

Searching for top-quark pair resonances in the fully hadronic final state at the ATLAS experiment

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Models of new physics often predict a coupling of new heavy particles to top quarks. Therefore the search for heavy resonances in the reconstructed mass of top quark pairs is a promising tool for testing extensions of the standard model.

Such an analysis searching for heavy resonances decaying to top quark pairs in which both top quarks decay hadronically was performed using proton-proton collision data at a center of mass energy of 13 TeV recorded in 2015 and 2016 by ATLAS.

The analysis focuses on improving the sensitivity over a large ditop mass range. This is achieved by combining resolved and substructure based top quark reconstruction methods. The largest backgrounds consisting of standard model top quark pair and QCD multijet production are estimated using data-driven techniques and validated in control regions.

No excess from the Standard Model prediction is observed. Thus, upper limits are set on the production cross-section times branching fraction for new hypothetical Z' bosons, dark-matter mediators, Kaluza-Klein gravitons and Kaluza-Klein gluons. The Z' in the topcolor-assisted-technicolor model is e.g. excluded in the mass range from 0.58 TeV to 3.1 TeV.