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## Observation of the Higgs boson decay to a pair of tau leptons with the CMS detector

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### Abstract

A measurement of the  $H \rightarrow \tau\tau$  signal strength is performed using events recorded in proton-proton collisions by the CMS experiment at the LHC in 2016 at a center-of-mass energy of 13TeV. The data set corresponds to an integrated luminosity of 35.9 fb<sup>-1</sup>. The  $H \rightarrow \tau\tau$  signal is established with a significance of 4.9 standard deviations, to be compared to an expected significance of 4.7 standard deviations. The best fit of the product of the observed  $H \rightarrow \tau\tau$  signal production cross section and branching fraction is 1.09(-0.2)(+0.27) times the standard model expectation. The combination with the corresponding measurement performed with data collected by the CMS experiment at center-of-mass energies of 7 and 8 TeV leads to an observed significance of 5.9 standard deviations, equal to the expected significance. This is the first observation of Higgs boson decays to tau leptons by a single experiment. (c) 2018 The Author(s). Published by Elsevier B.V.

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