

Abstract Submitted
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Higgs properties from Higgs to gamma gamma with converted photons FADY BISHARA, Univ of Cincinnati, YUVAL GROSSMAN, Cornell, RONI HARNIK, FNAL, DEAN ROBINSON, U.C. Berkeley, JING SHU, KITP China, JURE ZUPAN, Univ of Cincinnati — We show that the photon polarizations in the $h \rightarrow \gamma\gamma$ decay can be used to extract information about the CP properties of the Higgs interactions. The Higgs to photons coupling is one-loop suppressed in the Standard Model (SM) and is a good place to test for New Physics (NP) for two reasons: first, NP that modifies the couplings of the Higgs to vector bosons will have a larger effect on the $h \rightarrow \gamma\gamma$ than the $h \rightarrow ZZ$ coupling which is tree-level in the SM. Second, in the differential decay rate, CP violating observables are linearly proportional to interference terms that vanish in the total rate. In the $h \rightarrow \gamma\gamma$ process, both photons convert via a Bethe-Heitler process in 25% of the events. For vector bosons in general, the decay plane is itself correlated with the boson polarization. We construct observables sensitive to the CP violating terms in the decay process and present differential distributions from simulated events.

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