

High Energy Physics - Experiment

Search for single top quark production in pbar p collisions at $\sqrt{s}=1.96$ TeV in the missing transverse energy plus jets topology

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We report a search for single top quark production with the CDF II detector using 2.1 fb⁻¹ of integrated luminosity of pbar p collisions at $\sqrt{s}=1.96$ TeV. The data selected consist of events characterized by large energy imbalance in the transverse plane and hadronic jets, and no identified electrons and muons, so the sample is enriched in W → tau nu decays. In order to suppress backgrounds, additional kinematic and topological requirements are imposed through a neural network, and at least one of the jets must be identified as a b-quark jet. We measure an excess of signal-like events in agreement with the standard model prediction, but inconsistent with a model without single top quark production by 2.1 standard deviations (σ), with a median expected sensitivity of 1.4 σ . Assuming a top quark mass of 175 GeV/c² and ascribing the excess to single top quark production, the cross section is measured to be 4.9^{+2.5}-2.2(stat+syst)pb, consistent with measurements performed in independent datasets and with the standard model prediction.

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