

# SAIP2014



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## **Measure the properties of Higgs boson in vector boson fusion production mode in the ATLAS detector**

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### **Abstract :**

The ATLAS detector is one of the general purpose detector at the LHC. It has several sub-detectors, the inner detector, the electromagnetic and hadronic calorimeter and the muon spectrometer which providing track and energy measurement. The high performance and full coverage of the ATLAS detector allow the reconstruction of particles like electrons, photons, muons and candidates like jets. All of these show the possibility to reconstruct the Higgs boson. The standard model Higgs boson like particle has been observed in July 2012 in both the ATLAS and CMS detector at the LHC. The measurement of the Higgs properties is performed in Higgs decay to diphoton channel after the discovery. The Higgs mass spectrum can be well reconstructed in this channel. The Higgs boson produced via vector boson fusion process was also measured in this channel, which is a pure electroweak interaction not verified yet and has the potential to discover the new physics beyond the standard model. The multivariate analysis(MVA) method is critical to extract the Higgs boson in such case, in which the events should have at least two forward jets as well as large invariant mass of jets. The MVA method has the ability to exploit the subtle kinematic characteristic of VBF production mode and suppress the background.

### **Award :**

No

### **Level :**

No

### **Supervisor :**

Bruce MelladoBruce.Mellado.Garcia@cern.chWits University

### **Paper :**

Yes

**Primary authors :** Dr. RUAN, Xifeng (University of the Witwatersrand)

### **Co-authors :**

**Presenter :** Dr. RUAN, Xifeng (University of the Witwatersrand)

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