

Search for Higgs-like scalar particles in the $bb\gamma\gamma$ final state with the ATLAS experiment.

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We develop a new class of experimental search for new Higgs-like spin-0 particles with the ATLAS experiment at LHC. We focus on the essentially unexplored asymmetric Higgs decay $X \rightarrow SH$, where X and S denote two BSM spin-0 Higgs-like neutral particles and X is the heavier of the two ($m_X > m_S$). H denotes the already experimentally known Higgs boson with a mass of $m_H = 125$ GeV. This type of LHC signature arises in models that predict primordial Gravitational Waves (GW) and are able explain the baryon- antibaryon asymmetry of the universe via Strong First Order Electroweak Phase Transition which generates primordial GW in the process. In this talk we present the construction of a search for $X \rightarrow SH$ in the two photon, two b-jet final states and projected sensitivities with Run-2 and Run-3 data.

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