

# News from the Overall Contacts

*Sven Heinemeyer, IFCA (CSIC, Santander)*

CERN, 05/2012

on behalf of Chiara Mariotti (CERN/Torino),  
Giampiero Passarino (Torino), Reisaburo Tanaka (LAL-Orsay)

## LHCHXSWG Overview

(from <https://twiki.cern.ch/twiki/bin/view/LHCPhysics/CrossSections>)

→ since questions came up (again)

In January 2010, a new joint effort for Higgs cross sections between ATLAS, CMS and theory community was announced and the new LHC wide working group has been created. The aim of this group is to **produce agreements on cross sections, branching ratios and pseudo-observables relevant to SM and MSSM Higgs boson(s), which will facilitate comparison and combination of results.** This will require the active collaboration of the leading theorists developing the tools with experimental collaborations.

In Spring 2012, the group has been restructured and new subgroups were added ... The overall contact persons from ATLAS, CMS and theory community and contact persons for subgroups have been appointed for 2-year mandate starting from April 1st, 2012. The contacts will report the progress to each Higgs working groups.

## LHCHXSWG Overview (II)

(from <https://twiki.cern.ch/twiki/bin/view/LHCPhysics/CrossSections>)

The group is an open forum and all interested parties are invited to contribute. The results posted are under the responsibility of the subgroup and of the overall contacts of LHC Higgs XS WG. Nevertheless ATLAS/CMS and the LHC Higgs XS WG respect the scientific value of original works performed outside the group.

ATLAS/CMS have sole responsibility on citing work done within the LHC Higgs XS WG or not, but do not guarantee that the actual numbers used in the analyses will include results which have been produced outside the LHC Higgs XS WG. One also should keep in mind that this group is not a forum for general discussion on Higgs physics. Unreleased data results from the collaborations will not be shown nor discussed in this group.

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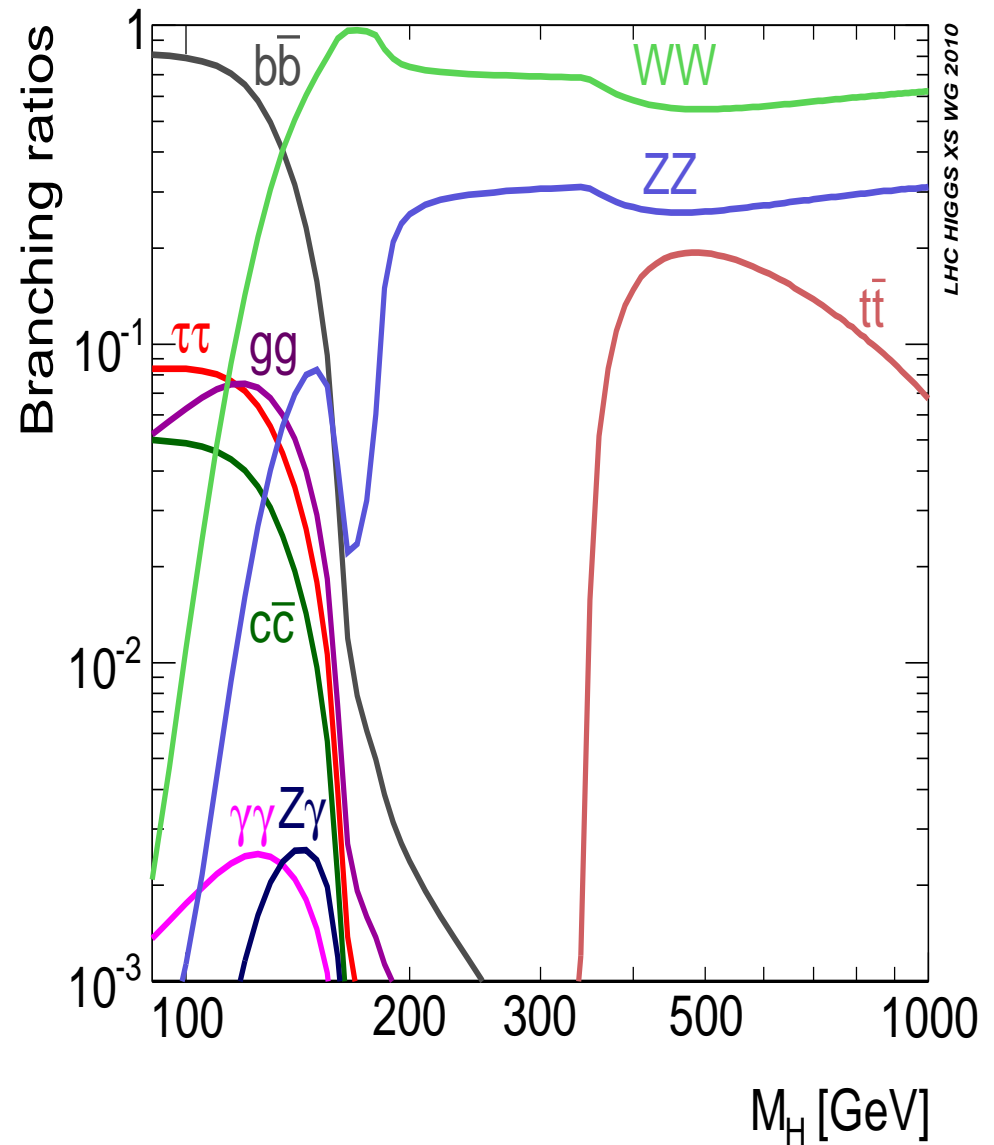
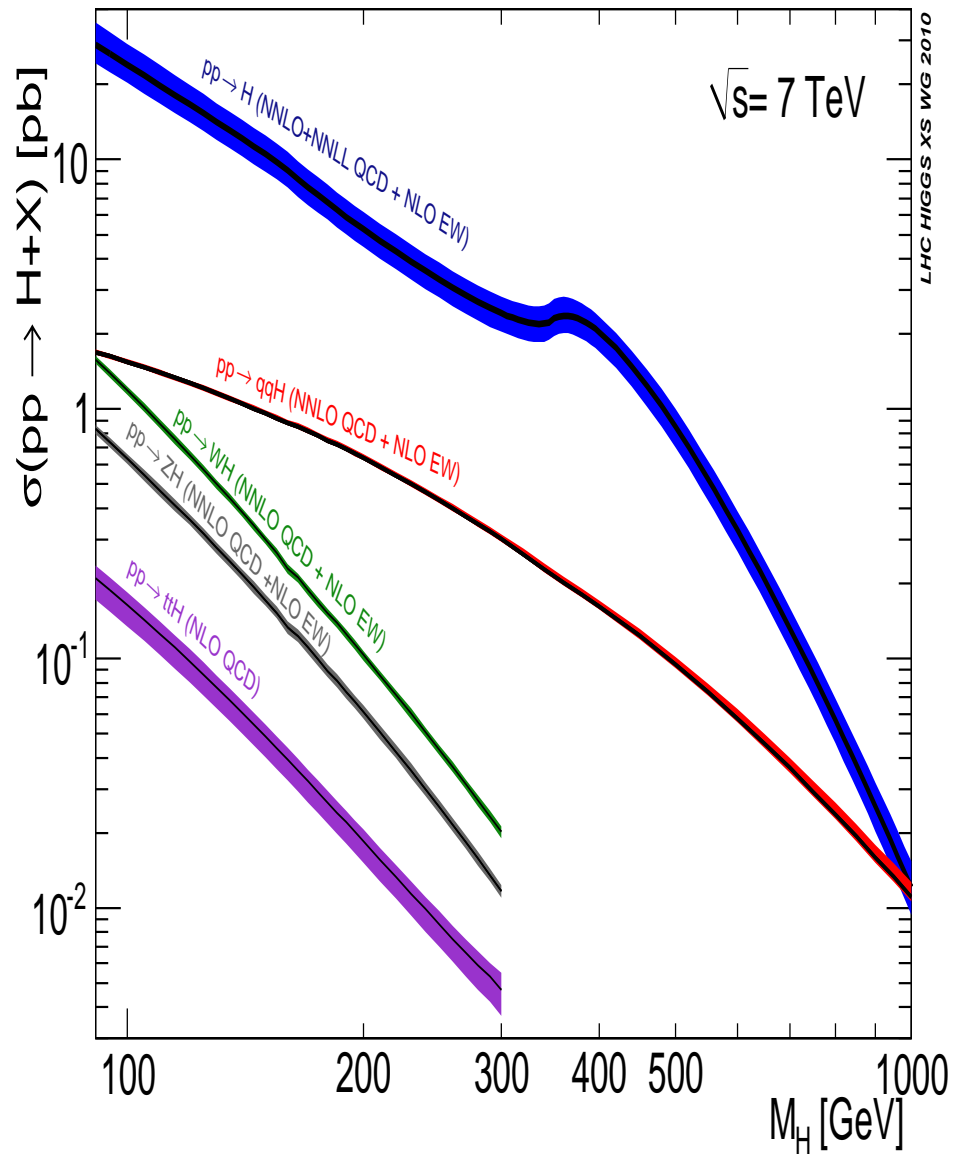
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⇒ Join and contribute to the overall effort! :-)

(mailing lists on the web page)

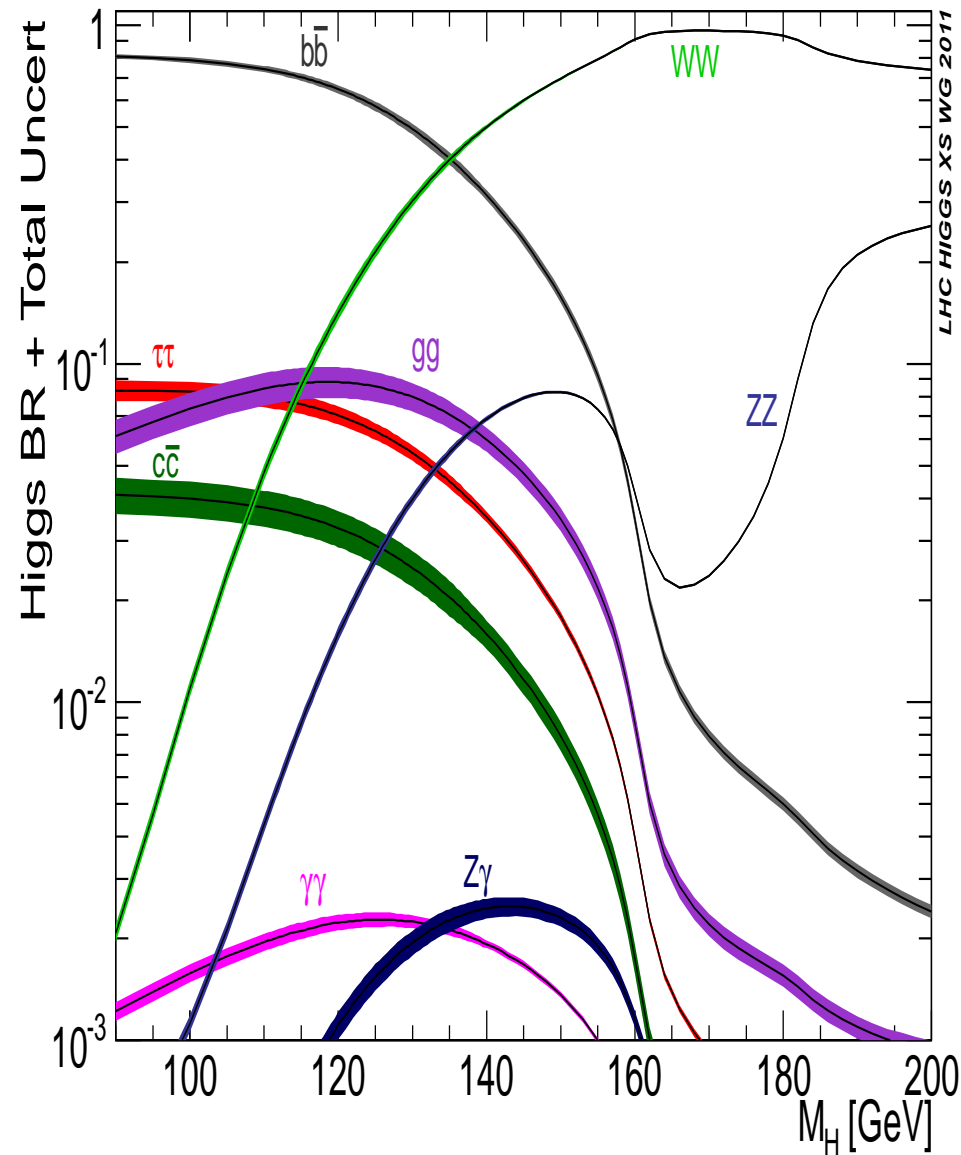
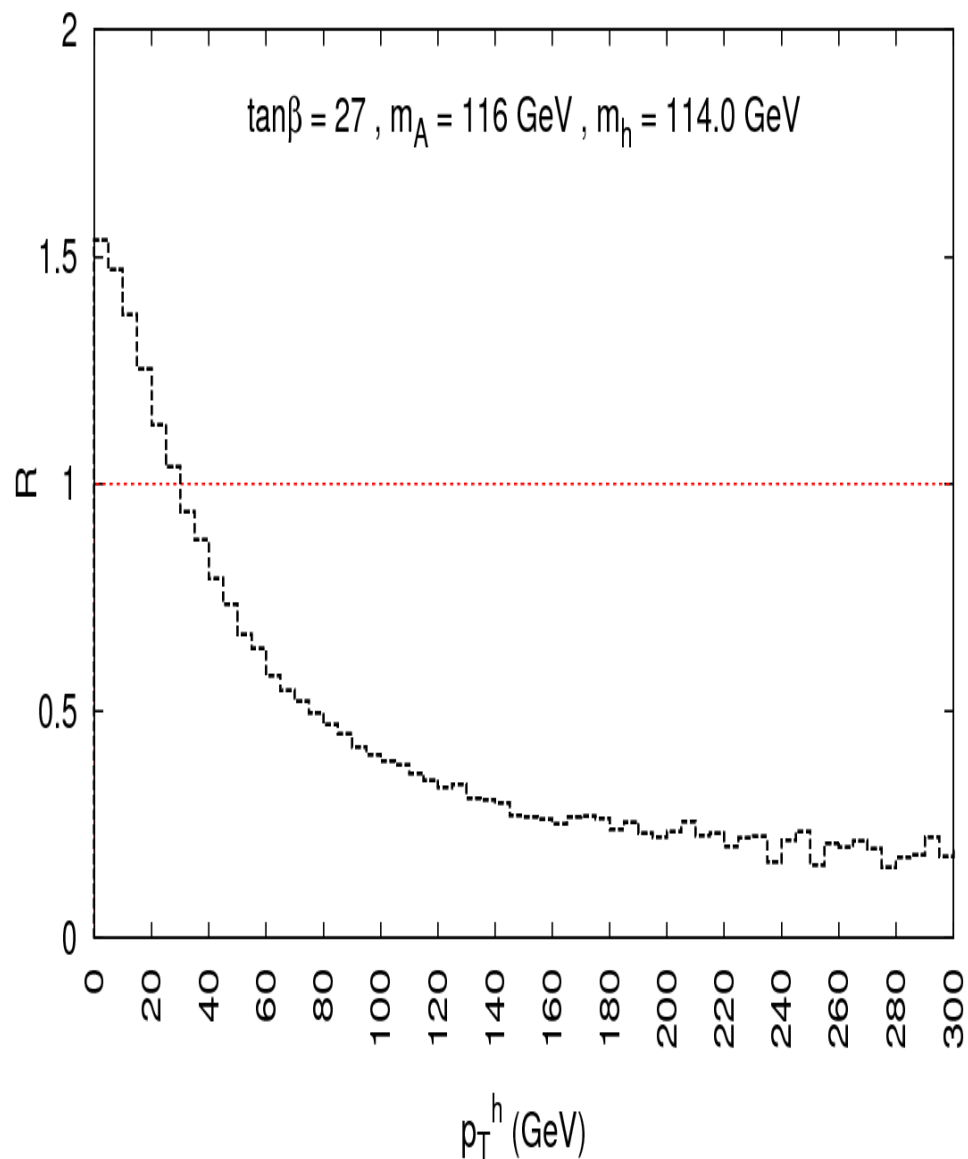
We should be proud of our achievements!

YR1: arXiv:1101.0593 [hep-ph] (149 citations)

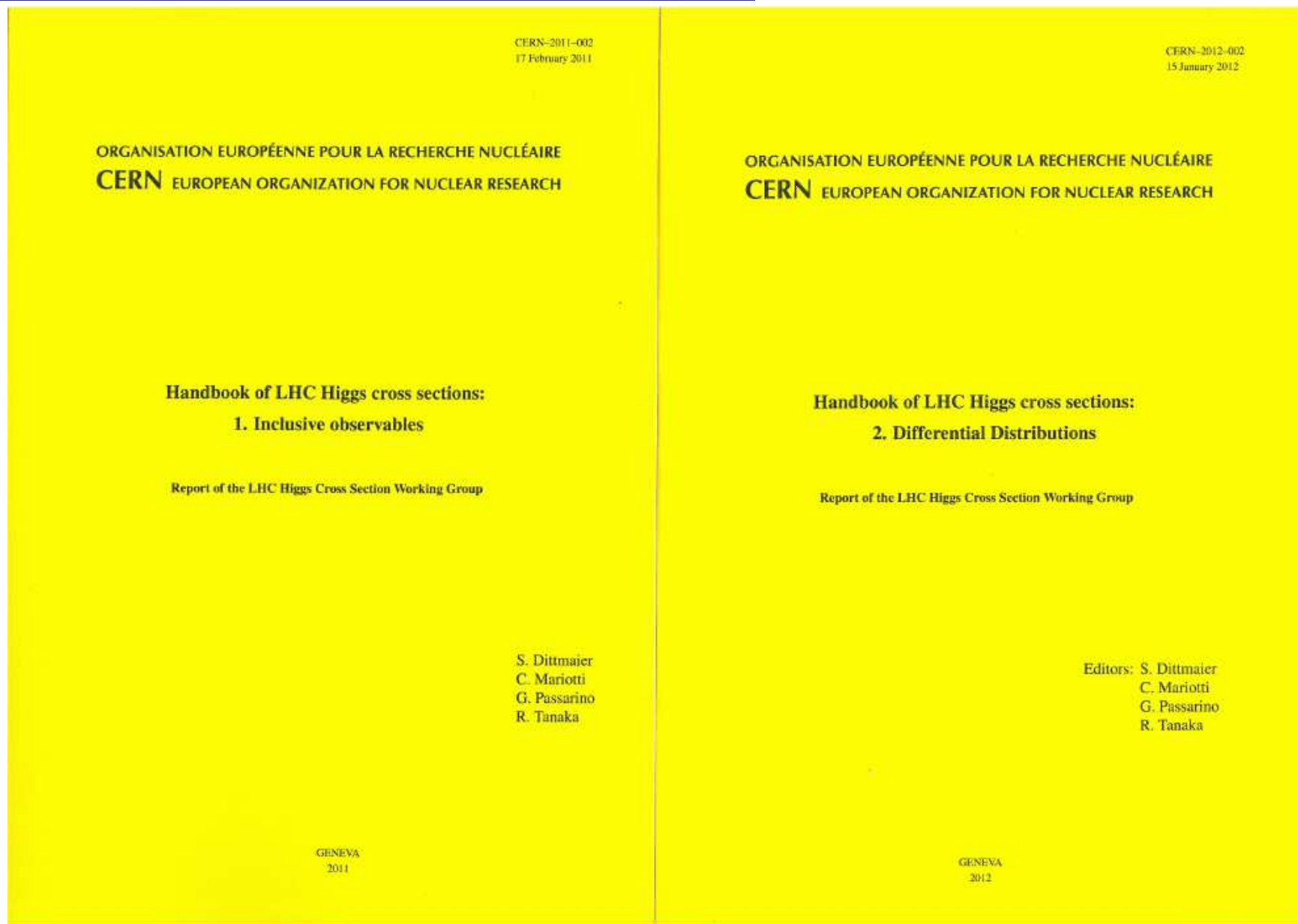


We should be proud of our achievements!

YR2: [arXiv:1201.3084 \[hep-ph\]](https://arxiv.org/abs/1201.3084) (21 citations)



## We should be proud of our achievements!



⇒ if you have not done so, pick up your copy!

Problem that appeared right after the achievements:

Several theorists got dumped from the mailing lists!

→ error from CERN IT!



## Problem that appeared right after the achievements:

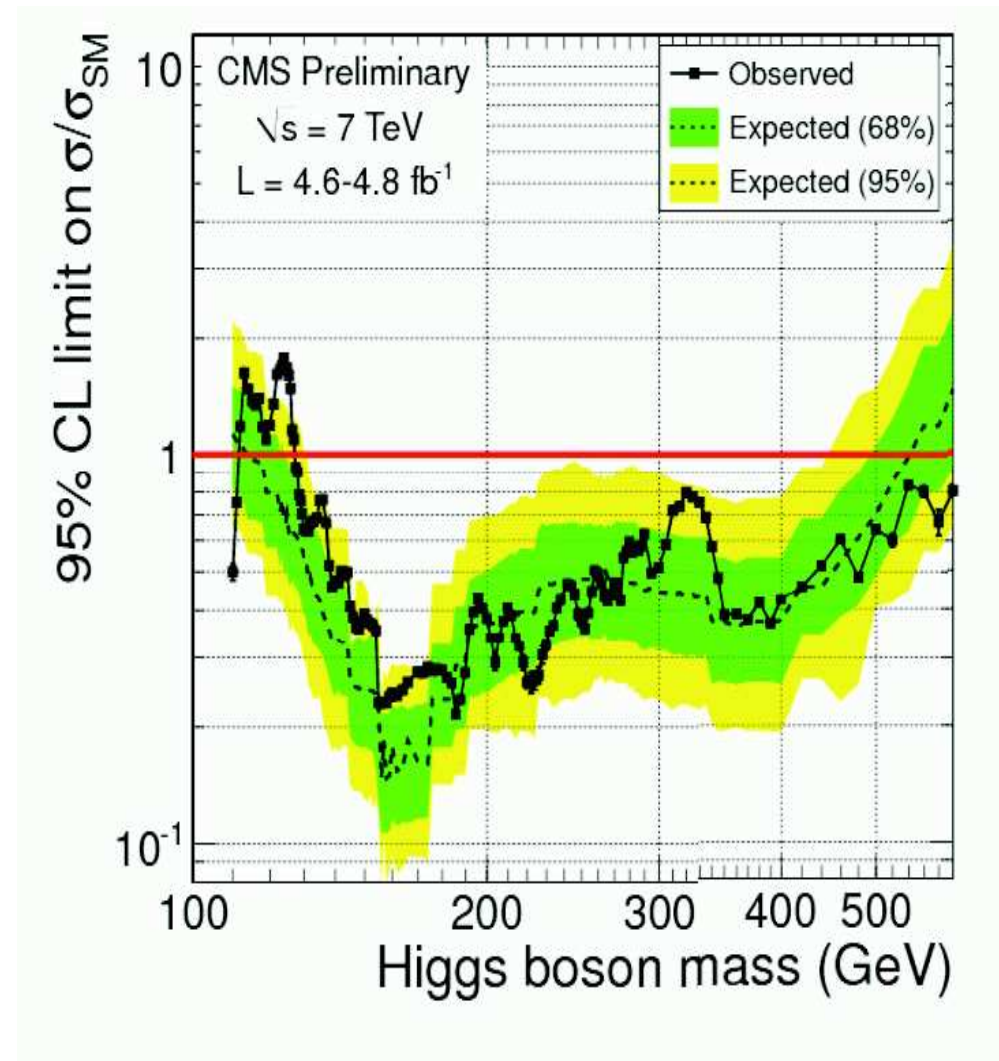
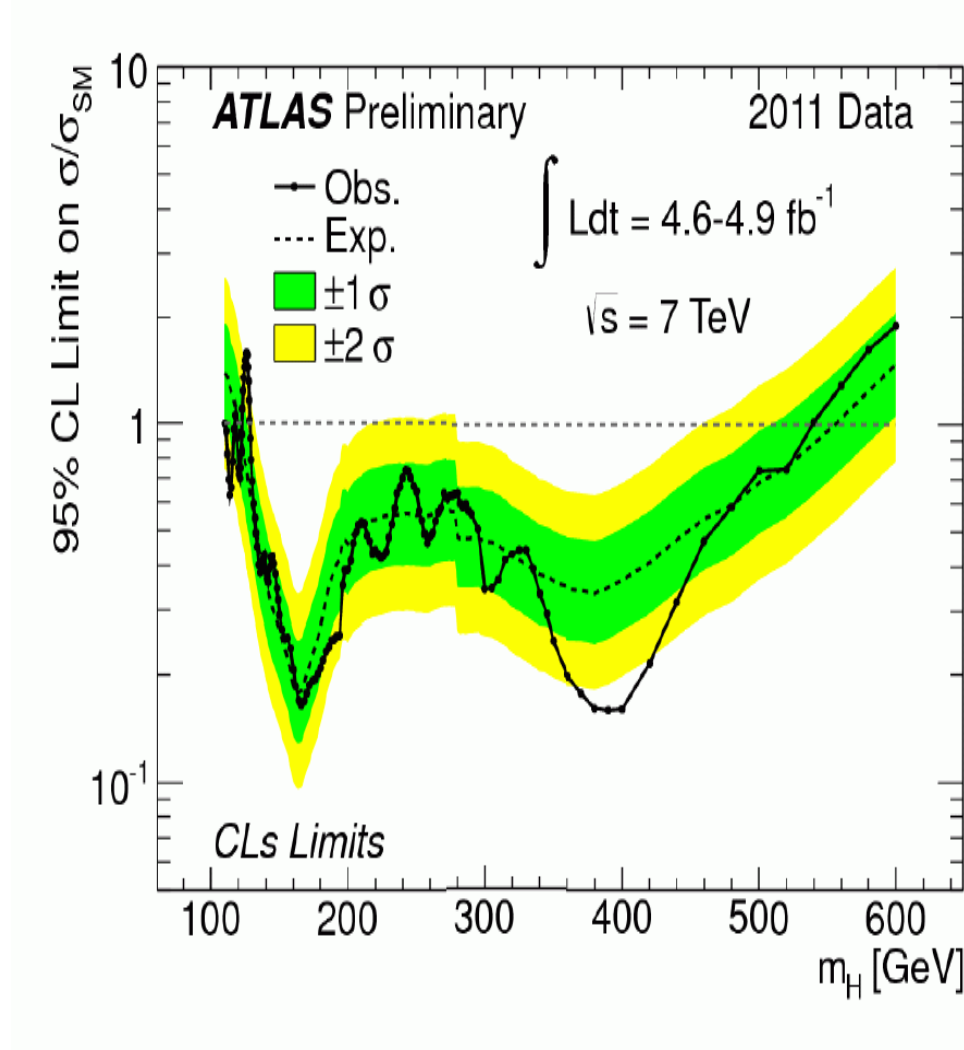
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If you were happy about unusual low email traffic, please let us know and we add you again (by hand).

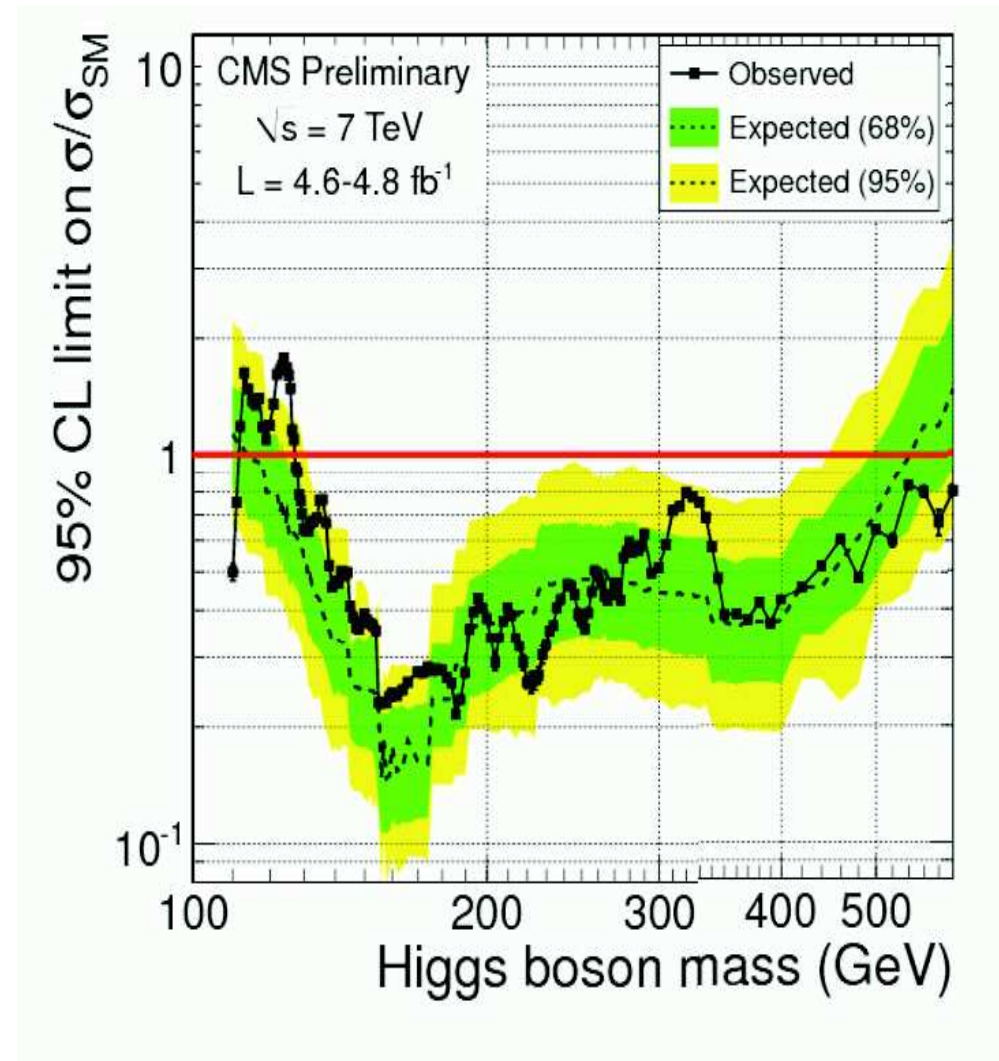
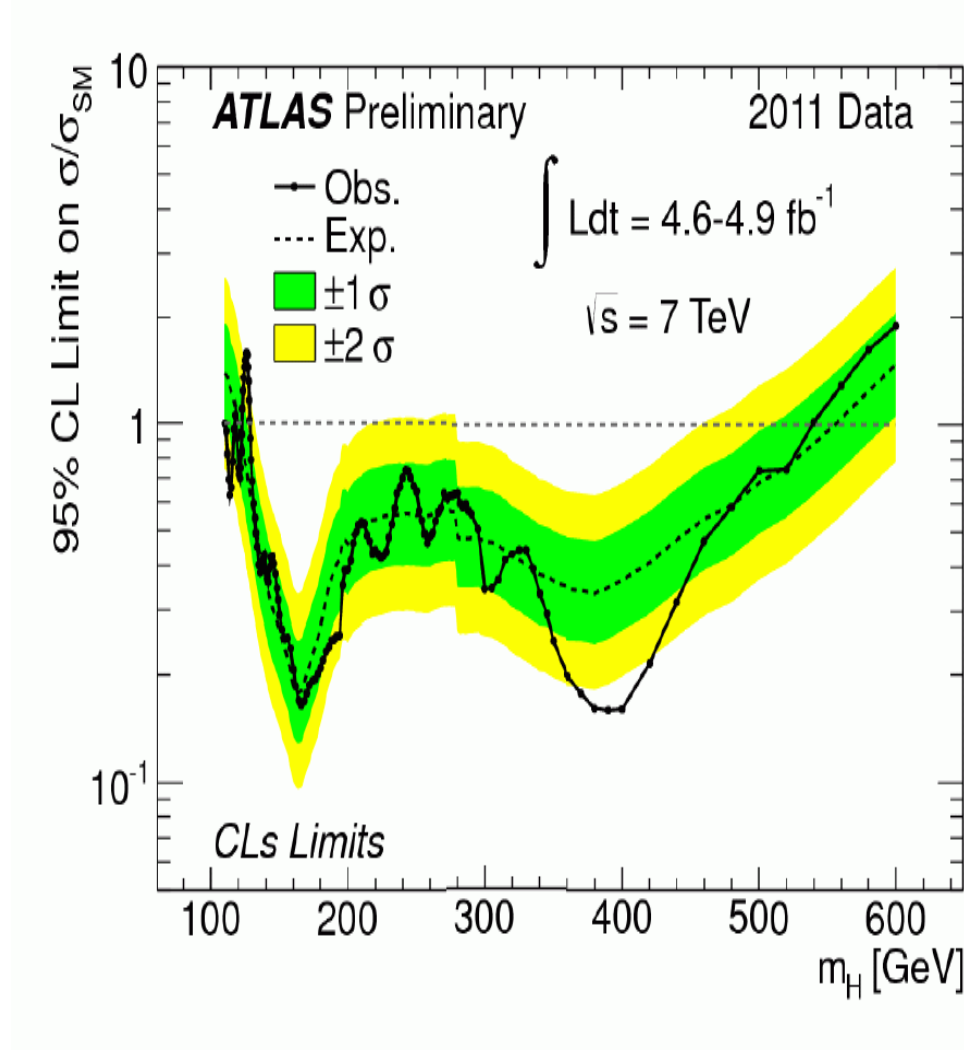
Many have been added already, but we may have overlooked someone . . .

## Data drives priorities!



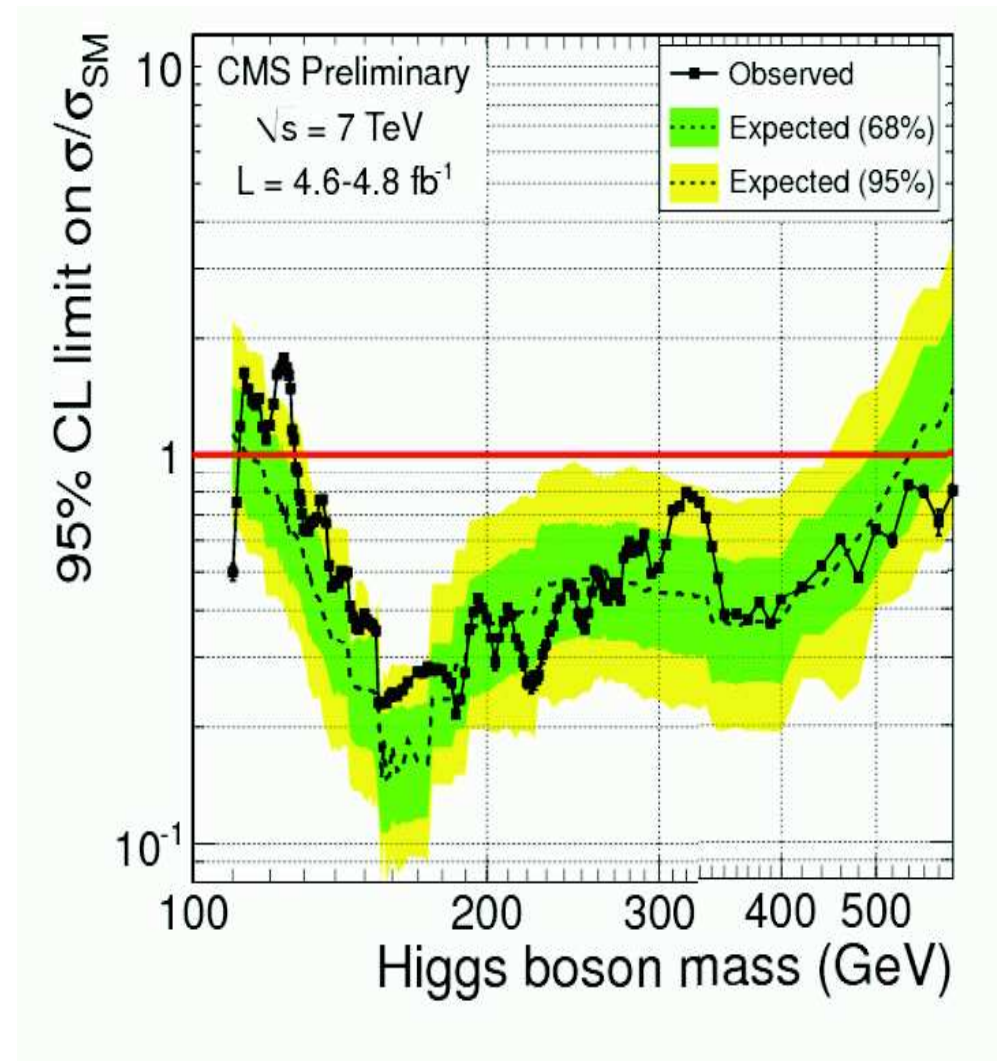
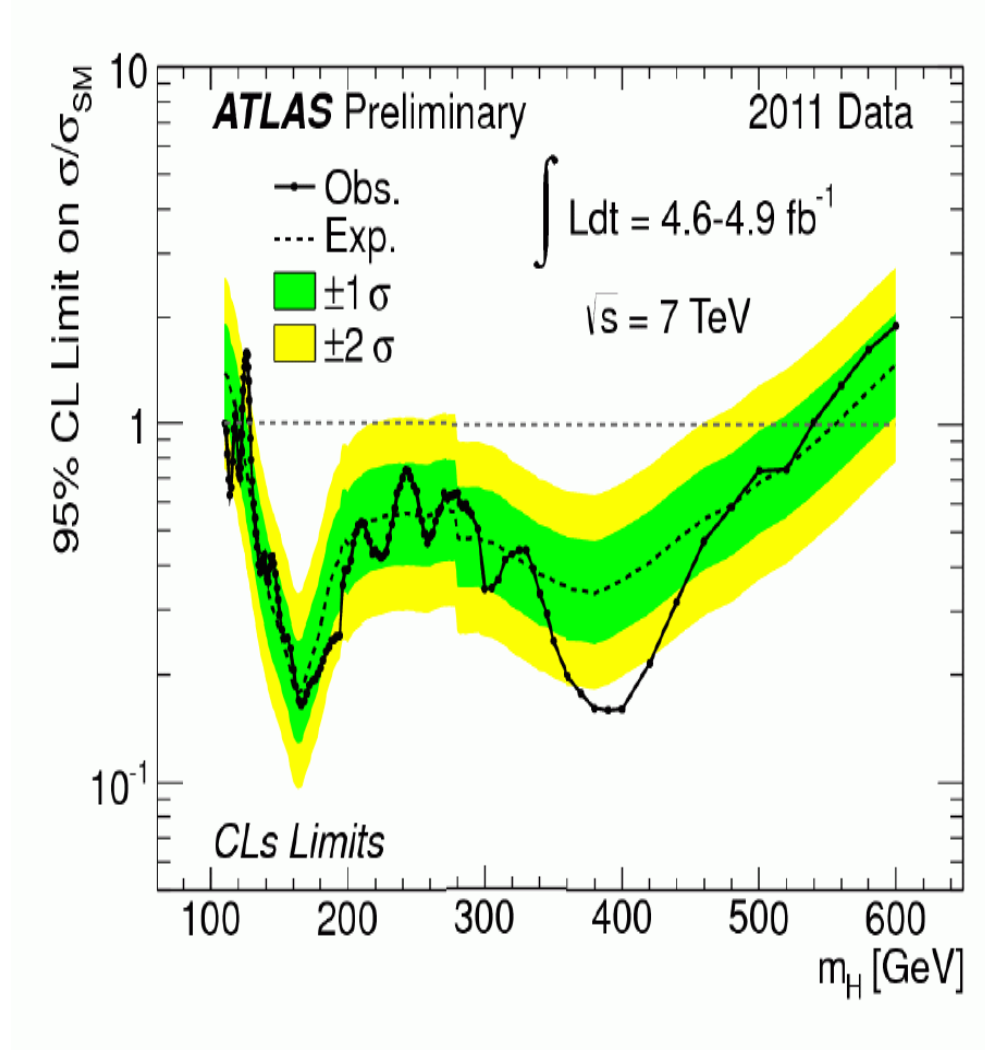
⇒ SM-like Higgs relevant only “around 125 GeV” or above  $\sim 500 \text{ GeV}$

## Data drives priorities!



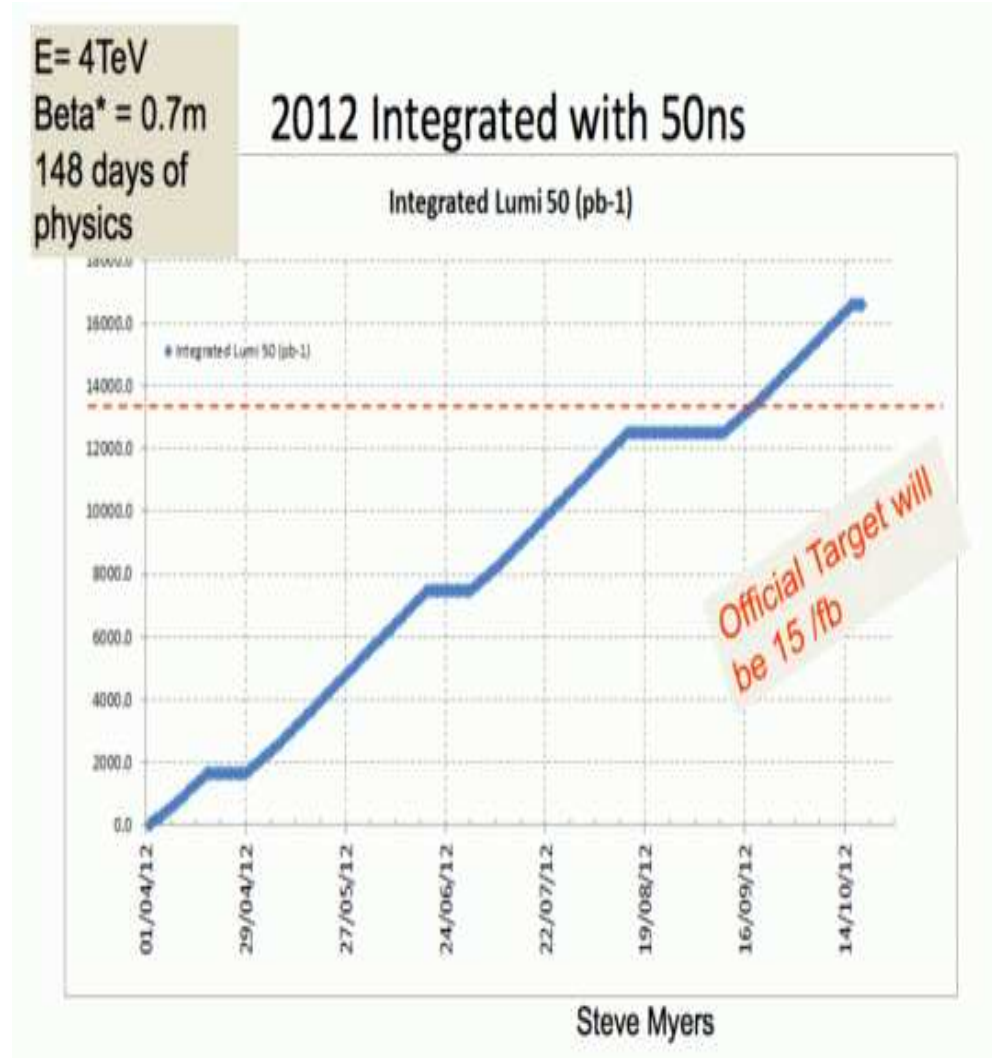
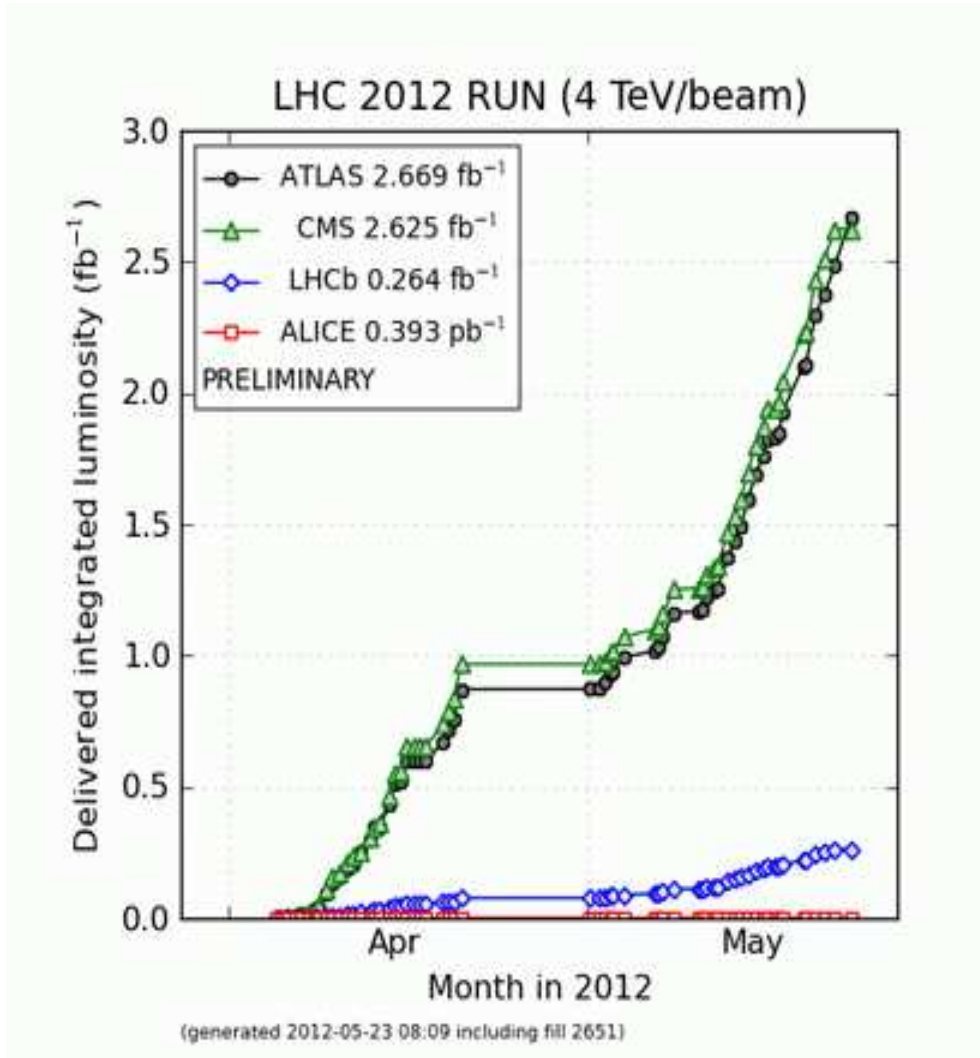
⇒ BSM physics for all masses, but also experimentally restricted

## Data drives priorities!



⇒ prepare property extraction around  $M_H \sim 125 \text{ GeV}$

# Expected data drives priorities!



ICHEP:  $\sim 5 \text{ fb}^{-1}$

End of 2012:  $\sim 15 \text{ fb}^{-1}$

## Priorities for 2013 (YR3):

- prepare for 8 TeV
- more on distributions?!
- prepare for property extraction
- improve MSSM and get it flexible
- prepare for heavy SM-like Higgs
- prepare for many B(MS)SM models ( $M_H = ?$ )
- make use of jets

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- prepare data for 33 TeV ⇒ ESPP



## The new group structure:

- to focus on **new/shifted** priorities
- removed “not so well” working structures
- kept most contact persons
- got some “**fresh blood**” :-)  
(ATLAS responsible for ATLAS, CMS responsible for CMS, ...)
- introduced some “**orthogonal**” structure

⇒ see **LoI** on our Twiki page

## The new group structure (I): XS groups

| Group           | Higgs decay                           | ATLAS                             | CMS  | THEORY                                  |  |                                       |  |
|-----------------|---------------------------------------|-----------------------------------|--|---|--|---------------------------------------|--|
| 1. <u>ggF</u>   | <u>yy, WW*, ZZ*</u>                   | <u>Biagio di Micco (Roma Tre)</u> | <u>Yanyan Gao (FNAL)</u>                                   | <u>Daniel de Florian (Buenos Aires)</u> | <u>Kirill Melnikov (Johns Hopkins)</u> | <u>Frank Petriello (Northwestern)</u> |  |
| 2. <u>VBF</u>   | <u><math>\pi</math>, yy, WW*, ZZ*</u> | <u>Daniela Rebutti (Pavia)</u>    | <u>Pietro Govoni (CERN)</u>                                | <u>Ansgar Denner (Würzburg)</u>         | <u>Carlo Oleari (Milano-Bicocca)</u>   |                                       |  |
| 3. <u>WH/ZH</u> | <u>bb</u>                             | <u>Giacinto Piacquadio (CERN)</u> | <u>Jim Olsen (Princeton)</u><br><u>Andrea Rizzi (Pisa)</u> | <u>Stefan Dittmaier (Freiburg)</u>      | <u>Giancarlo Ferrera (Milano)</u>      |                                       |  |
| 4. <u>ttH</u>   | <u>bb</u>                             | <u>Chris Potter (Oregon)</u>      | <u>Jim Olsen (Princeton)</u><br><u>Andrea Rizzi (Pisa)</u> | <u>Laura Reina (Florida)</u>            | <u>Michael Spira (PSI)</u>             |                                       |  |

- 8 TeV data! More on distributions?
- relevant decay modes associated? Any contact/connection yet?

## The new group structure (II): MSSM group

|               |                |                 |             |             |          |                |         |
|---------------|----------------|-----------------|-------------|-------------|----------|----------------|---------|
| <b>6.MSSM</b> | <b>Neutral</b> | Trevor Vickey   | Monica      | Robert      | Michael  | Pietro Slavich | Michael |
|               | <b>Charged</b> | (Witwatersrand) | Vazquez     | Harlander   | Krämer   | (LPTHE Paris)  | Spira   |
|               |                | Martin Flechl   | Acosta (IC) | (Wuppertal) | (Aachen) |                | (PSI)   |
|               |                | (Freiburg)      | Sami Lehti  |             |          |                |         |
|               |                |                 | (Helsinki)  |             |          |                |         |

- neutral and charged merged . . .
- . . . but more contacts (i.e. not less “work power” :-)
- contacts (may) keep their charge priority
- intrinsically more complicated than SM, but same level of predictions required

## The new group structure (III): BR group

|                                      |  |                         |                      |                        |                         |  |  |
|--------------------------------------|--|-------------------------|----------------------|------------------------|-------------------------|--|--|
| <b>8.</b><br><b>Branching ratios</b> |  | Daniela Rebutti (Pavia) | Ivica Puljak (Split) | Sven Heinemeyer (IFCA) | Alexander Mück (Aachen) |  |  |
|--------------------------------------|--|-------------------------|----------------------|------------------------|-------------------------|--|--|

- not much has changed (but “fresh blood” :-)
- mostly (B)MSSM work to do (same “complications” as for MSSM group)

## The new group structure (III): BR group

|                                      |  |                                |                             |                               |                                |  |  |
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## The new group structure (IV): “Support” groups

|                             |  |                                     |  |                                |                              |                                |                                     |
|-----------------------------|--|-------------------------------------|--|--------------------------------|------------------------------|--------------------------------|-------------------------------------|
| <b>10.</b><br><u>NLO MC</u> |  |                                     |  | <u>Stefano Frixione (CERN)</u> | <u>Frank Krauss (Durham)</u> | <u>Fabio Maltoni (Louvain)</u> | <u>Paolo Nason (Milano-Bicocca)</u> |
| <b>11.</b><br><u>PDF</u>    |  | <u>Joey Huston (Michigan State)</u> |  | <u>Stefano Forte (Milano)</u>  | <u>Robert Thorne (UCL)</u>   |                                |                                     |

- contact to PDF4LHC, MC issues

## The new “orthogonal” group structure (I): LM group

|                                    |            |  |   |                                |                                      |                             |  |
|------------------------------------|------------|--|---|--------------------------------|--------------------------------------|-----------------------------|--|
| <b>5. Light<br/>Mass<br/>Higgs</b> | <b>all</b> | Michael<br>Dührssen<br>(CERN) Markus<br>Schumacher<br>(Freiburg) | André<br>Tinoco<br>Mendes<br>(LIP)<br>Markus<br>Klute (MIT) | Ansgar<br>Denner<br>(Würzburg) | Massimiliano<br>Grazzini<br>(Zurich) | Georg<br>Weiglein<br>(DESY) |  |
|------------------------------------|------------|--|---|--------------------------------|--------------------------------------|-----------------------------|--|

- prepare **property extraction**
- recommendations/tools for the experimental analyses
- potentially requires input from all other groups
- issues that concern  $\sigma \times \text{BR}$

Extremely active group so far! :-)

## The new “orthogonal” group structure (II): BSM group

|                               |  |  |  |                              |                             |  |  |
|-------------------------------|--|--|--|------------------------------|-----------------------------|--|--|
| <b>7. Heavy Higgs and BSM</b> |  | Sara Diglio<br>(Melbourne)<br>Krisztian Peters<br>(CERN) | Sara Bolognesi<br>(Johns Hopkins)<br>Mario Kadastik<br>(NICPB Estonia) | Christophe Grojean<br>(CERN) | Heather Logan<br>(Carleton) |  |  |
|-------------------------------|--|--|--|------------------------------|-----------------------------|--|--|

- BMSSM models  $\Rightarrow$  priorities!?
- tbd: what can/should be done by MSSM/BR group (NMSSM, ...?)
- heavy SM-like Higgs
- general issues of large width

## The new “orthogonal” group structure (III): JET group

|                |  |                                     |   |  |   |  |  |
|----------------|--|-------------------------------------|---|--|---|--|--|
| <b>9. Jets</b> |  | <u>Bruce Mellado</u><br>(Wisconsin) | <u>Daniele Del</u><br><u>Re (Roma</u><br>1) | <u>Gavin</u><br><u>Salam</u><br>(CERN) | <u>Frank</u><br><u>Tackmann</u><br>(DESY) |  |  |
|----------------|--|-------------------------------------|---|--|---|--|--|

⇒ most recent “addition

- clearly connects to most other groups
- jet experts needed for many decay modes  
⇒ “center for jet related issues”
- jet-bin uncertainties (BNL accord . . .)
- treatment of boosted Higgs
- . . .



It's a lot of work ...



... but acting as a team we can make it !

# STEFAN: THANKS AND CHEERS!



## Organizational matters:

### coffee break:

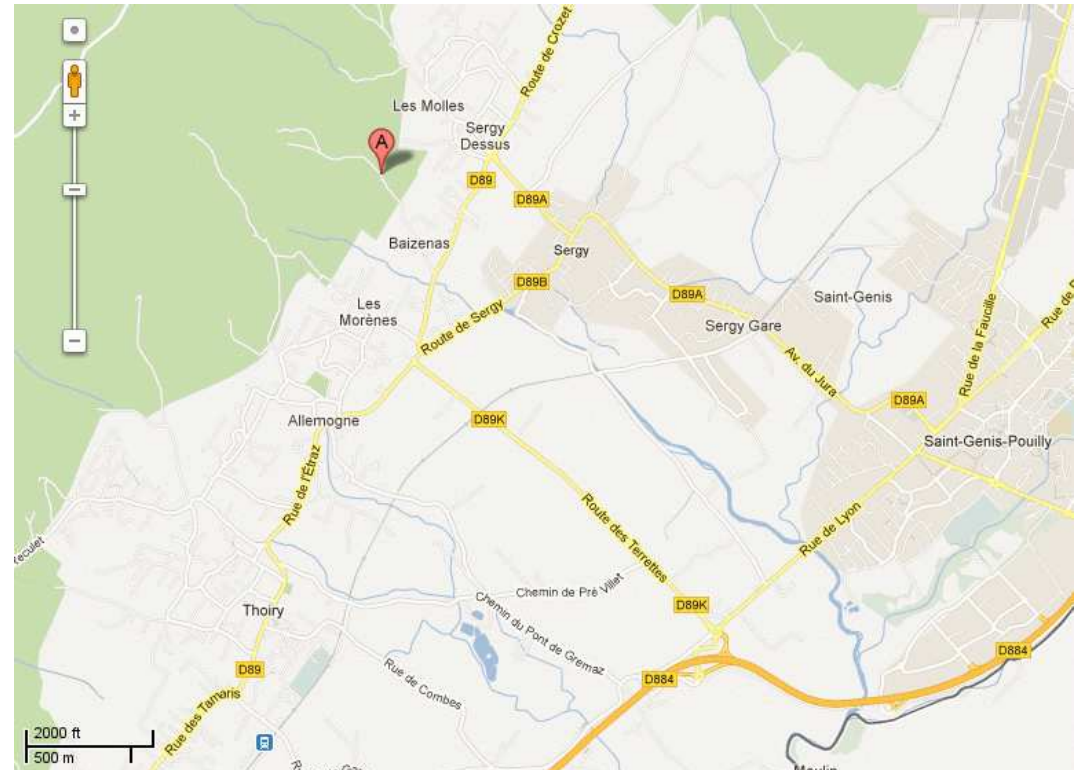
- cookies and soft drinks outside the conference room
- coffee in B40 or Resto 1

### dinner:

- meet at 19.00h in the B40 parking lot ⇒ car-pooling
- ⇒ **bring 35 Euro cash!** (or more if you want to drink more ;-)

### address:

Bergerie de Baisenz  
500 chem Baizenas  
01710 THOIRY



## Chiara's description:

From cern exit and of left towards Saint Genis.

At the Big roundabout take the third exit, i.e. go left towards Lyon, Bellegarde.

Take the first exit "call Sergy, Saint Genis".

At the exit there is a roundabout. Go straight (take the second exit) leaving the Holiday Inn to your right.

Go straight towards the Jura mountain.

At the end of the road (after having crossed the railway), there is a T cross.

Go right.

50 meters after go left, direction GEX.

Then about 100 m after take the second road on your left. There is a Panel indicating the "Bergerie".

Go up until the paved road ends. Continue and you will find the bergerie on your right. You can park there.

Chiara's map:

