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Higgs, Englert Share 2013 Nobel Prize in Physics

Canadians Key Part of Historical Nobel Prize to "Godfathers" of the "God Particle"

(Vancouver, BC) --- The Royal Swedish Academy of Sciences today awarded the Nobel Prize in physics to Professor Peter W. Higgs (Univ. of Edinburgh) and Professor François Englert (Univ. Libre de Bruxelles) to recognize their work developing the theory of what is now known as the Higgs field, which gives elementary particles mass. Canadians have played critical roles in all stages of the breakthrough discovery Higgs boson particle that validates the original theoretical framework. Throngs across Canada are celebrating.

More than 150 Canadian scientists and students at 10 different institutions are presently involved in the global ATLAS experiment at CERN. Canada's national laboratory for particle and nuclear physics, TRIUMF, has been a focal point for much of the Canadian involvement that has ranged from assisting with the construction of the LHC accelerator to building key elements of the ATLAS detector and hosting one of the ten global Tier-1 Data Centres that stores and processes the physics for the team of thousands.

"The observation of a Higgs Boson at about 125 GeV, or 130 times the mass of the proton, by both the ATLAS and CMS groups is a tremendous achievement," said Rob McPherson, spokesperson of the ATLAS Canada collaboration, a professor of physics at the University of Victoria and Institute of Particle Physics scientist. "Its existence was predicted in 1964 when theorists reconciled how massive particles came into being. It took almost half a century to confirm the detailed predictions of the theories in a succession of experiments, and finally to discover the Higgs Boson itself using our 2012 data."

The Brout-Englert-Higgs (BEH) mechanism was first proposed in 1964 in two papers published independently, the first by Belgian physicists Robert Brout and François Englert, and the second by British physicist Peter Higgs. It explains how the force responsible for beta decay is much weaker than electromagnetism, but is better known as the mechanism that endows fundamental particles with mass. A third paper, published by Americans Gerald Guralnik and Carl Hagen with their British colleague Tom Kibble further contributed to the development of the new idea, which now forms an essential part of the Standard Model of particle physics. As was pointed out by Higgs, a key prediction of the idea is the existence of a massive boson of a new type, which was discovered by the ATLAS and CMS experiments at CERN in 2012.

The next step will be to determine the precise nature of the Higgs particle and its significance for our understanding of the universe. Are its properties as expected for the Higgs boson predicted by the Standard Model of particle physics? Or is it something more exotic? The Standard Model describes the fundamental particles from which we, and every visible thing in the universe, are made, and the forces acting between them. All the matter that we can see, however, appears to be no more than about 4% of the total. A more exotic version of the Higgs particle could be a bridge to understanding the 96% of the universe that remains obscure.

TRIUMF salutes Peter Higgs and François Englert for their groundbreaking work recognized by today's Nobel Prize and congratulates the international team of tens of thousands of scientists, engineers, students, and many more from around the world who helped make the discovery.

For more information on the Higgs discovery, please see:

http://www.atlas-canada.ca/
http://www.atlas.ch/HiggsResources/
http://ed.ted.com/lessons/the-higgs-field-explained-don-lincoln
http://www.symmetrymagazine.org/article/march-2012/ten-things-you-may-not-know-about-the-higgs-boson

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FOR EDITORS

CERN, the European Organization for Nuclear Research, is the world's leading laboratory for particle physics. It has its headquarters in Geneva. At present, its Member States are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. India, Israel, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and UNESCO have Observer status. Canada has made important contributions to CERN's flagship accelerator, the Large Hadron Collider, and one of its associated particle physics detectors, the ATLAS experiment. See http://cern.ch.

The Large Hadron Collider **or LHC** is a particle accelerator which, at 27 kilometres in circumference, is the world's largest and most complex scientific instrument. The LHC is the world's most powerful particle accelerator, producing beams seven times more energetic than any previous machine, and around 30 times more intense when it reaches design performance, probably by 2013. It relies on technologies that would not have been possible 30 years ago. The LHC is, in a sense, its own prototype.

ATLAS is a worldwide collaboration comprising over 2,500 scientists and engineers from 178 institutions in 35 countries and regions. These are Armenia, Australia, Austria, Azerbaijan, Belarus, Brazil, Canada, China, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Japan, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom and the United States of America.

ATLAS-Canada comprises about 150 faculty members, post-doctoral fellows and students from ten Canadian institutes: the University of Alberta, University of British Columbia, Carleton University, McGill University, Université de Montréal, Simon Fraser University, University of Toronto, TRIUMF, University of Victoria and York University. See http://www.atlas-canada.ca

TRIUMF is Canada's national laboratory for particle and nuclear physics. The laboratory's research focuses on advancing isotopes for science and medicine and probing the structure and origins of matter. Together with its partner AAPS, Inc., TRIUMF also seeks to commercialize its technologies for the benefit of all Canadians. Located on the south campus of the University of British Columbia, TRIUMF is owned and operated as a joint venture by a consortium of the following Canadian universities, via a contribution from the Government of Canada through the National Research Council: University of Alberta, University of British Columbia, University of Calgary, Carleton University, University of Guelph, University of Manitoba, McGill University, McMaster University, Université de Montréal, University of Northern British Columbia, Queen's University, University of Regina, Saint Mary's University, Simon Fraser University, University of Toronto, University of Victoria, University of Winnipeg , and York University. See http://www.triumf.ca.