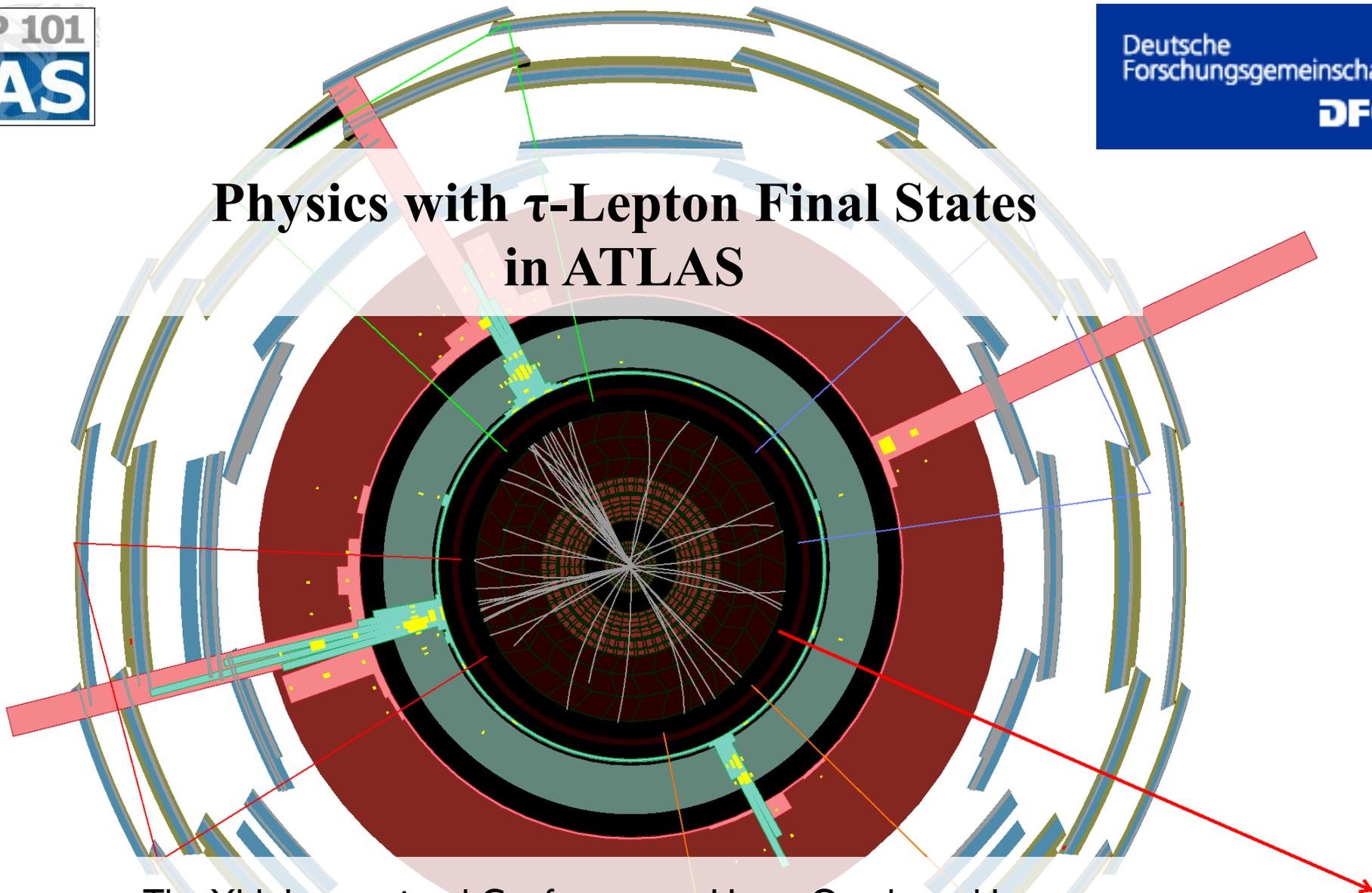


# Physics with $\tau$ -Lepton Final States in ATLAS



The XIth International Conference on Heavy Quarks and Leptons  
Postersession

14.06.2012 - Prague

Nils Ruthmann

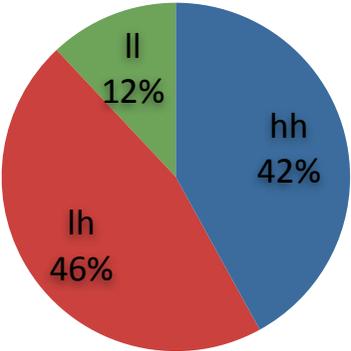
On behalf of the ATLAS Collaboration



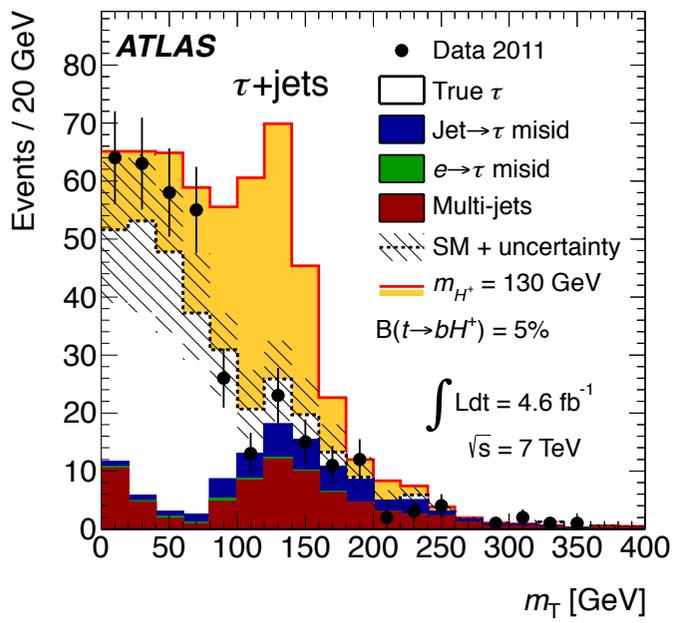
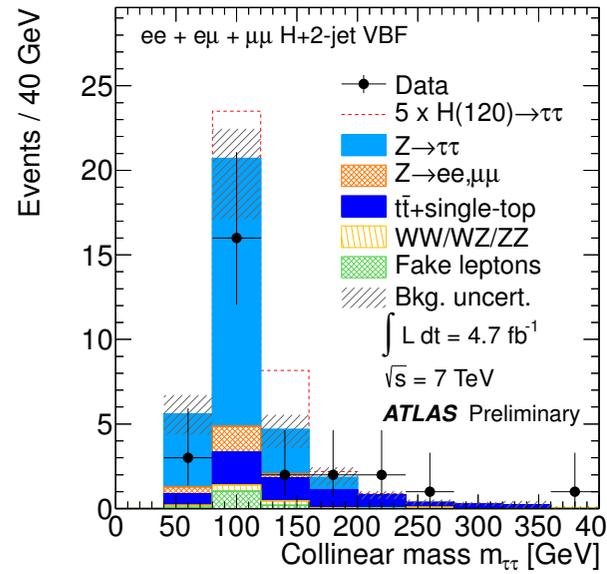
# Higgs Searches

Aiming for a broad overview over ATLAS physics programme involving  $\tau$ -leptons:

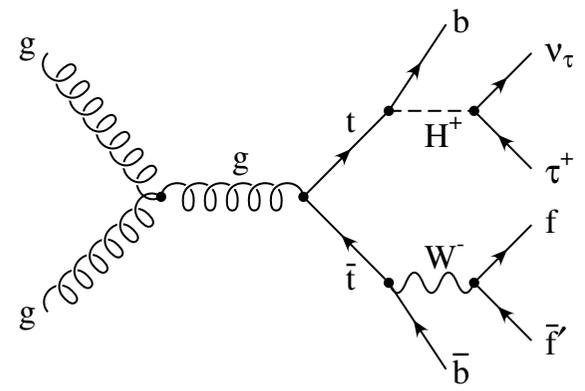
- Higgs Boson Searches - Within and beyond the Standard Model



- $H \rightarrow \tau\tau$  interesting due to:
  - Large branching ratio for low mass Higgs bosons
  - sensitive to  $\tau$  Yukawa coupling
- Search for  $H \rightarrow \tau\tau$  events including all possible  $\tau$ -decays
- Based on the 2011 dataset corresponding to  $\mathcal{L}=4.7 \text{ fb}^{-1}$
- Specific analyses of various event topologies



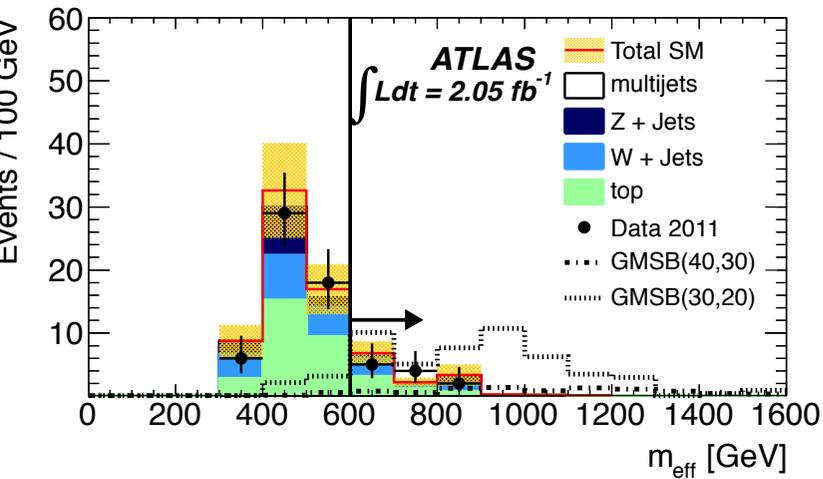
- Searches for charged Higgs Bosons for example in 2 Higgs doublet models
- Decay to  $\tau$ 's especially interesting



# Searches for Supersymmetry

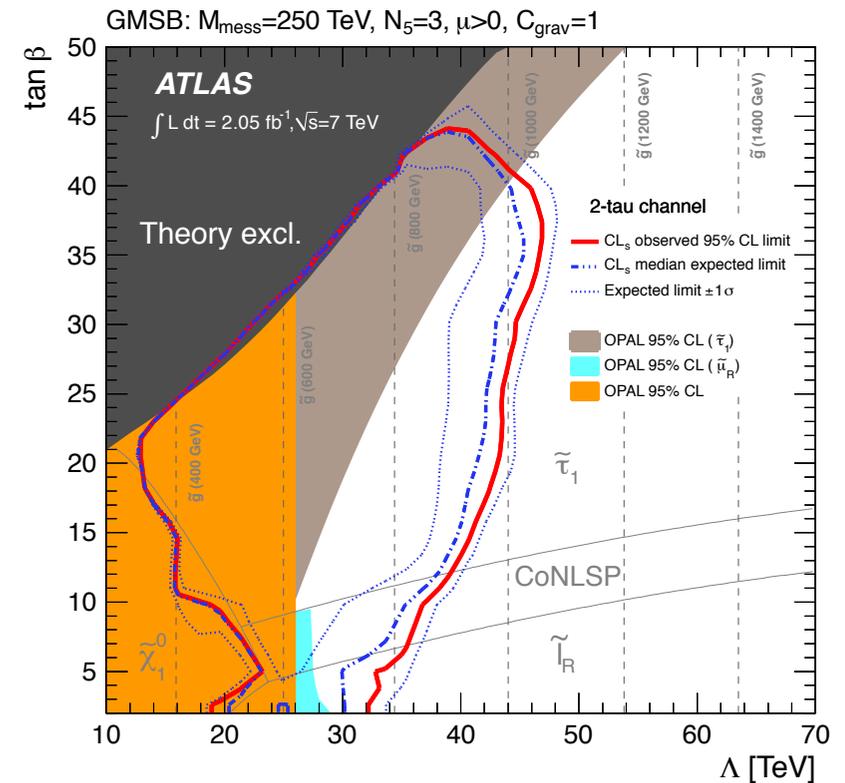
Aiming for a broad overview over ATLAS physics programme involving  $\tau$ -leptons:

- Searches for Supersymmetry involving  $\tau$ -leptons



- $\tau$ -leptons play a significant role in searches for supersymmetry
- Presenting two inclusive analyses with  $\geq 1(2)$   $\tau$ , Jets and large  $\cancel{E}_T$

- Generic analyses interpreted model independent as well as in a GMSB model, setting stringent limits on the SUSY breaking scale

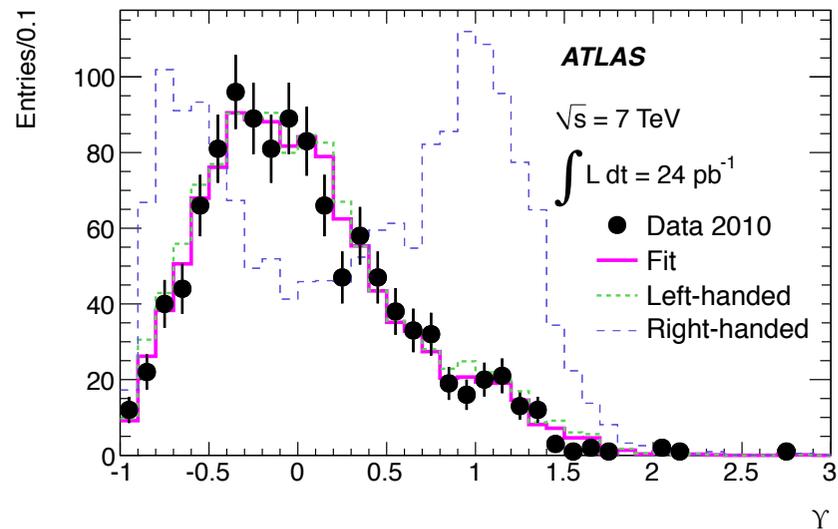
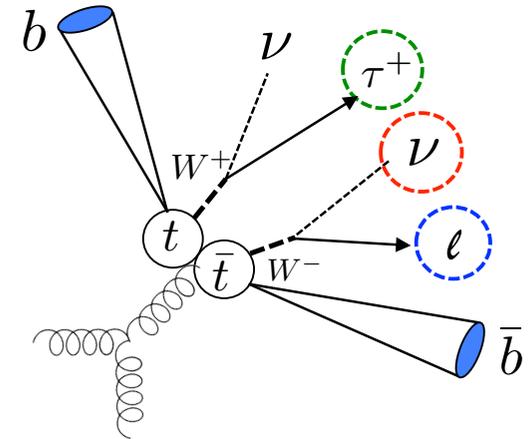


# Standard Model Measurements

Aiming for a broad overview over ATLAS physics programme involving  $\tau$ -leptons:

- Standard Model Measurements with  $\tau$ -leptons

- Measurement of the  $t\bar{t} \rightarrow l + \tau_{\text{had}} + X$  cross section
- Challenging channel due to large hadronic activity
- Tackled with a very interesting analysis technique



- Measurement of  $\tau$ -Polarization in  $W \rightarrow \tau \nu$  decays
- Showing how to analyse coupling structures at a hadron collider

Looking forward to discuss the poster content with you..