

**Stony Brook University  
The Graduate School**

Doctoral Defense Announcement

**Abstract**

From ZZ to ZH : How Low Can These Cross Sections Go or Everybody, Let's Cross  
Section Limbo!

By

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We report on two searches performed at the D0 detector at Fermi National Laboratory. The first is a search for Z di-boson production with a theoretical cross section of 1.4 pb. The search was performed on 2.6 fb<sup>-1</sup> of data and contributed to the first observation of ZZ production at a hadron collider. The second is a search for a low mass Standard Model Higgs boson in 3.7 fb<sup>-1</sup> of data. The Higgs boson is produced in association with a Z boson where the Higgs decays hadronically and the Z decays to two leptons. The ZZ search was performed in both the di-electron and di-muon channels. For the ZH search, we will focus on the muonic decays where we expanded the traditional coverage by considering events in which one of the two muons fails the selection requirements, and is instead reconstructed as an isolated track. We consider Higgs masses between 100 and 150 GeV, with theoretical cross sections ranging from 0.17 to 0.042 pb, and set upper limits at 95% confidence levels.

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