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Neutrino Studies with the T2K P0D Detector

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The T2K experiment is an off-axis long baseline neutrino oscillation experiment. It utilizes the intense ν_μ beam generated at the J-PARC accelerator complex in Tokai, Japan. It has a near detector, ND280, at 280m from the proton target, and Super-Kamiokande as far detector at 295 km. The measurements of the neutral current π^0 and single charged current π^+ (as part of CC inclusive) cross-sections on water is necessary to understand the background for measurement of the θ_{13} mixing angle. However, these cross-sections are not known well in the energy region ~ 0.6 GeV that is the peak energy of the T2K neutrino beam. This work presents the description and operations of P0D detector, a part of the ND280, and the overview of analyses being carried out with this detector.

Primary author: BEZNOSKO, Dmitriy (NN Group SUNYSB)**Presenter:** BEZNOSKO, Dmitriy (NN Group SUNYSB)**Session Classification:** Neutrino Physics**Track Classification:** Neutrino Physics