

Charged Higgs boson phenomenology within 2HDM-III

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Abstract content

We discuss the implications of assuming a four-zero Yukawa texture for the properties of the charged Higgs boson within the context of the general 2-Higgs Doublet Model of Type III. We begin by presenting a detailed analysis of the charged Higgs boson couplings with heavy quarks and the resulting pattern for its decays, including the decay $H^+ \rightarrow W^+\gamma$ at 1-loop level. The parameters chosen can still avoid the $B \rightarrow X_s\gamma$ constraint, the perturbativity and ρ_0 bound. Also, we present the constraints of $B0 - \bar{B}0$ mixing and of the radiative corrections to the $Zb\bar{b}$ vertex in the regime small $\tan\beta$. The production of charged Higgs bosons is also sensitive to the modifications of its couplings, so that we also evaluate the resulting effects on the top decay $t \rightarrow bH^+$ as well as on direct $c\bar{b} \rightarrow H^+ + c.c.$ and indirect $q\bar{q}, gg \rightarrow t\bar{b}H^+ + c.c.$ production. Significant scope exists at the Large Hadron Collider for several H^\pm production and decay channels combined to enable one to distinguish between such a model and alternative 2-Higgs doublet scenarios.

Summary

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