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Search for an Invisible Decaying Higgs Boson in Dilepton Events at CDF

A direct search at CDF for an exotic Higgs boson that decays to invisible particles is reported. The simplest $H \rightarrow \text{invisible}$ Standard Model (SM) process has a branching ratio of 10^{-3} . However, Higgs boson decays to invisible particles can be significantly enhanced in many BSM models. One of the cleanest signatures in searching for this process is when the Higgs boson is produced in association with a Z boson that decays to a charged dilepton pair. In this analysis we model the ZH signal assuming the SM production cross section and a $H \rightarrow \text{invisible}$ branching ratio of 100%. We investigate several Higgs mass hypotheses from 115 to 150 GeV/ c^2 , and place 95% credibility level limits on Higgs boson production in this final state. The results here use the full CDF data set corresponding to 9.7 fb^{-1} of luminosity.

Summary

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