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Status of the NINJA experiment

Friday, 5 August 2022 16:30 (20 minutes)

Uncertainty of the neutrino-nucleus interaction models is one of the major sources of systematic uncertainty for neutrino oscillation experiments. The NINJA experiment aims to measure the neutrino-nucleus interactions precisely using a nuclear emulsion detector called Emulsion Cloud Chamber (ECC). The sub-micron spatial resolution and a high sampling rate of the ECC allow us to detect short tracks of low-momentum charged particles such as protons (The momentum threshold for protons is down to 200 MeV/c).
So far, we have measured the kinematics of charged particles emitted from neutrino interactions on water or iron in J-PARC using the T2K high-intensity neutrino beam. Multiplicity, angle, and momentum distribution of the charged particles from the neutrino interactions have been compared to the prediction by the Monte Carlo simulation.
From November 2019 to February 2020, the NINJA experiment conducted its first physics run in J-PARC. The 75 kg water-target ECC was exposed to the neutrino beam corresponding to 4.8×10^{20} protons on target. In this presentation. we report the latest result of the pilot runs and the current status of neutrino interaction analysis of the physics run. In addition, expected outcomes from and prospects of the NINJA experiment will be discussed in this talk.

Attendance type

In-person presentation

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