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Search for a low-mass $\tau^-\tau^+$ resonance in association with a bottom quark in proton-proton collisions at $\sqrt{s} = 13$ TeV (Article) (Open Access)

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Abstract

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A general search is presented for a low-mass $\tau^-\tau^+$ resonance produced in association with a bottom quark. The search is based on proton-proton collision data at a center-of-mass energy of 13 TeV collected by the CMS experiment at the LHC, corresponding to an integrated luminosity of 35.9 fb^{-1}. The data are consistent with the standard model expectation. Upper limits at 95% confidence level on the cross section times branching fraction are determined for two signal models: a light pseudoscalar Higgs boson decaying to a pair of τ leptons produced in association with bottom quarks, and a low-mass boson X decaying to a τ-lepton pair that is produced in the decay of a bottom-like quark B such that B → bX. Masses between 25 and 70 GeV are probed for the light pseudoscalar boson with upper limits ranging from 250 to 44 pb. Upper limits from 20 to 0.3 pb are set on B masses between 170 and 450 GeV for X boson masses between 20 and 70 GeV.[Figure not available: see fulltext.].

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