論文の内容の要旨

Measurement of $W^{\pm}Z$ Production in Proton-Proton Collisions at $\sqrt{s} = 7$ TeV
with the ATLAS Detector
（アトラス検出器を用いた重心系エネルギー7 TeV での陽子・陽子衝突における$W^{\pm}Z$事象の測定）

氏名　結束　晃平

The Standard Model of particle physics (SM) which was established in 1970's has tremendous success. Large Hadron Collider (LHC) was built at CERN to get a clearer picture of the SM, explore the TeV energy region where new phenomena are expected to be observed, and make it clear whether the Higgs boson really exists, or not.

The ATLAS (A Toroidal Lhc ApparatuS) experiment was designed to catch extensive range of signals which indicate interesting physics. The experiment is expected to bring fruitful new knowledges concerning the elementary particle physics, and they could change our world view.

The $W^{\pm}Z$ process is one of interesting Standard Model processes because the process has not been tested at sufficient level at the past experiments. Furthermore anomalous Triple Gauge Couplings beyond the Standard Model could be observed in the production. The $W^{\pm}Z \to l\nu l'l'$ channel can be identified with less backgrounds compared to the other processes because of the three high p_T leptons coming from W and Z bosons. However, there are still significant backgrounds in the LHC environment, which are mainly ZZ, Z+jets, $t\bar{t}$, and Z+γ processes. Therefore the event and object selections need to be optimized to reduce those backgrounds. Among the selections, the isolation requirement for leptons is expected to largely reduce the backgrounds. This thesis reports the effect of this requirement on the process. Finally the $W^{\pm}Z$ production cross section at $\sqrt{s} = 7$ TeV is measured to be $19.0^{+1.4}_{-1.3}$ (stat.) $\pm$ 0.9 (syst.) $\pm$ 0.4 (lumi.) pb with 4.6 fb^{-1} data. This result is consistent with the Standard Model prediction within the uncertainties. The limit on anomalous Triple Gauge Couplings is also determined.