

## **Dr. Philip Michael Tuts**

Dr. Tuts received Bachelor Degrees in Physics and Mathematics (both in 1974). He received his Ph.D. in Physics from Stony Brook University in 1979, and continued to do experimental work there in High Energy Physics until 1983.

He joined Columbia University's Physics Department as an Assistant Professor (1983), and subsequently became an Associate Professor (1987), full Professor (1996) and became Chairman of the Physics Department in 2014.

He has worked in many other institutions; he is a Fellow of the American Physics Society and is an Executive Committee Member of the U.S. –Large Hadron Collider Users Organization.

### **Summary and Background of Presentation**

On July 4, 2012 the ATLAS and CMS experiments at the Large Hadron Collider (LHC) at CERN in Geneva, Switzerland announced the discovery of the Higgs Boson. The Higgs Boson discovery is one of the major scientific discoveries of the last 50 years – recognized by the award of the Nobel Prize in 2013. The Higgs Boson proves the existence of the Higgs field, which was postulated over 50 years ago as the mechanism by which elementary particles acquire their mass.

The Higgs Boson is a particle so unique that no other particle like it exists. In order to discover the Higgs Boson, a large number of physicists and engineers built the world's largest scientific instrument – a microscope called ATLAS to explore the subatomic world by recording debris of trillions of collisions of protons with protons. The construction of this state-of-the-art instrument was accomplished over 15 years by a collaboration of over 2,500 physicists, electrical engineers, mechanical engineers, cryogenic engineers and software professionals. Fundamental research, such as the discovery of the Higgs Boson, is the foundation on which future technology is based.

In this talk, Dr. Tuts will discuss what the Higgs Boson is, and why it is so important, how the ATLAS detector was used to make the discovery, and some of the major technological and engineering innovations developed for the ATLAS detector and the LHC.