University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

ZHELUN LI

BSc (University of Victoria, 2017)

"The development of missing transverse momentum reconstruction with the ATLAS detector using the PUfit algorithm in *pp* collisions at 13 TeV"

Department of Physics and Astronomy

Tuesday, July 30, 2019
10:00 A.M.
Clearihue Building
Room A207

Supervisory Committee:
Dr. Robert Kowalewski, Department of Physics and Astronomy, University of Victoria (Supervisor)
Dr. Richard Keeler, Department of Physics and Astronomy, UVic (Member)

External Examiner:
Dr. Adam Monahan, School of Earth and Ocean Sciences, UVic

Chair of Oral Examination:
Dr. Graham Voss, Department of Economics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Many interesting physical processes produce non-interacting particles that could only be measured using the missing transverse momentum. The increase of the proton beam intensity in the Large Hadron Collider (LHC) provides sensitivity to rare physics processes while inevitably increasing the number of simultaneous proton collisions in each event. The precision of the MET determination deteriorates as the complexity of the recorded data escalates. Given the current complexity of data analysis, a new algorithm is developed to effectively determine the MET. Several well-understood physics processes were used to test the effectiveness of the newly designed algorithm. The performance of the new algorithm is also compared to that of the standard algorithm used in the ATLAS experiment.