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Higgs bosons with large couplings to up-type quarks

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We present an analysis of Two Higgs Doublet Models with an extended flavor sector realizing Spontaneous Flavor Violation. In this framework, flavor changing neutral currents are suppressed by powers of CKM matrix elements and Yukawa insertions, allowing the New Physics states to be closer to the energy reach of current colliders. Breaking away from the New Physics paradigm that dictates preferential couplings to the heavier, third generation particles, we see that it is possible to have large couplings to light quarks within this construction. Specifically, we study the bounds on dimension 6 effective operators arising in an Effective Field Theory for this class of models. We find that new couplings of order ~ 1 are allowed for $m \sim 100$ GeV of new Higgs states. Our results are relevant considering recent experimental bounds on the charm quark Yukawa coupling modifier $|\kappa_c|$. In addition, they strongly motivate dedicated experimental searches for deviations from the Standard Model in the light quark sector.

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