Contribution ID: **57** Type: **Presentation**

Commissioning and first data from T2K's near detector upgrade

Tuesday 2 September 2025 13:45 (25 minutes)

T2K is a long-baseline experiment measuring neutrino and antineutrino oscillations by observing the disappearance of muon neutrinos, as well as the appearance of electron neutrinos, over a long 295km distance. The ND280 near detector at J-PARC plays a crucial role to minimise the systematic uncertainties related to the neutrino flux and neutrino-nucleus cross-sections as it measures the neutrino beam at a ND site before it oscillates. The ND280 detector has recently been upgraded with a new suite of sub-detectors: a high granularity SuperFGD with 2 million optically-isolated scintillating cubes read out by wavelength shifting fibres and 55000 Multi-Pixel Photon Counters; two horizontal Time-Projection Chambers instrumented with resistive Micromegas, and additionally six panels of scintillating bars for precise time-of-flight measurements. The installation and commissioning of the new detectors will be discussed together with detector calibrations of the new detectors and the ND280 Classic detectors.

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Session Classification: WG6

Track Classification: NuFACT 2025: WG6 - Detectors