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Profs help to discover particle

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It was 2 a.m. in Bryan-College Station when scientists in Geneva sipped champagne and announced the discovery of a subatomic particle that could help explain the existence of mass in the universe.

Other celebrations occurred simultaneously around the world - hardly surprising considering more than 5,000 scientists worked on the project that unveiled what is believed to be a long-sought Higgs boson particle.

But the four Texas A&M professors involved in the breakthrough will wait until Friday to gather and celebrate their part of the accomplishment. They were too tired Wednesday morning.

Alexei Safonov and Ricardo Eusebi each watched a video stream of the announcement alone at their home computers. Teruki Kamon brought his family to his campus office. David Toback slept through the occasion. But all four said they are thrilled to be a part of history.

"It is really something," Safonov said. "Everybody is incredibly excited. Our students, our post-docs, it is a big thing for us."

In all, about 20 people from A&M collaborated on the project. The rest were postdoctoral researchers and graduate students. All were part of an international team called Compact Muon Solenoid, which helped build and operate the Large Hadron Collider in Switzerland.

The collider cost \$10 billion to build and was finished in 2008. It sends protons flying around a 17-mile circular tunnel close to the speed of light and then forces them to collide. When a collision occurs, scientists study the effects in hopes of learning about matter and the creation

of the universe.

The work isn't like what many researchers envisioned when they first became interested in physics. In this case, there is no Einstein-like figure who develops paradigm-shifting theories on his own. High-energy physics has become too complex - and expensive - for that, the researchers said.

Instead, the massive amounts of data are divided up and analyzed across the world by researchers who speak more than 100 languages.

"In the modern era, it takes billions of dollars and multinational collaborations from people around the world to create this enormous putting together of the pieces," Toback said.

But that is part of the thrill of the accomplishment, they said.

"Everybody puts in their best effort," Eusebi said. "It is just humankind working together for one goal."

The Higgs boson particle was first theorized in the 1960s as the substance that gives basic particles mass. But actually finding one has challenged physicists ever since.

Researchers said they can't yet be sure that the particle they found is a Higgs boson - it could merely be "Higgs-like." Either way, it is a major breakthrough that validates and expands physicists' understanding of the universe.

Signs first began to emerge that scientists had found the particle last year. The first half of this year was spent evaluating - and then re-evaluating - data. The A&M researchers began to know for sure two or three weeks ago, they said.

But final analysis and confirmation was still needed, so the researchers kept quiet. Hints leaked in the media and websites, prompting questions from the A&M professors' colleagues.

"Everybody asked about it," Eusebi said. "They come up and ask. What are you seeing? You have to be honest and say we are seeing exciting things but you can't say much more than that."

Even up to the hours before the announcement, the researchers were exchanging emails and preparing a press release. But the late hours and hard work were worth it, they said.

"We have been waiting for the past 40 years or so for this," Kamon said. "This is very exciting."