THE UNIVERSITY of ADELAIDE

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New Physics searches at the High Luminosity LHC

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Abstract

This thesis studies the $\tilde{\chi}_1^{\pm}\tilde{\chi}_1^{\mp}$ and $\tilde{\ell}^{\pm}\tilde{\ell}^{\mp}$ production processes in an upgraded LHC environment at $\sqrt{\hat{s}} = 14$ TeV. The Super Razor variables will be employed to obtain kinematic information and separate these Supersymmetric production processes from Standard Model background with identical final state topology. The analysis will be done using Monte Carlo generated data of events where truth-level information will be smeared to simulate the Phase-I and Phase-II ATLAS detector.

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Contents

1 Introduction **1**

2 Standard Model and Supersymmetry **3**
2.1 Standard Model 3
2.1.1 Feynman Diagrams 4
2.1.2 The Hierarchy Problem 5
2.1.3 Dark Matter 6
2.2 Supersymmetry 7
2.2.1 R-Parity 7
2.3 Production processes 8
2.3.1 Di-leptonic decays 9
2.3.2 SM Background 9

3 Experimental apparatus **13**
3.1 The Large Hadron Collider 13
3.2 ATLAS 13
3.2.1 Object Definition 14
3.3 Physics with the upgraded ATLAS detector 15

4 Kinematic Variables **19**
4.1 Razor 20
4.2 Super Razor 21
4.2.1 Mass variables 22
4.2.2 Angular variables 24

5 Event Generation, Simulation and Analysis Tools **25**
5.1 Monte Carlo Generation and Analysis 25
5.2 MET Smearing 26
5.3 Event reconstruction 27

6 Results and Interpretation **29**
6.1 Event Selection 29
6.2 Di-slepton production 29
6.2.1 Analysis for Phase-I: 300fb^{-1} with $< \mu >= 60$ 29
6.2.2 Analysis for Phase-II: 3000fb^{-1} with $< \mu >= 140$ . . . 39
6.3 Di-Chargino production 49
6.3.1 Analysis for Phase-I: 300fb^{-1} with $< \mu >= 60$ 49
6.3.2 Analysis for Phase-II: 3000fb^{-1} with $< \mu >= 140$ . . . 58

7 Conclusion **69**

A Cross sections and Filter efficiencies **71**

Bibliography **74**