Superstring theorist at University of Florida wins 2015 Heineman Prize

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The American Physical Society (APS) and the American Institute of Physics (AIP) announced today, on behalf of the Heineman Foundation for Research, Educational, Charitable, and Scientific Purposes, that theoretical physicist Pierre Ramond, director of the Institute for Fundamental Theory at the University of Florida, has won the 2015 Dannie Heineman Prize for Mathematical Physics—one of the highest honors for scientific investigators in that field.

In recognizing Ramond, the two organizations cited his "pioneering foundational discoveries in supersymmetry and superstring theory, in particular the dual model of fermions and the theory of the Kalb-Ramond field."

"Since the days of ancient Democritus, philosophers and scientists who pondered what makes up the fundamental building blocks of matter have thought about point-like particles—first atoms then subatomic particles like electrons or quarks," said H. Frederick Dylla, executive director and CEO of AIP. "But by initiating superstring theory in the early 1970s, Pierre Ramond generalized to all particles the notion that the basic building blocks are not point particles at all, but tiny string-like objects that vibrate to form the particles."

The prize consists of a certificate and a $10,000 award, which will be presented at a special ceremony during the April 2015 APS meeting in Baltimore, Md.

Once an Engineer, Always a Theorist

Ramond's path to prominence in the field was a bit unconventional—one he likens to a general who comes up through Officer Candidate School rather than going to West Point. He grew up in Neuilly/Seine, a suburb of Paris, and after graduating high school in 1961, Ramond moved to the United States where his father worked as an engineer, and he attended Newark College of Engineering in New Jersey. Upon graduating with a degree in electrical engineering, he decided to change direction and follow his interest in physics and attended Syracuse University, where he received his PhD in 1969. He did his first postdoc at the National Accelerator Laboratory (NAL), now the Fermi National Accelerator Laboratory, where he wrote what was the 7th theory publication to come out of Fermilab. "Dual Theory for Free Fermions" was published in 1971, and it formed the basis of supersymmetry and superstring theory. He then went on to Yale as an instructor and assistant professor where he continued his work.

According to Ramond, superstrings offer a compelling picture of our universe.

"At its onset (the big bang), stood superstrings, a kind of quantum superviolin whose vibrations generated all elementary constituents of the universe, some of which we know—quarks, electrons, photons—and some yet to be discovered," Ramond said.

The common origins of these elementary constituents that make up the universe link together, through a hypothetical construct called supersymmetry, all the particles from which all the stuff in the universe is made, including the particles that create the forces that bind the stuff together.

"This evocative picture, tightly constrained by mathematics, requires

more than three space dimensions and supersymmetry, although there is (so far) no evidence for either," he added.

Ramond is a fellow of the APS and has received numerous other awards including the Oskar Klein Medal from the Swedish Royal Academy, and has published several seminal papers and books on the subject of mathematical physics including Field Theory, Journeys Beyond the Standard Model, and Group Theory. He lives with his wife Lillian, also an electrical engineer, in Gainesville, Fl. They have three daughters and six grandchildren. When he is not entangled in the mysteries of superstring theory, Ramond plays tennis and is an avid reader of history.

Provided by American Institute of Physics