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Measurement of Charged Current anti-neutrino cross section on water and hydrocarbon with limited acceptance at 1.5 deg off axis with the T2K beam

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A detailed understanding of neutrino and antineutrino interactions with nuclei is essential for the precise measurement of neutrino oscillations at long-baseline experiments, such as T2K. Moreover, since T2K utilises a water Cherenkov far detector, the study of neutrino cross sections on water is imperative. The T2K experiment has recently been equipped with a new additional near detector, WAGASCI, located 1.5 degrees off-axes with respect to the beam center. Composed of 80% of water and 20% of plastic scintillator, WAGASCI offers unique opportunity to characterize (anti-)neutrino interactions on water with a 4π acceptance. In this talk, we will present the first WAGASCI analysis, using antineutrino data taken with the detector in its preliminary configuration. The differential charged current cross sections of antineutrinos on water and hydrocarbon will be shown, as well as their ratio, in a restricted phase space, as a function of the reconstructed muon angle. The signal selection, the analysis technique, as well as the precautions taken to reduce possible model dependence, will be described in detail.

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