Contribution ID: **49** Type: **not specified**

Charged Higgs boson production via cb-fusion at the Large Hadron Collider

We analyze the production of a light charged Higgs boson at the Large Hadron Collider (LHC) via the quark-fusion mechanism cb⁻⟶H- considering the decay channel H-⟶τν⁻τ in the final state. We study this process in the framework of the two-Higgs-doublet model type III (2HDM-III) which assumes a four-zero texture in the Yukawa matrices and a general Higgs potential, wherein the two Higgs doublets coupling to both up and down fermions do generate flavor-changing neutral currents, yet the latter can be controlled by the texture when flavor physics constraints are considered. We consider the parameter space of the model where this signal is enhanced and in agreement with both theoretical constraints and experimental data. In particular, we exploit the setup with lepton-specific-like Yukawa couplings and assess the LHC sensitivity to such H± signals against the dominant irreducible and reducible backgrounds. We show that in our model BR(H±⟶cb)~0.1–0.2 and BR(H±⟶τν)~0.7–0.9 so that, under these conditions the prospects for H± detection in the 2HDM-III in the aforementioned production and decay channels are excellent assuming standard collider energy and luminosity conditions.

We analyze the production of a light charged Higgs boson at Large Hadron Collider (LHC), via the quark-fusion $c\bar{b} + h.c. \to H^-$, considering the decay channel $H^- \to \tau\bar{\nu}_\tau$ in the final state. We study this process in the framework of the 2-Higgs Doublet Model Type III (2HDM-III) which assumes a four-zero texture in the Yukawa matrices and a general Higgs potential, wherein the two Higgs doublets coupling to both up and down fermions do generate flavor-changing neutral currents, yet the latter can be controlled by the texture when flavor physics constraints are considered. We consider the parameter space of the model where this signal is enhanced and in agreement with both theoretical constraints and experimental data. In particular, we exploit the setup with lepton-specific-like Yukawa couplings and assess the LHC sensitivity to such $H^\pm$ signals against a variety of both reducible and irreducible backgrounds. We show that under this scheme $BR(H^\pm \to cb) \sim 0.1-0.2$ and $BR(H^\pm \to \tau\nu) \sim 0.7-0.9$ so that, under these conditions the prospects for $H^\pm$ detection in the 2HDM-III in the aforementioned production and decay channels are excellent assuming standard collider energy and luminosity conditions.

Authors: HONORATO, Carlos (BUAP); ROSADO NAVARRO, Sebastian; HERNÁNDEZ-SÁNCHEZ, Jaime (Benemérita Universidad Autónoma de Puebla); MORETTI, Stefano (University of Southampton)

Presenter: HERNÁNDEZ-SÁNCHEZ, Jaime (Benemérita Universidad Autónoma de Puebla)