



Photo: Reidar Hahn, Fermilab

The LHC: The greatest physics experiment of history

We are on the eve of one of the greatest experiments in the history of physics. The Large Hadron Collider, a 27-kilometer ring straddling the Swiss-French border, is pushing the frontier of exploration into the fundamentals of our universe.

The machine is currently being prepared for first injection of the high-energy proton beams, due in the next few months. Soon after, the largest detectors ever made will be peering into the debris of collisions, a tangle of data that physicists will dissect, examine, and probe in their journey to reveal long-sought secrets of nature.

In recent years, particle physics has been revolutionized with the discovery that 95% of the universe is missing. The Large Hadron Collider will answer many significant questions about the part of the universe we know and start to reveal critical information that will guide our exploration of the rest. The LHC will answer much, but it will raise just as many new questions for the ongoing scientific enterprise.

Projects like the LHC are almost indescribably complex, requiring many tens of thousands of person-years of effort. Experiments on this scale need a long-term, consistent commitment to make them feasible. CERN has built an outstanding structure for managing large-scale, international collaboration, and the pursuit of scientific goals through this means has brought many additional non-scientific benefits to the partners and society as a whole.

This issue of *symmetry* is dedicated to the imminent switch-on of the Large Hadron Collider. It can only skim the surface but presents views of the science, technology, international collaboration, and humanity of the LHC.

Although not a CERN member state, the United States has one of the largest contingents of scientists working on the LHC. In the fiscal year 2008 federal budget, the United States fully honors its commitment to the LHC program. However, last minute cuts to the science budget, made as a consequence of political tussles, seriously threaten the future health of high-energy physics (and other sciences) in the United States.

Whether the US government is able to justify its claim to support the physical sciences, and whether it will be able to generate confidence in itself as a good partner in international scientific projects, hangs in the balance.

However, science goes on, and the promises and opportunities of particle physics are now greater than at any time in the past few decades.

David Harris, Editor-in-chief

Symmetry
PO Box 500
MS 206
Batavia Illinois 60510
USA
630 840 3351 telephone
630 840 8780 fax
www.symmetrymagazine.org
mail@symmetrymagazine.org

(c) 2007 *symmetry* All rights reserved

symmetry (ISSN 1931-8367) is published 10 times per year by Fermi National Accelerator Laboratory and Stanford Linear Accelerator Center, funded by the US Department of Energy Office of Science.

symmetry

Editor-in-Chief
David Harris
650 926 8580

Deputy Editor
Glennnda Chui

Managing Editor
Kurt Riesselmann

Senior Editor
Tona Kunz

Staff Writers
Elizabeth Clements
Heather Rock Woods
Kelen Tuttle
Rhianna Wisniewski

Copy Editor
Melinda Lee

Interns
Haley Bridger
Lizzie Buchen
Amber Dance

Publishers
Neil Calder, SLAC
Judy Jackson, FNAL

Contributing Editors
Roberta Antolini, LNGS
Peter Barratt, STFC
Romeo Bassoli, INFN
Stefano Bianco, LNF
Kandice Carter, JLab
Reid Edwards, LBNL
Suraiya Farukhi, ANL
James Gillies, CERN
Silvia Giromini, LNF
Youhei Morita, KEK
Marcello Pavan, TRIUMF
Perrine Royole-Degieux, IN2P3
Yuri Ryabov, IHEP Protvino
Yves Sacquin, CEA-Saclay
Kendra Snyder, BNL
Boris Starchenko, JINR
Maury Tigner, LEPP
Ute Wilhelmsen, DESY
Tongzhou Xu, IHEP Beijing
Gabby Zegers, NIKHEF

Print Design and Production
Sandbox Studio
Chicago, Illinois

Art Director
Michael Branigan

Designer
Aaron Grant

Web Design and Production
Xeno Media
Hinsdale, Illinois

Web Architect
Kevin Munday

Web Design
Karen Acklin
Alex Tarasiewicz

Web Programmer
Mike Acklin

Photographic Services
Fermilab Visual Media
Services