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Reconstructing the general 2HDM charged Higgs boson at the LHC

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We study the discovery prospects for a charged Higgs boson via the $bg \to cH^- \to c\bar{t}b$ process at the Large Hadron Collider (LHC). Focusing on the general Two Higgs Doublet Model (G2HDM) that possesses extra Yukawa couplings, the process is controlled by extra top couplings ρ_{tc} and ρ_{tt}, which can drive electroweak baryogenesis to account for the baryon asymmetry of the Universe. We propose benchmark points and demonstrate that evidence could emerge at 14 TeV LHC and luminosity of 300 fb^{-1}, with discovery potential at 600 fb^{-1}.

Primary author: KRAB, Mohamed (National Taiwan University)

Co-author: Prof. HOU, Wei-Shu (National Taiwan University)

Presenter: KRAB, Mohamed (National Taiwan University)

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