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Observation of Single Top Quark Production with the D0 Detector

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We report first observation of the electroweak production of single top quarks in ppbar collisions at sqrt(s) = 1.96 TeV based on 2.3 fbˆ-1 of data collected by the D0 detector at the Fermilab Tevatron Collider. Using events containing an isolated electron or muon and missing transverse energy, together with jets originating from the fragmentation of b quarks, we measure a cross section of sigma(ppbar -> tb + X, tqb + X) = 3.94 +- 0.88 pb. The probability to measure a cross section at this value or higher in the absence of signal is 2.5 x 10ˆ-7, corresponding to a 5.0 standard deviation significance for the observation.

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