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Search for the standard model Higgs boson in associated WH production in the emutau and mumutau final states

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At the LHC, the Standard Model Higgs boson is expected to be produced mainly from gluon and vector boson fusion. A secondary process is the Higgs production in association with vector bosons which, despite the lower cross section, provides an additional sensitive channel thanks to the higher background rejection achieved through the additional highly energetic leptons from the W/Z decays. Moreover, in the light mass region, Higgs decay into τ -lepton pairs has the second highest branching ratio, after the decay in $b\bar{b}$ (more difficult to reconstruct). For these reasons, a search for the WH production, where the Higgs decays into tau pairs, has been performed based on data collected with the CMS detector during 2011 and corresponding to an integrated luminosity of 4.7 fb⁻¹. A full data-driven background estimation, based on a lepton fake rate technique, is also presented. The data are found to be consistent with the expected Standard Model background, therefore, upper limits at 95% CL on the WH production cross section are set.

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