

Measurement of the Charged Current ν_e Interaction Cross Section on Water with the T2K π^0 Detector

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The T2K experiment is a long base-line neutrino oscillation experiment which is designed to measure ν_μ disappearance and ν_e appearance from the ν_μ beam produced from a 30 GeV proton beam at J-PARC (Japan Proton Accelerator Research Complex). It consists of the J-PARC accelerator, a near detector complex (ND280) and a far detector (Super-Kamiokande). In order to achieve more precise ν_e appearance measurements and to explore CP violation in the neutrino sector, we need to improve our knowledge on ν_e interactions and determine contamination of ν_e in the ν_μ beam better. The ν_e component in the beam that is intrinsic is the main background in the ν_e appearance measurement. Besides, a large systematic uncertainty in T2K ν_e appearance observation comes from uncertainties related with the neutrino cross-section modeling. Since the far detector is a water Cherenkov detector, neutrino interaction measurements on water are important to constrain the neutrino cross-section systematic uncertainties. The design of π^0 Detector (POD), a component of ND280, which includes fillable water targets, allows us to measure on-water neutrino interaction cross-section. We developed a cross-section measurement method utilizing Markov-Chain Monte Carlo. In this talk, I will present the method and fake data study results of the charged current ν_e interaction cross section on-water.

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