

# NP : Summer plans and prospects

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# Published / Accepted / Submitted analysis

PUBLISHED/ACCEPTED

$W' \rightarrow WZ \rightarrow lljj + lnujj$

Accepted by PRL 3/24

# Analyses in reviews

**MIS**

**EB032**

**LQ1 (ej)(vj)**

**EB015**

**CMLLP**

**EB020**

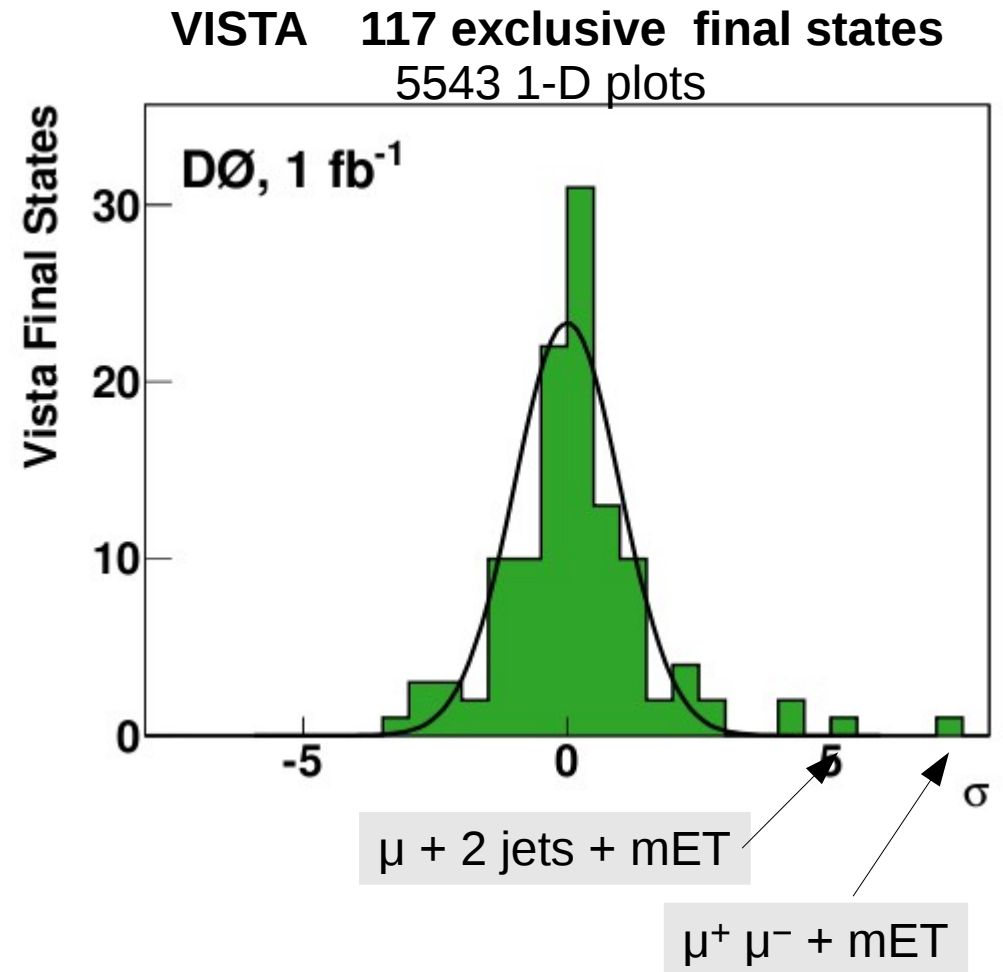
**GMSB  $Z_\gamma$**

**EB013**

# Model Independent Searches

(A. Evdokimov, J. Kraus, J. Linnemann, P. Mal, M. Naimuddin, J. Piper, S. Protopopescu, P. Renkel)

- ✓ RunIIa dataset  $1.07 \text{ fb}^{-1}$
- ✓ Preliminary results at Moriond 2009
- ✓ Collab. review ended on May 16
- ✓ Latest PRD draft v3.0
  
- ✓ Waiting for author responses



# First generation leptoquark

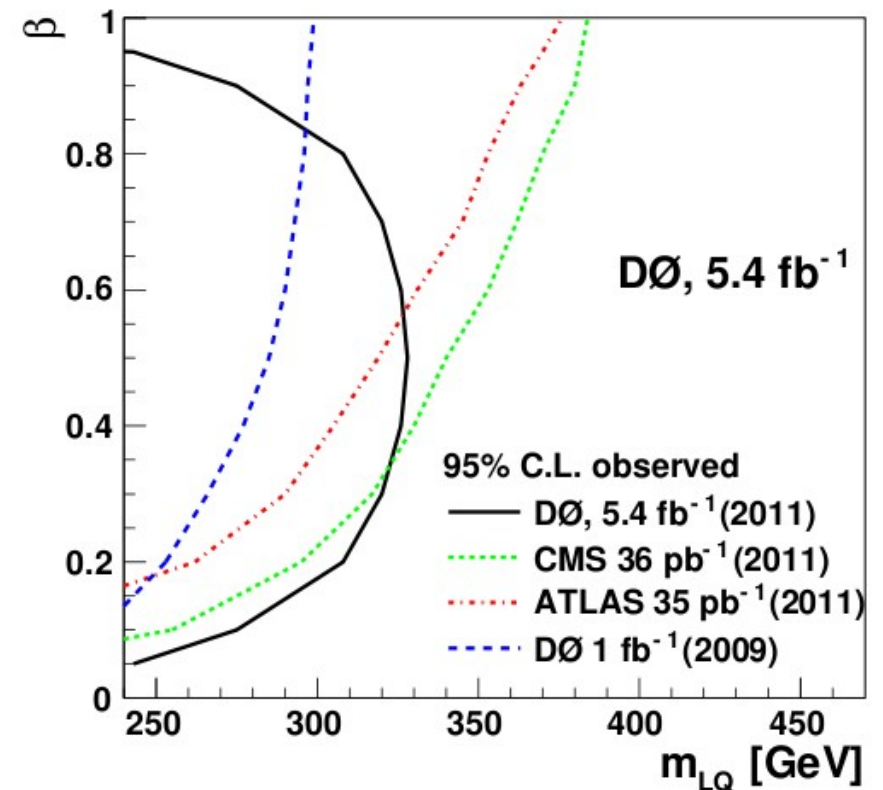
(Xinlu Huang, Thomas Gadfort, Gustaaf Brooijmans, Lidija Zivkovic)

Analysis (ej) (vj) based on  $5.4 \text{ fb}^{-1}$ , in EB015 since Feb. 2010

waiting for a combination with (ej)(ej) !

**Time is pressing now for a standalone publication as result is slightly better than published LHC results**

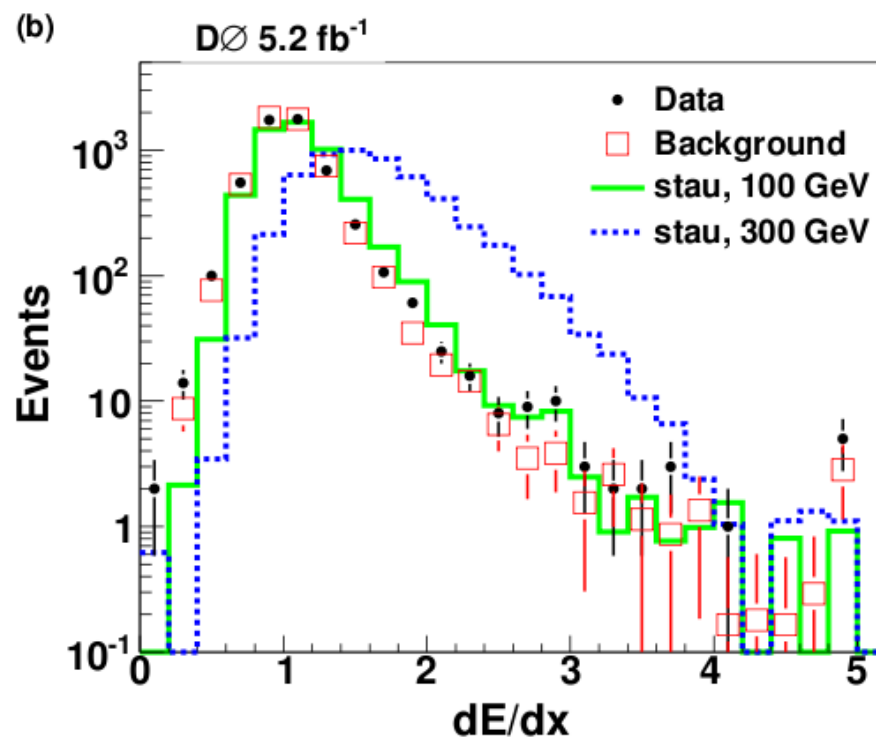
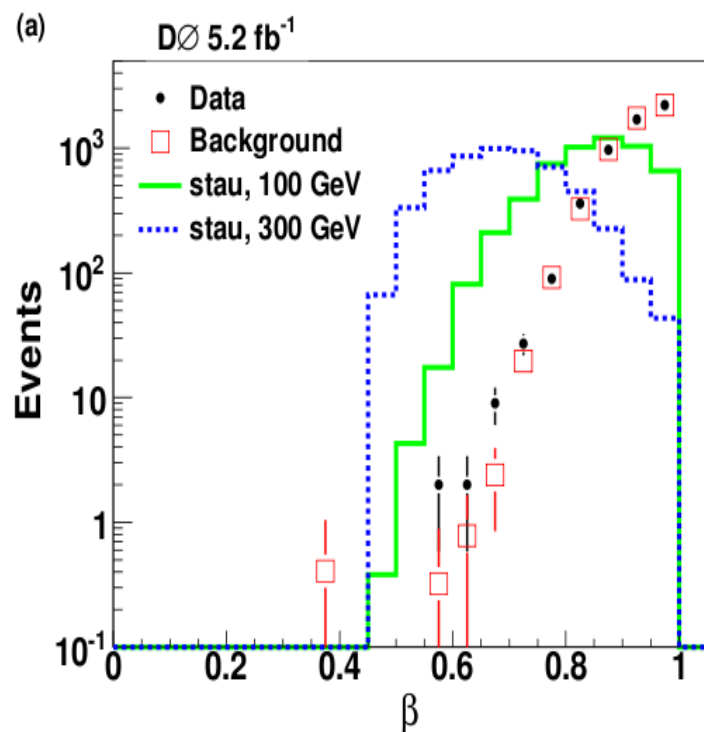
**In collaboration review until June 6**



# Search for Charged Massive Long-Lived Particles

( J. Alimena, S. Banerjee, S. Cho, D. Cutts, M. Eads, S. Park, Y. Xie)

- ✓ in EB020 since Feb. 7                      search based on  $5.2 \text{ fb}^{-1}$
- ✓ Variables : speed  $\beta$  (and its significance) measured by muon scint. counters  
                   $dE/dx$  (and its significance) measured by SMT

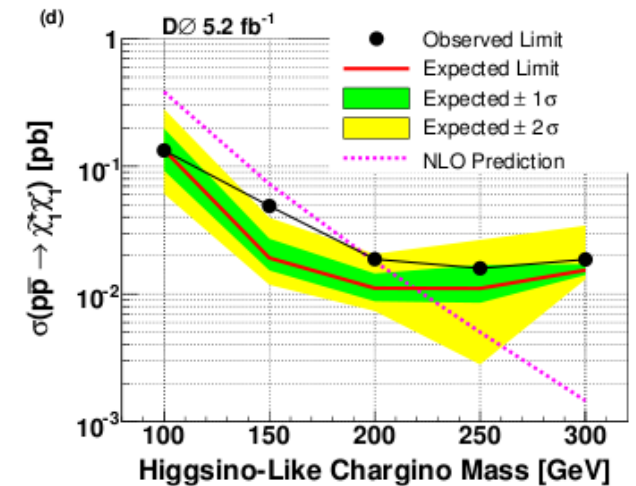
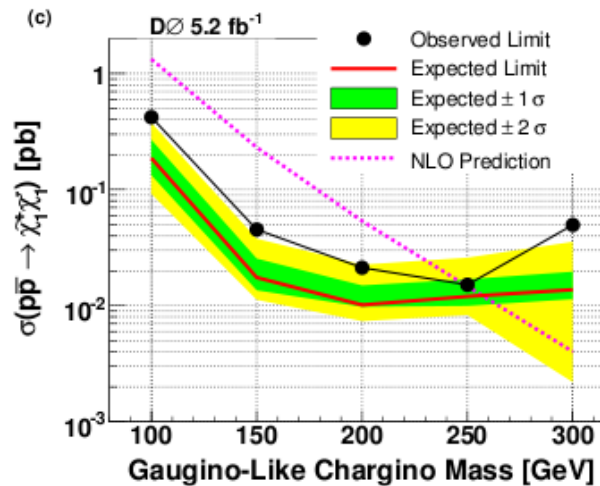
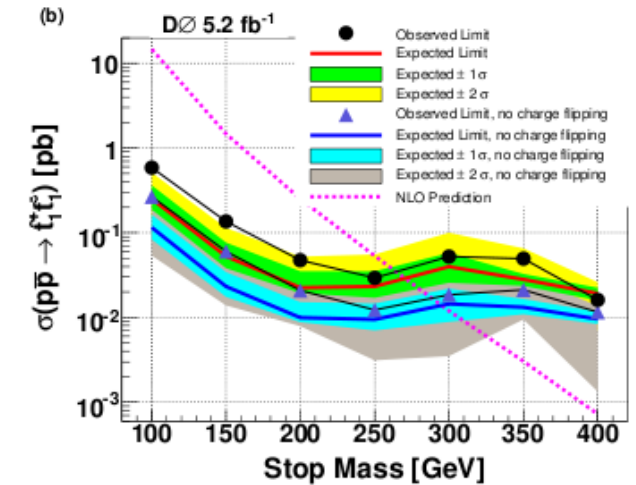
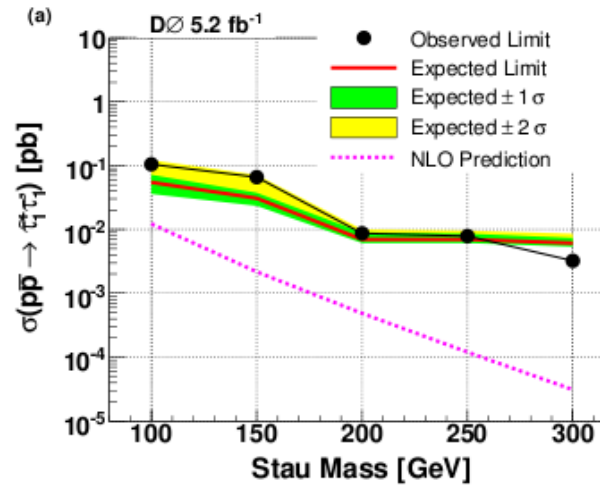


# CMLLP (2)

Here also time is pressing.

PRD longer paper !

- ✓ p17 published analysis
- ✓ p20 single and double CMLLP analysis



# Z( → ll) γ mET

(A. Wilson, B. Zhou, J. Zhu)

*In EB013 since April 21*

*GMSB Model Line E : higgsino-like neutralino  
→ Z Gravitino*

$$\chi_1^0 \chi_1^0 \rightarrow Z \tilde{G} + \gamma \tilde{G}; \quad Z \rightarrow ll; \quad l=e, \mu$$

**Data set 6.2 fb<sup>-1</sup>**

**1-Cut analysis to get Xsection limits vs  $\Lambda$**

**EM(llγ) > 120 GeV to get rid of FSR**

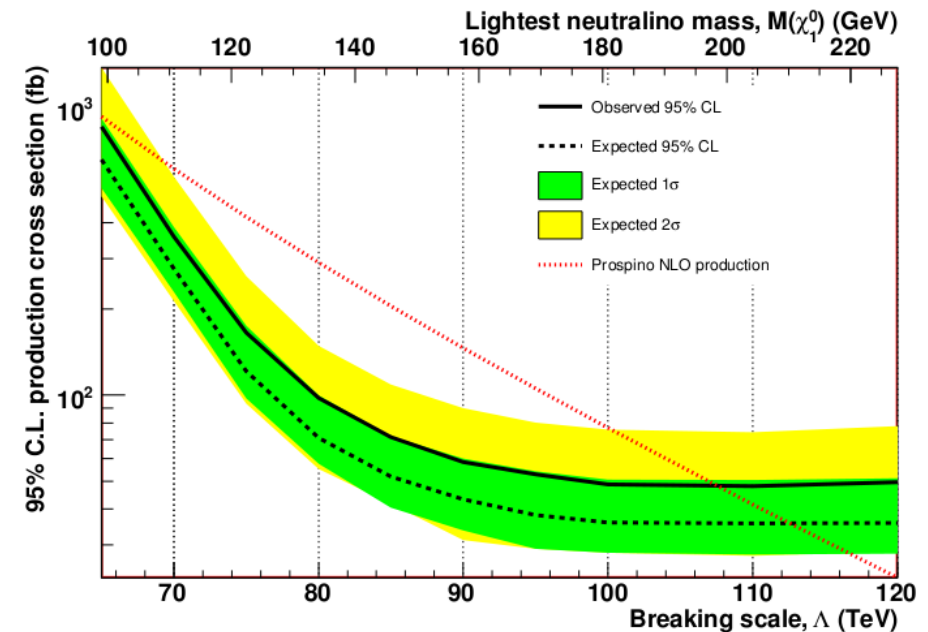
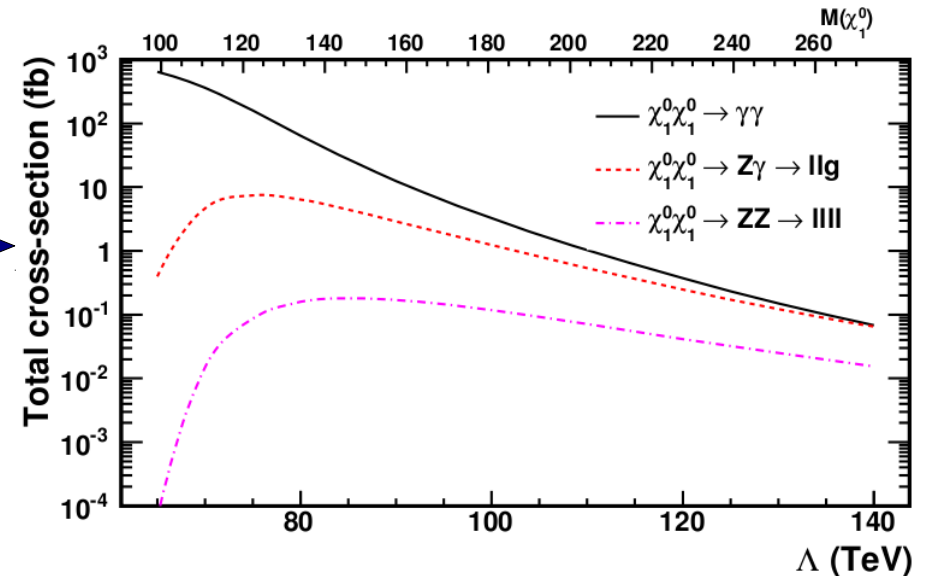
**E<sub>Tγ</sub> > 30 GeV**

**mET > 30 GeV (eeγ), 40 GeV(μμγ)**

**$\Lambda > 107 \text{ TeV}$  (  $M_\chi > 198 \text{ GeV}$  )**

**2-Better sensitivity using MVA analysis (14 variables)**

**$\Lambda > 119 \text{ TeV}$  (  $M_\chi > 225 \text{ GeV}$  )**





# Summer analyses

**Like sign dimuons**

**SUSY, UED**

**2b+ $\mu$ + $\tau$ +mET**

**SUSY stop pair**

**Trileptons**

**SUSY chargino-neutralino**

# Like sign dimuons

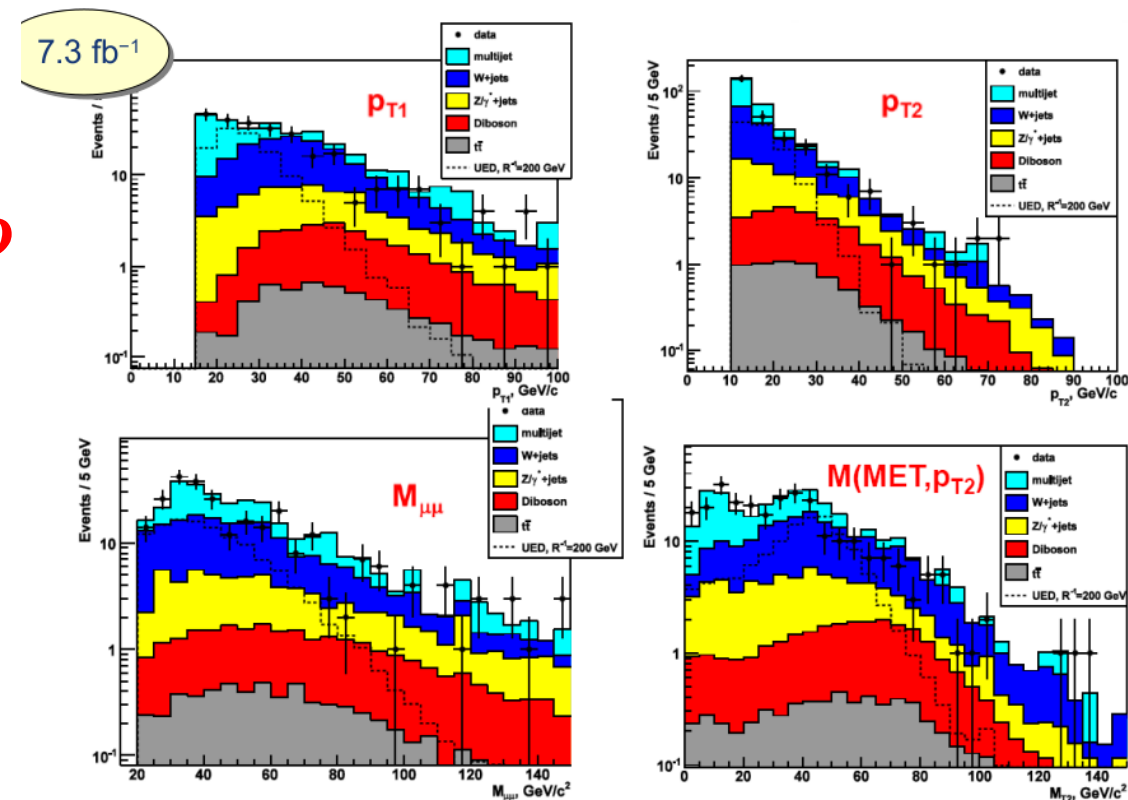
( A. Popov, A. Shchukin, A. Santos, J. Mansour, P. Mercadante, V. Goryachev)

*SUSY  $\chi_1^+ \chi_2^0$  production in 3 leptons;  
when slepton-neutralino mass  
difference is small the 3<sup>rd</sup> lepton is soft  
and may escape detection*

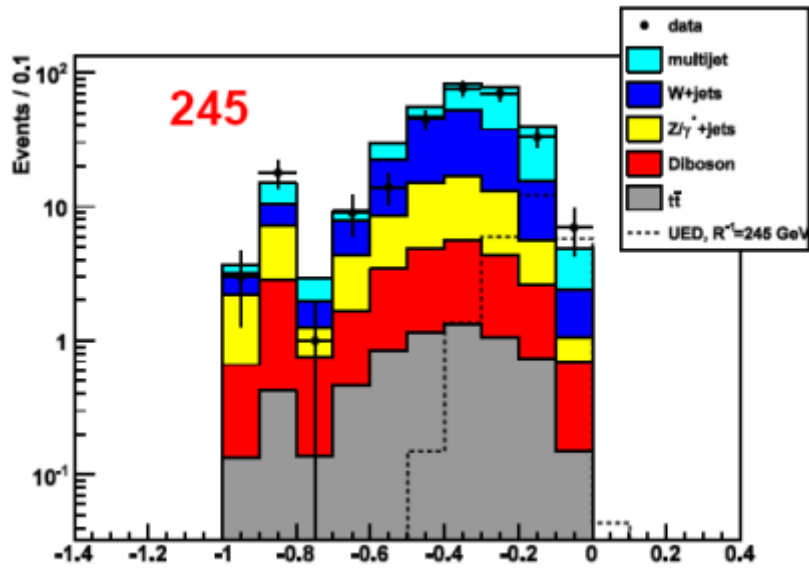
*Similar signature in the context of UED  
model*

Use 7.3 fb<sup>-1</sup> RunIIa + RunIIb data

Analysis note expected today !

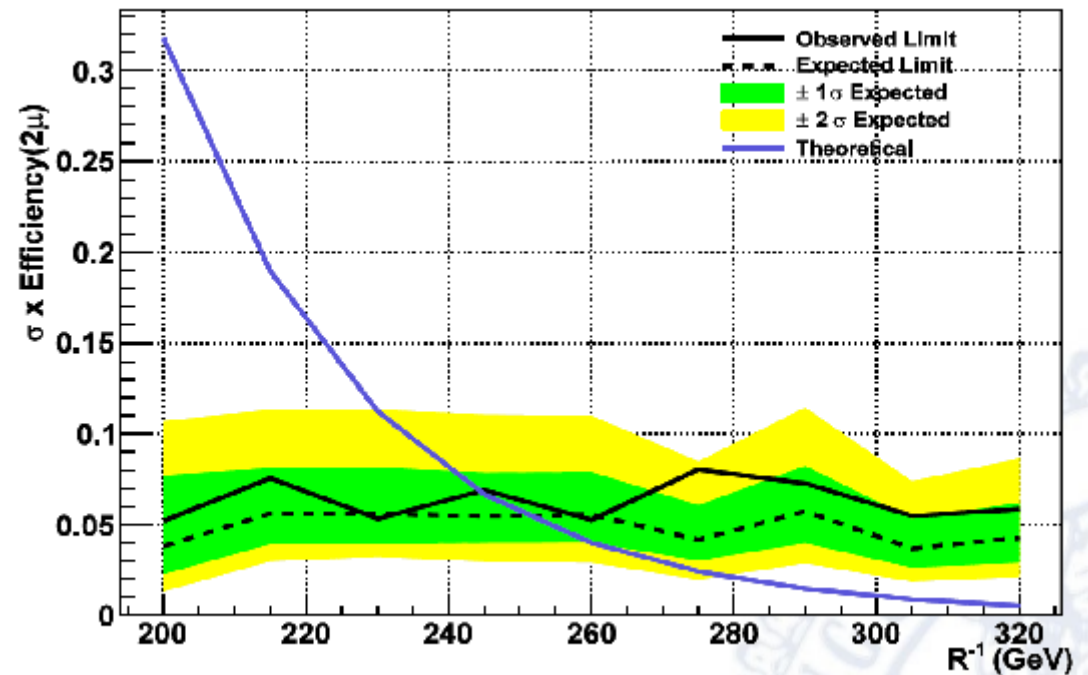


# Like sign dimuons (2)



BDT analysis: separate training for each  $R^{-1}$  point

Observed limit  $R^{-1} > 240$  GeV



# Stop pair in $bb \mu\tau$ mET

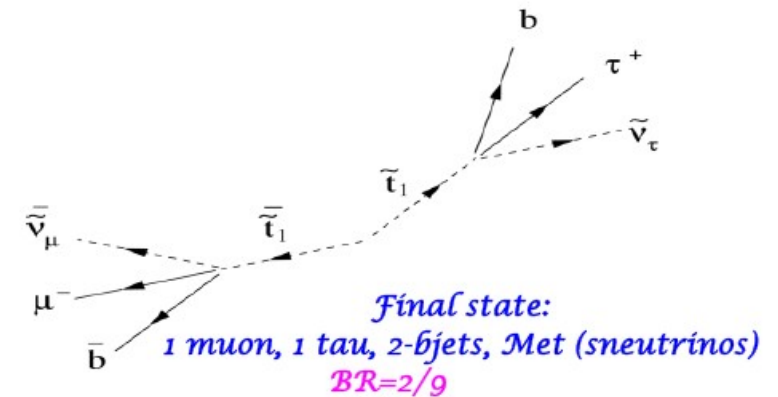
(Ph. Gris)

- ✓ 7.2 fb<sup>-1</sup>: RunIIa, RunIIb1,2,3 mu inclusive data

See Philippe's talk to-morrow

- ✓ Analysis note expected today !

All  $\tau$  types



# Trileptons

(M. Rominsky, I. Katsanos, J. Mansour, M. Eads)

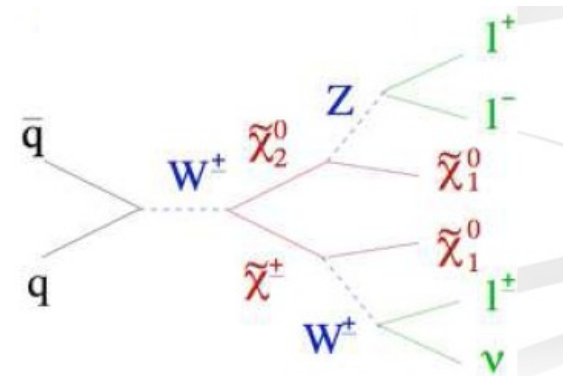
**2 leptons + isolated track + mET**

**Adapt the HWW analysis framework ( + isol. Trk)**

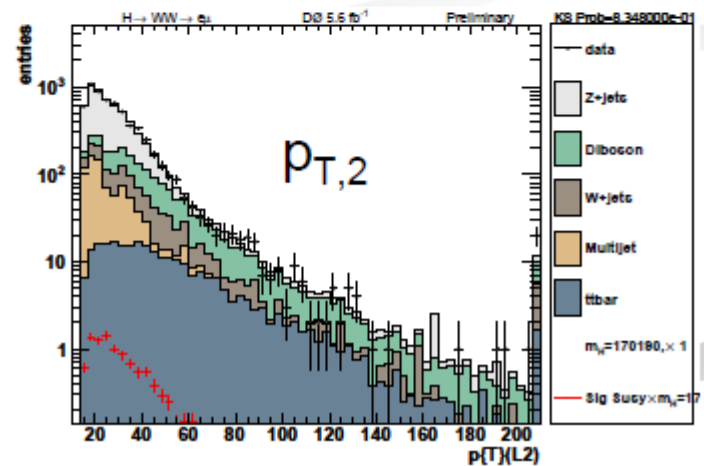
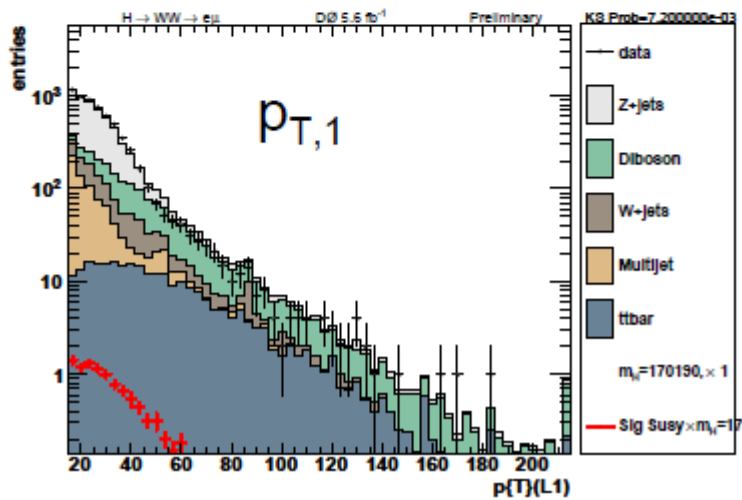
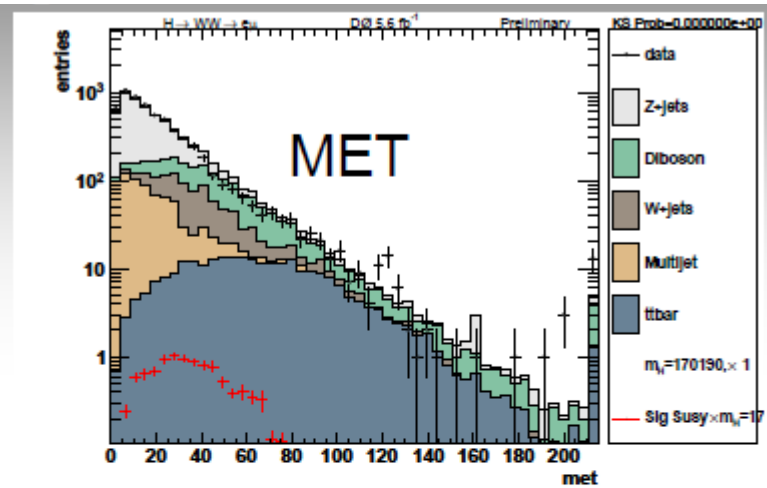
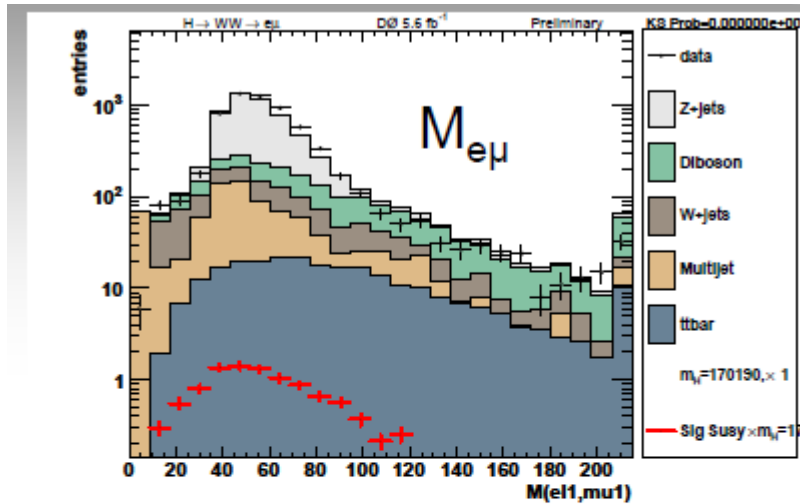
**3 final states :  $\mu\mu$ ,  $e\mu$ ,  $ee$**

**Tools are in place**

**Will missed the EPS dead line**

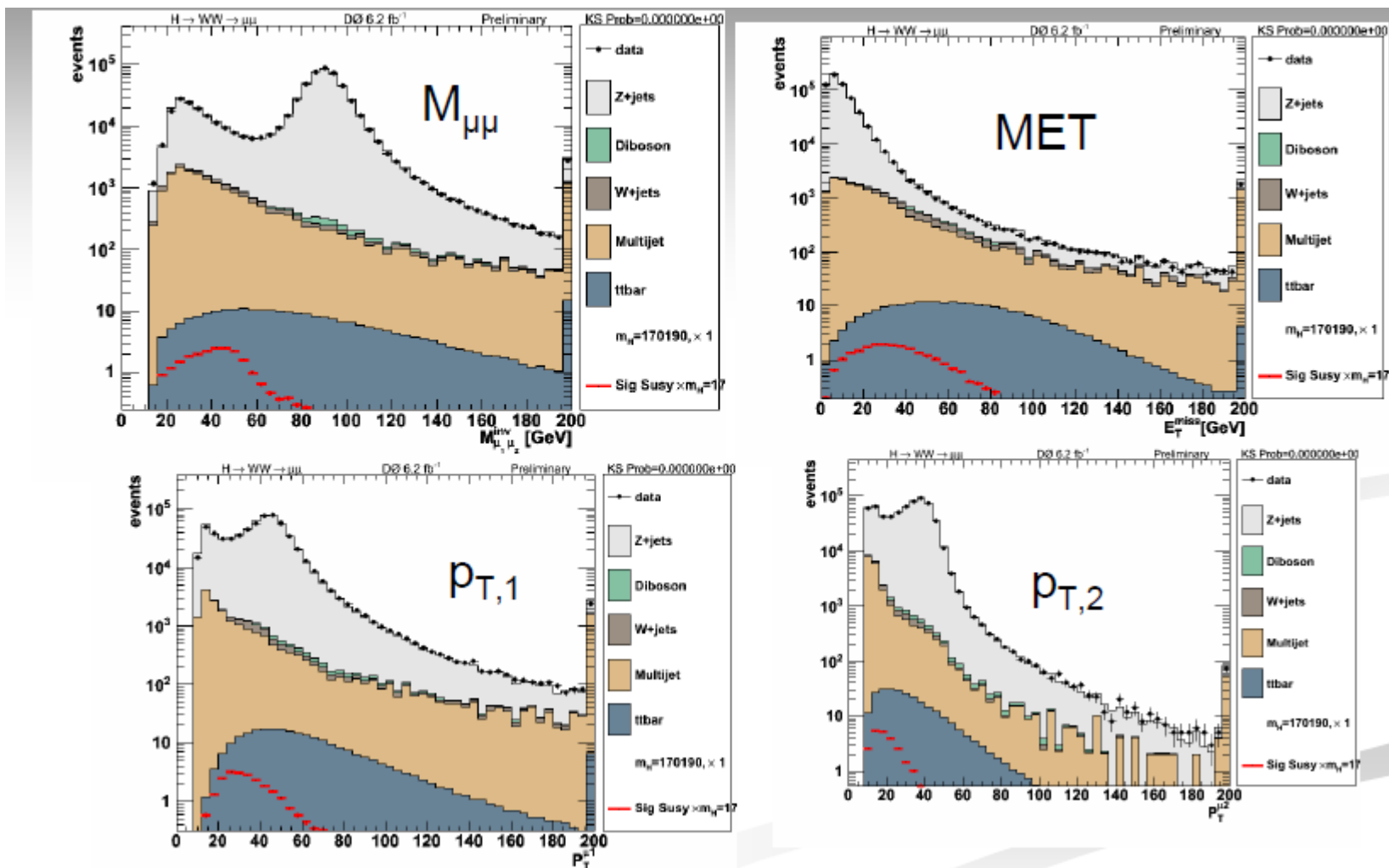


# EMU: $p_{T_e} > 15 \text{ GeV}$ , $p_{T_\mu} > 15 \text{ GeV}$



Satisfactory agreement

# $\mu\mu$ preselection level



data/MC normalisation in the Z mass range

# After summer analyses

**Search for gluino pairs**

**SUSY**

**Monojet, monophoton**

**Extra Dimensions**



# Search for gluino pairs

(P. Salcido, D. Hedin, S. Uzunyan, P. Svoisky)

- ✓ In the context of Yukawa-unified SUSY GUT SO(10)  
*Baer et al arXiv:0910.2988*

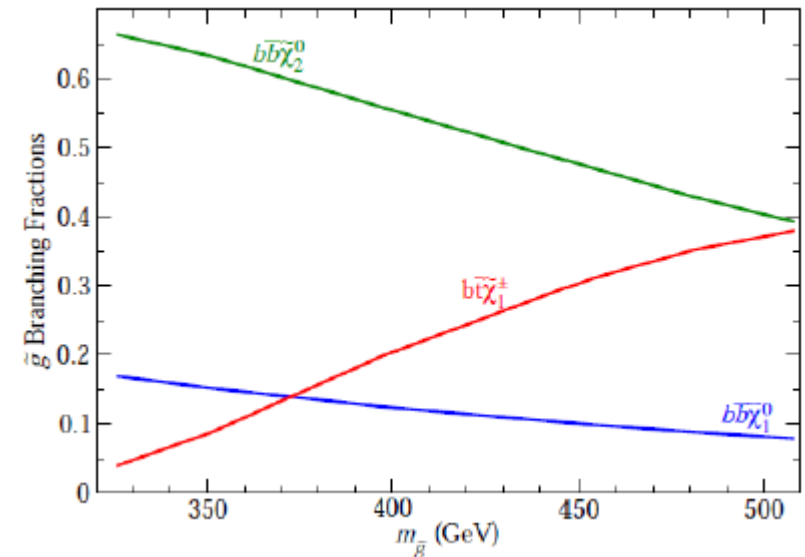
$M_{\text{gluino}} = 325\text{-}510$  GeV (much lighter than squarks)

gluinos will decay to 3<sup>rd</sup> generation particles

- ✓ Update to a more recent hznunubb framework

Lot of problems

and ...



Expected to converge late summer

ATLAS publication arXiv:1103.4344 (Mar. 22)

Higgs splitting model :  $M > 420$  GeV

# **Monojet - Monophoton**

**2 undergraduates students at Florida State University (Todd A.)**

**Work started on monophoton, not yet on monojet**

**No schedule !**

# Summary

**4 analyses in reviews**

**3 analysis for summer conferences**

**2 ! longer term analyses**