

Rediscovering the Higgs Boson Lab

E. Long (UNH)

Abstract

This lab will utilize publicly available data from the CMS detector at CERN to re-discover the Higgs boson and determine its mass from Higgs to 4-lepton events.

In this lab, you will be utilizing the guide available at the CERN Open Data site <http://opendata.cern.ch/record/5500> to analyze a simplified version of the CMS Higgs discovery from four-lepton decay events [1]. This is a significantly involved lab, so make sure that you schedule your time well to complete it.

Helpful resources for this lab include:

- <https://cms.cern/physics/higgs-boson>
- <https://cms.cern/physics/cms-higgs-search>
- <http://opendata.cern.ch/docs/cms-virtual-machine-2011>
- <http://opendata.cern.ch/docs/cms-guide-for-education>
- <http://cms-results.web.cern.ch/cms-results/public-results/publications/HIG/index.html>

[1] S. Chatrchyan *et al.* (CMS), Phys. Lett. B **716**, 30 (2012), arXiv:1207.7235 [hep-ex].