Long-lived staus in a simplified model approach at the LHC

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Introduction

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- MSSM: neutralino LSP
  sneutrino LSP
- Ext.: gravitino LSP
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Big difference: NLSP neutral or charged

similar to neutralino LSP

totally different SUSY search

$\longrightarrow$ Phenomenology of long-lived stau scenario

Signal at colliders

- Charged tracks, high p_{T}, tracker+muon-chambers (muon-like)
- Muons always ultrarelativistic $\leftrightarrow$ stau can travel slower than c
  $\rightarrow$ Main discrimination: velocity
- If staus originate from cascades: further signatures from SM particle radiation

Simplified model

As model-independent as possible $\rightarrow$ Simplified model approach

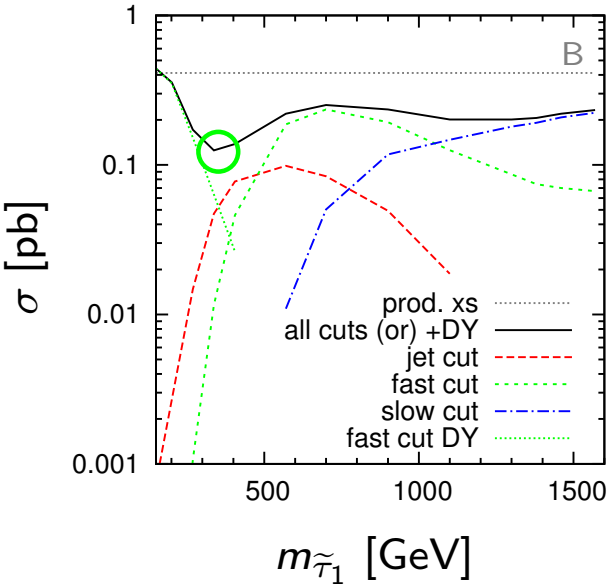
- Focus on strong production
- Consider $m_{\widetilde{g}}$, common $m_{\widetilde{q}}$ and $m_{\widetilde{\tau}_1}$

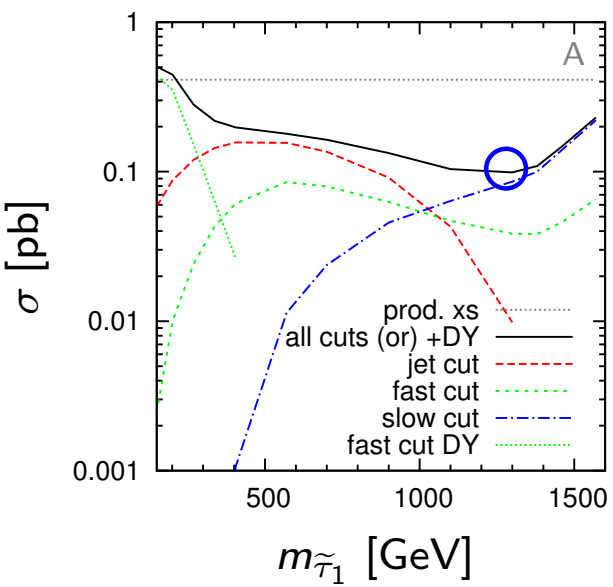
Can one set conservative bounds on these parameters from the LHC experiment, that cover all possible spectra?

How large is the dependence on the spectra?

Cascades

- Systematically explore parameter space
- Impose appropriate selection criteria $\rightarrow$ high efficiencies

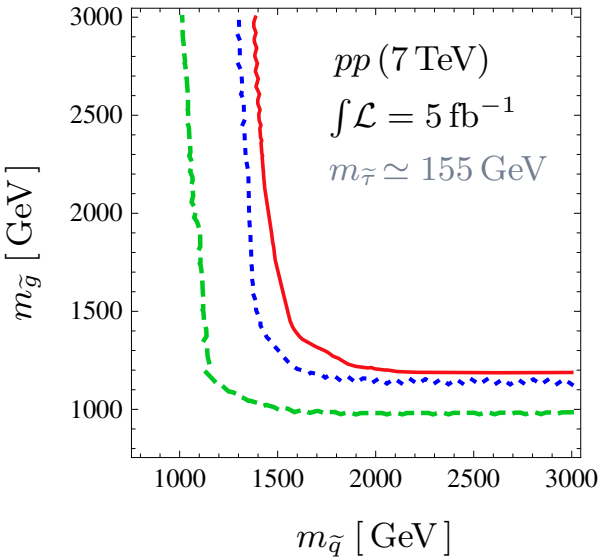


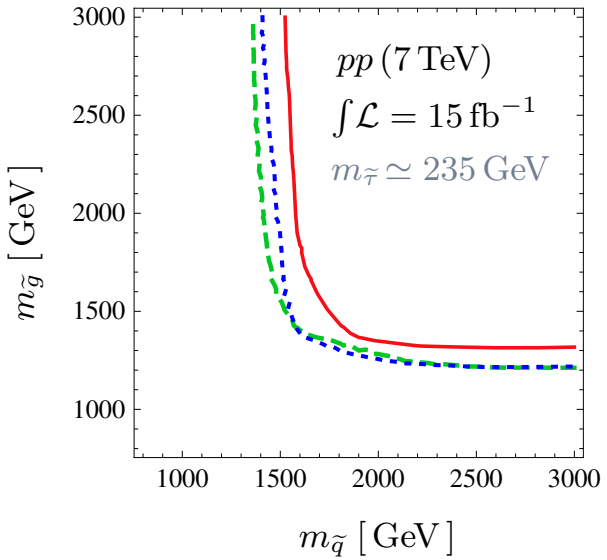


- Two potential regions to hide scenario

Gluino-squark-plane

Projected LHC sensitivity for the main region and the two limiting cases (very fast staus, very slow staus):





Curves lie within a relatively thin band

Conclusion

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- **Thank you for your attention!**