Texas A&M Physicists Celebrate Birth of Large Hadron Collider

COLLEGE STATION -- As the first beam of protons careened at near-light speed around Europe's $9 billion, 17-mile Large Hadron Collider (LHC) near Geneva, Switzerland in the early-morning hours of September 10, so did the hard work and dreams of seven Texas A&M University physicists.

Texas A&M experimental physicists Teruki Kamon, David Toback, Alexei Safonov and Peter McIntyre, along with theoretical physicists Dimitri Nanopoulos, Bhaskar Dutta and Richard Arnowitt, are among the thousands of international scientists whose groundbreaking work went into the world's most powerful accelerator, which scientists believe could help unlock extraordinary discoveries about the nature of the physical Universe.

An estimated 10,000 people from 60 countries helped design and build the accelerator and its massive particle detectors, including more than 1,700 scientists, engineers, students and technicians from 94 U.S. universities and laboratories supported by the United States Department of Energy (DOE) Office of Science and the National Science Foundation (NSF).

The bulk of the Texas A&M group's DOE-funded research supports a 12-member team spearheaded by Kamon, Toback and Safonov that contributed to the design and construction of one of the LHC's two largest particle detectors -- the Compact Muon Solenoid (CMS), the result of a major collaboration whose U.S. component is headquartered at Fermi National Accelerator Laboratory (Fermilab) in Illinois. In the days and years to come, the Texas A&M team will play a key role in collecting and analyzing the data collected at the energy frontier.

"This new machine is a huge next step for the entire field of particle physics," Safonov said. "It's truly a dream machine that may completely change what we think about the world around us and fundamental forces, particles and interactions.

"Many of our faculty are working on high-energy physics phenomenology, string theory and cosmology, performing research that either directly relates to LHC physics or will be strongly influenced by what the LHC sees in the years to come."

McIntyre's expertise also went into critical components for the accelerator. Along with colleagues from Stanford's Linear Accelerator Center, he continues to provide ongoing accelerator research and development vital to the LHC's future.

"The LHC has the potential to take us full circle, to gaze upon nature in microscale as it looked when the matter of the first stars was just emerging from the cosmic furnace of the Big Bang," McIntyre said. "Each step in energy takes us further on that journey; we really don't know what lies ahead, or what it might mean for our understanding of nature. That is the romance of basic science. It also spawns the development of technology that may have benefit for us here on Earth."

As a switch flipped deep in CERN's (the European Organization for Nuclear Research) massive underground laboratory and fired off the chain reaction that breathed life into a scientific marvel more than 15 years in the making, the Texas A&M contingent...
Simulation of a detection of the Higgs boson in the CMS equipment.

MEN AT WORK

Texas A&M CMS group members (clockwise from center) David Toback, Teruki Kamon, Bhaskar Dutta and Alexei Safonov discuss next steps in Toback's office on the Texas A&M campus. (Photograph courtesy of David Toback.)

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