

Search for a heavy resonance decaying into a top quark and a W boson in the lepton+jets final state at $\sqrt{s} = 13$ TeV

A search for a heavy resonance decaying into a top quark and a W boson in proton-proton collisions at $\sqrt{s} = 13$ TeV is presented. The data was recorded by CMS detector and correspond to an integrated luminosity of up to 138 fb⁻¹. The analysis is performed in the lepton+jets final state, where the top quark is reconstructed from an electron or muon, missing transverse momentum and a jet identified as originating from a bottom quark. The W boson from the resonance decay is reconstructed as a single large-radius jet, identified by its characteristic substructure. The results are interpreted in the context of an excited bottom quark b^* model. No statistically significant excess over the expected background is found, and b^* quarks with left-handed, right-handed, and vector-like chiralities are excluded at 95% confidence level for masses below 2.4, 2.8, and 3.1 TeV, respectively.

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Session Classification: 分会场一

Track Classification: TeV 物理和超出标准模型新物理