

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Measurement of the Single Charged Pion Production Cross Section in Charged-Current
Neutrino-Carbon Interactions

By

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The discovery of neutrino oscillations is one of the most exciting recent developments in particle physics. Current and future neutrino experiments are aiming to make precise measurements of the oscillation parameters. Improving our understanding of neutrino-nucleus cross sections is crucial to these precision studies of neutrino oscillations. Interactions in the neutrino energy region around 1 GeV are particularly important because this is the region of the expected oscillation signal in many experiments, but the cross sections in this region are not very well-known. This energy region is somewhat complicated due to significant contributions from quasi-elastic scattering, single pion production, and deep inelastic scattering. This dissertation describes a measurement of the cross section for single charged pion production in charged-current muon neutrino interactions with carbon made using data collected by the K2K neutrino oscillation experiment. The mean energy of the muon neutrinos is 1.3 GeV. The results of this measurement are consistent with previous experiments and the theoretical prediction.

Date: May 8, 2007

Time: 10:00 AM

Place: Physics, D-122

Program: Physics

Dissertation Advisor: Chang Kee Jung