

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Search for the Standard Model Higgs boson at $D\bar{O}$ in the $\mu+\tau$ (hadrons) + 2 jets final state

By

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The Standard Model has been a successful theory in various aspects. It predicted and led to the discovery of many new particles, including the recently found Higgs boson, the last missing piece of the Standard Model. The Higgs mechanism allows the vector bosons and fermions to be massive via the electroweak symmetry breaking. We present the search of the Standard Model Higgs through the decay products: one muon, one hadronically decaying tau, and two or more jets using the full Tevatron accelerator Run 2 data set collected in the $D\bar{O}$ detector at Fermilab. The main production channels are gluon-gluon fusion, vector boson fusion, and Higgs production associated with a W/Z boson. No evidence of the Standard Model Higgs boson is observed in these channels with hypothesized Higgs mass between 105 GeV and 150 GeV, but the data do not exclude it either. We set the upper limits on the ratio of the 95% CL exclusion to the SM Higgs cross section. Combining with other analyses in Tevatron, the Higgs mass is ruled out at 95% confidence level between 147 and 180 GeV, and a 2.9σ excess of events indicates a Higgs boson possibly lies in the mass range from 115 to 140 GeV.

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