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Searches for new physics using the top-quark pair invariant mass distribution in proton-proton collisions at $\sqrt{s}=13$ TeV

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A search for new heavy particles that decay into top-quark pairs is performed in proton-proton collisions at the LHC at a center-of-mass energy of 13 TeV using data collected by the ATLAS experiment during the years 2015 and 2018. Events consistent with top-quark pair production are selected by requiring a single isolated charged lepton, missing transverse momentum and jet activity compatible with a hadronic top-quark decay. Jets identified as likely to contain b-hadrons are required to reduce the background from other Standard Model (SM) processes. The observed invariant mass spectrum of the candidate top-quark pairs is investigated to seek for any significant deviation from the SM background expectation.

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