Physics Landscape Working Group

CERN Workshop Summary

Convenors:

Volker Büscher (Freiburg), Bogdan Dobrescu (FNAL),
David Rainwater (Rochester), Michael Schmitt (Northwestern)

Outline:

- Experimental Aspects
- Model-independent Analysis
- Models: Case Studies

Experimental Aspects

Goals:

- Review differences between Tevatron and LHC algorithms
- Comparison of performance in LHC MC with Tevatron MC and data
- Inject realism into LHC simulation and analysis

Projects:

- Electrons and Photons (Yuri Gershtein)
- Muons (Carsten Hof, Carsten Magass, Alexey Drozdetskiy)
- Taus (Michael Heldmann, Ingo Torchiani, Volker Büscher)
- Jets and Missing E_T (Shoji Asai, Song Ming Wang, Reiseburo Tanake)
- tracking and b-tagging (Veronique Boisvert)

Please add your name to the list!

τ-ID at D0 and ATLAS

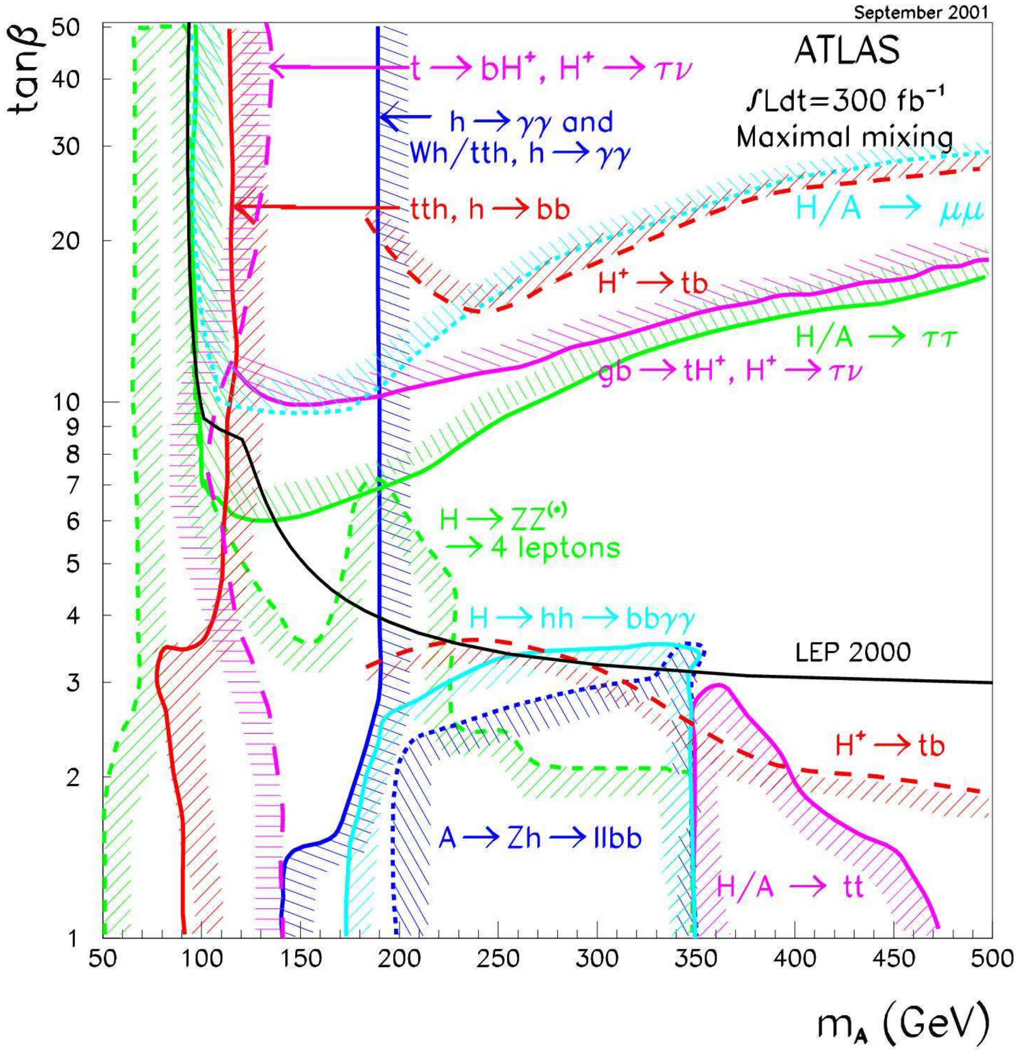
Volker Büscher,
Michael Heldmann,
Ingo Torchiani

University of Freiburg

- Motivation
- D0
- ATLAS
- preliminary comparison
- summary

Motivation

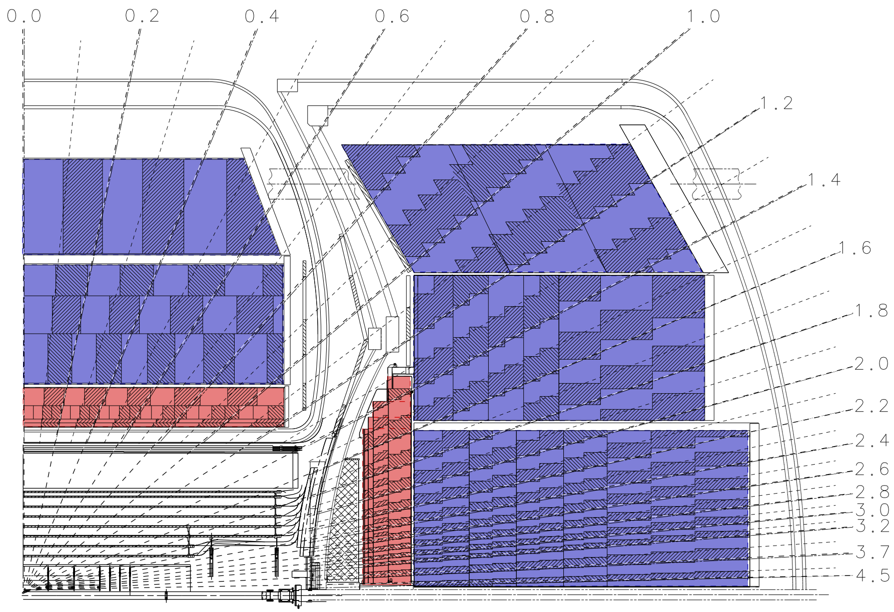
- **At ATLAS we expect a big number of final states involving taus**
- **Channels using taus**
  - $A^0/H^0 \to \tau\ \tau$
  - $H^+ \to \tau\ \nu$
  - SUSY with production of $\tilde{\tau} \to \tau + \chi^0{}_1$
  - Standardmodell Higgs (VBF qq H $\to$ qq $\tau\ \tau$)
  - Z $\to \tau\ \tau$ (for comissioning)
  - τ are perhaps the only way to access the chiral structure of SUSY
- $\to\tau$'s are an important signature

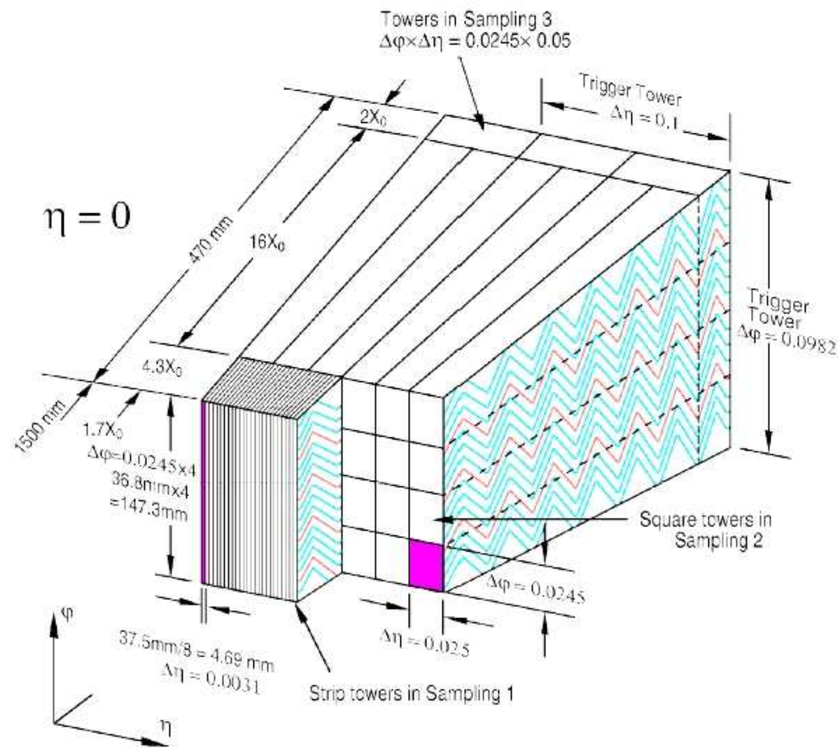


Preliminary comparison

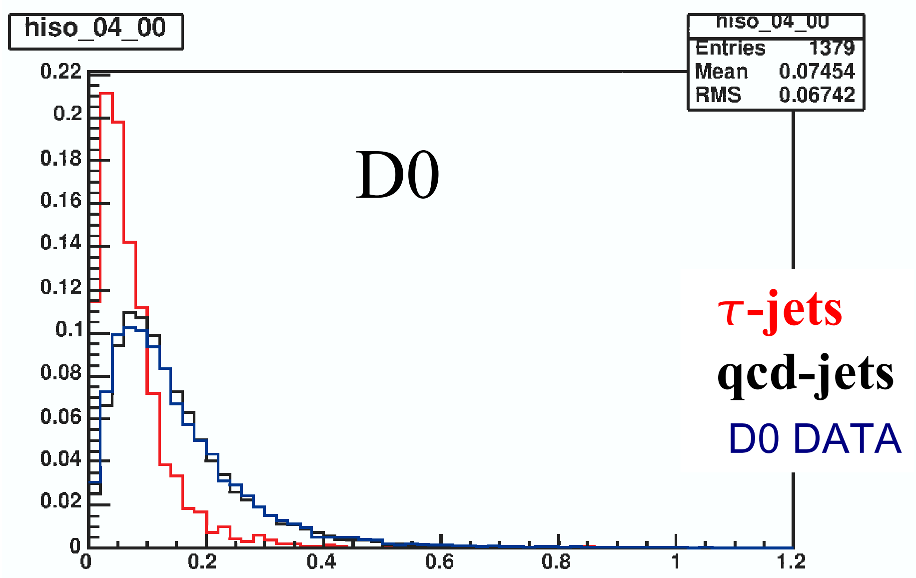
- The goal is to understand what difference we can expect from the results in MC to performance with real data
  - We think we can accomplish establishing a chain of understanding
  - ATLAS Algorithm on ATLAS MC → D0 Algorithm on ATLAS MC →
  - → D0 Algorithm on D0 MC → D0 Algorithm on D0 data
- Therefor we need to implement all variables D0 uses at ATLAS
- Of course because of differences in the detector design the “translation” of variables is not unambiguous
- our convention:
  - D0 EM3 (finely granulated layer in the EM) → ATLAS EM2
  - D0 EM1, EM2 → ATLAS eta-strip layer
  - tower granularity in both cases 0.1x0.1
- energy thresholds have to be adjusted

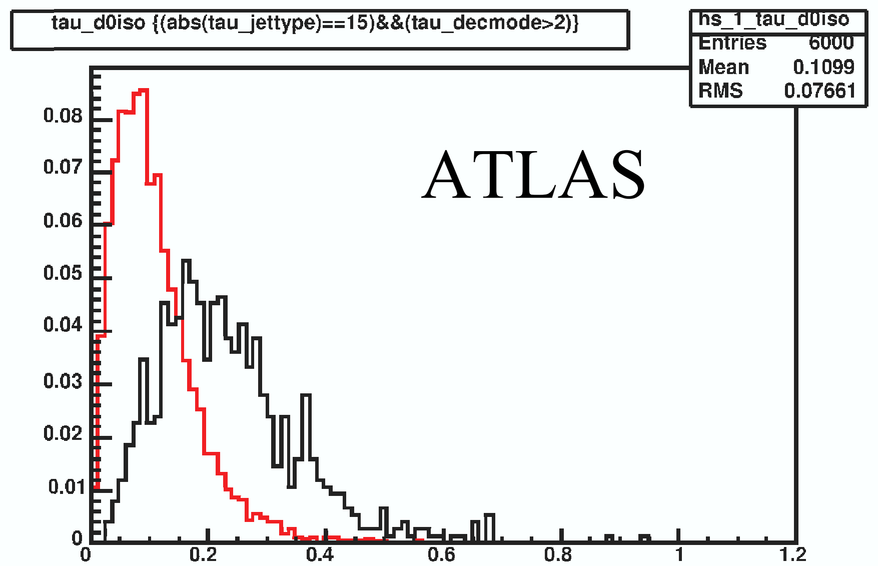
Tau Identification in ATLAS and DØ





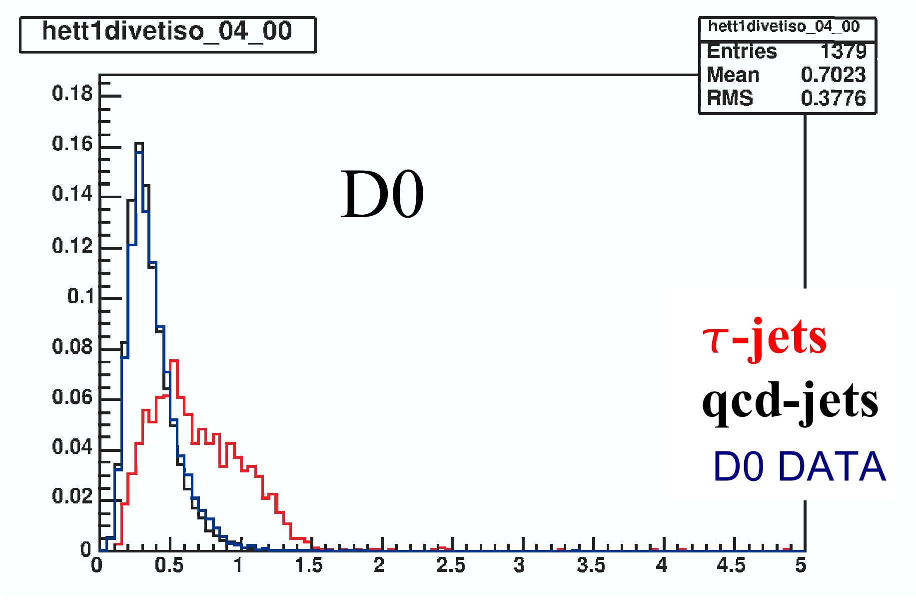
Tau Isolation:

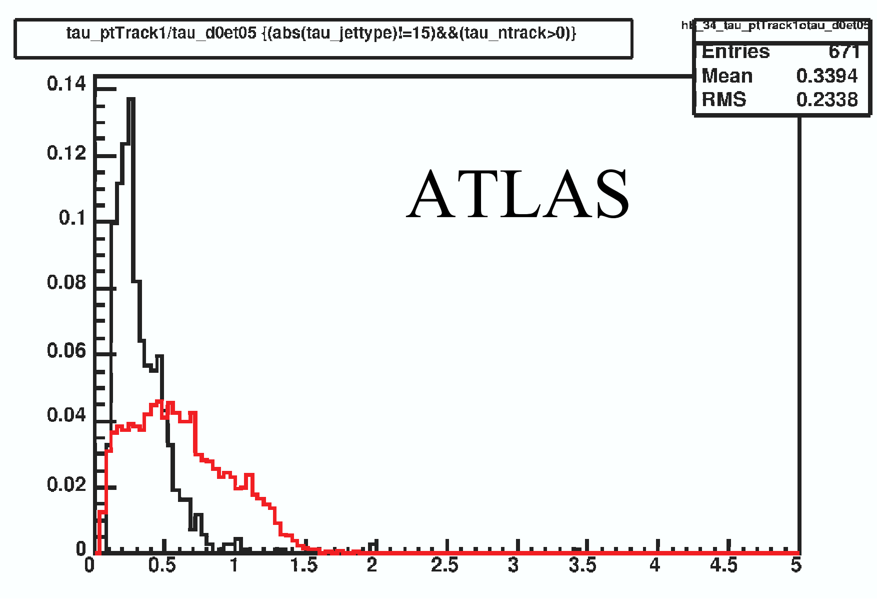




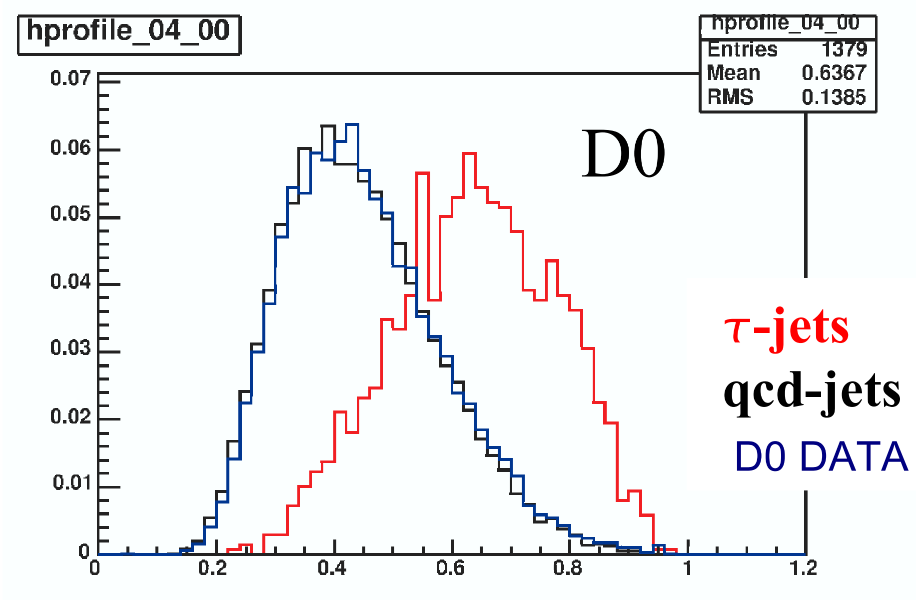
Tau Identification in ATLAS and DØ

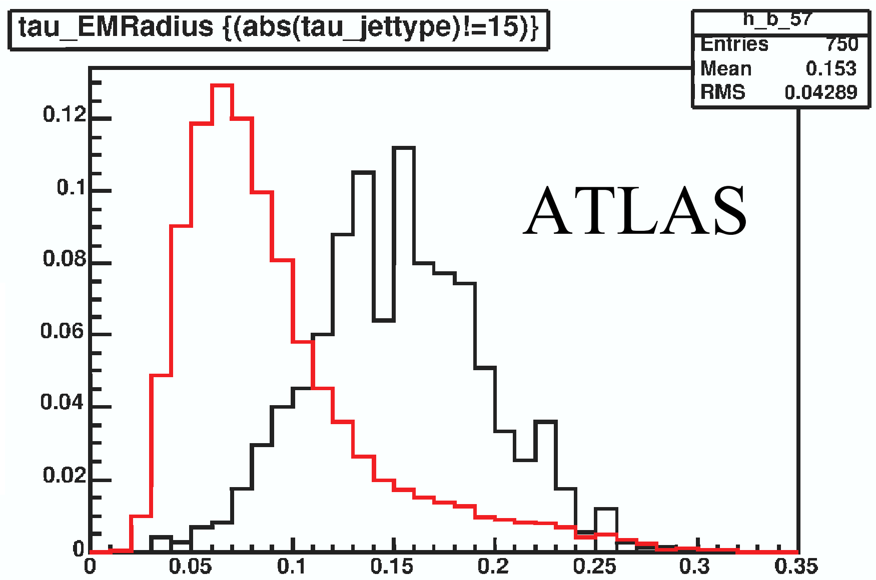
Ratio of track p_T and calorimeter E_T:





Width of calorimeter cluster:





Comparison Performance

- I don't shows plots involving non-tau tracks, because D0 uses tracks down to 200MeV, and I have only > 1.5GeV at the moment
- As stated before the results are not really comparable, but just to give some idea
- we had a first look, cutting on the D0 variables for ATLAS
  - iso < 0.2
  - e1e2/ETt > 0.4
  - pT(Trk1)/ET > 0.25
  - EM12isof < 0.3
  - EMRadius < 0.15
  - **eff = 56%, R=10.6**
- the D0 neural network gives
  - NN eff=57%, R=47 or NN eff=36%, R=125
- for comparison the ATLAS LikelihoodRatio shows
  - LLH eff=57%, R=59 or LLH eff=38%, R=334
- these number are normalized to tau-candidates, so they should be corrected for the reconstruction efficiency for the tau-candidates

Study of Background for SUSY @LHC

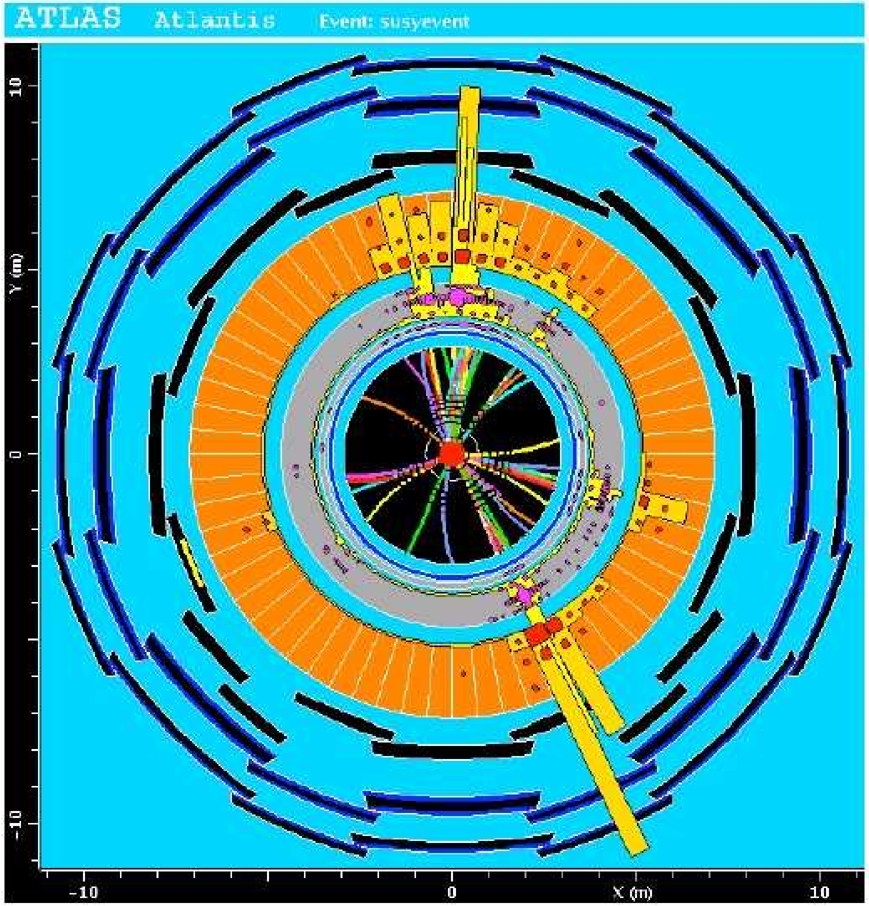
1. Event topologies of SUSY
2. SM background processes
3. Problem in the current estimation
4. Production with ME information
5. ME-PS matching
6. Results
7. Extrapolation for SUSY
8. Summary

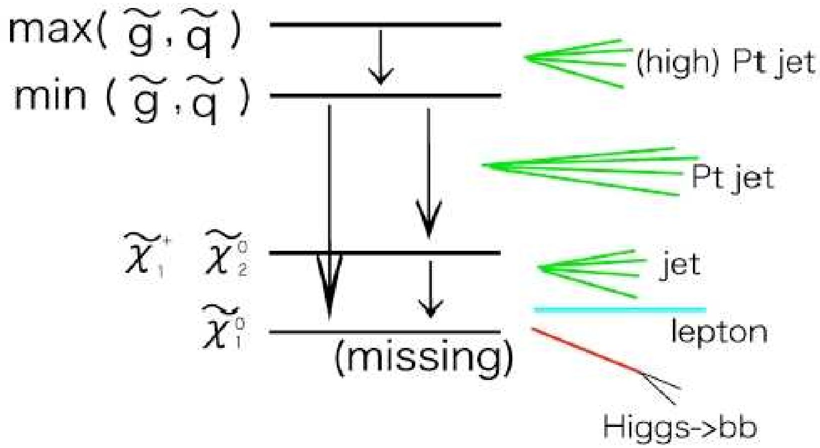
S.Asai T.Sasaki and J.Tanaka
(University of TOKYO)

SUSY Jets + $\not{E}_T$

1.Events topology of SUSY (Gravity- mediation + R-parity)

Gluino/squark are produced copiously,
Cascade decay is followed.





event topologies of SUSY

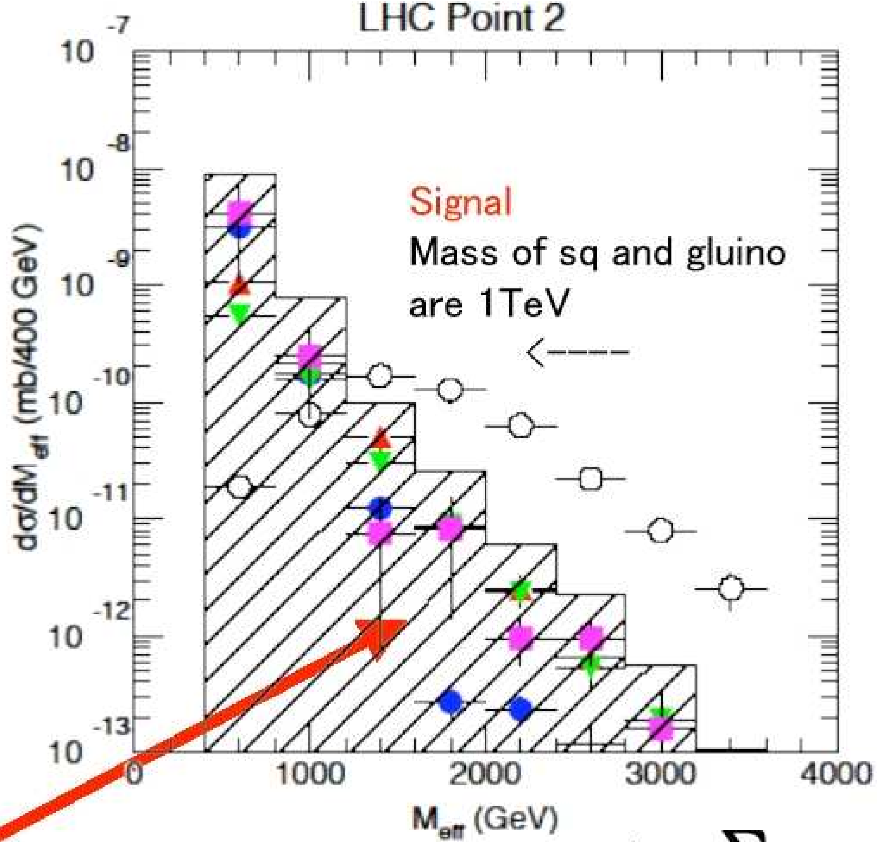
	multi	leptons
$\not{E}_T$ +	High P_T jets +	b-jets
		τ-jets

Especially no or one lepton mode is promising for Discovery

SUSY Jets + $\not{E}_T$

No lepton mode:
- Z (ν ν , τ τ)+ N jets ▼
- W (τ ν) + N jets ▲
- tt + N jets ●
- QCD multi-jets ■ (Fake-missing Et)

One lepton mode:
- W + N jets
- tt + N jets
- Z(τ τ) + Njets



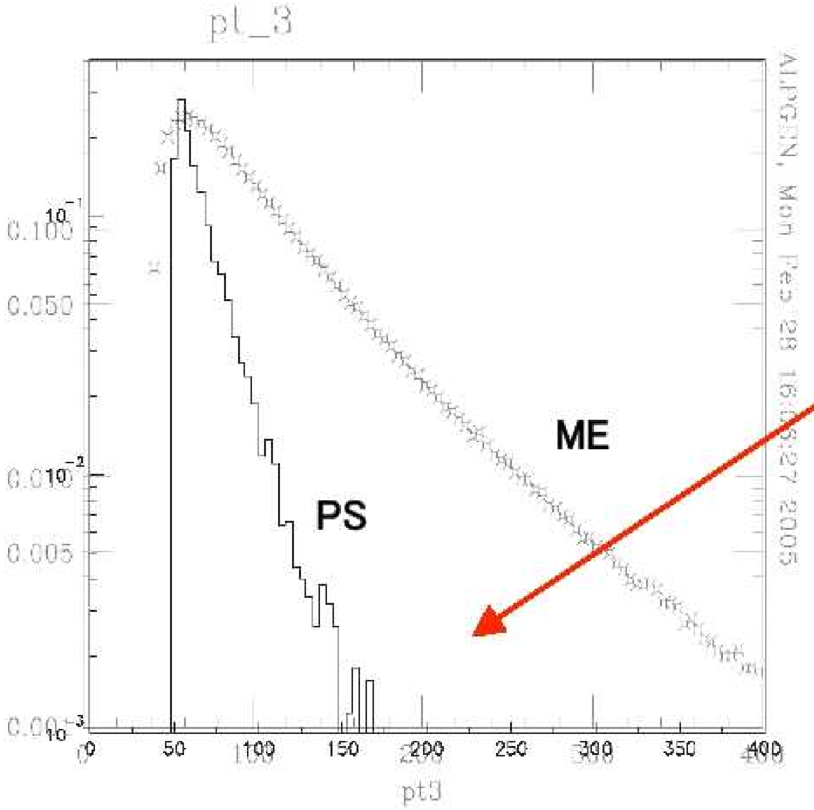
$= \not{E}_T + \sum P_T$

Up to 4jets

But these backgrounds are estimated with **Parton shower model !!!!!!** and are underestimaed.

High Pt multi-jet also contribute to suppress BG.

Pt distributions of 3rd jet for Z+ Njets processes



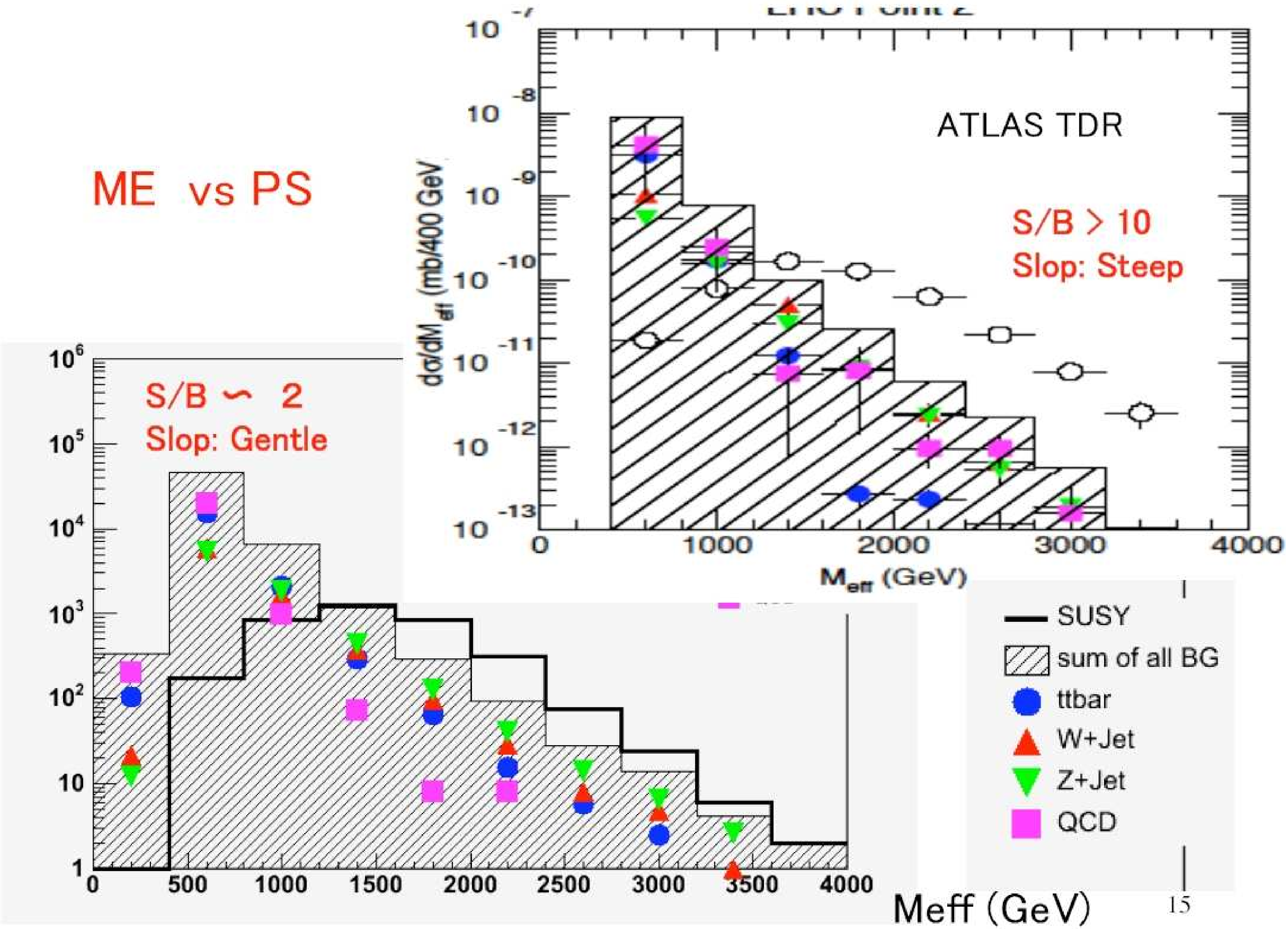
Missing Et > 100GeV
At least one jet(parton) has pt > 100GeV
At least four jets(partons) have pt>50GeV

When the distributions are superimposed,
You can see significant difference.

Hard jet is not emitted in Parton Show:
(It is famous problem.)

- Factor of more then 100 is different.
- The same problem is in 2nd,3rd,4th,,,, jets
- Jet contribution should be underestimated in current estimations.

SUSY Jets + $\not{E}_T$



Muons

TeV4LHC, CERN, April 2005

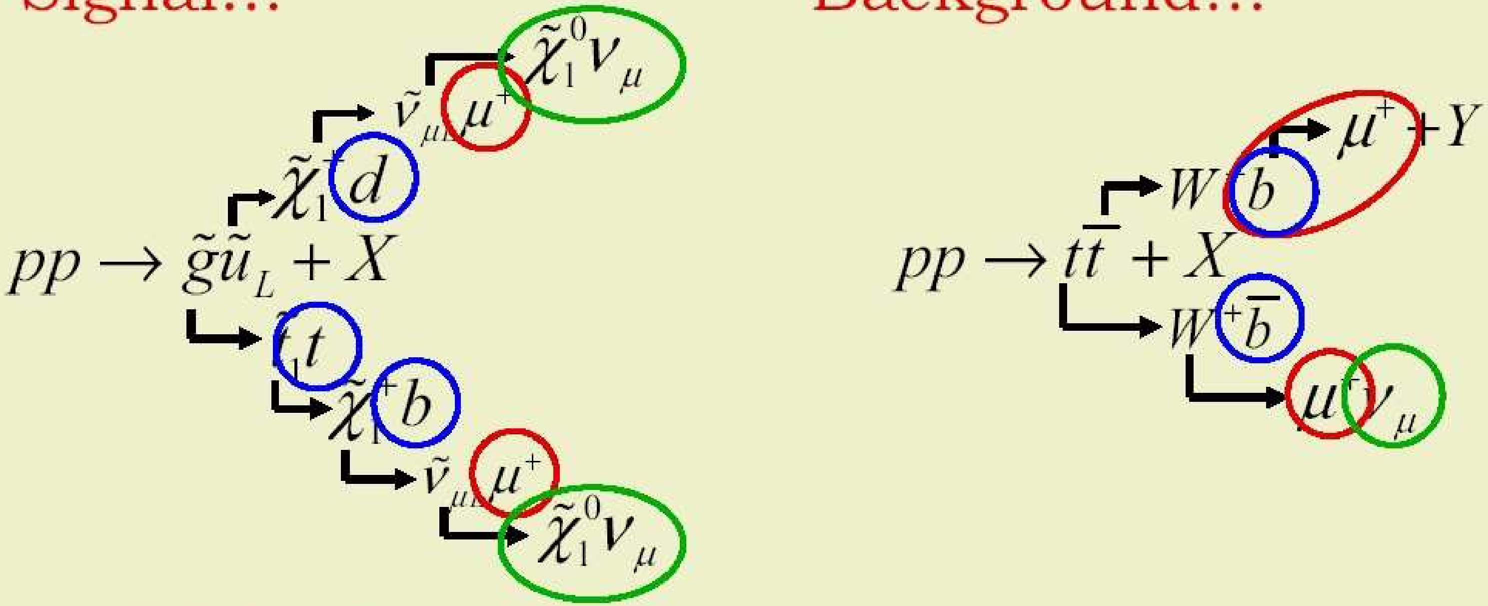
First detailed study on the CMS SUSY discovery potential with two same sign muons in the mSUGRA model

Salavat Abdullin (FNAL)
Darin Acosta (UF)
Paolo Bartalini (UF)
Rick Cavanaugh (UF)
Alexey Drozdetskiy (UF)
Andrey Korytov (UF)
Guenakh Mitselmakher (UF)
Yuriy Pakhotin (UF)
Alexander Sherstnev (MSU)
Bobby Scurlock (UF)

Muons

Diagram examples

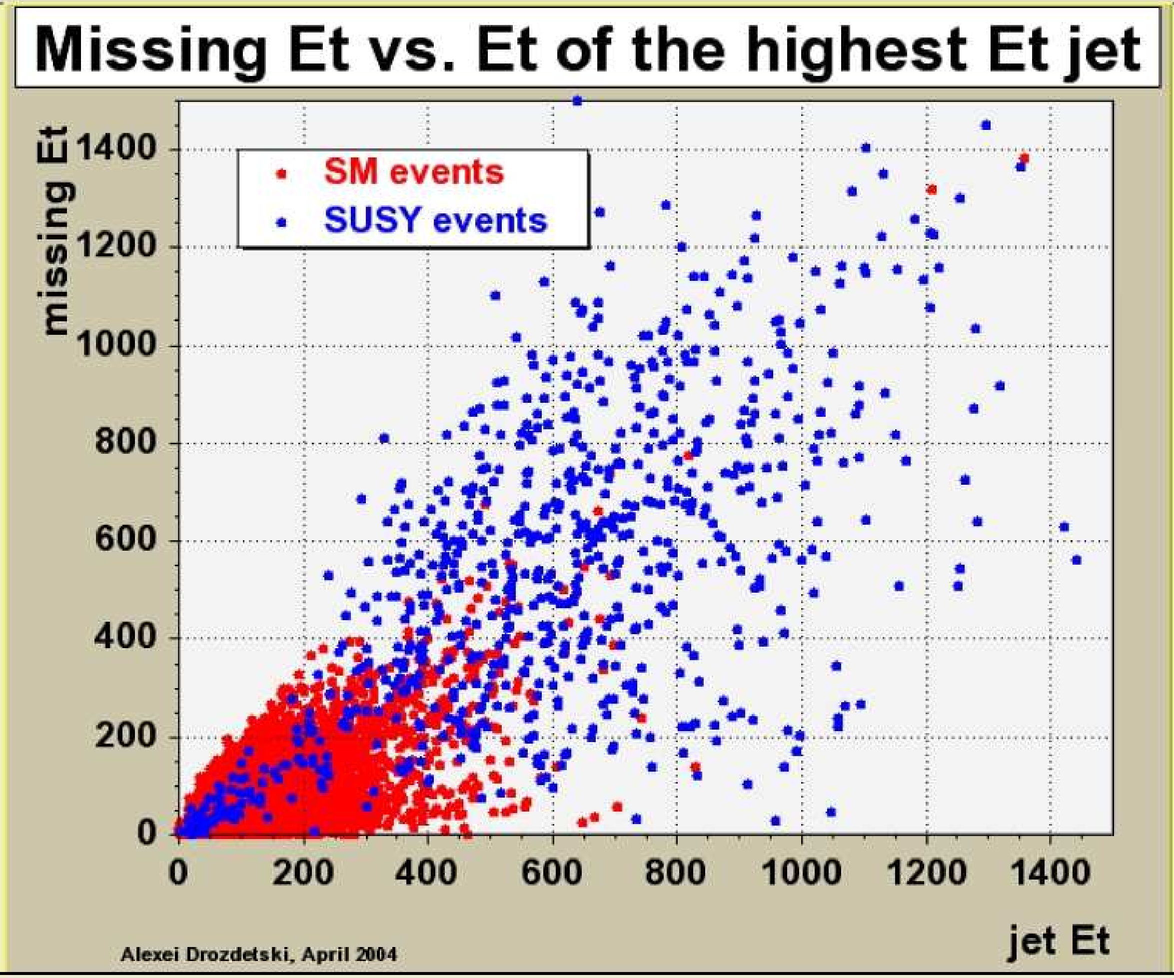
▷ Signal… Background…



▷ Variables for cuts:

- ▷ Missing E_T
- ▷ Jets E_T
- ▷ Muon P_T, Muon Impact Parameter
- ▷ Plus: Muon Isolation, Muon η, Jet η, number of jets/muons, …

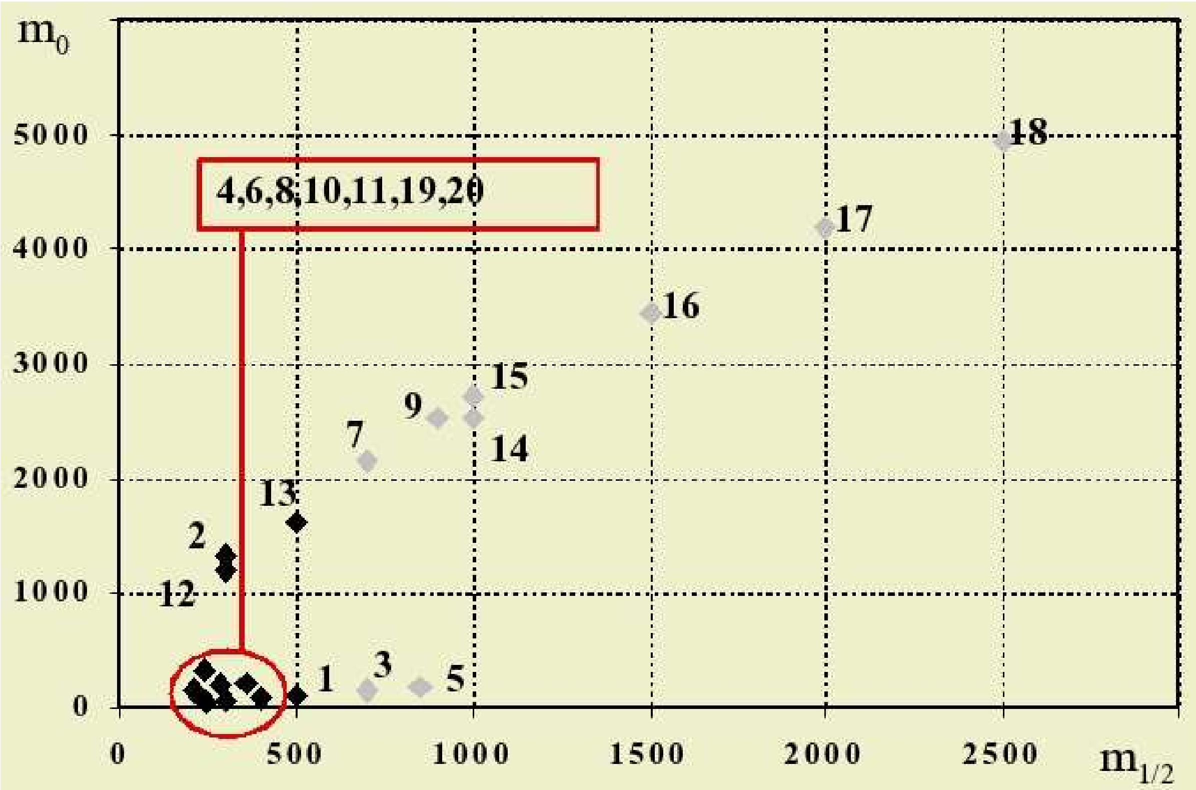
Event kinematics: SM vs. SUSY, example



- ▷ SUSY point (#3):
  - ▷ m_0=149 GeV, $m_{1/2}$=700 GeV, $\tan\beta = 10$, $A_0 = 0$, sign$\mu > 0$

Muons

A number of benchmark scenarios can be discovered with 10 fb^{-1}:



	Significance	
	SET 1	SET 2
1	9.05	8.06
2	20.8	21.4
3	2	1.44
4	25	48.4
5	0.77	0.46
6	20.6	35
7	0.78	0.4
8	15.5	20.5
9	n/a	n/a
10	31.7	56.1
11	12.1	13.4
12	27.1	28.1
13	6	4
14	n/a	n/a
15	n/a	n/a
16	n/a	n/a
17	n/a	n/a
18	n/a	n/a
19	25.6	39.8
20	20.6	34

Tevatron like-sign dimuon analyses:

- non-negligible instrumental backgrounds:
  - non-isolated muons from $b\bar{b}$
  - mismeasurement of muon charge)

$\longrightarrow$ CMS studies in progress

Model-Independent Analysis

Goals:

- Assuming observation of a signal, interpret as Standard Model plus one new particle
- Classify new particles according to spin (gauge bosons, fermions, scalars) and charges
- Study each type of particle, understand signatures and how to disentangle them

Projects:

- Zprimes (Michael Schmitt, Benjamin Trocme, Tim Tait, Bogdan Dobrescu)
- Wprimes (Zack Sullivan, Carsten Hof, Carsten Magass)
- Vectorlike Quarks (Tim Tait, Georges Azuelos)
- TeV-Scale String Resonances (Tao Han, Piyabut Burikham)
- Leptoquarks (Michael Spira, Simona Rolli)
- Gluinos (David Milstead)
- Topgluons, Colorons, ...
- Charged Scalars
- ...

Please add your name to the list!

Distinguishing Z′ models in ATLAS

- Motivations
- Current limits and discovery perspectives
- Discriminating variables at LHC:
  - Natural width and cross section
  - Forward - backward asymmetry

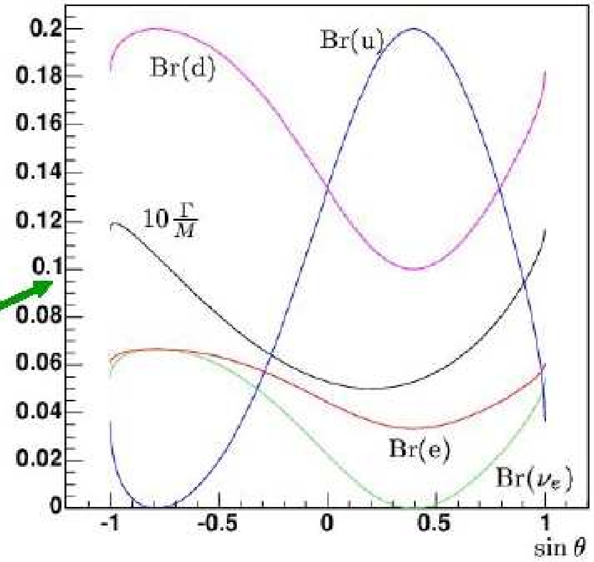
F. Ledroit, M. Schaefer,
B. Trocme (LSPC Grenoble)

The width & leptonic cross sections

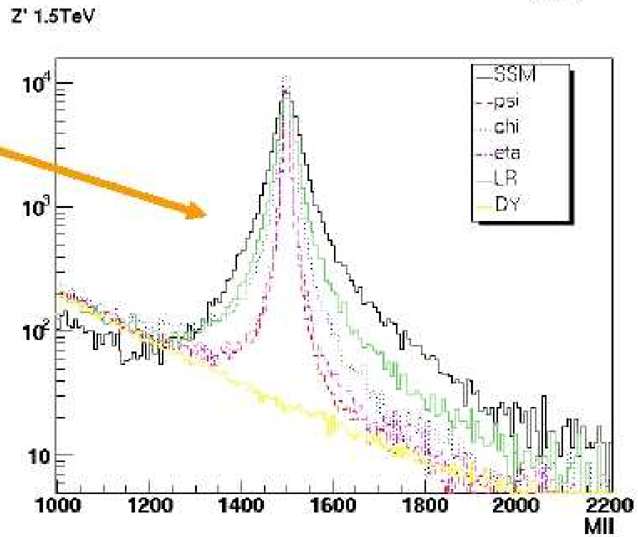
- Partial decay widths(light fermions):

$$\Gamma(Z' \to f\bar{f}) = N_c \frac{g^2}{\cos^2\theta_\omega} \frac{1}{48\pi}(g_V^2 + g_A^2)M$$

- Width / branching ratios variations in E6 models (assuming no exotic decays)



- Resonance shape for several models (arbitrary normalization)



- Problem : total width altered if Z' decays in invisible particles (gauginos by e.g.)

→ Consider instead the product :

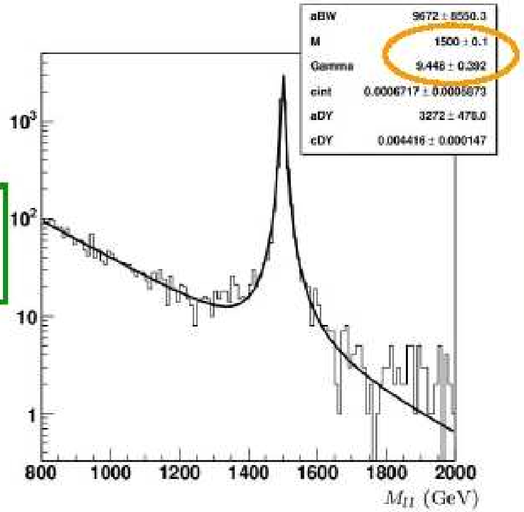
$$\sigma_{ll} \times \Gamma$$

The width extraction in Atlas

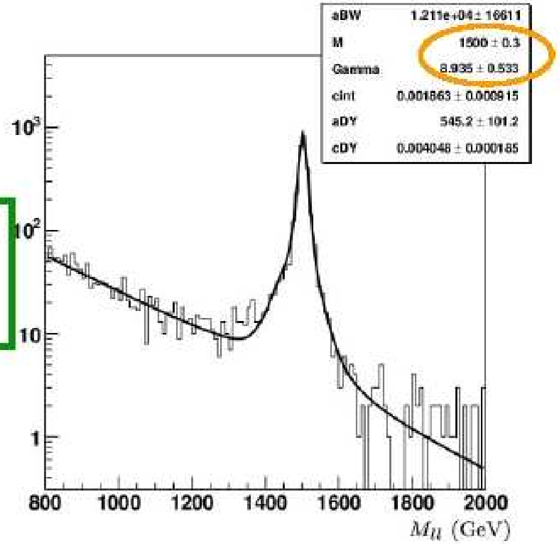
- Analytical fit of di-electron mass: $f(M_{ll}) = \frac{a_{BW} M^2 \Gamma^2}{(M_{ll}^2 - M^2)^2 + M^2\Gamma^2} \times e^{-c_{int} M_{ll}} + a_{DY} e^{-c_{DY} M_{ll}}$

- Example : η model ($M_{Z'}$ = 1.5TeV $\Gamma_{Z'}$ = 9.5GeV)

Generation level



Reconstructed level (convoluted with resolution function)



- Given the E/position resolution, the width can be accurately measured.

		M_{rec} (GeV)	Γ_{rec}(GeV)	Γ_{gen}(GeV)	$\Gamma_{theo.}$(GeV)
$M = 1.5\,\mathrm{TeV}$	SSM	1501.0±0.7	45.2±1.4	44.1± 0.9	44.7
	ψ	1500.1±0.3	7.5±0.6	6.9± 0.5	8.0
	η	1500.5±0.3	8.7±0.6	9.4± 0.4	9.5
	χ	1500.7±0.4	16.5±0.9	18.2± 0.5	17.6
	LR	1499.3±0.6	29.3±1.2	31.8± 0.7	30.6
$M = 4\,\mathrm{TeV}$	SSM	3996.5±2.5	112.9±4.6	121.1± 2.7	119.2
	KK	3987.2±6.8	151.4±13.8	159.8±8.0	

The product $\sigma_{ll} \times \Gamma$

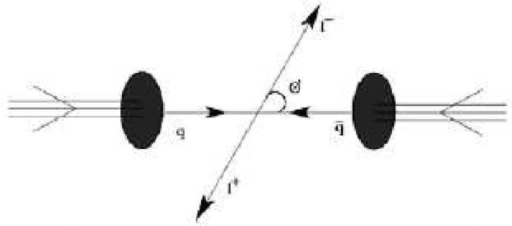
		σ_{ll}^{gen}(fb)	σ_{ll}^{rec}(fb)	$\sigma_{ll}^{rec} \times \Gamma_{rec}$(fb.GeV)
$M = 1.5$ TeV	SSM	78.4±0.8	78.5±1.8	3550±137
	ψ	22.6±0.3	22.7±0.6	166±15
	χ	47.5±0.6	48.4±1.3	800±47
	η	26.2±0.3	24.6±0.6	212±16
	LR	50.8±0.6	51.1±1.3	1495±72
$M = 4$ TeV	SSM	0.16±0.002	0.16±0.004	19±1
	KK	2.2±0.07	2.2±0.12	331±35

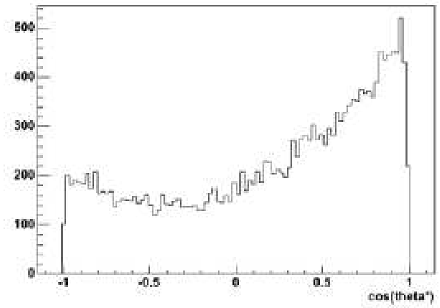
- Promising discriminating potential (independent on potential invisible decays).

The forward backward asymmetry : the potential

- Typical spin 1 particle behaviour (Z' may also have spin 2 in different models : warped extra dimensions by e.g. Not considered here) :

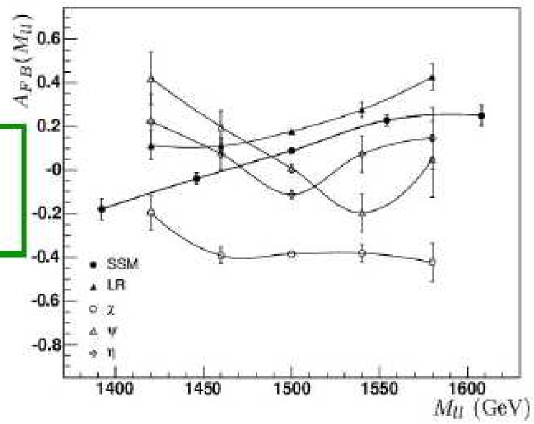
$$\frac{d\sigma}{d\cos\theta^*} \propto \frac{3}{8}\left(1+\cos^2\theta^*\right)+A_{FB}\cos\theta^*$$



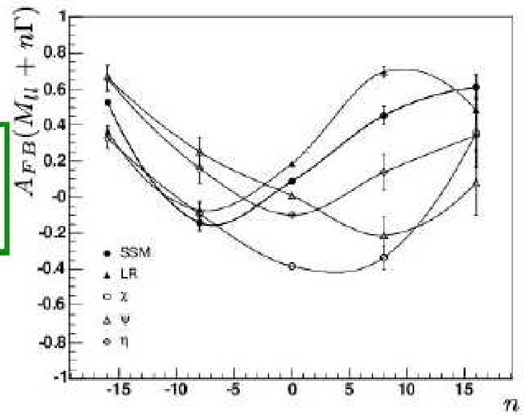


- Asymmetry at generation level for several models with $M_{Z'}$ = 1.5 TeV

Narrow Mass bins



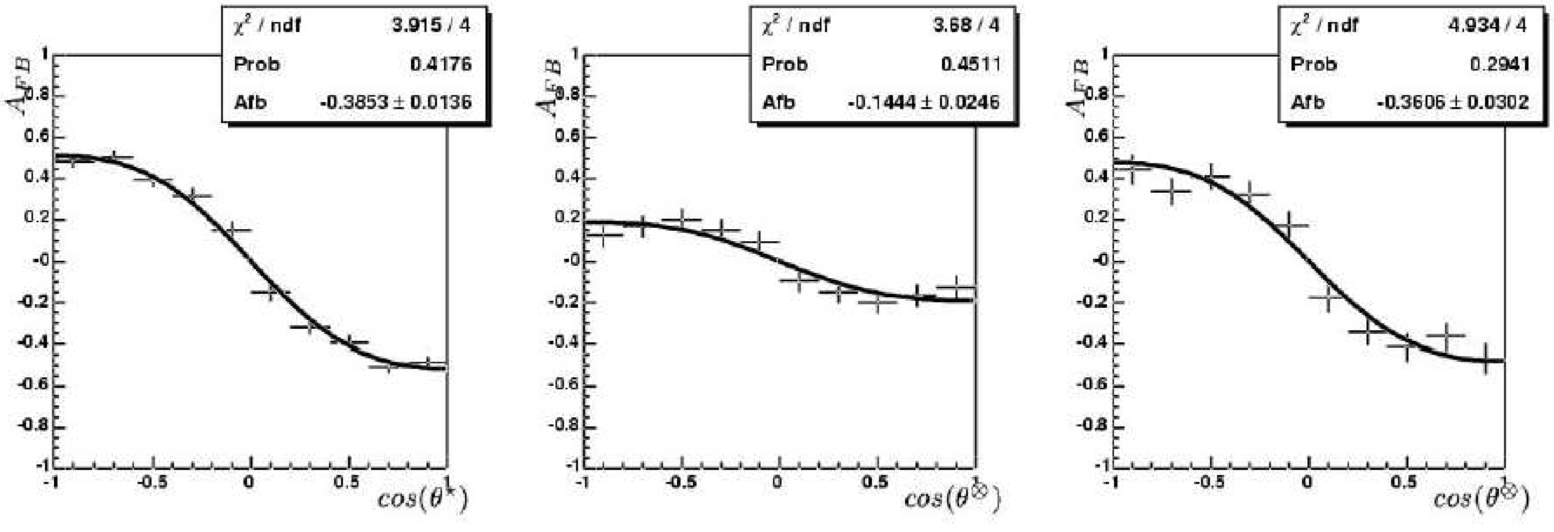
Wide Mass bins



The A_{FB} extraction in Atlas

- A_{fb} is deduced with the "ratio" method :
  - Compute A_{FB} (cos θ) by the basic counting method ($N^+ - N^-/N^+ + N^-$) in several bins of cosθ
  - Extract A_{FB} by fitting $A_{FB}(\cos\theta) = \frac{8}{3} A_{FB} \times \frac{\cos\theta}{1+\cos^2\theta}$

- Example : χ model at $M_{Z'}$ = 1.5TeV (1.48TeV<M_{ll}<1.52TeV)



(a) *At generation level* (b) *Observed* (c) *Corrected*

The A_{FB} extraction in Atlas (2)

- The results for all models in the central mass bins

Model	$\int \mathcal{L}(fb^{-1})$	Generation	Observed	Corrected
1.5 TeV				
SSM	100	$+0.088 \pm 0.013$	$+0.060 \pm 0.022$	$+0.108 \pm 0.027$
χ	100	-0.386 ± 0.013	-0.144 ± 0.025	-0.361 ± 0.030
η	100	-0.112 ± 0.019	-0.067 ± 0.032	-0.204 ± 0.039
η	300	-0.090 ± 0.011	-0.050 ± 0.018	-0.120 ± 0.022
ψ	100	$+0.008 \pm 0.020$	-0.056 ± 0.033	-0.079 ± 0.042
ψ	300	$+0.010 \pm 0.011$	-0.019 ± 0.019	-0.011 ± 0.024
LR	100	$+0.177 \pm 0.016$	$+0.100 \pm 0.026$	$+0.186 \pm 0.032$
4 TeV				
SSM	10000	$+0.057 \pm 0.023$	-0.001 ± 0.040	$+0.078 \pm 0.051$
KK	500	$+0.491 \pm 0.028$	$+0.189 \pm 0.057$	$+0.457 \pm 0.073$

- Systematic error associated to ε lower then 10%.
- Possible to precisely measure the forward backward asymmetry in Atlas:
  - ε correction works well.
  - method remains efficient even far away from the resonance with a reduced statistic (not shown here).
  - very promising discriminating potential (especially when including analysis of all mass bins - cf slide 9).

PROSPINO AND LEPTOQUARKS : FROM TEV. TO TEV

Michael Spira (PSI)

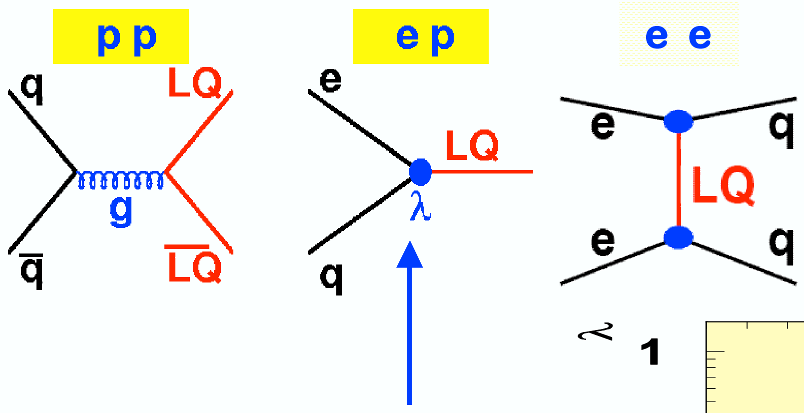
I PROSPINO

II Leptoquarks

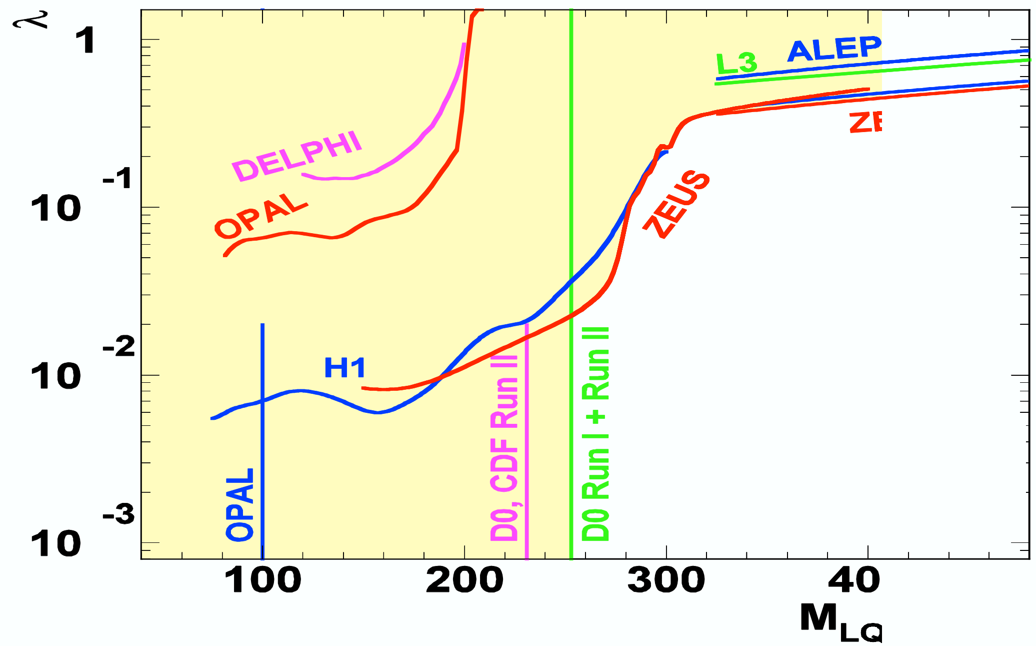
III Conclusions

in collaboration with W. Beenakker, M. Krämer, T. Plehn and P. Zerwas

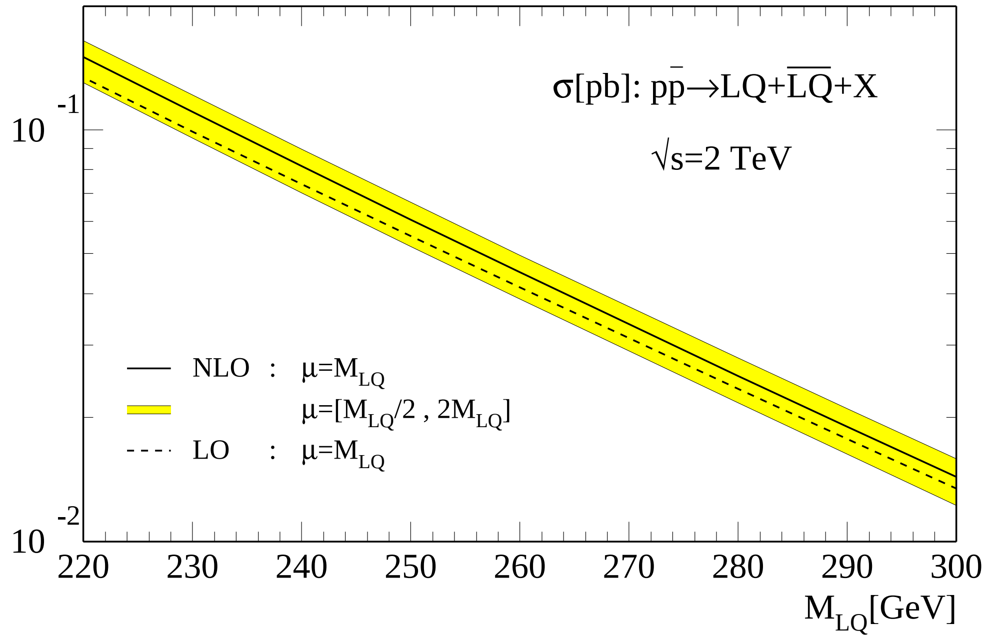
Comparison with Other Colliders

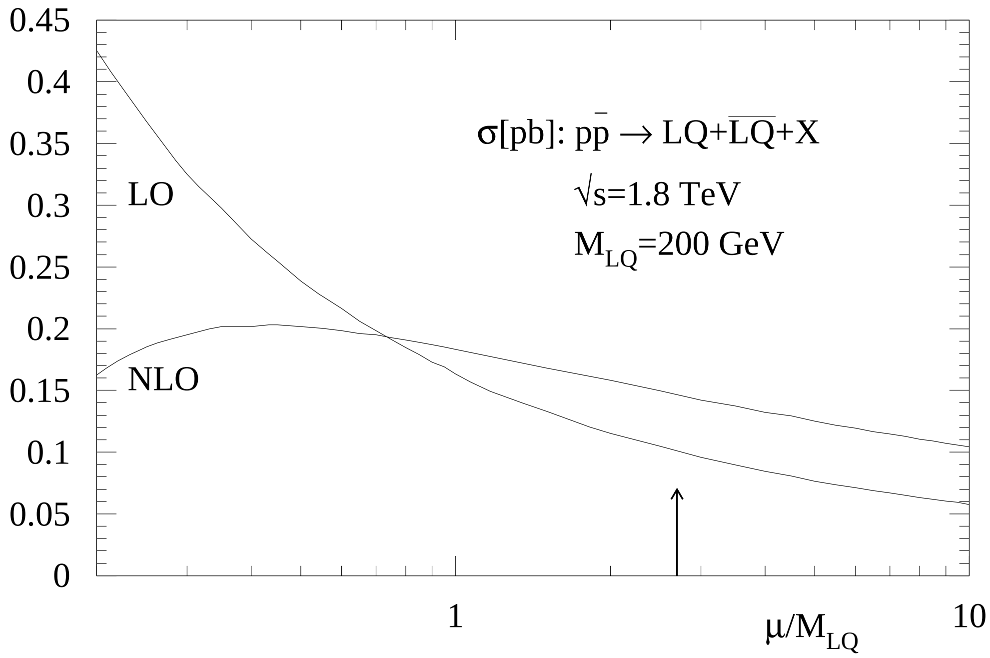


λ dependence



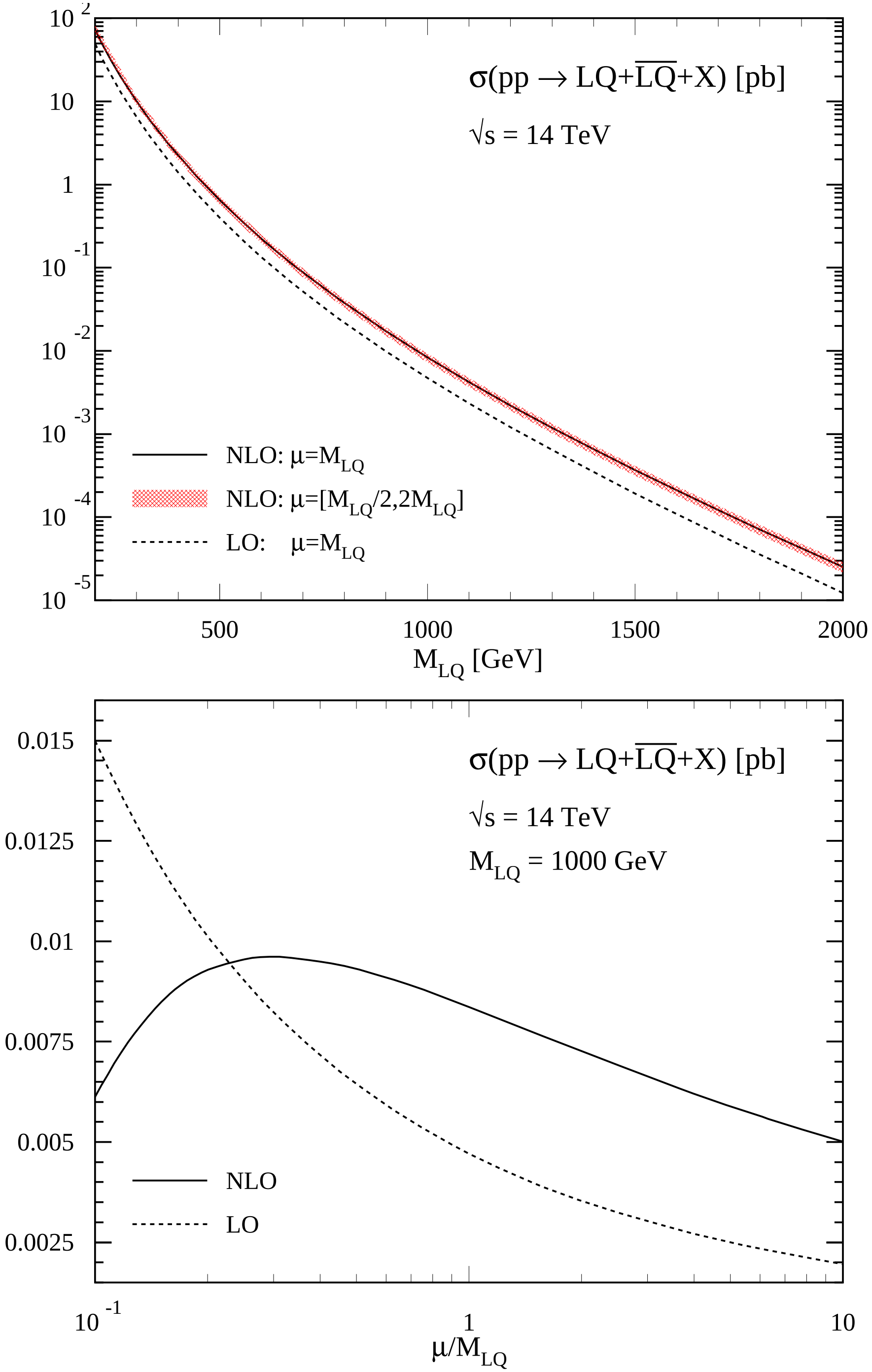
Leptoquarks





Krämer, Plehn, S., Zerwas

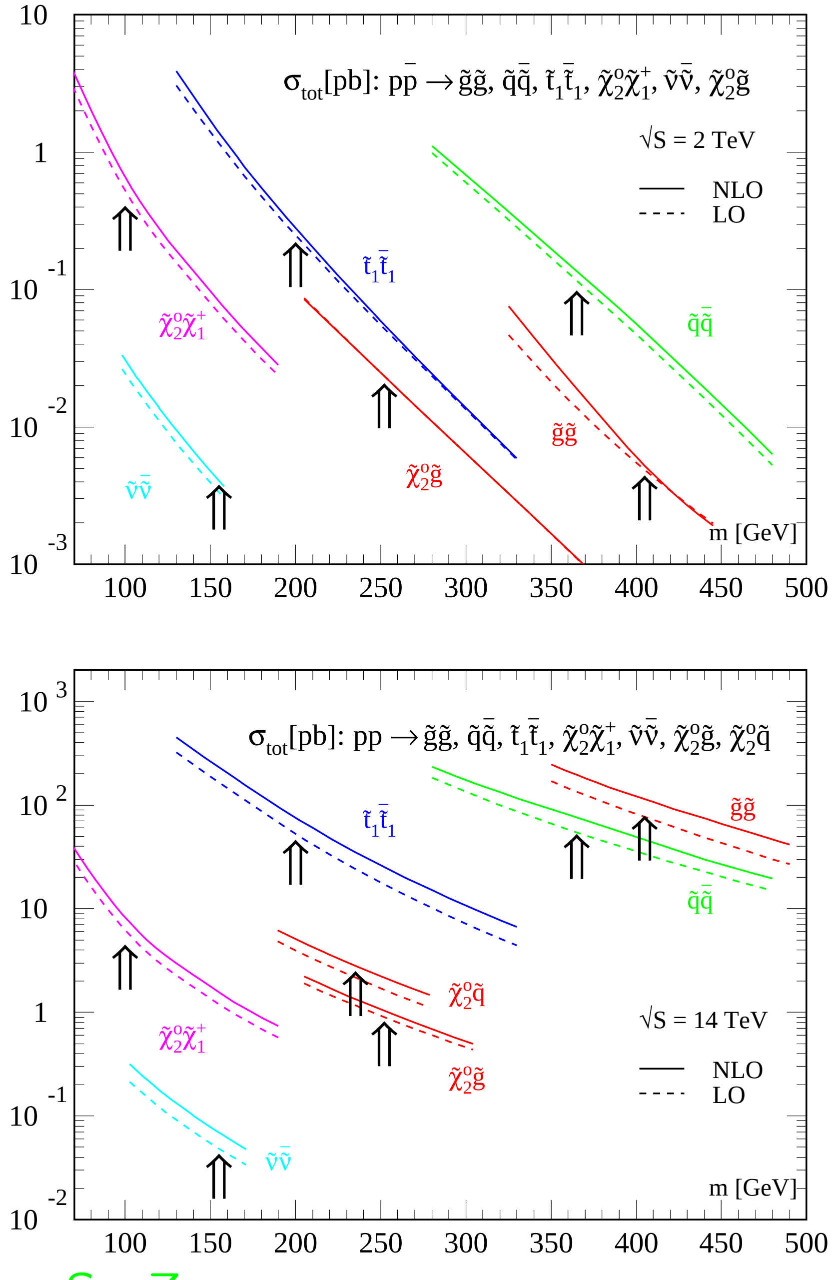
Leptoquarks



Krämer, Plehn, S., Zerwas

Leptoquarks

PROSPINO



Beenakker, Krämer, Plehn, S., Zerwas

Models: Case Studies

Goals:

- For more complex signals (cascades, production of multiple particles), check if consistent with various models
- Large number of models, phenomenology depends on free parameters → case studies

Projects:

- SUSY
  - mSUGRA (Alexander Belyaev, Tadas Krupovnickas)
  - MSSM (Howie Baer, Georg Weiglein, Csaba Balazs)
  - NMSSM (Sabine Kraml, Cyril Hugonie)
  - Stops (Sabine Kraml, Joe Lykken, Shoji Asai)
  - Disentangling Models (Dirk Zerwas et al. (SFITTER), Bob Kehoe, Gordon Kane)
  - Tools (Michael Spira (PROSPINO), Peter Skands (SLHA))
- Universal Extra Dimensions (Kyoungchul Kong, Konstantin Matchev, Satya Nandi)
- Signal Generators and tools for Extra Dimensions (Albert de Roeck et al.)
- Little Higgs Models with T-Parity (Jay Hubisz)
- Technicolor (Ken Lane)
- Higgsless Models (Andreas Birkedal)

Please add your name to the list!

SUSY searches: where Tevatron may help LHC analyses

SABINE KRAML

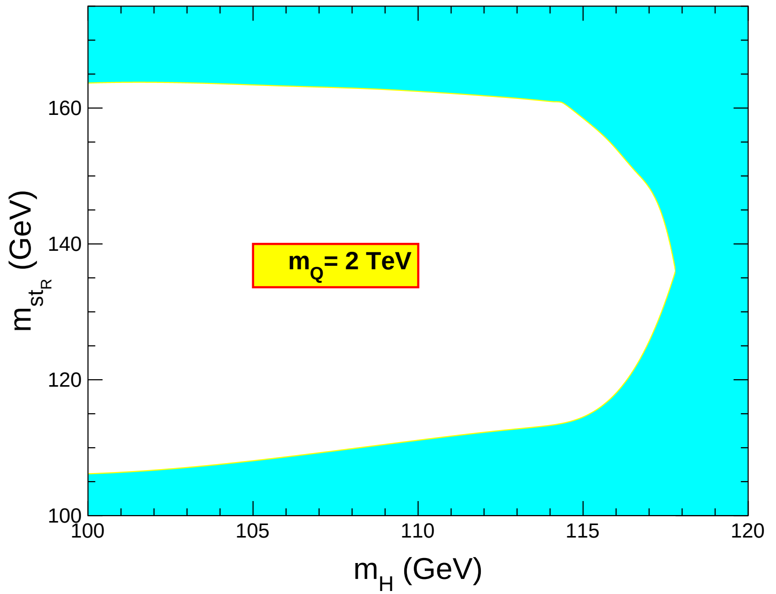
CERN PH-TH

(APART Fellow of the Austrian Academy of Sciences)

TEV4LHC workshop, CERN, 28-30 April 2005

Light Stop

Motivation: sufficiently strong first order phase transition to preserve generated baryon asymmetry



$m_h \lesssim 120$ GeV

$m_{\tilde{t}_1} \lesssim 165$ GeV

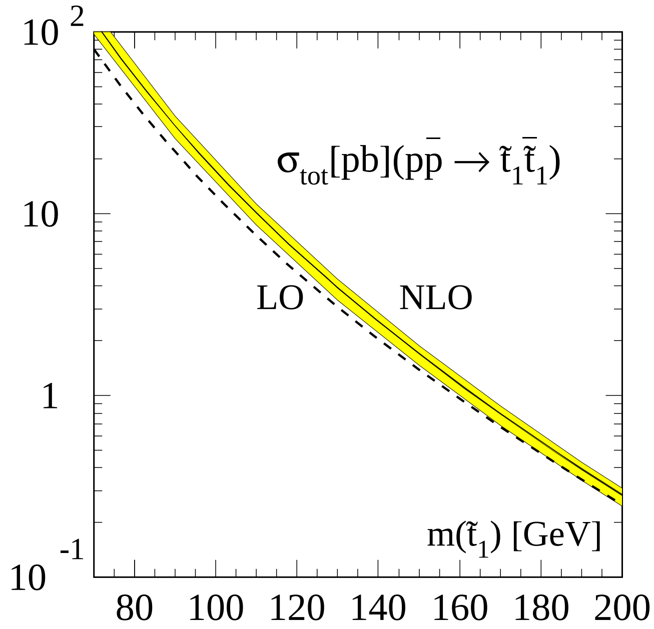
moderate $\tan\beta \sim 5$

[Carena, Quiros, Wagner, 1998]

NB: Right Ωh^2 from $\tilde{\chi}_1^0 \tilde{t}_1$ coannihilation: $m_{\tilde{t}_1} - m_{\tilde{\chi}_1^0} \sim 30$ GeV. Otherwise other contributions from e.g. light sleptons needed.

$\tilde{t}_1$ rates and signatures

- Large rate of $p\bar{p} \to \tilde{t}_1\bar{\tilde{t}}_1$
- Decay $\tilde{t}_1 \to c\tilde{\chi}_1^0 \rightsquigarrow 2j + \not{E}_T$
- Other modes: $\tilde{t}_1 \to b\tilde{\chi}_1^\pm,\ bW\tilde{\chi}_1^0,\ bl\tilde{\nu}$
- If gluino mass ∼300–400 GeV:
  $p\bar{p} \to \tilde{g}\tilde{g} \to tt\ \tilde{t}_1\tilde{t}_1$
  ca. 50% of SUSY cross section

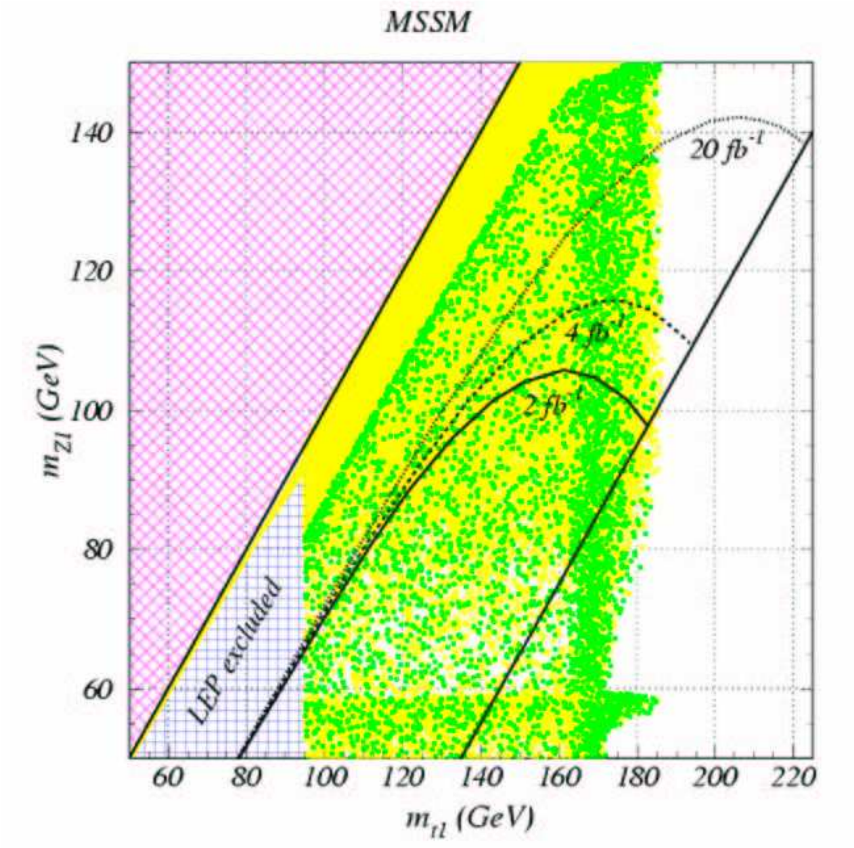


[Plehn, Spira]

- Possible discovery channel at Tevatron
- At LHC: $pp \to \tilde{g}\tilde{g} \to tt\ \tilde{t}_1\tilde{t}_1$, $pp \to \tilde{g}\tilde{b} \to tW\tilde{t}_1\tilde{t}_1$, ...

VERY difficult if stop is light

Tevatron reach for $\tilde{t}_1 \to c\tilde{\chi}_1^0$



[Balazs, Carena, Wagner, hep-ph/0403224]

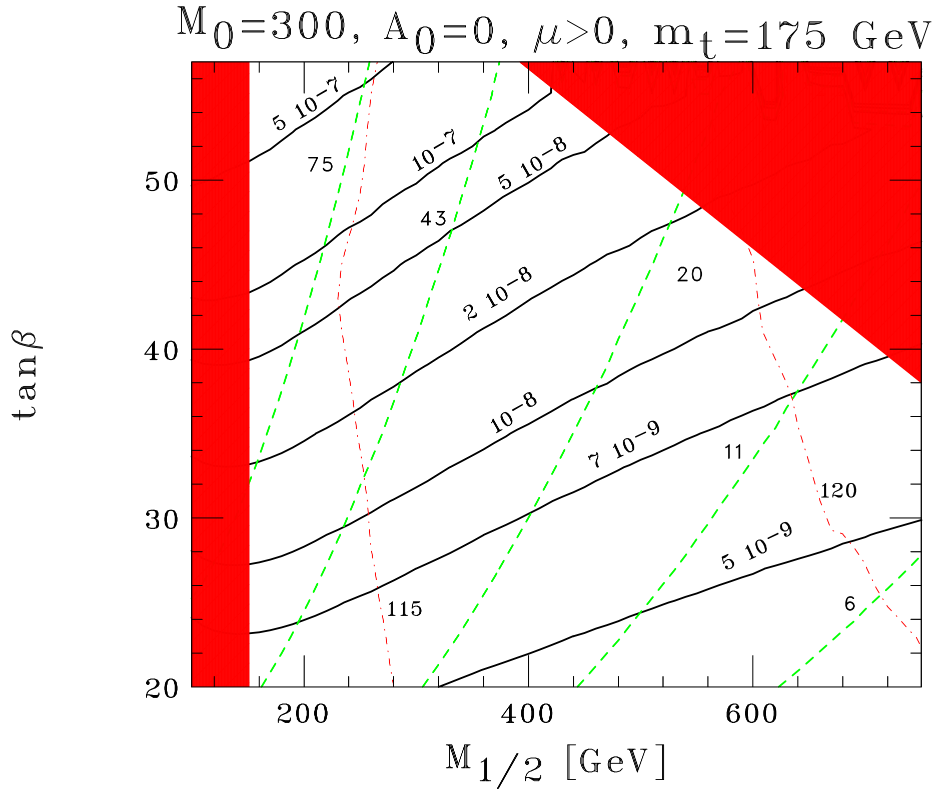
$\mathbf{BR}(B_s \longrightarrow \mu\mu)$

- Present bound: BR$(B_s \to \mu^+\mu^-) < 5.8 \times 10^{-7}$
- SM prediction: BR$(B_s \to \mu^+\mu^-) = (3.4 \pm 0.5) \times 10^{-9}$
- In SUSY, the $B \to \mu\mu$ branching ratio grows like $\tan^6 \beta$, orders of magnitude enhancement, BR$\sim 10^{-7}$ for $\tan\beta = 50$
- If deviation from SM prediction observed at the Tevatron:

  $\star$ large $\tan\beta$ interpretation in SUSY $\star$

- Consequence: expect many τ's in SUSY decay chains at Tevatron and LHC $\longrightarrow$ optimize τ identification, want good τ energy and polarization measurements, etc.

BR($B_s \rightarrow \mu\mu$)



[Dedes, Dreiner, Nierste, hep-ph/0108037]

SFITTER: Impact of TeVatron data

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CERN and LAPP, MPI Munich, LAL Orsay

TeV4LHC Workshop
CERN
April 29, 2005

- Introduction
- SPS1a
- Some scenarios
- Conclusions

SUSY Fits in Tevatron and LHC Data (SFITTER)

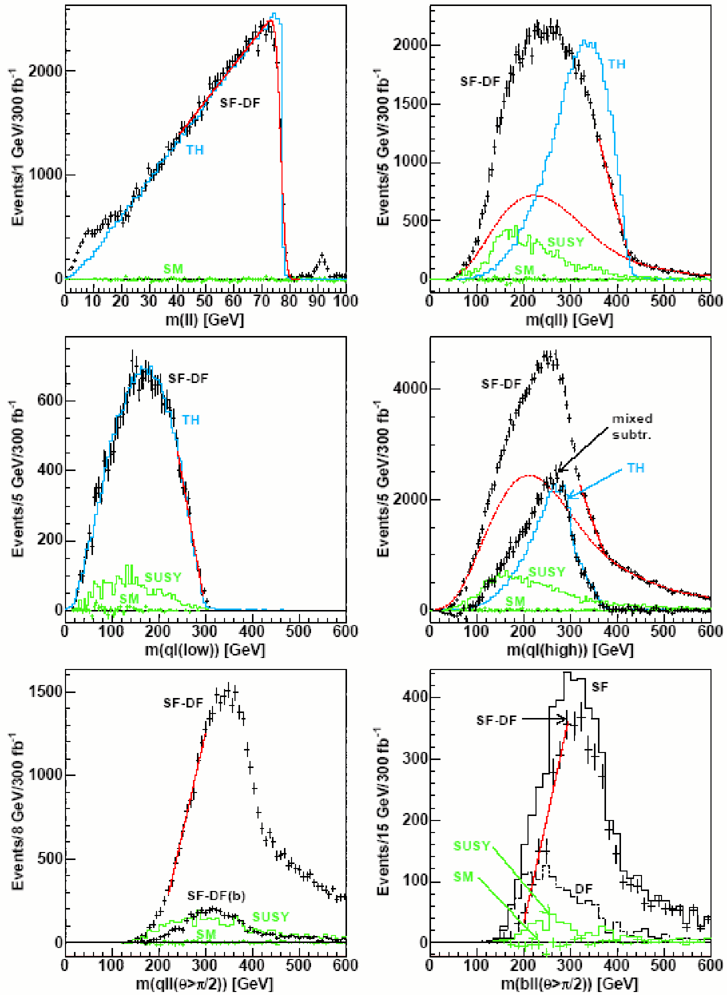
Examples of measurements at LHC

Gjelsten et al: ATLAS-PHYS-2004-007/29

$$
\begin{aligned}
(m^2_{ll})^{\text{edge}} &= \frac{(m^2_{\tilde\chi^0_2} - m^2_{\tilde l_R})(m^2_{\tilde l_R} - m^2_{\tilde\chi^0_1})}{m^2_{\tilde l_R}} \\
(m^2_{qll})^{\text{edge}} &= \frac{(m^2_{\tilde q_L} - m^2_{\tilde\chi^0_2})(m^2_{\tilde\chi^0_2} - m^2_{\tilde\chi^0_1})}{m^2_{\tilde\chi^0_2}} \\
(m^2_{ql})^{\text{edge}}_{\text{min}} &= \frac{(m^2_{\tilde q_L} - m^2_{\tilde\chi^0_2})(m^2_{\tilde\chi^0_2} - m^2_{\tilde l_R})}{m^2_{\tilde\chi^0_2}} \\
(m^2_{ql})^{\text{edge}}_{\text{max}} &= \frac{(m^2_{\tilde q_L} - m^2_{\tilde\chi^0_2})(m^2_{\tilde l_R} - m^2_{\tilde\chi^0_1})}{m^2_{\tilde l_R}} \\
(m^2_{qll})^{\text{thres}} &= [(m^2_{\tilde q_L} + m^2_{\tilde\chi^0_2})(m^2_{\tilde\chi^0_2} - m^2_{\tilde l_R})(m^2_{\tilde l_R} - m^2_{\tilde\chi^0_1}) \\
&\quad -(m^2_{\tilde q_L} - m^2_{\tilde\chi^0_2})\sqrt{(m^2_{\tilde\chi^0_2} + m^2_{\tilde l_R})^2(m^2_{\tilde l_R} + m^2_{\tilde\chi^0_1})^2 - 16 m^2_{\tilde\chi^0_2} m^4_{\tilde l_R} m^2_{\tilde\chi^0_1}} \\
&\quad +2 m^2_{\tilde l_R}(m^2_{\tilde q_L} - m^2_{\tilde\chi^0_2})(m^2_{\tilde\chi^0_2} - m^2_{\tilde\chi^0_1})]/(4 m^2_{\tilde l_R} m^2_{\tilde\chi^0_2})
\end{aligned}
$$

Edge	Nominal Value	Fit Value	Syst. Error Energy Scale	Statistical Error
$m(ll)^{\text{edge}}$	77.077	77.024	0.08	0.05
$m(qll)^{\text{edge}}$	431.1	431.3	4.3	2.4
$m(ql)^{\text{edge}}_{\text{min}}$	302.1	300.8	3.0	1.5
$m(ql)^{\text{edge}}_{\text{max}}$	380.3	379.4	3.8	1.8
$m(qll)^{\text{thres}}$	203.0	204.6	2.0	2.8
$m(bll)^{\text{thres}}$	183.1	181.1	1.8	6.3

plus other mass differences and edges…

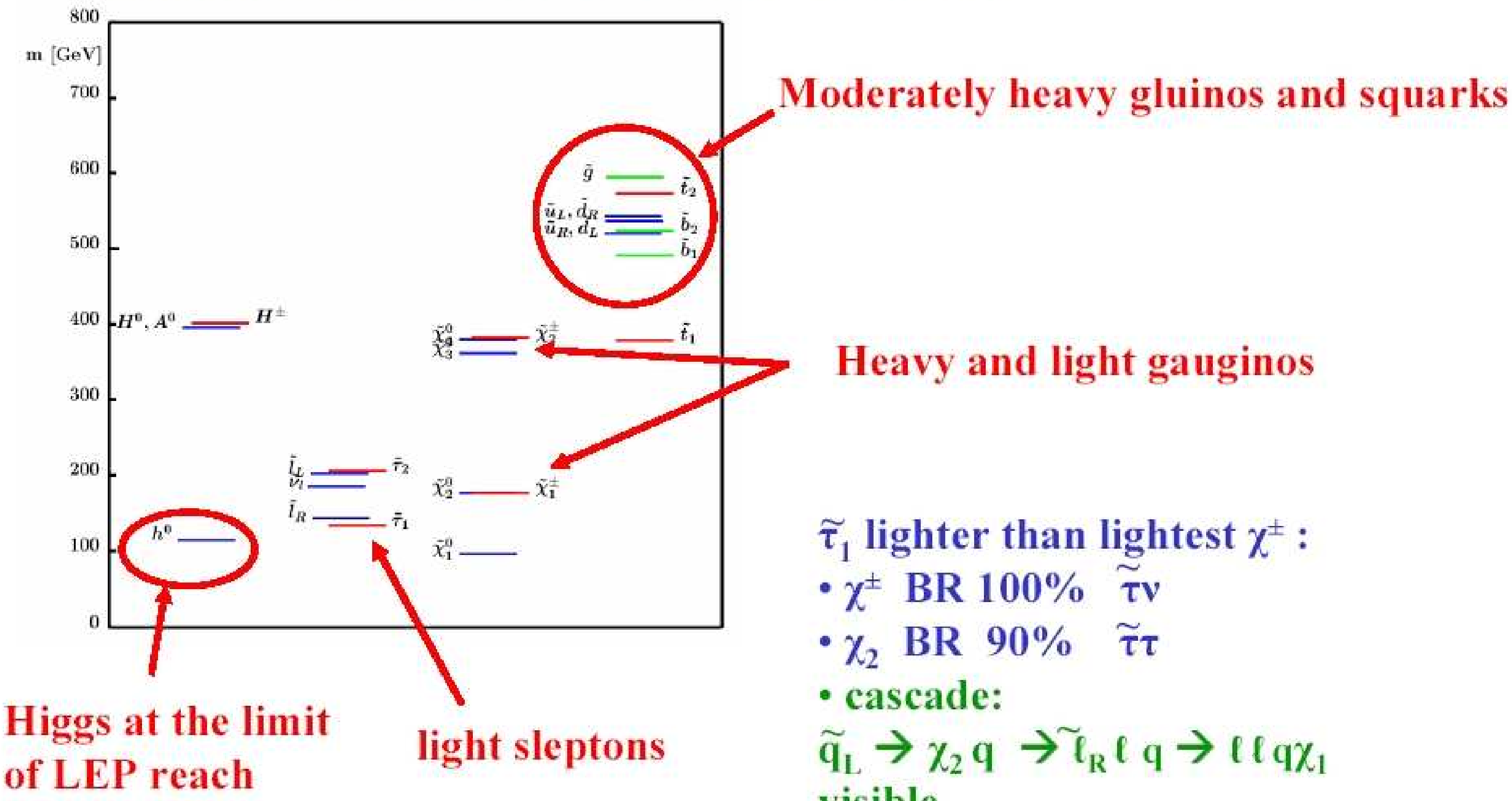


From edges to masses:
System overconstrained

SUSY Fits in Tevatron and LHC Data (SFITTER)

SPS1a

m_0 = 100GeV $m_{1/2}$ = 250GeV A_0 = -100GeV $\tan\beta$ =10 sign(μ)=+
favourable for LHC and ILC (Complementarity)



$\tilde{\tau}_1$ lighter than lightest $\chi^\pm$:

- $\chi^\pm$ BR 100% $\tilde{\tau}\nu$
- χ_2 BR 90% $\tilde{\tau}\tau$
- cascade:

$\tilde{q}_L \rightarrow \chi_2 q \rightarrow \tilde{\ell}_R \ell q \rightarrow \ell \ell q \chi_1$
visible

SUSY Fits in Tevatron and LHC Data (SFITTER)

LHCmax scenario:

- all LHC measurements are available
- 10fb-1 (2008): statistical error ~ factor sqrt(30)
- systematic (e-scale) ~ factor 5.4

(5‰ lepton e-scale, 5% jet e-scale)

- top mass measurement from TeVatron
  - currently ± 4GeV
  - extrapolated begin of LHC ± 2GeV
- using the masses

mtop = 175GeV	mtop = 179GeV	mtop = 171GeV
$m0 = 100 \pm 22$ GeV	$m0 = 99 \pm 22$GeV	$m0 = 102 \pm 22$ GeV
$m_{1/2} = 250 \pm 9$ GeV	$m_{1/2} = 249 \pm 9$ GeV	$m_{1/2} = 250 \pm 9$ GeV
$\tan\beta = 10 \pm 6$	$\tan\beta = 7.4 \pm 3$	$\tan\beta = 13.7 \pm 9$
$A_0 = -100 \pm 181$ GeV	$A_0 = -22 \pm 226$ GeV	$A_0 = -174 \pm 145$ GeV

top mass precision 4GeV:

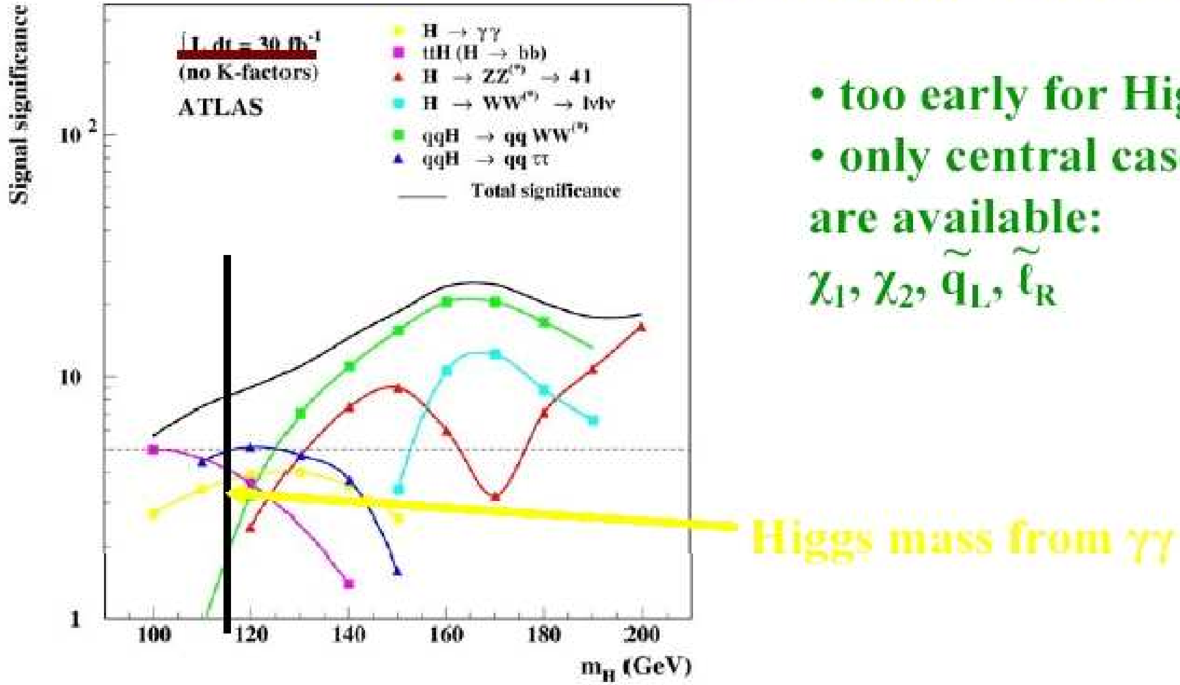
- m_0, $m_{1/2}$ unaffected
- $\tan\beta$ and A_0 shifted by up to 1σ

top mass precision 2GeV:

- shift reduced to less than 0.7σ

SUSY Fits in Tevatron and LHC Data (SFITTER)

LHCminimal scenario:



- too early for Higgs to γγ with 10fb-1
- only central cascade SUSY measurements are available:

$\chi_1, \chi_2, \tilde{q}_L, \tilde{\ell}_R$

From the masses

$m_0 = 100 \pm 30$ GeV
$m_{1/2} = 250 \pm 26$ GeV
$\tan\beta = 10 \pm 485$
$A_0 = -100 \pm 9200$ GeV

From the edges:

$m_0 = 100 \pm 14$ GeV
$m_{1/2} = 250 \pm 10$ GeV
$\tan\beta = 10 \pm 144$
$A_0 = -100 \pm 2400$ GeV

No surprise: less information, less precision, even for mtop 4GeV error negligeable effect given the errors

SUSY Fits in Tevatron and LHC Data (SFITTER)

LHCminimal plus Higgs scenario:

- Higgs is sitting on the edge of LEP exclusion
- WH+ZH 6 events per fb^{-1} and experiment
- end of Run: $\Delta m_h = \pm 2$GeV
- adding background: ΔmHiggs = ± 4-5GeV
- minimal scenario LHC

plus TeVatron Higgs hint of 4.5GeV precision:

No Higgs, edges from the LHC:

$m_0 = 100 \pm 14$ GeV
$m_{1/2} = 250 \pm 10$ GeV
$\tan\beta = 10 \pm 144$
$A_0 = -100.37 \pm 2400$ GeV

Higgs hint plus edges from the LHC:

$m_0 = 100 \pm 9$ GeV
$m_{1/2} = 250 \pm 9$ GeV
$\tan\beta = 10 \pm 31$
$A_0 = -100 \pm 685$ GeV

A Higgs hint mass measurement would lead to an improvement of m_0, $\tan\beta$ and A_0 (but the latter two are still essentially undetermined)!

Conclusions

- Community has a strong interest in landscaping
- A number of experimental and phenomenological projects in progress
- Many fruitful discussions and collaboration between experiment/theory as well as Tevatron/LHC
- Now aiming at producing a summary document that will hopefully be useful for the LHC era