

Exotic signals of heavy scalar bosons through vectorlike quarks

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Heavy vectorlike quarks (VLQs) in many new physics models are very attractive as they can play the key role in the model building and easily fit in with the Higgs measurement as well as the electroweak precision data. We study their **loop level** effects on the phenomenological signatures of a heavy scalar boson S . Under some conditions, loop induced decays of S are significantly enhanced. First, the longitudinal polarization enhancement in the decay of $S \rightarrow WW/ZZ$ can happen at loop level, which is shown in a singlet extended standard model with VLQs. We find that the critical condition for the radiative enhancement is large mass differences among VLQs. Secondly, the heavy VLQs running in the loop open new decay channels of the charged Higgs bosons into $W\gamma$ and WZ . In a two Higgs doublet model with VLQs, the branching ratios can be as large as 10^{-3} .

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