State hopes for big economic bang as Jeff Lab bids for ion collider

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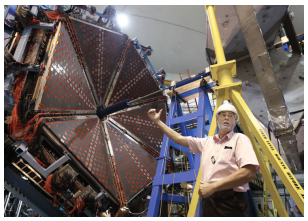

JEFFERSON LAB

Andrew Hutton, assoc. director of the Accelerator Division at the Thomas Jefferson National Accelerator Facility, talks about a new detector, at left, Tuesday, September 29, 2015. Electrons or protons are accelerated to collide with other particles inside the detector enabling physicists to collect data.

NEWPORT NEWS — Andrew Hutton is not a mad scientist, but he may be one of the happiest on the planet.

The British-born physicist oversees the Continuous Electron Beam Accelerator Facility at Jefferson Lab, which is completing a $340 million upgrade that will double its energy and allow experiments to resume this fall.

Despite the admonitions of his wife, he just got a new sports car.

And, if all goes well, in a few years' time he may be overseeing construction of one of the most advanced scientific tools ever made — an electron ion collider — to investigate the mysteries of the universe.

If you're a nuclear physicist, it doesn't get any better than this.

"I'd get the best in the world," he says with a smile, bending his 6-foot-5-inch frame to navigate a cramped space during a recent underground tour of the lab's upgraded accelerator.

"All of us want to build the next best thing."

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In Virginia, people like to call the Hanover County hamlet of Ashland the "Center of the Universe."

But the real center may be in Newport News, where scientists at Jefferson Lab are trying to figure out what makes up the universe — namely, the nature and properties of the smallest particles of atomic nuclei.

Uncovering the mysteries of these infinitesimally small things will require a big machine — namely an electron ion collider, or "EIC" — a subterranean, 2.1 km (1.3 mile) figure-eight track that would collide electrons into heavy ions or protons at nearly the speed of light.

Scientists would study the resulting collisions to learn more about the force that binds all visible matter.

"The fundamental theory of the structure of atomic nuclei, the 'glue' that holds quarks together … is still very mysterious," said Bob McKeown, deputy director of science at Jefferson Lab.

On Thursday, that pursuit took a big step when the Nuclear Science Advisory Committee recommended that the U.S. Department of Energy build the collider — a massive project estimated to cost $1 billion that would take almost 10 years to complete.

Now the race is on to win the project, and Jefferson Lab — one of 10 Department of Energy research laboratories and home to the Thomas Jefferson National Accelerator Facility — is competing with Brookhaven National Laboratory in Long Island, N.Y.

Brookhaven has an ion collider; Jeff Lab has an electron accelerator. Both facilities are in the process of submitting plans to show the Energy Department how they would build a new collider.

"We need to work hard to be prepared to try to bring this facility to our site," said McKeown.

The stakes are high even outside the realm of science — there are big bucks to be made in studying the Big Bang.

Jefferson Lab already employs 700 people and attracts nearly 1,400 researchers from the U.S. and the international community.

State officials estimate the project would generate 4,900 jobs over 10 years and add $708 million to Virginia's economy.

Virginia lawmakers budgeted $3.95 million for fiscal 2016, and Jeff Lab is seeking an additional $2.4 million in the next biennium to help prepare its bid for the project.

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Officials said the new research tool would ensure the viability of the lab that gets the project for decades to come.

Research at Jefferson Lab has produced more than 125 patents and led to advancements in the real world, not just the theoretical world, affecting everything from microwaves to MRIs, and cancer detection and treatment.

But also it would help continue another mission: to make Virginia and the Hampton Roads region the center of the universe for science education.

Jefferson Lab hosts about 15,000 visitors a year as part of its mission to expose young people to science and help train the people who teach it.

Landing a frontier research project "would boost science across the state," Hutton said.

"It would help us create a pipeline of people with scientific backgrounds. It's important for the country."

Not to mention the importance a collider could hold for our understanding of the cosmic scheme of things.

"We want to be pushing forward the fundamental understanding of things," Hutton said.

"Why doesn't the nucleus fall apart? What is holding everything together?

"We need to be asking those questions."

Who doesn't want to be in the center of the universe?

PHOTOS: Jefferson Lab