

## Higgs rare and exotic decays at CMS

*Sunday, 21 December 2025 14:20 (20 minutes)*

This talk presents the latest results from the CMS experiment on rare and exotic decays of the Higgs boson, which serve as crucial portals to physics beyond the Standard Model (BSM). Key highlights include the first evidence of the  $H \rightarrow \mu\mu$  decay, probing the second-generation Yukawa coupling, and the  $H \rightarrow Z\gamma$  decay, with a combined significance of  $3.4\sigma$ . Searches for  $H \rightarrow c\bar{c}$ , decays to mesons, invisible decays, and exotic decays such as  $H \rightarrow aa \rightarrow 4e$  are also discussed, showcasing advanced analysis techniques including graph neural networks. All results are consistent with Standard Model predictions so far. With ongoing Run-3 data collection and future HL-LHC operations, the sensitivity to these rare processes is expected to improve significantly.

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