

Search for a light charged Higgs boson in the H-+/- -> cs channel in proton-proton collisions at root s=13 TeV

By: Sirunyan, AM (Sirunyan, A. M.)^[1]; Tumasyan, A (Tumasyan, A.)^[1]; Adam, W (Adam, W.)^[2]; Ambroggi, F (Ambroggi, F.)^[2]; Bergauer, T (Bergauer, T.)^[2]; Dragicevic, M (Dragicevic, M.)^[2]; Ero, J (Ero, J.)^[2]; Del Valle, AE (Del Valle, A. Escalante)^[2]; Flechl, M (Flechl, M.)^[2]; Fruhwirth, R (Fruhwirth, R.)^[2,218] ...More

Group Author(s): CMS Collaboration

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Abstract

A search is conducted for a low-mass charged Higgs boson produced in a top quark decay and subsequently decaying into a charm and a strange quark. The data sample was recorded in proton-proton collisions at root s = 13 TeV by the CMS experiment at the LHC and corresponds to an integrated luminosity of 35.9 fb(-1). The search is performed in the process of top quark pair production, where one top quark decays to a bottom quark and a charged Higgs boson and the other to a bottom quark and a W boson. With the W boson decaying to a charged lepton (electron or muon) and a neutrino, the final state comprises an isolated lepton, missing transverse momentum, and at least four jets, of which two are tagged as b jets. To enhance the search sensitivity, one of the jets originating from the charged Higgs boson is required to satisfy a charm tagging selection. No significant excess beyond standard model predictions is found in the dijet invariant mass distribution. An upper limit in the range 1.68%-0.25% is set on the branching fraction of the top quark decay to the charged Higgs boson and bottom quark for a charged Higgs boson mass between 80 and 160 GeV.

Author Information

Reprint Address:
Yerevan Physics Institute Yerevan Phys Inst, Yerevan, Armenia.

Corresponding Address: Sirunyan, AM (corresponding author)

- + Yerevan Phys Inst, Yerevan, Armenia.
- Addresses:**
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- + [2] Inst Hochenergiephys, Vienna, Austria
- + [3] Inst Nucl Problems, Minsk, BELARUS
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