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Measurement and interpretation of differential cross sections for Higgs boson production at $\sqrt{s}=13\text{TeV}$ (Article) [Open Access](#)

Sirunyan, A.M.^a, Tumasyan, A.^a, Adam, W.^b, Ambrogio, F.^b, Asilar, E.^b, Bergauer, T.^b, Brandstetter, J.^b, Dragicevic, M.^b, Erö, J.^b, Escalante Del Valle, A.^b, Flechl, M.^b, Frühwirth, R.^b, Ghete, V.M.^b, Hrubec, J.^b, Jeitler, M.^b, Krammer, N.^b, Krätschmer, I.^b, Liko, D.^b, Madlener, T.^b, Mikulec, I.^b, Rad, N.^b, Rohringer, H.^b,

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Abstract

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Differential Higgs boson (H) production cross sections are sensitive probes for physics beyond the standard model. New physics may contribute in the gluon-gluon fusion loop, the dominant Higgs boson production mechanism at the LHC, and manifest itself through deviations from the distributions predicted by the standard model. Combined spectra for the $H\rightarrow\gamma\gamma$, $H\rightarrow ZZ$, and $H\rightarrow b\bar{b}$ decay channels and the inclusive Higgs boson production cross section are presented, based on proton-proton collision data recorded with the CMS detector at $\sqrt{s}=13\text{TeV}$ corresponding to an integrated luminosity of 35.9fb^{-1} . The transverse momentum spectrum is used to place limits on the Higgs boson couplings to the top, bottom, and charm quarks, as well as its direct coupling to the gluon field. No significant deviations from the standard model are observed in any differential distribution. The measured total cross section is $61.1\pm 6.0(\text{stat})\pm 3.7(\text{syst})\text{pb}$, and the precision of the measurement of the differential cross section of the Higgs boson transverse momentum is improved by about 15% with respect to the $H\rightarrow\gamma\gamma$ channel alone. © 2019 The Author(s)

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Combination Differential cross sections Higgs boson coupling modifiers

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