



Contribution ID: 177

Type: **Talk**

The SuperFGD for the upgraded T2K Near detector - Operation and performance

Friday 21 February 2025 10:15 (20 minutes)

After the long construction phase until 2024, we recently started operation of the SuperFGD for the upgraded T2K Near detector. To improve the systematic uncertainty for the neutrino oscillation measurement in the T2K experiment, especially sensitivity to measure the CP violation in the neutrino sector, the SuperFGD plays a key role as a fully active tracking detector with the fine-grained structure and 2 tons of target mass. The detector has a novel structure, consisting of approximately 2 millions of 1 cm^3 plastic scintillator cubes, about 56k wave-length shifting fibers penetrating the cubes from 3 directions, and many readouts such as MPPCs and electronics. It provides a capability to detect short tracks with low energy, excellent detection efficiency for 4- π angle, and neutron detection capability. This report will cover the SuperFGD construction, operational experience, and status of detector performance evaluations.

Primary experiment

The T2K experiment

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Session Classification: Plenary Neutrino/DM

Track Classification: Dark matter and other low-background experiments