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## Combined Search for an Invisibly Decaying Higgs Boson in Hadronic Channels at $\sqrt{s} = 13$ TeV with CMS

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The leading upper limit on the Higgs boson to invisible state branching ratio (BR) is 24%, while the Standard Model prediction sits far below at 0.1%. The observed value was measured using pp collision data collected by the CMS experiment between 2011 and 2015. Our analysis targets a better limit by using 13 TeV data from 2016-2018 – an integrated luminosity of over 130 fb<sup>-1</sup> – in addition to performing the combination over all Higgs production modes from the outset rather than in a posthoc fashion. The hadronic channels we include are gluon-gluon fusion, ttH, vector boson fusion (VBF) and Higgs production in association with a vector boson (VH). Analysing each production mode in an orthogonal search region gives a high degree of sensitivity compared to previous attempts. In this talk, the finalised event selection, signal categorisation, data-driven background estimation and systematic uncertainties for the non-VBF modes will be presented. A sufficiently accurate limit on the BR that is still above the Standard Model prediction may be interpreted in a beyond-Standard Model context. Constraints can be placed on theories that posit exotic particles or dark matter that couple to the Higgs, enhancing the invisible state BR.

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