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A search for charged Higgs bosons with the ATLAS experiment

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The experimental observation of charged Higgs bosons, whose existence is predicted by several models with an extended Higgs sector, would be an unambiguous signal for physics beyond the Standard Model (SM). We present the results from a search for charged Higgs bosons in 36/fb of pp collision data at 13 TeV recorded by the ATLAS experiment at the Large Hadron Collider. The search focuses on production of a charged Higgs boson in association with a top quark, followed by decay of the charged Higgs to a tau lepton and the associated neutrino, while the top quark decays to a W boson and a b quark. We consider hadronic decays of the tau from the charged Higgs, and include both leptonic (into an e or a mu and the associated neutrino) or hadronic (quark-antiquark) decays of the W. Results from the two channels, dubbed tau+lep and tau+jets, respectively, are combined. We place upper limits on the rates of the process (i.e. on the production cross section of charged Higgs boson times its branching fraction into tau+nu) over the mass range of $90 \text{ GeV} < m(H^+) < 2 \text{ TeV}$.

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