

Hund's molecular theory provided the basis of the molecular orbital method, which he and especially Mulliken developed further to describe covalent molecular bonding. Using what Douglas Hartree called the self-consistent field, the molecular orbital method placed electrons in combined molecular orbitals, rather than in originally unchanged atomic orbitals as proposed by Walter Heitler and Fritz London in their competing valence bond method. In 1929, while Hund and Mulliken were establishing the modern nomenclature of molecular states in the US, Gerhard Herzberg in Germany demonstrated that the Hund and Mulliken molecular orbital method also described the Heitler-London concept of bonding electron pairs, hence it could serve as the basis of quantum chemistry.

Hund spent the 1930s at the University of Leipzig, where he, Peter Debye and Heisenberg created a center of atomic theory. At Leipzig, Hund applied quantum mechanics and symmetry considerations to solid-state and nuclear theory. The result of his research was a set of pioneering papers on the coupling of equivalent nucleons (yielding the energy states of nuclei), which Hund wrote in 1937 independently of Wigner in the US. Hund also worked on the theory of matter at high pressure and temperature, with application to astrophysics (the theory of Cepheid variable stars) and to superconductivity (but, like others, without success).

Germany's scientific isolation during World War II and its aftermath prevented Hund from participating more actively in modern topics, such as quantum field theory. Between 1945 and 1950, he wrote five successful textbooks on introductory theoretical physics, moving in 1946 from Leipzig to the University of Jena.

In the summer of 1951, Hund managed to leave East Germany and take a position at the University of Frankfurt in West Germany. In 1957, after spending six years at Frankfurt, he returned in to Göttingen, where he resumed work on solid-state problems. After his retirement in 1964, Hund concerned himself with fundamental concepts in physics and with the history of physics, notably quantum theory, which he wrote about in the book *The History of Quantum Theory* (Bibliographisches Institut, 1967; English-language edition: Barnes & Noble, 1974). He continued to lecture into the 1990s.

From 1933 to 1951, he lived under two totalitarian regimes in Germany. Contemporaries observed that he behaved bravely, defending people and science against the attacks of Nazis and Communists. In his later years, Hund

served as an inexhaustible, reliable source of information on the historical, conceptual and didactic aspects of physics. This honest and modest man deserved perhaps more than the comparatively few honors that were bestowed on him. A demanding teacher and friendly gentleman, he was loved and revered by many generations of students.

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Tosiya Taniuti

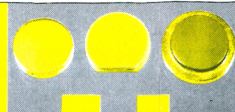
Tosiya Taniuti, an emeritus professor of physics at Nagoya University in Japan, passed away on 6 December 1996, one day after his 72nd birthday. He made many contributions to the study of nonlinear phenomena in mathematical physics and theoretical plasma physics, the most important being the establishment of the reductive perturbation method.

Born in Hyogo prefecture, Taniuti graduated with a major in physics from Osaka University in 1946, going on to pursue studies in the physics departments of Osaka University and Kobe University. In 1956, he received a DSc from Osaka, and in the same year, became an assistant professor at Kobe. Seven years later, he moved to Nagoya University's Institute of Plasma Physics as a professor and head of the theoretical division.

In an early piece of research at Kobe, Taniuti discovered a particular solution for a Born field according to which two waves propagate and return to their original shapes after colliding. This outstanding achievement ranks alongside his later discovery of solitons as nonlinear dispersive waves.

Back in the early 1960s, it was still not clear that the existence of solitons in nonlinear dispersive systems is due to the balance between nonlinearity and dispersion. After the rediscovery of the Korteweg-de Vries (KdV) soliton by Norman Zabusky and Martin Kruskal in 1965, Taniuti was quick to elucidate the special features of nonlinear dispersive systems. To an ion acoustic wave, he applied the reductive perturbation method, which eliminates secular terms successively by the stretching of spatiotemporal variables in terms of a small expansion parameter related to the wave amplitude. As a result, he found that the wave could be described by the KdV equation.

Through this work, Taniuti drew attention to the fact that many nonlinear dispersive waves have the same properties asymptotically. Recognizing the effectiveness of combining scale transformations and perturbation ex-



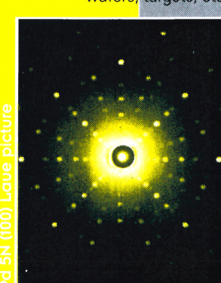
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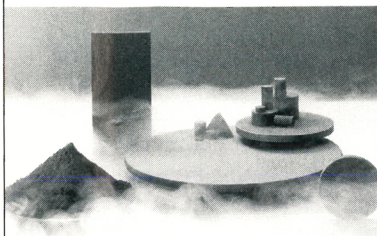
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pansions, he immediately extended the method to more general systems, showing that a general weakly dispersive system of nonlinear equations reduces to the KdV equation, whereas a general strongly dispersive system reduces to the nonlinear Schrödinger equation. He applied this method to many different areas, including plasma physics and hydrodynamics, and contributed greatly to the elucidation of nonlinear wave phenomena. Even today, his work is a *sine qua non* for researchers in the field of nonlinear waves.

Staying within the Nagoya University system, Taniuti moved in 1966 to the physics department, where he served as a professor for 22 years. Highly regarded by his physics peers, he was instrumental in guiding many promising young researchers, and under his strong leadership, he established and organized research in nonlinear wave theory.

He actively contributed to many research collaborations, both in Japan and abroad. In addition to publishing numerous papers, he wrote six well-known books, including *Non-Linear Wave Propagation* (Academic Press, 1964) with Alan Jeffrey; *Magnetohydrodynamic Stability and Thermonuclear Containment* (Academic Press, 1966), also with Jeffrey; and *Nonlinear Waves* (Pitman, 1983) with Katsunobu Nishihara.

In the two years after his retirement from Nagoya in 1988, Taniuti made a number of extended international visits, invited as a guest scientist by his friends. He also taught at Chubu University until 1994.

Tosiya Taniuti's lifelong commitment to nonlinear physics and plasma physics was an inspiration to all who discussed with him new ways to tackle difficult problems. Loved and respected, he will be greatly missed by his colleagues and students worldwide.

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James Raymond Lawson

James Raymond Lawson died on 21 December 1996 in Nashville, Tennessee, after a long and distinguished career as an experimental infrared spectroscopist, university president and science administrator. He was 81.

A native of Louisville, Kentucky, he became the first student to graduate from Fisk University (a traditionally black institution) with a major in physics. That was in 1935. He went on to

earn his PhD in physics at the University of Michigan in 1939.

Following the untimely death of Elmer Imes, his mentor at Fisk, Lawson returned to the university in 1942 as chair and professor of the physics department. He immediately began efforts to develop a research program in infrared spectroscopy. With the help of former colleagues in the Michigan physics department's instrument shop, he ordered an infrared spectrophotometer like one the department was building for its own use. By 1948, when the instrument was shipped to Fisk, Lawson had recruited five Fisk physics majors, then seniors, to stay on to do their MA theses in infrared spectroscopy on the new instrument. That was the beginning of the Fisk Infrared Research Laboratory (FIRL).

In 1950, Lawson along with Nelson Fuson began the Fisk Infrared Spectroscopy Institute, which sponsored week-long courses. Also, Fisk graduate students began reading scientific papers at meetings of the American Physical Society and American Chemical Society, thereby effectively integrating those groups.

After spending the years 1955–57 at Tennessee A&I State University (now Tennessee State University), Lawson returned to Fisk in 1957. He became vice president of the university in 1966 and president in 1967. While president, he was very active in both the local Nashville community and in national affairs. His activities included service on the board of directors of Oak Ridge Associated Universities and the joint advisory committee of the American Institute of Physics and American Association of Physics Teachers.

During Lawson's tenure, Fisk had its largest-ever enrollment—1500 students. He also attracted a strong faculty. However, the social turmoil that accompanied the civil rights movement was felt strongly in Nashville, and Fisk suffered declining external financial support that led to sharp decreases in faculty, staff and enrollment. Lawson resigned from the university in 1975.

During the next decade, Lawson lived in Washington, DC, where he served as special assistant to the director of the office of university programs for the Energy Research and Development Administration (forerunner to the Department of Energy) and later as head of NASA's University Affairs Office. After a series of illnesses, he went into full retirement and eventually returned to Nashville.

Known as the "gentle giant," he will long be missed as a friend, scholar, good family man and a compassionate human being.

RONALD E. MICKENS

Atlanta, Georgia ■