

Search for a Generic Heavy Higgs Boson at ATLAS

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Many beyond the Standard Model (BSM) theories suggest the existence of multiple fundamental scalar fields and associated Higgs bosons, with the standard model Higgs boson being the lightest and most easily discovered. The dimension-4 interactions between a theorized generic heavy Higgs boson and Standard Model (SM) particles have already been explored in all major Higgs boson production channels, particularly in gluon-gluon fusion, with no evidence of BSM effects so far. Thus, our study takes a new direction by accounting for effective dimension-6 interactions with SM particles in addition to dimension-4 interactions, and by probing the VH channel for a heavy Higgs boson. If the generic heavy Higgs boson is connected with BSM physics at the scale of a few TeV, these dimension-6 operators will dramatically boost heavy Higgs boson momentum such that it can be distinguished from background. This particular region of the phase space has not been investigated by previous LHC studies, enhancing its potential for discovery of BSM physics and a generic heavy Higgs boson.

In this talk, I will present the motivations for the Generic Heavy Higgs Search and the reason for exploring this particular corner of the phase space, as well as the work-in-progress Monte-Carlo kinematic distributions and upper limits describing various signal hypotheses.

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Author: VU, Carter Cheney (University of Washington (US))

Co-authors: LI, Ke (University of Washington (US)); HSU, Shih-Chieh (University of Washington Seattle (US))

Presenter: VU, Carter Cheney (University of Washington (US))

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