

# Search for Higgs boson exotic decays to pseudoscalars in the final states with tau leptons and b quarks at CMS

Thursday 18 July 2024 20:40 (20 minutes)

This poster presents results from a search for exotic decays of the 125 GeV Higgs boson (H) to a pair of light pseudoscalars  $a$ , where one pseudoscalar decays to two b quarks and the other to a pair of muons or tau leptons ( $H \rightarrow aa \rightarrow 2b2\mu/2b2\tau$ ). The analysis is performed on the full CMS Run-2 dataset of proton-proton collisions at center-of-mass-energy 13 TeV, corresponding to an integrated luminosity of  $138 \text{ fb}^{-1}$ . Upper limits are set at 95% confidence level (CL) on the branching fraction of the Higgs boson to  $aa$ , to  $2b2\mu$  and to  $2b2\tau$ . In models with two Higgs doublets extended by a complex scalar singlet (2HDM+S), the results from the two final states are combined to determine model-independent upper limits on the branching fraction  $B(H \rightarrow aa \rightarrow llbb)$  at 95% CL, where  $l$  is a muon or tau lepton. Upper bounds on the combined branching fraction  $B(H \rightarrow aa)$  are also set for different types of 2HDM+S.

## Alternate track

### I read the instructions above

Yes

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