Physics Results from ATLAS (EXCEPT HIGGS!)

G. Compostella on behalf of the ATLAS MPP group



Max-Planck-Institut für Physik (Werner-Heisenberg-Institut)

MPP ATLAS group director: Prof. Siegfried Bethke

Performance studies

With contributions by: Teresa Barillari, Johanna Bronner, Daniele Capriotti, Michael Flowerdew, Maximilian Goblirsch-Kolb, Andrey Kiryunin, Oliver Kortner, Alessandro Manfredini, Sven Menke, Martin Nagel, Denis Salihagic, Rikhard Sandstrom, Peter Schacht, Federico Sforza, Sebastian Stern, Marco Vanadia, Daniele Zanzi

Standard Model measurements

With contributions by: Daniele Capriotti, Katharina Ecker, Maximilian Goblirsch-Kolb, Oliver Kortner, Hubert Kroha, Robert Richter, Fabian Spettel, Stefan Stonjek, Marco Vanadia

Top quark physics

With contributions by: Gabriele Compostella, Giorgio Cortiana, Andreas Maier, Thomas McCarthy, Richard Nisius, Stefan Kluth, Andreas Wildauer

Supersymmetry searches

With contributions by: Michael Flowerdew, Maximilian Goblirsch-Kolb, Hubert Kroha, Federico Sforza

Missing Transverse Energy (MET) performance

⁻¹/0.11

g

Pile-up conditions drastically changed during 2012!

MET performance is the key for many analyses

Recorded Luminosity Studied 2012 MinBias data in 3 different calorimeter regions |n| < 3.2, |n| < 4.5, and |n| < 4.9

MET resolution is improved using the "STVF correction method" (ATLAS-CONF-2012-101) (The fraction of tracks from the primary vertex pointing to soft terms of the MET is used to reweight the terms and recalculate the overall MET)





Mean Number of Interactions per Crossing

Muon performance in pp $\rightarrow Z \rightarrow \mu \mu$ collision data



Muon reconstruction efficiency

Muon momentum scale



• Deviations modelled by the Monte-Carlo simulation

Many more performance studies ongoing:

regions with limited muon spectrometer coverage

• Agreement with the Monte-Carlo prediction at <<1%

- *t* identification and reconstruction
- b-jet reconstruction optimization with track jets
- local hadron calibration method for jet energies (standard for 2012 analyses)

Standard Model at ATLAS



ATLAS is sensitive to a large number of SM processes, with cross sections spanning multiple orders of magnitude... MPP presence all over this plot!

Measurement of the $pp \rightarrow Z \rightarrow \tau \tau$ production



ATLAS-CONF-2012-006, Phys.Rev. D84 (2011) 112006

Measurement of the $pp \rightarrow ZZ \rightarrow 4I$ production

 Search for anomalous triple gauge couplings which are forbidden in the Standard Model at leading order:



Standard Model Production

SM Forbidden

• $pp \rightarrow ZZ \rightarrow 4I$ irreducible background to $pp \rightarrow H \rightarrow ZZ \rightarrow 4I$



Standard Model prediction $5.89^{+0.22}_{-0.18}$ pb ATLAS ($\int Ldt = 4.7 \text{ fb}^{-1}$) $\sigma_{ZZ}^{\text{tot}} = 6.7 \pm 0.7 \text{ (stat.)} {}^{+0.4}_{-0.3} \text{ (syst.)} \pm 0.3 \text{ (lumi.)} \text{ pb}$

Standard Model compatible with result on data

ATLAS-CONF-2012-026, arXiv:1211.6096

Other Standard Model measurements at MPP



Ongoing Activities:

Measurement of the pp \rightarrow W+c jet production

• $pp \rightarrow W + c$ jet is sensitive to the s quark and gluon density inside the proton

Measurement of the pp \rightarrow WW \rightarrow jets production

- Very challenging
- Important test of the Standard Model
- dominant background to $H \rightarrow WW$

The top quark plays a central role in LHC physics:

- its mass is a fundamental parameter of the Standard Model
- the top quark is ~40x heavier than the bottom quark: the only SM fermion with mass at the Electroweak scale
- \rightarrow Large contribution in virtual fermionic loops
- top quark decays before hadronization, provides a unique opportunity to study a "bare" quark
- Important background to direct searches, large tt pair production cross section at the LHC:



Top quark pair decay signatures

Top quark decays almost exclusively to Wb, tt pair decay signatures categorized from W decay



(other signatures involve at least one τ)

Our institute has ongoing analyses in each of the 3 channels!

MPP Project Review 2012 - ATLAS

ATLAS 2012 top quark mass paper

0.16

0.14

0.12

0.1

0.08

0.06

ATLAS Simulation

m_{ton} = 160 GeV

m_{top} = 170 GeV m_{top} = 180 GeV

] m_{top} = 190 GeV

e + jets

Events / 0.

Vormalized

Template method in the lepton+jets channel, 1.04 fb⁻¹ of 2011 LHC Data:

- Perform jet-parton assignment using a kinematic likelihood fitter
- Use R_{32} as estimator for top quark mass
- Derive signal and background templates of $\mathsf{R}_{_{32}}$ from simulation
- Fit templates to data to extract the top quark mass



ATLAS 2012 top quark mass paper

The European Physical Journal

Recognized by European Physical Society

volume 72 · number 6 · june · 2012

Particles and Fields



The measurements on mtop from the individual analyses and the combined result from the 2d-analysis compared to the present combined value from the Tevatron experiments and to the most precise measurement of mtop used in that combination. From the ATLAS Collaboration: Measurement of the top quark mass with the template method in the $t\tilde{t} \rightarrow lepton + jets$ channel using ATLAS data





Results published in Eur.Phys.J. C (2012) 72:2046

Major MPP contribution, made the cover of EPJ!

Results from different channels (e/mu) and methods (1D/2D template) Getting closer to Tevatron precision, but still limited by large systematic uncertanties

Major sources of uncertainties for this measurement (~80%): JES, bJES, modelling of Initial and Final state radiation (ISR/FSR)

In 2012 MPP contributed to the efforts in reducing these uncertainties: bJES: study the calorimeter/tracker jet p_T ratio r_{trk} in the lepton +jets sample ISR/FSR: tune simulations to data using jet track shapes

A 3D template analysis fitting simultaneously m_t^{reco} , m_w^{reco} and an r_{trk} -like variable is in the final stages of development: it will measure the top quark mass, fixing JES and bJES to data!

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First LHC top quark mass combination

Many measurements of the top quark mass already available at the LHC:

- different top decay channels and techniques
- different assumptions and sensitivity to various systematic effects

Combination is not easy!

- Needs deep understanding of systematic uncertainties and their correlations between ATLAS and CMS
- Work is ongoing towards harmonization of the treatment of the different uncertainties
- Experience gained was successfully ported to the first LHC top quark pair production cross section combination



ATLAS-CONF-2012-095 (mass combination) ATLAS-CONF-2012-134 (cross section combination) Ongoing Activities:

Measurement of the top quark mass in the dilepton channel MPP-2012-160

- Underconstrained kinematics due to the presence of 2 undetected neutrinos
- Studied performance of 3 different m_t estimators with a template method
- Public result coming soon

Measurement of the top quark mass in the all-hadronic channel

- Very challenging to reconstruct: 6 jets, no leptons, no MET!
- Studied different algorithms for jet-parton assignment

Search for New Physics in single top quark decays

- Probe anomalous couplings in the Wtb vertex
- Public result almost ready

Supersymmetry (SUSY)

- SUSY postulates a boson field for every fermion field, and vice versa
- Exact SUSY stabilizes the Higgs mass canceling loop corrections from fermions
- If SUSY exists, it must be a broken symmetry \rightarrow sparticles gain mass ~TeV



• To prevent rapid proton decay, many SUSY models assume R-Parity is conserved:

 $R_{P} = (-1)^{2s+3B+L} = \begin{cases} +1(particles) \\ -1(sparticles) \end{cases}$ Lightest SUSY particle (LSP) stable, Experimental signature: large MET

		ATLAS SUSY	/ Searches* - 95% CL Lo	wer Limits (Status:	: Dec 2012)		
	MSUCRA/CMSSM : 0 lop + i's + F			x ã - ã mara			
	MSUGRA/CMSSM : 0 lep + js + $E_{T,miss}$ MSUGRA/CMSSM : 1 lep + i's + E_{-}	L=5.8 fb , 8 TeV [ATLAS-CONF-2012-109]	1 24 TeV	or q−g mass õi=õimass	1		
	Pheno model : 0 lep + i's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.18 TV	$\tilde{\mathbf{a}}$ mass $(m(\tilde{a}) < 2 \text{ TeV. light } \overline{\mathbf{v}}^0)$	ATLA	AS	
les.	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.38 TeV	$\tilde{\mathbf{q}}$ mass (m($\tilde{\mathbf{q}}$) < 2 TeV, light $\tilde{\mathbf{z}}^{\circ}$)) Prelimi	nary	
101	Gluino med. $\tilde{\chi}^{\pm}(\tilde{q} \rightarrow q\bar{q}\tilde{\chi}^{\pm})$: 1 lep + j's + $E_{\chi \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	900 GeV ĝ ma	ass $(m(\chi^0) < 200 \text{ GeV}, m(\chi^{\pm}) = \frac{1}{2}(m)$	n(x ⁰)+m(g))		
2 2 2 2	GMSB (ÎNLSP) : 2 lep (OS) + i's + E	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	1.24 eV	\tilde{g} mass (tan β < 15)			
e (GMSB ($\overline{\tau}$ NLSP) : 1-2 τ + 0-1 lep + j's + $E_{T mise}^{T,mise}$	L=4.7 fb ⁻¹ , 7 TeV [1210.1314]	1.20 T <mark>e</mark> V	\tilde{g} mass (tan $\beta > 20$)	ſ		
is i	GGM (bino NLSP) : $\gamma\gamma + E_{T miss}^{\gamma}$	L=4.8 fb ⁻¹ , 7 TeV [1209.0753]	1.07 TeV ĝ	mass $(m(\bar{\chi}_{1}^{0}) > 50 \text{ GeV})$	Ldt = (2.1 - 13.0)) fb ⁻¹	
101	GGM (wino NLSP) : γ + lep + E ^T miss	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-144]	619 GeV ĝmas		J ,		
	GGM (higgsino-bino NLSP) : $\gamma + b + E_{T,miss}$	L=4.8 fb ⁻¹ , 7 TeV [1211.1167]	900 GeV g ma	ass_ (m(χ_1) > 220 GeV)	s = 7, 8	TeV	
	GGM (higgsino NLSP) : Z + jets + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-152]	690 GeV g mass	(m(H) > 200 GeV)			
	Gravitino LSP : 'monojet' + $E_{T.miss}$	L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147]	645 GeV F SCAle	9_ (m(G) > 10 ⁻⁺ eV)			
ed.	$g \rightarrow bb \overline{\chi}_{n}$ (virtual b) : 0 lep + 3 b-j's + $E_{T,miss}$	L=12.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-145]	1.24 TeV	$g \text{ mass}_{(m(\chi_1))} < 200 \text{ GeV}$			
3	$g \rightarrow tt \chi$ (virtual t): 2 lep (SS) + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-105]	850 GeV C Mai	ISS $(m(\chi_{1}) < 300 \text{ GeV})$	8 TeV resu	ults	
a cui	$g \rightarrow tt \chi_1$ (virtual t) : 3 lep + J'S + $E_{T,miss}$	L=13.0 fb ,8 lev [A1LAS-CONF-2012-151]	100 GeV GINA	$nase_{(m(\chi_1) < 300 \text{ GeV})}$			•
gir n	$g \rightarrow it\chi$ (virtual i) . 0 lep + multi-js + $E_{T,miss}$	L=3.6 fb , 6 feV [ATLAS-CONF-2012-103]	115 TeV 0	$\frac{1}{2} \frac{1}{2} \frac{1}$	/ lev resu		つ へ)
	$g \rightarrow ii \chi$ (virtual i) . 0 lep + 3 b-js + $E_{T,miss}$	/ =12.8 fb ⁻¹ 8 TeV [ATLAS-CONF-2012-143]	620 GeV b mass (n	$m(x^{-0}) \le 120 \text{ GeV}$			
no Li	bb b $\rightarrow t\bar{x}^{\pm}$: 3 lep + i's + E.	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-151]	405 GeV b mass $(m(\overline{r}^{\pm}) = 2$	$(m(x^{-1}))$			20/
Ictio	$\tilde{t}t$ (light), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm 1}$: 1/2 lep (+ b-jet) + E_T miss	L=4.7 fb ⁻¹ , 7 TeV [1208.4305, 1209.2102][67 (Sev \tilde{t} mass $(m(\bar{\chi}^0) = 55 \text{ GeV})$	······································			
n po	$\tilde{t}\tilde{t}$ (medium), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm}$: 1 lep + b-jet + $E_{T,miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166]	160-350 Gev t mass (m(x) = 0 Ge	eV, m(x [±]) = 150 GeV)		$\langle \alpha \rangle$	~ ` /
bud	$\tilde{t}\tilde{t}$ (medium), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm}$: 2 lep + $E_{T \text{ miss}}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-167]	160-440 Gev t mass (m(x)) =	0 GeV, m(t)-m(x) = 10 GeV)		1, 2 ¹¹ , x91,	0
ect	$\tilde{t}\tilde{t}, \tilde{t} \rightarrow t\tilde{\chi}_{*}^{0}$: 1 lep + b-jet + $E_{T,miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166]	230-560 Gev t mass (m(j	$(\chi_{1}^{0}) = 0)$			
di la	$\widetilde{tt}, \widetilde{t} \rightarrow t \widetilde{\chi}_{\star}^{\circ}$: 0/1/2 lep (+ b-jets) + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.1447,1208.2590,1209.4	4186] 230-465 GeV t mass $(m(\chi_1^0))$	= 0)		\$10 S	
	tt (natural GMSB) : $Z(\rightarrow II) + b$ -jet + $E_{T.miss}$	L=2.1 fb ⁻¹ , 7 TeV [1204.6736]	310 Gev t mass (115 < m() < 2	230 GeV)			/
ţ	$\downarrow_{L}, \downarrow_{L}, \downarrow_{L}, \downarrow_{L}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85-19	5 GeV mass $(m(\chi_1) = 0)$	~ 1 + 0	Vix	1.160	
Vec	$\overline{\chi}_{\tau}, \overline{\chi}_{\tau}, \overline{\chi}_{\tau} \rightarrow lv(\overline{lv}) \rightarrow lv\overline{\chi}_{\tau}: 2 lep + E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884]	110-340 GeV χ_1 mass $(m(\chi_1) < 10)$	$0 \text{ GeV}, m(1, \overline{v}) = \frac{1}{2}(m(\overline{\chi_1}) + m(\overline{\chi_2})))$			
9.1	$\chi_1 \chi_2 \rightarrow \prod_{v \neq v} V_1 [(vv), V_1, [(vv)] : 3 \text{ lep } + E_{T, \text{miss}}$	L=13.0 fb", 8 TeV [ATLAS-CONF-2012-154]	580 GeV χ mass ($(m(\chi_1) = m(\chi_2), m(\chi_1) = 0, m(I,v)$ as a	above)		
	$\chi_1 \chi_2 \rightarrow W^* \chi_2 Z^* \chi_1 : 3 \text{ lep } + E_{T, \text{miss}}$	L=13.0 fb ', 8 TeV [ATLAS-CONF-2012-154]	140-295 GeV χ_1 mass $(m(\chi_1) = m(\chi_2)$	$_{2}^{2}, m(\chi_{1}) = 0, sleptons decoupled)$	0, 0	to	
SS GC	Stable \tilde{a} P badrops : low 8 By (full detector)	$L = 4.7 \text{ fb}^{-1}$ 7 TeV [1210.2052]	220 GeV χ_1 mass $(1 < \eta \chi_1) < 10 \text{ ms}$	nass	10:31	6.	
icle	Stable f R-hadrons : low β, βγ (full detector)	$L=4.7 \text{ fb}^{-1}$, 7 TeV [1211.1597]	683 Gev t mass		~ ~ ~	• /	
art	GMSB : stable 7	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	300 GeV τ̃ MASS (5 < tanβ ≤ 20)		1.12		
1 7	$\tilde{\tau}^0 \rightarrow qqu (RPV) : u + heavy displaced vertex$	L=4.4 fb ⁻¹ , 7 TeV [1210.7451]	700 Gev q mass	$(0.3 \times 10^{15} \le \lambda_{214}^{1} \le 1.5 \times 10^{15}, 1 \text{ mm} \le 10^{15}$	cτ < 1 m,		
	LFV : pp $\rightarrow \tilde{v}_{*}+X, \tilde{v}_{*}\rightarrow e+\mu$ resonance	L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	1.61 T	\tilde{v}_{π} mass $(\lambda_{311}^{*}=0.10, \lambda_{132}=0.10)$	0.05)		
	LFV : pp $\rightarrow \tilde{v}_{*} + X$, $\tilde{v}_{*} \rightarrow e(\mu) + \tau$ resonance	L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	1.10 Te v . V	mass ($\lambda_{311}^{*}=0.10, \lambda_{1(2133}^{*}=0.05)$			
>	Bilinear RPV CMSSM : 1 lep + 7 j's + E _{7,miss}	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140]	1.2 T V	$\tilde{q} = \tilde{g} \max(c\tau_{LSP} < 1 \text{ mm})$			
Ŷ	$\tilde{\chi}_{1}^{\dagger}\tilde{\chi}_{2}\tilde{\chi}_{1}^{\dagger}\tilde{\chi}_{2}^{\dagger}\tilde{\chi}_{2}^{\dagger}W\tilde{\chi}_{6}^{\circ},\tilde{\chi}_{6}^{\circ}\rightarrow eev_{\mu},e\mu v_{e}:4 lep + E_{\tau,miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	700 GeV X mass	5 $(m(\chi_1) > 300 \text{ GeV}, \lambda_{121} \text{ or } \lambda_{122} >$	0)		
	$ l_{L}l_{L}, l_{L} \rightarrow \tilde{\chi}_{1}^{*}, \tilde{\chi}_{1}^{*} \rightarrow eev_{\mu}, e\mu v_{\mu} : 4 lep + E_{T, miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	430 Gev mass_ (m čj) >	100 GeV, $m(l_{e})=m(l_{\mu})=m(l_{\tau}), \lambda_{121} \text{ or } \lambda_{121}$	122 > 0)		
	g → qqq : 3-jet resonance pair	L=4.6 fb ⁻¹ , 7 TeV [1210.4813]	666 GeV g mass				
WIME	Scalar gluon : 2-jet resonance pair P interaction (D5, Dirac γ) : 'monoiet' + F	L=4.6 fb ⁻¹ , 7 TeV [1210.4826]	100-287 GeV SGIUON MASS (incl. limit	from 1110.2693)	for DB1		
	T,miss.	L-10.310 , 6 16V [ATLAS-CONF-2012-147]		$\sigma_{\gamma} m_{\chi} < \omega_{OBV}$, inflit of < 687 GeV (
		10 ⁻¹	1		10		
		10	1			T \ A	
*Only	a selection of the available mass limits on new st	ates or phenomena shown.			Mass scale	levj	

MSUGRAVCHSSN: 10 lbp 1; F : E,, lb			ATLAS SUSY	' Searches* - 95% CL Lower Limits (Status:	: Dec 2012)	
$ \frac{1}{4} \frac{1}{4} \frac{1}{\sqrt{1}} 1$	searches	$\begin{array}{l} \text{MSUGRA/CMSSM}: 0 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{MSUGRA/CMSSM}: 1 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{Pheno model}: 0 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{Pheno model}: 0 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{Pheno model}: 0 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{Gluino med}, \tilde{\chi}^{\pm} (\tilde{g} \rightarrow q \tilde{q} \tilde{\chi}^{\pm}): 1 \text{ lep } + j'\text{s} + E_{T,\text{miss}} \\ \text{GMSB} (\tilde{I} \text{ NLSP}): 2 \text{ lep } (\text{OS}) + j'\text{s} + E_{T,\text{miss}} \\ \end{array}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109] L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-104] L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109] L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109] L=4.7 fb ⁻¹ , 7 TeV [1208.4688] L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	1.50 TeV $\tilde{\mathbf{q}} = \tilde{\mathbf{g}}$ mass 1.24 TeV $\tilde{\mathbf{q}} = \tilde{\mathbf{g}}$ mass 1.18 TeV $\tilde{\mathbf{q}} = \tilde{\mathbf{g}}$ mass $(m(\tilde{\mathbf{q}}) < 2$ TeV, light $\tilde{\chi}_1^0$) 1.38 TeV $\tilde{\mathbf{q}}$ mass $(m(\tilde{\mathbf{g}}) < 2$ TeV, light $\tilde{\chi}_1^0$) 900 GeV $\tilde{\mathbf{g}}$ mass $(m(\tilde{\chi}_1^0) < 200$ GeV, $m(\tilde{\chi}^{\pm}) = \frac{1}{2}(m)$ 1.24 TeV $\tilde{\mathbf{g}}$ mass $(\tan\beta < 15)$	ATLAS ۱) Preliminary ۱٫(🗝)+៣(j))	
g=-bb2, (v(trulat)): 01(e) + 3 br3 + E, rans g=+tf2, (v(trulat)): 01(e) + 3 br3 + E, rans g=-tf2, (v(trulat)): 01(e) + 3 br3 + E, rans g=-tf2, (v(trulat)): 01(e) + 3 br3 + E, rans g=-tf2, (v(trulat)): 01(e) + 3 br3 + E, rans bb1, -, -b2, -101(e) + 2 br3 + E, rans bb1, -, -b2, -101(e) + 2 br3 + E, rans bb1, -, -b2, -101(e) + 2 br3 + E, rans bb1, -, -b2, -101(e) + 2 br3 + E, rans bb1, -, -b2, -101(e) + 2 br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 11(e) + br3 + E, rans tit (medum), t-b2, ': 12(e) + E, rans tit (medum), to m2, (mas) (mas) (mas) (mas) (mas) (mas) (mas) (mas) (mas) (m	Inclusive	GMSB ($\overline{\tau}$ NLSP) : 1-2 τ + 0-1 lep + j's + E^{τ} , itiss GGM (bino NLSP) : $\gamma\gamma$ + E^{τ} , miss GGM (wino NLSP) : γ + lep + E^{τ} , miss GGM (higgsino-bino NLSP) : γ + b + E^{τ} , miss GGM (higgsino NLSP) : γ + b + E^{τ} , miss GGM (higgsino NLSP) : Z + jets + E^{τ} , miss Gravitino LSP : 'monojet' + E^{τ} , miss	L=4.7 fb ⁻¹ , 7 TeV [1210.1314] L=4.8 fb ⁻¹ , 7 TeV [1209.0753] L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-144] L=4.8 fb ⁻¹ , 7 TeV [1211.1167] L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-152] L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147]	1.20 TeV \tilde{g} mass (tanβ > 20) 1.07 TeV \tilde{g} mass (m($\tilde{\chi}_1^0$) > 50 GeV) 619 GeV \tilde{g} mass 900 GeV \tilde{g} mass (m($\tilde{\chi}_1^0$) > 220 GeV) 690 GeV \tilde{g} mass (m(\tilde{H}) > 200 GeV) 645 GeV $F^{1/2}$ scale (m(\tilde{G}) > 10 ⁴ eV)	∫ <i>Ldt</i> = (2.1 - 13.0) fb ⁻¹ √s = 7, 8 TeV	
$\frac{1}{2} \sum_{i=1}^{2} \sum_{j=1}^{2} \sum_{i=1}^{2} \sum_{j=1}^{2} \sum_{j=1}^{2} \sum_{j=1}^{2} \sum_{i=1}^{2} \sum_{i=1}^{2} \sum_{i=1}^{2} \sum_{j=1}^{2} \sum_{i=1}^{2} \sum_{i=1}^{2} \sum_{i=1}^{2} \sum_{j=1}^{2} \sum_{i=1}^{2} \sum_{i=1}^$	3rd gen. sq. gluino med.	$\begin{array}{l} g \rightarrow bb\gamma (\text{virtual } b) : 0 \text{ lep } + 3 \text{ b-} j \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{1}^{\sigma} (\text{virtual } \widetilde{t}) : 2 \text{ lep } (SS) + j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{1}^{\sigma} (\text{virtual } \widetilde{t}) : 3 \text{ lep } + j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + \text{multi-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{1}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 3 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 3 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ s} + E_{T, \text{miss}} \\ \widetilde{g} \rightarrow t\overline{t}\chi_{2}^{\sigma} (\text{virtual } \widetilde{t}) : 0 \text{ lep } + 2 \text{ b-}j' \text{ b} + 2 \text{ b-}j' \text{ b} + 2 \text{ b} + 2 \text{ b} + 2 \text{ b} + 2 \text{ b} $	L=12.816 .8 TeV [ATLAS-CONF-2012-145] L=5.8 (b ⁻¹ , 8 TeV [ATLAS-CONF-2012-105] L=13.0 (b ⁻¹ , 8 TeV [ATLAS-CONF-2012-151] L=5.8 (b ⁻¹ , 8 TeV [ATLAS-CONF-2012-103] L=12.8 (b ⁻¹ , 8 TeV [ATLAS-CON-2012-145] L=12.8 (b ⁻¹ , 8 TeV [ATLAS-CONF-212-165]	1.24 TeV 9 mass $(m(\chi_1^2) < 200 \text{ GeV})$ 850 GeV \widetilde{g} mass $(m(\widetilde{\chi}_1^2) < 300 \text{ GeV})$ 860 GeV \widetilde{g} mass $(m(\widetilde{\chi}_1^2) < 300 \text{ GeV})$ 1.00 TeV \widetilde{g} mass $(m(\widetilde{\chi}_1^2) < 300 \text{ GeV})$ 1.15 TeV \widetilde{g} mass $(m(\widetilde{\chi}_1^2) < 200 \text{ GeV})$ 620 GeV \widetilde{b} mass $(m(\widetilde{\chi}_1^2) < 200 \text{ GeV})$	8 TeV results 7 TeV results	
tt (natural GMSB): $Z(\rightarrow)$ + b-jet + $E'_{T,mas}$ $\frac{1}{\sqrt{1}}$, $\frac{1}{\sqrt{1}}$, $\frac{1}{\sqrt$	3rd gen. squarks direct production	tt (light), $t \rightarrow b\overline{\chi}^{\pm}$: 1/2'lep (+ b-jet) + $E_{T,miss}$ tt (light), $t \rightarrow b\overline{\chi}^{\pm}$: 1/2'lep (+ b-jet) + $E_{T,miss}$ tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 1 lep + b-jet + $E_{T,miss}$ tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 2 lep + $E_{T,miss}$ tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 1 lep + b-jet + $E_{T,miss}$ tt $t \rightarrow t\overline{\chi}^{0}$: 1 lep + b-jet + $E_{T,miss}$ tt, $t \rightarrow t\overline{\chi}^{0}$: 2/2/2 lep (+ b-jets) + $E_{T,miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-20, 2-151] L=4.7 fb ⁻¹ , 7 TeV [1208.4305, 1209.210,1167 G L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-16] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166] L=4.7 fb ⁻¹ , 7 TeV [1208.1447,1208.2590,1209.4	405 GeV b mass (m(\vec{x}_1) = 2m(\vec{x}_1)) Strong production: Inclusive searches for di	irect squark	/aluir
Direct χ_{1}^{M} pàir prod. (AMSB) : long-lived χ_{1}^{M} Stable \tilde{g} R-hadrons : low β , $\beta\gamma$ (full detector) Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\tilde{\tau}$. T av (1211.1597) GMSB : stable $\tilde{\tau}$. T av (1211.1597) GMSB : T av ($\tilde{\tau}$. T av (1211.1597) L = 4.6 fb ⁺ . T av (1210.4513) L = 4.6 fb ⁺ . T av (1210.4513) GMS ($\tilde{\tau}_{2,1}$, $\tilde{\tau}_{2,1}$, $\tilde{\tau}_{2,1}$, $\tilde{\tau}_{2,2}$, $\tilde{\tau}_{2,1}$, $$	EW direct	tt (natural GMSB) : $Z(\rightarrow) + b$ -jet + E $I_{1}I_{1}, I\rightarrow \overline{\chi}_{0}^{0} $: $2 \text{ lep } + E_{T,\text{miss}}$ $\overline{\chi}_{1}^{+}\overline{\chi}_{1}, \overline{\chi}_{1}^{+}\rightarrow v $ $\overline{ v }(\overline{v}) \rightarrow v\overline{\chi} $: $2 \text{ lep } + E_{T,\text{miss}}$ $\overline{\chi}_{1}^{+}\chi_{2}^{-}\rightarrow v _{1}^{-} (\overline{v}v), \overline{v} _{1} (\overline{v}v)$: $3 \text{ lep } + E_{T,\text{miss}}$ $\overline{\chi}_{1}^{+}\chi_{2}^{-}\rightarrow W^{(+)}\chi_{2}^{-}\overline{\chi}_{1}^{+}\chi_{2}^{-}$: $3 \text{ lep } + E_{T,\text{miss}}$	L=2.1 fb ⁻¹ , 7 TeV [1204.6736] L=4.7 fb ⁻¹ , 7 TeV [1208.2884] L=4.7 fb ⁻¹ , 7 TeV [1208.2884] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154]	production, based on jet $\chi_1^{\text{mass}} = m(\chi_2), m(\chi_1) = 0, m((v))$ as a $\chi_2^{\text{mass}} = m(\chi_2), m(\chi_1) = 0, m((v))$ as a $\chi_2^{\text{mass}} = m(\chi_2), m(\chi_1) = 0, \text{steptons decoupled}$	s + MET	gian
$\frac{LFV: pp \rightarrow \overline{v}_{x} + X, \overline{v}_{x} \rightarrow ee+\mu \text{ resonance}}{LFV: pp \rightarrow \overline{v}_{x} + X, \overline{v}_{x} \rightarrow ee(\mu) + \tau \text{ resonance}} = \frac{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Bilinear RPV CMSSM: 1 \text{ lep } + 7 \text{ J}^{1}s + E_{T, miss}} = \frac{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ V}_{x} \text{ mass} (\lambda_{311}^{2}=0.05)$ $= \frac{1.4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ V}_{x} \text{ mass} (\lambda_{311}^{2}=0.05)$ $= \frac{1.4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ V}_{x} \text{ mass} (\lambda_{311}^{2}=0.05)$ $= \frac{1.4.7 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ L}_{1233} = 0.05)$ $= \frac{1.4.7 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ L}_{1233} = 0.05)$ $= \frac{1.4.7 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ L}_{1233} = 0.05)$ $= \frac{1.4.7 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ L}_{1233} = 0.05)$ $= \frac{1.4.7 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ L}_{133} = 0.05$ $= \frac{1.4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]}{Le4.6 \text{ lb}^{1}, 7 \text{ TeV} [Preliminary]} = 1.01 \text{ lb}^{1}, 8 \text{ TeV} [ATLAS-CONF-2012-153]} = 1.01 \text{ lb}^{1}, 8 \text{ teV} [ATLAS-CONF-2012-153] = 1.01 \text{ lb}^{1}, 8 \text{ teV} [ATLAS-CONF-2012-153]} = 1.01 \text{ lb}^{1}, 8 \text{ teV} [ATLAS-CONF-2012$	Long-lived particles	Direct $\bar{\chi}_{1}^{\text{M}}$ påir prod. (AMSB) : long-lived $\bar{\chi}_{1}^{\text{M}}$ Stable \tilde{g} R-hadrons : low β , $\beta\gamma$ (full detector) Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\bar{\tau}$ $\bar{\chi}_{1}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex	L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 2 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.4 fb ⁻¹ , 7 TeV [1210.7451]	220 GeV	cτ < 1 m,ĝ decoupled)	
WIMP interaction (D5, Dirac χ): 'monojet' + $E_{T,miss}$. L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-[47] 704 GeV M* scale (m_χ < 80 GeV, limit of < 687 GeV for DB) 10 ⁻¹ 1 10	RPV	LFV : pp $\rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : pp $\rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + $E_{T,miss}$ $\overline{\chi}_{1}^{+} \overline{\chi}_{2} \overline{\chi}_{1}^{+} \rightarrow W \overline{\chi}_{0}^{0}, \overline{\chi}_{0}^{0} \rightarrow eev_{\mu}, e\mu v_{\mu} : 4 lep + E_{T,miss}$ $ L_{L_{1}}, \overline{L}_{1} \rightarrow \overline{\chi}_{1}, \overline{\chi}_{1} \rightarrow eev_{\mu}, e\mu v_{\mu} : 4 lep + E_{T,miss}$ $\overline{g} \rightarrow qqq : 3 - jet resonance pair Scalar gluon : 2-let resonance pair$	L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [1210.4813] L=4.6 fb ⁻¹ , 7 TeV [1210.4826]	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	0.05) : 0) ₁₂₂ > 0)	
	WIM	P interaction (D5, Ďirac χ) : 'monojet' + $\bar{E}_{T,miss}$	L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-[47]	704 GeV M* scale (m _χ < 80 GeV, limit of < 687 GeV I	for (P8)	



		AILAS 5051 5	earches - 55% of Lower Linnis (Status, Dec 2	012)
	MSUGRA/CMSSM : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.50 TeV q = g mass	
	MSUGRA/CMSSM : 1 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-104]	1.24 TeV q = g mass	20 170
0)	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.18 TeV g mass $(m(\tilde{q}) < 2 \text{ TeV}, \text{ light } \tilde{\chi}_1)$	Breliminany
she	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.38 TeV q mass (m(g) < 2 TeV, light $\chi_1^{(2)}$)	Preliminary
an	Gluino med. $\tilde{\chi}^{\perp}(\tilde{g} \rightarrow q\bar{q}\tilde{\chi}^{\perp})$: 1 lep + j's + $E_{T.miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	900 GeV $g \max(m(\chi_1) < 200 \text{ GeV}, m(\chi^2) = \frac{1}{2}(m(\chi^2) + m(\tilde{g}))$	
Se	GMSB (I NLSP) : 2 lep (OS) + j's + E _{T miss}	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	1.24 TeV \hat{g} mass $(\tan\beta < 15)$	
ive	GMSB ($\overline{\tau}$ NLSP) : 1-2 τ + 0-1 lep + j's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1210.1314]	1.20 TeV \tilde{g} mass $(\tan\beta > 20)$	
INSI	GGM (bino NLSP) : $\gamma\gamma + E_{T miss}$	L=4.8 fb ⁻¹ , 7 TeV [1209.0753]	1.07 TeV \tilde{g} mass $(m(\tilde{\chi}) > 50 \text{ GeV})$ Ldt =	(2.1 - 13.0) fb ⁻¹
10	GGM (wino NLSP) : γ + lep + $E_{T \text{ miss}}$	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-144]	619 GeV ĝ mass	(
-	GGM (higgsino-bino NLSP) : $\gamma + b + E_{T miss}^{\gamma}$	L=4.8 fb ⁻¹ , 7 TeV [1211.1167]	900 GeV \tilde{g} mass $(m(\chi_{*}^{0}) > 220 \text{ GeV})$	s = 7, 8 TeV
	GGM (higgsino NLSP) : Z + jets + E _{T miss}	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-152]	690 GeV \tilde{g} mass $(m(\tilde{H}) > 200$ GeV)	
	Gravitino LSP : 'monojet' + ET miss	L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147]	645 GeV $F^{1/2}$ scale $(m(\tilde{G}) > 10^{-4} \text{ eV})$	
60	$g \rightarrow DD\chi_{c}$ (virtual D): U lep + 3 D-JS + $E_{T miss}$	L=12.8 fb , 8 TeV [ATLAS-CONF-2012-145]	1.24 TeV g mass (m(χ) < 200 GeV)	
ne.	$\tilde{g} \rightarrow t t \tilde{\chi}^{(0)}(virtual \tilde{t}) : 2 lep (SS) + i's + E_{T miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-105]	850 GeV \tilde{g} mass $(m(\chi^0) < 300' \text{ GeV})$	0.7.14
ien jen	$\vec{q} \rightarrow t \vec{t} \vec{y}^0$ (virtual \vec{t}) : 3 lep + i's + $E_{T min}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-151]	860 GeV $\widetilde{\mathbf{g}}$ mass $(m(\overline{\chi}^{b}) < 300 \text{ GeV})$	8 TeV results
d g	$\tilde{g} \rightarrow t t \tilde{\chi}^{0}$ (virtual \tilde{t}) : 0 lep + multi-i's + E_{τ}	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-103]	1.00 TeV \tilde{g} mass $(m(\chi^0) < 300 \text{ GeV})$	7 TeV results
g 3	$\tilde{q} \rightarrow t \tilde{t} \tilde{\gamma}$ (virtual \tilde{t}) : 0 lep + 3 b-i's + E_{T} miss	L=12.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-145]	1.15 TeV \tilde{g} mass $(m(\chi^0) < 200 \text{ GeV})$	
	$bb, b, \rightarrow b\overline{\chi}^{\circ}$: 0 lep + 2-b-jets + E_{T} miss	L=12.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-165]	620 GeV b mass $(m(\chi^0) < 120 \text{ GeV})$	
ks on	$\tilde{b}\tilde{b}, \tilde{b}, \rightarrow t\tilde{\chi}^{\pm}$; 3 lep + i's + E_{χ} miss	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-151]	405 GeV \vec{b} mass $(m(\vec{\chi}^{\pm}) = 2m(\vec{\chi}^{\pm}))$	
uai	$\tilde{t}\tilde{t}$ (light), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm 1}$: 1/2 ¹ lep (+ b-jet) + E_{T} miss	L=4.7 fb ⁻¹ , 7 TeV [1208.4305, 1209.2102]167 GeV	\tilde{t} mass $(m(\chi^0) = 55 \text{ GeV})$	
sd	$\tilde{t}t$ (medium), $\tilde{t} \rightarrow b \tilde{\chi}^{\pm}$: 1 lep + b-jet + E_{χ} miss	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166]	160-350 GeV t mass $(m(\chi^0) = 0 \text{ GeV}, m(\chi^{\pm}) = 150 \text{ GeV})$	
n.	$\tilde{t}\tilde{t}$ (medium), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm}$: 2 lep + $E_{\chi}^{\prime,\text{miss}}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-167]	160-440 GeV \tilde{t} mass $(m(\bar{\chi}^0) = 0 \text{ GeV}, m(\tilde{t}) - m(\bar{\chi}^\pm) = 10 \text{ GeV})$	
ge ct	\widetilde{t} $\widetilde{t} \rightarrow t \widetilde{\tau}^0$: 1 lep + b-iet + E_{τ}	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166]	230-560 GeV \tilde{t} mass $(m(\bar{r}^0) = 0)$	
Srd	$\tilde{t}t, \tilde{t} \rightarrow t \tilde{\tau}^0$: $0/1/2 \text{ lep } (+ \text{ b-jets}) + E_{\tau}$	L=4.7 fb ⁻¹ , 7 TeV [1208.1447,1208.2590,1209.4186]	230-465 GeV \tilde{t} mass $(m(\tilde{x}^0) = 0)$	
., 0	tt (natural GMSB) : Z(→II) + b-iet + E	L=2.1 fb ⁻¹ , 7 TeV [1204.6736]	310 GeV \tilde{t} mass (115 < m(\tilde{x}) < 230 GeV)	
	$ \downarrow\rangle \rightarrow \overline{\chi}^{0}$: 2 lep + E_{-}			-
Menut.		L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge	$V = mass (m(\tilde{\chi}) = 0) $	
> 00	$\tilde{\chi}^+ \tilde{\chi}^-, \tilde{\chi}^+ \rightarrow \tilde{V}(\tilde{V}) \rightarrow \tilde{V} \tilde{\chi}^-; 2 \text{ lep } + E_T, \text{miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1	V mass $(m(\vec{\chi}) = 0)$ 10-340 GeV $\vec{\chi}^{\pm}$ mass $(m(\vec{\chi}) < 10 \text{ GeV}, m(\tilde{l}\vec{v}) = \frac{1}{2}(m(\vec{\chi}^{\pm}) + m(\vec{\chi})))$	
EW direc	$\vec{\chi}^{\dagger}_{\vec{\chi}}, \vec{\chi}^{\dagger}_{\vec{\chi}}, \vec{\chi}^{\dagger}_{\vec{\chi}} \rightarrow \tilde{I}_{V}(\vec{V}\rangle) \rightarrow I_{V}\vec{\chi}^{\dagger}$: 2 lep + $E_{T,miss}$ $\vec{\chi}^{\pm}_{\vec{\chi}}, \vec{\chi}^{\dagger}_{\vec{\chi}}, \vec{\chi}^{\dagger}_{\vec{\chi}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154]	V mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^+$ mass $(m(\vec{\chi}_1^0) < 10 \text{ GeV}, m(\tilde{v}) = \frac{1}{2}(m(\vec{\chi}_1^+) + m(\vec{\chi}_2^0)))$ 580 GeV $\vec{\chi}^+$ mass $(m(\vec{\chi}^+) = m(\vec{\chi}^0), m(\vec{\chi}^0) = 0, m(\tilde{v})$ as above)	
EW direc	$\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow \widetilde{\mathbb{I}}_{V}([\widetilde{v}] \rightarrow [v\chi_{1}^{+}]: 2 \text{ lep } + E_{T,\text{miss}}$ $\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow [v]_{U}([\widetilde{v}v]), \widetilde{v} _{U}([\widetilde{v}v]): 3 \text{ lep } + E_{T,\text{miss}}$ $\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow W^{(*)}\widetilde{\chi}_{2}^{-} Z^{(*)}\widetilde{\chi}_{2}^{-}: 3 \text{ lep } + E_{T,\text{miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 851 95 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 100	V mass $(m(\vec{x}_{1}^{+}) = 0)$ 10-340 GeV $\vec{\chi}_{1}^{\pm}$ mass $(m(\vec{\chi}_{1}^{0}) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_{1}^{\pm}) + m(\vec{\chi}_{1}^{0})))$ 580 GeV $\vec{\chi}_{1}^{\pm}$ mass $(m(\vec{\chi}_{1}^{\pm}) = m(\vec{\chi}_{2}^{0}), m(\vec{\chi}_{1}^{0}) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ -295 GeV $\vec{\chi}_{2}^{\pm}$ mass $(m(\vec{\chi}_{1}^{\pm}) = m(\vec{\chi}_{2}^{0}), m(\vec{\chi}_{2}^{0}) = 0, \text{ sleptons decoupled})$	
4 EW direc	$\begin{array}{c} \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-},\widetilde{\chi}_{1}^{\pm}\rightarrow\widetilde{I}v(\overline{v})\rightarrow \overline{I}v\chi_{2}^{\pm}:2 \text{ lep } + E_{T,\text{miss}}\\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-}\rightarrow\widetilde{I},v _{1}^{-}(\overline{v}v),\overline{v} _{1}^{-}(\overline{v}v):3 \text{ lep } + E_{T,\text{miss}}\\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-}\rightarrow W^{(*)}\widetilde{\chi}_{2}^{-}\widetilde{Z}^{(*)}\widetilde{\chi}_{2}^{-}:3 \text{ lep } + E_{T,\text{miss}}\\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-}\rightarrow W^{(*)}\widetilde{\chi}_{2}^{-}\widetilde{Z}^{(*)}\widetilde{\chi}_{2}^{-}:3 \text{ lep } + E_{T,\text{miss}}\\ \text{Direct }\widetilde{\chi}_{1}^{\pm}\text{pair prod. (AMSB): long-lived }\widetilde{\tau}\end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 854.95 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220	V mass $(m(\overline{\chi}_1^{\circ}) = 0)$ 10-340 GeV $\overline{\chi}_{+}^{\pm}$ mass $(m(\overline{\chi}_1^{\circ}) < 10 \text{ GeV}, m(\widetilde{l}\overline{v}) = \frac{1}{2}(m(\overline{\chi}_1^{\circ}) + m(\overline{\chi}_1^{\circ}))))$ 580 GeV $\overline{\chi}_{+}^{\pm}$ mass $(m(\overline{\chi}_1^{\circ}) = m(\overline{\chi}_2^{\circ}), m(\overline{\chi}_2^{\circ}) = 0, m(\widetilde{l}\overline{v}) \text{ as above})$ 295 GeV $\overline{\chi}_{+}^{\pm}$ mass $(m(\overline{\chi}_1^{\circ}) = m(\overline{\chi}_2^{\circ}), m(\overline{\chi}_1^{\circ}) = 0, \text{ sleptons decoupled})$ eV $\overline{\chi}_{-}^{\pm}$ mass $(1 < \tau(\overline{\chi}_1^{\circ}) < 10 \text{ ns})$	
ved EW es direc	$\begin{array}{c} \widetilde{\chi}_{1}^{\dagger}\widetilde{\chi}_{2}, \widetilde{\chi}_{1}^{\dagger} \rightarrow \widetilde{Iv}(\overline{V}) \rightarrow Iv\widetilde{\chi}_{2} : 2 \text{ lep } + E_{T,\text{miss}} \\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow \widetilde{Iv}(\overline{I}(\overline{V}), \overline{V}), \overline{V}(\overline{V}) : 3 \text{ lep } + E_{T,\text{miss}} \\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow W^{(*)}\widetilde{\chi}_{2}^{-}\widetilde{Z}^{(*)}\widetilde{\chi}_{2}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{-} \rightarrow W^{(*)}\widetilde{\chi}_{2}^{-}\widetilde{Z}^{(*)}\widetilde{\chi}_{2}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \end{array}$ Direct $\widetilde{\chi}_{1}^{\dagger}$ pair prod. (AMSB) : long-lived $\widetilde{\chi}_{1}^{\dagger}$ Stable \widetilde{g} R-hadrons : low β , $\beta\gamma$ (full detector)	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 854.95 Get L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.2852] 220	V I mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^0) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_1^{\pm}) + m(\vec{\chi}_2^0)))$ 580 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_2^0) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ 295 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_1^0) = 0, \text{ sleptons decoupled})$ cv $\vec{\chi}_1^{\pm}$ mass $(1 < \tau(\vec{\chi}_1^{\pm}) < 10 \text{ ns})$ 985 GeV \vec{g} mass	
g-lived EW ticles direc	$\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{\pm} \rightarrow \widetilde{I}v([\overline{v}] \rightarrow Iv\chi_{2}^{\pm} : 2 \text{ lep } + E_{T,\text{miss}}$ $\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{\pm} \rightarrow I_{1}vI_{1}^{\pm}([\overline{v}v], \overline{v} = Iv\chi_{2}^{\pm} : 3 \text{ lep } + E_{T,\text{miss}}$ $\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{\pm} \rightarrow W^{(w)}\widetilde{\chi}_{2}^{\pm}\widetilde{\chi}_{2}^{+} : 3 \text{ lep } + E_{T,\text{miss}}$ Direct $\widetilde{\chi}_{1}^{\pm}$ pair prod. (AMSB) : long-lived $\widetilde{\chi}_{1}^{\pm}$ Stable \widetilde{g} R-hadrons : low $\beta,\beta\gamma$ (full detector) Stable \widetilde{f} R-hadrons : low $\beta,\beta\gamma$ (full detector)	L=4.7 fb ⁻⁷ , 7 TeV [1208.2884] 854.95 Get L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1	V mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^0) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_1^{\pm}) + m(\vec{\chi}_2^0)))$ 580 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_2^0) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ 295 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_1^0) = 0, \text{ sleptons decoupled})$ reV $\vec{\chi}_1^{\pm}$ mass $(1 < \tau(\vec{\chi}_1^{\pm}) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t} mass	
ong-lived EW	$\begin{array}{c} \widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{\pm}, \widetilde{\chi}_{1}^{\pm}, \widetilde{ v _{1}^{\pm} } \neq \widetilde{ v _{2}^{\pm} } \neq \widetilde{ v _{2}^{\pm} } \neq \widetilde{ v _{1}^{\pm} } \neq \widetilde$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 854 95 Get L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1	V mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\circ}) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_1^{\pm}) + m(\vec{\chi}_2^{\circ}))))$ 580 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^{\circ}), m(\vec{\chi}_1^{\circ}) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ 295 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^{\circ}), m(\vec{\chi}_1^{\circ}) = 0, \text{ sleptons decoupled})$ veV $\vec{\chi}_1^{\pm}$ mass $(1 < \tau(\vec{\chi}_1^{\pm}) < 10 \text{ ns})$ 985 GeV $\vec{\xi}$ mass 683 GeV \vec{t} mass 300 VeV $\vec{\tau}$ mass $(5 < \tan\beta < 20)$	
Long-lived EW particles direc	$\begin{array}{c} \chi_{1}^{+}\chi_{2}^{-},\chi_{2}^{+}\rightarrow\widetilde{Iv}(\overline{V})\rightarrow V\chi_{2}^{+}:2 \text{ lep }+E_{T,\text{miss}}\\ \chi_{1}^{+}\chi_{2}^{-}\rightarrow\widetilde{Iv}(\overline{V}), \overline{V} , \overline{V}V\rangle:3 \text{ lep }+E_{T,\text{miss}}\\ \chi_{1}^{+}\chi_{2}^{-}\rightarrow W^{**}\chi_{2}^{-}Z^{**}\chi_{2}^{+}:3 \text{ lep }+E_{T,\text{miss}}\\ Direct \overline{\chi}_{1}^{+} pair \text{ prod. (AMSB): long-lived }\chi_{1}\\ \text{Stable } \widetilde{g} \text{ R-hadrons: low }\beta,\beta\gamma \text{ (full detector)}\\ \text{Stable } \widetilde{t} \text{ R-hadrons: low }\beta,\beta\gamma \text{ (full detector)}\\ \widetilde{\tau}^{0}\rightarrow \text{ gqu} \text{ (RPV): u + heavy displaced vertex} \end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Get L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 1	V mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^0) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_1^{\pm}) + m(\vec{\chi}_2^0)))$ 580 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_1^0) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ 295 GeV $\vec{\chi}_1^{\pm}$ mass $(m(\vec{\chi}_1^{\pm}) = m(\vec{\chi}_2^0), m(\vec{\chi}_1^0) = 0, \text{ sleptons decoupled})$ veV $\vec{\chi}_1^{\pm}$ mass $(1 < \tau(\vec{\chi}_1^{\pm}) < 10 \text{ ns})$ 985 GeV $\vec{\xi}$ mass 683 GeV \vec{t} mass 300 YeV $\vec{\tau}$ mass $(5 < \tan\beta < 20)$	
Long-lived EW particles direc	$\begin{array}{c} \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\chi_{1}} \overset{*}{\to} \overset{*}{\to} \widetilde{Iv}(\overline{v}) \Rightarrow Iv\chi_{0} \stackrel{*}{\chi_{1}} \stackrel{*}{\chi_{2}} \stackrel{*}{\to} I_{r,miss} \\ \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\to} [v]_{1}^{1}(\overline{v}v), I\widetilde{v}], I(\overline{v}v) : 3 \text{ lep } + E_{\tau,miss} \\ \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\to} W^{(*)} \overset{*}{\chi_{2}} \stackrel{*}{Z} \stackrel{*}{\to} \chi_{1} \stackrel{*}{\chi_{2}} : 3 \text{ lep } + E_{\tau,miss} \\ \text{Direct } \overset{*}{\chi_{1}} \stackrel{*}{\rho air} \text{ prod. } (\text{AMSB}) : \text{ long-lived } \chi_{1} \\ \text{Stable } \widetilde{g} \text{ R-hadrons } : \text{ low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{t} \text{ R-hadrons } : \text{ low } \beta, \beta\gamma \text{ (full detector)} \\ \text{GMSB } : \text{ stable } \overline{\tau} \\ \overset{*}{\chi_{1}} \xrightarrow{0} \text{ qqu } (\text{RPV}) : \mu + \text{ heavy displaced vertex} \\ \text{LFV : } \text{ pp} \rightarrow \widetilde{v} \stackrel{*}{+} \chi \stackrel{*}{\chi} \xrightarrow{v} \text{ actual resonance} \end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Get L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.4 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	V I mass $(m(\vec{x}_{1}^{c}) = 0)$ 10-340 GeV $\vec{\chi}_{1}^{\pm}$ mass $(m(\vec{\chi}_{1}^{0}) < 10 \text{ GeV}, m(\tilde{1}\vec{v}) = \frac{1}{2}(m(\vec{\chi}_{1}^{\pm}) + m(\vec{\chi}_{2}^{0})))$ 580 GeV $\vec{\chi}_{1}^{\pm}$ mass $(m(\vec{\chi}_{1}^{\pm}) = m(\vec{\chi}_{2}^{0}), m(\vec{\chi}_{1}^{0}) = 0, m(\tilde{1}\vec{v}) \text{ as above})$ 295 GeV $\vec{\chi}_{1}^{\pm}$ mass $(m(\vec{\chi}_{1}^{\pm}) = m(\vec{\chi}_{2}^{0}), m(\vec{\chi}_{1}^{0}) = 0, \text{ sleptons decoupled})$ veV $\vec{\chi}_{1}^{\pm}$ mass $(1 < \tau(\vec{\chi}_{1}^{\pm}) < 10 \text{ ns})$ 985 GeV $\vec{\xi}$ mass 683 GeV \vec{t} mass 300 YeV $\vec{\tau}$ mass $(5 < \tan\beta < 20)$ Third generation sea	rches:
Long-lived EW particles direc	$\begin{array}{c} \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\chi_{1}} \overset{*}{\eta_{1}} \overset{*}{\eta_{1}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	$ \begin{array}{c} v \mid \text{mass} (m(\vec{\chi}_{1}^{\circ}) = 0) \\ 10.340 \; \text{GeV} \vec{\chi}_{1}^{\pm} \; \text{mass} (m(\vec{\chi}_{1}^{\circ}) < 10 \; \text{GeV}, m(\vec{\lambda}_{1}^{\circ}) = \frac{1}{2}(m(\vec{\chi}_{1}^{\circ}) + m(\vec{\chi}_{2}^{\circ}))) \\ \hline & $580 \; \text{GeV} \vec{\chi}_{1}^{\pm} \; \text{mass} (m(\vec{\chi}_{1}^{\circ}) = m(\vec{\chi}_{2}^{\circ}), m(\vec{\chi}_{1}^{\circ}) = 0, m(\vec{\lambda}_{1}^{\circ}) = 0, m(\vec{\lambda}_{1}^{\circ}) \text{ as above}) \\ \hline & $295 \; \text{GeV} \vec{\chi}_{1}^{\pm} \; \text{mass} (m(\vec{\chi}_{1}^{\circ}) = m(\vec{\chi}_{2}^{\circ}), m(\vec{\chi}_{1}^{\circ}) = 0, \text{sleptons decoupled}) \\ \hline & $vV \vec{\chi}_{1}^{\pm} \; \text{mass} (1 < \tau(\vec{\chi}_{1}^{\circ}) < 10 \; \text{ns}) \\ \hline & $985 \; \text{GeV} \vec{g} \; \text{mass} \\ \hline & $683 \; \text{GeV} \vec{t} \; \text{mass} \\ \hline & $300 \; \text{veV} \vec{\tau} \; \text{mass} (5 < \tan\beta < 20) \\ \hline \end{array} $	rches:
V Long-lived EW particles direc	$\begin{array}{c} \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\chi_{1}} \overset{*}{\eta_{1}} \overset{*}{\eta_{1}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140]	V I mass $(m(\vec{x}_1) = 0)$ 10-340 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1^0) < 10 \text{ GeV}, m(\vec{x}) = \frac{1}{2}(m(\vec{x}_1^+) + m(\vec{x}_2^0)))$ 580 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1^+) = m(\vec{x}_2^0), m(\vec{x}_1^-) = 0, m(\vec{x})$ as above) 295 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1^+) = m(\vec{x}_2^0), m(\vec{x}_1^+) = 0, \text{ sleptons decoupled})$ rev $\vec{\chi}_1^+$ mass $(1 < \tau(\vec{x}_1^+) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t} mass 300 YeV $\vec{\tau}$ mass $(5 < \tan\beta < 20)$ Third generation sea Gluino mediated or directly for the state of the stat	rches:
RPV Long-lived EW particles direc	$\begin{array}{c} \sum_{i=0}^{t} \overline{\chi}_{i} \overline{\chi}_{i} \overline{\chi}_{i}^{+} \rightarrow \widetilde{Iv}([\overline{v}] \rightarrow)v \overline{\chi}_{i}^{+} : 2 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow [v]_{i}^{1}([\overline{v}v]), \overline{v} _{i}^{-}([\overline{v}v]) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{i}^{0} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{0} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{0} \rightarrow \text{detector} : \text{low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \overline{g} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \overline{\zeta}_{i}^{0} \rightarrow \text{qqu } (\text{RPV}) : \mu + \text{heavy displaced vertex} \\ \text{LFV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ \text{LFV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ \text{Bilinear } \text{RPV} \text{ CMSSM : 1 lep } + 7 \text{ J's } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i} \overline{\chi}_{i}^{+} \rightarrow W \overline{\chi}_{i}^{0} \overline{\chi}_{i}^{0} \rightarrow e v \text{ euv} : 4 \text{ lep } + F \end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	$ \begin{array}{c} \label{eq:constraint} \hline \textbf{v} \mbox{ mass } (m(\vec{\chi}_1)=0) \\ \hline \textbf{10.340 GeV} \vec{\chi}_1^+ \mbox{ mass } (m(\vec{\chi}_1^0)<\textbf{10 GeV}, m(\vec{\lambda}_1)=\frac{1}{2}(m(\vec{\chi}_1^+)+m(\vec{\chi}_2^0))) \\ \hline \textbf{580 GeV} \vec{\chi}_1^+ \mbox{ mass } (m(\vec{\chi}_1^+)=m(\vec{\chi}_2^0), m(\vec{\chi}_1^+)=0, m(\vec{\lambda}_1)=0, m(\vec{\lambda}_1)=\textbf{0}, m(\vec{\lambda}_1)=0, m(\vec{\lambda}_1)=\textbf{0}, m(\vec{\lambda}_1)=\textbf{0},$	rches: ect stop pi
RPV Long-lived EW particles direc	$\begin{array}{c} \sum_{i=0}^{t} \overline{\chi}_{i} \overline{\chi}_{i} \overline{\chi}_{i}^{+} \rightarrow \widetilde{Iv}([\overline{v}] \rightarrow)v_{\lambda} \overline{\chi}_{i} \stackrel{!}{\simeq} 2 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow [v_{i}]_{i} [(\overline{v}v), \overline{v} _{i} [(\overline{v}v) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 2^{(*)} \overline{\chi}_{i} \stackrel{!}{\simeq} 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \stackrel{!}{\simeq} qq\mu (RPV) : \mu + heavy for \beta \gamma_{i} que (etcor) \\ GMSB : stable \overline{\tau} \\ \overline{\chi}_{i} \stackrel{!}{\rightarrow} qq\mu (RPV) : \mu + heavy displaced vertex \\ LFV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ EV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ Bilinear RPV CMSSM : 1 \text{ lep } + 7 j \text{ 's } E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i} \overline{\chi}_{i} \stackrel{!}{\longrightarrow} \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} \rightarrow e ev_{\mu}, e \mu v : 4 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} 1 + \sum \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} \rightarrow e ev_{\mu} e uv : 4 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} 1 + \sum \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} 2 + e e uv : 4 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} 1 + \sum \overline{\chi}_{i} \stackrel{!}{\xrightarrow{\tau}} 2 + e e v = v \text{ or } 1 \text{ eve} 1 0 \text{ eve} 1 0 \text{ eve} 1 0 \text$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	V I mass $(m(\vec{x}_1) = 0)$ 10.340 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1) < 10 \text{ GeV}, m(\vec{x}) = \frac{1}{2}(m(\vec{x}_1^+) + m(\vec{x}_2^0)))$ 580 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1) = m(\vec{x}_2), m(\vec{x}_1) = 0, m(\vec{x})$ as above) 295 GeV $\vec{\chi}_1^+$ mass $(m(\vec{x}_1) = m(\vec{x}_2), m(\vec{x}_1) = 0, \text{sleptons decoupled})$ eV $\vec{\chi}_1^+$ mass $(1 < \tau(\vec{x}_1) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t} mass 583 GeV \vec{t} mass 583 GeV \vec{t} mass 583 GeV \vec{t} mass 683 GeV \vec{t}	rches: ect stop pi
RPV Long-lived EW particles direc	$\begin{array}{c} \sum_{i=0}^{t} \overline{\chi}_{i} \overline{\chi}_{i} \overline{\chi}_{i}^{+} \rightarrow \widetilde{Iv}([\overline{v}] \rightarrow)v_{\lambda_{0}}^{+} \ge 2 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1} \overline{\chi}_{2} \rightarrow [v_{1}]^{1}[(\overline{v}v), \overline{v}] \cdot [(\overline{v}v) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{2} \rightarrow W^{(*)} \overline{\chi}_{i}^{0} \overline{Z}^{(*)} \overline{\chi}_{i}^{-} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i} \overline{\chi}_{i} \overline{\chi}_{i} \rightarrow g \mu (RPV) : \mu + heav (AMSB) : 1 \text{ long-lived } \overline{\chi}_{i}^{-} \\ \text{Stable } \overline{g} \text{ R-hadrons : low } \beta, \beta \gamma (\text{full detector}) \\ \text{Stable } \overline{f} \text{ R-hadrons : low } \beta, \beta \gamma (\text{full detector}) \\ \text{GMSB : stable } \overline{\tau} \\ \overline{\chi}_{i}^{0} \rightarrow q \mu (RPV) : \mu + heav y \text{ displaced vertex} \\ \text{LFV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ \text{Bilinear } \text{RPV } \text{CMSSM : 1 lep } + 7 \text{ J's } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i} \overline{\chi}_{i}^{-} \overline{\chi}_{i}^{0} \overline{\chi}_{i}^{0} \rightarrow e e \nu_{\mu}, e \mu \nu_{i} : 4 \text{ lep } + E_{T,\text{miss}} \\ I_{i} L^{1}_{i}, I_{i} \rightarrow I_{i}^{-}, \overline{\chi}_{i}^{-} \rightarrow e e \nu_{i}^{-}, e \mu \nu_{i}^{-} : 4 \text{ lep } + E_{T,\text{miss}} \\ V_{i} \overline{\chi}_{i} \overline{\chi}_{i}^{-} \overline{\chi}_{i}^{-} \overline{\chi}_{i}^{-} \rightarrow 2 \text{ is } e e \sigma \rho \text{ concorder one of i} \end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-153]	$ \frac{1}{10340 \text{ GeV}} \frac{(m(\overline{x}^{0}) = 0)}{(\overline{x}^{0}_{1} \text{ mass}} \frac{(m(\overline{x}^{0}_{1}) < 10 \text{ GeV}, m(\overline{x}^{0}) = \frac{1}{2}(m(\overline{x}^{0}_{1}) + m(\overline{x}^{0}_{1}))) $ $ \frac{580 \text{ GeV}}{580 \text{ GeV}} \frac{1}{\chi_{1}^{0}} \frac{1}{\text{ mass}} \frac{(m(\overline{x}^{0}_{1}) = m(\overline{x}^{0}_{2}), m(\overline{x}^{0}_{1}) = 0, m(\overline{x}^{0}) = 0, m(\overline{x}^{0}) \text{ as above}) $ $ \frac{295 \text{ GeV}}{2} \frac{1}{\chi_{1}^{0}} \frac{1}{\text{ mass}} \frac{(m(\overline{x}^{0}_{1}) = m(\overline{x}^{0}_{2}), m(\overline{x}^{0}_{1}) = 0, \text{ sleptons decoupled}) }{10 \text{ mass}} \frac{(1 < \tau(\overline{x}^{0}_{1}) < 10 \text{ ns})}{985 \text{ GeV}} \frac{1}{9} \frac{1}{9} \frac{1}{9} \frac{1}{300 \text{ tev}} \frac{1}{\chi_{1}^{0}} \frac{1}{10 \text{ mass}} \frac{(5 < \tan\beta < 20)}{10 \text{ mediated or direction}} \frac{1}{300 \text{ mediated}} \frac{1}{9} \frac{1}{9} \frac{1}{100 \text{ mediated}} $	rches: ect stop pi
RPV Long-lived EW particles direc	$\begin{array}{c} \sum_{i=0}^{t} \overline{\chi}_{i}, \overline{\chi}_{i} \rightarrow \overline{\mathbb{IV}}_{i} \rightarrow \mathbb{IV}_{i}, 2 \text{ lep } E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2} \rightarrow [\mathbb{IV}]_{i} [(\overline{\mathbb{VV}}), \overline{\mathbb{VI}}]_{i} [(\overline{\mathbb{VV}}) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2} \rightarrow \mathbb{W}_{i}^{1} [(\overline{\mathbb{VV}}), \overline{\mathbb{VI}}]_{i} [(\overline{\mathbb{VV}}) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2} \rightarrow \mathbb{W}_{i}^{1} [(\overline{\mathbb{VV}}), \overline{\mathbb{VI}}]_{i} = 1 \text{ (find)} \\ \text{Direct } \overline{\chi}_{i}, \overline{pair} \text{ prod. } (AMSB) : \text{ long-lived } \overline{\chi}_{i} \\ \text{Stable } \overline{g} \text{ R-hadrons } : \text{low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \overline{g} \text{ R-hadrons } : \text{low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \overline{g} \text{ R-hadrons } : \text{low } \beta, \beta\gamma \text{ (full detector)} \\ \text{GMSB } : \text{stable } \overline{\tau} \\ \overline{\chi}_{i}^{0} \rightarrow \text{qqu } (\text{RPV}) : \mu + \text{heavy displaced vertex} \\ \text{LFV } : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow \text{e} + \mu \text{ resonance} \\ \text{Bilinear } \text{RPV} \text{ CMSSM } : 1 \text{ lep } + 7 \text{ J's } E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i}, \overline{\chi}_{i}^{-} \rightarrow \text{W}_{0}^{0}, \overline{\chi}_{0}^{0} \rightarrow \text{eev}_{\mu}, \text{eµv} : 4 \text{ lep } E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i}, \overline{\chi}_{i}^{+} \rightarrow \text{W} \overline{\chi}_{0}^{0}, \overline{\chi}_{0}^{0} \rightarrow \text{eev}_{\mu}, \text{eµv} : 2 \text{ lep } E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i}, \overline{\chi}_{i}^{-} \overline{\chi}_{i}^{-} \rightarrow \text{Qqu } : 3 \text{ -jef resonance pair} \\ \overline{\chi}_{i} = 1 \text{ Constance pair} \\ \overline{\chi}_{i} $	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [1210.4813] L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100.	V I mass $(m(\vec{x}_{1}) = 0)$ 10.340 GeV $\vec{\chi}_{1}^{+}$ mass $(m(\vec{x}_{1}) < 10 \text{ GeV}, m(\vec{x}) = \frac{1}{2}(m(\vec{x}_{1}^{+}) + m(\vec{x}_{2}^{0})))$ 580 GeV $\vec{\chi}_{1}^{+}$ mass $(m(\vec{x}_{1}) = m(\vec{x}_{2}^{0}), m(\vec{x}_{1}^{0}) = 0, m(\vec{x})$ as above) 295 GeV $\vec{\chi}_{1}^{+}$ mass $(m(\vec{x}_{1}) = m(\vec{x}_{2}^{0}), m(\vec{x}_{1}^{0}) = 0, sleptons decoupled)$ 295 GeV $\vec{\chi}_{1}^{+}$ mass $(1 < \tau(\vec{x}_{1}^{0}) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t} mass 300 TeV $\vec{\tau}$ mass $(5 < tan\beta < 20)$ Third generation sea Gluino mediated or directly as a structure to light stops 430 50 UOD mass (incl limit from 1110.2803)	rches: ect stop pi
RPV Long-lived EW	$\begin{array}{c} \sum_{\substack{t=0\\ i\neq j}}^{t} \overline{\chi}_{i}, \overline{\chi}_{i}^{*} \rightarrow \widetilde{Iv}(\overline{V}) \rightarrow Iv\overline{\chi}_{i}^{*} : 2 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1}, \overline{\chi}_{2}^{*} \rightarrow [V_{1}]_{i}^{1}(\overline{vv}), \widetilde{Iv}_{i}^{1} (\overline{vv}) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1}, \overline{\chi}_{2}^{*} \rightarrow W_{i}^{1} \overline{\chi}_{i}^{0} \overline{Z}_{i}^{(*)} \overline{\chi}_{i}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2}^{*} \rightarrow W_{i}^{(*)} \overline{\chi}_{i}^{0} \overline{Z}_{i}^{(*)} \overline{\chi}_{i}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2}^{*} \rightarrow W_{i}^{(*)} \overline{\chi}_{i}^{0} \overline{Z}_{i}^{(*)} \overline{\chi}_{i}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{*} \overline{\chi}_{i}, \overline{\chi}_{i}^{*} \rightarrow \text{pair prod. } (AMSB) : \text{ long-lived } \overline{\chi}_{i}^{*} \\ \text{Stable } \widetilde{g} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{g} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{f} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{GMSB : stable } \overline{\tau} \\ \overline{\chi}_{i}^{0} \rightarrow \text{equ} (\text{RPV}) : \mu + \text{heavy displaced vertex} \\ \text{LFV : pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow \text{e} + \mu \text{ resonance} \\ \text{Bilinear } \text{RPV } \text{CMSSM : 1 lep } + 7 $	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Gel L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.1597] L=4.7 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [1210.4813] L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100-	V I mass $(m(\vec{x}') = 0)$ 10.340 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}') < 10 \text{ GeV}, m(\vec{x}') = \frac{1}{2}(m(\vec{x}_{+}^{+}) + m(\vec{x}_{-}^{0})))$ 580 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}_{+}^{+}) = m(\vec{x}_{-}^{0}), m(\vec{x}_{+}^{+}) = 0, m(\vec{x}) \text{ as above})$ 295 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}_{+}) = m(\vec{x}_{-}^{0}), m(\vec{x}_{+}^{+}) = 0, \text{ sleptons decoupled})$ 295 GeV $\vec{\chi}_{+}^{+}$ mass $(1 < \tau(\vec{x}_{+}^{+}) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV I mass 300 TeV $\vec{\tau}$ mass $(5 < \tan\beta < 20)$ Third generation sea Gluino mediated or direction seasing the sensitive to light stops 287 GeV Sgluon mass (incl. limit from 1110.2693) 287 GeV M ¹ Scale (m < 80 GeV limit of < 687 GeV for DB)	rches: ect stop pi
RPV Long-lived EW	$\begin{array}{c} \sum\limits_{\substack{t=0\\ i\neq j}}^{t} \overline{\chi}_{i}, \overline{\chi}_{i}^{*} \rightarrow \overline{\mathbb{Iv}}([\overline{v}] \rightarrow \mathbb{Iv}_{i}^{*}] : 2 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1}, \overline{\chi}_{2}^{*} \rightarrow [\mathbb{Iv}]_{i}^{1}([\overline{v}v]), \overline{\mathbb{Iv}}]_{i}([\overline{v}v]) : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{1}, \overline{\chi}_{2}^{*} \rightarrow \mathbb{W}^{1}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2}^{*} \rightarrow \mathbb{W}^{1}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{2}^{*} \rightarrow \mathbb{W}^{1}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*}, \overline{\chi}_{2}^{*} : 3 \text{ lep } + E_{T,\text{miss}} \\ \overline{\chi}_{i}, \overline{\chi}_{i}, \overline{\chi}_{i}^{*} \rightarrow \mathbb{R}^{n} \text{ adrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{g} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{g} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{Stable } \widetilde{f} \text{ R-hadrons : low } \beta, \beta\gamma \text{ (full detector)} \\ \text{GMSB : stable } \overline{\tau} \\ \overline{\chi}_{i}^{0} \rightarrow qq\mu \text{ (RPV) : } \mu + \text{heavy displaced vertex} \\ \text{ LFV : } pp \rightarrow \overline{v}_{\tau} + X, \overline{v}_{\tau} \rightarrow e + \mu \text{ resonance} \\ \text{Bilinear } \text{RPV } \text{ CMSSM : 1 lep } + 7 \text{ J's } + E_{T,\text{miss}} \\ \overline{\chi}_{i}^{+} \overline{\chi}_{i}, \overline{\chi}_{i}^{+} \rightarrow \mathbb{W}_{g}^{0}, \overline{\chi}_{0}^{0} \rightarrow e e \nu_{\mu}, e \mu \nu_{e} : 4 \text{ lep } + E_{T,\text{miss}} \\ \overline{g} \rightarrow qqq : 3 \text{ -jet resonance pair} \\ \overline{g} \rightarrow qqq : 3 \text{ -jet resonance pair} \\ \text{Scalar gluon : } 2 \text{ -jet resonance pair} \\ \text{IP interaction (D5, Dirac } \chi) : \text{ monojet' } + E_{T,\text{miss}} \end{array}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Gei L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 2 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 2 L=4.7 fb ⁻¹ , 7 TeV [1210.7451] 1 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 2 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 2 L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-153] 2 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 2 L=4.6 fb ⁻¹ , 7 TeV [1210.4813] 2 L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100-2 L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147] 1 L 1 1	V I mass $(m(\vec{x}') = 0)$ 10.340 GeV $\vec{\chi}^+_{1}$ mass $(m(\vec{\chi}') < 10 \text{ GeV}, m(\vec{v}) = \frac{1}{2}(m(\vec{\chi}^+_{1}) + m(\vec{\chi}^0_{1})))$ 580 GeV $\vec{\chi}^+_{1}$ mass $(m(\vec{\chi}^+_{1}) = m(\vec{\chi}^0_{2}), m(\vec{\chi}^+_{1}) = 0, m(\vec{v})$ as above) 295 GeV $\vec{\chi}^+_{1}$ mass $(m(\vec{\chi}^+_{1}) = m(\vec{\chi}^0_{2}), m(\vec{\chi}^+_{1}) = 0, sleptons decoupled)$ eV $\vec{\chi}^+_{1}$ mass $(1 < \tau(\vec{\chi}^+_{1}) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t} mass	rches: ect stop pi
RPV Long-lived EW ■ RPV Long-lived EW	$\begin{array}{c} \overset{*}{\chi_{1}} \overset{*}{\chi_{2}} \overset{*}{\chi_{1}} \overset{*}{\eta_{1}} \overset{*}{\eta_{1}} \overset{*}{\eta_{2}} \overset{*}{\eta_{1}} \overset{*}{\eta_{2}} \overset{*}{\eta_{1}} \overset{*}{\eta_{1}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85 195 Ge L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 1 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.4 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [1210.4813] L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100- L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147] 1 1 1 1 1 1 1	V I mass $(m(\vec{x}') = 0)$ 10.340 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}') < 10 \text{ GeV}, m(\vec{x}') = \frac{1}{2}(m(\vec{x}_{+}^{+}) + m(\vec{x}_{-}^{0})))$ 580 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}_{+}) = m(\vec{x}_{-}^{0}), m(\vec{x}_{+}) = 0, m(\vec{x})$ as above) 295 GeV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}_{+}) = m(\vec{x}_{-}^{0}), m(\vec{x}_{+}) = 0, \text{ sleptons decoupled})$ eV $\vec{\chi}_{+}^{+}$ mass $(m(\vec{x}_{+}) < 10 \text{ ns})$ 985 GeV \vec{g} mass 683 GeV \vec{t}	rches: ect stop pi



	ATLAS SUSY Searches* - 95% CL Lower Limits (Status: Dec 2012)
MSUGRA/CMSSM : 0 lep + j's + $E_{T,miss}$ MSUGRA/CMSSM : 1 lep + j's + $E_{T,miss}$ Pheno model : 0 lep + j's + $E_{T,miss}$ Pheno model : 0 lep + j's + $E_{T,miss}$ Gluino med. $\vec{\chi}^{\pm}$ ($\vec{g} \rightarrow q \vec{q} \vec{\chi}^{\pm}$) : 1 lep + j's + $E_{T,miss}$ GMSB (\vec{i} NLSP) : 2 lep (OS) + j's + $E_{T,miss}$ GMSB ($\vec{\tau}$ NLSP) : 1-2 τ + 0-1 lep + j's + $E_{T,miss}^{T,miss}$ GGM (bino NLSP) : γ + lep + $E_{T,miss}^{T,miss}$ GGM (higgsino-bino NLSP) : γ + b + $E_{T,miss}^{T,miss}$ GGM (higgsino-bino NLSP) : γ + b + $E_{T,miss}^{T,miss}$ GGM (higgsino-bino NLSP) : γ + b + $E_{T,miss}^{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV (ATLAS-CONF-2012-109) 1.60 TeV $\widetilde{q} = \widetilde{g}$ mass L=5.8 fb ⁻¹ , 8 TeV (ATLAS-CONF-2012-104) 1.24 TeV $\widetilde{q} = \widetilde{g}$ mass ATLAS L=5.8 fb ⁻¹ , 8 TeV (ATLAS-CONF-2012-109) 1.18 TeV \widetilde{g} mass $(m(\widetilde{q}) < 2 TeV, light \chi_{1}^{0}) Preliminary L=5.8 fb-1, 8 TeV (ATLAS-CONF-2012-109) 1.38 TeV \widetilde{q} mass (m(\widetilde{g}) < 2 TeV, light \chi_{1}^{0}) Preliminary L=5.8 fb-1, 8 TeV (ATLAS-CONF-2012-109) 1.38 TeV \widetilde{q} mass (m(\widetilde{g}) < 2 TeV, light \chi_{1}^{0}) Preliminary L=4.7 fb-1, 7 TeV (1208.4688) 900 GeV \widetilde{g} mass (m(\widetilde{g}_{1}^{0}) > 200 GeV, m(\widetilde{g}^{0}) = \frac{1}{2}(m(\widetilde{g}^{0}) + m(\widetilde{g})) L=4.7 fb-1, 7 TeV (1210.1314) 1.20 TeV \widetilde{g} mass (tan\beta < 15) L=4.7 fb-1, 7 TeV (1210.1314) Log TeV \widetilde{g} mass (tan\beta > 20) \int Ldt = (2.1 - 13.0) fb^{-1} L=4.8 fb-1, 7 TeV (1210.1314) 1.07 TeV (\widetilde{g} mass (m(\widetilde{g}_{1}^{0}) > 200 GeV) \int Ldt = (2.1 - 13.0) fb^{-1} L=4.8 fb-1, 7 TeV (1211.1167) 900 GeV (\widetilde{g} mass (m(\widetilde{g}_{1}^{0}) > 220 GeV) \int s = 7, 8 TeV I =5.8 fb-1, 8 TeV (ATLAS-CONF-2012-152) GPB GoV (\widetilde{g} mass (m(\widetilde{g}_{1}^{0}) > 220 GeV) s = 7, 8 TeV $
$ \begin{array}{c} \widetilde{g} \rightarrow \widetilde{b} \overline{\chi}^{0} \\ \widetilde{g} \rightarrow \widetilde{t} \overline{\chi}^{0} $	Direct Electroweak production of gauginos, sleptons, small cross sections, various signatures, mainly with multilepton final states
tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 1 lep + b-jet + $E_{T,miss}$ tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 2 lep + $E_{T,miss}$ tt (medium), $t \rightarrow b\overline{\chi}^{\pm}$: 2 lep + $E_{T,miss}$ tt ($t, \overline{t} \rightarrow t\overline{\chi}^{\pm}$: 1 lep + b-jet + $E_{T,miss}$ tt ($t, \overline{t} \rightarrow t\overline{\chi}^{\pm}$: 0/1/2 lep (+ b-jets) + $E_{T,miss}$ tt (netural CMSR): $Z(-\lambda lb)$ + b jet + $E_{T,miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-166] 160-350 GeV t mass $(m(\overline{\chi}_1^0) = 0 \text{ GeV}, m(\overline{\chi}_1^+) = 150 \text{ GeV})$ L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-167] 160-440 GeV t mass $(m(\overline{\chi}_1^0) = 0 \text{ GeV}, m(\overline{\chi}_1^+) = 10 \text{ GeV})$ L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-165] 230-560 GeV t mass $(m(\overline{\chi}_1^0) = 0 \text{ GeV}, m(\overline{\chi}_1^+) = 10 \text{ GeV})$ L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-165] 230-560 GeV t mass $(m(\overline{\chi}_1^0) = 0)$ L=4.7 fb ⁻¹ , 7 TeV [1208.1447,1208.2590,11] 3186] 230-465 GeV t mass $(m(\overline{\chi}_1^0) = 0)$
$ \begin{array}{c} \overbrace{\mathcal{Z}}^{\downarrow} \overbrace{\mathcal{Z}}^{\downarrow}, \overbrace{\mathcal{Z}}^{I}, \overbrace{\mathcal{Z}}^{I}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85-195 GeV I mass $(m(\overline{\chi}_1^0) = 0)$ L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 110-340 GeV $\overline{\chi}_{\pm}^{\pm}$ mass $(m(\overline{\chi}_{\pm}^0) < 10 \text{ GeV}, m(\overline{\lambda}_{\pm}^0) = \frac{1}{2}(m(\overline{\chi}_{\pm}^{\pm}) + m(\overline{\chi}_{\pm}^0)))$ L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 580 GeV $\overline{\chi}_{\pm}^{\pm}$ mass $(m(\overline{\chi}_{\pm}^{\pm}) = m(\overline{\chi}_{\pm}^0), m(\overline{\chi}_{\pm}^0) = 0, m(\overline{\lambda})$ as above)
Direct $\overline{\chi}_{1}^{+}$ påir prod. (AMSB) : long-lived $\overline{\chi}_{2}^{+}$ Stable \overline{g} R-hadrons : low β , $\beta\gamma$ (full detector) Stable \overline{t} R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}_{1}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : pp $\rightarrow \overline{v}_{z}$ +X, $\overline{v}_{z} \rightarrow e+\mu$ resonance LFV : pp $\rightarrow \overline{v}_{z}$ +X, $\overline{v}_{z} \rightarrow e(\mu)$ + τ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + $E_{T,miss}$ $\overline{\chi}_{1}^{+}\overline{\chi}_{1}, \overline{\chi}_{1}^{+} \rightarrow W\overline{\chi}_{1}^{0}, \overline{\chi}_{1}^{0} \rightarrow eev$, euv. : 4 lep + E_{z}	L=4.7 (b ⁻³ , 7 TeV [1210.2852] 220 GeV $\overline{\chi}_{1}^{\pm}$ mass (1 < \tau(\overline{\chi}_{1}^{\pm}) < 10 ns)
$\begin{array}{c} \chi_{1}\chi_{2}\chi_{1} \chi_{1}\chi_{2} \chi_{1}\chi_{2} \chi_{2} \chi_{2} $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $



	MSUGRA/CMSSM : 0 lep + j's + E _{T,miss}	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.50 TeV q= g mass	
	MSUGRA/CMSSM : 1 lep + j's + E _{T,miss}	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-104]	1.24 TeV q = g mass	ATLAS
0	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.18 TeV g mass $(m(\tilde{q}) < 2 \text{ TeV}, \text{ light } \tilde{\chi}_1)$	Broliminan
che	Pheno model : 0 lep + J's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.38 TeV Q MASS (<i>m</i> (g) < 2 TeV, light χ)	Freinnary
an'	Gluino med. χ^{-} (g \rightarrow qq χ^{-}) : 1 lep + j's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	900 GeV g mass $(m(\overline{\chi}_1) < 200 \text{ GeV}, m(\overline{\chi}) = \frac{1}{2}(m(\overline{\chi}_1) + m(\overline{g}))$	
S	GMSB (I NLSP) : 2 lep (OS) + j's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	1.24 TeV g mass $(\tan\beta < 15)$	
ive	GMSB (τ NLSP): 1-2 τ + 0-1 lep + JS + E CCM (bino NLSP) : my + E ^T ,miss	L=4.7 fb ⁻¹ , 7 TeV [1210.1314]	1.20 TeV g mass $(\tan \beta > 20)$	
lus	$GGM (wing NLSP) : \pi + lop + E^{T,miss}$	L=4.8 fb ⁻¹ , 7 TeV [1209.0753]	1.07 TeV g mass $(m(\chi_1) > 50 \text{ GeV})$ Ldt :	(2.1 - 13.0) fb ⁻ '
Inc	GGM (biggsing-bing NLSP) $x \neq b \neq E^{T,miss}$	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-144]	619 GeV g mass J	
	COM (higgsino-billo NEOF) : 7 + b + E	L=4.8 fb ^{-*} , 7 TeV [1211.1167]	900 GeV g mass $(m(\chi_1) > 220 \text{ GeV})$	IS = 7, 8 IeV
	GGW (higgsino NLSP) . $Z + jets + E_{T,miss}$	L=5.8 fb ', 8 TeV [ATLAS-CONF-2012-152]	690 GeV g mass $(m(H) > 200 \text{ GeV})$	
	Graviuno LSP . monojet + ET.miss	L=10.5 fb ', 8 TeV [ATLAS-CONF-2012-147]	645 GeV F SCALE (m(G) > 10 feV)	
sq.	$g \rightarrow bb\chi$ (virtual b): 0 lep + 3 b-j's + $E_{T,miss}$	L=12.8 fb , 8 TeV [ATLAS-CONF-2012-145]	1.24 TeV g mass $(m(\chi_1) < 200 \text{ GeV})$	
m.	$g \rightarrow tt \chi$ (virtual t): 2 lep (SS) + J'S + $E_{T,miss}$	L=5.8 fb , 8 feV [ATLAS-CONF-2012-105]	BOUGEV UTILIASS $(m(\chi)) < 300 \text{ GeV}$	8 TeV results
ge ino	$g \rightarrow tt \chi_1$ (virtual t): 3 lep + J's + $E_{T,miss}$	L=13.0 fb , 8 TeV [ATLAS-CONF-2012-151]	and Gev g mass (m(χ) < 300 Gev)	
3rd glui	$g \rightarrow t(\chi_{T,miss}) = 0$ lep + multi-j's + $E_{T,miss}$	L=5.8 fb , 8 feV [ATLAS-CONF-2012-103]		7 TeV results
	$g \rightarrow ii \chi$ (virtual i): U lep + 3 b-j s + $E_{T,miss}$	L=12.0 ID , 8 IEV [A1LAS-CONF-2012-145]		
2 5	$DD, D, \rightarrow D\chi$: U lep + 2-D-jets + $E_{T,miss}$	L=12.8 fD , 8 TeV [AT LAS-CONF-2012-165]	Long lived particles s	earcnes
any	$DD, D \rightarrow t\chi$: 3 lep + J'S + $E_{T,miss}$	L=13.0 TD , 8 TEV [ATLAS-CONF-2012-151]		• • •
dr.	$f_{T,miss}$	L=4.7 ID , 7 IEV [1208.4305, 1209.2102](07 GeV [1	🚺 Mix of different signatu	res with longe
7. S	tr (medium) $t \rightarrow b\chi$. The $p + b$ -jet $+ E_{T,miss}$	L=13.0 fb , 8 TeV [AT LAS-CONF-2012-166]		
ge/	\widetilde{tt} t t τ	L=13.0 fb , 8 TeV [ATLAS-CONF-2012-167]	sparticles litetime	
ire d	t_{1} t_{2} t_{3} t_{4} t_{7} t_{1} t_{1} t_{1} t_{1} t_{1} t_{1} t_{1} t_{1} t_{1} t_{2} t_{1} t_{1	$L = 13.0 \text{ fb}^{-1}$ 7 TeV [1208 1447 1208 2590 1209 4186]		
00	T (natural GMSB) : $Z(\rightarrow) + b - iet + F$	/ =2.1 fb ⁻¹ 7 TeV [1204.6736]	0.GeV t mass (115 < m(z) < 230 GeV)	
	11 miss	L=4.7 fb ⁻¹ . 7 TeV [1208.2884] 85-197 GeV	$[mass (m/x^0) = 0)$	
of A	$\vec{v} \cdot \vec{v} \cdot \vec{v} \cdot \vec{v} + \vec{v} \cdot $	L=4.7 fb ⁻¹ . 7 TeV [1208.2884]	340 GeV $\vec{\chi}^{\pm}$ mass $(m(\vec{\chi}) \le 10 \text{ GeV} m(\vec{\chi}) = \frac{1}{2}(m(\vec{\chi}^{\pm}) \pm m(\vec{\chi})))$	
EV	$\tilde{\gamma}^{\pm}\tilde{\gamma}^{0} \rightarrow v (\tilde{v}v), \tilde{v} (\tilde{v}v) : 3 \text{ lep } + F$	L=13.0 fb ⁻¹ , 8 TeV IATLAS-CONF-2012-1	580 GeV $\tilde{\gamma}^{\pm}$ mass $(m(\tilde{x}_{1}^{\pm}) + m(\tilde{x}_{2}^{\pm}) + m(\tilde{x}_{1}^{\pm}) + m(\tilde{x}_{2}^{\pm}))$ as above)	
0	$\chi_1 \chi_2 \xrightarrow{\tau \pm 0} W^{(*)} \chi Z^{(*)} \chi \xrightarrow{\tau 0} 3 \text{ lep } + E_{\tau}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154] 140-29	GeV $\tilde{\chi}^{\pm}$ MASS $(m(\tilde{\chi}^{\pm}) = m(\tilde{\chi}^{-}), m(\tilde{\chi}^{-}) = 0$, sleptons decoupled)	
77	Direct $\tilde{\chi}^{\pm}$ páir prod. (AMSB) : long-lived $\tilde{\chi}^{\pm}$	L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220 GeV	$\tilde{\chi}_{\pm}^{\pm}$ mass (1 < $\tau(\tilde{\chi}^{\pm})$ < 10 ns)	
vec	Stable of R-hadrons ; low 6, 6y (full detector)	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	985 Gev g mass	
5 5	Z			
5 5	Stable t R-hadrons : low 6. 6y (full detector)	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	683 Gev t mass	
ong- parti	Stable t R-hadrons : low β, βγ (full detector) GMSB : stable τ	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30	683 GeV Î mass 3 GeV Ĩ mass (5 < tanβ < 20)	
Long- parti	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.4 fb ⁻¹ , 7 TeV [1210.7451]	683 Gev Î mass 3 Gev Ĩ mass (5 < tanβ < 20) 700 Gev Ĩ mass (0.3×10 ⁻⁵ < λ ₂₁₁ < 1.5×10 ⁻⁵ , 1 mm < cτ < 1 m,ĝ	iecoupled)
Long- parti	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : pp $\rightarrow \overline{v}_{z}$ +X, $\overline{v}_{z} \rightarrow e^{+}\mu$ resonance	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	683 GeV Ť mass 3 GeV Ť mass (5 < tanβ < 20) 700 GeV ϥ̃ mass (0.3×10 ⁻⁵ < λ ⁺ ₂₁₁ < 1.5×10 ⁻⁵ , 1 mm < ct < 1 m,ĝ 1.61 TeV V _ε mass (λ ⁺ ₃₄₁ =0.10, λ ₁₁₂ =0.05)	fecoupled)
Long- parti	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{-} \rightarrow e(\mu) + \tau$ resonance	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	683 GeV t mass D GeV t mass D GeV t mass (5 < tanβ < 20) 700 GeV q mass (0.3×10 ⁻⁵ < λ ⁺ ₂₁₁ < 1.5×10 ⁻⁵ , 1 mm < ct < 1 m, g̃i 1.61 TeV V _τ mass (λ ⁺ ₃₁₁ =0.10, λ ₁₃₂ =0.05) 1.10 TeV V _τ mass (λ ⁺ ₃₁₁ =0.10, λ ₁₄₂₁₃₂ =0.05)	Jecoupled)
PV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + E_{τ} mise	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 10	683 GeV \tilde{t} mass D GeV $\tilde{\tau}$ mass (5 < tanβ < 20) 700 GeV \tilde{q} mass (0.3×10 ⁻⁵ < λ_{211}^{*} < 1.5×10 ⁻⁵ , 1 mm < ct < 1 m, \tilde{g} 1.61 TeV V_{τ} mass (λ_{311}^{*} =0.10, λ_{132}^{*} =0.05) 1.10 TeV \tilde{V}_{τ} mass (λ_{311}^{*} =0.10, $\lambda_{1(2)33}^{*}$ =0.05) 1.2 TeV \tilde{q} = \tilde{g} mass ($c_{\tau_{LSP}}$ < 1 mm)	decoupled)
RPV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + $E_{T,miss}$ $\overline{\chi}^{+} \overline{\chi}_{\tau} \overline{\chi}_{\tau} \overline{\chi}^{+} \rightarrow W \overline{\chi}_{\tau}^{0}, \overline{\chi}_{\tau}^{0} \rightarrow eev_{\mu}, e\mu\nu$: 4 lep + $E_{\tau,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] 10 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 10	683 GeV t T <tht< th=""> <tht< th=""> <tht< t<="" td=""><td>decoupled)</td></tht<></tht<></tht<>	decoupled)
RPV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + $E_{T,miss}$ $\overline{\chi}^{+}_{\tau} \overline{\chi}_{\tau} \overline{\chi}^{+}_{\tau} \rightarrow W \overline{\chi}^{0}_{\tau}, \overline{\chi}^{0}_{\tau} \rightarrow eev_{\mu}, e\muv$: 4 lep + $E_{T,miss}$ $i_{ , } \rightarrow \overline{\chi}_{\tau}, \overline{\chi}_{\tau} \rightarrow eev_{\mu}, e\muv$: 4 lep + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 10 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 10 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-140] 10 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 10	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	fecoupled)
RPV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 J's + $E_{T,miss}$ $\overline{\chi}_{\tau}^{+} \overline{\chi}_{\tau} \overline{\chi}_{\tau}^{+} \rightarrow W \overline{\chi}_{0}^{0}$, $\overline{\chi}_{0}^{0} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $ _{L_{\tau}} _{L_{\tau}} = V \overline{\chi}_{\tau}, \overline{\chi}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $ _{L_{\tau}} _{L_{\tau}} = V \overline{\chi}_{\tau}, \overline{\chi}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $g \rightarrow qqq$: 3-jet resonance pair	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1210.7451] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] 10 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 124.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 124.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 124.3 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 124.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-153]	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	fecoupled)
RPV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 j's + $E_{T,miss}$ $\overline{\chi}_{\tau}^{+} \overline{\chi}_{\tau} \overline{\chi}_{\tau}^{+} \rightarrow W \overline{\chi}_{0}^{0}$, $\overline{\chi}_{0}^{0} \rightarrow eev_{\mu}$, $e\mu v_{e}$: 4 lep + $E_{T,miss}$ $ _{L} _{L}$, $\overline{l}_{L} \rightarrow \overline{\chi}_{\tau}, \overline{\chi}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{e}$: 4 lep + $E_{T,miss}$ $\overline{g} \rightarrow qqq$: 3-jet resonance pair Scalar gluon : 2-jet resonance pair	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1210.7451] 30 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 1 L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-153] 1 L=4.6 fb ⁻¹ , 7 TeV [1210.4813] 1 L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100-287	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	iecoupled)
NIN Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e + \mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 J's + $E_{T,miss}$ $\overline{\chi}^{+}_{\tau} \overline{\chi}^{-}_{\tau} \overline{\chi}^{+}_{\tau} \rightarrow W \overline{\chi}^{0}_{\sigma}$, $\overline{\chi}^{0}_{\sigma} \rightarrow eev_{\mu}$, $e\mu v_{e}$: 4 lep + $E_{T,miss}$ $[l_{\tau} l_{\tau}, \overline{l}_{\tau} \rightarrow W \overline{\chi}^{0}_{\sigma}, \overline{\chi}^{0}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{e}$: 4 lep + $E_{T,miss}$ $[l_{\tau} l_{\tau}, \overline{l}_{\tau}, \overline{\chi}^{-}_{\tau}, \overline{\chi}^{-}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{e}$: 4 lep + $E_{T,miss}$ $g \rightarrow qqq$: 3-jef resonance pair Scalar gluon : 2-jet resonance pair IP interaction (D5, Dirac χ) : 'monojet' + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.4 fb ⁻¹ , 7 TeV [1210.7451] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.6 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [Preliminary] L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] L=4.6 fb ⁻¹ , 7 TeV [1210.4813] L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100-287 L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147]	683 GeV t mass D GeV τ mass (5 < tanβ < 20)	lecoupled)
N RPV Long-	Stable t R-hadrons : low β , $\beta\gamma$ (full detector) GMSB : stable $\overline{\tau}$ $\overline{\chi}^{0} \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e+\mu$ resonance LFV : $pp \rightarrow \overline{v}_{\tau} + X$, $\overline{v}_{\tau} \rightarrow e(\mu) + \tau$ resonance Bilinear RPV CMSSM : 1 lep + 7 J's + $E_{T,miss}$ $\overline{\chi}^{+}_{\tau} \overline{\chi}_{\tau} \overline{\chi}^{+}_{\tau} \rightarrow W \overline{\chi}^{0}_{\tau}$, $\overline{\chi}^{0}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $[l_{\tau} l_{\tau}, \overline{l}_{\tau} \rightarrow W \overline{\chi}^{0}_{\tau}, \overline{\chi}^{-}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $[l_{\tau} l_{\tau} \rightarrow \overline{\chi}_{\tau}, \overline{\chi}^{+}_{\tau} \rightarrow eev_{\mu}$, $e\mu v_{\mu}$: 4 lep + $E_{T,miss}$ $g \rightarrow qqq$: 3-jet resonance pair Scalar gluon : 2-jet resonance pair IP interaction (D5, Dirac χ) : 'monojet' + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1211.1597] 30 L=4.7 fb ⁻¹ , 7 TeV [1210.7451] 30 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.6 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.7 fb ⁻¹ , 7 TeV [Preliminary] 1 L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140] 1 L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153] 1 L=4.6 fb ⁻¹ , 7 TeV [1210.4813] 1 L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 100-287 L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147] 1 I I I	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	lecoupled)

*Only a selection of the available mass limits on new states or phenomena shown. All limits quoted are observed minus 1σ theoretical signal cross section uncertainty.



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		ATLAS SUSY S	Searches* - 95% CL Lower Limi	its (Status: Dec 2	012)
	MSUGRA/CMSSM : 0 lep + j's + E _{T,miss}	L=5.8 fb ⁻ , 8 TeV [ATLAS-CONF-2012-109]	1.50 TeV q = g ma	ŚŚ	
	MSUGRA/CMSSM : 1 lep + Js + $E_{T,miss}$	L=5.8 fb ^{-*} , 8 TeV [ATLAS-CONF-2012-104]	1.24 TeV q = g mass		ΔΤΙ Δ.S
0	Pheno model : 0 lep + J's + $E_{T,miss}$	L=5.8 fb ^{-*} , 8 TeV [ATLAS-CONF-2012-109]	1.18 TeV g mass (m(q)) < 2 TeV, light χ_)	Preliminary
ŝ	Pheno model : 0 lep + j s + $E_{T,miss}$	L=5.8 fb ', 8 TeV [ATLAS-CONF-2012-109]	1.38 TeV q mass (m	$\gamma(g) < 2$ TeV, light χ_1	ricinniary
ea/	Giuno med. χ (g \rightarrow qq χ): 1 lep + J's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	900 Gev g mass (m(x_) < 2	$00 \text{ GeV}, m(\chi) = \frac{1}{2}(m(\chi) + m(g))$	
б Ф	GMSB (INLSP): 2 lep (OS) + j's + E CMSB (# NLSP): 1.2 # + 0.1 lop + i's + E ^T , miss	L=4.7 fb ⁻¹ , 7 TeV [1208.4688]	1.24 TeV g mass (tan	β < 15)	
sive	G(M) O(T) NLOP(T) = T + T + T + T + T + T + T + T + T + T	L=4.7 fb ^{-*} , 7 TeV [1210.1314]	1.20 TeV g mass (tan)	\$ > 20)	
in the	GGM (wino NLSP) : $\gamma + lep + E^{T,miss}$	L=4.8 fb ⁻ , 7 TeV [1209.0753]	1.07 TeV g mass (m(x_)	> 50 GeV) Ldt =	(2.1 - 13.0) fb ⁻ '
u	GGM (biggsing-bing NLSP) $\gamma + b + E^{T,miss}$	L=4.8 fb , 7 TeV [ATLAS-CONF-2012-144]	ginass and a mass (mass		
	GGM (higgsino billo NEO) : $7 \pm iots \pm E^{T,miss}$	L=4.8 fD , / lev [1211.116/]	goo Gev g mass (m(x)) > 2	20 GeV)	s = 7, 8 lev
	Gravitino LSP : 'monoiet' + E	L=5.8 fb , 8 feV [ATLAS-CONF-2012-152]	640 GeV GTTLCSS (m(H) > 200 Ge	V)	
	a show (virtual b) + 0 loss + 2 b i/a + 5	L=10.5TD , 6 TEV [ATLAS-CONF-2012-147]	4 24 To U C C C C C C C C C C C C C C C C C C	0 < 200 GoV)	
sq.	$g \rightarrow bb\chi$ (virtual b): 0 lep + 3 b-Js + $E_{T,miss}$	L=12.010 , 0 10V [A1LAS-CONF-2012-145]		(1 < 200 GBV)	
. III	$g \rightarrow tt \chi$ (virtuall) $\ge 2 lep (55) + J S + E_{T,miss}$	L=3.010 , 010V [ATLAS-CONF-2012-105]	860 CAV Q MASS (m(X) < 30	0 GeV)	8 TeV results
ino	$g \rightarrow tt \chi_1$ (virtual t) : 3 lep + JS + $E_{T,miss}$	L=13.010 , 0 10V [A1LA3-CONF-2012-151]	1 00 Tay 0 mass (m(g)) < 30	300 GaV)	77.1
glu	$g \rightarrow t \chi_{T,miss}$	L=12.9 fb ⁻¹ 8 ToV (ATLAS-CONF-2012-103)	1 15 Tay 0 mass (m(x) <	300 GeV)	/ IeV results
	$g \rightarrow i \chi$ (virtual) 0 lep + 3 b-j s + $E_{T,miss}$	L=12.0 ID , 0 IEV [ATLAS-CONF-2012-143]	620 GeV b mass $(m/\pi^0) < 120 \text{ GeV}$) < 200 GBV)	
2 5	$bb, b_1 \rightarrow b_{T,miss}$	L=12.0 fb ⁻¹ 8 ToV (ATLAS-CONE-2012-103)	405 GeV b mass $(m(\chi_1) < 120 \text{ GeV})$	1	
ctio	t (light) $t \rightarrow b \tilde{x}^{\pm 1}$ 1/2 len (+ b-iet) + E	L=4.7 fb ⁻¹ 7 TeV (1208 4305 1200 2102)[67 GeV	\tilde{t} mass $(m/x^0) = 55 \text{ GeV}$		
of n	ff (medium) $t \rightarrow b\tilde{v}^{\pm}$: 1 lep + b-jet + F	(=13.0 fb ⁻¹ 8 TeV [ATLAS_CONE_2012_161]	160-350 GeV 1 mass $(m/2^{-0}) = 0$ GeV $m/2^{-1} = 150$	GaVi	
2010	tt (medium), $t \rightarrow b\chi^{\pm}$, 2 lep + F	L=13.0 fb ⁻¹ 8 TeV [ATLAS-CONF-2012-160]	160-440 GeV T mass $(m(\chi)) = 0$ GeV $m(\chi) = 1000$	\tilde{c}^{\pm} = 10 GeV/	
Ct /	$ff_{T_{iniss}}$	(=13.0 fb ⁻¹ 8 TeV [ATLAS-CONF-2012-166]	230-560 GeV T mass $(m(\chi_1) = 0.000, m(\eta_2) = 0)$	() - 10 060)	
lire	\widetilde{tt} $\widetilde{t} \rightarrow t\widetilde{v}$: 0/1/2 len (+ b-jets) + E_	L=4.7 fb ⁻¹ , 7 TeV [1208.1447.1208.2590.1209.418]	61 230-465		
50	$\widetilde{\text{tt}}$ (natural GMSB) : $Z(\rightarrow) + b - iet + E$	L=2.1 fb ⁻¹ , 7 TeV [1204.6736]	310 Gev R-Parity vio	lating SU	
	$ \widetilde{I}_{i} \rightarrow \widetilde{\chi} : 2 \text{ lep } + F_{-}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884] 85-195 G	in any vic	hatting 00	
of A	$\tilde{\gamma}^+ \tilde{\gamma}^-, \tilde{\gamma}^+ \rightarrow \tilde{V}(\tilde{V}) \rightarrow \tilde{V}\tilde{\gamma}^-; 2 \text{ lop } + E_{\pi}$	L=4.7 fb ⁻¹ , 7 TeV [1208.2884]	110-340 GV $\tilde{\gamma}^{\pm}$ mass $(m(\bar{\gamma}^{0}) < 10 \text{ GeV}, m(\bar{1}\bar{\gamma}) = \frac{1}{2}$	$(m(\bar{\gamma}^{\pm}) + m(\bar{\gamma}^{0})))$	
life	$\tilde{\chi}^{\pm}\tilde{\chi}^{0} \rightarrow [, v], [(\tilde{v}v), [\tilde{v}], [(\tilde{v}v)]; 3 \text{ lep } + E_{\pm}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154]	580 GeV $\tilde{\gamma}^{\pm}$ mass $(m(\tilde{\tau}^{\pm}) = m(\tilde{\tau}^{0}), r$	$n(\overline{y}^0) = 0, m(\overline{l}, \overline{y})$ as above)	
0	$\widetilde{\chi}_{1}^{\pm}\widetilde{\chi}_{2}^{\pm} \rightarrow W^{(*)}\widetilde{\chi}_{2}^{-}\widetilde{\chi}_{1}^{*}\widetilde{\chi}_{2}^{*}: 3 \text{ lep } + E_{-}^{T,\text{miss}}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-154]	40-295 GeV $\tilde{\chi}^{\pm}_{\pm}$ mass $(m(\tilde{\chi}^{\pm}) = m(\tilde{\chi}^{0}), m(\tilde{\chi}^{0}) = 0, \text{ ster}$	ptons decoupled)	
	Direct $\overline{\chi}^{+}$ pair prod. (AMSB) : long-lived $\overline{\chi}^{-}$	L=4.7 fb ⁻¹ , 7 TeV [1210.2852] 220	D Ge χ_{\pm}^{\pm} mass $(1 < \tau(\chi_{\pm}^{\pm}) < 10 \text{ ns})^{-2}$		
es ve	Stable g R-hadrons ; low B, By (full detector)	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	985 GeV g mass		
ticl	Stable t R-hadrons ; low ß, ßy (full detector)	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	683 Gev t mass		
an or	GMSB : stable 7	L=4.7 fb ⁻¹ , 7 TeV [1211.1597]	300 GeV τ mass (5 < tanβ < 20)		
1	$\bar{\chi}^0 \rightarrow qq\mu$ (RPV) : μ + heavy displaced vertex	L=4.4 fb ⁻¹ , 7 TeV [1210.7451]	700 GeV q mass (0.3×10 ⁻⁵ < λ ₂₁₁	$< 1.5 \times 10^{15}$, 1 mm $< c\tau < 1$ m, \tilde{g} d	ecoupled)
	LFV : pp $\rightarrow \tilde{v}_{z}+X, \tilde{v}_{z}\rightarrow e+\mu$ resonance	L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	1.61 TeV V, mass	δ (λ ₃₁₁ =0.10, λ ₁₃₂ =0.05)	
	LFV : pp $\rightarrow \tilde{v}_{*} + \tilde{X}, \tilde{v}_{*} \rightarrow e(\mu) + \tau$ resonance	L=4.6 fb ⁻¹ , 7 TeV [Preliminary]	1.10 TeV V mass (λ ₃₁₁	=0.10, $\lambda_{1(2)33}$ =0.05)	
2	Bilinear RPV CMSSM : 1 lep + 7 j's + E _{7 miss}	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-140]	1.2 TeV q = g mass ((ct _{LSP} < 1 mm)	
2	$\tilde{\chi}_{\chi}^{\dagger} \tilde{\chi}_{\chi}^{\dagger} \tilde{\chi}_{\chi}^{\dagger} \rightarrow W \tilde{\chi}_{\pi}^{0}, \tilde{\chi}_{\pi}^{0} \rightarrow eev_{\mu}, e\mu v_{\mu} : 4 lep + E_{T miss}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	700 GeV $\tilde{\chi}_{1}^{*}$ mass $(m(\tilde{\chi}_{1}^{\circ}) > 30)$	0 GeV, λ ₁₂₁ or λ ₁₂₂ > 0)	
	$ \tilde{l}_1 \tilde{l}_1, \tilde{l}_1 \rightarrow \tilde{\chi}_1, \tilde{\chi}_2 \rightarrow \text{eev}_1, \text{euv} : 4 \text{ lep } + E_{T \text{ miss}}$	L=13.0 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-153]	430 GeV Mass $(m(\tilde{\chi}^0) > 100 \text{ GeV}, m(\tilde{l}_0) = 100 \text{ GeV},$	$m(\tilde{l}_{\mu})=m(\tilde{l}_{\tau}), \lambda_{121} \text{ or } \lambda_{122} > 0)$	
	g → qqq . 0-jet resonance pair		an orr ĝimedo		
10/18.4	Scalar gluon : 2-jet resonance pair	L=4.6 fb ⁻¹ , 7 TeV [1210.4826] 10	0-287 GeV Sgluon mass (incl. limit from 1110.2693)		
WIN	Pinteraction (D5, Dirac χ): monojet + E	L=10.5 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-147]	704 GeV M* SCale (m _χ < 80 GeV	, limit of < 687 GeV for DB)	
		10 ⁻¹	1	10	
		10	•		



- What if we relax R-Parity and protect the proton with other simmetries?
 - LSP now can decay violating lepton/baryon number conservation:

 $W_{RPV} = \lambda_{ijk} L_i L_j \bar{E}_k + \lambda'_{ijk} L_i Q_j \bar{D}_k + \lambda''_{ijk} \bar{U}_i \bar{D}_j \bar{D}_k + \kappa_i L_i H_2$

Assuming a simplified R-Parity Violating (RPV) model with neutralino-like LSP and λ_{121} >0:



Analysis of \geq 4I events at MPP



I gave a (somehow personal) overview of the analysis activities at MPP within the ATLAS collaboration

A lot of work is ongoing, both measurements and performance studies to improve our understanding of the detector ...couldn't show all of them in detail!

For more informations on ATLAS results: https://twiki.cern.ch/twiki/bin/view/AtlasPublic

- 2012 hasn't been only about Higgs!
- Standard Model analyses are the base for searches of new phenomena
- Encouraging prospects for:
 - precision measurements in top quark physics
 - Beyond the Standard Model searches

MPP has a strong presence in all these activities and continues to play a central role in the ATLAS collaboration!

- Additional Material -

τ identification performance in pp \rightarrow W/Z collision data

Jets with 1 prong

Jets with 3 prongs



Excellent agreement of T lepton reconstruction and identification efficiency in experimental and simulated data!

b jet reconstruction optimization with track jets



- Significantly better rejection for track jets than for standard calorimeter jets at a given efficiency
- High rejection of *b*-quark track jets event at low transverse momenta as required for the low $p_{\tau} b$ quarks in $pp \rightarrow bbA/H$.

Measurement of the $pp \rightarrow W+b$ jets production

Motivation:

- Test of higher order QCD predictions
- $pp \rightarrow W + bb$ important reducible background to $pp \rightarrow H \rightarrow WW$



Initial indication for a discrepancy between NLO predictions and experimental measurement have disappeared with the full 2011 data set

ATLAS-CONF-2012-156, Phys.Lett. B707 (2012) 418-437

Measurement of the $pp \rightarrow W+c$ jet production

Motivation:

- Significant differences in s quark densities in different PDF sets
- $pp \rightarrow W+c$ jet is sensitive to the *s* quark and gluon density inside the proton for approx. 0.002<x<0.2



Analysis Strategy:

• Use anticorrelation of lepton charges to indentify the final state:

 $W^- \rightarrow l^- v, c \rightarrow W^+ s' \rightarrow l^+ X$

- Strategy applicable because
 - $pp \rightarrow W + b$ jet is Cabibbo suppressed
 - Production of leptons in light jets of $pp \rightarrow W+light$ jets rare and has same and opposite signs of lepton charges with equal probability
- Publication planned for upcoming winter conferences

Reducing systematics on the top quark mass measurement

 $R' = R_{r_{trk}, b-jet} / R_{r_{trk}, inclusive}$

0.9

0.8

20

30 40

ISR/FSR:

- find observables sensitive to the effect and tune simulations using data, current investigations cover:
 - jet shapes
 - jet track shapes (MPP contribution)
 - jet veto analysis

Eur.Phys.J. C72 (2012) 2043

bJES:

• MPP contribution to validate the bJES using tracks associated to jets in 2011 data:



$$R' = \frac{R_{r_{trk}, b-jet}}{R_{r_{trk}, light}}$$

relative additional JES uncertainty of b-jets with respect to the light JES



10²

2×10²

p_T^{jet} [GeV]

Top quark mass analyses in other channels

dilepton channel, underconstrained kinematics due to the presence of 2 undetected neutrinos

• determined the performance of 3 different mtop estimators using the template method

• analysis on 4.7 fb⁻¹ data being finalized, public result coming soon!

Master Thesis in MPP-2012-160

m_{Ib} **Method**: invariant mass of the lepton-b-jet system

 m_{T_2} **Method**: transverse mass of the t-quark using MET information to scan transverse neutrino momenta.

Neutrino Weighting Method (vWT): Scan over trial m_{top} and neutrino pseudo-rapidities η_1 , η_2 Use the level of agreement of reconstructed neutrino momenta with MET for weighting the trial m_{top}

all-hadronic channel,

very challenging to reconstruct: 6 jets, no leptons or MET!

- evaluated the performance of many different algorithms for jet-parton assignment
- plan to use the known W mass to constrain the light jets energy scale with an iterative method

Reconstruction Algorithm	Efficiency	Purity
1. Pt Max	1.655%	43%
2. Pt Pair Max	1.655%	39%
3. Random	1.655%	12%
4. Random Pair	1.655%	5.4%
5. ∆mTopPlus	0.023%	89%
6. Jet ∆R Pair	0.105%	77%

Search for New Physics in single top decays

The effects of New Physics on the Wtb vertex can be parameterized using effective operators:

$$\mathcal{L}_{Wtb} = -\frac{g}{\sqrt{2}} \bar{b} \gamma^{\mu} \left(\underline{V_L} P_L + \underline{V_R} P_R \right) t W_{\mu}^{-} \\ -\frac{g}{\sqrt{2}} \bar{b} \frac{i \sigma^{\mu\nu} q_{\nu}}{M_W} \left(\underline{g_L} P_L + \underline{g_R} P_R \right) t W_{\mu}^{-} + \text{h.c.}$$

...in the Standard Model $V_L = V_{tb} \approx 1$ and the **anomalous couplings** V_R , g_L , g_R are zero

In single top quark t-channel production, top quark polarized in the direction of the spectator quark

Can define two directions N, T:





The forward–backward asymmetry with respect to $N (A_{FB}^{N})$ is very sensitive to $Im g_{R}^{N}$, and $A_{FB}^{N} \neq 0$ would imply CP violation

ATLAS measurement of A_{FB}^N in 4.7 fb⁻¹ of lepton+2 jets data in final stages of approval, public result expected soon!

Strong production example

Strategy 1: Strong production

A suite of inclusive searches, based on jet+ E_T^{miss} Example: 1 e/ μ , \geq 4 jets, high E_T^{miss} and effective mass

Jets Intermediate sparticles

 \tilde{q}, \tilde{g}

Stable $\tilde{\chi}_1^0$ "Missing" transverse

momentum (E_{T}^{miss}, MET)

95% exclusion limits for squark/gluino production around or beyond m~1 TeV

Bad for natural SUSY?



MPP Project Review 2012 - ATLAS

