

ABSTRACT

**SEARCH FOR CHARGED HIGGS BOSONS IN THE $\tau + \ell$ FINAL STATE
WITH 36.1 fb^{-1} OF pp COLLISION DATA AT $\sqrt{s} = 13 \text{ TeV}$ WITH THE ATLAS
EXPERIMENT**

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BY

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DEDICATION

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CHAPTER 1

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1.1.1.1 Fermions

1.1.1.2 Bosons

1.1.2 Interactions

1.1.2.1 Electromagnetic Interaction

1.1.2.2 Weak Interaction

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1.1.3 The Higgs Mechanism

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THE LHC AND ATLAS EXPERIMENT

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NEEDS TO BE DONE

4.1.1 Object Definitions

NEEDS TO BE DONE

4.1.2 Event Selections

NEEDS TO BE DONE

4.2 Datasets

NEEDS TO BE DONE

4.2.1 Signal Modeling

NEEDS TO BE DONE

4.3 Background Modeling

NEEDS TO BE DONE

4.4 Analysis Strategy

NEEDS TO BE DONE

4.4.1 Multivariate Analysis Techniques

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4.4.2 Training

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4.4.3 Feature Selection

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4.4.4 Hyperparameter Optimization

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4.5 Systematic Uncertainties

NEEDS TO BE DONE

4.6 Results

CHAPTER 5
CONCLUSION

Appendices

