

IHEF Bachelor Project 2012 – week 19 t/m 26

Naam van project: Can we find more evidence for the Higgs particle?
Experiment: ATLAS
Begeleider: Stefan Gadatsch - Stan Bentvelsen

Week	Activiteit	Opmerking
19	Introduction to the problem - literature	
20	Getting to know the framework	
21	Produce standard results on Higgs->WW	
22	Create new ways to increase sensitivity - exploit the full data set of 2011.	If no new methods are developed, the existing ones already are interesting enough
23	Investigate Higgs existence	
24	Determine significance of result	
25	Conclusions and writeup	
26	Writeup	

Beschrijving project:

In December of last year, ATLAS announced a first hint for the existence of the Higgs particle. This statement was based on the analysis of Higgs decay to photons, to ZZ bosons and to WW bosons.

At Nikhef we are heavily involved in the Higgs discovery via the decay to WW bosons. The announcement of last year was based on only 40% of the total data set taken in 2011, in this channel. Now we have the full 100% available to analyze.

In this project the student is asked to analyze the full data set of 2011 to see if the evidence of the Higgs particle is increased with respect to earlier studies. A framework for this analysis is available so that it is straightforward to produce results on this full dataset - but a number of checks still need to be made to assess the sensitivity to the Higgs particle. The aim of this project is to find ways to increase this sensitivity, perform the search, and ultimately discover or exclude the Higgs in this channel.

In practice the work will be done - after a study of relevant literature - behind a PC with all the data and simulations available to you. Knowledge of Root and C++ (or programming) is an advantage.