

Abstract Submitted  
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**All-hadronic search for Vector-Like Quarks using the BESTagger with  $137 \text{ fb}^{-1}$  of  $\sqrt{s} = 13 \text{ TeV}$  proton-proton collisions collected by CMS** JOHAN BONILLA, University of California, Davis, CMS COLLABORATION — We present the status of our all-hadronic analysis in search of pair-produced Vector-Like Quarks (VLQs) using the Boosted Event Shape Tagger (BEST) with the CMS detector using  $137 \text{ fb}^{-1}$  of  $\sqrt{s} = 13 \text{ TeV}$  proton-proton collisions at the LHC. VLQs are motivated by models which predict compositeness of the scalar Higgs boson and avoid increasing constraints from Higgs measurements. In the all-hadronic channel, this analysis is sensitive to all possible VLQ decay modes:  $T(B)\text{-}\bar{t}(b)H/t(b)Z/b(t)W$ , capturing the highest branching fraction of each process. The high mass of the VLQs produce highly boosted objects in the final state which can be reconstructed as anti- $k_T$   $R=0.8$  jets and identified as either QCD/b/W/Z/H/t using the BESTagger. The tagger boosts jet constituents into various rest frames and uses neural networks to find correlations between event shape variables, such as Fox-Wolfram moments and sphericity, to determine the category of identification. The HT (sum pT) of the event is scanned for an excess of signal. The analysis is in progress and plans to be completed by summer 2021.

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