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Enhanced diphoton signal of a light singlet-like scalar in NMSSM

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NMSSM with a light singlet-like scalar and strongly suppressed couplings to b and τ is investigated. It is shown that in such a scenario the singlet-like scalar to diphoton signal can be larger than for the SM Higgs for a wide range of masses between 60 and 110 GeV, in agreement with all the LEP and LHC data. Enhancement of the singlet-like scalar to diphoton signal is correlated with positive correction to the SM-like Higgs mass from mixing between SM-like Higgs and the singlet. It is also shown that the couplings to b and τ and, in consequence, branching ratios of the SM-like Higgs are anti-correlated with those of the singlet-like scalar. If the singlet-like scalar to diphoton signal is enhanced, the signal strengths of the 125 GeV Higgs in the diphoton and WW*/ZZ* channels are predicted to be smaller than for the SM Higgs.

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