Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Measurement of charged current single charged pion production cross-section on water with P0D detector SHAMIL ASSYLBEKOV, ROBERT WILSON, Colorado State University, TOMASZ WACHALA, The H. Niewodniczanski Institute of Nuclear Physics PAN, Cracow, Poland, T2K COLLABORATION —
This work describes the first neutrino cross-section measurement of charged-current (CC) single charged pion ($1\ \pi^+$) interaction channel on water as a target. There is some disagreement between measurements on carbon for this process, which effects the precision of neutrino oscillation results. P0D detector of the T2K experiment has been taking neutrino interaction data since 2009 in configurations with and without a water target. Using a statistical water-in/water-out event rate subtraction, a measurement of ν_μ-induced CC1π^+ cross-section on water is reported to be $\sigma = 1.10 \cdot 10^{-39}\ ^{+35.27\%}_{-32.38\%}\ cm^2$, integrated over the entire T2K energy range. The measurement is based on a sample of 2703 events selected from beam runs of 2.64×10^{20} protons-on-target with the P0D water-in configuration, and 2187 events selected from 3.71×10^{20} protons-on-target with the water-out configuration. The corresponding Monte Carlo (MC) simulation predicted numbers of background events to be 1387.2 and 1046.0 for the water-in and water-out configurations, respectively. Data favors a smaller cross-section when compared with the model, but within uncertainty is consistent with $\sigma = 1.26 \cdot 10^{-39}\ cm^2$ predicted by MC.

Shamil Assylbekov
Colorado State University

Date submitted: 09 Jan 2015 Electronic form version 1.4