Search for squarks and gluinos in final states with one isolated lepton, jets, and missing transverse momentum at $\sqrt{s}$=13TeV with the ATLAS detector
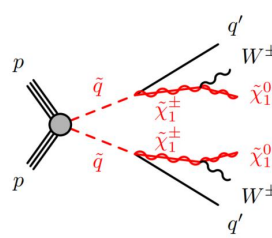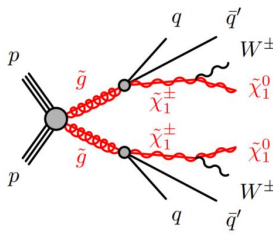
This poster presents recent ATLAS results of the search for gluino and squark pair production with one lepton, jets and missing transverse momentum based on 139fb^{-1} of $\sqrt{s}$=13TeV proton – proton collision data collected by ATLAS detector.

SUSY signal

2 types of mass spectra:

Case1: $x = \dfrac{m(\tilde{\chi}_1^{\pm}) - m(\tilde{\chi}_1^0)}{m(\tilde{g}) - m(\tilde{\chi}_1^0)} = 0.5$

Case2: $m(\tilde{\chi}_1^0) = 60$ GeV

Event selection

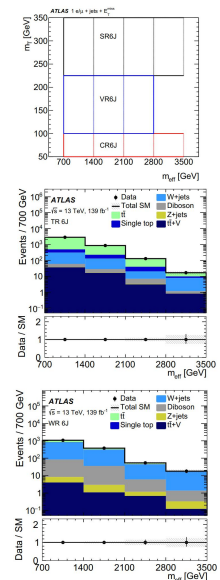Different jet multiplicity SRs are designed to target various signal scenarios.

Background estimation

6J case as an example

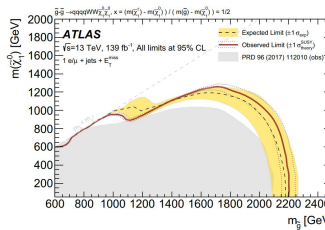- Dedicated CRs are designed for dominant background (ttbar, singleTop and Wjets).
- A simultaneous fit with SRs and CRs is performed.
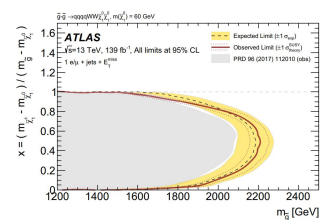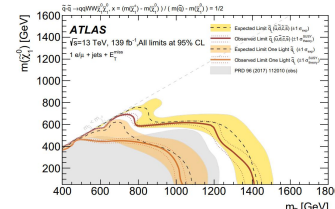- VRs are designed correspondingly for each Njet case.

Results
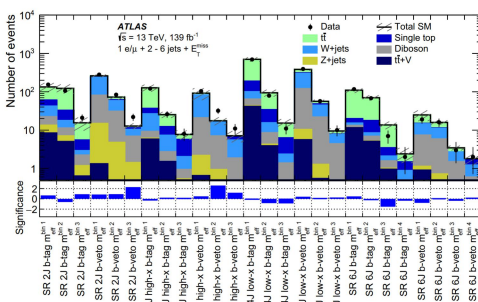
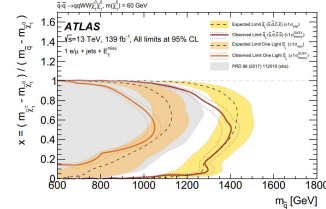No significant excess beyond the Standard Model expectation is found

$\tilde{g}$-$\tilde{g}$ →qqqqWW$\tilde{\chi}_1^0\tilde{\chi}_1^0$ && Case1

$\tilde{g}$-$\tilde{g}$ →qqqqWW$\tilde{\chi}_1^0\tilde{\chi}_1^0$ && Case2

$\tilde{q}$-$\tilde{q}$ →qqWW$\tilde{\chi}_1^0\tilde{\chi}_1^0$ && Case1

$\tilde{q}$-$\tilde{q}$ →qqWW$\tilde{\chi}_1^0\tilde{\chi}_1^0$ && Case2

Gluino (Squark) masses up to around 2.2(1.4) TeV are excluded for a mass of $\tilde{\chi}_1^0$ lower than 200GeV.

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