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## Search for pair-produced resonances decaying to quark pairs in proton-proton collisions at $\sqrt{s} = 13$ TeV (Article) [\(Open Access\)](#)

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### Abstract

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A general search for the pair production of resonances, each decaying to two quarks, is reported. The search is conducted separately for heavier resonances (masses above 400 GeV), where each of the four final-state quarks generates a hadronic jet resulting in a four-jet signature, and for lighter resonances (masses between 80 and 400 GeV), where the pair of quarks from each resonance is collimated and reconstructed as a single jet resulting in a two-jet signature. In addition, a b-tagged selection is applied to target resonances with a bottom quark in the final state. The analysis uses data collected with the CMS detector at the CERN LHC, corresponding to an integrated luminosity of 35.9 fb<sup>-1</sup>, from proton-proton collisions at a center-of-mass energy of 13 TeV. The mass spectra are analyzed for the presence of new resonances, and are found to be consistent with standard model expectations. The results are interpreted in the framework of R-parity-violating supersymmetry assuming the pair production of scalar top quarks decaying via the hadronic coupling  $\lambda_{312}$  or  $\lambda_{323}$  and upper limits on the cross section as a function of the top squark mass are set. These results probe a wider range of masses than previously explored at the LHC, and extend the top squark mass limits in the  $t \rightarrow qq'$  scenario. © 2018 CERN.

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