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Search for a new heavy particle with exclusive couplings to top quarks in multiple-top-quarks final states

A search for a new heavy particle produced in association with top quarks and exclusively decaying into a top quark pair is presented, based on proton-proton collision data taken with the CMS experiment from 2016 to 2018 at 13 TeV and 2022 at 13.6 TeV.

The two top quarks from the new particle are expected to be highly Lorentz-boosted. The particle mass is reconstructed from a pair of special jets resulting from a variable-radius jet clustering algorithm. These jets are identified as originating from hadronically decaying top quarks using a machine learning algorithm. The signal region is defined by events that also contain opposite-sign leptons and b-tagged jets.

Various scenarios, characterized by different particle masses in the range 500 GeV to 4 TeV, are tested by searching for local excesses in the reconstructed mass spectrum.

Secondary track

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