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High SUSY scale and a few-parameter description of the scalar sector

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We analyze the Minimal Supersymmetric extension of the Standard Model that we have after the discovery of the Higgs boson at the LHC, i.e. a model in which the lighter h boson has a mass of approximately 125 GeV which, together with the non-observation of superparticles at the LHC, indicates that the SUSY-breaking scale M_S is rather high. We first demonstrate that the value $M_h \approx 125$ GeV fixes the dominant radiative corrections that enter the MSSM Higgs boson masses, leading to a Higgs sector that can be described, to a good approximation, by only two free parameters. In a second step, we consider the direct supersymmetric radiative corrections and show that, to a good approximation, the phenomenology of the lighter Higgs state can be described by its mass and three couplings : those to massive gauge bosons and to top and bottom quarks. We perform a fit of these couplings using the latest LHC data on the production and decay rates of the light h boson and combine it with the limits from the negative search of the heavier H, A and H^\pm states.

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