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Search for single top production at CDF

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In proton-antiproton collisions at the Tevatron top quarks are predominantly pair-produced via the strong interaction. However, the standard model of particle physics also predicts the production of single top-quarks via electroweak processes where an off-mass-shell W boson is exchanged either in the s-channel or the t-channel. Once a signal is established the single-top cross section will serve as an input to tests of the unitarity of the CKM mixing matrix.

It is a major challenge to distinguish the single top signal from significant backgrounds, mainly W production in association with heavy flavour jets. The CDF collaboration has analyzed a Tevatron Run II dataset corresponding to 1 fbˆ{-1} of integrated luminosity. Advanced analysis techniques including neural networks, matrix elements and likelihood discriminants are employed to search for the tiny single-top signal. The results of these multivariate searches will be presented.

Single-Top analyses are an improtant stepping stone for the Higgs boson search in the WH channel, since the two processes have the same experimental signature. Understanding the background rates and background composition in the W+jets sample using single-top techniques will be a prerequiste for a successful WH analysis. The talk will summarize the lessons learned by the single-top analyses and point to their application in the WH search.

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