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Measurement of Neutral Current single pi0 production of neutrino interaction on water using the T2K Pi-zero Detector

We present a measurement of the neutral current single pi0 production (NC1pi0) cross section using Runs 1-4 of T2K data corresponding to 3.74 x 10^{20} protons on target. Selection criteria are applied to reconstructed events to enhance the signal pi0 invariant mass distribution, which is fitted using an extended likelihood method to extract the number of signal events. These are used to obtain the ratio of the NC1pi0 cross section to the NEUT Monte Carlo prediction for both the water-filled and emptied pi0 detector. The on-water NC1pi0 cross section for the J-PARC neutrino beam can be obtained through a statistical subtraction of water-filled and emptied data. The calculated on-water rate can be used to constrain the neutral pion background at Super-Kamiokande for the oscillation analysis of nu_e appearance from a nu_mu beam.

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