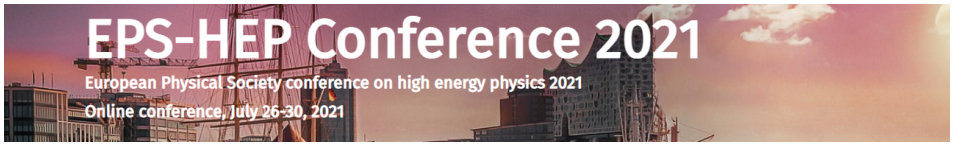

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Precise measurement of the top quark mass with single top events at CMS at $\sqrt{s}$ = 13 TeV

The t-channel process provides a unique phase space with lower colour reconnection probability as compared to the $t\bar{t}$ which has been exploited to make a precision measurement of the top quark and antiquark mass. Single top quark production via t-channel is the most dominant production process at the LHC. The final state comprises a single top along with a light quark giving rise to at least two jets, (one of which arises from hadronization of b-quark), an isolated high-momentum lepton (electron or muon), and large missing transverse momentum due to an escaping neutrino from the W decay, in the final state. The study is based on proton-proton collision data, equivalent to $35.9\,\mathrm{fb}^{-1}$ integrated luminosity, recorded at $\sqrt{s} = 13$ TeV by the CMS experiment during 2016. Dominant standard model backgrounds are studied in different regions depending on the number of b quark and light-flavour jets in the final state. A multivariate technique relying on boosted decision trees is employed to optimally separate the signal from backgrounds. The top-quark mass is reconstructed using kinematic information of the final state objects such as charged lepton, missing energy and the jets. We obtain the top quark mass by fitting its reconstructed mass distribution using an appropriate combination of parametric shapes. $m_{\mathrm{t}} = 172.13^{+0.69}_{-0.70}$ GeV.

Collaboration / Activity

Compact Muon Solenoid (CMS)

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