Physicist explains significance of Higgs boson discovery

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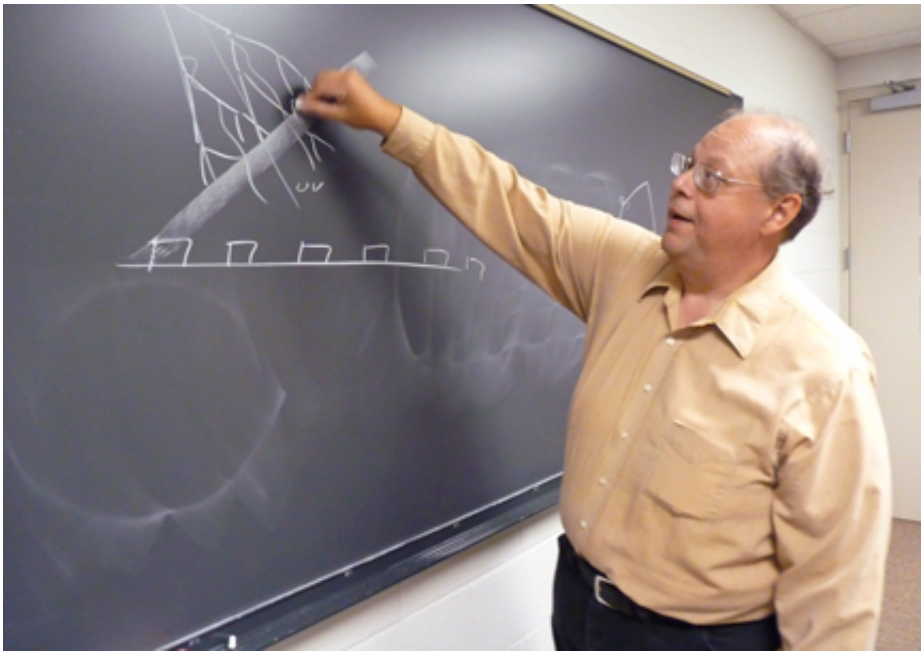

WSU physics professor Nick Solomey is excited about the discovery of the long-sought Higgs boson particle. Credit: WSU file photo

In July, physicists were ecstatic in announcing preliminary results pointing to the discovery of the long-sought Higgs boson particle. The Higgs boson is a tiny subatomic particle that apparently weighs about 130 times as much as an atom of hydrogen, the lightest gas. The non-scientist might have no idea what's so important about this elementary particle, but Wichita State University physics professor Nick Solomey is excited about the discovery.

Solomey: "What excites me the most about the Higgs boson discovery is that we now know that there's a Higgs field that's present. And this Higgs field could be like the electromagnetic field, where we're actually able to manipulate it to have control over magnetic and electromagnetic interactions. Can we now have some control over the interaction of mass?"

Solomey is no stranger to the subject of the Higgs boson, thanks to his work with a researcher at CERN, the European Organization for Nuclear Research.

Solomey: "My involvement with the Higgs boson studies and research at CERN goes back to when I was the graduate student of the man who was doing all of the research on how to develop the various detectors, and all these large detectors that you see at the CERN experiment are actually all based on his research that started back in the early '60s. And I only worked with him in the 1980s."

So how does the Higgs boson work? Solomey explains.

Solomey: "The Higgs boson will interact with this proposed Higgs field to give all these other particles that we see around us creating the normal matter and even some of the exotic matter produced at high energies its mass. And so, this interaction with the Higgs field with the particles that we see to produce the mass is the first indication of something major new beyond what used to be considered the standard model of particle physics."

Even with all of the excitement surrounding the news about the Higgs boson, Solomey says it's hard to predict the future significance of the discovery.

Solomey: "The Higgs boson, now that it's discovered, shows that the

Higgs field exists, but it's hard to predict the future. How are we going to be able to use it? There could be some amazing applications of it just like there was amazing applications of the electron, once we realized it existed."

The good news for those of us who don't understand all the fuss about the Higgs boson is that our lack of understanding doesn't mean we can't benefit from it.

Solomey: "So the Higgs boson with this Higgs field—it's going to be very complicated for a lot of people to understand. But imagine the world when quantum mechanics was just first discovered a hundred years ago. It eventually led to us making the transistor. And the transistor, although it relies on quantum mechanics, the average person carrying a cell phone with hundreds of thousands of transistors in it doesn't actually have to know how the transistor works to make use of it. And we can have some fantastic discoveries and applications of the Higgs boson and Higgs field once we understand how to manipulate that Higgs field."

Solomey says one of his concerns is the limited number of schools who teach quantum mechanics and electrical engineering at the chip level design.

Solomey: "With the concept of the Higgs boson and new applications, let's go back and look at the schools that are teaching quantum mechanics and electrical engineering at the chip level design. Only a handful of schools around the United States have advanced programs that do this and they're all related in cities that have industries that really need these advanced educated people. And I'd like to see more people educated on advanced physics and advanced electrical engineering throughout these applications."

And Solomey says the potential is great for students studying physics.

Solomey: "Physics, the study of physics, or even if you're an engineer and you have a double degree in physics, there's a great potential for this field. It will give you an enhanced job. But it also, even if you're not going to study physics after you get a degree, but are going to study applied physics and applications of physics concepts, there's a huge demand in industry for these type of people."

Provided by Wichita State University