

LP Poster Session – Toronto, Canada August 5-10 2019

Search for SUSY with Missing Transverse Momentum and Multiple b-jets at 13 TeV with the ATLAS Detector

Abstract

A search for supersymmetry involving the pair production of gluinos decaying via third generation squarks into the lightest neutralino is presented. The analysis uses the large hadron collider proton-proton collision data at a center-of-mass $\sqrt{s} = 13$ TeV with an integrated luminosity of 79.8 fb⁻¹ collected with the ATLAS detector in 2015, 2016 and 2017. No excess is found above the Standard Model predicted background. For neutralino masses below approximately 800 GeV, gluino masses of less than 2.2 TeV are excluded at 95% confidence level in simplified models involving the pair production of gluinos that decay via top or bottom squarks.

SUSY motivation

Supersymmetry is a generalization of space-time symmetry that predicts new bosonic partners for fermions and vice versa. Some of the open questions solved by SUSY are: 10^{4} $\sigma_{res}[pb]: pp \rightarrow SUSY$

• Hierarchy problem

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Strong multi-b model

The simplified model featured with at **least four b-jets** originating from the top quark or gluino decays and two neutralinos which escape the detector and resulting in **high** E_{T}^{miss} .

Gtt



Standard Model gauge coupling unification

Search for gluino-mediated 3rd generation squark production is motivated by **high production crosssection** of gluinos at the LHC.



Standard Model background

Data and background estimation are checked in preselection region using different discriminating variables:

- To increase sensitivity, the analysis is divided depending on the presence (1L) or absence (0L) of electrons or muons.
- > All backgrounds are estimated from MC except QCD. Dominant background is $t\bar{t}$.
- Data-driven QCD estimation for 0-lepton channel.
- Kinematic correction (reweighting) implemented in 1-lepton channel.



Region definition and Analysis strategy





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