mSUGRA/cMSSM searches in ATLAS

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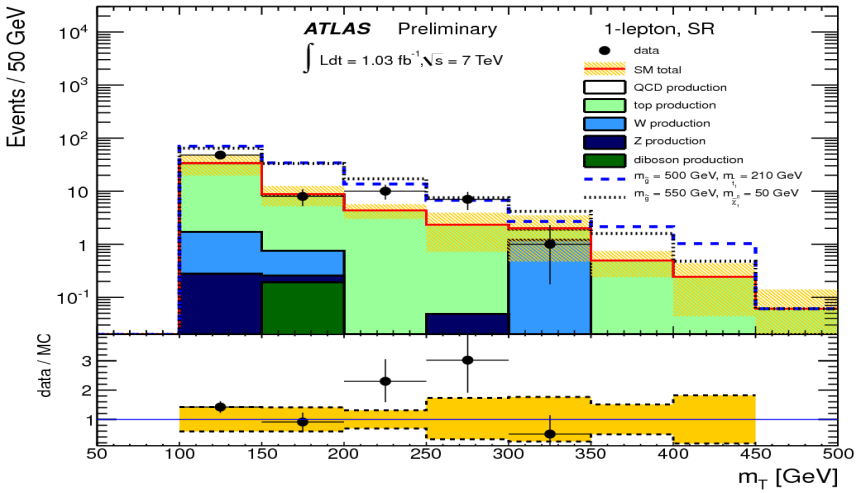
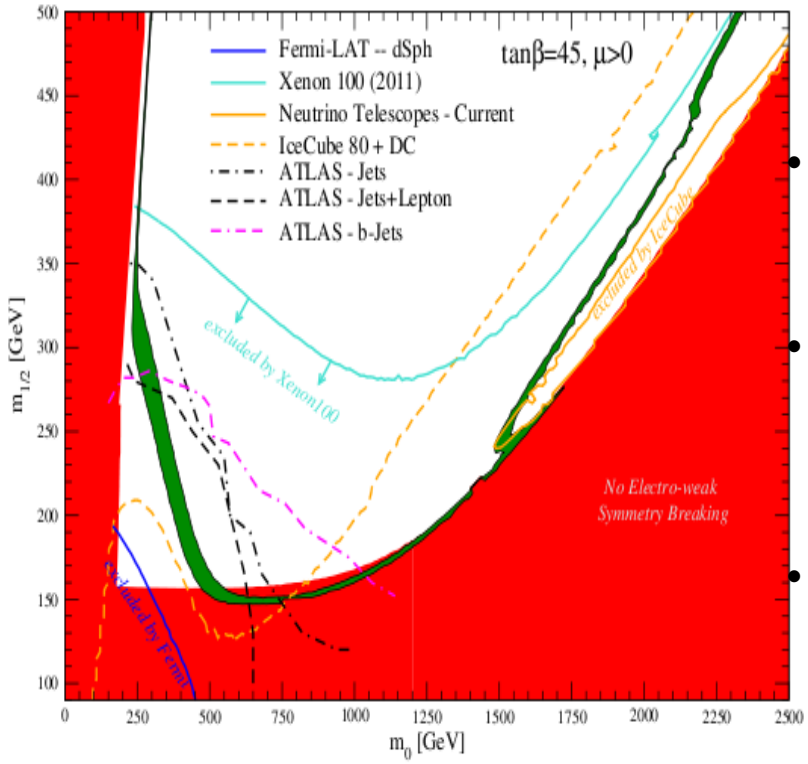
- Searches ongoing in many different topologies; 0-lepton, 1-lepton, 2-leptons, with different number of jets.
- Many analyses are exclusive, meaning that their results can easily be combined.
- The SUSY search program is discovery oriented. Choice of limits that are set is somewhat arbitrary.



ATLAS-CONF-2011-130

Small «excess» observed in 1-lepton searches

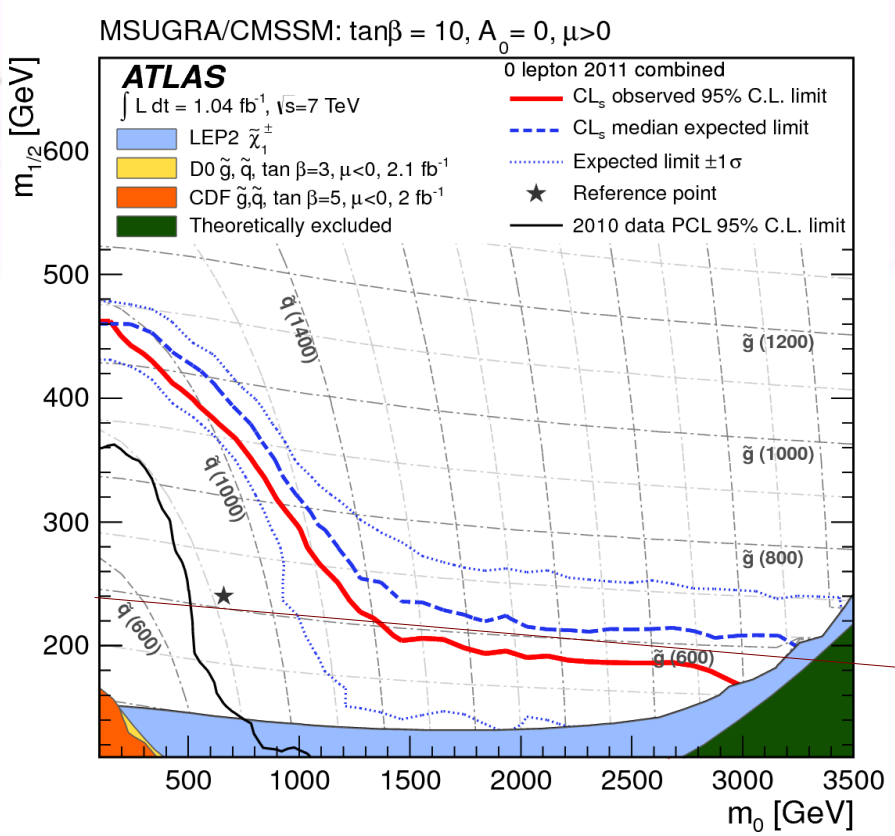
Plan for the 2011 data



arXiv:1105.5162v2

- The ATLAS limit in this plot is not really obtained through ATLAS searches (ATLAS-like searches were redone on simple MC)
- We are interested in a narrow region in mSUGRA referred to as the *stau-neutralino* coannihilation region, which is still not excluded.
- This region is interesting from the point of view that a neutralino DM candidate is consistent with WMAP measurements of the DM relic density
- Tau leptons would provide an important signature in this region

mSUGRA limits



ArXiV:1109.6572

- We wish to contribute to make «real» ATLAS exclusion limits in mSUGRA with high tan(β), combining searches with taus and 0-leptons
- In mSUGRA a gluino mass of 600 GeV corresponds roughly to a neutralino mass of ~90 GeV

$$M_{\chi_0} \simeq 90 \ \ GeV$$

- We are now responsible for the 1-tau analysis for the ATLAS 2011 dataset of 5 fb-1

- We wish to perform an analysis that can be combined with the 0-lepton searches (leptons = e, μ), since we believe that by including the contribution from τ-signal, it is possible to improve the search compared to a 0-lepton analysis alone.

- We did this as a training with the ATLAS 2010 data, and we saw that the combined limits are indeed more powerful than the limits obtained without splitting into nτ – regions, at least in the tau signal rich models we were analysing

  (Internal ATLAS note: http://cdsweb.cern.ch/record/1385579/)

Thanks!
Comments, Questions?