

## **2008-10-21 OSC NEWS: Ohio Supercomputer Center playing supportive role in super collider experiment (Dayton Legal News)**

### **Ohio Supercomputer Center playing supportive role in super collider experiment**

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Halfway around the world, thousands of today's top scientists are working on an experiment the magnitude of which has never been seen before, and they're doing so with the help of some fellow scientists in Columbus.

In Geneva, Switzerland more than 10,000 scientists, engineers and technicians from 60 countries last month set off the first beam of protons zooming at nearly the speed of light around the 17-mile Large Hadron Collider, a highly-publicized experiment that has been decades in the making and is the largest particle collider in history.

Scientists hope the collider will reveal more about "dark matter," antimatter and possibly hidden dimensions of space and time. They also could find evidence of a hypothetical particle, the Higgs boson, which is believed to give mass to all other particles, and thus to matter that makes up the universe.

But since the project is so big, all of the work cannot be completed at the Swiss site, so six remote support centers, along with 10 other smaller support centers, offer the project software, computing and networking support.

One of those centers is located at the Ohio Supercomputer Center, and at the helm is a team of Ohio State University physicists.

Being involved in a project of such size and importance is an accomplishment for the supercomputer center and OSU, said Doug Johnson, senior systems engineer at the Ohio Supercomputer Center.

"It's a huge undertaking and for us to help in a supporting role is important and goes to the heart of our own role," he said.

Johnson said the center was first asked to participate in the experiment back in 2001.

In Columbus, physicists worked on the preparation phase simulating the operation of the collider, and now are participating in the actual execution of the experiment.

"The amount of computing and storage needed is more than any one site can support," Johnson said.

He said the supercomputer center is in constant communication with leaders of the project in Switzerland.

"There are lots of e-mails," he said.

The project is one of the largest undertaken by the center, which provides supercomputing, networking, research and educational resources to a diverse state and regional community including education, academic research, industry, and government.

"It's more effort compared to our usual users. It's above and beyond what we normally do," Johnson said.

As part of the ALICE experiment, short for A Large Ion Collider Experiment, physicists will accelerate lead atoms to nearly the speed of light, collide their nuclei and then study the particles that make up the protons and neutrons of the lead nuclei.

Sensitive detectors will measure the particles' reactions, recording approximately 1.25 gigabytes of data per second, or as much as three DVDs per minute.

In a lush valley near Geneva, Switzerland, the work of the massive physics research project will recreate on a small scale within the Large Hadron Collider at CERN, the European Laboratory for Nuclear Research, the explosive first moments of the birth of the universe.

The massive data sets are distributed to researchers around the world through high-speed connections to the "Grid," a network of computer clusters at scientific institutions, including the supercomputer center in Columbus.

OSC already has provided 300,000 CPU hours for data simulations and has allocated up to 1 million hours for analysis of the first experimental data, expected in Fall 2008.

"After working on this project for several years, we look forward to data being collected and continuing to provide resources to aid discovery of the planet's greatest mysteries," said Johnson.

Beyond revealing a new world of unknown particles, the LHC experiments could explain why those particles exist and behave as they do.

They could reveal the origins of mass, shed light on dark matter, uncover hidden symmetries of the universe, and possibly find extra dimensions of space.

The Ohio Supercomputer Center is operated by the Ohio Board of Regents and "promotes and stimulates computational research and education to enable the state to achieve its aspirations in information systems and advanced technology and industries."

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