

Double Higgs Production with a Jet Substructure Analysis to Probe Large Extra Dimensions

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In this paper, we perform a comprehensive study to probe the effects of large extra dimensions through double Higgs production in proton-proton collisions at the center-of-mass energies of 14, 33, and 100 TeV. We concentrate on the channel in which both Higgs bosons decay into the $b\bar{b}$ pair and take into account the main background contributions through realistic Monte Carlo simulations. In order to achieve an efficient event reconstruction and a good background rejection, jet substructure techniques are used to efficiently capture the boosted Higgs bosons in the final state. The expected limits on the model parameters are obtained based on the invariant mass and the angular properties of the final state objects. Depending on the number of extra dimensions, bounds up to 6.1, 12.5, and 28.1 TeV are set on the model parameter at proton-proton collisions with the center-of-mass energies of 14, 33, and 100 TeV, respectively. [Phys. Rev. D 92, 073013].

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