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WILLIS E. LAMB, JR.
Professor of Physics, Stanford University
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Dr. Willis E. Lamb, Jr., Professor of Physics at Stanford University, is acknowledged by his colleagues to rank among the world's outstanding physicists. In recognition of his research achievements, he has received numerous scientific honors including the 19th Research Corporation Award for Contribution to Science (1955), the honorary degree of Doctor of Science from the University of Pennsylvania (1954), election to the National Academy of Sciences (1954), and the Rumford Premium of the American Academy of Arts and Sciences (1953).

He is best known for his work in the field of atomic structure and quantum electrodynamics. In 1947 his research attracted the attention of the scientific world with his discovery of the "Lamb Shift." It established a deviation from the previously accepted Dirac formula for the fine structure of hydrogen and measured the deviation precisely.

This achievement paved the way for fresh consideration of quantum electrodynamics and an important extension of its domain of applicability. It removed another barrier to knowledge about the atom by providing one more important clue in the search for understanding of the ultimate composition of matter.

The Dirac theory of 1928 had enabled scientists to predict various energy levels of the hydrogen atom. This energy is believed to arise from attractive forces between the hydrogen atom's proton nucleus and its single electron--forces similar to those between the earth and the moon.

When the hydrogen atom is excited by outside influences--heat, electricity, or bombardment by other atomic particles--the position of the electron changes. The

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changes are manifested in a large number of specific energy levels, and it became possible to predict each level by means of Dirac's formula.

Spectroscopic measurements of these energy levels at first confirmed the Dirac formula, but after a few years the experiments of some investigators began to show discrepancies. Many attempts to eliminate or account for these discrepancies failed, and this led some physicists to question the reliability of the Dirac formula.

LAMB MEASUREMENTS OF ENERGY

Most physicists seemed to feel the discrepancies were unimportant, however, until Dr. Lamb in 1947 published a report of his ingenious direct measurements of resonance absorption by a beam of excited hydrogen atoms.

Dr. Lamb had formed some of the basic ideas for this work on the atomic hydrogen spectrum in 1941, but did not actually undertake it until 1946. It consisted of a measurement, using microwaves, of the separation of two levels of energy in the hydrogen atom.

According to the Dirac formula, both these levels of energy would coincide. In fact, they did not. As a result of Lamb's measurement, scientists were able to make exceedingly accurate tests not only of the physical laws for electrical charges, but also of any proposed theory to account for the discrepancies.

In later work by Dr. Lamb and other noted physicists, most of the discrepancies were accounted for, though a small deviation still remains to be explained. The agreement is so good, however, that scientists now regard quantum electrodynamics as a practically completed theory. Developments since 1947 have shown how the difficulties could be by-passed, and the Dirac formula can be used to solve problems dealing with the interaction of charged particles and radiation.

Dr. Lamb performed his measurements of the atomic hydrogen spectrum while engaged in work on microwave problems for the Office of Scientific Research and Development at the Radiation Laboratory of Columbia University during World War II. His associate in the project was R. C. Retherford, and their work was supported by the Signal Corps and the Office of Naval Research.

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The project was continued after the war at Columbia's Radiation Laboratory until 1951, when Dr. Lamb became professor of physics at Stanford University. With his Stanford associates, further research has been carried on for higher energy levels of the hydrogen atom.

His later associates at Columbia were E. Dayhoff and S. Triebwasser, and related work was done with Miriam Skinner. His Stanford associates have included T. H. Maiman, T. M. Sanders, Erwin Wieder, and Lee Wilcox.

BIOGRAPHICAL DATA

Willis E. Lamb, Jr., was born at Los Angeles, California, July 12, 1913. His father was an electrical engineer for the Southern California Telephone Company. His mother, who was an undergraduate at Stanford University at the time of the 1906 earthquake, later received a teaching degree. Both parents are now dead.

Lamb attended Los Angeles High School, where he became more interested in chemistry than in physics. His interest continued through four years at the University of California, where he received a bachelor of science degree in chemistry in 1934. His high school and college classmates remember him as an exceptional chess player, but he seldom plays the game now.

During his undergraduate days in chemistry, he was required to take numerous courses in physics. As a result, he switched to the latter studies and in 1938 earned his Ph.D. in physics at the University of California under Dr. J. Robert Oppenheimer of atomic bomb fame.

He became an instructor in physics at Columbia University in 1938, where he rapidly rose to the rank of full professor in 1948. He has been a member of the Stanford faculty continuously since 1951, but served as a visiting professor at Harvard during the fall and winter of 1953-54.

Dr. Lamb has published many articles on a variety of subjects in physics. He has presented scientific papers at meetings in Europe, Canada, Mexico, and in many cities of the U. S.

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In 1939 Dr. Lamb married Ursula Schaefer, who earned a Ph.D. in history at Barnard College of Columbia University. She taught history at Barnard until the Lambs came to Stanford, where she is doing research on the early Spanish explorers. She recently completed a book, soon to be published, on a now-obscure Spaniard named LaVondo who succeeded Christopher Columbus as governor of Haiti.

The Lambs live quietly in their own home in Palo Alto, near the Stanford campus. They have no children, and usually spend their summers sailing on Great South Bay off Long Island, New York, where Dr. Lamb still has a sailboat. He is also considered an excellent swimmer.

Dr. Lamb is tall and athletic, shy in manner. He never seems more at home than when standing in his old-fashioned, oak panelled office at Stanford, writing endless equations on the blackboard to explain the mysteries of physics to a student. Students find him always ready to help with their problems.

His colleagues know him as an extremely talented theoretical physicist, but respect him equally for his ability as an experimental physicist. It was the latter field in which he gained his fame, and his combination of abilities they regard as remarkable.

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