

BRIEF OVERVIEW

The Joint Institute for Nuclear Research (JINR) in Dubna, Russia, is looking for master's students, PhD students and postdocs from the JINR Member States to become part of the team involved in the DUNE project.

The DUNE experiment, aimed at determining the phase responsible for CP violation and determination of neutrino mass ordering, is being prepared at the Dzhelapov Laboratory of Nuclear Problems within Theme 1099 "Neutrino oscillation research".

A modular liquid-argon time projection chamber (ND-LAr TPC) is proposed for the Near Detector both as a target and as the system for detection of neutrino interactions.

The ND-LAr Consortium embraces several tens of institutes, including JINR. The JINR's responsibility is to design the light detection system, including light detectors, readout electronics and the DAQ system, and to integrate it into the general DAQ DUNE ND system.



JOB OPPORTUNITIES

Supervisor:

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1. Data analysis for the light readout system: signal processing, reconstruction of time & space track resolution, joint analysis with charge readout, study of event pile-ups: Michel's electrons, muon captures, rock muons with neutrino interactions, etc.
2. Simulations (based on Geant 4): time calibration using a light source and muon tracks, detection efficiency estimations, pile-up resolution, time & space track resolution, etc.
3. Experimental activities: measurements of light detectors in liquid argon, studies of SiPMs and their testing, etc.
4. Design and testing of electronics: variable gain amplifiers, SiPM power, ADC, components, etc.
5. Development of DAQ (ADC readout) and slow control (power supply) software.
6. QA/QC (Quality Assurance/Quality Control) development of production, testing and commissioning.

REFERENCES

1. DUNE experiment: <https://www.dunescience.org>
2. Joint Institute for Nuclear Research: <http://www.jinr.ru/main-en/>
3. ArgonCube Collaboration: <https://argoncubecollab.org>
4. Dzhelapov Laboratory of Nuclear Problems: <https://dlnp.jinr.ru/en/>
5. Experimental Department of Particle Physics (DUNE): https://astronu.jinr.ru/wiki/index.php/DUNE_Experiment
6. ND-LAr Light readout (DLNP seminar in Russian):
<https://dlnp.jinr.ru/en/meetings/video-recordings-ofseminars/1426-the-liquid-argon-tpc-of-the-near-detector-of-the-dune-experiment-by-nikolay-anfimov>
7. Interview with Michele Weber (Bern University): <https://dlnp.jinr.ru/en/news/dlnp-news/1425-interview-with-thedirector>