

Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Higgs/ ZZ searches in the 3 leptons + X channels AZEDDINE KASMI, Southern Methodist University, ATLAS COLLABORATION — The mechanism of spontaneously broken symmetries is one of the key problems in particle physics. Hence understanding the Higgs mechanism, by which the fundamental particles gain mass, is one of the primary goals of the LHC. Another area of great interest is ZZ diboson production. In the Standard Model(SM), the triple neutral gauge couplings (ZZZ and $ZZ\gamma$) are absent and ZZ searches provide a test for any gauge-coupling anomalies and hence possible new physics beyond the SM. Production of ZZ dibosons is an irreducible background for the Higgs production with a 4 lepton decay mode (particularly at high mass). To maximize the sensitivity of Higgs searches, the $3\ell + X$ channels were considered as they have higher acceptance than the 4ℓ channel due to inefficiencies in lepton reconstruction. I pursued an exclusive search for the Higgs/ ZZ signal in the $3\ell + X$ channel using clustering algorithms for finding unidentified electrons. The motivations for a cluster based algorithm are: 1) no assumption of a cluster width is required 2) the cluster centric based algorithm has greater η coverage than the standard electron identification methods and 3) the cluster based algorithm does not split the cluster in the crack regions. The background in the $3\ell + X$ channel is very challenging. In this work, I present a set of selection criteria along with a likelihood method for particle identification to achieve an acceptable signal-over-background.

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Date submitted: 09 Jan 2009

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