

## 学位申請論文公開講演会

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場 所：物理会議室 (C-422)

論文題目：Momentum measurement of secondary particle by multiple coulomb scattering with Emulsion Cloud Chamber in DONuT experiment

(DONUT 実験で使用された ECC を用いて多重電磁散乱による二次粒子の運動量測定)

### Abstract

The charged particle traversing a medium is deflected by many small angle scatters and the most of this deflection is known as coulomb scattering from nuclei. For getting the scattering information of deflected particles definitely, detector used as a target have to provided high position accuracy and angular resolution.

In turn, the purpose of DONuT experiment is the direct observation of tau neutrino charged-current interaction. In this experiment, the neutrino beam was generated using an 800 GeV/c protons provided by the Fermi National Accelerator laboratory. and the nuclear emulsion sheets were used as interaction target to record charged tracks. The emulsion targets used in this experiment were composed of emulsion sheets stacked perpendicular to the neutrino beam. The track information on the emulsion sheets was optically scanned and digitized by an automatic scanning system developed at Nagoya university(F-Lab).

In DONuT experiment, 578 neutrino interactions were observed in emulsion sheets, and 2338 charged particles were emitted from these interactions. Moreover, 9 events out of these neutrino interactions were identified as the candidate of tau neutrino charged-current interaction.

In this experiment, Momentum was measured for only 689 tracks (~29%) out of particles emitted from neutrino interaction by Analysis magnet and drift chamber. This is because both geometrical and reconstruction efficiency were low for many neutrino interactions. To overcome this problem, I have tried to measure the momentum for secondary particle emitted from neutrino interactions using multiple coulomb scattering with emulsion data. This paper introduces DONuT experiment and presents the study on the momentum measurement of these secondary particles emitted from those neutrino interactions observed in this experiment.