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Interference Study on ttbb Final State by Monte Carlo Event Generation for a Heavy Higgs Search at the ATLAS Experiment at the LHC

At the LHC, particle physicists have been actively searching for more Higgs bosons, since the discovery of one, at 126 GeV, in 2012. The 126 GeV Higgs boson behaves like the Standard Model (SM) described. However, it is uncertain whether it is the SM Higgs or a SM-like Higgs among a larger Higgs sector in some beyond Standard Model (BSM) theories. The HKU ATLAS group is interested in the simplest extended Higgs sector in the Two Higgs Doublet Model (2-HDM) and is looking for production of heavier Higgs bosons with ttbb final state from billions of proton-proton (p-p) collisions. Discovery of a heavy Higgs boson will prove the existence of an extended Higgs sector and eliminate some BSM theories. This project is a study of the effect of interference between different processes with ttbb final state by simulating p-p collisions with Monte Carlo method.

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