

粒子物理学术报告

时间: 2014年8月22日(星期五) 下午 4:00PM-5:00PM

地点: 理科楼三楼物理系报告厅

Title: "Exploration of the Higgs boson and the Physics case for the Large Hadron Electron Collider"

Abstract:

With the discovery of a Higgs boson at the Large Hadron Collider a new era in particle physics has started. The Large Hadron Electron Collider (LHeC) is a proposed facility which will exploit the LHC beams for electron-proton scattering, using a new 60 GeV electron accelerator. The Future Circular Collider (FCC) is a proposed facility at CERN to provide 50 TeV protons which may be combined with either up to 175 GeV electrons from an electron ring in a new tunnel or with the LHeC ERL installation. A striking Higgs physics program exists for both the LHeC and the FCC-he. The LHeC gives a unique access to the $WW-H$ and $ZZ-H$ production modes and to various decay channels, as into $b\bar{b}$, $c\bar{c}$ and $di\text{-}\tau$, which are difficult to study precisely at the LHC in pp scattering. In the further future, the FCC-he promises access to the $t\bar{t}H$ and $H-HH$ channels with significant precision under evaluation. This talk presents progress in the study directed to Higgs physics in ep, including couplings, CP properties and different H related distributions. The status of the project is summarized and its complementary with other future facilities is reviewed.



Speaker: Bruce Mellado

Department of Physics at University of the Witwatersrand

Prof. Mellado obtained his PhD from Columbia University and he is the director of the High-throughput electronics laboratory at the School of Physics of the Witwatersrand. Prof. Mellado is the recipient of several fellowships and awards the most recent of which are: First Time Inventor Award by the University of the Witwatersrand (2014), Internationally Acclaimed Researcher by the National Research Foundation (2013) and APS-IUSSTF Professorship Award in Physics (2011)

Prof. Mellado is an expert on the Higgs boson – a sub-atomic particle that is thought to give matter its mass – and was a leading participant in its discovery that was announced in 2012 and led to the Nobel Prize in Physics being awarded in 2013 to François Englert and Peter W. Higgs. Prof. Mellado has been part of the ATLAS Experiment at the Large Hadron Collider (LHC) at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland, since 2001.

He introduced the classification of the Higgs boson according to the multiplicity of quarks and gluons. This methodology has become standard in Higgs boson searches and played an important role in the announcement of the discovery. Mellado has also been invited by the CERN Director of Research and Computing to become a member of the LHeC Coordination Group – a future accelerator and detector facility at CERN to collide electrons head-on with the protons and heavy ions of the LHC.