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Diphoton signal of light Higgs Boson in NMSSM at the LHC.

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The next-to-minimal supersymmetric standard model (NMSSM) with an extended Higgs sector offers at least one Higgs boson as the Standard model (SM) like Higgs with a mass around 125 GeV. We revisit the mass spectrum and couplings of non-SM-like Higgs bosons taking into consideration most relevant constraints. We evaluate the rates of productions of these non-SM-like Higgs bosons at the LHC for a variety of decay channels corresponding to the allowed region of the parameter space. We notice that for a substantial region of the parameter space the two-photon decay mode has a remarkably large rate. In this study we emphasize that this diphoton mode can be exploited to find the non-SM-like Higgs bosons of the NMSSM and can also be a potential avenue to distinguish the NMSSM from the MSSM. We plan to present also detection possibility of light pseudoscalar Higgs boson (A_1) in the diphoton final states where A_1 is produced via chargino-neutralino production. In this context we will present signal sensitivity by computing the background in details at the LHC with energy 13 TeV.

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