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Probing CP Violation in $h \to \gamma\gamma$ with Converted Photons[1] FADY BISHARA, University of Cincinnati/Fermilab, YUVAL GROSSMAN, Cornell University, RONI HARNIK, Fermilab, DEAN ROBINSON, University of California Berkeley/LBL, JING SHU, KITP China, JURE ZUPAN, University of Cincinnati
— We study Higgs diphoton decays where both photons convert to electron-positron pairs in the field of a nucleus in a silicon tracker. The kinematic distribution of the two electron-positron pairs may be used to probe the CP violating (CPV) coupling of the Higgs to photons, that may be produced by new physics. Further, interference terms in the differential rate are linearly proportional to the CPV coupling of Higgs to two photons but vanish in the integrated rate which is only quadratically sensitive. We derive compact expressions for the fully differential rate which we use to generate Monte Carlo (MC) events with a dedicated code. We then apply experimental cuts to the MC events to enhance the CPV signal. We show that there exist regions of phase space on which sensitivity to CPV is of order unity.

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