

Discussion on “BSM Higgs Searches/Rare Higgs Decays”

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Talks:

- Xiaotong Chu
- Yiwen Wen
- Yuan-Tang Chou
- Maxime Gouzevitch

⇒ no full ATLAS – CMS comparison ...

⇒ just a few (personally biased) examples ...

Hopefully slightly provocative ... :-)

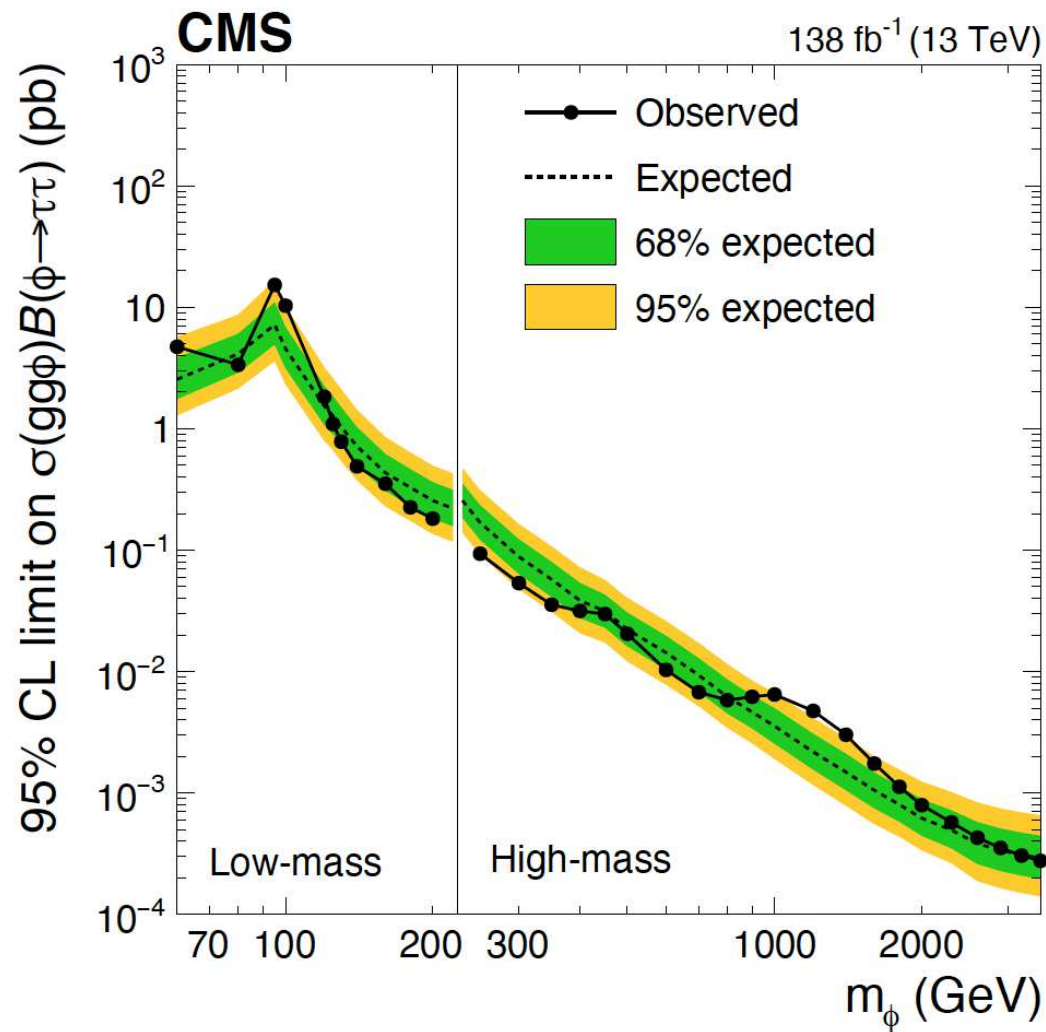
Before I start, one comment on EFTs:

A Quote from a Model Builder



- “Whatever bound you get from your EFT, I can always write down a model that passes the test against data and violates the bound you claim to have.” – Bhaskar Dutta

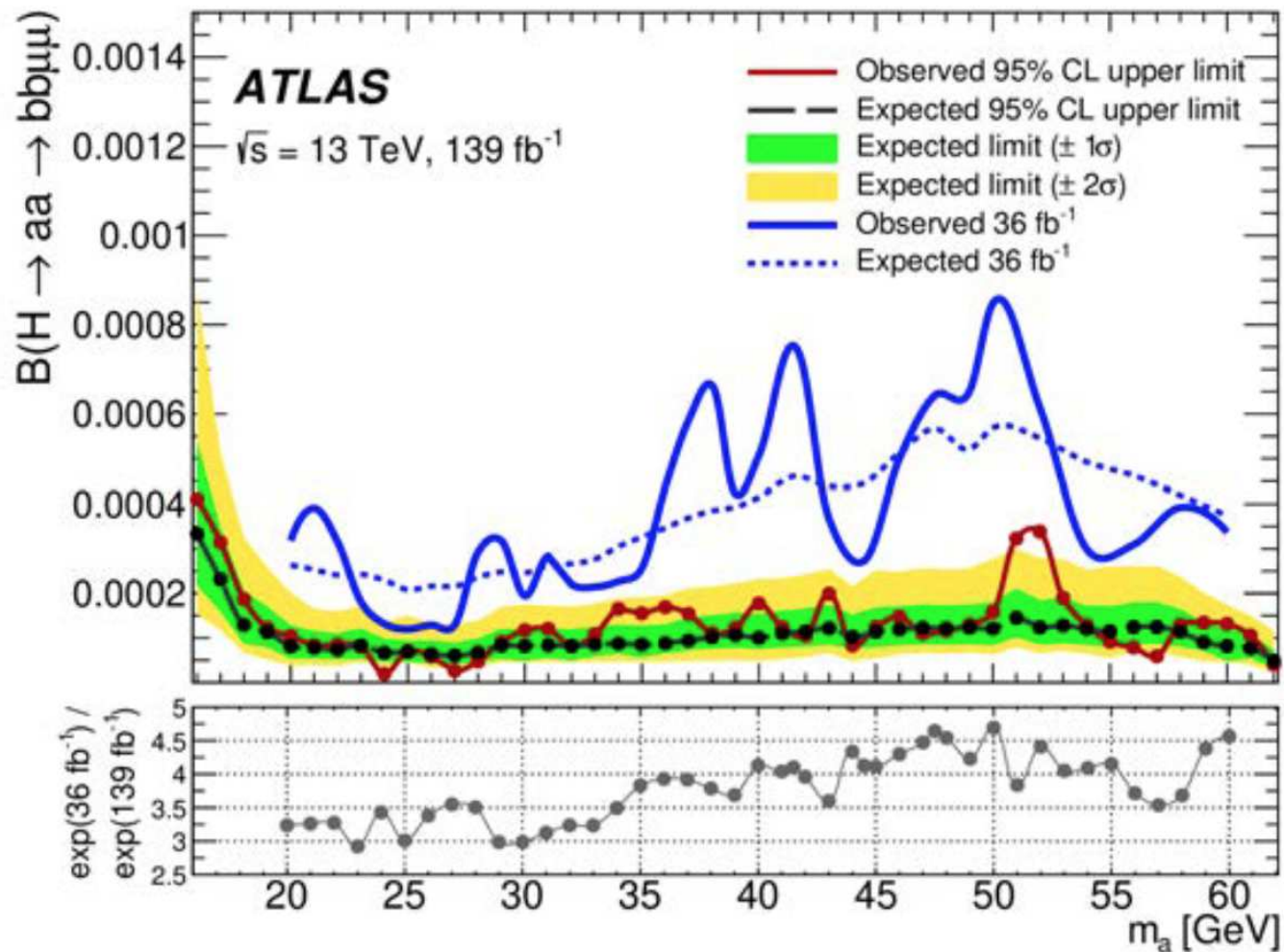
My personal favorite: $pp \rightarrow \phi \rightarrow \tau^+ \tau^-$:



⇒ finally killed the ATLAS excess at 400 GeV

... but: I will come back to this in a moment

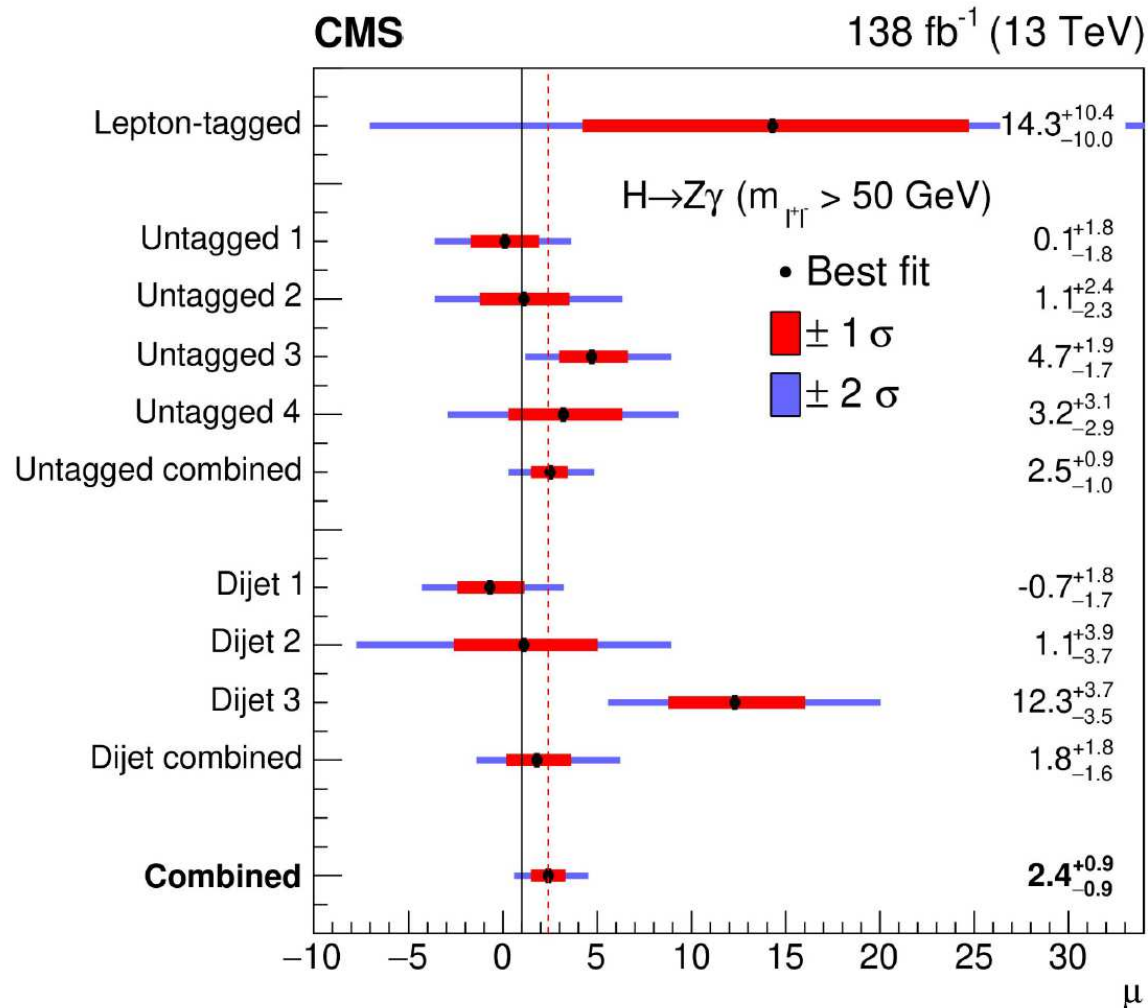
Discovery?



⇒ CMS???

⇒ general trend: the other experiment's excess does not seem to have high priority ...

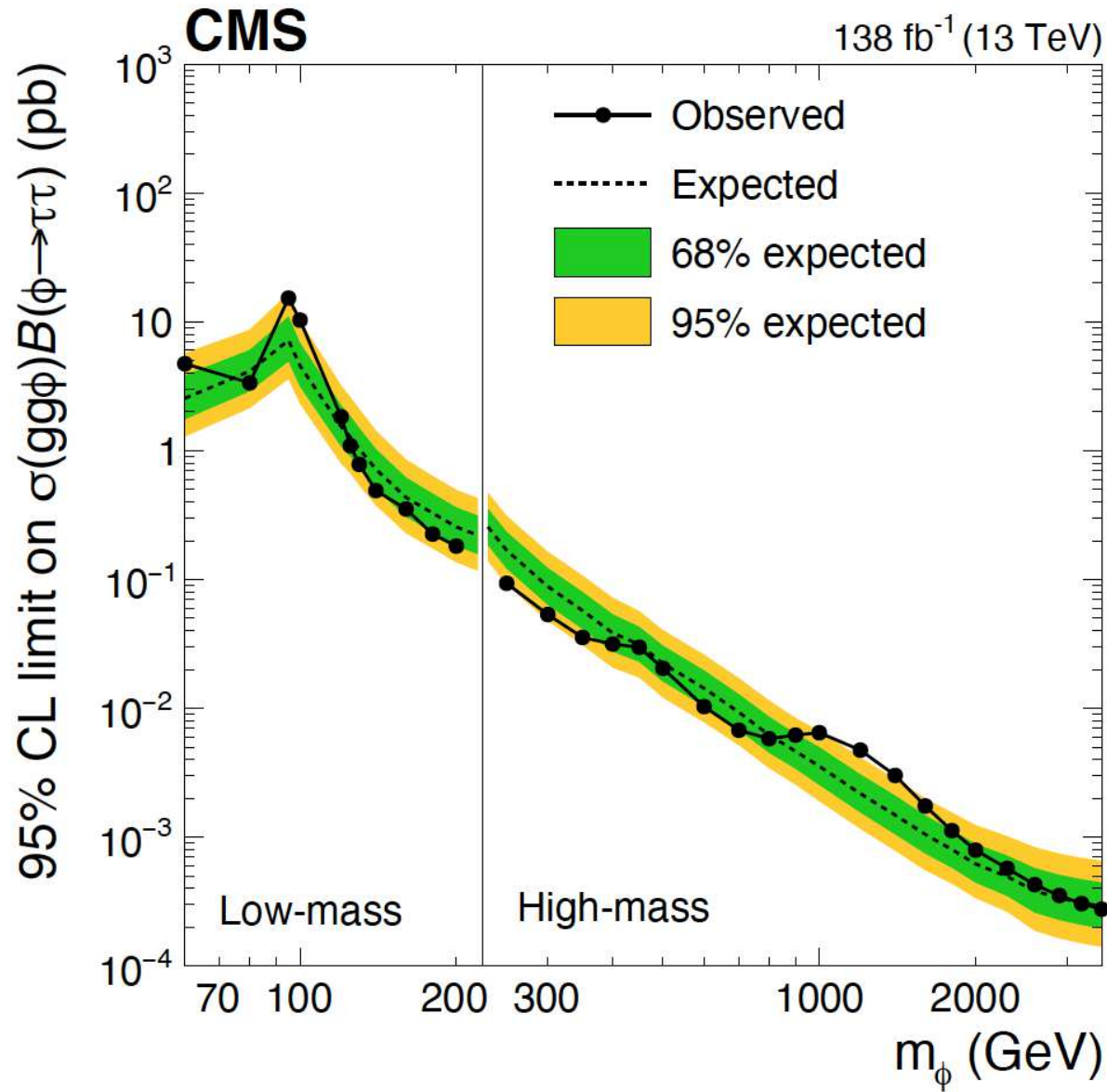
First glimpse at $h_{125} \rightarrow Z\gamma$



⇒ “Above the SM prediction, but compatible at 1.5σ ”

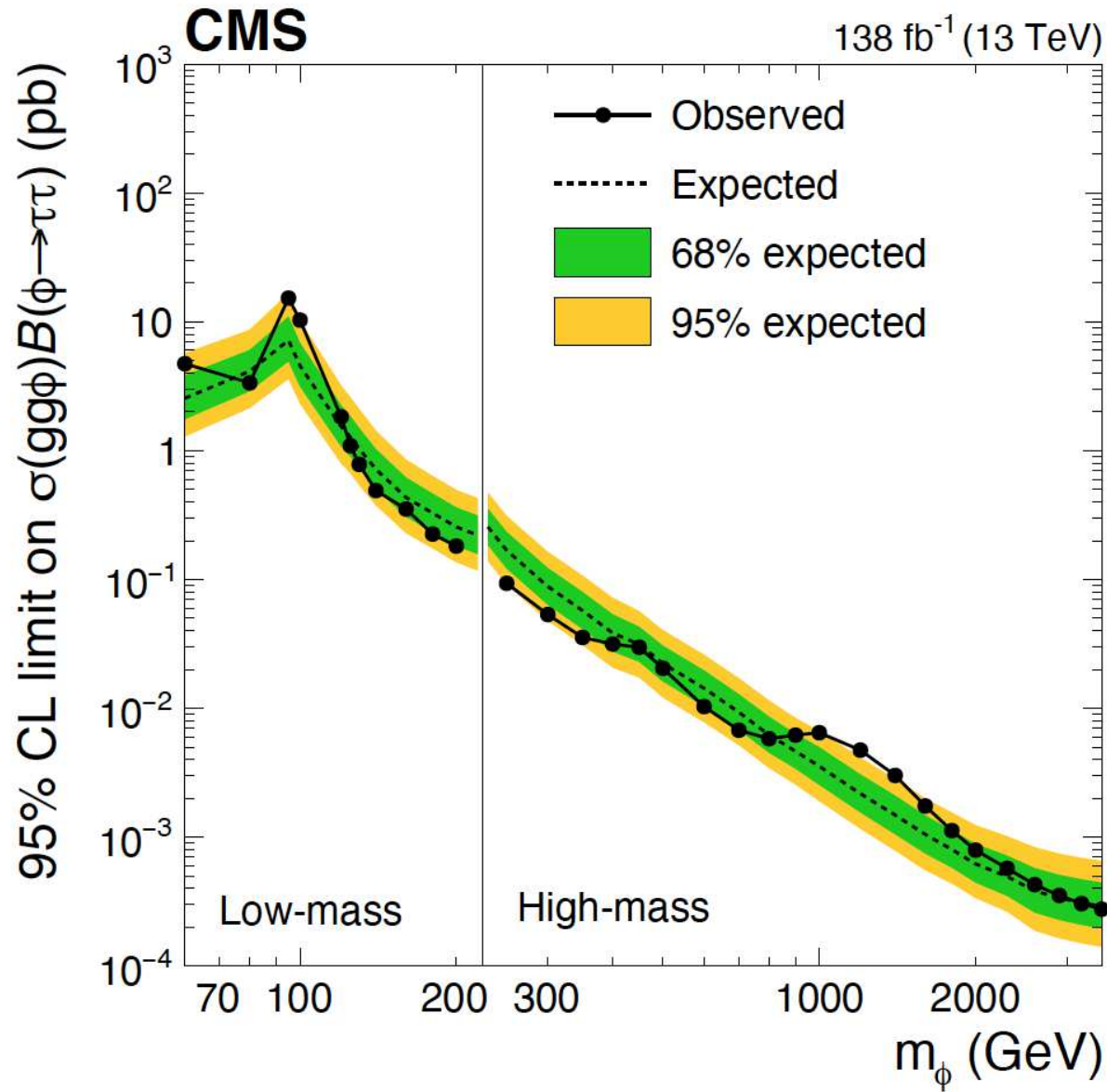
⇒ general trend: new signals come out too high,
later converge to the SM prediction ...

Coming back to the $\tau\tau$ analysis:



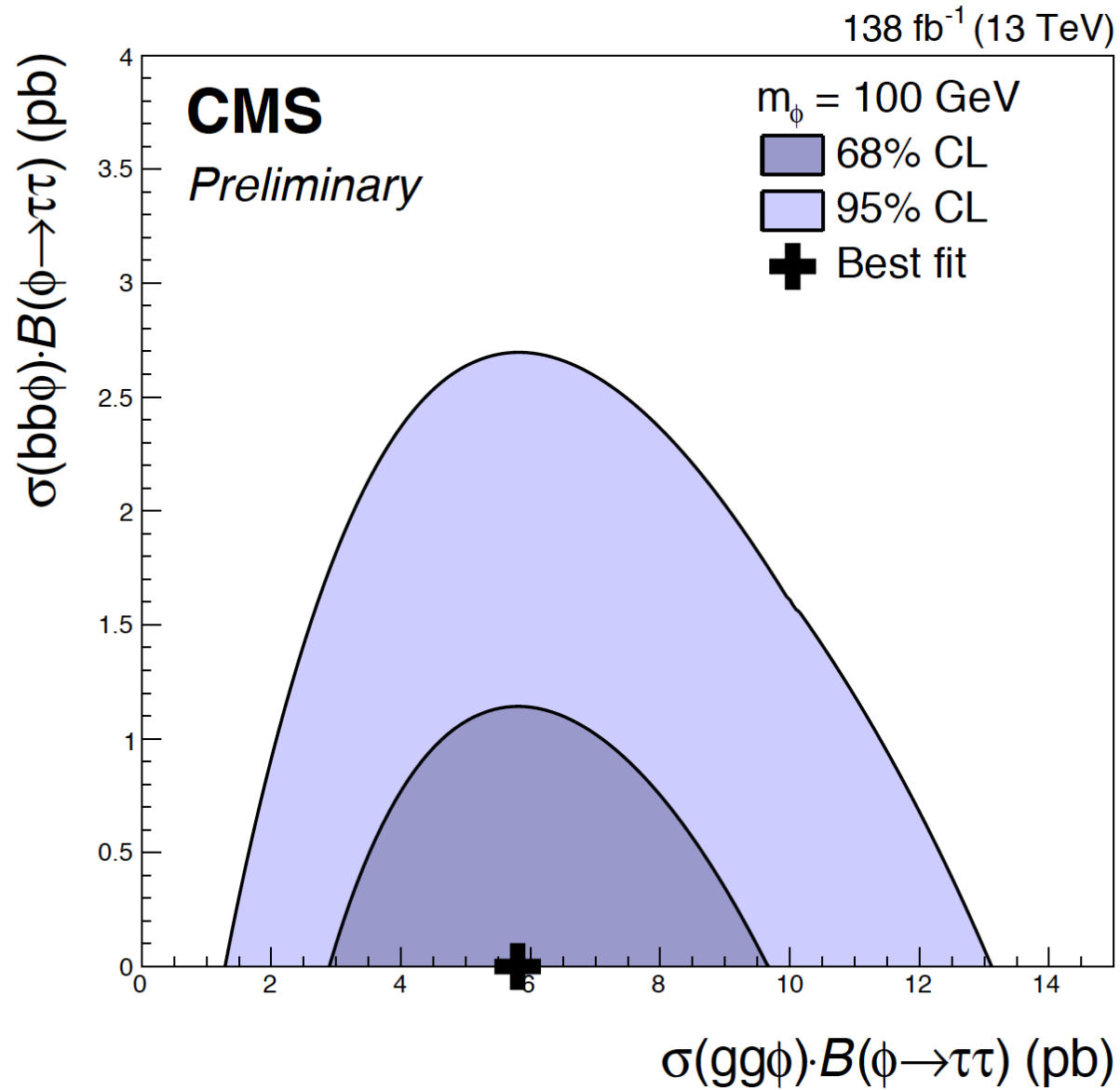
Can you spot the excess?

Coming back to the $\tau\tau$ analysis:



Can you spot the excess? **At 95 – 100 GeV?**

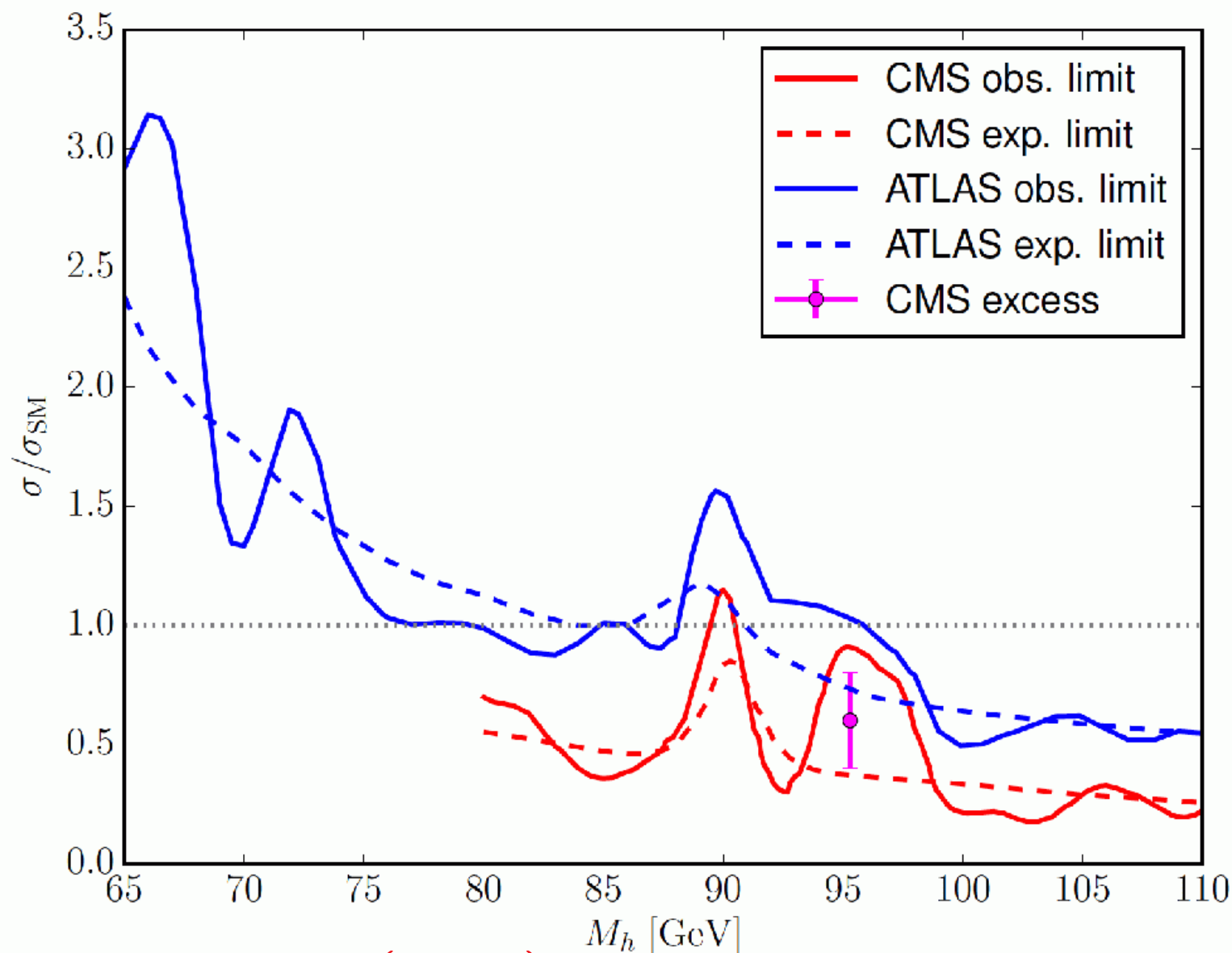
Better visible here, focusing on 100 GeV:



⇒ clear excess of $\sim 3\sigma$ at ~ 100 GeV

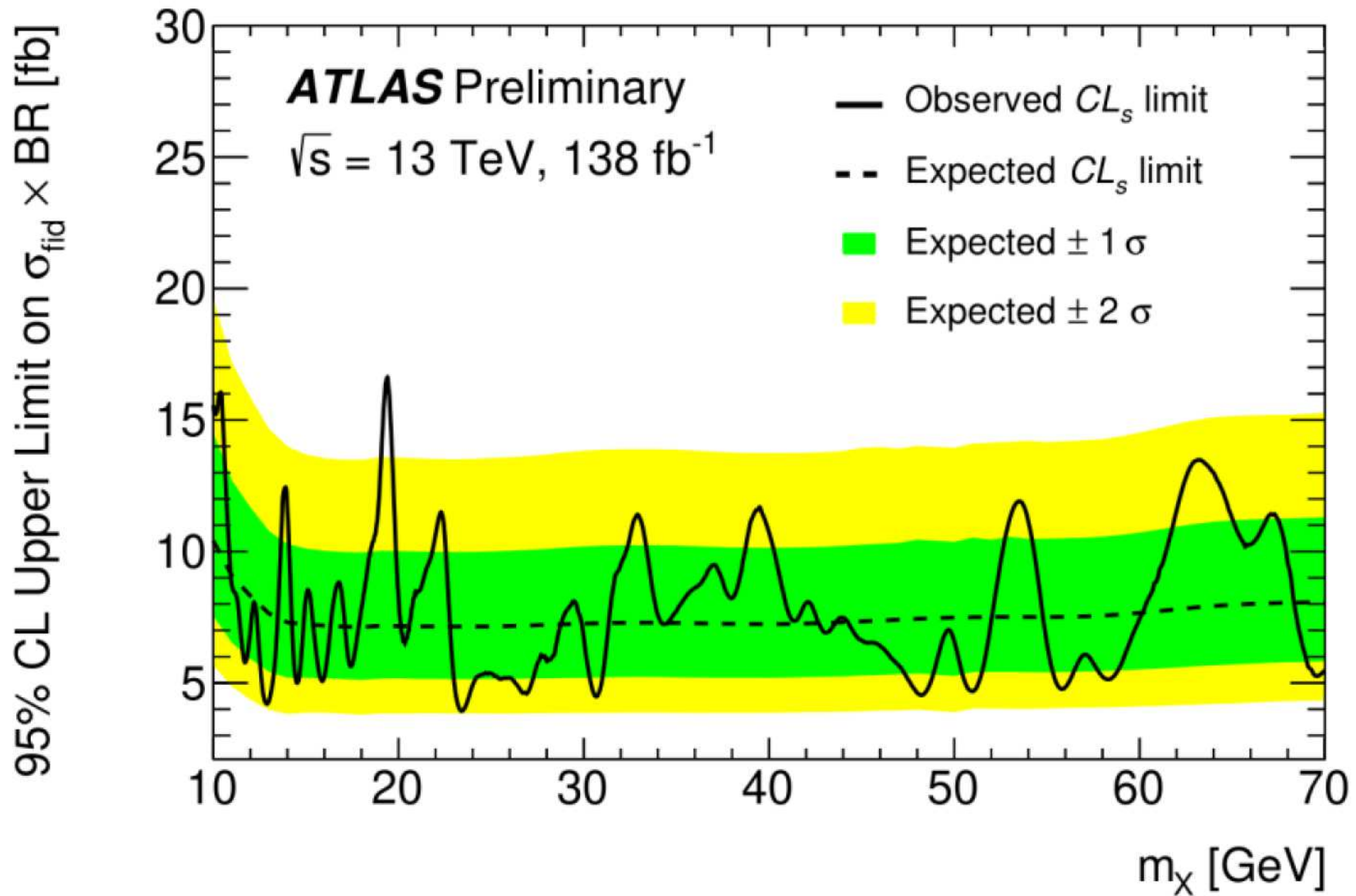
Slide that I repeat over the years: CMS and ATLAS in direct comparison:

[S.H., T. Stefaniak '18]



⇒ Can ATLAS and CMS (finally) clarify this?

Even worse: ATLAS put out a low mass $\tau\tau$ analysis:



⇒ but they stop at 70 GeV. Argh.