Weekly report IHEP

Xiaohu SUN

--- --- --- --- ---

11-08-2015

IHEP

CDS entry
[wwyy]https://cds.cern.ch/record/1967498
[bbττ]https://cds.cern.ch/record/1967500
[combination]https://cds.cern.ch/record/1984111/
[paper draft]https://cds.cern.ch/record/2008753/

ATLAS weekly
https://indico.cern.ch/event/434823/
Open presentation
https://indico.cern.ch/event/436601/

STATUS – HH combination

- **CDS entry**
  - **[wwyy]https://cds.cern.ch/record/1967498**
  - **[bbττ]https://cds.cern.ch/record/1967500**
  - **[combination]https://cds.cern.ch/record/1984111/**
  - **[paper draft]https://cds.cern.ch/record/2008753/**
- In ATLAS 1st circulation for ~ two weeks
- Answered questions and implemented suggestions
- ATLAS weekly 4' report – Keita
  - **https://indico.cern.ch/event/434823/**
- Open presentation – Xiaohu (Analysis), Bill (CDS comments)
  - **https://indico.cern.ch/event/436601/**

STATUS – major updates after 1st circul

- Add 600GeV high mass combination in syst table

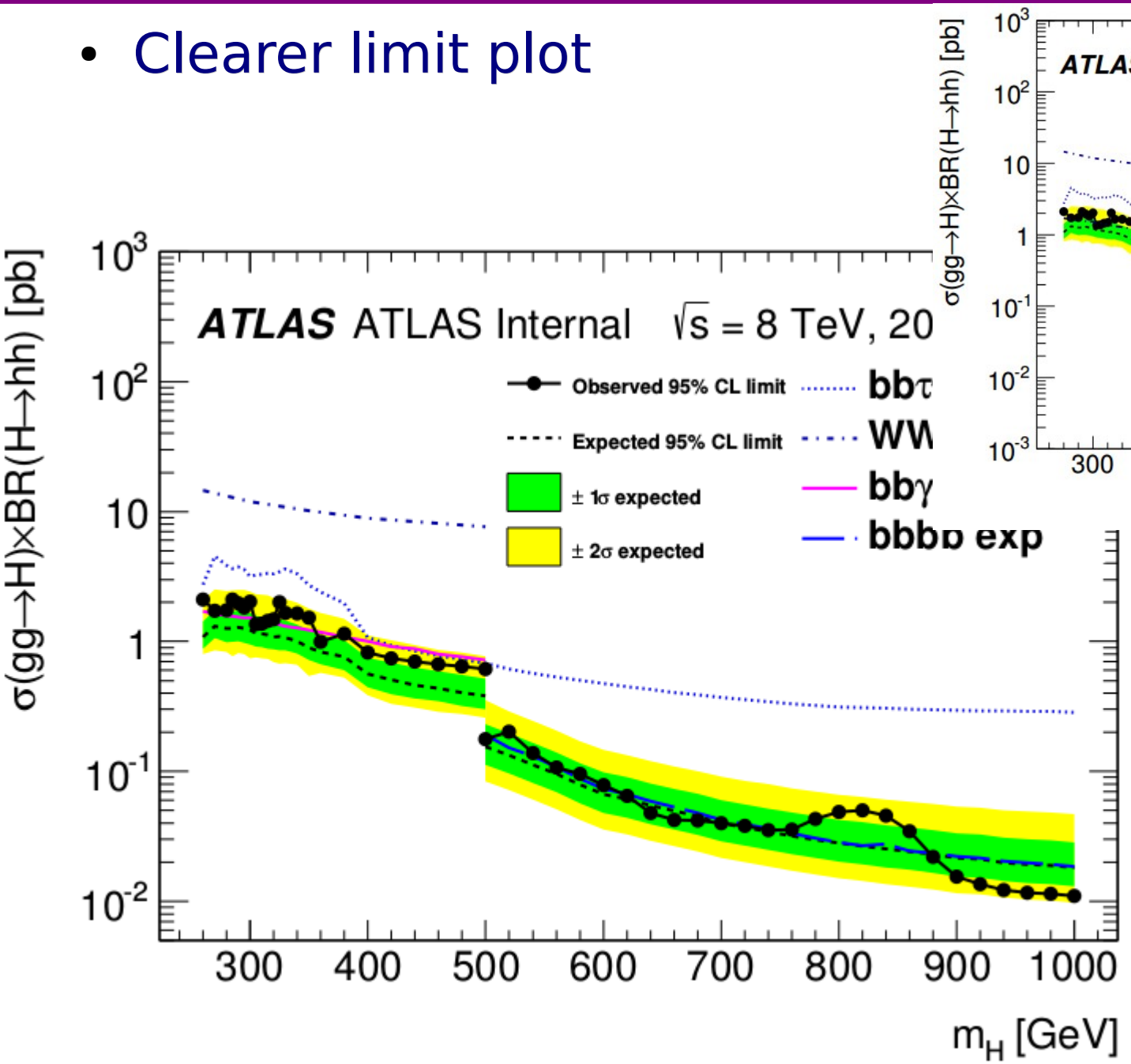
Non-resonant search	
Uncertainty source	$\Delta\mu/\mu$ [%]
Background estimates	11
b-tagging	7.9
h branching ratios	5.8
Jet and $E_{\mathrm{T}}^{\mathrm{miss}}$ measurements	5.5
Luminosity	3.0
Total systematics	17

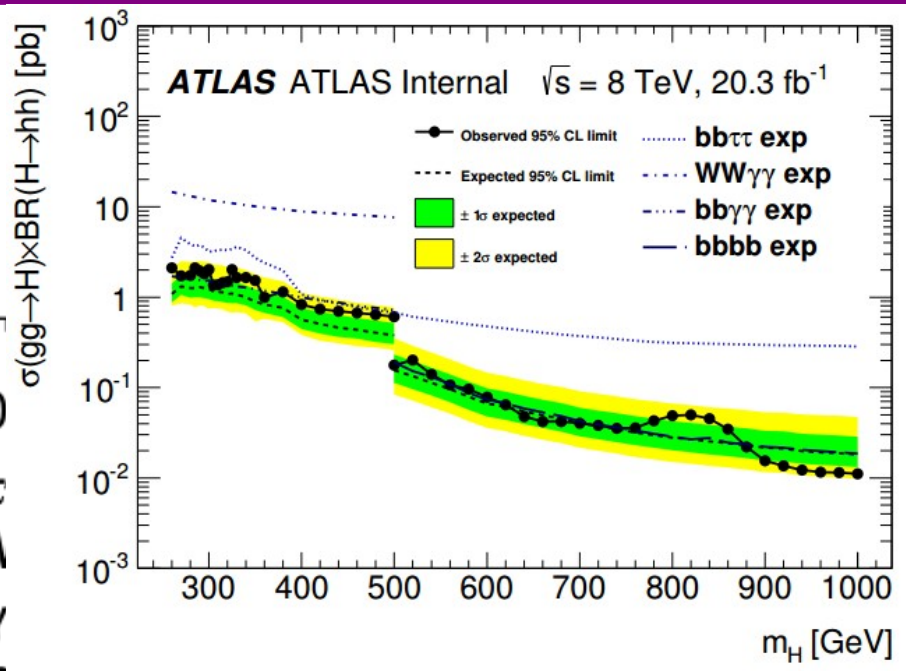
Resonant search: m_H = 300 GeV	
Uncertainty source	$\Delta\mu/\mu$ [%]
Background estimates	15
Jet and $E_{\mathrm{T}}^{\mathrm{miss}}$ measurements	9.9
Lepton and τ_{had}	6.9
h branching ratios	5.9
Luminosity	4.0
Total systematics	24

Resonant search: m_H = 600 GeV	
Uncertainty source	$\Delta\mu/\mu$ [%]
b-tagging	10
h branching ratios	6.3
Jet and $E_{\mathrm{T}}^{\mathrm{miss}}$ measurements	5.5
Luminosity	2.7
MC statistics	2.3
Total systematics	14

STATUS – major updates after 1st circul

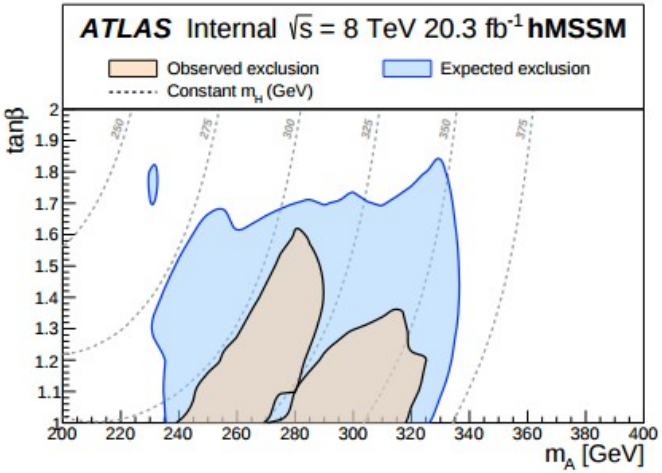
- Clearer limit plot

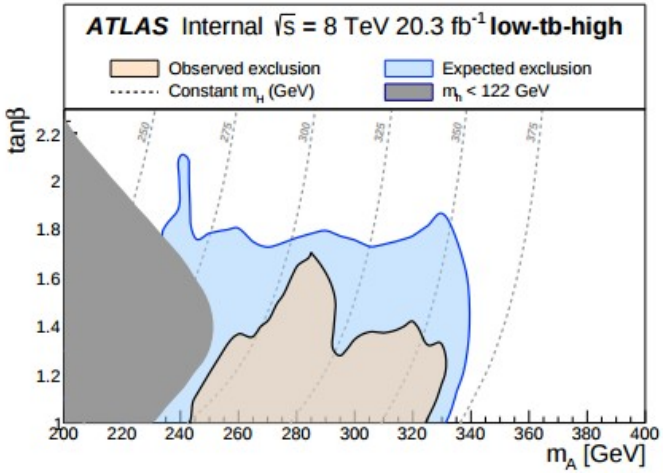


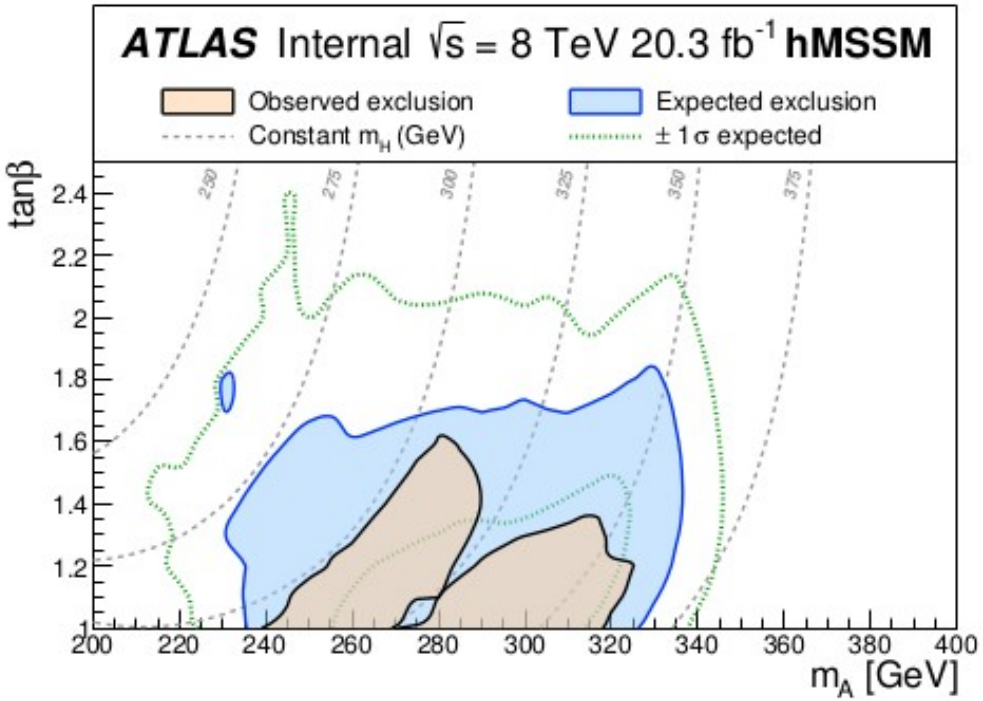


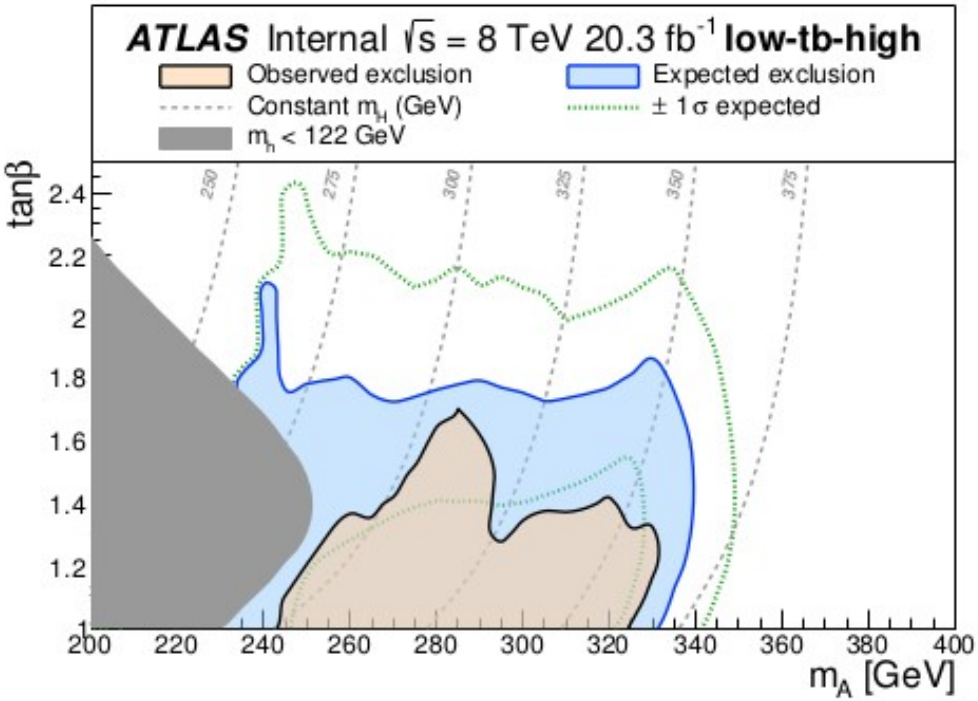
STATUS – major updates after 1st circul

- +-1 sigma band added



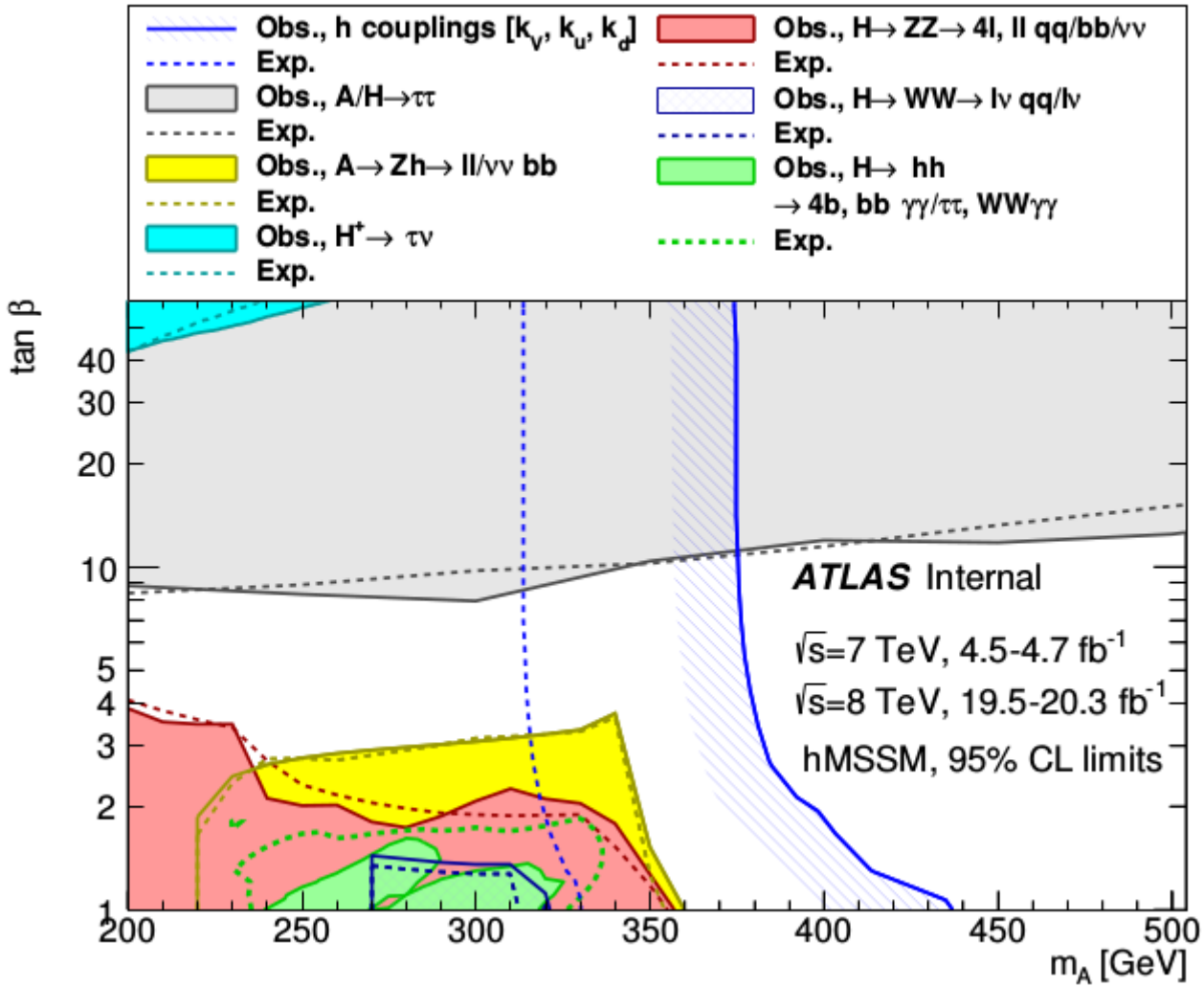






STATUS – major updates after 1st circul

- Add new plot, hMSSM interpretation with various channels



STATUS – major updates after 1st circul

- Table 6 : the combined expected limits are significantly better than the naive quadratic average of the single channels. Is this an expected feature for CLs limits ?

	ggbb	ggWW	bbtt	bbbb	Gauss	Paper	Ratio
260	1.7	11.2	2.6	-	1.41	1.1	1.28
300	1.53	9.3	3.1	-	1.36	1.2	1.13
350	1.22	7.8	2.2	-	1.06	0.89	1.19
400	1	6.9	0.97	-	0.69	0.56	1.24
500	0.72	5.9	0.66	-	0.48	0.38	1.28
500	-	-	0.66	0.19	0.18	0.16	1.14
700	-	-	0.31	0.042	0.04	0.04	1.04
1000	-	-	0.28	0.019	0.02	0.018	1.05
Non-res	1	6.7	1.3	0.59	0.47	0.47	1.00

Yes, it is expected in the Poisson regime. The likelihood is linear with s, NOT quadratic. This is basically the well-known feature that low background search sensitivity improves with L, not √L.

STATUS – major updates after 1st circul

- The behaviour at 260 GeV is below. The linear behaviour of the expected ln L is clear