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Diquark effect on single top production at LHC

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Abstract:

In this work, we consider a color sextet vector diquark having the quantum number of (ud) type, its resonance production, and the subsequent decay to $t\bar{b}$, giving rise to excess contribution to the single top production. The strong resonance production of the diquark dominates the weak production of $t\bar{b}$ for a wide range of the diquark mass. Also its subsequent decay to $t\bar{b}$ produce a very hard b-jet compared to the usual electroweak production. In addition, the missing energy in the final state event is much larger from the massive diquark decays. Thus, with suitable cuts, the final state with b, \bar{b} and a charged lepton together with large missing energy stands out compared to the Standard Model background. We make a detailed study of both the signal and the background.

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