

# Weekly report

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**10-11-2015**

**IHEP**

# HH combination paper is published!

2

**Paper Final Publication**

Referee Report On2015/09/24

Journal Acceptance Date2015/10/13

Proofs On2015/10/23

Final Journal Publication

[Phys. Rev. D 92, 092004 \(2015\)](#)

[Inspire](#)

[DOI:10.1103/PhysRevD.92.092004](#)

PGCPCPubEdB

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**Phys. Rev. D 92, 092004**

Published online on2015/11/05

PGCPCPubEdB

<https://atglance.web.cern.ch/atglance/analysis/detailAnalysis.php?readonly=true&id=4783>

PHYSICAL REVIEW D

particles, fields, gravitation, and cosmology

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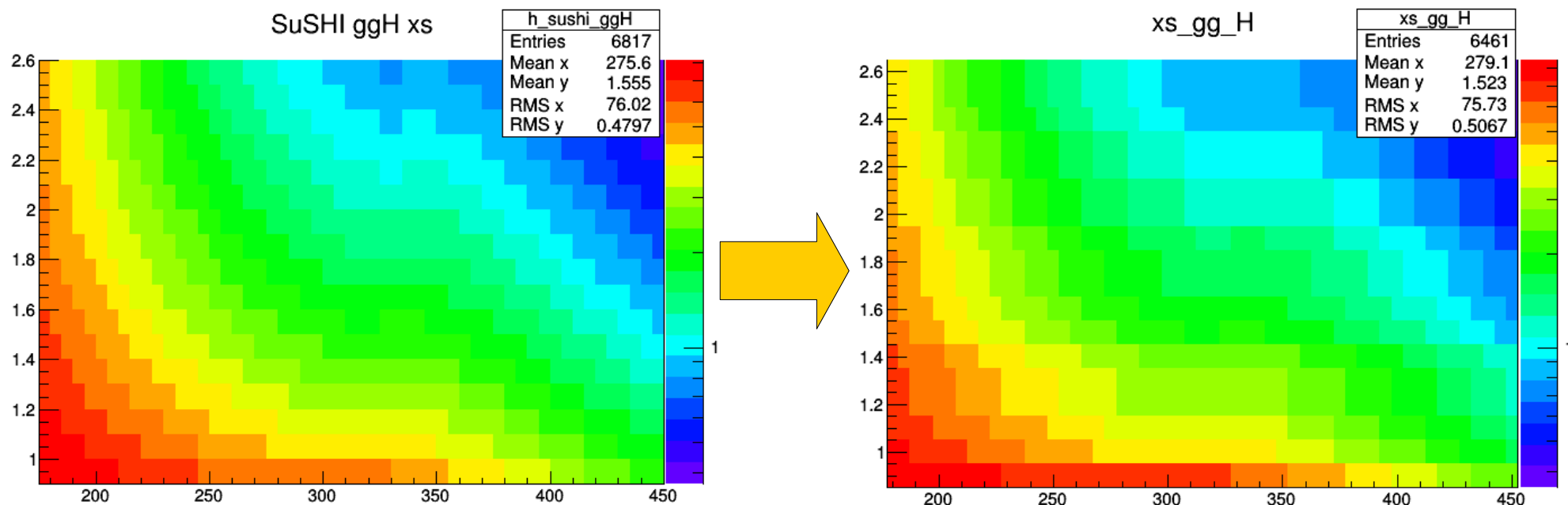
Searches for Higgs boson pair production in the  $hh \rightarrow bb\tau\tau$ ,  $\gamma\gamma WW^*$ ,  $\gamma\gamma bb$ ,  $bbbb$  channels with the ATLAS detector

G. Aad *et al.* (ATLAS Collaboration)

Phys. Rev. D **92**, 092004 – Published 5 November 2015

# HH combination exclusion plots

- Felix just release updated low-tb-high calculations after our publication is out ...
- Ill-timed checks are going on
- The difference are in xs mostly and affects only a bit; Our results are slightly conservative and should be fine



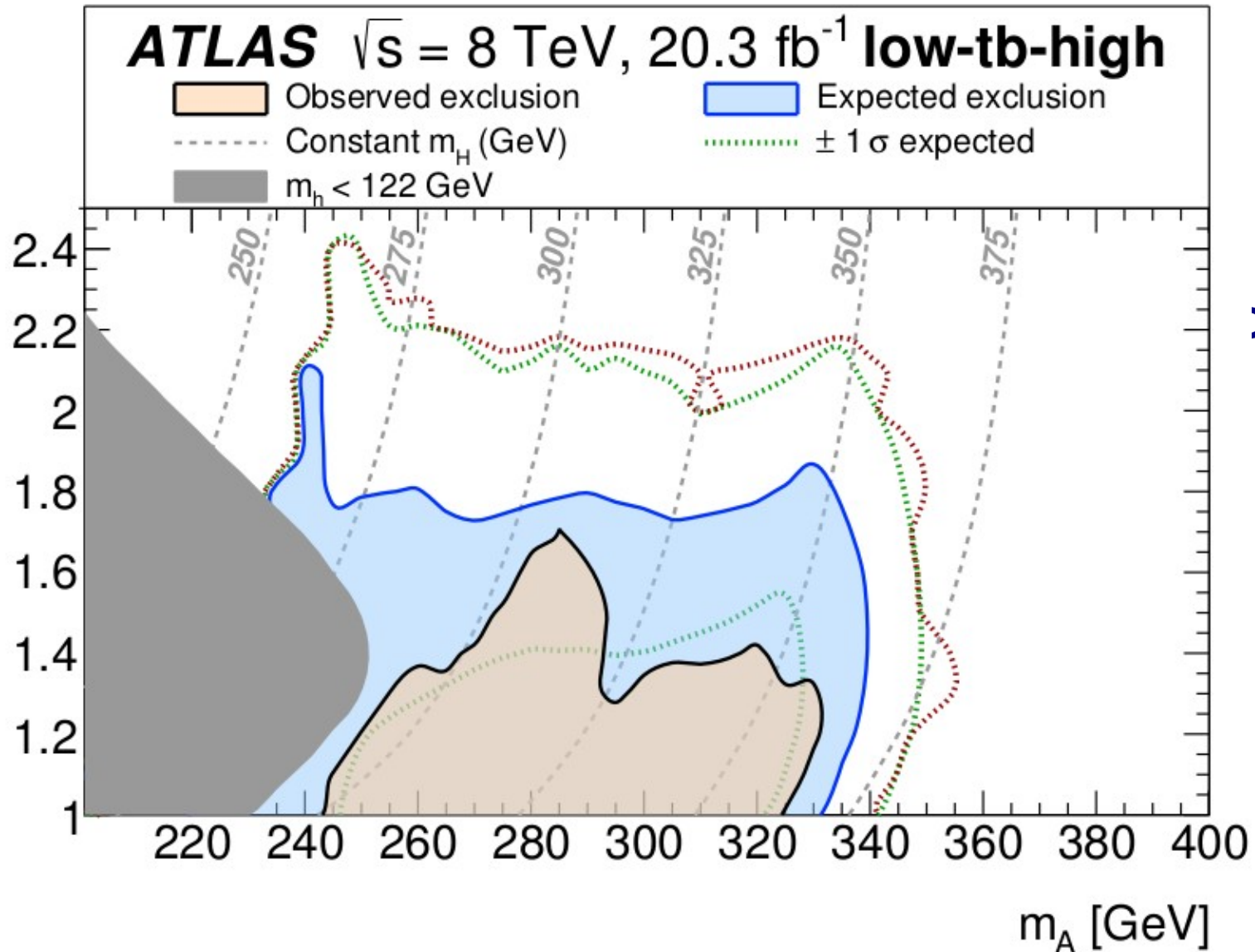
# HH combination exclusion plots

- Felix just release updated low-tb-high calculations

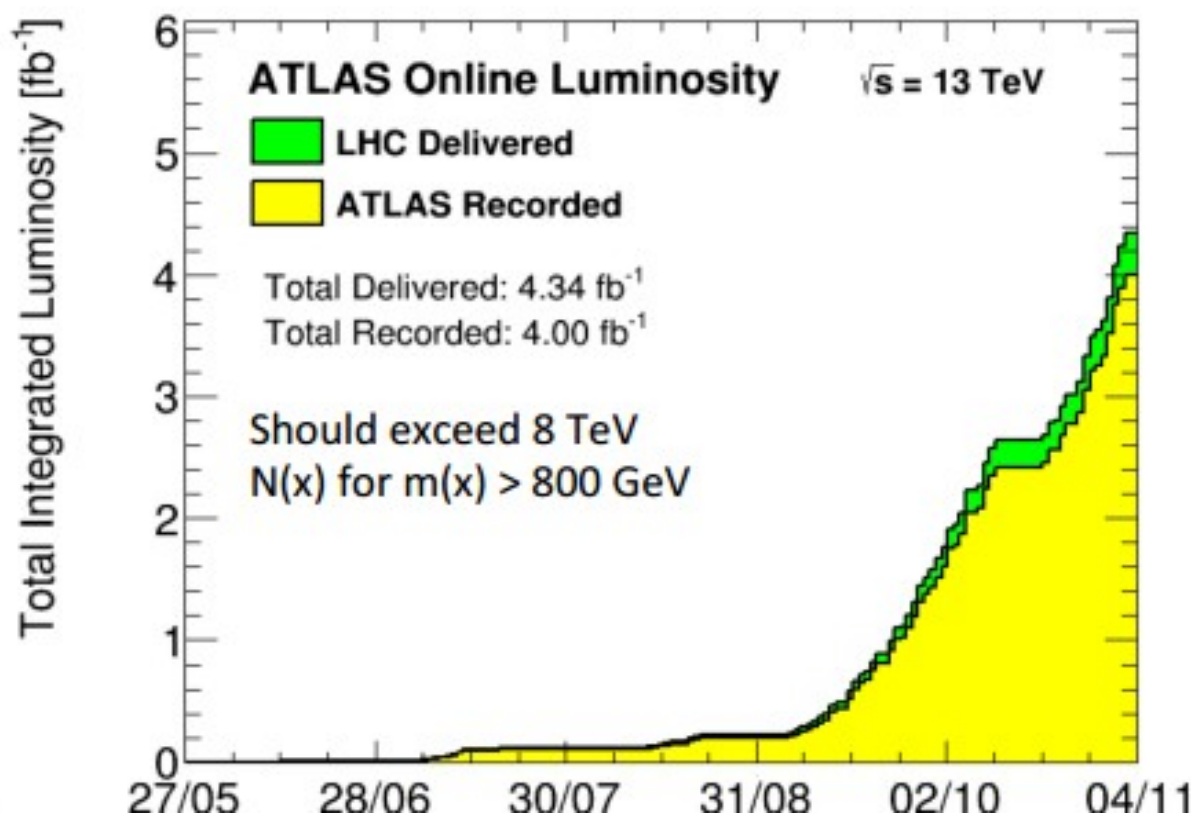
a

II

•  $T_{b\bar{b}} \tan\beta$



a  
ould



- Run 2: Finished 2015 data taking with a nice, round  $4 \text{ fb}^{-1}$ !
  - GRL available for  $2.67 \text{ fb}^{-1}$  (w/o IBL)\*
  - Likely to have full dataset derivations + GRL by 12<sup>th</sup> Nov

# MC summary in HBSM

- As part of MC contact mandate, a summary on sample we requested so far is presented
  - **Recommendations**, summary and useful links
    - <https://twiki.cern.ch/twiki/bin/view/AtlasProtected/HiggsBSMrunIIMC>
  - **PMG** recommendations on parameters
    - <https://twiki.cern.ch/twiki/bin/view/AtlasProtected/McProductionCommonParametersMC15>
  - 25ns sample requests cover all analyses and are almost done at the current stage
  - The **MC15b** requested samples will start soon, expecting 500-700M events in ~2 weeks
    - <https://docs.google.com/spreadsheets/d/1J0WBncCgROvmplWNzJglnP1O7FO-qpDPxDXFpVzu1LM/edit#gid=1493282412>
  - This talk aims to summarizing what we have and what are missing for 2015



# Additional Neutral Higgs (to bosons)

|                               |  |                      |
|-------------------------------|--|----------------------|
| hh->bbyy                      | 50ns, 25ns;<br>nonres, res; bkg; width | done                 |
| hh->bbww                      | 25ns; nonres, res                      | done                 |
| hh->bba $\tau\tau$            | 25ns; nonres, res                      | running              |
| hh->wwyy                      | 25ns; nonres; bkg                      | done; request<br>bkg |
| hh->bbbb                      | 25ns; nonres                           | done                 |
| hh->yy $\tau\tau$             | 25ns; nonres                           | done                 |
| hh->wwww                      | 25ns                                   | to-do                |
| A->Zh ll/vv bb<br>(Hgg group) | 50ns, 25ns                             | done                 |

# Additional Neutral Higgs (to bosons)

There are still several channels  
wwyy bbbb yytautau etc.  
**missing resonance** samples.

We have a private NLO model for res,  
which needs to go back to  
MG5\_aMC@NLO 2.3.3  
Passed the model to PMG,  
hope to generate NLO res for all channels soon

A→Zh ll/vv bb  
(Hgg group)

50ns, 25ns

done



# Additional Neutral Higgs (to fermions)

|                 |   |         |
|-----------------|---|---------|
| MSSM ggF tautau | 50ns, 25ns  | done    |
| MSSM bbA tautau | 50ns, 25ns<br>(NLO, negative weights, AFII,<br>0+ priority; LO in parallel) | done    |
| MSSM bbA mumu   | 25ns  | running |
| MC12 A/H ttbar  | 8TeV  | done    |

## Charged BSM Higgs

|                       |                       |   |
|-----------------------|-----------------------|---|
| H+ taunu high mass    | 50ns, 25ns (AFII X10) | done; AFII<br>(stuck,<br>investigating) |
| H+ taunu intermediate | 25ns                  | done                                    |
| H+ tb high mass       | 25ns                  | done                                    |

## Exotic Higgs decays with no MET

H->aa

25ns

done

## Rare and other exotic Higgs decays

JpsiGamma  
PhiGamma

25ns

done