

The purpose of the T501 experiment was to measure the energy loss ( $dE/dx$  (MeV)) of the minimum-ionizing particle in a lead-glass counter and a 10cm-thick iron, by using the time-of-flight (TOF) method. the  $\pi^+$  beam was defined by a set of scintillation counters and the beam energy was measured by two sets of TOF counters ( $\sigma_{\text{TOF}} = 80 \text{ psec}$ ) placed 5m away.

Both materials (lead-glass and iron) are being used for the range measurement of a muon for the K2K near detector.

We measured the beam energy with and without placing the materials and determined the energy loss by the difference of the TOF.

We confirmed that the measured energy-loss in the iron agrees with the calculation. We measured the energy loss in the lead-glass (LG) counter as reference to that in the iron:

$$\frac{(\text{Data/MC})_{\text{LG}}}{(\text{Data/MC})_{\text{Iron}}} = 0.95 \pm 0.03 \text{ (stat.)} \pm 0.03 \text{ (sys.)}$$

This measurement has determined the energy scale of the neutrino spectrum, measured by the K2K near detector, and it is the very important input to the K2K oscillation analysis. This experiment also measured the energy loss for the pions and protons in a scintillation counter successfully, which will be used for the particle identification.