

High-Angle TPCs for T2K ND280 Upgrade

The T2K (“Tokai to Kamioka”) experiment in Japan is a long baseline neutrino oscillation experiment, which studies the neutrino oscillation parameters using a beam of neutrinos. The experiment consists of two detector complexes, a near detector, ND280, to characterize the beam before oscillation and a far detector, SuperKamiokande, at 295km to measure the oscillated neutrino spectrum. One of the major goals of the T2K experiment is to measure the θ_{13} CP violation term. The collaboration published in 2020 the first measurement of the leptonic CP violation. To increase the significance of the result to above 3sigma, it was decided to upgrade the neutrino beam and the ND280 detector. The latter consists of the installation of three new subdetectors in ND280: a 3-D plastic scintillator Super-Fine Grained Detector(SuperFGD), two High Angle-Time Projection Chambers (HA-TPC), and 6 planes of Time Of Flight (ToF) panels.

While the SuperFGD serves as the target for the neutrinos, the HA-TPCs are used to reconstruct the tracks leaving the SuperFGD, to measure the particle momenta, and to identify the particle types. These HA-TPCs have an overall dimension of $2 \times 2 \times 0.8$ m³ each and each endplate is equipped with 8 Encapsulated Resistive Anode MicroMegas (ERAM) modules for gas amplification.

An overview of the work for the HA-TPCs will be shown, from studies using test beam data taken at CERN until the installation of the TPCs in ND280.

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