

High Energy Physics - Experiment

Measurement of W-Boson Polarization in Top-quark Decay in ppbar Collisions at $\sqrt{s} = 1.96$ TeV

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We report measurements of the polarization of W bosons from top-quark decays using 2.7 fb^{-1} of ppbar collisions collected by the CDF II detector. Assuming a top-quark mass of $175 \text{ GeV}/c^2$, three measurements are performed. A simultaneous measurement of the fraction of longitudinal (f_0) and right-handed (f_+) W bosons yields the model-independent results $f_0 = 0.88 \pm 0.11$ (stat) ± 0.06 (syst) and $f_+ = -0.15 \pm 0.07$ (stat) ± 0.06 (syst) with a correlation coefficient of -0.59 . A measurement of f_0 (f_+) constraining f_+ (f_0) to its standard model value of 0.0 (0.7) yields $f_0 = 0.70 \pm 0.07$ (stat) ± 0.04 (syst) ($f_+ = -0.01 \pm 0.02$ (stat) ± 0.05 (syst)). All these results are consistent with standard model expectations.

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