UNH Senior Wrote Computer Code For Eagerly Anticipated Large Hadron Collider

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September 9, 2008

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DURHAM, N.H. - When the Large Hadron Collider, a particle accelerator that is the world's most eagerly anticipated physics experiment, starts up near Geneva, Switzerland, tomorrow (Sept. 10, 2008), a University of New Hampshire undergraduate will be among the 7,000 scientists worldwide to claim credit for the creation of this landmark scientific instrument.

Austin Purves, a senior physics major from Silver Spring, Md., worked on ATLAS, one of two general-purpose detectors of the LHC and, at 7,000 tons, the largest volume particle detector ever constructed.

The LHC, which spans the border between Switzerland and France in a tunnel 100 meters underground, is a particle accelerator that will let physicists study the smallest known particles. "This new machine will give us new insight into the fundamental laws of physics and maybe even give hints of string theory being behind it all," says UNH associate professor of physics Per Berglund, who is Purves's research advisor. The LHC will accelerate protons around its 17-mile underground racetrack and collide them to create conditions present one trillionth of a second after the Big Bang.

Purves, who's particularly interested in fundamental theories of the universe such as string theory, was among several hundred students who worked at the European Organization of Nuclear Research (which goes by the acronym CERN) this summer. He wrote computer programming code for several aspects of ATLAS (A Toroidal Lhc ApparatuS). "I'm happy to know that code I wrote will be used when ATLAS is generating results," he says. A highlight of his summer work was the opportunity to go into the "cave" - the underground racetrack -- and see the ATLAS detector as underground assembly was being finished.

Purves's role in the LHC, while monumental for a college undergraduate, was small relative to the massive scope of the project, which carries an $8 billion price tag and took 14 years to complete. Its contribution to physicists' understanding of the very early universe shortly after the Big Bang is expected to be enormous. In particular, physicists anticipate finding a particle called the Higgs boson, the proposed mechanism for fundamental particles to obtain mass. The Higgs boson, with mass higher than physicists have been able to probe, has been theorized but never observed. The LHC will also add to physicists' understanding of supersymmetry and the possibility that the lightest, most stable, most supersymmetric particle could be making up a large component of so-called dark matter, from which the universe is made.

"I'm interested in theories like string theory, supersymmetry, and the Higgs mechanism, which are very difficult to test experimentally," says Purves. "Working on the LHC gave me the opportunity to learn more about the challenges behind experimental study of these theories and to be a part of one of the most exciting parts of physics today."

To learn more about the LHC, go to http://public.web.cern.ch/Public/en/LHC/LHC-en.html.

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Photo available to download: http://www.unh.edu/news/cj_nr/2008/sept/IMG_0276.jpg

UNH senior Austin Purves poses with friend Melanie Schroer, also a UNH senior, in front of the ATLAS detector underground near Geneva, Switzerland. Credit: Austin Purves.