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Measurements of spin correlation, spin polarization, and forward-backward asymmetries in $t\bar{t}$ -> ttbar events at the Tevatron (D0+CDF) (15' + 5')

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We present recent measurements on top properties obtained in $t\bar{t}$ events produced in $p\bar{p}$ collisions at a center-of-mass energy of 1.96 TeV at the Tevatron Collider. We first present a measurement of the spin correlations strength obtained with a matrix element technique applied to dilepton and lepton plus jets final states in $9.7\,\mathrm{fb}^{-1}$ of data accumulated with the D0 detector. The measured correlation coefficient in the off-diagonal basis is in agreement with the standard model prediction, and represents evidence for a top-antitop spin correlation different from zero at a level of 4.2 standard deviations. Using the same dataset in the lepton plus jets channel, we also discuss a measurement of the top quark polarization in the beam and helicity bases, as well as the first measurement of the transverse polarization at a hadron collider. The combination between D0 polarization measurements in the lepton plus jets and dilepton channels is also presented. We finally discuss the complete overview of the forward-backward asymmetry measurements in the angular distributions in $t\bar{t}$ events at the Tevatron. These measurements use the full data set accumulated by the Tevatron in lepton plus jets and dilepton channels, in the D0 and CDF detectors. The combinations of the measurements of the $t\bar{t}$ and leptonic asymmetries are presented and compared with the NNLO QCD predictions.

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