Search for low-mass resonances decaying into bottom quark-antiquark pairs in proton-proton collisions at root s=13 TeV

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Abstract

A search for narrow, low-mass, scalar, and pseudoscalar resonances decaying to bottom quark-antiquark pairs is presented. The search is based on events recorded in root s = 13 TeV proton-proton collisions with the CMS detector at the LHC, collected in 2016, and corresponding to an integrated luminosity of 35.9 fb(-1). The search selects events in which the resonance would be produced with high transverse momentum because of the presence of initial- or final-state radiation. In such events, the decay products of the resonance would be reconstructed as a single large-radius jet with high mass and two-prong substructure. A potential signal would be identified as a narrow excess in the jet invariant mass spectrum. No evidence for such a resonance is observed within the mass range from 50 to 350 GeV, and upper limits at 95% confidence level are set on the product of the cross section and branching fraction to a bottom quark-antiquark pair. These constitute the first constraints from the LHC on exotic bottom quark-antiquark resonances with masses below 325 GeV.

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