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Benchmark scenarios and resonant decays in singlet models at the LHC run 2

Content :

Singlet models are an interesting and simple framework to address several beyond the standard model issues which can also provide interesting new phenomenology at colliders. They can provide dark matter candidates, improve the stability of the standard model (SM) at high energies, make electroweak baryogenesis viable and provide Higgs to two-Higgs decay signatures at colliders. In this talk I will discuss the real and complex singlet extensions of the SM with emphasis on resonant decays of heavy Higgs bosons with an SM-like Higgs boson in the decay. I will also present a comparison between a singlet model with two new Higgs bosons (visible at the LHC run 2) and the NMSSM, as well as with two singlet models with only one new Higgs boson at the LHC run 2.

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