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Probing H+ with the mu_x boosted bottom-jet tag

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We present the discovery potential for a TeV-scale charged Higgs using 100–300 fb^{-1} of 13–14 TeV LHC data. While H^+ is predicted by a generic two Higgs doublet model, strong phenomenological constraints restrict our focus to type-II models in the alignment limit. We examine H^+ produced in association with, and decaying to, 3rd generation quarks ($pp \to \bar{t}b(H^+ \to t\bar{b})$). The $H^+ \to t\bar{b}$ final state gives H^+ superior reach (compared to its neutral H/A siblings) in the critical "wedge" region ($\tan(\beta) = 2$–20), where the dominant neutral coupling transitions from y_t to y_b.

We tag massive $H^+ \to t\bar{b}$ by pairing a high-efficiency boosted-top tag with our low fake-rate μ_x boosted bottom-jet tag (which rejects light jets $\sim$10 times better than prior b-tags). The success of the μ_x tag to suppress the QCD background for H^+ events further validates its usefulness in the high-p_T regime (as has already been demonstrated in generic W' and leptophobic Z' searches).

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