

Tech professors examine quarks' influence on protons

University News Service

RUSTON — Four Louisiana Tech University professors just helped rewrite the book on physics. They assisted in proving that "strange" quarks do indeed influence proton structure.

Neven Simicevic, an associate professor of physics at Tech, in the mid-'90s, worked directly with Doug Beck, spokesman for the G-Zero collaboration and a professor of physics at the University of Illinois at Urbana-Champaign.

When Simicevic came to Tech in 1997, he had already contributed to the G-Zero project by designing the particle-detector system and devising computer simulations of

fully developed," Simicevic said. "We have extended this picture because we understand better now how the proton is made."

Protons are found in what is considered the heart of all matter: the nucleus of the atom. Physicists have long known that protons are primarily built of particles called quarks, along with particles called gluons that bind the quarks together.

Three permanent quarks in the proton are classified as either "up" or "down." Up and down quarks are the lightest of the possible six "flavors" of quarks.

In addition to the three resident quarks, others appear from time to

time but vanish in a tiny fraction of a second. Nuclear physicists determined to catch some of these ghostly particles in the act of coming and going, chose to look for the next-lightest quark, the "strange" quark, since it seemed the most likely to have a visible effect.

G-Zero equipment worth \$10 million allowed researchers to do just that.

"This is like in astronomy when someone discovers a new star or planet," Simicevic said. "If you discover a new planet, there is perhaps no practical application for that, but discoveries like that feed our curiosity and help us better understand the world around us.

home of the G-Zero project, supported their research for several years by paying half their salaries.

He also credited yearly NSF grants that not only supported his and Wells' research but also Johnston's and Forest's contributions to the project.

Next, Simicevic and Wells will work on a project of theirs called "N to Delta," which will be conducted using the same \$10 million apparatus that the G-Zero project used.

"This experiment is similar to G-Zero and will further extend our knowledge of the proton," Simicevic said.

And like with almost any discovery, you don't know what all may come of it."

G-Zero is a multiyear experiment financed by the U.S. Department of Energy and the National Science Foundation. In addition, contributions of hardware and manpower were also made by Centre National de la Recherche Scientifique in France and Natural Sciences and Engineering Research Council in Canada.

Simicevic said when he and Wells came to Tech in 1997 (he from the University of Illinois at Urbana-Champaign and Wells from MIT), the Jefferson Lab,