EPS-HEP Grenoble 2011

Thu 21/07 — Print | Go back

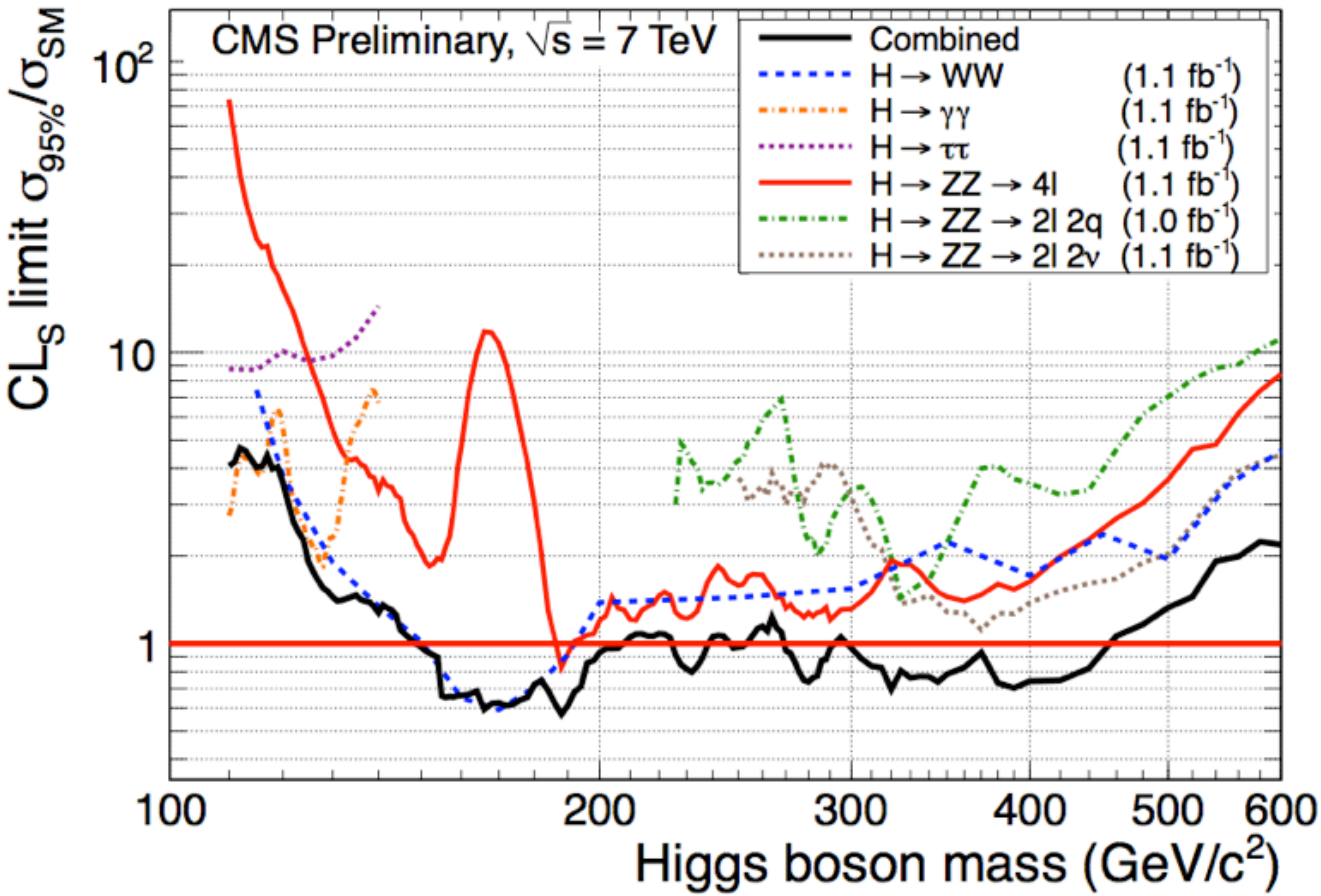
Time						
09:00	**Ultrarelativistic Heavy Ions** *Lesdiguières, Alpes Congrès - Alpexpo*	**Astroparticle Physics** *Berlioz, Alpes Congrès - Alpexpo*	**Flavour Physics and Fundamental Symmetries**	**Higgs and New Physics** *Dauphine, Alpes Congrès - Alpexpo*	**QCD** *Bayard, Alpes Congrès - Alpexpo*	**Top and Electroweak Physics**
10:00						
	Coffee *Lobby, Alpes Congrès - Alpexpo* 10:30 - 11:00					
11:00	**Ultrarelativistic Heavy Ions** *Alexande...* *Lesdiguières, Alpes Congrès - Alpexpo*	**Astroparticle Physics** *Berlioz, Alpes Congrès - Alpexpo*	**Flavour Physics and Fundamental Symmetries** *Oisans, Alpes Congrès - Alpexpo*	**Higgs and New Physics** *Dauphine, Alpes Congrès - Alpexpo*	**QCD** *Bayard, Alpes Congrès - Alpexpo*	**Top and Electroweak Physics** *Stefan Dittm...* *Stendhal, Alpes Congrès - Alpexpo*
12:00						
13:00	**Lunch** *les Ecrins, Alpes Congrès - Alpexpo* 13:00 - 14:30					
14:00						
15:00	**Ultrarelativistic Heavy Ions** *Lesdiguières, Alpes Congrès - Alpexpo*	**Astroparticle Physics** *Berlioz, Alpes Congrès - Alpexpo*	**Flavour Physics and Fundamental Symmetries**	**Higgs and New Physics** *Dauphine, Alpes Congrès - Alpexpo*	**QCD** *Bayard, Alpes Congrès - Alpexpo*	**Top and Electroweak Physics** *Stendhal, Universe*
16:00	**Tea** *Lobby, Alpes Congrès - Alpexpo* 16:00 - 16:30					
17:00	**Ultrarelativistic Heavy Ions** *Jorge Casal...* *Lesdiguières, Alpes Congrès - Alpexpo*	**Astroparticle Physics** *les Ecrins 3, Alpes Congrès - Alpexpo*	**Flavour Physics and Fundamental Symmetries** *Oisans, Alpes Congrès - Alpexpo*	**Higgs and New Physics** *Dauphine, Alpes Congrès - Alpexpo*	**QCD** *Bayard, Alpes Congrès - Alpexpo*	**Top and Electroweak Physics** *Andrea ...* *Stendhal, Alpes Congrès - Alpexpo*
18:00						
19:00						
20:00	**City Hall Reception**					
21:00						

- 1 semaine
- Entre 500 et 1000 participants
- Sessions parallèles et plénières
- Conférences d'hiver (Moriond) et d'été (ICHEP, Lepton-Photon, EPS-HEP)
- Workshops, séminaires....

Le Higgs à cache-cache

Search for the SM Higgs Boson

"To make an ocean you must bring together really many droplets of water"



CMS PAS-HIG-11-011

Detailed presentations on the channels

Higgs search in the Higgs to bb channel

inside **Higgs and New Physics**

View details | Export

11:30 - 11:45

Room: *Dauphine*
Location: *Alpes Congrès - Alpexpo*
Presenter(s): *GONCALO, Ricardo*

The decay of the Standard Model-like Higgs boson into bb is the dominant decay process in the region of low Higgs boson masses. The Hig[...] search in this channel requirese an associated heavy objec...

Search for Higgs to ZZ (llll,llnunu,llqq)

inside **Higgs and New Physics**

View details | Export

12:15 - 12:35

Room: *Dauphine*
Location: *Alpes Congrès - Alpexpo*
Presenter(s): *NIKOLOPOULOS, Konstantinos*

The search for the Standard Model-like Higgs boson via its decays into two Z bosons is presented, based on the ATLAS data collected in 2011. The results obtained in the fully leptonic 'golden' deca...

Higgs search in the Higgs to gammagamma channel

inside **Higgs and New Physics**

View details | Export

11:45 - 12:00

Room: *Dauphine*
Location: *Alpes Congrès - Alpexpo*
Presenter(s): *KADO, Marumi*

The search for the Standard Model-like Higgs boson decaying to two photons is one of the best ways to identify a low mass Higgs boson at LHC. The results of the search in this channel are presente...

Search for Higgs to WW (lnulnu,lnuqq)

inside **Higgs and New Physics**

View details | Export

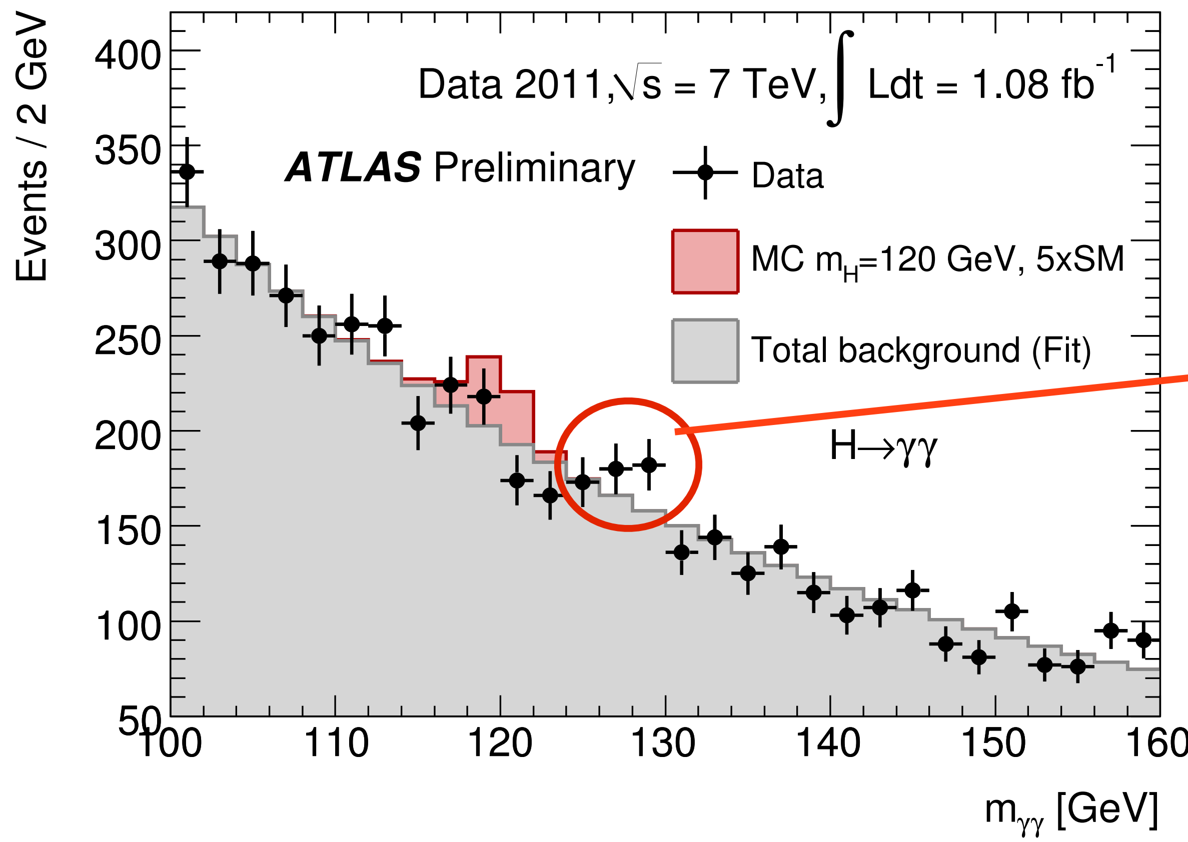
14:30 - 14:45

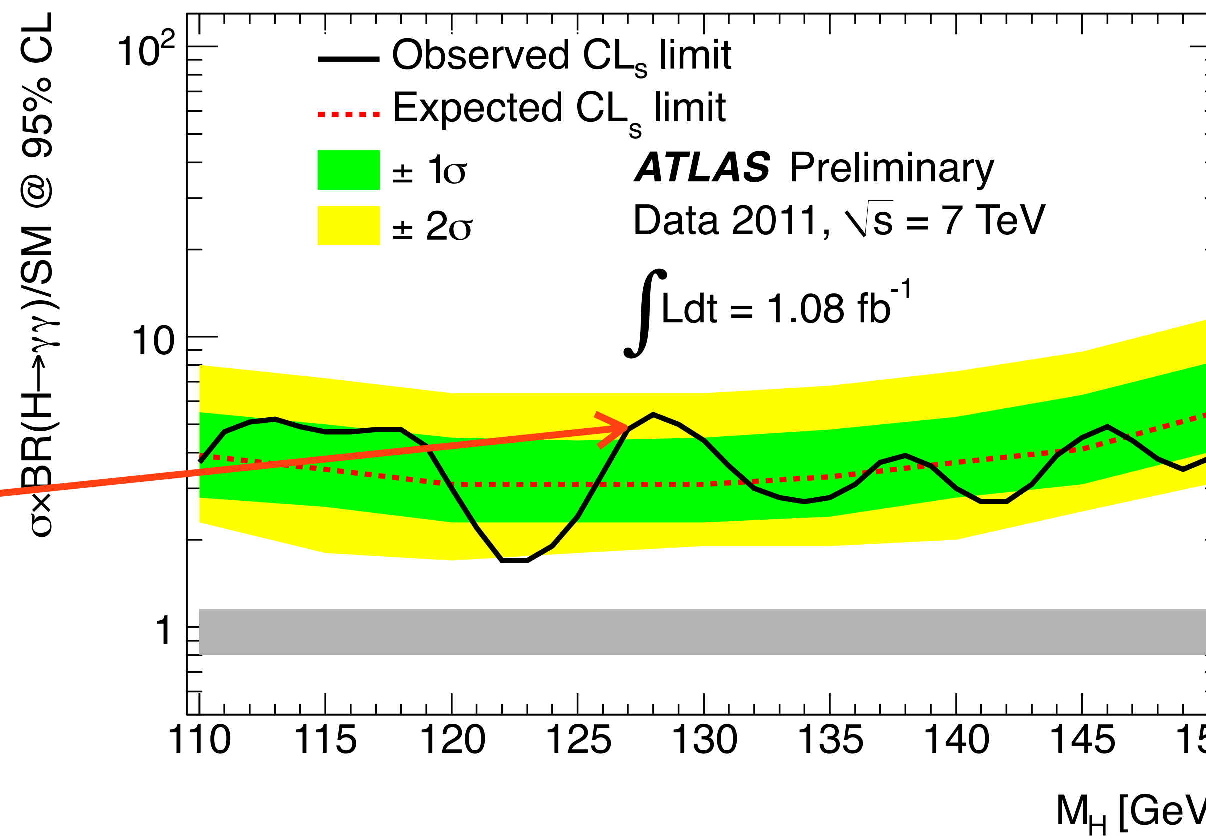
Room: *Dauphine*
Location: *Alpes Congrès - Alpexpo*
Presenter(s): *STRANDBERG, Jonas*

The search for the Standard Model-like Higgs boson via its decays into two W bosons is presented, based on the ATLAS data collected in 2011. The search in the dilepton final state is more powerful...

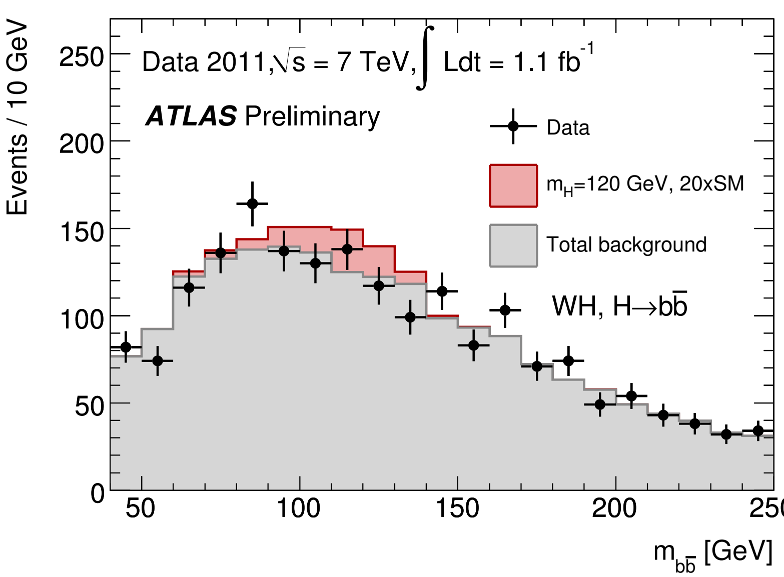
Low mass channels

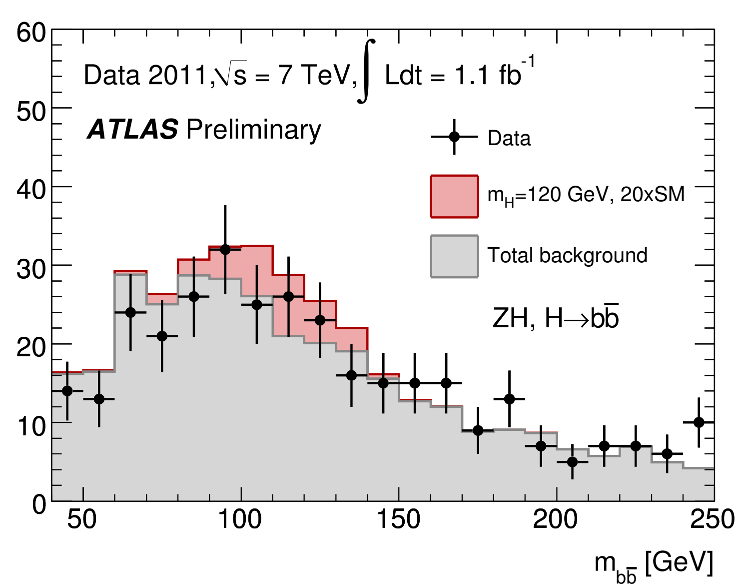
H→γγ (110-150)

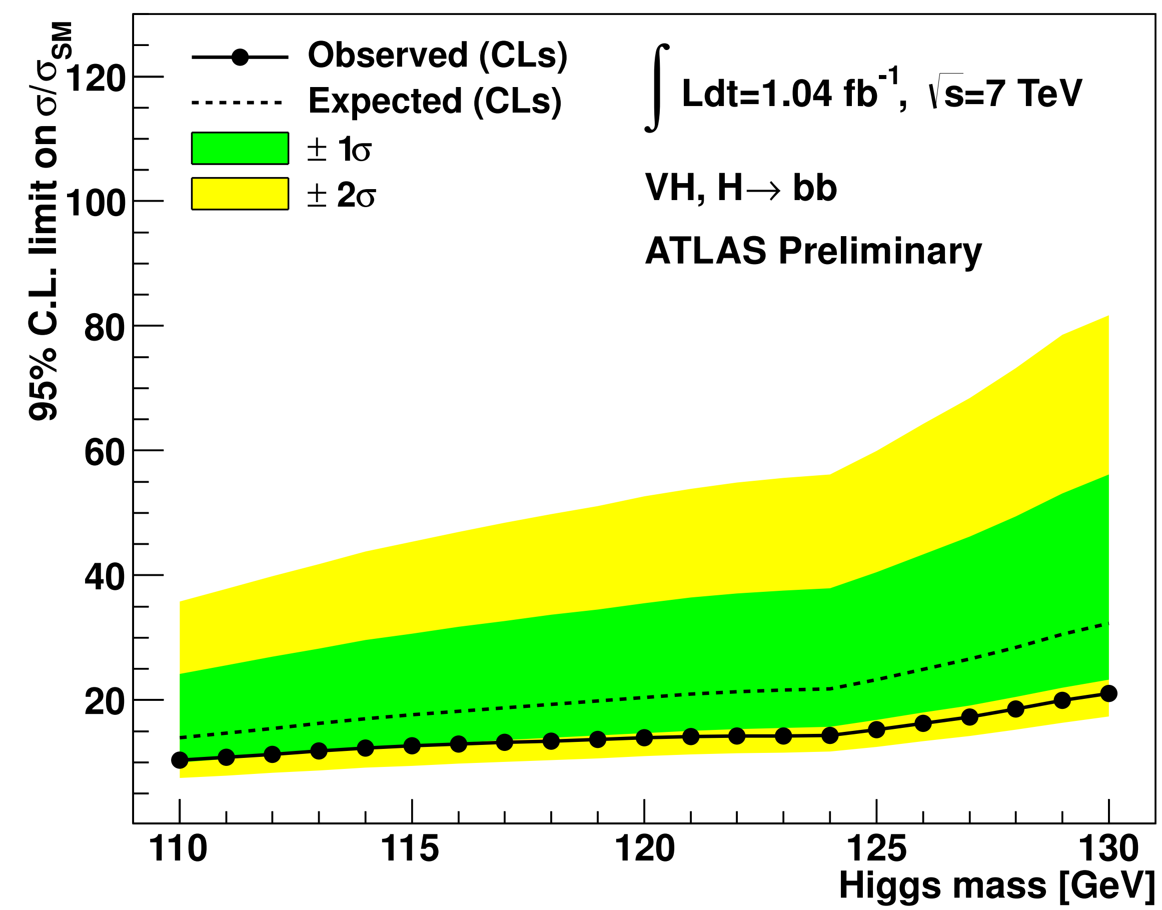




WH and ZH, H→bb (110-130)

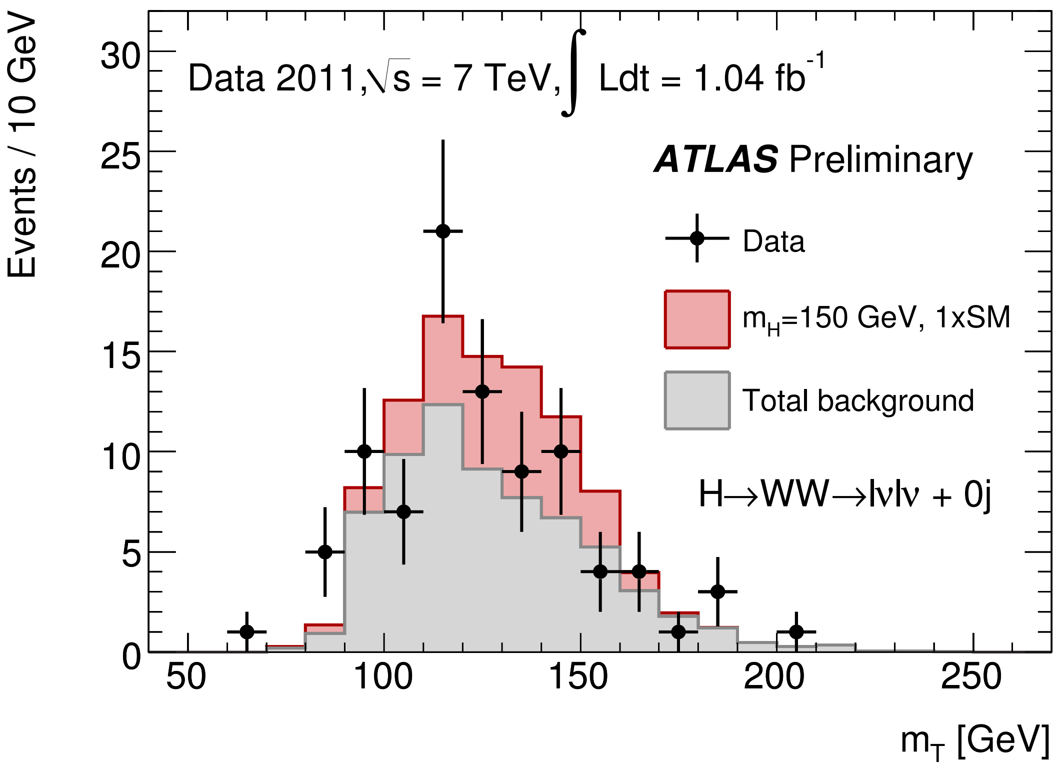


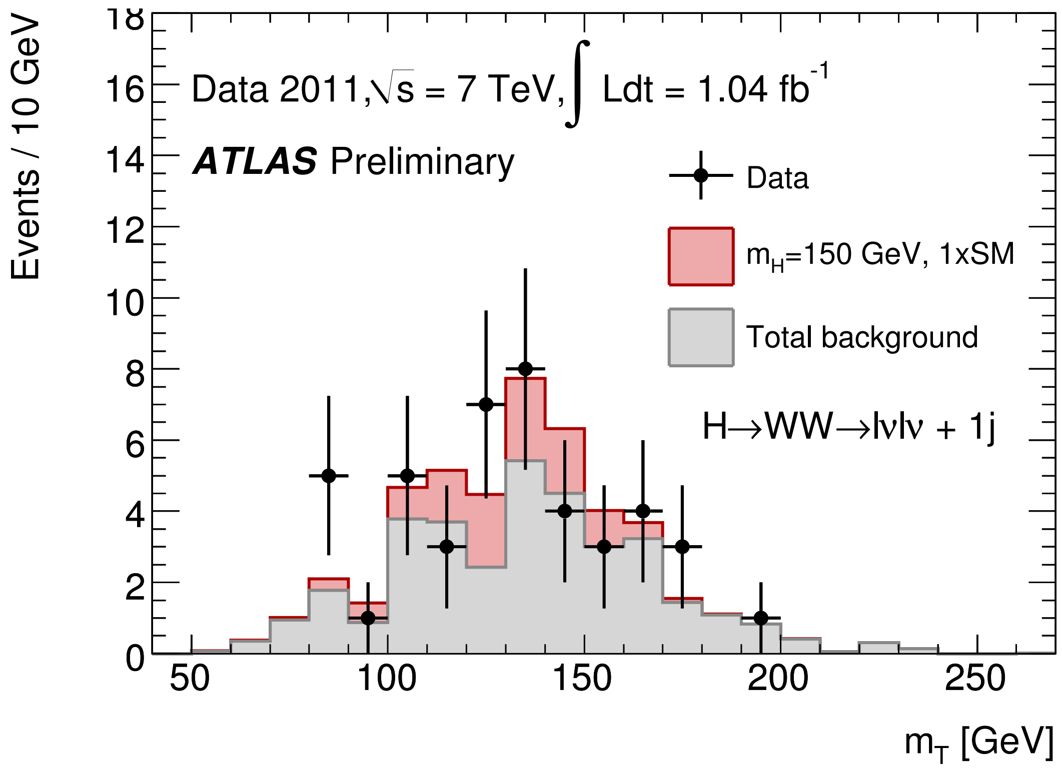




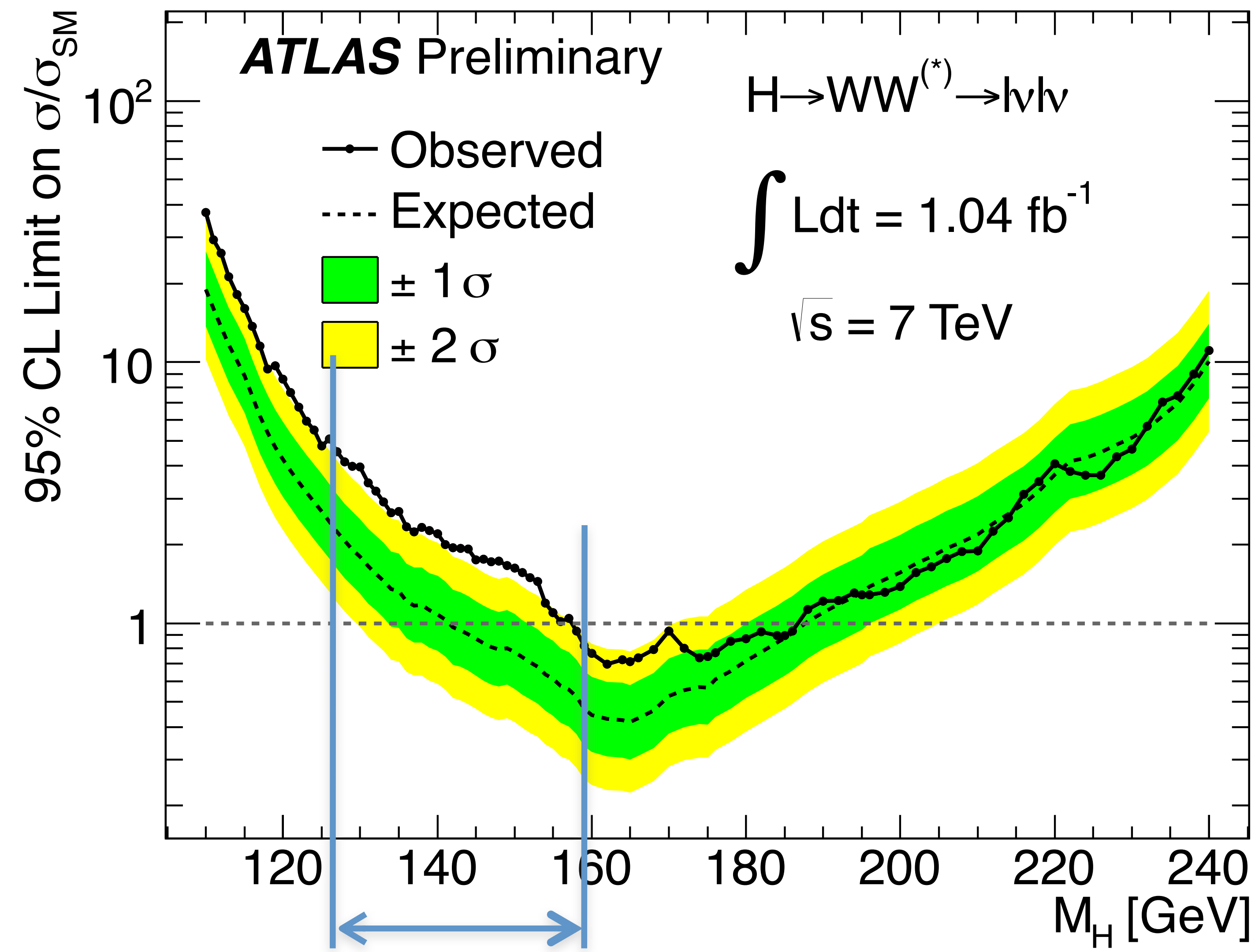
The H→ WW → lνlν Channels

Center for Cosmology and Particle Physics

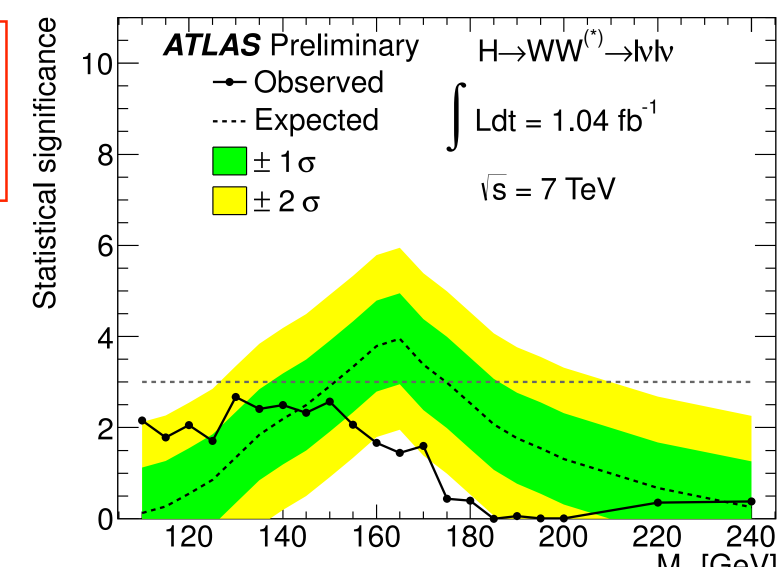




$$m_{\mathrm{T}} = \sqrt{(E_{\mathrm{T}}^{\ell\ell} + E_{\mathrm{T}}^{\mathrm{miss}})^2 - (\mathbf{P}_{\mathrm{T}}^{\ell\ell} + \mathbf{P}_{\mathrm{T}}^{\mathrm{miss}})^2},$$



Broad excess >2σ
$126<m_H<158$ GeV/c^2

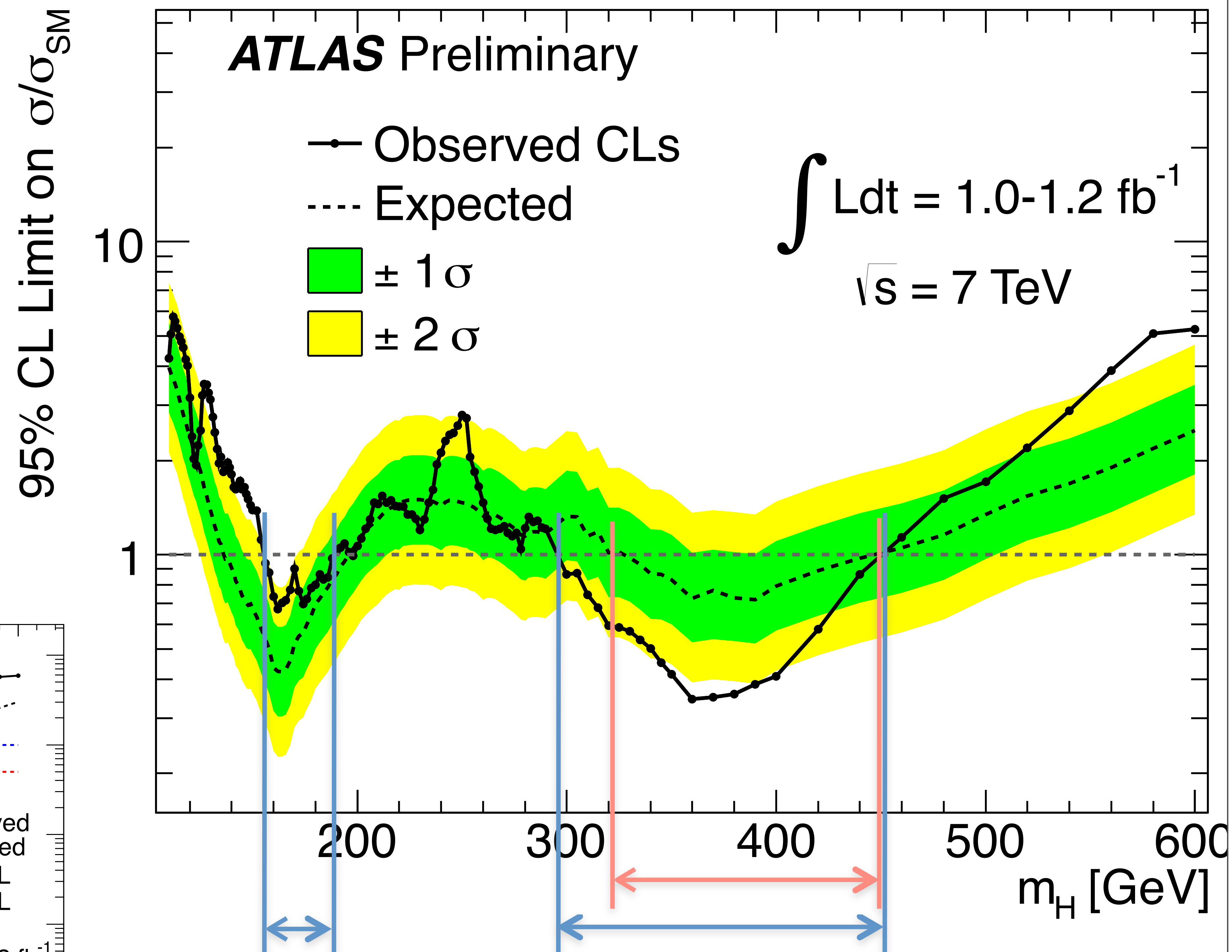


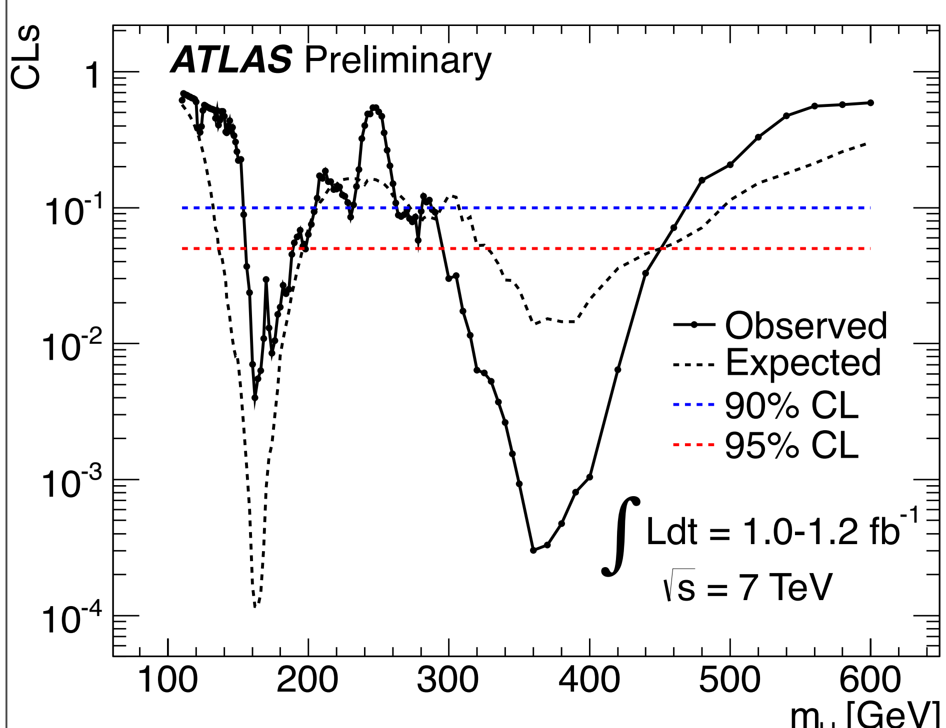
Limits full mass range

CENTER FOR COSMOLOGY AND PARTICLE PHYSICS

Additional High-mass channels extend the $H \rightarrow ZZ \rightarrow ll\nu\nu$ exclusion

Noticeable excess around 250 GeV from $H \rightarrow ZZ \rightarrow 4l$ candidates





$155 < M_H < 190$ and $295 < M_H < 450$ GeV/c^2 excluded at @ 95% CL

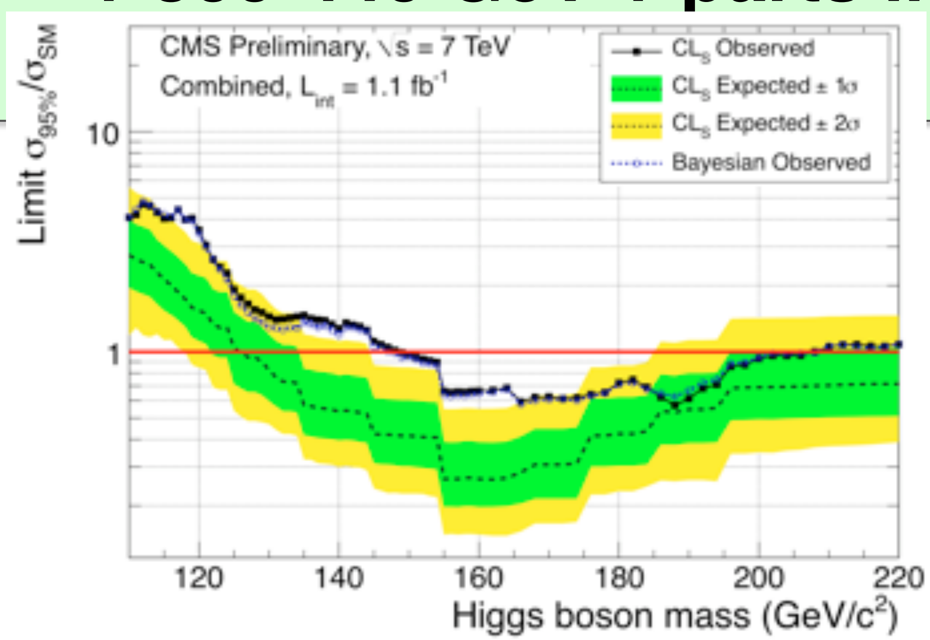
SM Higgs exclusion limits

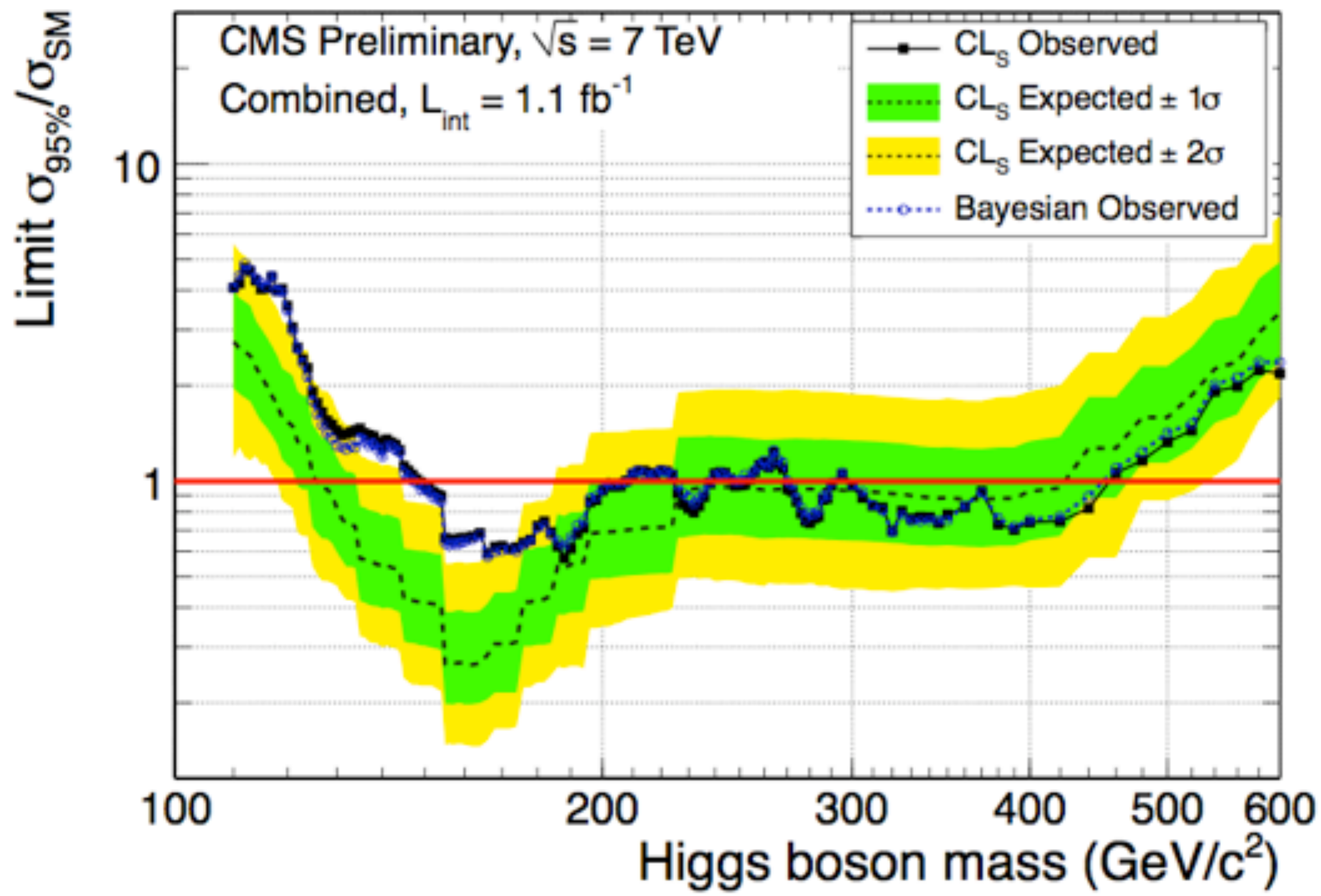
CMS PAS-HIG-11-011

Expected exclusion: 127-420 GeV

Observed exclusion: 149-206 GeV

+ 300-440 GeV + parts in



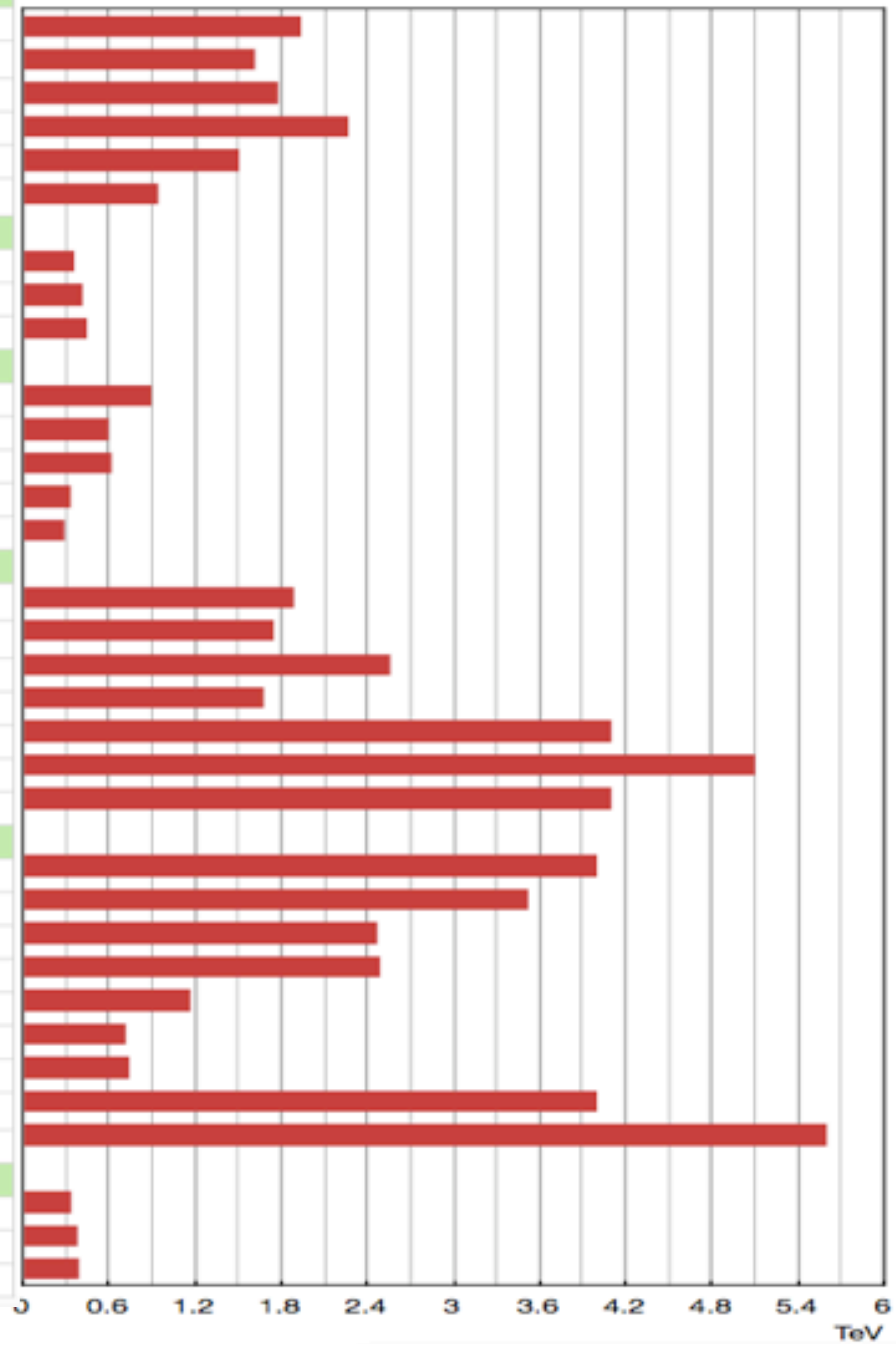


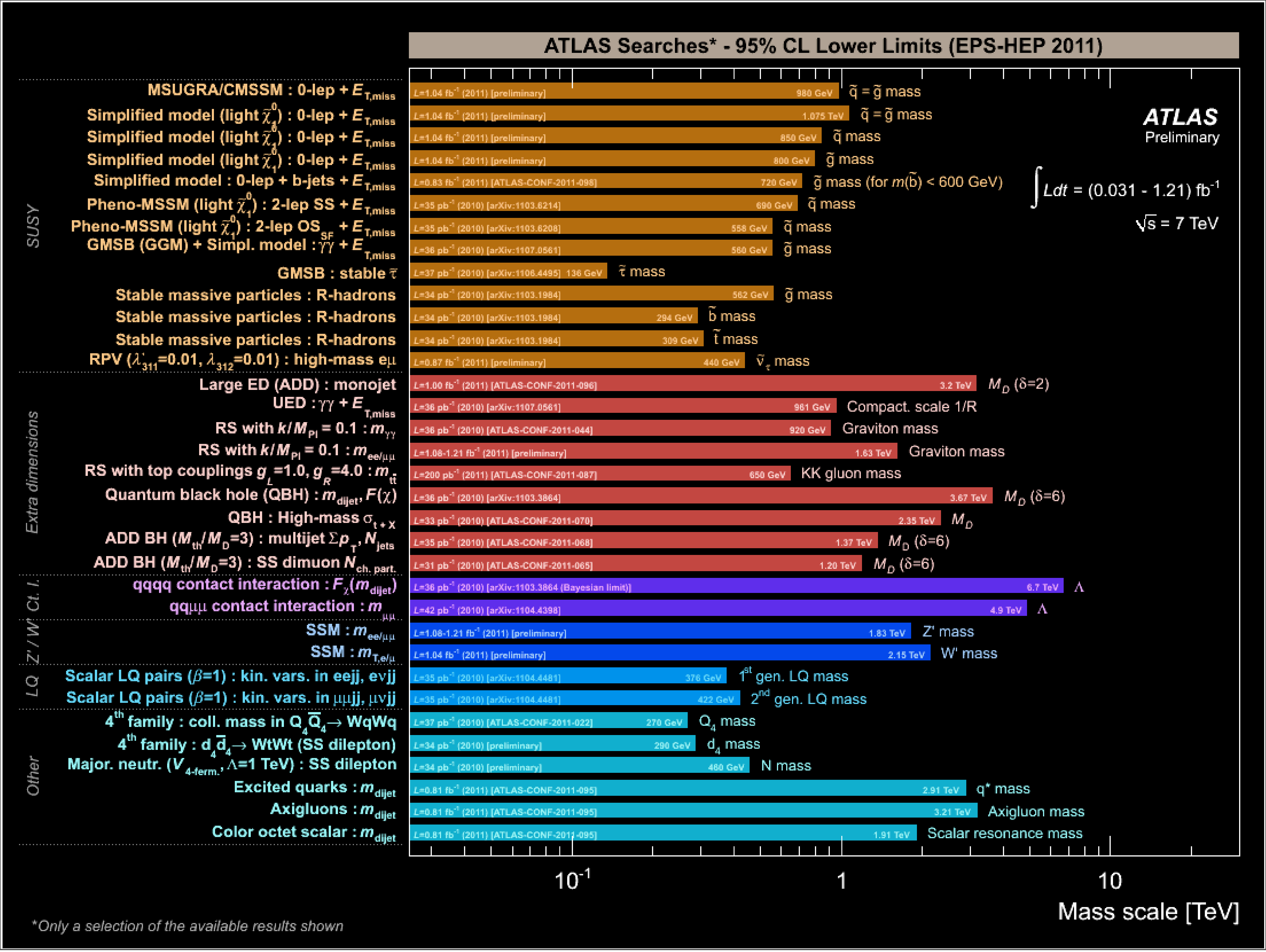
In the low mass part (114-149 GeV) we see a couple of interesting regions showing excesses larger than 3σ (local significance without correction for LEE effects). Further study with the new data we are collecting will hopefully tell us if we are seing a background fluctuation or a first sign of the Higgs boson.

Quelque chose au-delà du Modèle Standard ?

Summary of the searches in EXO

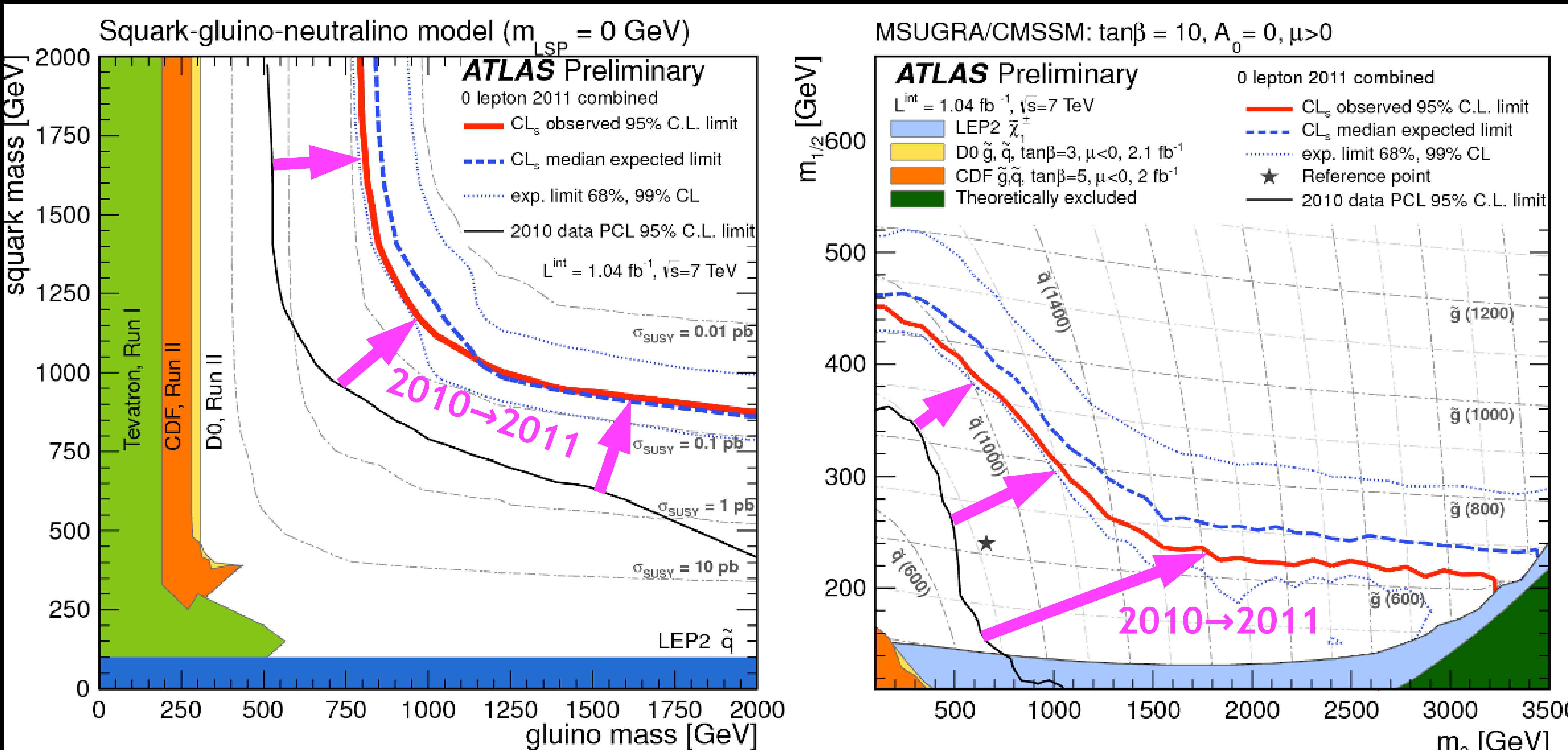
	Limits in TeV	
	Heavy Bosons	
Z'_{SSM} ll	1.94	2011
Z'_{ψ} ll	1.62	2011
G_{KK} ll k/M = 0.1	1.78	2011
W' lν	2.27	2011
W' dijet	1.51	2011
G_{KK} γγ k/M = 0.1 (2010)	0.945	2010
	4th Generation	
$M_{b'}$, b' ⇒ tW (2010)	0.361	2010
$M_{t'}$, t' ⇒ tZ (100%)	0.417	2011
$M_{t'}$, t' ⇒ bW (100%), l+jets	0.45	2011
	Heavy Stable Particles	
M_{gluino}, HSCP	0.899	2011
M_{gluino}, Stopped Gluino	0.601	2011
M_{stop}, HSCP	0.620	2011
M_{stop}, Stopped Gluino	0.337	2011
M_{stau}, HSCP	0.293	2011
	Large Extra Dimensions	
M_s, γγ, GRW (2010)	1.89	2010
M_s, μμ, GRW (2010)	1.75	2010
M_D, monojet, n_{ED} = 2 (2010)	2.56	2010
M_D, monojet, n_{ED} = 6 (2010)	1.68	2010
M_{BH}, rotating, M_D=3.5 TeV, n_{ED} = 2	4.1	2011
M_{BH}, non-rot, M_D=1.5 TeV, n_{ED} = 6	5.1	2011
String Ball M, M_D=2.1, M_s=1.7, g_s=0.4	4.1	2011
	Compositeness and Contact Interactions	
String Resonances	4.0	2011
E_6 diquarks	3.52	2011
Axigluon/Coloron	2.47	2011
q* , dijet	2.49	2011
q* , boosted Z	1.17	2010
e*, Λ = 2 TeV	0.720	2010
μ*, Λ = 2 TeV	0.745	2010
C.I. Λ , dijet mass (3 pb^{-1})	4.0	2010
C.I. Λ , X analysis	5.6	2010
	LeptoQuark	
LQ1, β=0.5 (2010)	0.340	2010
LQ1, β=1.0 (2010)	0.384	2010
LQ2, β=1.0 (2010)	0.394	2010





Wednesday, July 27, 2011

SUSY in 0-lepton channel



Simplified model with two $\tilde{q}$ generations, $m(\tilde{\chi}_1^0)$~0

$m_{\tilde{g}}$>800 GeV $m_{\tilde{q}}$>850 GeV

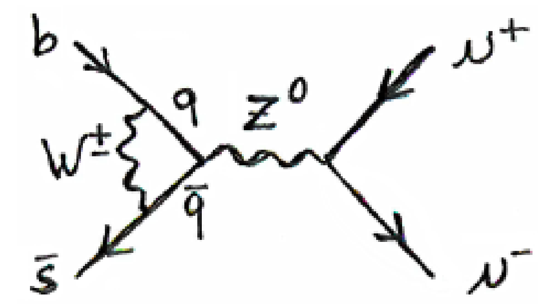
Equal mass case: $m_{\tilde{g}}=m_{\tilde{q}}$>1.075 TeV

MSUGRA/CMSSM: tanβ=10, A_0=0, μ>0

Equal mass case: $m_{\tilde{q}}=m_{\tilde{g}}$ > 980 GeV

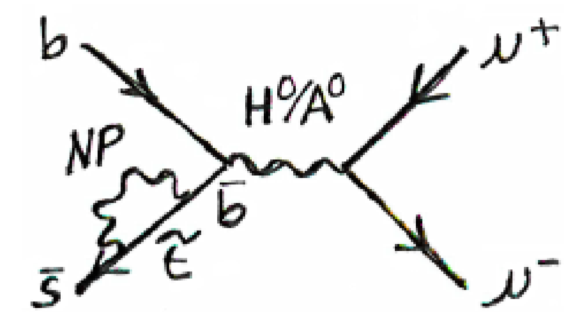
Interest of $B_{s/d}\to\mu^+\mu^-$

- FCNC and helicity suppressed decays



- Precise SM prediction:
  - $BR(B_s\to\mu^+\mu^-) = (3.2\pm0.2)\times10^{-9}$
  - $BR(B_d\to\mu^+\mu^-) = (1.1\pm0.1)\times10^{-10}$

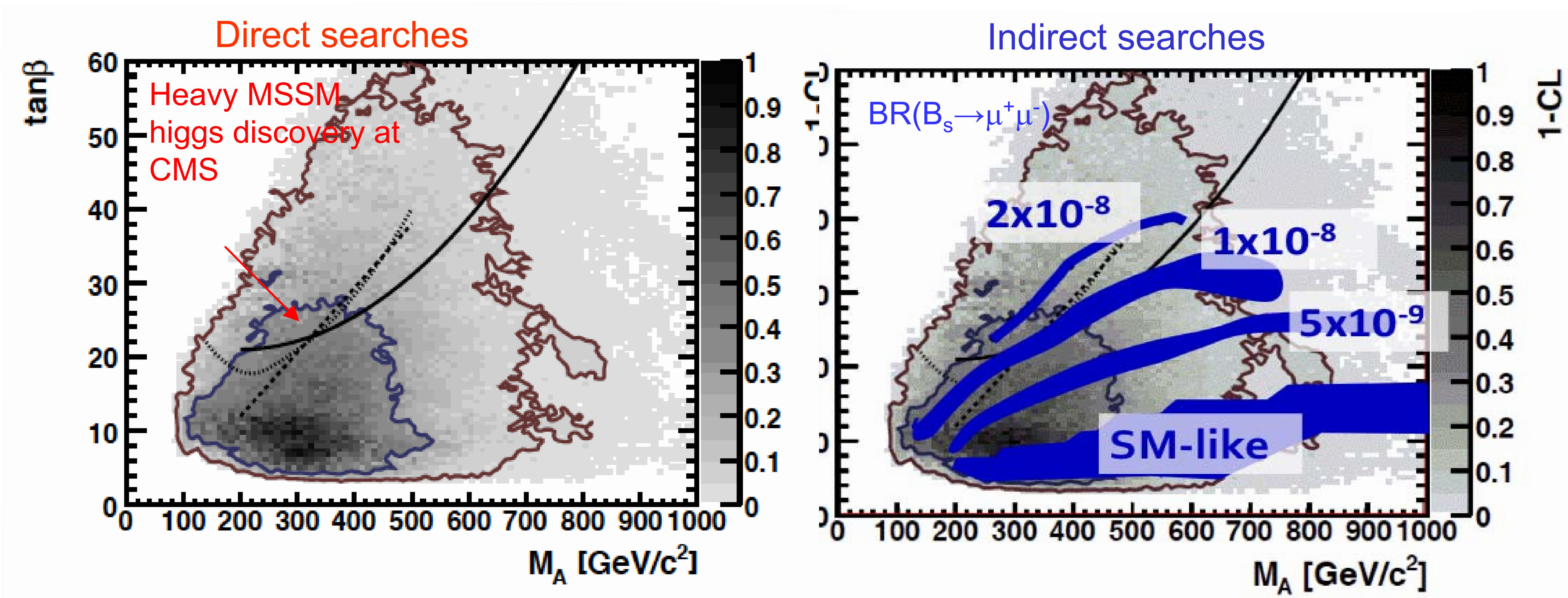
A.J.Buras: arXiv:1012.1447,
E. Gamiz et al: Phys.Rev.D 80 (2009) 014503



- BR very sensitive to new physics

Ex: NUHM1 model

O. Buchmuller et al, arxiv:0907.5568



using SuperIso/SoftSUSY, Comput. Phys.Comm. 143, 305 (arXiv: 08083144)

Wednesday, July 27, 2011

Summary

- LHCb presents new preliminary results with 300pb^{-1} on $BR(B_{s/d} \to \mu^+\mu^-)$

  $BR(B_s \to \mu^+\mu^-) < 1.3 \times 10^{-8}$ (1.6×10^{-8}) @ 90 (95)% CL

  $BR(B_d \to \mu^+\mu^-) < 4.2 \times 10^{-9}$ (5.2×10^{-9}) @ 90 (95)% CL

- Combined results with 2010 data (37pb^{-1}):

  $BR(B_s \to \mu^+\mu^-) < 1.2$ (1.5) $\times 10^{-8}$ @ 90 (95)% CL

- We do not confirm the excess seen by CDF

Des résultats aussi de CMS et CDF,
tuant beaucoup de modèles
de Nouvelle Physique...

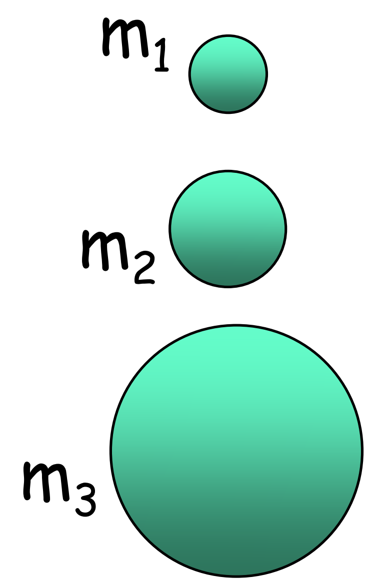
Le troisième angle des neutrinos

Six independent parameters

Weak eigenstates

$$\begin{pmatrix} \nu_e \\ \nu_\mu \\ \nu_\tau \end{pmatrix} = U_{MNS} V_M^{CP} \begin{pmatrix} \nu_1 \\ \nu_2 \\ \nu_3 \end{pmatrix}$$

mass eigenstates



$$U_{PMNS} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & +c_{23} & +s_{23} \\ 0 & -s_{23} & +c_{23} \end{pmatrix} \begin{pmatrix} +c_{13} & 0 & +s_{13}e^{-i\delta} \\ 0 & 1 & 0 \\ -s_{13}e^{i\delta} & 0 & +c_{13} \end{pmatrix} \begin{pmatrix} +c_{12} & +s_{12} & 0 \\ -s_{12} & +c_{12} & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$c_{ij} = \cos\theta_{ij}$, $s_{ij} = \sin\theta_{ij}$

$$V_M^{CP} = \begin{bmatrix} e^{i\alpha_1} & 0 & 0 \\ 0 & e^{i\alpha_2} & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

θ_{12}, θ_{23}, θ_{13}
$+\ \delta$ (+2 Majorana phase)
Δm_{12}^2, Δm_{23}^2, Δm_{13}^2

θ_{12}

ν_1 to be the largest component in ν_e $\theta_{12} < \pi/4$

solar neutrino experiments, reactor (KamLAND)

matter effect fix the sign of $m^2{}_{12}$, ν_1 the lighter one

$\Delta m_{12}^2 = m_2^2 - m_1^2 = 7.65^{+0.23}_{\;0.02} \times 10^{-5}\,eV^2 \left(\Delta m_{12}^2 > 0\right)$ $\sin^2\theta_{12} = 0.304^{+0.022}_{-0.016}$

θ_{23}

atmospheric neutrino (SK), long-baseline (K2K, MINOS)

No matter effect has been measured

$\sin^2\theta_{23} > 0.93$ 90%CL (SK) $\theta_{23} = 45^0 \pm 5^0$

$|\Delta m^2{}_{23}| = 2.32^{+0.12}{}_{-0.08}$ x 10^{-3} eV^2 ($\pm$unkown)

θ_{13}

ν_1 to be the larger component in ν_e $\theta_{13} < \pi/4$

CHOOZ 90%CL allowed region

$|\Delta m^2{}_{13}| \sim 2.3 x 10^{-3}$ eV^2 ($\pm$unknown)

$\sin^2 2\theta_{13} < 0.16$ (upper limit)

Present Knowledge

θ_{12}

ν_1 to be the largest component in ν_e $\theta_{12} < \pi/4$

solar neutrino experiments, reactor (KamLAND)

matter effect fix the sign of $m^2{}_{12}$, ν_1 the lighter one

$\Delta m^2_{12} = m^2_2 - m^2_1 = 7.50^{+0.17}_{0.23} \times 10^{-5} eV^2 \left(\Delta m^2_{12} > 0\right)$ $\sin^2\theta_{12} = 0.304^{+0.022}_{-0.016}$

θ_{23}

atmospheric neutrinos (SK), long-baseline (MINOS,T2K)

No matter effect has been measured

$\sin^2 2\theta_{23} > 0.9$ 90%CL (SK) $\theta_{23} = 45^0 \pm 5^0$

$|\Delta m^2_{23}| = 2.32^{+0.12}_{-0.08}$ x 10^{-3} eV^2 ($\pm$unkown)

θ_{13}

ν_1 to be the larger component in ν_e $\theta_{13} < \pi/4$

$|\Delta m^2_{13}| \sim 2.3 \text{x} 10^{-3}$ eV^2 ($\pm$unknown)

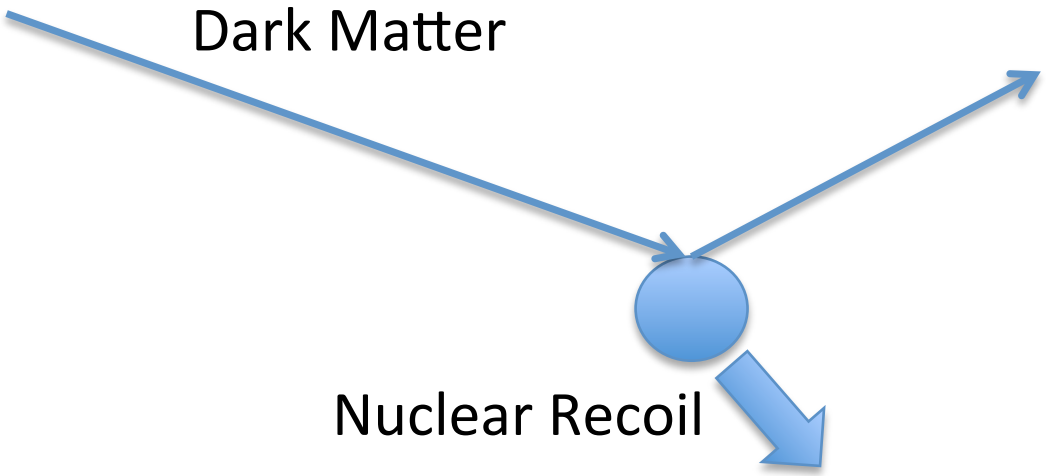
T2K 90%CL allowed region
$0.03 < \sin^2 2\theta_{13} < 0.28$ (N.H.)
$0.04 < \sin^2 2\theta_{13} < 0.34$ (I.H.)

MINOS allowed region
$\sin^2 2\theta_{13} = 0$ excluded at 89%CL
<0.12 (N.H.), <0.19 (I.H.) 22

via nu_mu -> nu_e : violation de CP pour neutrinos accessible ?

A-t-on vu
la matière noire ?

Direct Detection

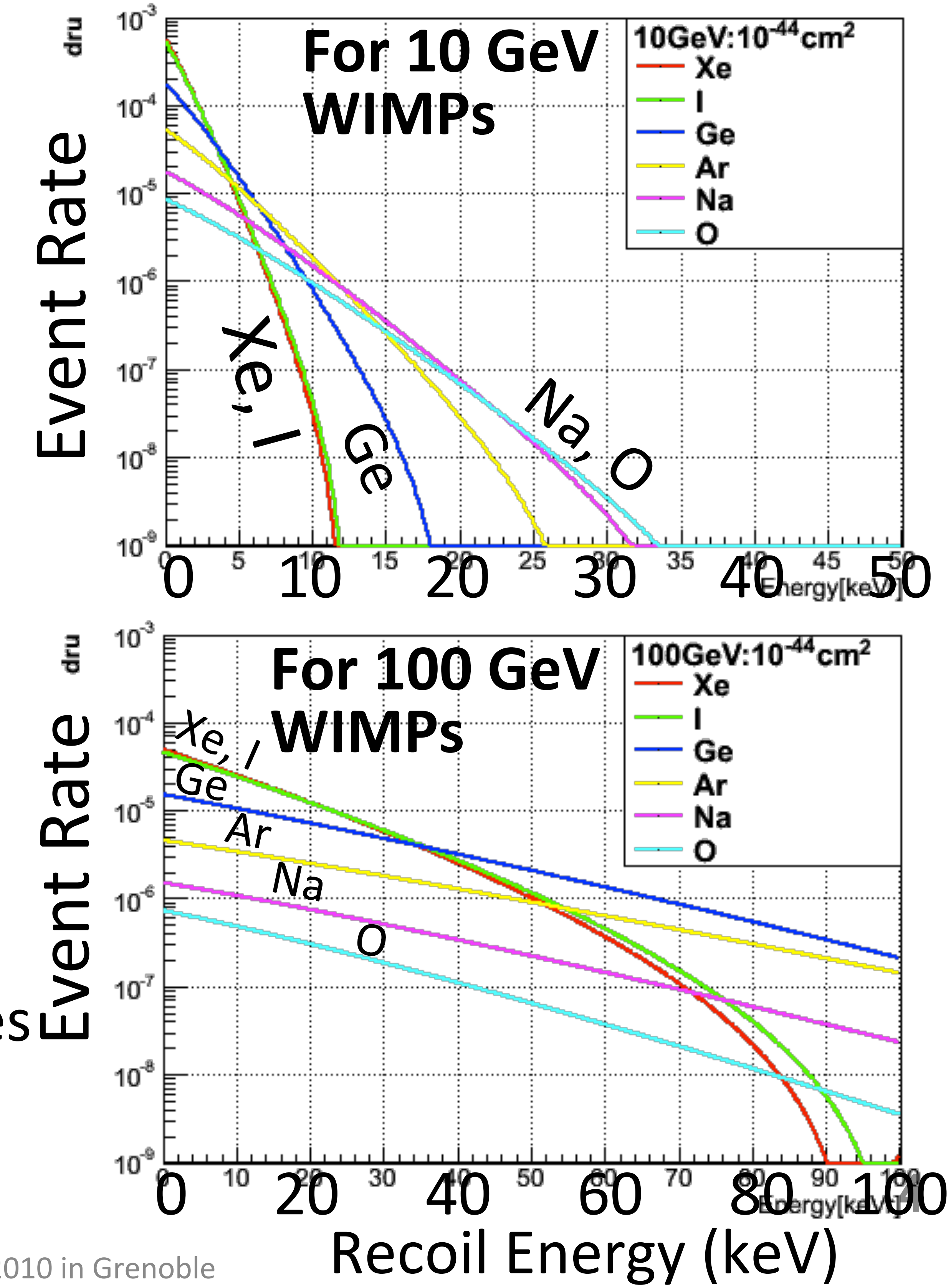


- Direct searches : Observe Nuclear Recoils
  - $\chi + N \rightarrow \chi + N$
- Recoil Energy:

  ← Kinetic energy of DM

$$E_R = \frac{M_\chi v^2}{2} \frac{4 M_\chi M_A}{(M_\chi + M_A)^2} \frac{(1 - cos\theta)}{2}$$

  - 1~100 keV
  - For low mass DM, sp. become very soft for large target masses like Xe, Ge,,
    - Loose efficiency unless lowering the threshold



Event Rate

$$R \sim \sigma_{\chi-N} \times n < v > \propto \sigma_{\chi-N} \times (\frac{\rho}{M_x}) \times \int v f(v) dv$$

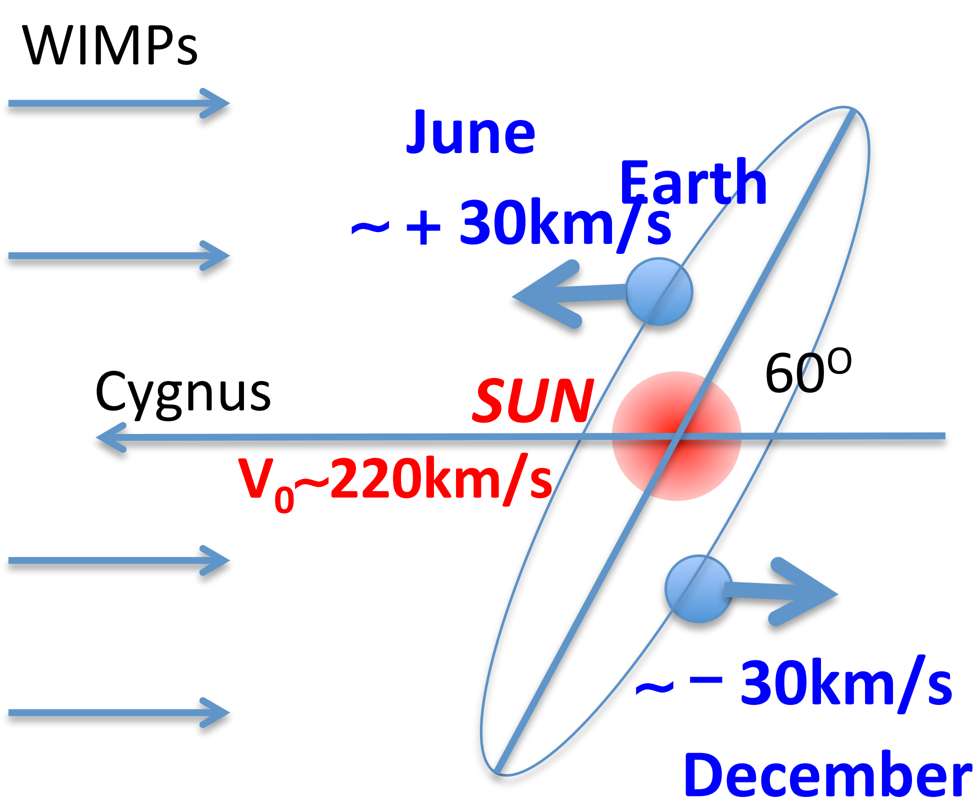
$$\sigma_{\chi-N} = \sigma^{SI}_{\chi-N} + \sigma^{SD}_{\chi-N}$$

$$\sigma^{SI}_{\chi-N} = A^2 \frac{\mu^2_{\chi-N}}{\mu^2_{\chi-p}} \sigma^{SI}_{\chi-n} \qquad \sigma^{SD}_{\chi-N} = \frac{\lambda^2 J(J+1)}{0.75} \frac{\mu^2_{\chi-N}}{\mu^2_{\chi-p}} \sigma^{SD}_{\chi-n}$$

TYPICAL:

- ~0.1 ev/day/100kg-Xenon
  for m_χ = 50 GeV and σ_{SI}=10^{-44} cm^2
  with $10keV_{NR}$ threshold, 30% eff

- Seasonal variations of the velocity: ±30km/s ➔
  < ~ 10% modulation effects
  - depend upon spectrum shape, trigger efficiency, analysis cuts and so on



Recent Status

Sorry,
We did not plot all the results

Beaucoup de discussions sur les effets systématiques…

CRESST-II:
Wait until their FINAL results

Low threshold Analysis by CDMS-II (LE) and XENON-10 (LE)