

First Measurement of $\sigma(gg \rightarrow t\bar{t})/(q\bar{q} \rightarrow t\bar{t})$ in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV

Following the discovery of the top quark, various studies have been dedicated to understanding the properties of this heavy particle. We will present the first measurement of the relative rate of $t\bar{t}$ production through gluon-gluon fusion and quark-antiquark annihilation, $\sigma(gg \rightarrow t\bar{t})/(q\bar{q} \rightarrow t\bar{t})$. This measurement uses about 0.7 fb⁻¹ of $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV collected by the Collider Detector at Fermilab (CDF) experiment at the Fermilab Tevatron. It provides a test of the QCD predictions for this pair-production mechanism, and a technique to test for unexpected sources of top quark production. The average number of gluons in the initial state of candidate $t\bar{t}$ events is measured using the low p_T charged particle multiplicity, and the charged particle multiplicity is determined using W+n jet(s) and dijet data calibration samples and verified using Standard Model Monte Carlo calculations.