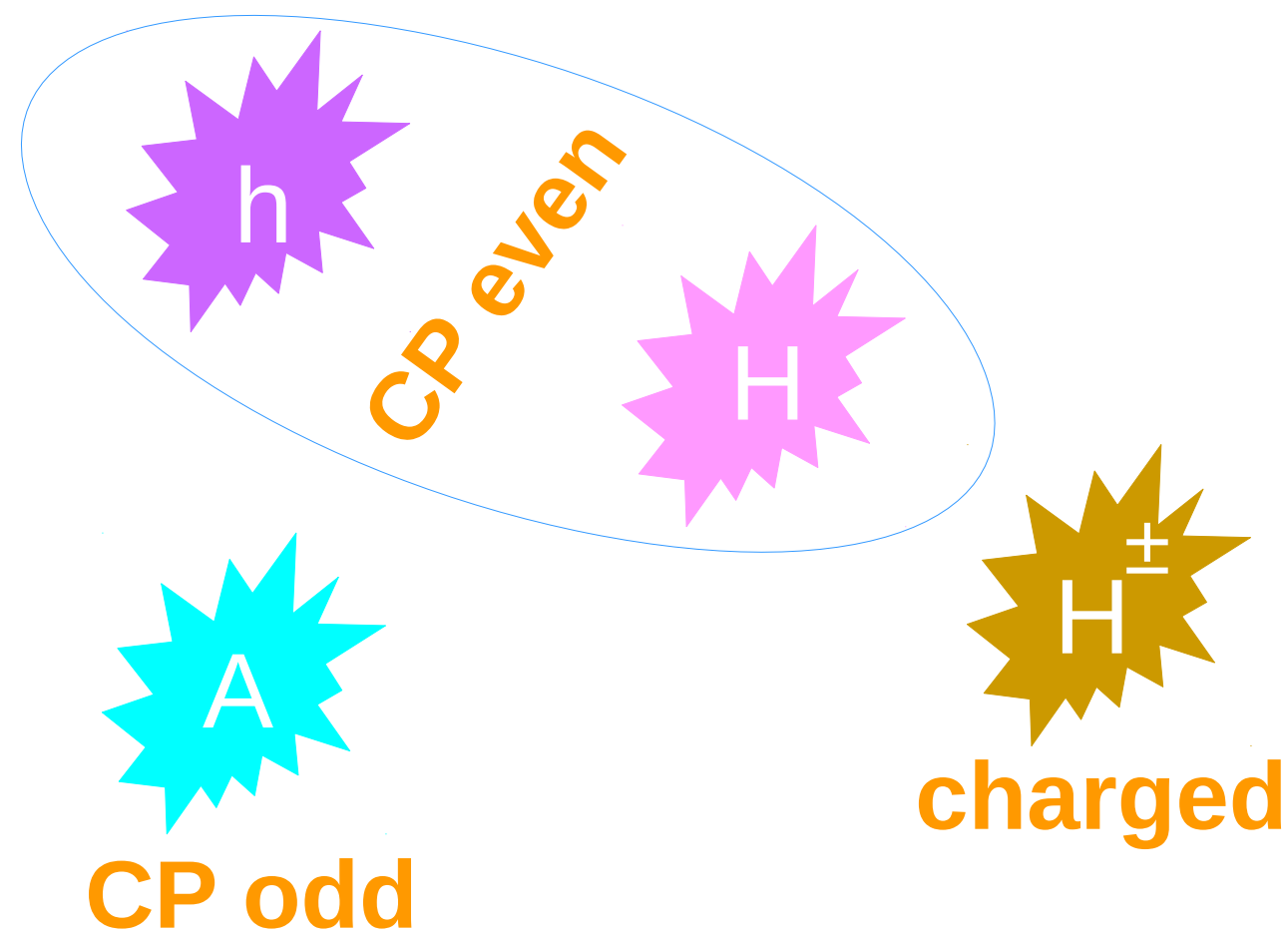


Search for additional Higgs bosons produced in association with b quarks and decaying into two b quarks.

Paul Asmuss (DESY) for the CMS collaboration
paul.asmuss@desy.de

What are we looking for?

- High-mass Higgs bosons
- In models with two Higgs doublets: five physical Higgs bosons
 - × This search: neutral states

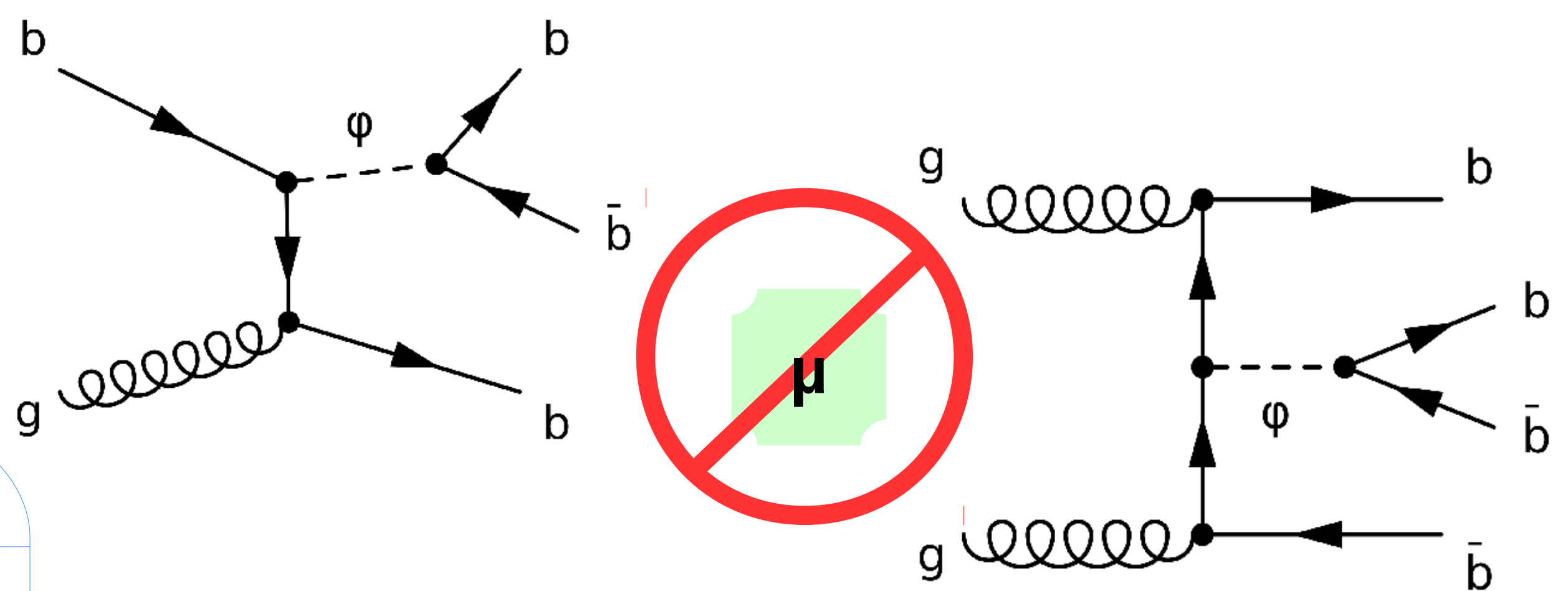


Event selection

- Dedicated trigger requiring two online b tags
- Reverse 3rd b tag: control region (CR)
- From 2017: 3 and 4 b tag categories
- From 2017: Semileptonic channel
- Basic p_T cuts: 100/40 GeV (leading/subleading)

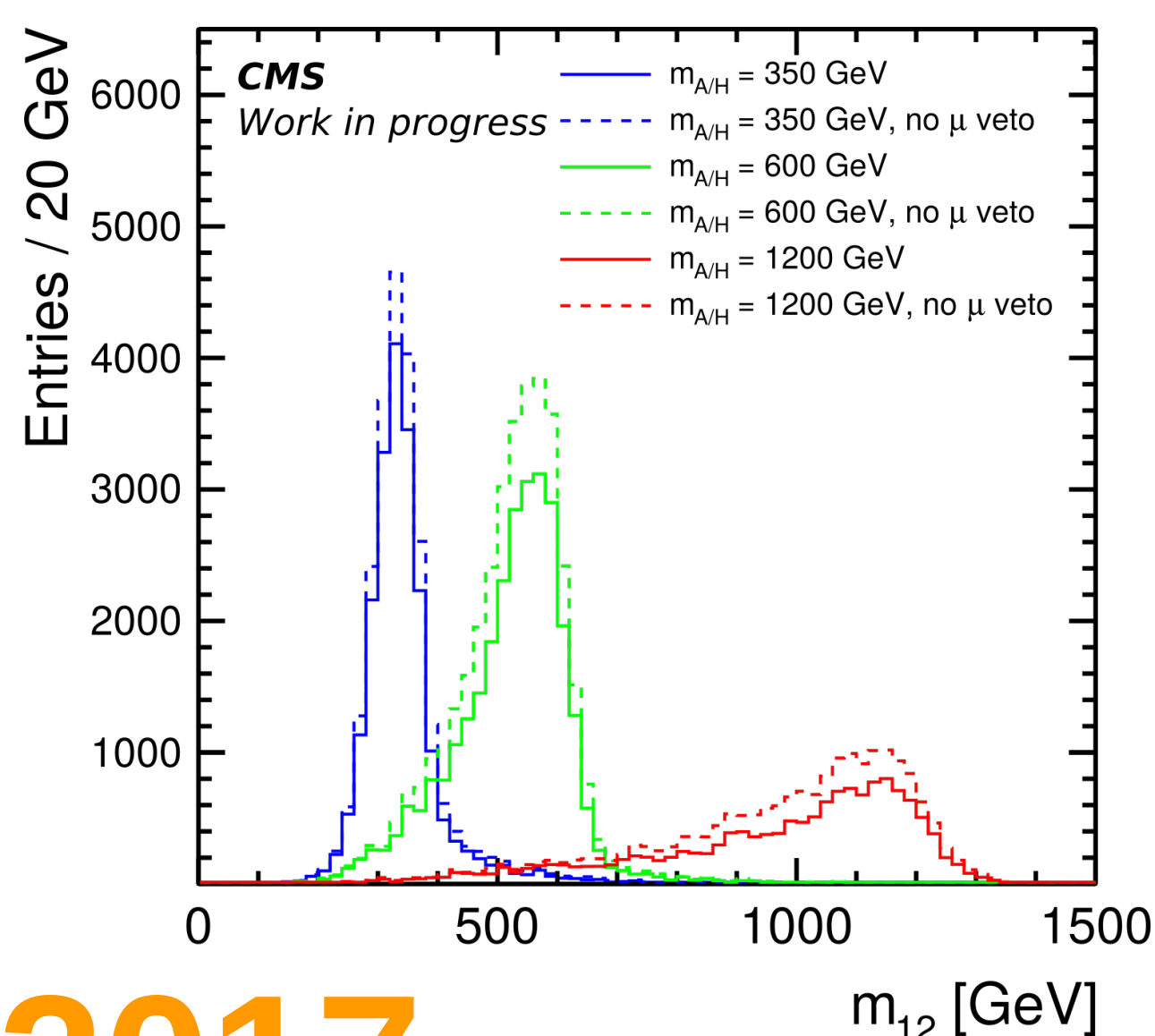
Why this channel?

- A/H decaying to b quarks: dominant
- b associated production: enhanced in 2HDM and MSSM $\sim \tan^2 \beta$
- Main background: QCD multijet events

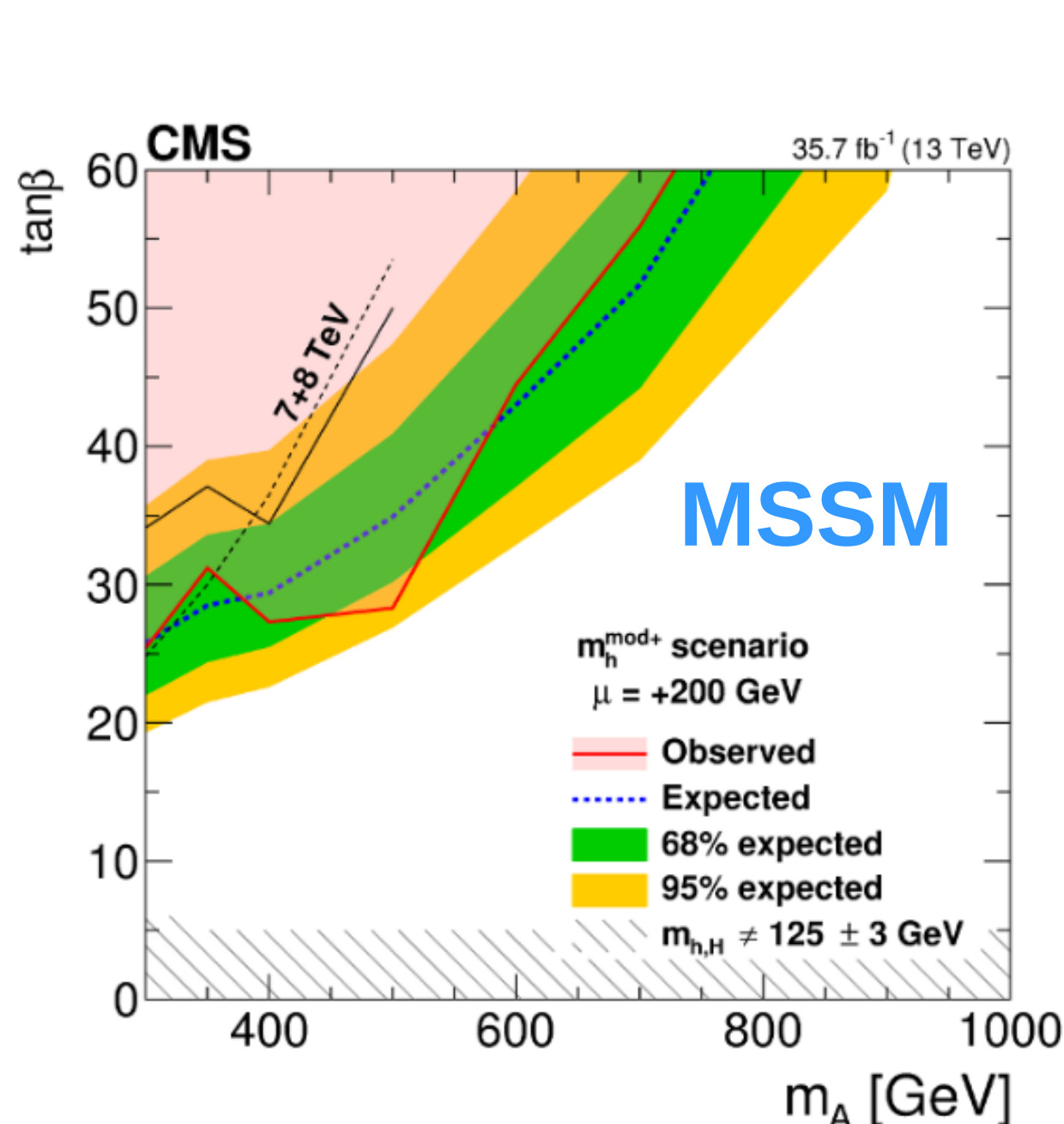


Signal and Background model

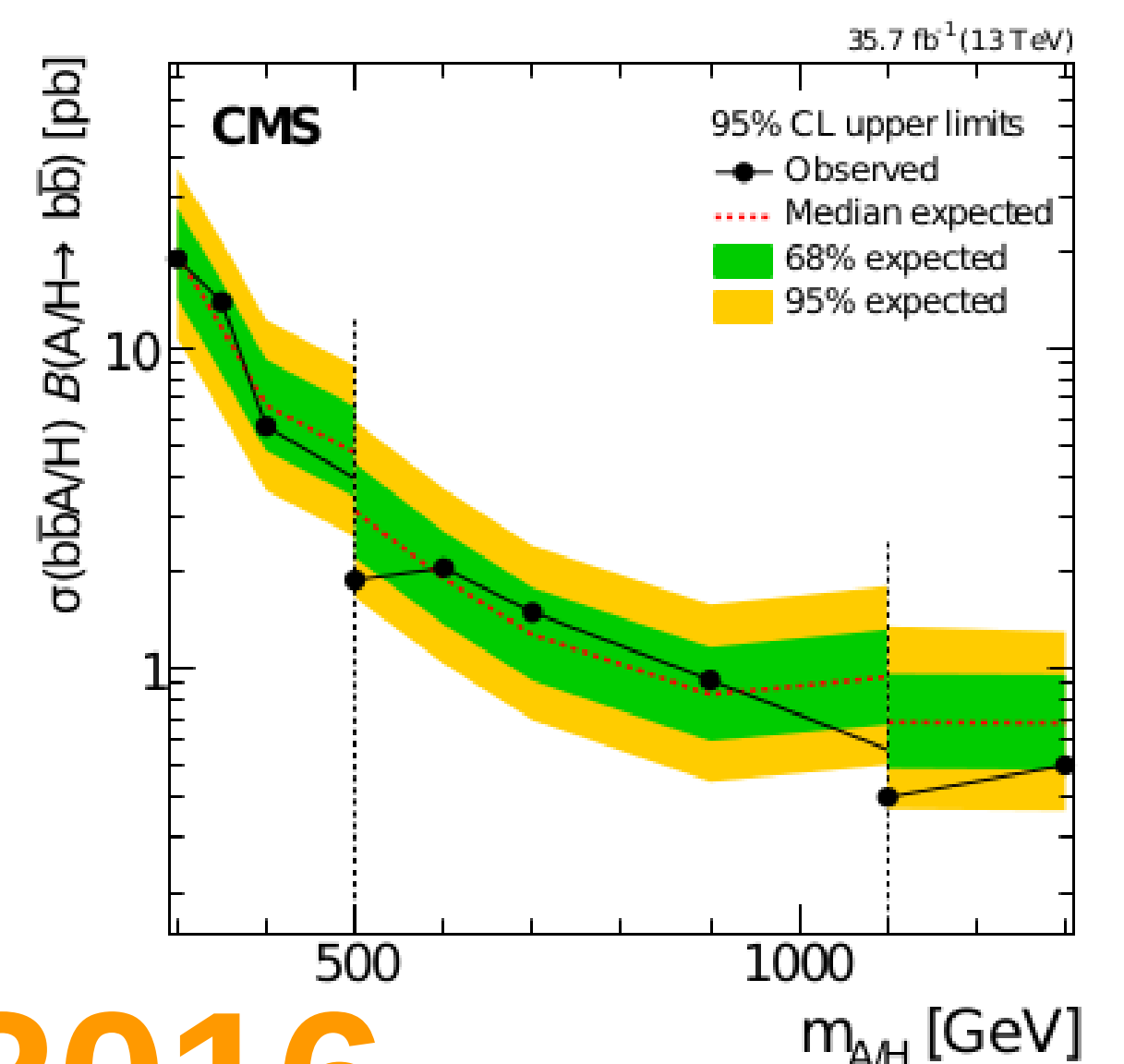
- Background modeled using reverse b tag CR
 - × Novosibirsk-type functions + turn-on
 - × Subranges defined to reduce syst. uncertainties
- Signal mass range: 200 – 1600 GeV
 - × Using Gaussian and Bukin functions to model



2017



2016



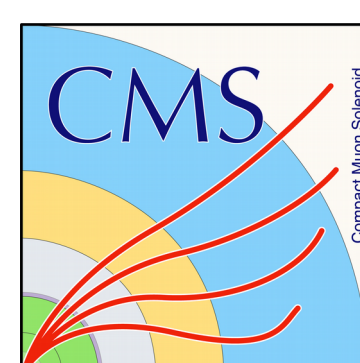
No place to hide anymore

- No signal observed → limits set
- Model independent limit on $\sigma \times \text{BR}$; interpretation e.g. within MSSM
- New techniques applied for 2017/18 targeting combination of full Run 2

Reference:
[arXiv:1805.12191](https://arxiv.org/abs/1805.12191)



HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES



10th CERN LATIN-AMERICAN SCHOOL
OF HIGH-ENERGY PHYSICS
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