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Measurement of the inclusive ttbar production cross section in ppbar collisions at 1.96 TeV and determination of the top quark pole mass at D0.

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The inclusive cross section of top quark-antiquark pairs produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV is measured in lepton+jets and dilepton decay channels. The data sample corresponds to 9.7 fb^{-1} of integrated luminosity recorded with the D0 detector during Run II of the Fermilab Tevatron Collider. Employing multivariate analysis techniques we measure the cross section in the two decay channels and we perform a combined cross section measurement. For a top quark mass of 172.5 GeV, we measure a combined inclusive top quark-antiquark pair production cross section of $\sigma_{t\bar{t}} = 7.26 \pm 0.13\,(stat.)^{+0.57}_{-0.50}\,(syst.)$ pb which is consistent with standard model predictions. We also perform a likelihood fit to the measured and predicted top quark mass dependence of the inclusive cross section, which yields a measurement of the pole mass of the top quark. The extracted value is $m_t = 172.8 \pm 1.1\,(theo.)\,^{+3.2}_{-3.4}\,(exp.)$ GeV.

Summary

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