

Searching for Neutral BSM Higgs Bosons in the $\tau\tau$ Decay Channel Using Full Run-2 Data from the ATLAS Detector

Janina Krzysiak

IFJ PAN, Kraków, Poland

on behalf of ATLAS

ICHEP 2020

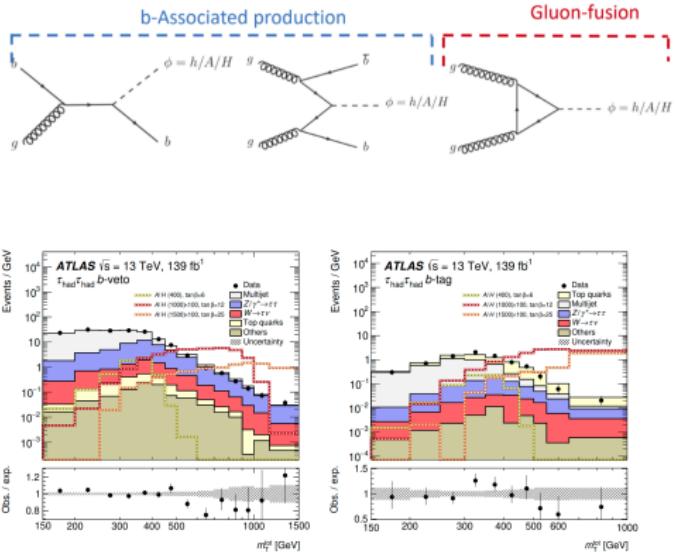


Analysis motivation and basics

- ▶ extra Higgs bosons predicted by many BSM scenarios
 - ▶ Two-Higgs-Doublet models (2HDMs) predict 5 Higgs bosons
 - ▶ type-II 2HDM corresponds to Higgs sector of the Minimal Supersymmetric Standard Model (MSSM)
- ▶ search range: [200, 2500] GeV
- ▶ 140 fb^{-1} of data from $\sqrt{s} = 13 \text{ TeV}$ pp collisions
- ▶ paper published in PRL: Phys. Rev. Lett. 125 (2020) 051801

Analysis method

- ▶ separate by Higgs production mode:
 - ▶ b-associated production → b-tag region
 - ▶ gluon-gluon fusion → b-veto region
- ▶ separate by tau decay mode:
 - ▶ had-had and lep-had channels
- ▶ background from jets faking taus estimating using data-driven methods



- ▶ discriminating variable:

$$m_T^{\text{tot}} = \sqrt{(p_T^{\tau_1} + p_T^{\tau_2} + E_T^{\text{miss}})^2 - (p_T^{\tau_1} + p_T^{\tau_2} + \mathbf{E}_T^{\text{miss}})^2}$$

Limits

