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Top properties measurements with the CMS detector at the LHC (15' + 5')

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Measurements are presented of the properties of top quarks in pair production from proton-proton collisions at the LHC. The data were collected at pp centre-of-mass energies of 7 and 8 TeV by the CMS experiment during the years 2011 and 2012. The charge asymmetry is measured using the difference of the absolute rapidities of the reconstructed top and anti-top kinematics, as well as from distributions of the top quark decay products. The measurements are performed in the decay channels of the ttbar pair into both one and two leptons in the final state. The results, obtained differentially in several kinematic variables of the ttbar-system, are discussed in the context of the forward-backard asymmetry measurements at Tevatron. The polarization of top quarks is measured from the decay angular distributions. Ttbar spin correlation and asymmetries are measured from the angular distributions of the top quark decay products. These measurements are used to search for new physics. TTbar spin correlation is also measured using a matrix element method. Measurements of the associate production of top quark pairs with vector bosons (photons, W and Z) are also presented. The results are compared with standard model predictions.
Several measurements of top quark properties in top quark decays are presented using data collected by the CMS experiment during the years 2011 and 2012. The polarization of W bosons in top quark decays is measured. The W-boson helicity fractions and angular asymmetries are extracted and limits on anomalous contributions to the Wtb vertex are determined. Furthermore, searches for flavor-changing neutral currents in top quark decays are presented using samples of top-quark pair event candidates decaying via Wb and Zq into lvb and llq events, or decaying via Hq into 3 b-quarks. The flavor contents in top-quark pair events are measured using the fraction of top quarks decaying into a W-boson and a b-quark relative to all top quark decays, R=BR(t->Wb)/Sum(BR(t->Wq)), and the result is used to determine the CKM matrix element Vtb as well as the width of the top quark resonance. The top-quark charge is measured, using the charge correlations between high-pT muons from W boson decays and soft muons from B-hadron decays in b jets. We also report on searches for CP violation effects in ttbar.

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