and construction in China. After starting, the experiment will be on the leading edge of the modern science for many years with primary target to determine the neutrino mass hierarchy with a sensitivity corresponding to 3-4 standard deviations. Supplementary scientific program including searches for proton decay, supernova neutrinos, detection of geo-, atmospheric and solar neutrinos, as well as searches for physics beyond the Standard Model will make an important impact on the particle physics.

To be successful the JUNO experiment has to resolve many challenging tasks: unprecedented energy resolution for huge volume of liquid scintillator, energy scale precision for all types of events, localization of events, backgrounds, etc. All of those tasks will require development of new technologies, experimental techniques and approaches for the project. It is important that the JINR team is participating in different parts of the project and thus will bring home these new know how and innovations in the experimental physics.

JINR contributions to both Daya Bay and JUNO experiments are valuable and highly visible. In the JUNO, JINR is responsible for design and production of high voltage units for photomultipliers. JINR will contribute to the construction of the Top Tracker detector; to mass tests and commissioning of large PMTs with help of JINR's made brand new scanning stations. JINR contributes to the design and construction of JUNO's near detector. JUNO project will not achieve its objectives without those contributions. The JINR group is solid and is help the project from both experimental and theoretical sides. Taking into account that the JINR group has already gained huge experience in the neutrino physics participating in the Day Bay experiment and JINR visibility increased on both national and international levels with the Day Bay world leading results I would strongly support the JUNO experiment and the team, and recommend the participation of the Institute in the project with high priority.

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