Contribution ID: **35** Type: **not specified**

Search for Massive Vector-like Quarks using Boosted Particle Reconstruction in CMS

Friday 22 July 2016 10:05 (20 minutes)

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Summary

We present results of searches for massive top and bottom quark partners decaying to boosted particles using proton-proton collision data collected with the CMS detector at the CERN LHC at a center-of-mass energy of 8 and 13 TeV. These fourth-generation vector-like quarks are postulated to solve the Hierarchy problem and stabilize the Higgs mass, while escaping constraints on the Higgs cross section measurement. The vector-like quark can be produced singly or in pair and their decays result in a variety of final states, containing boosted top and bottom quarks, boosted gauge and Higgs bosons. We search using several categories of reconstructed objects, from multi-leptonic to fully hadronic final states. We set exclusion limits on both the vector-like quark mass and cross sections, for combinations of the vector-like quark branching ratios.

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Session Classification: Plenary