

Recent Developments in Rivet

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+ all other Rivet developers



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Overview

Rivet – you mean those little fasteners?

Developments – or “how to bore an audience”

Example – not what you probably think

What *is* Rivet?

Rivet is a general analysis toolkit for Monte Carlo studies.

- Can be used for MC validation – but not exclusively
- Generator independent – uses HepMC as generator interface
- Modular design – very simple to add new analyses
- Great way of archiving analysis knowledge
- Many analyses already implemented – is yours missing?

Learn more online: <http://projects.hepforge.org/rivet/>

What is *new* in Rivet?

Rivet 1.5.0 was released in March. Visible to the outside:

- 15 LHC analyses available (so far mostly ATLAS – come on, where are the others? ALICE UE and identified particles? CMS UE and jet substructure? LHCb identified particles?)
- New categories “OBSOLETE” and “PRELIMINARY”

Not so visible:

- General housekeeping work in the code
- Improved beam consistency checking
- Changes in the library loader for easier use of plugin analyses

A not so obvious example

Most people think of Rivet as tuning tool. Some think of it as validation tool. Only few see it as general tool for MC studies.

ATLAS recently published a SUSY search paper with exclusion limits based on jets and missing momentum (1102.5290).

A group of theorists took their event counts, implemented the analysis in Rivet and improved the exclusion limits (1104.0585).

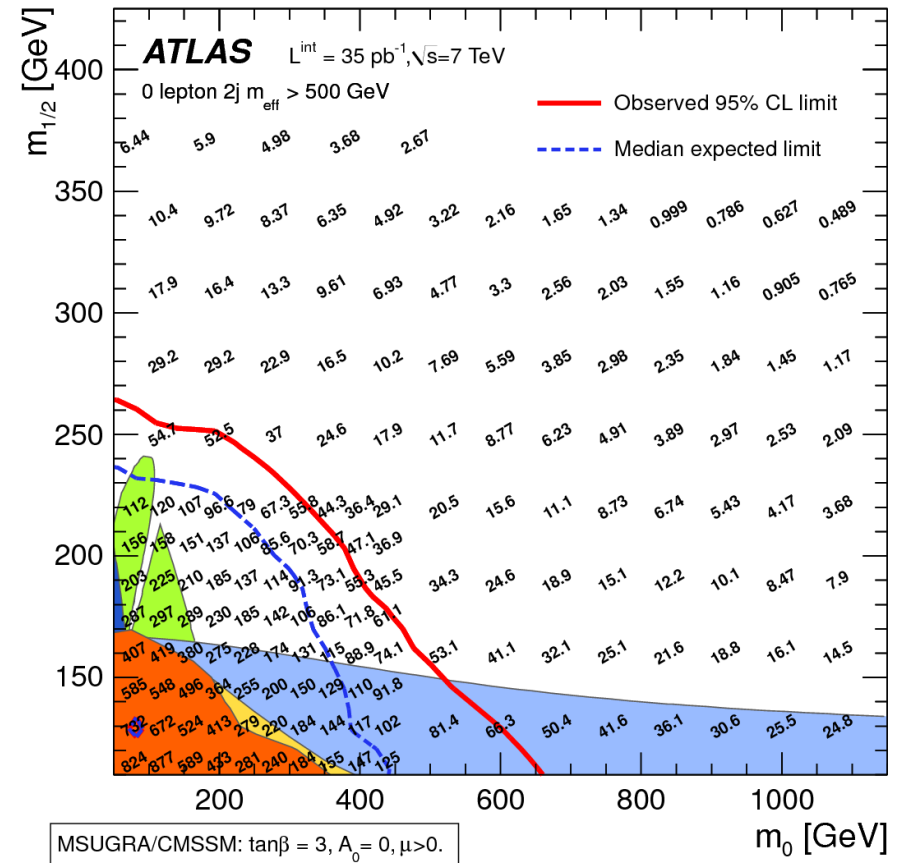
The ATLAS analysis (arXiv:1102.5290)

Four signal regions

For each region scan the m_0 - $m_{1/2}$ plane

Regions with too many expected signal events can be excluded

Combine the four regions into a single plot

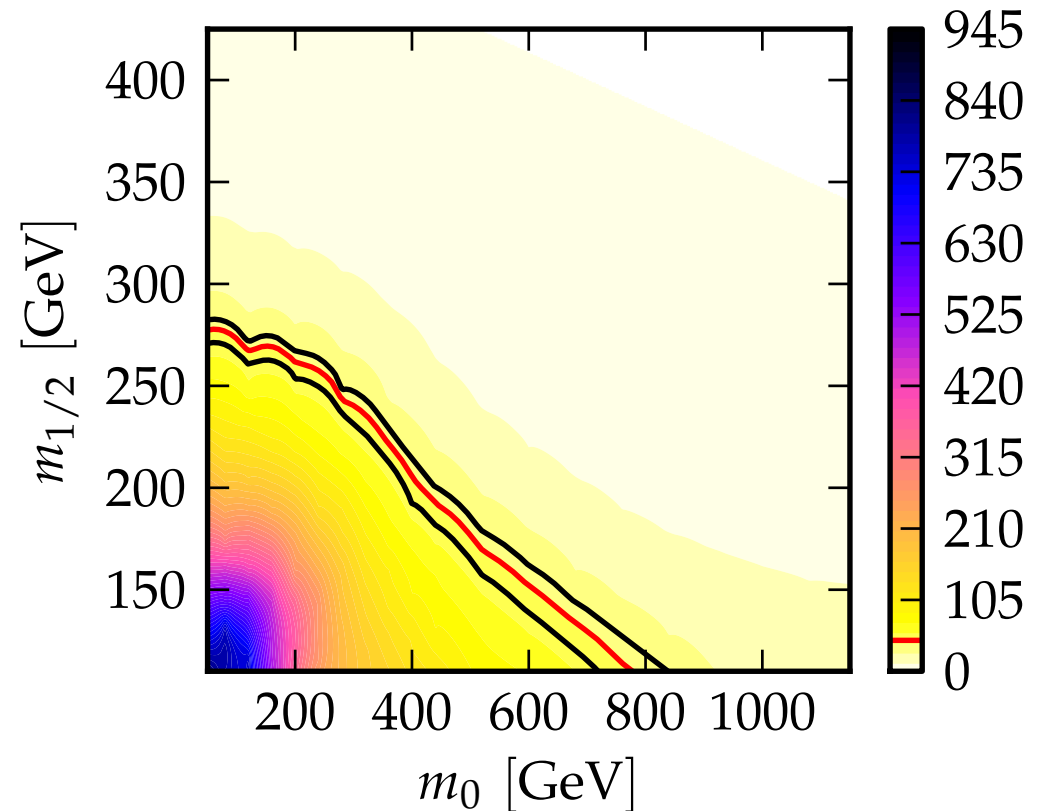


The Rivet analysis (arXiv:1104.0585)

Repeat the exercise in Rivet

Herwig++ for efficiencies

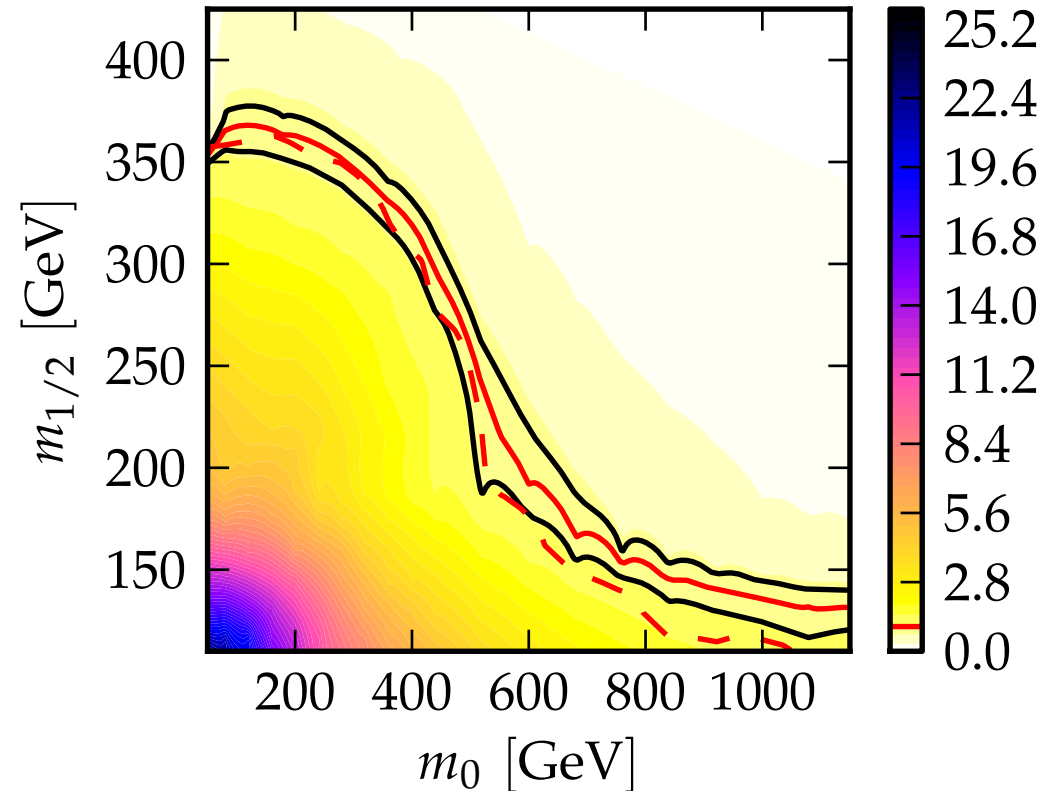
Prospino for NLO cross-sections



The Rivet analysis (arXiv:1104.0585)

Combine signal regions: Good agreement with ATLAS (dashed)

Lower right corner: ATLAS is a bit fancier with their efficiencies

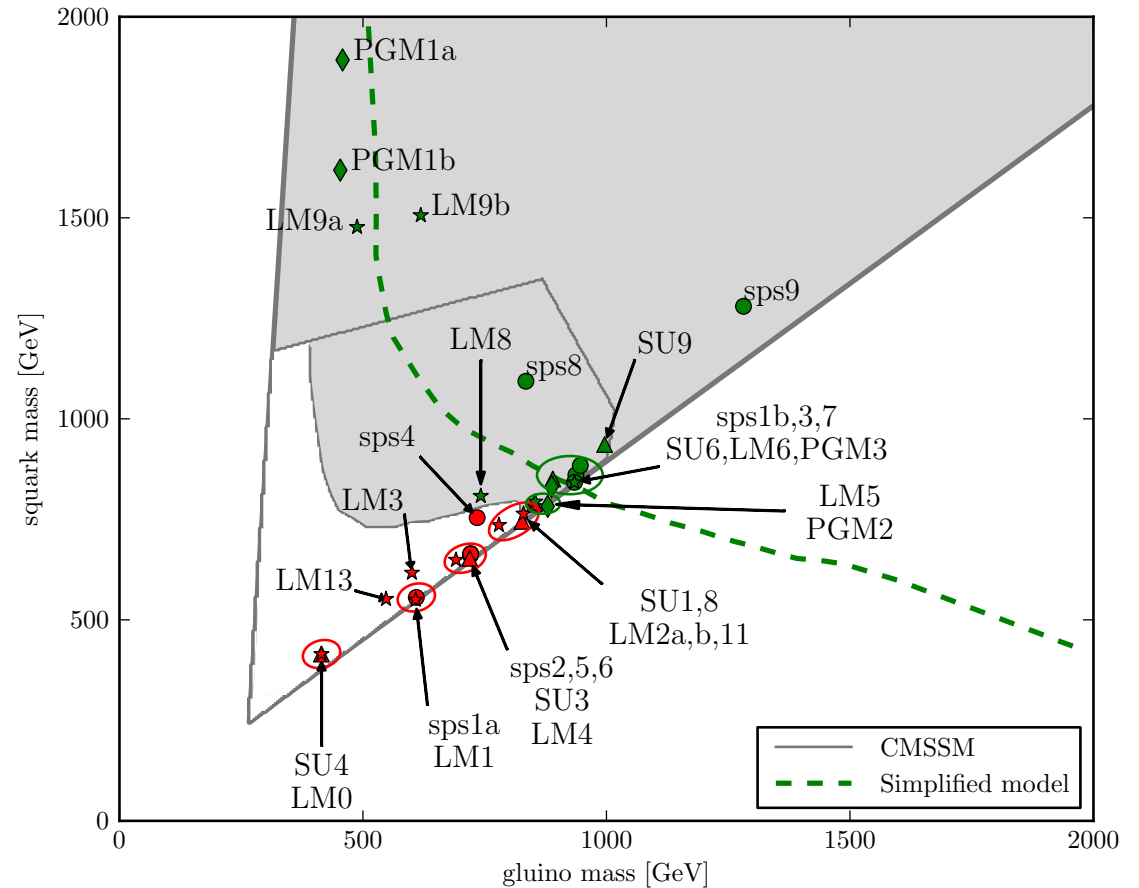


The Rivet analysis (arXiv:1104.0585)

Now translate this into a gluino/squark mass plot

ATLAS assumes massless neutralinos for their limit

Very simple to check other models with this method, too



Summary

- Rivet is not just for tuning. It is a general MC analysis tool.
- We need your input! Keep sending us your (unfolded) analyses.
- Questions? Discussion? Coffee?