



Northern Illinois  
University

# Search for Charged Higgs Bosons in the $\tau + \ell$ Final State with $139\text{ fb}^{-1}$ of pp Collision Data at $\sqrt{s} = 13\text{ TeV}$ with the ATLAS Experiment

Dissertation Defense

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Introduction

$$H^\pm \rightarrow \tau^\pm \nu_\tau$$

Theory

Signature

The Standard Model

Event Selection

Supersymmetry

Datasets

Charged Higgs Bosons

Background Modeling

Experimental Apparatus

MVA

LHC

Systematic Uncertainties

The ATLAS Detector

Results

Simulation

Conclusion

Event Reconstruction

# Introduction

- This defense will take ~ 1 hour
  - After the presentation is complete, the committee and I will address comments privately
  - When we are done, I will return, the committee will discuss among themselves then return
- General Guidelines
  - Please remain muted unless you are speaking
  - There will be time at the end for questions, but feel free to interrupt if there is something urgent.
- Thank you for attending!

# Theory

## Experimental Apparatus

## Simulation

## Event Reconstruction

$$H^\pm \rightarrow \tau^\pm \nu_\tau$$

## Conclusion

# Thank You



# Backup