Discussion on "BSM Higgs Searches"

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$\Rightarrow$ no full ATLAS – CMS comparison . . .

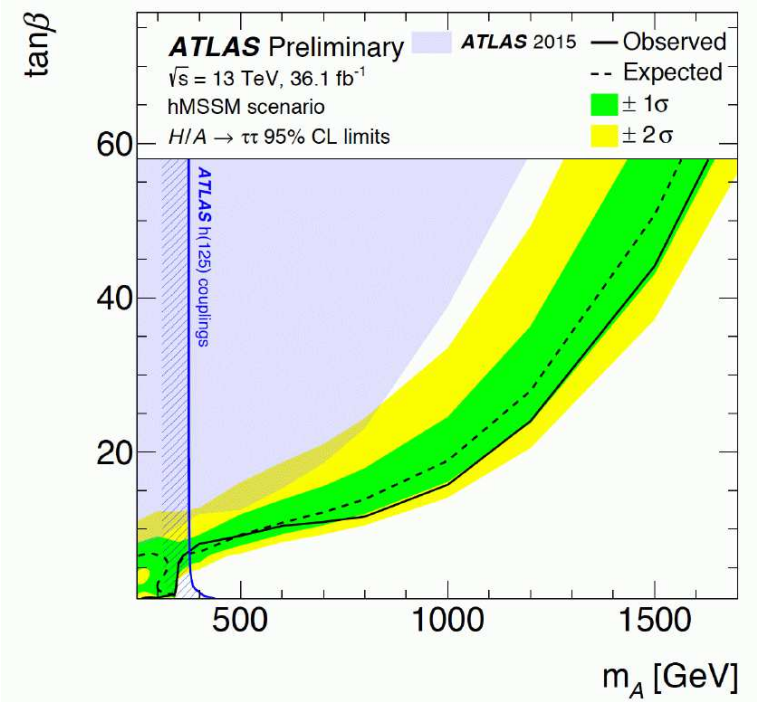
$\Rightarrow$ just a few (personally biased) examples . . .

Perhaps slightly provocative . . . :-)

Strategies that use Higgs to find new physics:

Indirectly, by looking for non-standard properties of light Higgs (couplings, CP, LFV decays...)	Directly, by explicit search for BSM Higgs decaying to SM objects	Higgs decays to BSM states (light scalar resonances, invisible decays, LLP...)

My personal favorite: $pp \to \phi \to \tau^+\tau^-$:

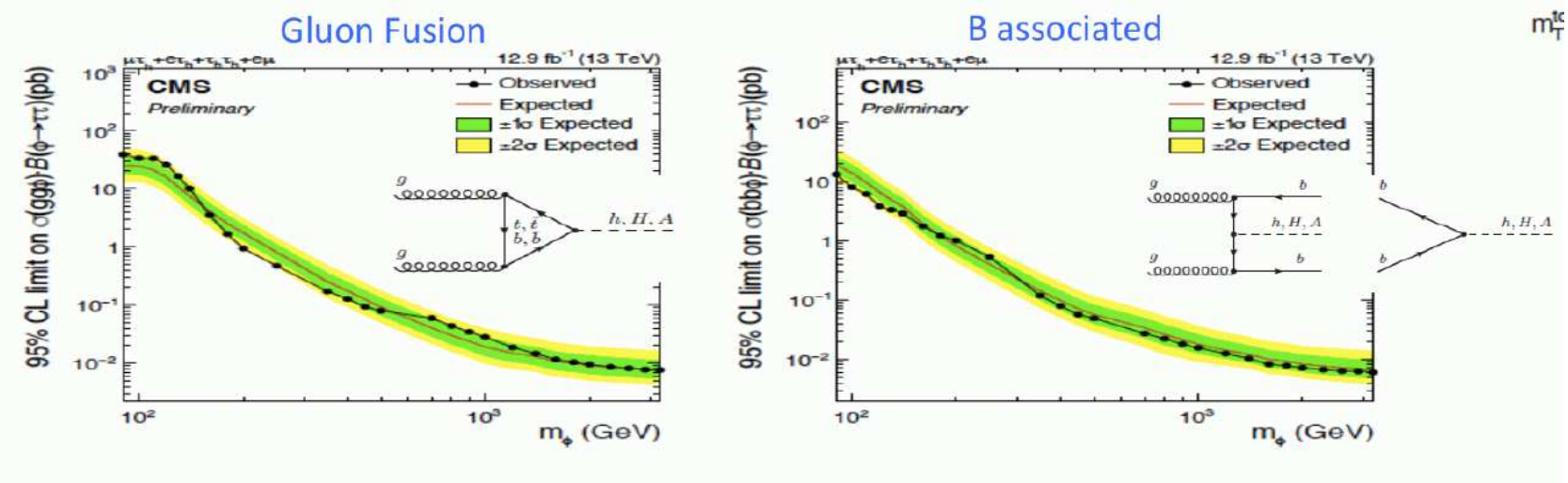


What theorists need:

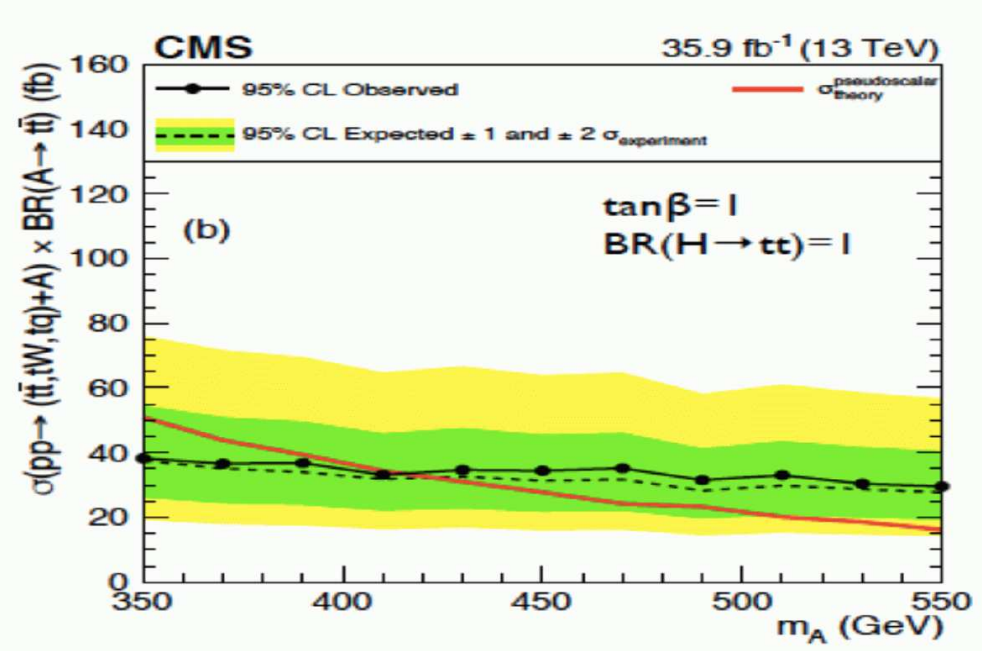
Full likelihood information
(obs. $\oplus$ exp.) in 3-dim space
$(m_\phi,\ \sigma(gg \to \phi),\ \sigma(bb \to \phi))$

$\Rightarrow$ CMS :-) ATLAS :-|

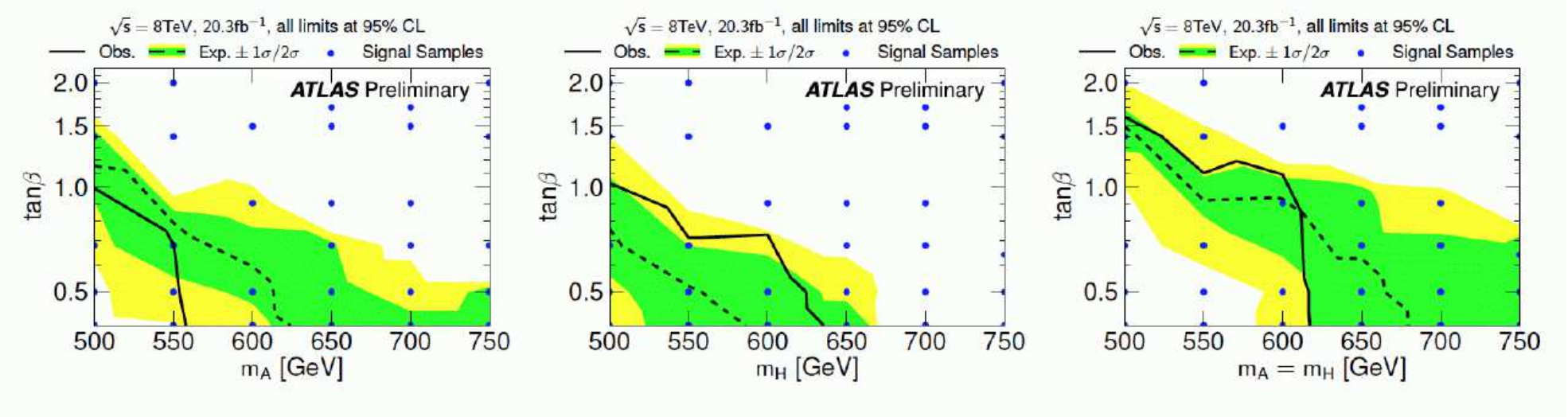
(and don't get me started
about the "hMSSM")



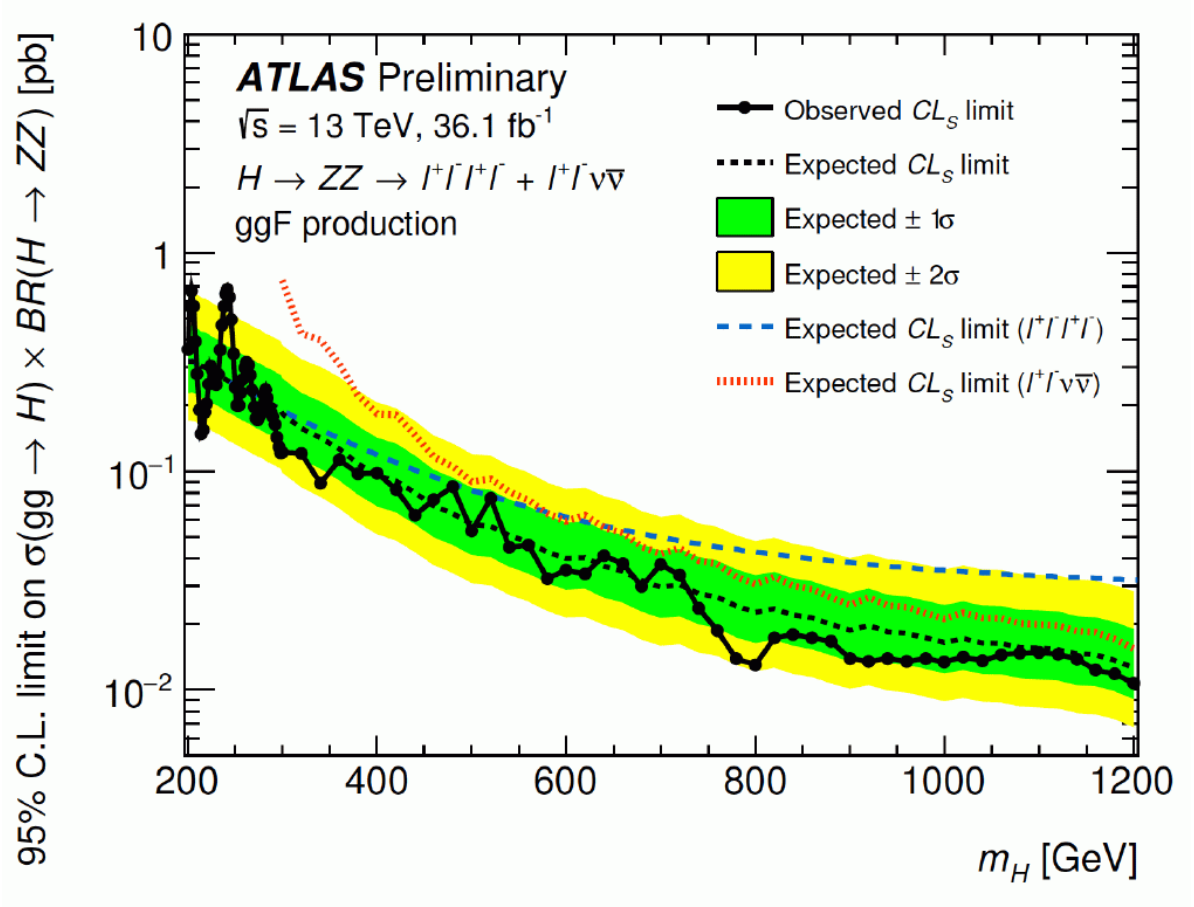
Finally: $pp \to \phi \to t\bar{t}$:



- results appear very differently displayed between ATLAS and CMS, difficult to compare?
  Any coordination?
- can you reproduce the theorists results?



SM-like Higgs searches: (at HH17: no overlap with CMS)

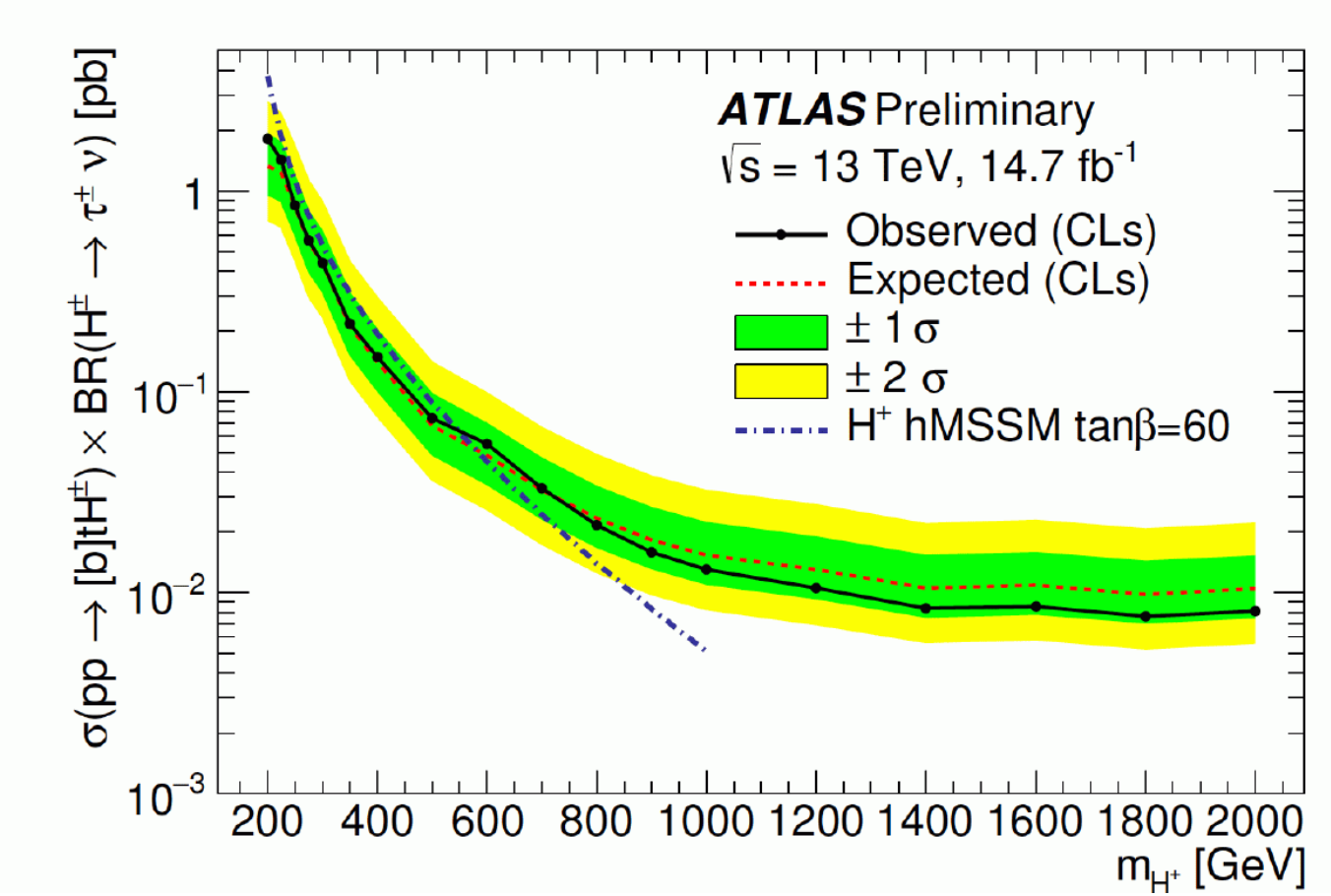


– Please continue! Drive the XS bound as low as possible!

– What about the excess at 250 GeV? (Also in VBF!)

Charged Higgs searches:

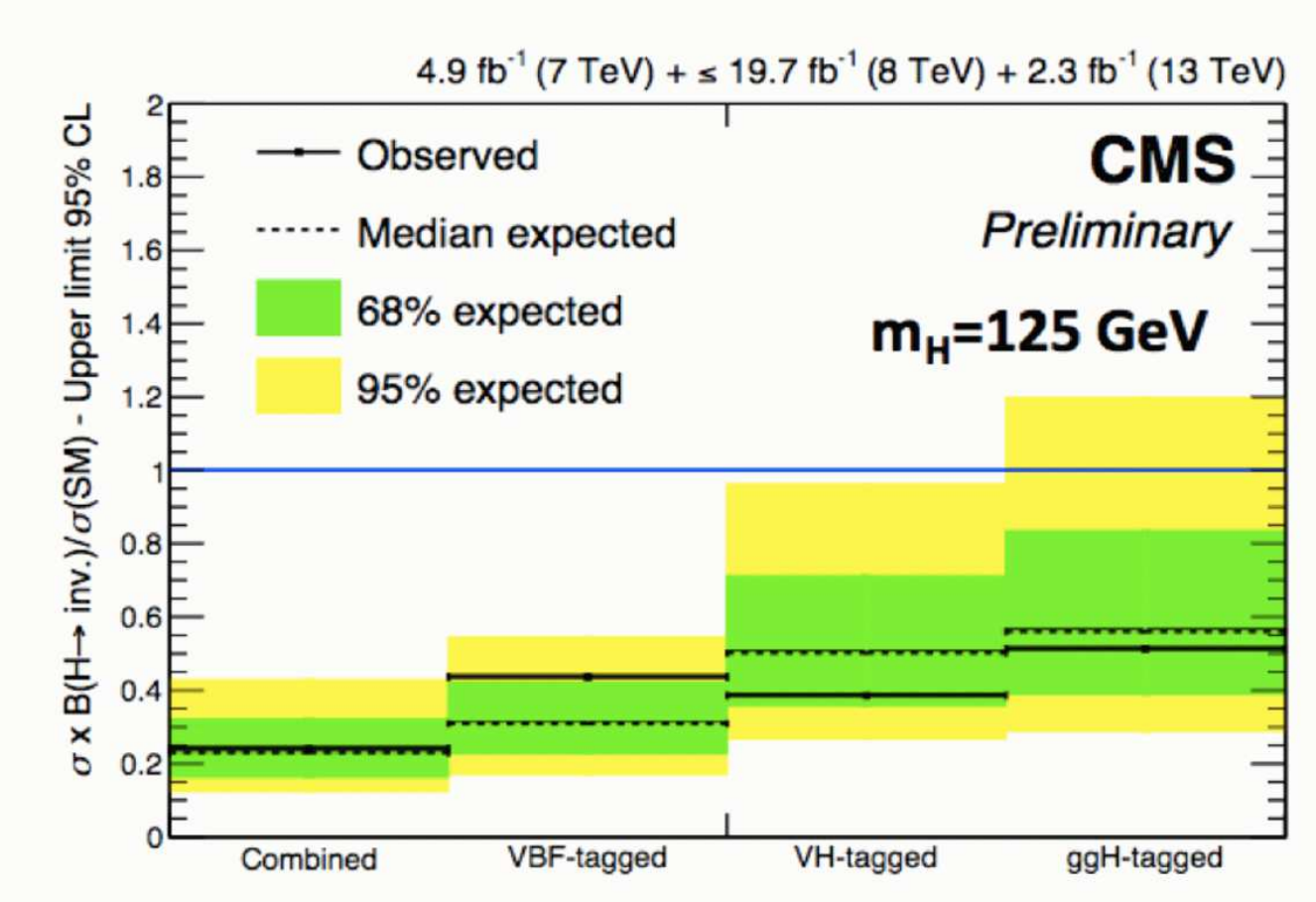
(at HH17: no overlap with CMS)



- Will you close the gap between low and high $M_{H^\pm}$?
- Will you exclude the low-M_H scenarios? ⇐ see Maggie's talk
  (with $M_h < 125$ GeV, $M_H = 125$ GeV)

- hMSSM for $\tan\beta = 60$ . . . (was defined up to $\tan\beta = 10$) WHY??

Invisible Higgs decays: (at HH17: no overlap with ATLAS)



– Happy to see this!

– But only with 2.3 fb^{-1} ⇒ no priority :-(WHY?