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Measurement of the charge asymmetry in highly boosted top-quark pair production in pp collision data collected by the CMS experiment

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Due to interference between particles involved in the production of top quark pairs in hadron collisions, top quarks are produced preferentially in the center of the LHC's collisions, while antitop quarks are produced preferentially at larger angles. This central-forward charge asymmetry can be altered by several BSM processes. In this report, we will discuss the measurement of the charge asymmetry as function of the invariant mass of $t\bar{t}$ system in highly boosted top-quark pairs produced in pp collisions at a center of mass energy of $\sqrt{s} = 13$ TeV, using 137fb of Run II CMS data. We concentrate on the lepton+jet decay channel, where one W decays to a charged lepton (electron or muon) and a neutrino, and the other decays to light jets. We employ special techniques to identify the non-isolated lepton and fat jets with substructure variables compatible with the hadronic decay of the top quark. Different combinations of tagged jets are used to separate boosted $t\bar{t}$ events from background. Finally, we will discuss the introduction of unregularized unfolding via a Maximum Likelihood Fit applied to correct bin-by-bin smearing due to finite detector resolution, limited acceptance, and event selection to the fiducial phase space and the full phase-space.

Summary

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