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Studies for Standard Model Higgs Decaying to two pseudoscalar light bosons with final states two muons and two taus, in pp colisions using the CMS detector

Searches for exotic decay of the scalar Higgs boson to a pair of light pseudoscalar α bosons, which subsequently decay into pairs of muons and taus are performed using data collected by the CMS Experiment at centre-of-mass energies 8 and 13 TeV in addition to data based on future runs. This scenario is modivated by the 2HDM+S model which predicts the existence of supersymmetric higgs bosons. For the decay channel h->αα->mmττ TYPE III has the largest braching fraction. Due to the short lifetime of taus we study 6 different final states depending on whether the tau leptons decay leptonicaly or hadronicaly: mmτeτe , mmτeτμ , mmτeτh, mmτμτμ, mmτμτh and mmτhτh. Pseudoscalar boson masses between 20 and 60 GeV are promped. The estimation of the background contribution from experimental data and the contribution of theoretical and experimental uncertainties will be also addressed. A possible discovery of a scalar or pseudoscalar Higgs Boson would constitute a decisive test for 2HDM+S model.

Experimental Collaboration

CMS

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