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Search for vector-like B quarks with oppositely-charged dilepton pairs in proton-proton collisions at 13 TeV

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We present the results of searches for pair-produced vector-like B quarks using proton-proton collision data collected with the CMS detector at the CERN LHC at a center-of-mass energy of 13 TeV. The searches are performed using opposite sign dileptons from a Z boson decay. Vector-like quarks, having symmetric interactions in the weak sector of the Standard Model (SM), are postulated as an alternate mechanism to solve the Hierarchy problem of the SM, compared to SUSY models. The search focuses on a vector-like quark doublet, meaning the vector-like B quark can decay to two potential channels: bZ or bH . Using a chi-squared minimization technique, we are able to reconstruct the potential vector-like B invariant mass. This mass is used to distinguish signal from background. This search allows us to probe for B quark masses up to 1.1 GeV assuming a 100% branching ratio of the B quark decay.

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