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Jet Clustering Techniques for New Higgs Boson Searches in Hadronic Final States

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We assess the performance of different jet-clustering algorithms, in the presence of different resolution parameters and reconstruction procedures, in resolving fully hadronic final states emerging from the chain decay of the discovered Higgs boson into pairs of new identical Higgs states, the latter in turn decaying into bottom-antibottom quark pairs. We show that, at the Large Hadron Collider (LHC), both the efficiency of selecting the multi-jet final state and the ability to reconstruct from it the masses of the Higgs bosons (potentially) present in an event sample depend strongly on the choice of acceptance cuts, jet-clustering algorithm as well as its settings. Hence, we indicate the optimal choice of the latter for the purpose of establishing such a benchmark Beyond the SM (BSM) signal. We then repeat the exercise for a heavy Higgs boson cascading into two SM-like Higgs states, obtaining similar results.

In-person participation

Yes

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