



# detector seminar

SPEAKER: Davide Sgalaberna  
TITLE: **The upgrade project of the T2K near detector**  
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## ABSTRACT

The T2K long-baseline neutrino oscillation experiment established the electron neutrino appearance in a muon neutrino beam, opening the door to the observation of CP violation in neutrino mixing. In view of the J-PARC program of upgrades of the beam intensity, the T2K-II proposal requires to run up to  $20 \times 10^{21}$  protons on target, i.e. an increase in the exposure by more than a factor 10 aimed at establishing CP violation at the 3 standard deviations level for a significant fraction of the possible  $\delta$ -CP values. The T2K collaboration has launched in 2017 the upgrade project for its magnetized near detector, ND280, with the aim of reducing the overall statistical and systematic uncertainties at the appropriate level of better than 4%. In January 2018 the proposal has been submitted to the CERN SPSC (CERN-SPSC-P357) and to the J-PARC PAC. A highly-segmented scintillator detector (Super-FGD) made of 1cm side plastic scintillator cubes read out by three orthogonal WLS fibers will be used as neutrino active target. It will be complemented by two High-Angle TPCs, consisting of a light field cage and resistive Micromegas detectors for charge readout, and a TOF detector to reach a full polar angle coverage for Charged Current Neutrino interactions, improve the tracking performance for low energy pions and protons and select a clean electron neutrino sample. We will report on the goals of the project and its development program including prototypes, beam tests at CERN and in Japan and projected performances.