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Search for Lorentz boosted nonresonant HH production in the 4b final state with the CMS detector (Zoom)

Tuesday, September 13, 2022 4:30 PM (12 minutes)

Double Higgs boson production (HH) allows us to measure the Higgs self-interaction and is uniquely sensitive to the structure of the Higgs potential. This talk will cover the production of HH⟶4b with highly boosted Higgs bosons in the gluon-fusion (ggF) and VBF production mode with 138 fbˆ{-1} of data collected with the CMS Experiment at sqrt(s) = 13 TeV [1]. The four-bottom-quark final state has the largest branching ratio (33.9%) amongst all HH decays, but is dominated by large backgrounds (QCD and top) and a poor decay channel resolution. To enhance the signal sensitivity, this analysis uses a dedicated jet identification algorithm developed to identify boosted H⟶ bb jets, known as the ParticleNet Tagger. This analysis is very sensitive to anomalous quartic VVHH couplings and, for the first time, we exclude κ_{2V} = 0 at >5 $sigma$, when other Higgs couplings are at their SM values. This talk will cover the analysis methods used and show the final sensitivity to different HH couplings (κ_λ, κ_{2V} and κ_V). I'll also discuss future directions and scope of improvements for measuring the HH process.

Presenter: DUTTA, Irene (California Institute of Technology (US))

Session Classification: Young scientist forum