

D0-France @ Lyon / in2p3-news + >2011

G. Bernardi

Thanks to INP Lyon to welcome us,
and thanks to the organizing
committee chaired by Patrice Lebrun

Duncan Brown (IPHC)
Elemer Nagy (CPPM)
Fabrice Couderc (IRFU)
Jan Stark (LPSC)
Pascal Gay (LPC Clermont)
Patrice Lebrun (IPNL) Chair
Thibault Guillemin (LAL)
Yuji Enari (LPNHE)



Layout of the talk

- Status of the groups
- Status of D0-in2p3
manpower/budget
- Plans for beyond 2011

DØ au LPC / Clermont-Ferrand

état actuel

F. Badaud (MdC)

Ph. Gris (CR1)

P. Gay (Prof.)

J. Jammes (student → 2011)

Tasks: Editorial Boards , shifts

Physics: Recherche de paire de Stop état final avec lepton tau +
Section efficace du quark top état final avec lepton tau

perspectives 2011-2012

	2010	2011	2012
F. Badaud	50%	50%	20%
Ph. Gris	100%	100%	60%
P. Gay	20%	20%	
J. Jammes	90%	50%	0%
Total	FTE: 2.6	2.2	0.8

DØ au LPSC / Grenoble

état actuel

G. Sajot (Prof)

J. Stark (CR1) (co-convener groupe electroweak → 09/10)

H. Li P. Doc (since 01/12/2009, CDD 3 ans DØ-ATLAS)

Tasks : expertise calorimétrie (J. Stark), code calorimètre et calibration (H.Li + J. Stark), shifts

Physics : masse et largeur du W (publication sur 5 fb⁻¹+combinaison avec résultats publiés)

perspectives 2011-2012

	2010	2011	2012
G. Sajot	20%	10%	0%
J. Stark	90%	25%	0%
H. Li	100%	25%	0%
Total	FTE: 2.1	0.6	0

DØ a IPN Lyon / état actuel

P. Lebrun (CR, 100% DØ)

G. Grenier (MCF, DØ/ILC : 50 % DØ)

P. Verdier (CR [HDR], DØ/CMS : 40% DØ)

T. Kurca (IR service informatique, DØ/CMS : 50% DØ)

Tasks:

- shifts

- P.Lebrun: MC production, Calo calibration/DB, WZ MC rep., Data reprocessing

- P. Verdier: EB-chair

- G. Grenier: Certification MC generators, Maintenance Algen, EB Chair

-T.Kurca: Responsable MC-Request coordination, LCG, SAMGRID

Physics:

P.Lebrun : W mass analysis

P. Verdier : NP analysis

G. Grenier : Higgs to tau-mu

IPN Lyon / perspectives 2011-2012

	2010	2011	2012
P. Lebrun	100%	60%	30%
P. Verdier	30%	20%	20%
G. Grenier	50%	30%	30%
T. Kurca	50%	40%	20%
Total	FTE: 2.3	1.5	1.0

- Forte décroissance 2011-2012
- Nouvelle mesure masse du W avec plus de statistique ?
- Analyse NP a terminer.
- Analyse Higgs -> Tau-mu en collaboration avec analyse H->tau-tau
- Lyon continuera a assurer la prod MC et le suivi de la calibration electronique

DØ au CPPM / état actuel

Pr. M.-C. Cousinou

Cr. A. Duperrin (conveneur du groupe New Phenomena)

Dr. E. Kajfasz

Ir. S. Kermiche

Cr. S. Muanza

Pr. E. Nagy (conveneur du groupe Simulation)

B. Calpas (→ thèse 6/2010, $HZ \rightarrow b\bar{b}e\bar{e}$)

D. Jamin (→ thèse 9/2010, $HZ \rightarrow b\bar{b}\nu\nu$, monitorat)

Concentration sur le Higgs: électron ICR (B. Calpas) et b-tagging (D. Jamin)

- $HZ \rightarrow b\bar{b}e\bar{e}$: Calpas, Nagy, Cousinou

- $HZ \rightarrow b\bar{b}\nu\nu$: Jamin, Duperrin, Kajfasz

- EB: Nagy (chair), Kajfasz

- Software: releases CPPM et CCIN2P3, transfert des données (Kermiche)

- General: Workshop DØ in Marseille (Duperrin, Kermiche, et al.)

CPPM / perspectives 2011-2012

	2010	2011	2012
M.-C. Cousinou	70%	70%	70%
A. Duperrin	80%	50%	50%
E. Kajfasz	20%	20%	20%
S. Kermiche	40%	20%	20%
S. Muanza	50%	20%	20%
E. Nagy	100%	100%	100%
B. Calpas	80%		
D. Jamin	80%		
M. Rangel (ANR postdoc)	20%	100%	
Total	FTE: 5.4	3.8	2.8

→ Nécessité Postdocs (il n'y a plus d'étudiant intéressé)
pour une participation au delà de 2011

DØ à l'IPHC Strasbourg / état actuel

Isabelle Ripp-Baudot (CR)

Walter Geist (retraite) calo-operations (→ mars/2010)

Duncan Brown (postdoc) EB chair

Sébastien Greder b-identification (2009-2010)

Florian Miconi (WH→lvbb, monitorat)

Activités :

Calorimeter operation (WG)

b-identification (IR,SG,FM)

shifts

Physics: Recherche du boson de Higgs léger WH-> lnu bb (IR,DB,SG,FM)

IPHC Strasbourg / perspectives 2011-2012

	2010	2011	2012	
Isabelle Ripp-Baudot	0.8	0.8	0.5	
Walter Geist	0.3	0	0	(retraite)
Duncan Brown	0.5	0	0	(postdoc LPNHE)
Sébastien Greder	0.7	0	0	(CMS ou ?)
Florian Miconi	0.9	0.9	0.3	(monitorat)
Total FTE	3.2	1.7	0.8	

Conclusion : contribution possible jusqu'en 2011, renfort nécessaire (postdoc, sénior) pour participer au-delà.

DØ au LAL Orsay / état actuel

Jean-Francois Grivaz

Michel Jaffré

Pierre Pétroff

Thibault Guillemain PostDoc depuis Nov. 2010

Murilo Rangel PostDoc depuis Jan. 2009

Activités :

Jet identification et efficacité (MR)

Jet Data/MC (JSSR : correction en énergie des MC jets)

Générateurs et interface to MC production (MJ)

Editorial Board Chair (MJ), shifts

Physics:

Recherche du boson de Higgs SM/ HZ-> bb nu nu (JFG, TG, MR, MJ)

Masse du boson W (PP)

LAL Orsay/ perspectives 2011-2012

	2010	2011	2012
J.F. Grivaz	70%	50%	30%
M. Jaffré	100%	100%	50%
P. Pétroff (émeritat oct 2010 ?)	70%	??	??
M. Rangel (CPPM Oct 2010)	85%	0%	0%
T. Guillemain (→11/2012)	100%	100%	85%
Total	FTE: 4.2	2.5	1.7

Renfort nécessaire si l'on veut participer à l'analyse Higgs avec toute la statistique

→ Nécessité Post-doc (Etudiant !!!)

DØ au LPNHE Paris / état actuel

G. Bernardi (Physics-co/DØ-in2p3)

Yuji Enari (→12/2011 + 3 ans ATLAS)

Duncan Brown (6/2010→ 12/2011)

J. Lellouch (CMS/DØ (20%) Gent)

N. Huske (→ these 9/2010, vient de finir 8 mois de theorie a Bielefeld)

J. Brown (→ these 9/2011, sur le site en 2010)

Candidat these 2010

Concentration sur le Higgs, canal WH techniques avancees et combinaison, b-jes (Jeremie) / jet resolution (Nils/Jonathan)
+ calo expert (Nils)

- **G. B.**, (Higgs combination, WH)
- **Yuji E.**, Low mass Higgs convener, + Clued0 administrator + AC chair
- **D. Brown:** analyse WH, QCD-EB-chair, va reprendre Clued0 adm
- **Nils Huske:** 2 ans sur site , calo expert/ WH-canal e
- **J. Brown:** plusieurs sejours de 2 mois / daq shift/ MVA/ WH-canal mu
- **J. Lellouch,** expert analyse / expert collie/systematiques.

LPNHE Paris / perspectives 2011-2012

	2010	2011	2012
G. Bernardi	100%	90%	70%
Yuji Enari	90%	50%	30%
Duncan Brown	50%	100%	20%
J. Lellouch	20%	20%	0%
N. Huske (→ these 9/2010)	50%	0%	0%
J. Brown (→ these 9/2011)	100%	60%	0%
Candidat these 2010	30%	100%	100%
Total	FTE: 4.1	3.2	1.2

Forte décroissance 2011-2012, au pic des résultats sur toute la statistique.

→ Necessite' etudiant et Post-doc

Post-doct / CDD-HN

	2004	2005	2006	2007	2008	2009	2010	
L. Berntzon		Postdoc fac						CPPM
A. Gay		ATER						IPHC
M. Hohlfeld			Postdoc					LAL
L.Sonnenschein		VE						LPNHE
C. Yu		VE						LPSC
C. Biscarat				Postdoc				IPNL
M. Sanders				Postdoc				LPNHE
F. Couderc			Postdoc					DAPNIA
S. Chakrabarti				Postdoc				DAPNIA
M. Escalier					Postdoc			CPPM
S. Calvet					Postdoc			LAL
CDD-HN						Yui		LPNHE
post-doc ANR						Murilo		LAL
post-doc ANR						Duncan		IPHC
CDD-HN								GRE
CDD-HN								ORSE

....

Fall 2006: C. Biscarat, M. Sanders, S. Chakrabarty (3)

Fall 2007: M. Escalier, S. Calvet (2)

Fall 2008: Y. Enari, M. Rangel, D. Brown (3)

Fall 2009: H. Li, T. Guillemin (2)

Fall 2010: ??

Manpower summary

		2010	2011	2012
LPC	Clermont	2.6	2.2	0.8
LPSC	Grenoble	2.1	0.6	0.0
IPN	Lyon	2.3	1.5	1.0
CPP	Marseille	5.4	3.8	2.8
LAL	Orsay	4.2	2.5	1.7
LPNHE	Paris	4.1	3.2	1.2
IPHC	Strasbourg	3.2	1.7	0.8
Total		23.9	15.5	8.3

Clear need for

**~2-3 postdocs in 2010,
and
~1-2 postdocs in 2011**

to mitigate the manpower decrease

Theses

	2004	2005	2006	2007	2008	2009	2010	2011	
M. Arthaud			Production et masse du top en e-mu						DAPNIA/SP
A.-F. Barfuss			Leptoquarks de 1ere generation						CPPM
S. Calvet		Paire de sbottoms en 2 b-jets + MET							CPPM
F. Chevallier		Higgs charge dans D0 et ATLAS							LPSC
F. Lacroix			H+ -> tau nu						LPC
J. Lellouch			WH						LPNHE
B. Martin			Production top en di-electrons et desint. FCNC						LPSC
Th. Millet		Paire de gluinos en 4 b-jets+MET							IPNL
Ch. Ochando			Z(nunu)H(bb)						LAL
V. Siccardi		Helicite du W dans la desintegration du top							IPHC
F. Tissandier		Paire de stops avec electrons dans l'etat final							LPC
B. Calpas					Z(ee)H(bbar)				CPPM
W. Geng					l1cal				CPPM/MSU
B. Calpas					Z(ee)H(bbar)				CPPM
D. Jamin					Z(nunu)H(bbar)				CPPM
S.Chevalier					top				DAPNIA/SP
N. Huske					WH				LPNHE
J. Brown						WH/combo			LPNHE
A. Croc						Top			IRFU/SPP
R. Madar						Higgs Susy (tautau)			IRFU/SPP
J. James							Susy		LPC
F. Micconi							Higgs		IPHC

a l'in2p3:

2007-2010: B. Calpas (cppm), N. Huske(lpnhe), D. Jamin(cppm)

2008-2011: J. Brown (lpnhe)

2009-2012: J. James (LPC) , F. Miconi (iphc)

2010-2013: ? ?

Budget 2010

Obtenu en 2008:

2008 (+20 wkshop) total ~320kE

Obtenus en 2009

2009 total 290 kE + 5000 \$ computing fnal

Proposition 2010: total 290 kE + 15000 \$ computing fnal (340kE demandes)

(1ere vague) 237 kE + 15000 \$ (11.5 kE)

CPPM 60

IPHC 25

IPNL 24

LAL 34

LPC-CI 22

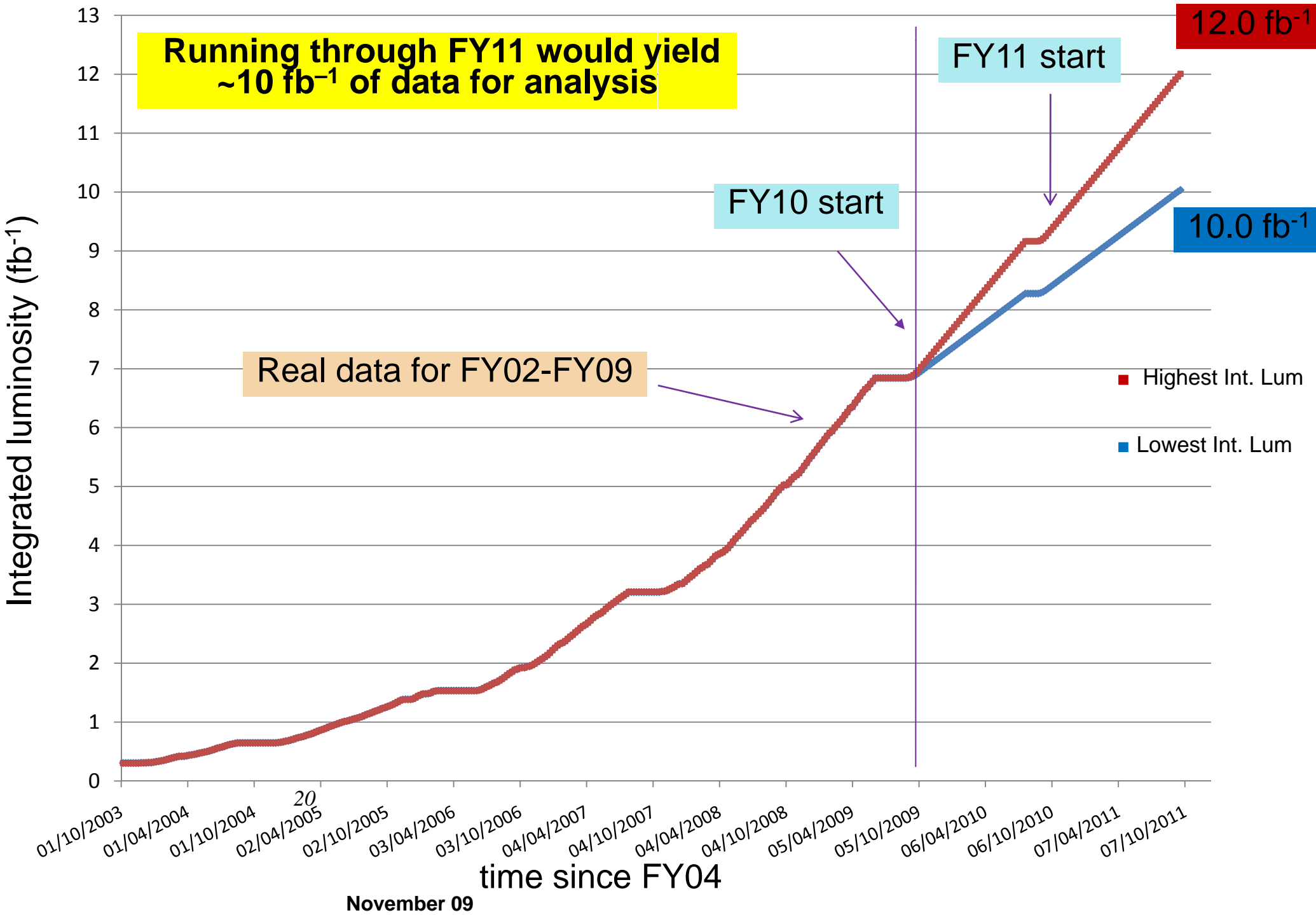
LPNHE 50

LPSC 22

~50KE missing in action?

Beyond 2011

Luminosity projections for Run II



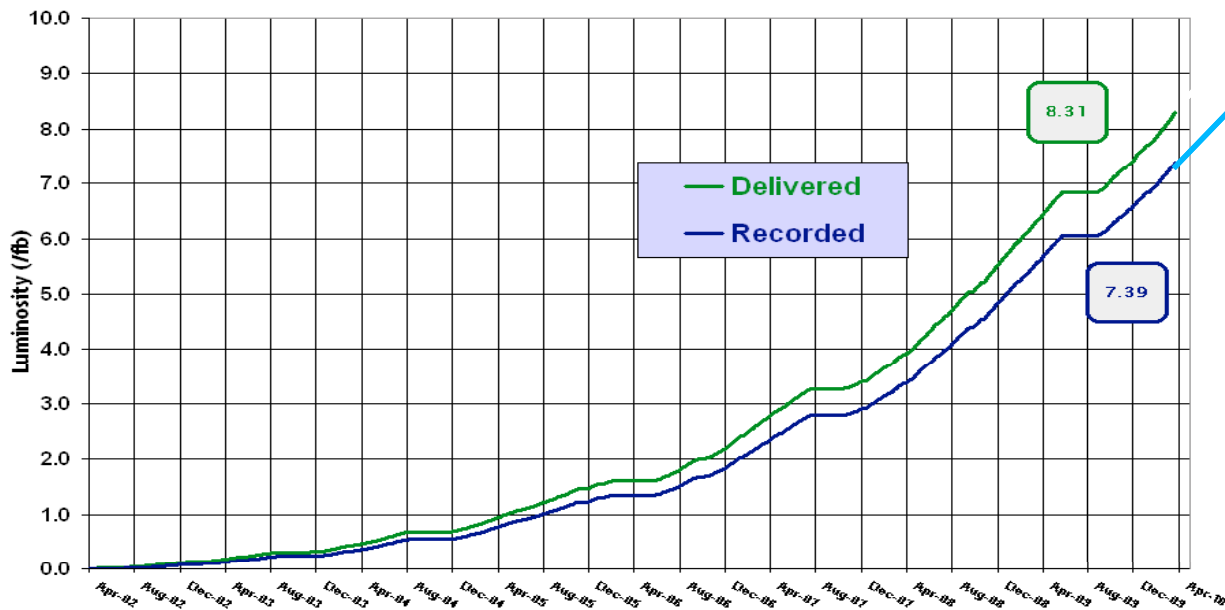
Detectors and Physics Beyond 2011

Running for three more years beyond 2011 will double the currently available integrated luminosity
→ 16 fb⁻¹ analyzable



Run II Integrated Luminosity

19 April 2002 - 11 April 2010

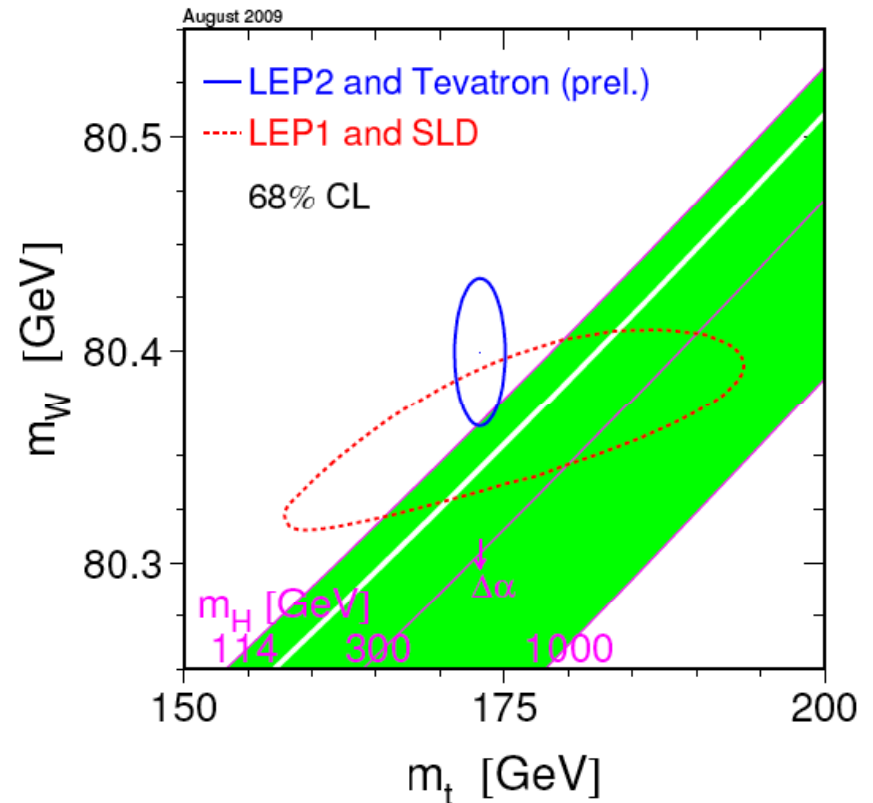
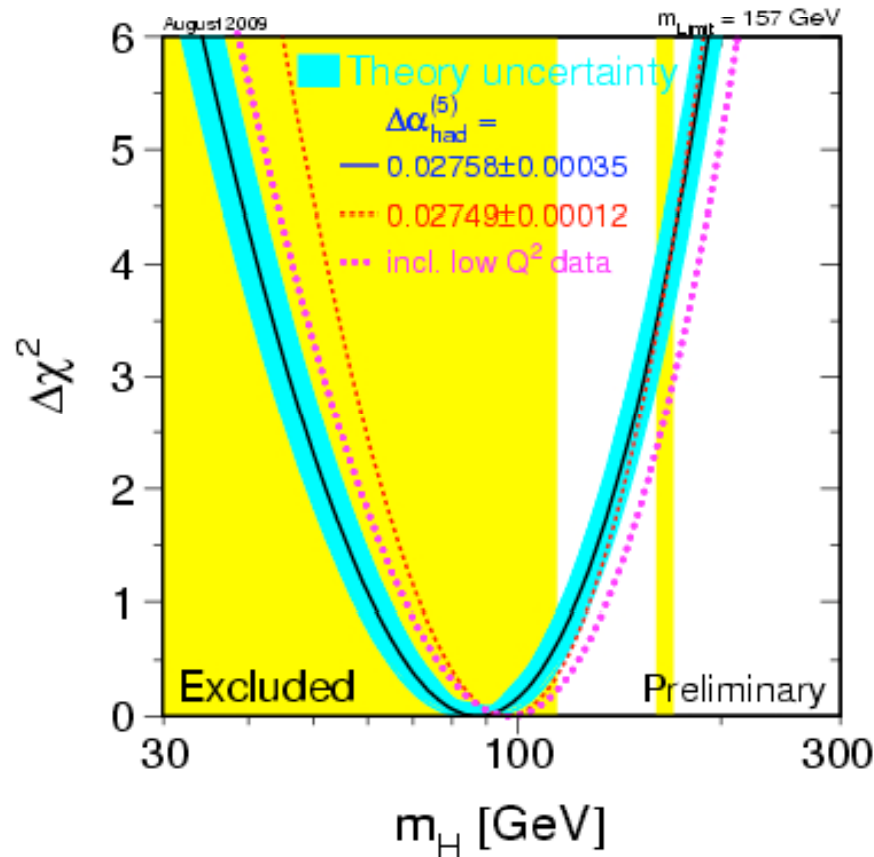
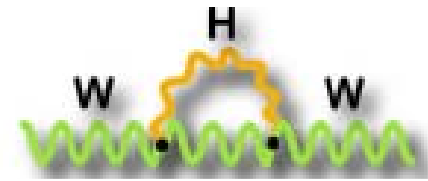


Main challenges for collaborations:

- Communicating physics case
- Detector performance
- Collaboration manpower

Goals: Cornering the Higgs

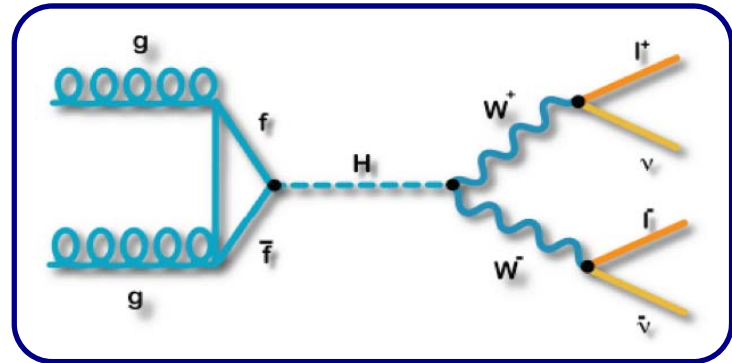
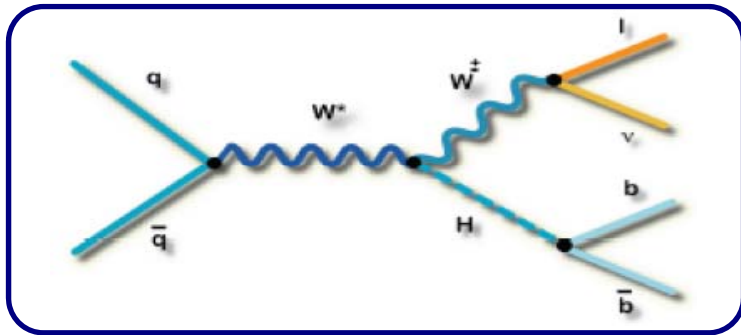
$$M_H = (87 \pm \begin{matrix} 35 \\ 26 \end{matrix}) \text{ GeV}$$



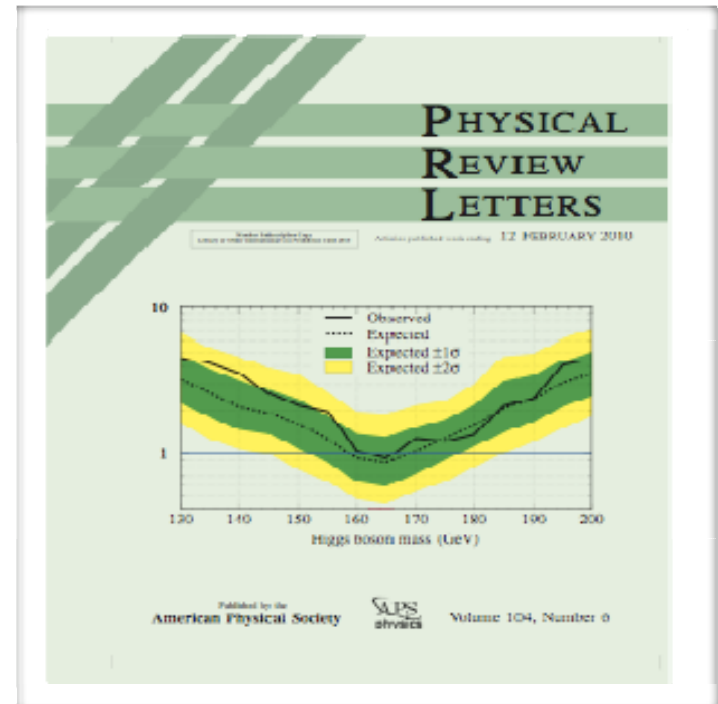
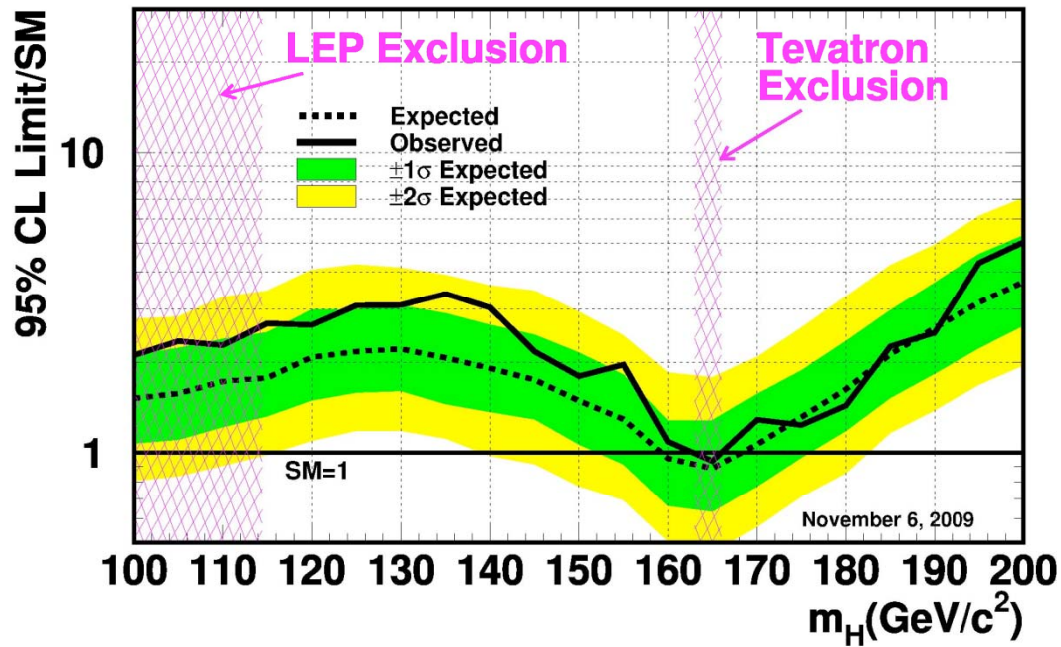
$M_H < 186 \text{ GeV}$, including LEP limit

A light Higgs is favoured by the precision data..

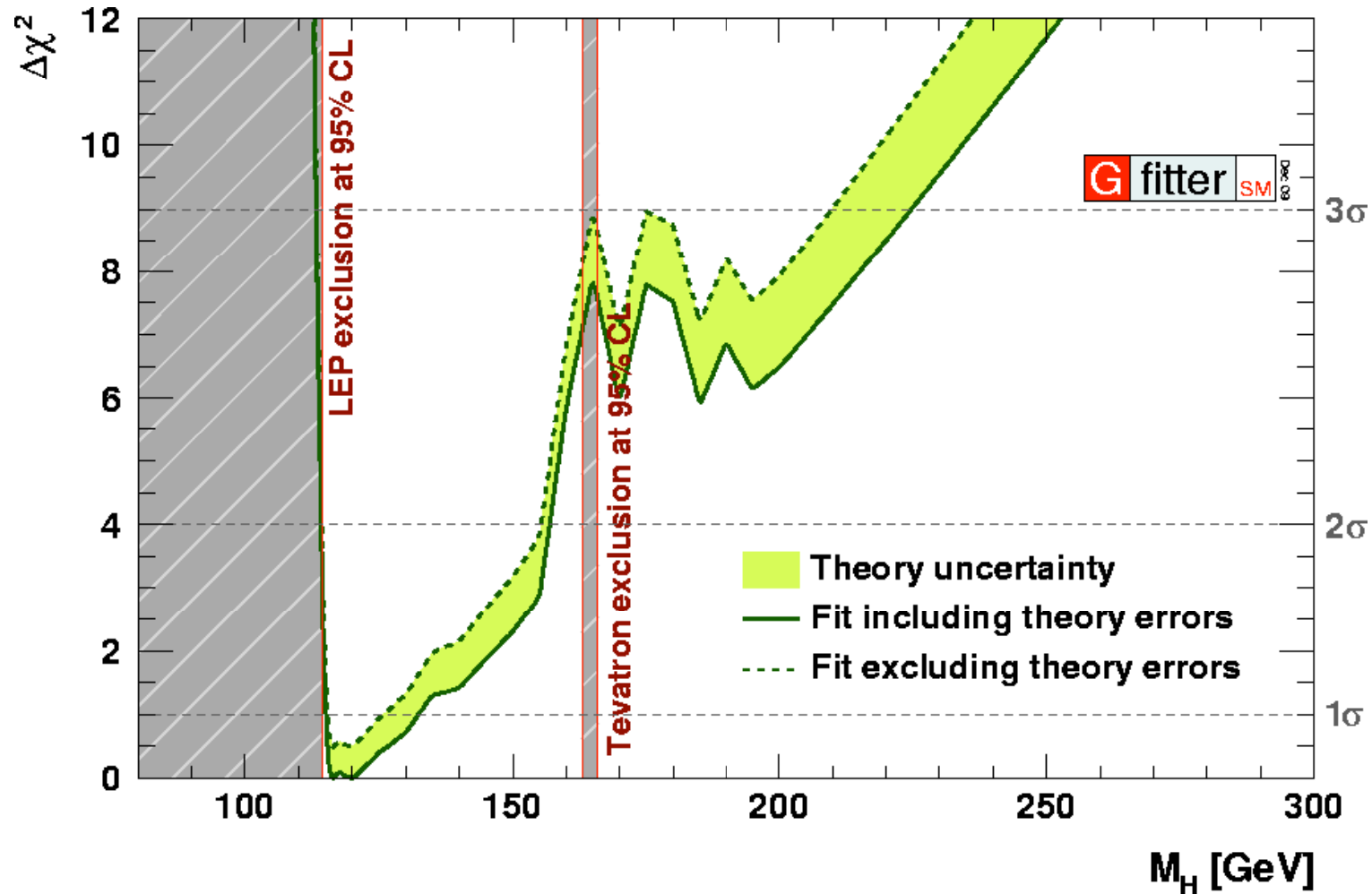
SM Higgs Searches



Tevatron Run II Preliminary, $L=2.0-5.4 \text{ fb}^{-1}$

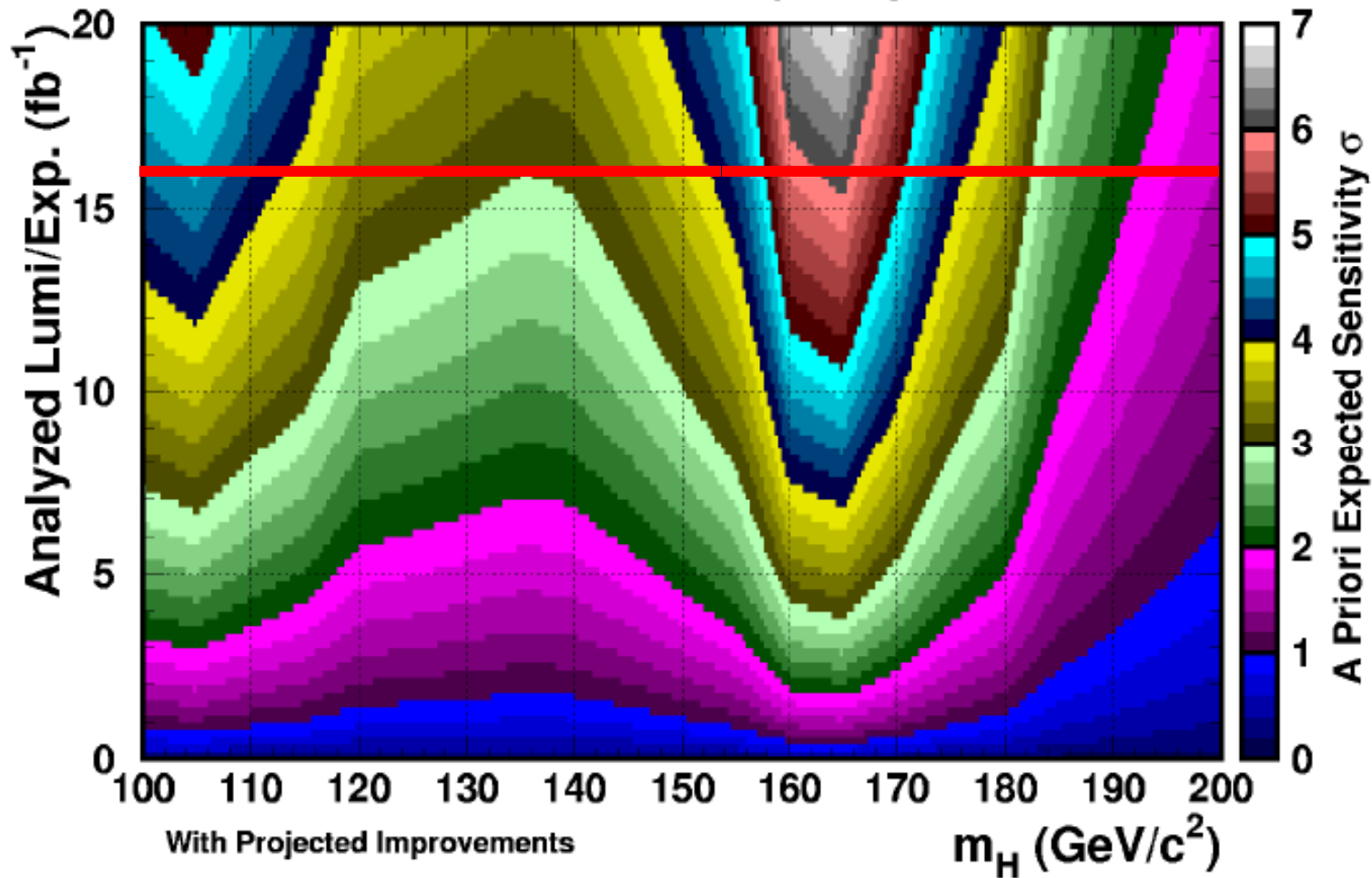


Including the Direct Limits



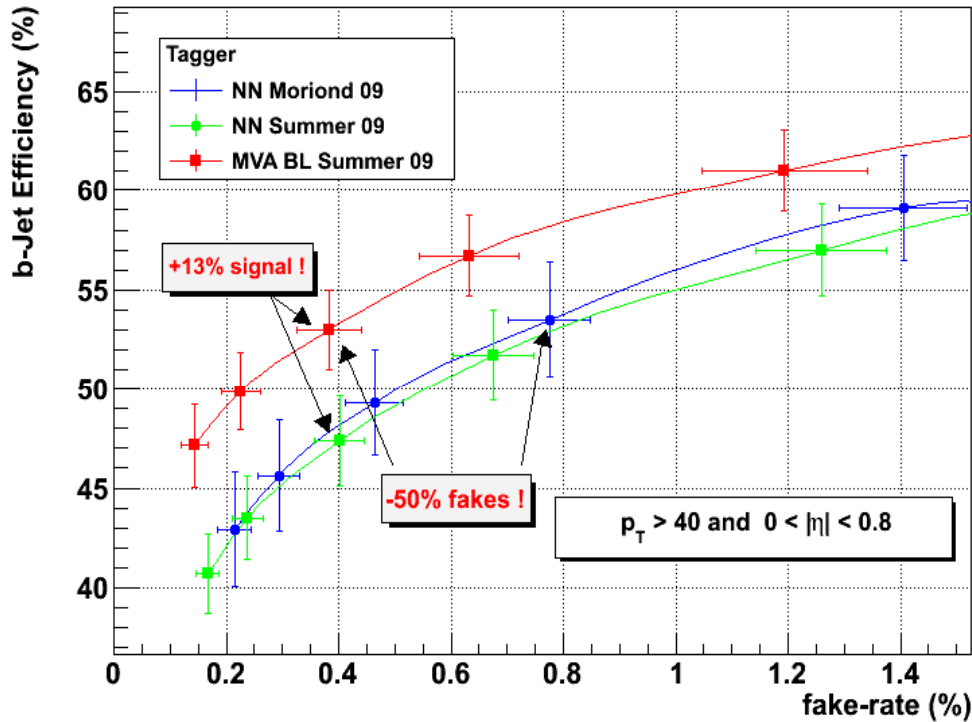
Higgs Projection

Tevatron Preliminary Projection



3 sigma evidence on the whole range, up to 185 GeV, assuming analysis improvements

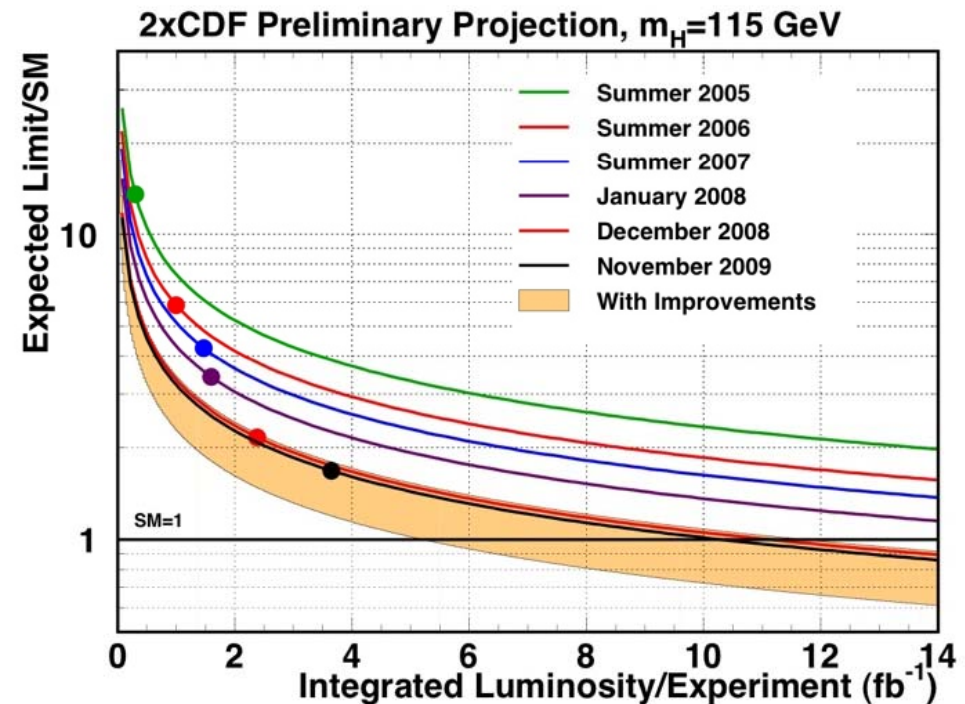
Improvements are happening



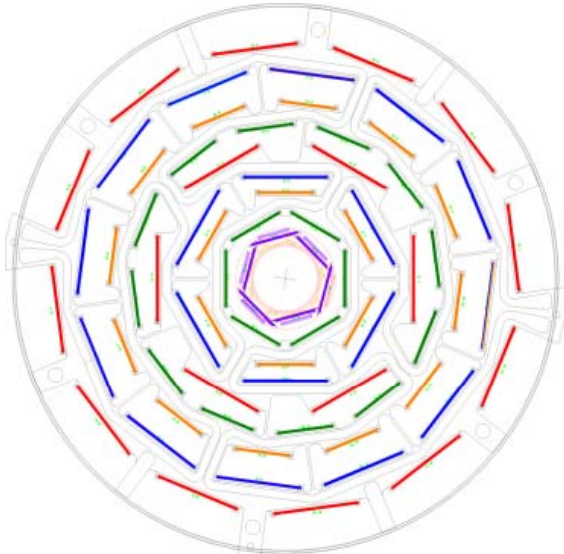
- b tagging
- lepton id
- Dijet mass resolution
- ...

Experiments work hard on improving the sensitivity.

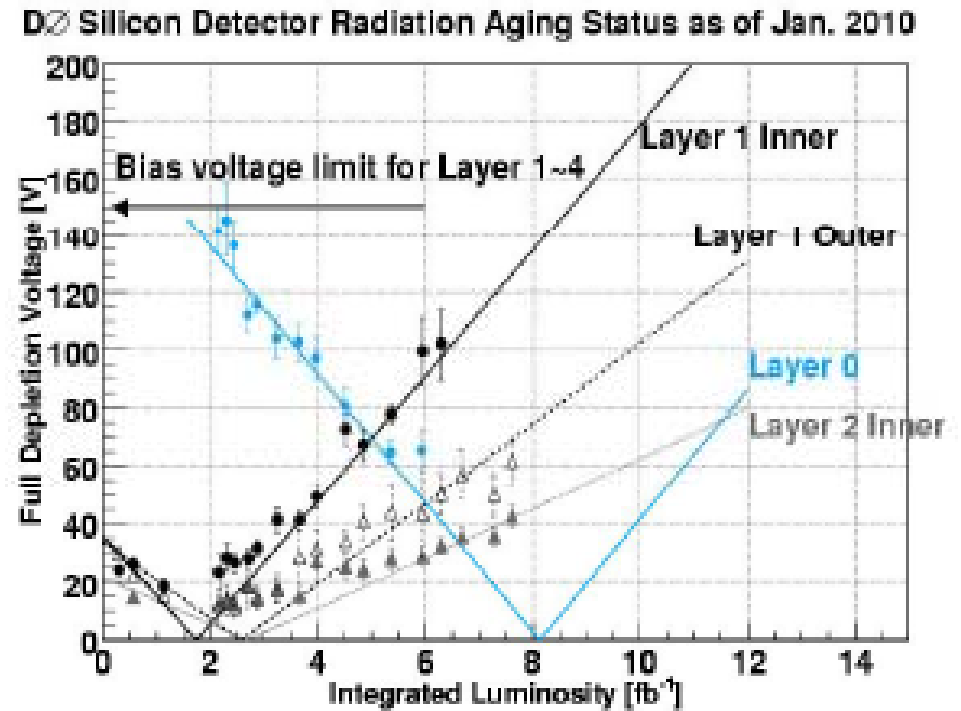
Even with improvements, we want to go beyond 10 fb⁻¹ to have highest probability for evidence



Tracker Lifetimes

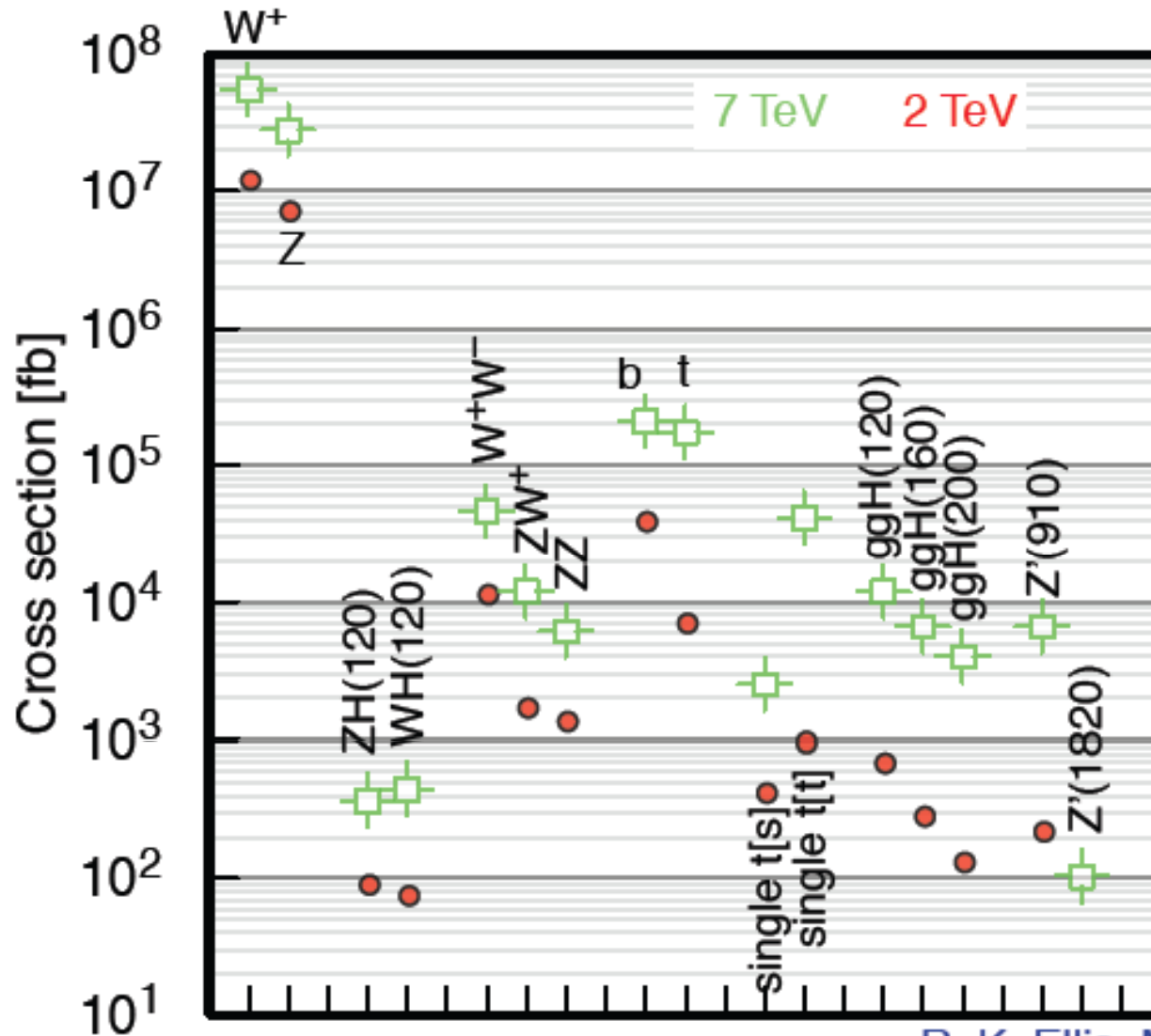


Addition of inner layer (L0) in 2006 to improve resolution and to compensate for anticipated radiation damages on Layer 1 essential for silicon tracking capability beyond 2011.



Central Fiber Tracker: Light yield expected to decrease slowly with time (radiation dose, ageing) – impact on performance when running significantly beyond 2011 is currently being assessed.

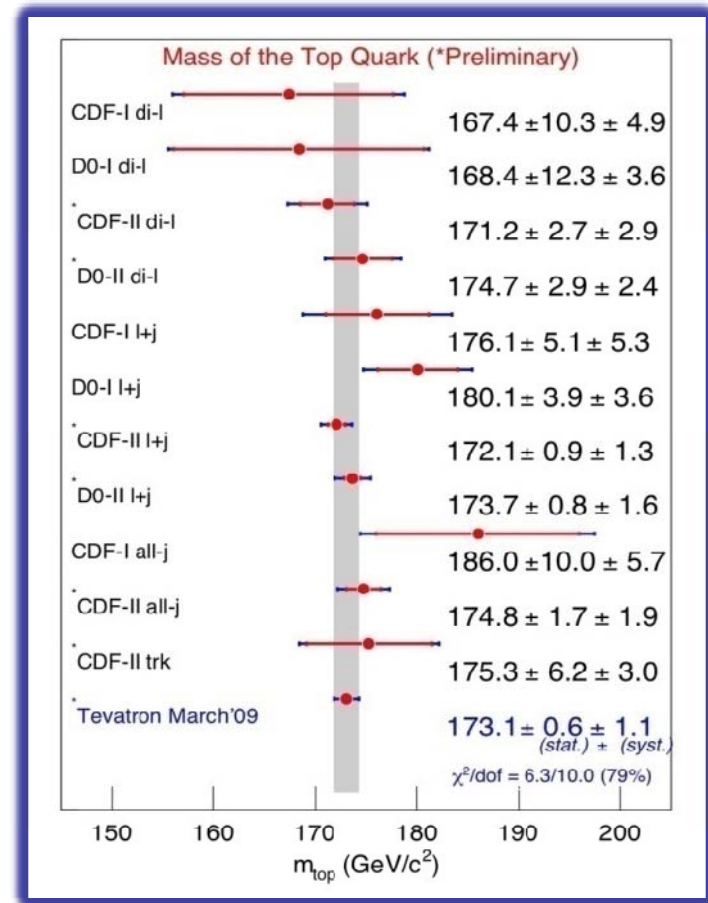
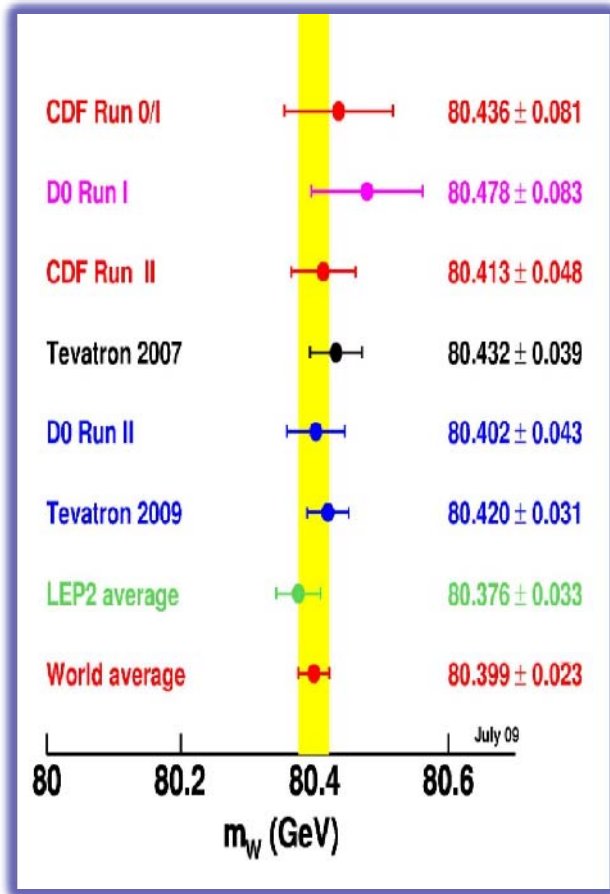
Complementarity



Similar size electroweak samples (top, W, Z) for $L(\text{LHC}) = 1 \text{ fb}^{-1}$
 $L(\text{Tevatron}) = 15 \text{ fb}^{-1}$

R. K. Ellis, MCFM

Future Legacy



Current Tevatron precision:
 m_W 0.04%

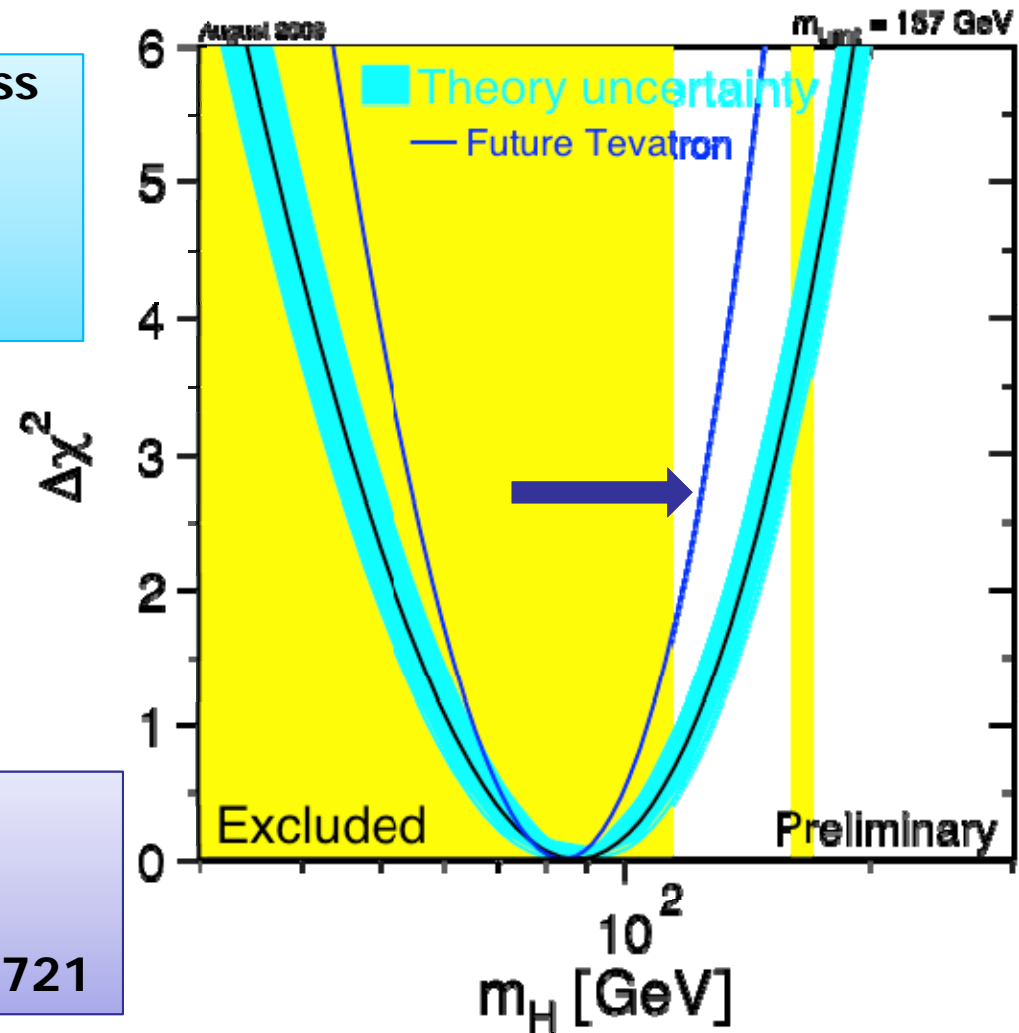
m_{top} 0.7%

Expect improvements (statistics + systematics) with larger data sets

Self-consistency of SM

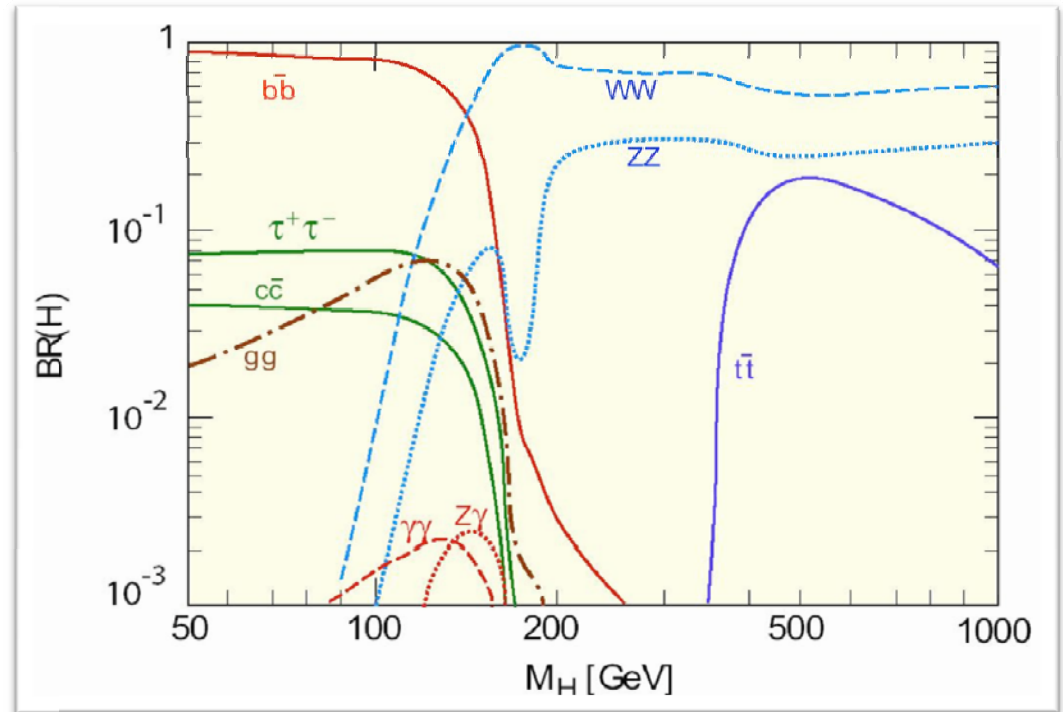
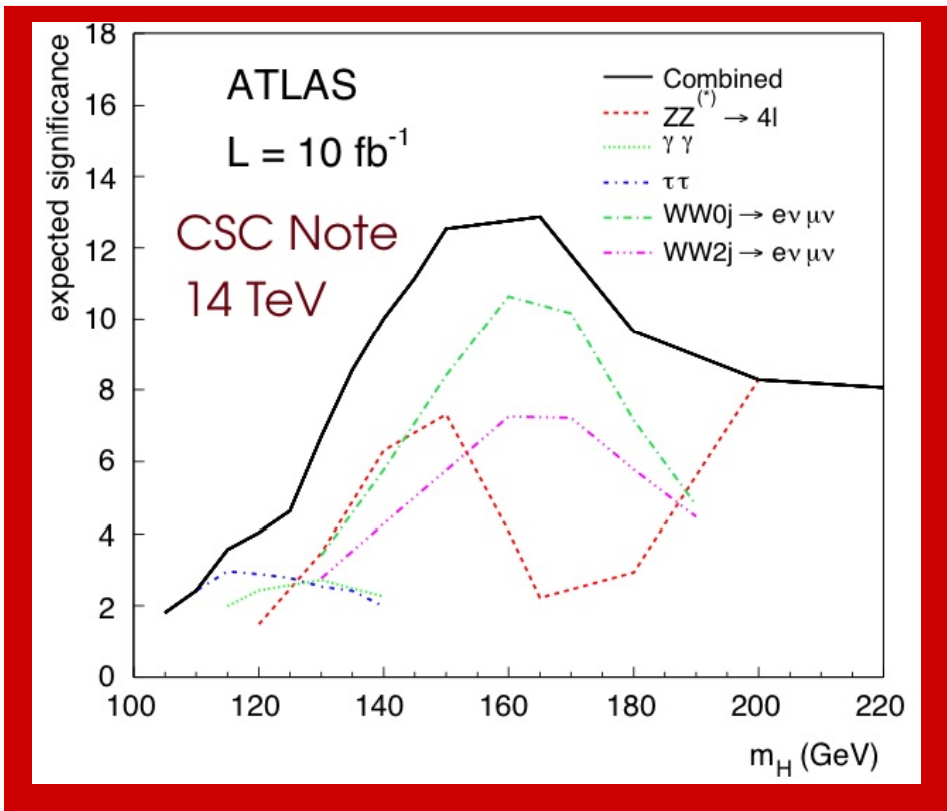
Precision of 1 GeV for the top mass and 15 MeV for W boson mass:

$m_H < 117$ GeV at 95% CL
for current minimum.



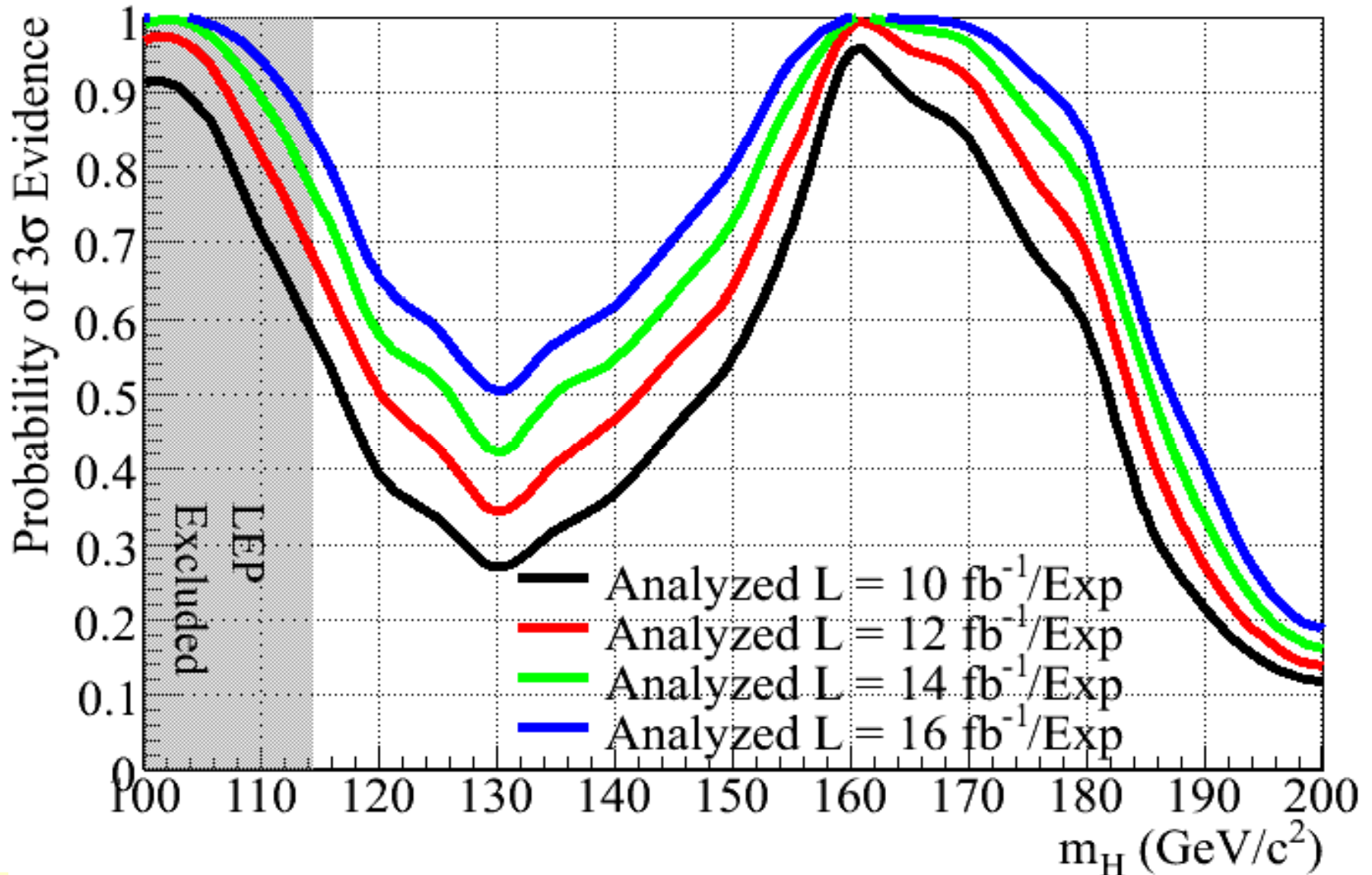
In addition, we will be able to cover a very significant part of the parameter space for SUSY Higgs boson, see Draper, Liu, Wagner, arxiv:0905:4721

The Nature of the SM Higgs



Without direct observation of Higgs decays into b jets, it is not possible to reach a definite conclusion about the EWSB mechanism.

Projections in Higgs Sensitivity



Using P5 plots we extended combined projected LHC Higgs sensitivity for 3 sigma evidence to luminosities above 10 fb^{-1}

> 80% 'a priori' probability to observe evidence for 115 GeV Higgs with 16 fb^{-1}

Beyond 2011

- Running the Tevatron for 3 more years accumulate 16 fb⁻¹.
- Finding evidence for a low mass Higgs boson in b decays is essential to understanding EWSB in the Standard Model.
- Complementarity – Future Legacy
- Currently assessing tracking performance beyond 2011.
- Ensuring sufficient manpower beyond 2011.
- **What about D0-France?**