Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Search strategies for the exotic decays of the Higgs boson into two photons plus missing energy at the LHC RAFAEL TEIXEIRA DE LIMA, Northeastern University, SHIKMA BRESSLER, Weizmann Institute of Science, STEFANIA GORI, Perimeter Institute, ABDOLLAH MOHAMMADI, Kansas State University, TOYOKO ORIMOTO, Northeastern University, JESSIE SHELTON, University of Illinois at Urbana-Champaign — In this study, we devise a search strategy for the exotic decay of the 125 GeV Higgs boson in the $\gamma\gamma$+missing energy final state. The studied final state comes in two different topologies: resonant and non-resonant. In the resonant case, the Higgs decays into two scalars, one being undetected and the other decaying resonantly into two photons. In the non-resonant case, based on low scale SUSY breaking models, the Higgs decays into two neutralinos, each subsequently decaying into a photon and a gravitino. We estimate the sensitivity of these searches using a DELPHES detector simulation, and targeting 100 fb^{-1} of $\sqrt{s} = 14$ TeV pp data from the LHC.

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Date submitted: 08 Jan 2016 Electronic form version 1.4