

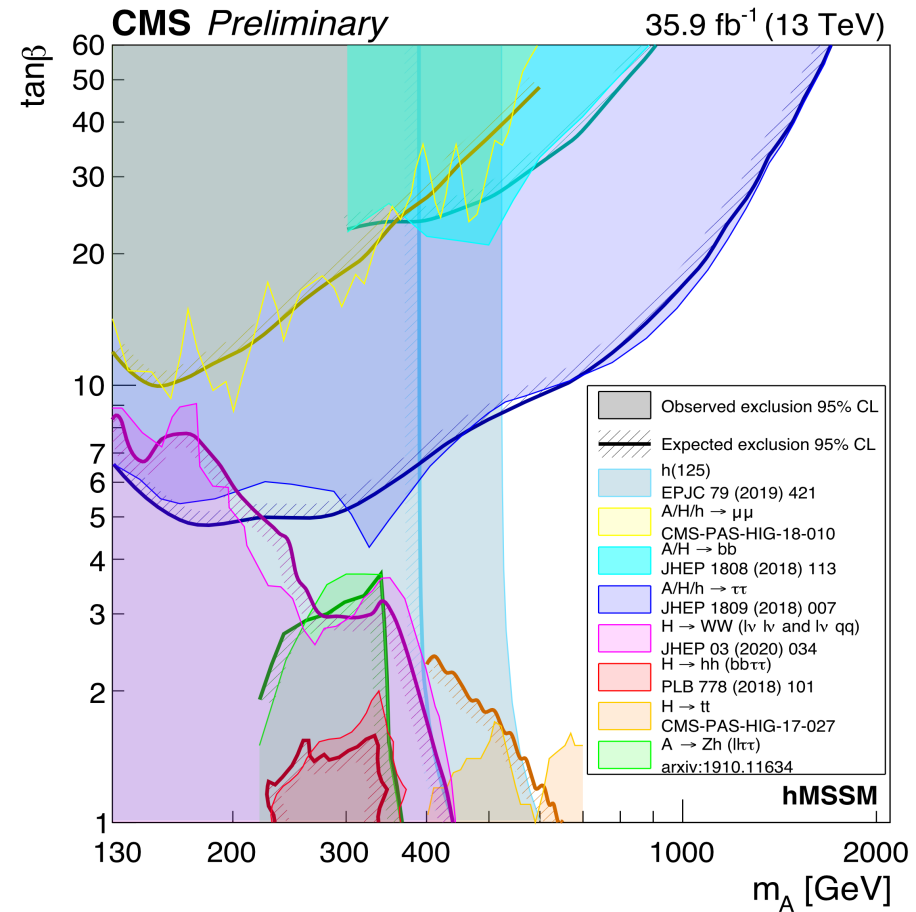
Searches for additional heavy Higgs bosons at CMS (Summary)

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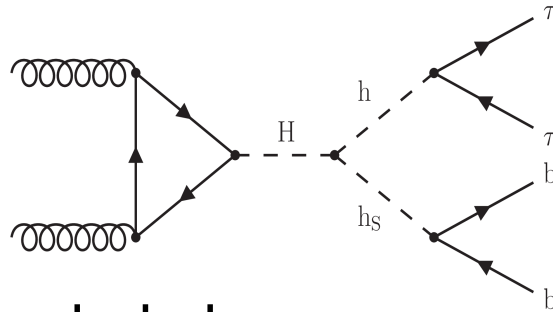
Additional Higgs bosons in 2HDM (MSSM)

- Enriched Higgs phenomenology from BSM theories (additional SU(2) multiplets of scalar fields)
- Searches for heavy Higgs bosons (CMS Run2)
 - many channels motivated by 2HDM (MSSM) analyzed
 - no signal found
 - large domain of 2HDM (MSSM) parameter space excluded
- No evidence of 2HDM models
→ theories with a more complicated structure of Higgs sector probed

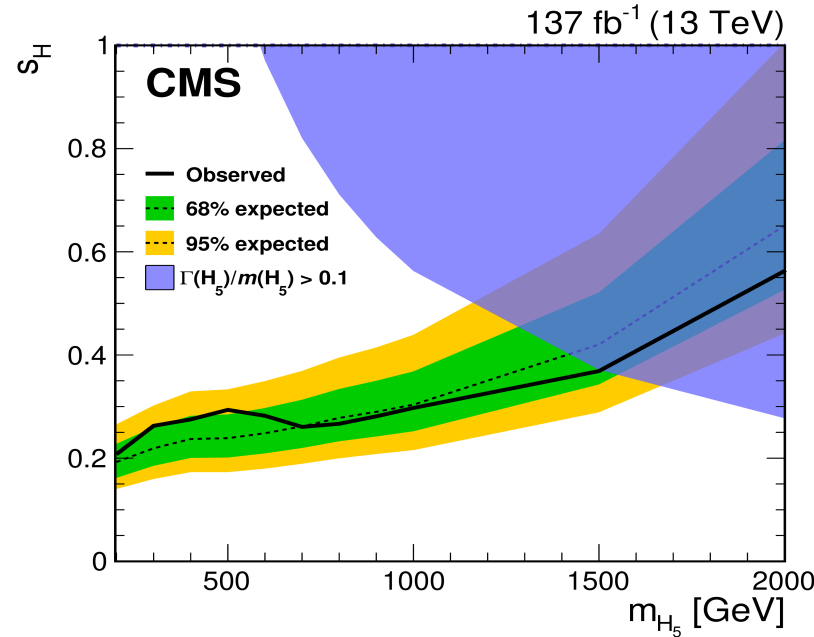
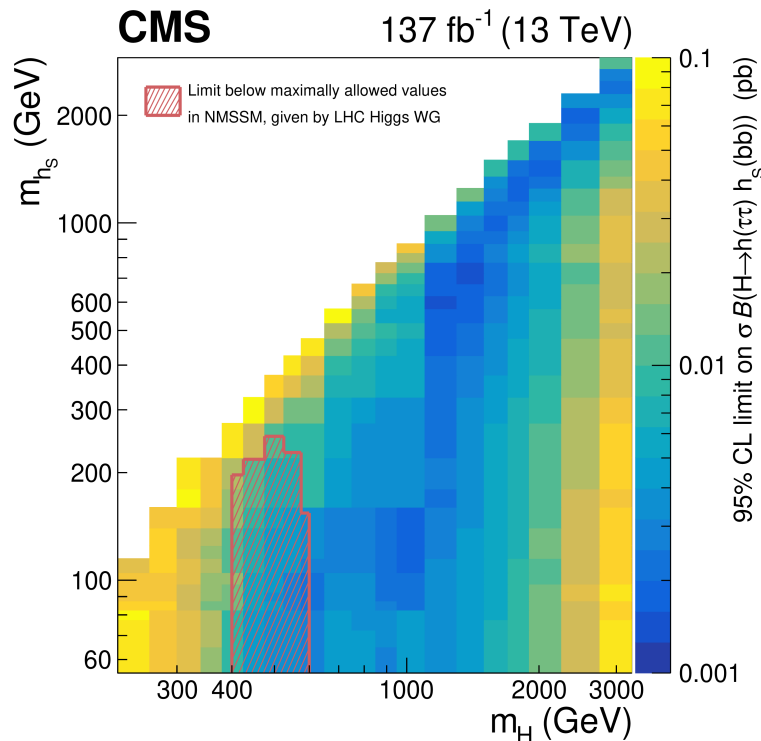


Searches for Higgs bosons beyond 2HDM

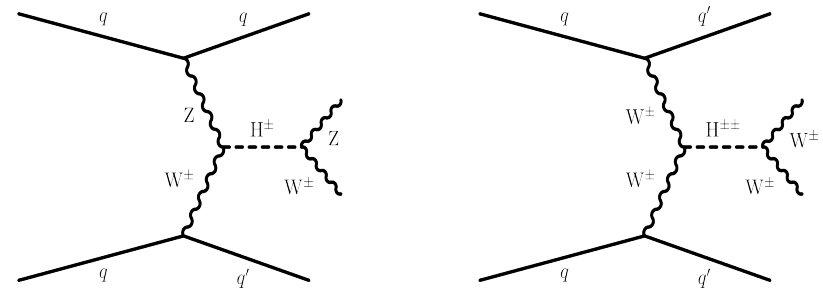
- NMSSM
 $H \rightarrow h_s h_{125}$



- mass range excluded:
 $m_H \simeq 400\text{--}600\text{ GeV}$, $m_{h_s} \simeq 60\text{--}200\text{ GeV}$



- Georgi-Machacek model



- Limits on s_H as a function of m_{H_5}

Summary

- Searches for additional Higgs bosons of 2HDM (MSSM) and beyond are performed at CMS with partial or full LHC Run 2 dataset
 - large variety of channels studied
 - broad mass range probed
- Advanced analysis techniques are developed to boost sensitivity of searches beyond increase in luminosity
 - e.g. deep learning to identify physics objects (b-jets, τ , ...) and discriminate signal against background
- No signal found (so far) \rightarrow large set of models excluded
- Many new results with full Run 2 and eventually Run 3 datasets are expected.