Discovery Center: ATLAS Physics

Mogens Dam

1

LHC Performing very well

2

Rapidly approaching design luminosity of 10³⁴



Running until Xmas: Will have about 5 + 25 = 30fb⁻¹. Then shutdown until 2015



Multiple pp interactions per X'ing



Running at 50 ns instead of 25 ns => Two times more interactions per BX





ATLAS recording efficiency high



SM Higgs @ 125 GeV (?)

Higgs Discovery



Spin/CP Analysis

Ongoing

In H->ZZ*->4l, sensitivity to spin/ CP through 5 production/decay angles and 2 inv. masses.





Example on BDT based analysis to separate O⁻ from O⁺



Also MatrixElement-based analysis

Monday, November 12, 12

Higgs -> tautau

Measurement of Higgs leptonic BRs: Only bbbar and tautau have sizable xsects. Both channels obscured by large QCD background.

WW



100

120

Branching ratios

 10^{-1}

10⁻²

 10^{-1}

-ττ

cc

bb

qq

Zγ

140

160

180

M_H [GeV]

Higgs -> tautau



Monday, November 12, 12

Tau Identification & Performance







Also contributions to tau energy scale

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Standard Model

11

Rediscovering Standard Model



Dibosons: ZZ -> IIII



+ Data

ZZ→III

ostat+syst

ZZ→|⁺|[†]|[†]

200

150

250

Background(d.d.)

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Diboson production: Trilinear Gauge Couplings

Model independent parametrisation of new physics operating at a much higher scale is introduced via generic operator expansion.

As example ZZ production:

$$\mathcal{L}_{TGC} = \frac{e}{m_Z^2} \left[f_4^{V} (\partial_{\mu} V^{\mu\beta}) Z_{\alpha} (\partial^{\alpha} Z_{\beta}) + f_5^{V} (\partial^{\sigma} V_{\sigma\mu} \tilde{Z}^{\mu\beta} Z_{\beta}) \right]$$

$$f_i^V$$
 where $V = \{Z, \gamma\}$ and $i = \{4, 5\}$



Measurements of Trilinear Gauge Couplings provide sensitive tests of the symmetries in the SM.



Search for new phenomena in Dijets



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SUSY Searches

SUSY Summary

ATLAS SUSY Searches* - 95% CL Lower Limits (Status: SUSY 2012)

Ś	MSUGRA/CMSSM : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.50 TeV $\tilde{q} = \tilde{g}$ mass	1	
he	MSUGRA/CMSSM : 1 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-104]	1.24 TeV $\widetilde{q} = \widetilde{g}$ mass	$\int dt = (1.00 - 5.8) \text{ fb}^{-1}$	
arc	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.18 TeV \widetilde{g} mass $(m(\widetilde{q}) < 2 \text{ TeV}, \text{ light } \widetilde{\chi}_1^0)$	$\int \frac{d}{dt} = (100 - 0.0) \frac{d}{dt}$	
Se	Pheno model : 0 lep + j's + $E_{T,miss}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-109]	1.38 TeV $\widetilde{\mathbf{q}}$ mass $(m(\widetilde{g}) < 2 \text{ TeV}, \text{ light } \widetilde{\chi}_1^0)$	≰s = 7, 8 TeV	
ive	Gluino med. $\tilde{\chi}^{\pm}$ ($\tilde{g} \rightarrow q \bar{q} \tilde{\chi}^{\pm}$) : 1 lep + j's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-041]	900 GeV \tilde{g} mass $(m(\tilde{\chi}_1^0) < 200 \text{ GeV}, m(\tilde{\chi}^{\pm}) = \frac{1}{2}(m(\tilde{\chi}_1^0))$		
lus	GMSB : 2 lep (OS) + j's + $E_{T,miss}$	L=4.7 fb ⁻¹ , 7 TeV [Preliminary]	1.24 TeV \tilde{g} mass (tan β < 15)	AILAS	
Inc	GMSB : $1-2\tau + 0-1$ lep + j's + E	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-112]	1.20 TeV $\widetilde{\mathbf{g}}$ mass $(\tan\beta > 20)$	Preliminary	
	$GGM: \gamma\gamma + E_{T,miss}$	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-072]	1.07 TeV $\widetilde{\mathbf{g}}$ mass $(m(\widetilde{\chi}_1^0) > 50 \text{ GeV})$		
S T	$\widetilde{g} \rightarrow b \widetilde{\chi}_{1}^{0}$ (virtual \widetilde{b}) : 0 lep + 1/2 b-j's + $E_{T,miss}$	L=2.1 fb ⁻¹ , 7 TeV [1203.6193]	900 GeV $\widetilde{\mathbf{g}}$ mass $(m(\widetilde{\chi}_1^0) < 300 \text{ GeV})$		
	$\widetilde{g} \rightarrow b \widetilde{b} \widetilde{\chi}_{\perp}^{0}$ (virtual \widetilde{b}) : 0 lep + 3 b-j's + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1207.4686]	1.02 TeV \widetilde{g} mass $(m(\widetilde{\chi}_1^0) < 400 \text{ GeV})$		
ark ateo	$\widetilde{g} \rightarrow \widetilde{b}\widetilde{\chi}_{\downarrow}^{0}$ (real \widetilde{b}) : 0 lep + 3 b-j's + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1207.4686]	1.00 TeV $\widetilde{\mathbf{g}}$ mass $(m(\widetilde{\chi}_1^0) = 60 \text{ GeV})$		
squ ediá	$\widetilde{g} \rightarrow t \widetilde{t} \widetilde{\chi}_{1}^{0}$ (virtual \widetilde{t}) : 1 lep + 1/2 b-j's + $E_{T \text{ miss}}$	L=2.1 fb ⁻¹ , 7 TeV [1203.6193]	710 GeV \widetilde{g} mass $(m(\widetilde{\chi}_{1}^{0}) < 150 \text{ GeV})$		
л. s те	$\widetilde{g} \rightarrow t \widetilde{t} \chi^0$ (virtual \widetilde{t}) : 2 lep (SS) + j's + $E_{T \text{ miss}}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-105]	850 GeV \widetilde{g} mass $(m(\widetilde{\chi}_1^0) < 300 \text{ GeV})$		
gei no	$\widetilde{g} \rightarrow t \widetilde{t} \widetilde{\chi}^0$ (virtual \widetilde{t}) : 3 lep + j's + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-108]	760 GeV \widetilde{g} mass (any $m(\widetilde{\chi}_{1}^{0}) < m(\widetilde{g})$)		
lui glui	$\widetilde{g} \rightarrow tt \widetilde{\chi}^{0}$ (virtual \widetilde{t}) : 0 lep + multi-j's + $E_{T \text{ miss}}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-103]	1.00 TeV \tilde{g} mass $(m(\tilde{\chi}_{4}^{0}) < 300 \text{ GeV})$		
5 0	$\tilde{g} \rightarrow t \tilde{t} \tilde{\chi}^{0}$ (virtual \tilde{t}) : 0 lep + 3 b-j's + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1207.4686]	940 GeV \widetilde{g} mass $(m(\widetilde{\chi}_{i}^{0})^{2} < 50 \text{ GeV})$		
	$\widetilde{g} \rightarrow t \widetilde{t} \widetilde{\chi}^0$ (real \widetilde{t}) : 0 lep + 3 b-j's + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1207.4686]	820 GeV \widetilde{g} mass $(m(\widetilde{\chi}_1^0) = 60 \text{ GeV})$		
	$\widetilde{b}\widetilde{b}, \widetilde{b}, \rightarrow b\widetilde{\chi}^0$: 0 lep + 2-b-jets + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-106]	480 GeV b mass $(m(\tilde{\chi}_{4}^{0}) < 150 \text{ GeV})$		
'ks on	$\widetilde{b}\widetilde{b}, \widetilde{b}, \rightarrow t\widetilde{\chi}^{\pm}$: 3 lep + j's + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-108]	380 GeV \widetilde{g} mass $(m(\widetilde{\chi}_{\star}^{\pm}) = 2 m(\widetilde{\chi}_{\star}^{0}))$		
en. squar producti	$\tilde{t}\tilde{t}$ (very light), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm}$: 2 lep + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-059]135 GeV	\widetilde{t} mass $(m(\widetilde{\chi}_{4}^{0}) = 45 \text{ GeV})$		
	$\tilde{t}\tilde{t}$ (light), $\tilde{t} \rightarrow b\tilde{\chi}^{\pm}$: 1/2 lep + b-jet + $E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-070] 120-173 Ge	$t \tilde{t}$ mass $(m(\tilde{\chi}_{4}^{0}) = 45 \text{ GeV})$		
	$\widetilde{t}\widetilde{t}$ (heavy), $\widetilde{t} \rightarrow t\widetilde{\chi}^0$: 0 lep + b-jet + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [1208.1447]	380-465 GeV \tilde{t} mass $(m(\tilde{\chi}_{4}^{0}) = 0)$		
d g ect	\widetilde{t} (heavy), $\widetilde{t} \rightarrow t \widetilde{\chi}$: 1 lep + b-jet + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-073]	230-440 GeV \widetilde{t} mass $(m(\chi_{i})^{0}) = 0)$		
3rc dir	$\widetilde{t}\widetilde{t}$ (heavy), $\widetilde{t} \rightarrow t\widetilde{\chi}$: 2 lep + b-jet + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-071]	298-305 GeV \tilde{t} mass $(m(\tilde{\chi}^0) = 0)$		
	\widetilde{t} (GMSB) $: Z(\rightarrow II) + b - jet + E_{\perp}$	L=2.1 fb ⁻¹ , 7 TeV [1204.6736]	310 GeV \tilde{t} mass (115 < $m(\tilde{\chi}_{1}^{0})$ < 230 GeV)		
,	$\widetilde{I_{i}I_{i}}, \widetilde{I} \rightarrow I_{\widetilde{\chi}_{i}}^{0}$: 2 lep + $E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-076] 93-180 G	ev T mass $(m(\tilde{\chi}_{i}^{0}) = 0)$		
ΞW	$\widetilde{\chi}^+_{,\widetilde{\chi}}, \widetilde{\chi}^+_{,\widetilde{\chi}} \rightarrow \widetilde{lv}(\widetilde{lv}) \rightarrow lv\widetilde{\chi}^0_{,\widetilde{\chi}}: 2 lep + E_{Tmiss}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-2012-076]	120-330 GeV $\tilde{\chi}_{\pm}^{\pm}$ mass $(m(\tilde{\chi}_{\pm}^{0}) = 0, m(\tilde{l}, \tilde{v}) = \frac{1}{2}(m(\tilde{\chi}_{\pm}^{\pm}) + m(\tilde{\chi}_{\pm}^{0})))$		
d h	$\widetilde{\chi}_{\pm}^{\pm 20^{01}} \xrightarrow{\sim} 3!(vv\rangle + v + 2\widetilde{\chi}_{\pm}^{01}) : 3 \text{ lep } + E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [CONF-201 <mark>2-077]</mark>	60-500 GeV $\widetilde{\chi}_{\pm}^{\pm}$ MASS $(m(\widetilde{\chi}_{\pm}^{\pm}) = m(\widetilde{\chi}_{\pm}^{0}), m(\widetilde{\chi}_{\pm}^{0}) = 0, m(\widetilde{l}, \widetilde{\nu})$ as above	9)	
7	AMSB (direct $\tilde{\chi}^{\pm}$ pair prod.) : long-lived $\tilde{\chi}^{\pm}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-111] 210) GeV $\widetilde{\chi}_{\pm}^{\pm}$ MASS (1 < $\tau(\widetilde{\chi}_{\pm}^{\pm})$ < 10 ns)		
ve(es	Stable g R-hadrons : Full detector	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-075]	985 Gev g mass		
g-li ticl	Stable t B-hadrons · Full detector	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-075]	683 Gev t mass		
pai	Metastable q R-hadrons : Pixel det. only	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-075]	910 GeV g̃ mass (τ(g̃) > 10 ns)		
	GMSB : stable τ	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-075]	310 GeV $\tilde{\tau}$ MASS (5 < tan β < 20)		
	RPV : high-mass eµ	L=1.1 fb ⁻¹ , 7 TeV [1109.3089]	1.32 TeV $\tilde{\nu}_{\tau}$ MASS $(\lambda_{311}^{*}=0.10, \lambda_{312}=0.05)$		
\geq	Bilinear RPV : 1 lep + j's + $E_{T \text{ miss}}$	L=1.0 fb ⁻¹ , 7 TeV [1109.6606]	760 GeV $\tilde{\mathbf{q}} = \tilde{\mathbf{g}} \text{ mass } (c\tau_{\text{LSP}} < 15 \text{ mm})$		
H H	BC1 RPV : 4 lep + $E_{T \text{ miss}}$	L=2.1 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-035]	1.77 TeV g mass		
	RPV $\tilde{\chi}^0 \rightarrow qq\mu$: μ + heavy displaced vertex	L=4.4 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-113]	700 GeV $\tilde{\mathbf{q}}$ mass $(3.0 \times 10^{-6} < \lambda_{211} < 1.5 \times 10^{-5}, 1 \text{ mm} < \text{cm}$	$x < 1 m, \tilde{g}$ decoupled)	
5	Hypercolour scalar gluons : 4 jets, $m_{\mu} \approx m_{\mu}$	L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-110] 1	00-287 GeV SQIUON MASS (incl. limit from 1110.2693)		
the	Spin dep. WIMP interaction : monojet $+ E_{\tau \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-084]	709 GeV M [*] scale (<i>m.</i> , < 100 GeV, vector D5, Diracχ)		
○ S	bin indep. WIMP interaction : monojet $+E_{T \text{ miss}}$	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-084]	548 GeV M* SCale $(m_{\chi} < 100 \text{ GeV}, \text{ tensor D9}, \text{Dirac}_{\chi})$	1	
		10 ⁻¹	1	10	
		10	I		
*Only a selection of the available mass limits on new states or phenomena shown. NIASS SCAIE [Ie/					

All limits quoted are observed minus 1σ theoretical signal cross section uncertainty.

Search for Heavy Long-lived Particles

sleptons, R-hadrons, ...

Aggressive exploitation of ATLAS particle identification capabilities:

- Specific ionisation in the Pixel silicon
- Time-of-flight in calorimeters and Muon System





Heavy Long-lived Particles

Mass of candidates established through measurement of i) momentum, **p** ii) velocity, β or βγ

Analysis setting limits on many possible LLPs: – stau in GMSB – directly produced sleptons – R-hadrons (gluino, stop, sbottom)





m_{Bv} [GeV]

Other Searches

"Exotics" Summary

ATLAS Exotics Searches* - 95% CL Lower Limits (Status: LHCC, Sep 2012)

	Large FD (ADD) : monoiet + F	$L = 1.0 \text{ fb}^{-1}$ 7 TeV [ATLAS_CONE 2011.006]	3 39 ToV			
S	Large ED (ADD) : monophoton + F_{τ}	$l = 4.6 \text{ fb}^{-1}$ 7 TeV [1209 4625]	1.93 TeV $M_{\rm p} (\delta=2)$			
	Large ED (ADD) · diphoton m	$L=4.9 \text{ fb}^{-1}$. 7 TeV [ATLAS-CONF-2012-087]	3.29 TeV M _c (GF	RW cut-off, NLO) ATLAS		
ио	UED : diphoton + E_{τ}	$L=4.8 \text{ fb}^{-1}$, 7 TeV [ATLAS-CONF-2012-072]	1 41 TeV Compact, scale 1/R	Preliminary		
ISI	BS1 with $k/M_{\rm ex} = 0.1$ diphoton m	$L=4.9 \text{ fb}^{-1}$, 7 TeV [ATLAS-CONF-2012-087]				
er	BS1 with $k/M_{\odot} = 0.1$ dilepton m_{\odot}	$I = 4.9-5.0 \text{ fb}^{-1}$ 7 TeV [1209.2535]	2 16 TeV Graviton mas	$\int \int dt = (1, 0, 6, 1) fb^{-1}$		
lim	BS1 with $k/M_{ex} = 0.1$; ZZ resonance, m_{ex}	$L=1.0 \text{ fb}^{-1}$, 7 TeV [1203.0718]	845 GeV Graviton mass	$\int Ldt = (1.0 - 0.1) ID$		
0	BS1 with $k/M_{\odot} = 0.1$; WW resonance, $m_{\tau_{1}}$	$L=4.7 \text{ fb}^{-1}$, 7 TeV [1208.2880]	1 23 TeV Graviton mass	s = 7.8 TeV		
tra	RS with BR(g \rightarrow tt)=0.925 : tt \rightarrow l+jets, m	$L=4.7 \text{ fb}^{-1}$, 7 TeV [ATLAS-CONF-2012-136]	1 9 TeV KK gluon mass	<u> </u>		
Щ	ADD BH $(M_{TH}/M_{P}=3)$: SS dimuon, N_{A}	$L=1.3 \text{ fb}^{-1}$. 7 TeV [1111.0080]	1.25 TeV M_{\odot} (δ =6)			
	ADD BH $(M_{TH} / M_{p} = 3)$: leptons + jets, Σp	$L=1.0 \text{ fb}^{-1}$, 7 TeV [1204.4646]	1.5 TeV M_{\odot} (δ =6)			
	Quantum black hole : dijet, F (m_{ij})	$I = 4.7 \text{ fb}^{-1}$ 7 TeV [ATLAS-CONE-2012-038]	4 11 TeV Ma	(δ=6)		
	gggg contact interaction $\chi(m')$	$l = 4.8 \text{ fb}^{-1}$ 7 TeV [ATLAS-CONE-2012-038]	78			
5	agll CI : ee. uu combined. m	$L = 1.1 \cdot 1.2 \text{ fb}^{-1}$, 7 TeV [1112.4462]		10.2 TeV Λ (constructive int.)		
\bigcirc	uutt CI : SS dilepton + iets + E_{τ}	$L=1.0 \text{ fb}^{-1}$. 7 TeV [1202.5520]	1.7 TeV			
	Z' (SSM) : <i>m</i>	L=5.9-6.1 fb ⁻¹ . 8 TeV [ATLAS-CONF-2012-129]	2 49 TeV Z' mass			
	Z' (SSM) : <i>m</i>	L=4.7 fb ⁻¹ . 7 TeV [ATLAS-CONF-2012-067]	1.3 TeV Z' mass			
-	W' (SSM) : $m_{T_{a}}$	$L = 4.7 \text{ fb}^{-1}$, 7 TeV [1209,4446]	2.55 TeV W' mass			
\geq	W' (\rightarrow tq, g =1) : m_{tq}	$L=4.7 \text{ fb}^{-1}$, 7 TeV [CONF-2012-096] 350 Ge	W mass			
	W'_{B} (\rightarrow tb, SSM) : m_{i}^{H}	$L=1.0 \text{ fb}^{-1}$, 7 TeV [1205.1016]	1.13 TeV W' mass			
	$W^*: m_{T_{r_{r_{r_{r_{r_{r_{r_{r_{r_{r_{r_{r_{r_$	L=4.7 fb ⁻¹ , 7 TeV [1209.4446]	2.42 TeV W* mass			
G	Scalar LQ pairs (β =1) : kin, vars, in eeii, evii	L=1.0 fb ⁻¹ , 7 TeV [1112.4828]	660 Gev 1 st gen. LQ mass			
T(Scalar LQ pairs (β =1) : kin. vars. in uuii, uvii	L=1.0 fb ⁻¹ , 7 TeV [1203.3172]	685 GeV 2 nd gen. LQ mass			
Ś	4^{th} generation \cdot t't' \rightarrow WbWb	L=4.7 fb ⁻¹ , 7 TeV [Preliminary]	656 GeV t' mass			
r.k	4^{th} generation : b'b'($T_{zy}T_{5/3}$) \rightarrow WtWt	L=4.7 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-130]	670 GeV b' (T) mass			
ua	New quark b' : $b'b' \rightarrow Zb+X, m_{T}$	L=2.0 fb ⁻¹ , 7 TeV [1204.1265] 400	Gev b' mass			
6 /	Top partner : TT \rightarrow tt + A ₀ A ₀ (dilepton, M ₋₀ ²⁰)	L=4.7 fb ⁻¹ , 7 TeV [1209.4186]	183 Gev T mass (<i>m</i> (A) < 100 GeV)			
θИ	Vector-like guark : CC, $m_{\rm heg}^{12}$	L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-137]	1.12 Tev VLQ mass (charge -1/3	B. coupling $\kappa_{a0} = v/m_0$		
Z	Vector-like guark : NC, m	L=4.6 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-137]	1.08 TeV VLQ mass (charge 2/3,	coupling $\kappa_{a0} = v/m_0$		
s d	Excited quarks : y-jet resonance, m	L=2.1 fb ⁻¹ , 7 TeV [1112.3580]	2.46 TeV g* mass			
ite	Excited quarks : dijet resonance, $m_{ii}^{\gamma jet}$	L=5.8 fb ⁻¹ , 8 TeV [ATLAS-CONF-2012-088]	3.66 TeV g* ma	SS		
XC	Excited electron : $e-\gamma$ resonance, m_{μ}	L=4.9 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-008]	2.0 TeV e^* mass ($\Lambda = n$	n(e*))		
Цe	Excited muon : μ - γ resonance, m_{μ}	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-008]	1.9 TeV μ^* mass ($\Lambda = m$	$n(\mu^*))$		
	Techni-hadrons (LSTC) : dilepton, $m_{ee/uu}$	L=4.9-5.0 fb ⁻¹ , 7 TeV [1209.2535]	850 GeV $\rho_{\tau}/\omega_{\tau}$ mass (<i>m</i> ($\rho_{\tau}/\omega_{\tau}$) - <i>m</i> (π.	$M_{\rm T} = M_{\rm H}$		
	Techni-hadrons (LSTC) : WZ resonance (vIII), m	L=1.0 fb ⁻¹ , 7 TeV [1204.1648]	183 GeV ρ_{τ} mass $(m(\rho_{\tau}) = m(\pi_{\tau}) + m_{W}, m(a_{\tau})$	$= 1.1 m(\rho_{\tau})$		
Iel	Major. neutr. (LRSM, no mixing) : 2-lep + jets	L=2.1 fb ⁻¹ , 7 TeV [1203.5420]	1.5 TeV N mass $(m(W_{p}) = 2$	2 TeV)		
)th	W _R (LRSM, no mixing) : 2-lep + jets	L=2.1 fb ⁻¹ , 7 TeV [1203.5420]	2.4 TeV W _R mass (n	n(N) < 1.4 TeV)		
0	$H_1^{\pm\pm}$ (DY prod., $BR(H^{\pm\pm}\rightarrow\mu\mu)=1$) : SS dimuon, $m_{\mu\nu}$	L=1.6 fb ⁻¹ , 7 TeV [1201.1091] 355 Ge	•V H ^{±±} mass			
	Color octet scalar : dijet resonance, $\ddot{m}_{ii}^{\mu\mu}$	L=4.8 fb ⁻¹ , 7 TeV [ATLAS-CONF-2012-038]	1.94 TeV Scalar resonan	ice mass		
		10 ⁻¹	1	10 10 ²		
		10	•			
* O nl	* Only a calaction of the quailable mass limits on new states or phonomena shown					
011	y a selection of the available mass intills on new States Of					

Monday, November 12, 12

3rd Generation Leptoquark search





Monopole Search

Searching for magnetic monopoles trapped in accelerator material at the Large Hadron Collider

M. Dam Joergensen, A. De Roeck, H.-P. Hächler, A. Hirt, A. Katre, P. Mermod, D. Milstead, T. Sloan



Soft QCD and such

ALFA Forward Spectrometer

Continue long tradition for total, elastic, diffractive_infolding $d\sigma$ $d\tau$ $d\tau$ $d\tau$ etc pp cross-sections. $\varepsilon^{out} \cdot \varepsilon^{trigger} \cdot \varepsilon^{reco} \int Ldt$ Applications in luminosity, forward physics and astro-p.

Results from $be ta = \frac{16\pi(\hbar c)^2}{1=200} \frac{d\sigma_{el}}{dt}_{t \to 0}$ run in Oct 2011 ----->

Much more accuracy from $\sigma_{tot}^2 \exp(-Bt)$ 1km run Oct 2012 $16\pi(\hbar c)^2 = \sigma_{tot}^2 \exp(-Bt)$ reaching Coulomb interference

Underlying Event

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Short Outlook

Finishing off the <10 TeV Analyses

Higgs Discovery: Higgs or not? Standard Model or not? Or perhaps MSSM?

- Measure its properties the best we can (need statistics)
 - Braching fractions: In particular, need to understand better the fermionic BRs (tautau + bbbar)
 - Spin-parity: ZZ channel is main handle
- Precision Standard Model measurements:
 - A prominent method to look for new physics
 - Di-bosons and TGC
 - Ø Dijets
 - W mass

SUSY Searches:

- SUSY partners "getting heavy", especially squarks and gluinos. Natural?
- Still some room for lightish sleptons and third generation squarks
- Other searches:
 - Rapidly closing the door for many "speculations"