



SPEAKER: Michele De Gruttola

TITLE: **Evidence for the decay of the Higgs boson to bottom quarks with CMS data**

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## ABSTRACT

A search for the standard model (SM) Higgs boson (H) decaying to  $bb$  when produced in association with an electroweak vector boson (V) is presented for the following processes:  $Z(\nu\nu)H$ ,  $W(\mu\nu)H$ ,  $W(e\nu)H$ ,  $Z(\mu\mu)H$ , and  $Z(ee)H$ . The search is performed in data samples corresponding to an integrated luminosity of 35.9 /fb at  $\sqrt{s} = 13$  TeV recorded by the CMS experiment at the LHC during Run 2 in 2016. An excess of events is observed in data compared to the expectation in the absence of a  $H \rightarrow bb$  signal. The significance of this excess is 3.3 standard deviations, where the expectation from SM Higgs boson production is 2.8. The signal strength corresponding to this excess, relative to that of the SM Higgs boson production, is  $1.2 \pm 0.4$ . This result is combined with the one from the search for the same processes performed by the CMS experiment in Run 1 of the LHC (using proton-proton collisions at  $\sqrt{s} = 7$  and 8 TeV with data samples corresponding to integrated luminosities of up to 5.1 and 18.9 /fb, respectively). The observed combined signal significance is 3.8 standard deviations with 3.8 expected from a SM Higgs boson signal. The corresponding signal strength, relative to that of the SM Higgs boson, is  $1.06^{+0.31}_{-0.29}$ .