

Measurements of single top production in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV utilizing data collected with the D0 detector at the Fermilab Tevatron Collider

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We present studies of single top production using the D0 experiment. Single top events are selected with an isolated electron or muon missing transverse energy, two, three or four jets, with one or of them identified as originating from the fragmentation of b quarks. From the cross section measurement we obtain new bounds on the Kobayashi-Maskawa $|V_{tb}|$ matrix element. A model-independent measurement of t -channel electroweak production of single top gives a cross section $\sigma(p\bar{p} \rightarrow tq + X) = 2.90 \pm 0.59(stat + syst)$ pb for a top quark mass of 172.5 GeV. We estimate the probability of the background to fluctuate and produce a signal as large as the one observed to be 1.6×10^{-8} , corresponding to a significance of 5.5 standard deviations. We also present search for anomalous top quark production and for CP violation in single top production. The total width of the top quark, Γ_t , is measured from the partial decay width $\Gamma(t \rightarrow Wb)$ measured using the t -channel cross section for single top quark production and from the branching fraction $\mathcal{B}(t \rightarrow Wb)$ measured in $t\bar{t}$ events

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