AWARDS

Tullio Regge

Heineman Prize

Tullio Regge, professor of physics at the University of Turin, was awarded the 1964 Dannie Heineman Prize for Mathematical Physics on April 29, during the Washington meeting of the American Physical Society. He was cited for "important papers introducing into particle theory the concept of analytic continuation in angular momentum".

Since 1961, the evolution of the theory of strong interactions has largely depended on Regge's discovery, according to Geoffrey Chew of the University of California at Berkeley. Dr. Regge's original papers, which appeared in 1959 and 1960, were in potential scattering theory. Theoreticians have found explicit solutions for the scattering amplitude only for a few very simple potentials. For more complicated potentials (in particular, superpositions of Yukawa potentials), they have had only limited success. They were able to find the behavior of the scattering amplitude, A, for large values of energy and fixed angular momentum, l, and they could find the analytic properties of A in the complex energy plane for fixed momentum transfer.

What Dr. Regge did was to prove that the scattering amplitude was an analytic function of the continuous complex variable, l, for fixed energy (although physically only integral values of angular momentum can exist). He developed an interpolation procedure for calculating the singularities in the scattering amplitude. The singularities are now known as Regge poles. In the complex angular momentum plane, the path traced out by the Regge pole as a function of the energy is evaluated. The path is called a Regge trajectory.

For large values of momentum transfer, the Regge pole that is furthest to the right in the complex l plane dominates the scattering amplitude. This pole corresponds to a resonance whenever it is near an integral value of l. Hence, by evaluating the behavior of the scattering amplitude for high momentum transfer, Regge's results implied that the position of resonances could be found.

Particle physicists pounced on Regge's idea and tried to extend it to the theory of strongly interacting particles. They plotted the mass and spin angular momentum, J, of known elementary particles. Then they drew straight lines between those which shared all other quantum numbers except J, and had $\Delta J=2$. These straight lines correspond to Regge trajectories. By means of these plots, the known particles could be organized. It should be possible to predict the existence of new particles along the trajectories, but none has as yet been found.

Theoreticians hoped that, by looking at the high-energy behavior of the scattering amplitude, they would gain complete information about the amplitude, but this hope has not yet been realized. However, the idea of looking at the properties of the scattering amplitude in the complex l plane has been, and probably will continue to be, useful in understanding the dynamical properties of strongly interacting particles.

The $2500 Heineman Prize, endowed in 1959 by the Heineman Foundation for Research, Educational, Charitable, and Scientific Purposes, Inc., is presented under the auspices of the American Institute of Physics and the American Physical Society to encourage research and to recognize outstanding contributions to the published literature in mathematical physics. The endowment fund is administered by the Institute and the prize is awarded to an individual selected by a committee of the Society. Previous recipients of the honor include Murray Gell-Mann, Aage Bohr, Marvin L. Goldberger, Léon Van Hove, and Keith A. Brueckner.

NAS Awards

On the occasion of its 101st annual meeting in Washington, D. C., the National Academy of Sciences presented its Cyrus B. Comstock Award to Chien-Shiung Wu of Columbia University. The award, which is given every five years by the Academy for the most important discovery or investigation in electricity, magnetism, or radiant energy, paid tribute to Dr. Wu's work in providing the first experimental confirmation of the violation of parity.

In their classic paper of 1956, T. D. Lee and C. N. Yang considered the strange case of the unstable K mesons, τ^+ and θ^+, which appear identical in mass and lifetime but different in that one decays into pi mesons of odd parity and the other into pi mesons of even parity. Lee and Yang chose to assume that in the realm of weak interactions the principle of parity conservation might be violated and that τ^+ and θ^+ might be two different decay modes of the same particle. On the basis of existing experimental information, they concluded that there was no evidence either to confirm or refute parity conservation in weak interactions, and suggested ways of testing the question.

Within a few months, Dr. Wu, in collaboration with E. Ambler, R. Hayward, D. D. Hoppes, and R. P. Hudson of the National Bureau of Standards, demonstrated conclusively that the parity law does not hold in the beta decay of oriented cobalt-60 nuclei. Their procedure was described by Dr. Wu as follows: The essence

photo by Heka

Chien-Shiung Wu

of the experiment was to line up the spins of the Co-60 nuclei along the same axis and then to determine whether the beta particles were emitted preferentially in one direction or the other along the axis. In order to reduce the thermal agitation which tends to disrupt the orderly orientation, the crystal was cooled down to a temperature of 0.01°K. The results showed that the electrons were emitted preferentially in the direction opposite to that of nuclear spin and therefore conclusively proved that the beta decay of Co-60 behaves like a left-handed screw.

A native of Shanghai, Dr. Wu was educated at the National Central University in China and came to the United States in 1936 for graduate studies at the University of California. After teaching at Smith College and Princeton University, she joined the Division of War Research at Columbia University in 1944, and became associate professor of physics in 1952 and full professor in 1959. Dr. Wu is a fellow of the American Physical Society and was also awarded the Research Corporation Award in 1959.

The National Academy has presented its James Craig Watson Medal to astronomer Willem J. Luyten of the University of Minnesota. The medal, the Academy's oldest, honors Dr. Luyten's contributions to the understanding of white dwarfs, a class of stellar objects of low luminosity and high temperature, and also of small diameter and high density, which are believed to represent the final state of stellar decay.

Over a thirty-year period, first at Harvard University and later at Minnesota, Professor Luyten has identified more than 80 percent of the approximately 500 known white dwarfs. To discover these objects, Professor Luyten had first to distinguish between distant, luminous stars and much closer faint stars with large angular motions, which he did by comparing photographs of the same portion of the sky taken at ten-year intervals. He then compared photographs of the stars in both red and blue light, and was thus able to distinguish between ordinary red dwarfs and the significant white dwarfs.

Born in the Dutch East Indies and educated at Amsterdam and Leiden, Professor Luyten has served as chairman of Minnesota's Department of Astronomy since 1931. He is a member of the American Astronomical Society and the Royal Astronomical Society of London.

The election of 35 new members was also announced by the Academy in April. They include Freeman Dyson of the Institute for Advanced Study, Harold Edgerton of Massachusetts Institute of Technology, Walter Gordy of Duke University, George H. Herbig of the Lick Observatory, Walter Kauzmann of Princeton University, Tsung-Dao Lee of Columbia University, and Clark Millikan of Caltech.

AGU Awards

The American Geophysical Union presented four awards for distinguished contributions to the earth sciences at a special honors ceremony held on April 21, during its forty-fifth annual meeting.

The Union's third annual John A. Fleming Award was given to Edward O. Hulburt, formerly of the Naval Research Laboratory in Washington, D. C., for his work in geomagnetism, atmospheric electricity, and aeronomy, and for his leadership in national and international programs. In the course of his thirty-year career at NRL, Dr. Hulburt, who was the Laboratory's first director of research, pioneered studies of the atmosphere and ionosphere. In 1925 he deduced the structure of an ionosphere varying in density with altitude and capable of refracting radio signals. He is also credited with early explanations of the origin and behavior of the ionosphere as a response to solar radiation. The NRL has recently established an E. O. Hulburt Center for Space Research in Washington.

Julius Bartels, professor of geophysics at the University of Göttingen and director of the Max Planck Institute for Aeronomy until his death on March 6, was posthumously awarded the twenty-sixth William Bowie Medal. He was cited for his "unselfish cooperation in research". Professor Bartels was known for his applications of statistical procedures to problems involving the effects of solar radiation on the earth's magnetic field. He also applied these methods to the study of the effects of the lunar gravitational field on atmospheric tides and their influence on geomagnetic and ionospheric variations.

Klaus F. Hasselmann of the Institute of Geophysics at the University of California in La Jolla, has received the James B. Macelwane Award. The award is given for outstanding contributions in the geophysical sciences by a young scientist and was presented to Dr. Hasselmann for his work on nonlinear wave interaction.

J. Wallace Joyce of the US State Department has been given a Special Award for his leadership in directing the course of the American Geophysical Union's international affairs and for his service on behalf of geophysics in the United States. As Secretary for International Participation, Dr. Joyce had guided the expansion of the AGU's activities throughout the world. He has also served as head of the National Science Foundation Office for the United States International Geophysical Year Program and since 1958 has directed NSF's Special International Programs.