

Rumford Medals to Dehmelt, Deutsch, Hughes and Ramsey

At its Niels Bohr Symposium last November the American Academy of Arts and Sciences presented Rumford Medals to Hans G. Dehmelt (University of Washington), Martin Deutsch (MIT), Vernon W. Hughes (Yale) and Norman F. Ramsey (Harvard). The prize was established in 1796 to recognize "outstanding discoveries in the fields of heat and light," and is presented every other year.

Dehmelt was honored for his radio-frequency spectroscopy studies of trapped single electrons. At the presentation, Bernard F. Burke, chairman of the AAAS Rumford committee, noted that "capturing a single electron and measuring its properties, rather than taking the average of an enormous number of electrons, is truly an extraordinary piece of experimental work.... Dehmelt has essentially created a new atom, which he has named 'geonium,' a hydrogenic atom consisting of one electron bound to the Earth." Dehmelt received his Dr. Rer. Nat. from the University of Göttingen in 1950. He was a research associate at Duke University in 1952-55, and then came to Washington as a visiting assistant professor of physics. He has remained there, becoming an assistant professor in 1956 and advancing to full professor in 1961. In 1956 Dehmelt made the first measurement of the spin resonance of free electrons, using the electric field produced by a cloud of ions to trap the electrons. He subsequently pioneered the use of the Penning trap,

originally a gas-discharge device, to perform prolonged measurements on trapped single particles. Over the past decade he and his group have made the world's most precise measurements of the gyromagnetic ratio, which form the basis of an estimate of the radius of the electron some 10 000 times smaller than the accepted upper limit. These measurements were made possible by Dehmelt's discovery of the continuous Stern-Gerlach effect. Last year, for further improvement, Gerald Gabrielse, Dehmelt and William Kells operated a geonium apparatus as a 10-eV mini-synchrotron (see *PHYSICS TODAY*, May 1985, page 17).

Deutsch was honored for his discovery of positronium and for the first rf spectroscopy studies of positronium. Burke remarked, "Positronium... has the virtue of simplicity, which pleases the theorists, but also the disadvantage of living a very brief length of time. Martin Deutsch is therefore to be congratulated for being quick enough to measure its properties." Deutsch received his PhD in physics in 1941 from MIT. He remained there as an instructor from 1941 to 1945; concurrently he worked at the Los Alamos Scientific Laboratory in 1944-46. In the 1940s and 1950s he performed a series of β -decay experiments testing for interference terms between the weak and electromagnetic interactions, as well as a series of experiments on the angular correlation of γ rays emitted in nuclear decays, and measured a number of

nuclear magnetic moments. In 1951 Deutsch reported the first observation of positronium formation, made while studying the annihilation of positrons stopped in various gases. He subsequently used dc magnetic-quenching techniques and rf spectroscopy to measure the Zeeman splitting of positronium in its ground state. His interest then turned to studies of photoproduction effects, instrumentation (Deutsch was among the first to automate spark-chamber photography) and neutral- and charged-kaon decay. Most recently he has used γ -ray spectroscopy to study hypernuclei. Deutsch was named a full professor at MIT in 1953; he served as director of the institute's Laboratory of Nuclear Science in 1975-80.

Hughes was honored for his discovery of muonium (1960) and for his pioneering and precise measurements of its energy levels. Burke noted that Hughes "has been a leader in a most interesting series of measurements on yet another simple version of the hydrogen atom, muonium.... Muonium, like positronium, is an atom that lives only a brief length of time, but it provides insights into both the electromagnetic structure of the system and the internal structure of the muon." Hughes received his BA from Columbia (1941) and his MS from Caltech (1942). After World War II Hughes completed his PhD with I. I. Rabi at Columbia (1950), where he was an instructor and lecturer (1949-52). In their early work

DEHMELT



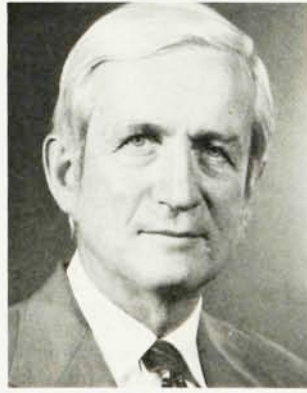
DEUTSCH



HUGHES

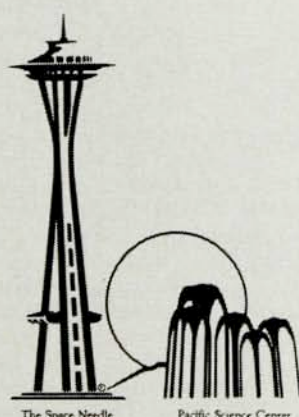


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at Columbia's Nevis Laboratory Hughes and his colleagues initiated the field of muon chemistry in gases and the search for the exotic conversion of muonium to anti-muonium. In 1952 Hughes became an assistant professor at the University of Pennsylvania; he came to Yale as an assistant professor in 1954. Working at the Los Alamos Meson-Physics Facility, Hughes and his collaborators from Yale and Heidelberg made highly precise measurements of the hyperfine structure and Zeeman splitting of muonium's ground state, which have provided one of the most sensitive tests of quantum electrodynamics and of the character of the muon as a heavy, structureless lepton—as well as precise values for the muon magnetic moment and the fine-structure constant. Hughes has served as associate chairman of the Yale physics department (1960–61) and as chairman (1961–67). He was named Donner Professor of Physics in 1969, and Sterling Professor of Physics in 1978; he is now also an adjunct professor of physics at Columbia. Recently Hughes and his coworkers have observed the Lamb-shift transition in muonium, as has a group at TRIUMF.

In the presentation to Ramsey, Burke noted that the technique of separated oscillatory fields in rf and optical spectroscopy, which Ramsey introduced (1950), allows one to "measure the properties of atoms with far greater precision than had heretofore been possible. This discovery is closely related to the work of Niels Bohr

because the uncertainty principle... forces the spectroscopist to carry out his measurements over a very long interval of time or, in the case of an atomic beam, over a very large space. This presents the problem of maintaining a uniform electromagnetic field over a large physical dimension. Norman Ramsey showed that the interference of resonances at the beginning and end of the flight path could circumvent the requirement of uniformity of the entire space. He also conceived and developed, with his associates, the atomic-hydrogen maser." Ramsey received an AB (1935) and PhD (1940) from Columbia, and an MA (1941) and DSc (1954) from Cambridge. During World War II he worked both at MIT on the first 3-cm-wavelength magnetrons and on the Manhattan Project. He returned to Columbia in 1945. From 1946 to 1947 he was the first chairman of the physics department at Brookhaven National Laboratory. In 1947 he came to Harvard as a professor of physics. The method of separated oscillatory fields serves as the basis for the most precise atomic clocks, as well as a high-resolution spectroscopic tool; in 1960 Ramsey and Daniel Kleppner invented the hydrogen maser, which allows still greater precision in spectroscopic studies and higher stability in atomic clocks (see *PHYSICS TODAY*, December, page 72). Ramsey was named Higgins Professor of Physics in 1966; he is currently studying time-reversal symmetry and parity, primarily with neutrons.

in brief

G. Samuel Hurst, formerly of Oak Ridge National Laboratory, has become a professor of physics at the University of Tennessee and director of the Institute of Resonance Ionization Spectroscopy, which was recently established under the university's Science Alliance Program.

Gerald Garvey, deputy associate director for nuclear- and particle-physics programs at Los Alamos, has been named director of the Los Alamos Meson Physics Facility.

Aviva Brecher, a recent Congressional fellow of The American Physical Society, has been named to head Boston University's new Office for Academic-Corporate Relations.

The Royal Institution of Great Britain has announced the following appointments: **John M. Thomas**, at present professor and head of the physical-chemistry department and fellow of King's College at Cambridge University, will

become director and resident professor at the institution and director of the institution's Davy Faraday Research Laboratory on 1 October 1986. He succeeds **Sir George Porter**, who was elected president of the Royal Society last November; Porter will remain as Fullerian Professor of Chemistry in the Royal Institution until 31 August 1988. **David Phillips**, Wolfson Professor of Natural Philosophy in the institution, will serve as its acting director from 1 January to 30 September 1986, when he will become deputy director. **Anthony K. Cheetham** will become professor in the institution on 1 October, holding a new chair in solid-state chemistry; he will also remain a lecturer in chemical crystallography at the University of Oxford.

Charles P. Bean, a physicist and biophysicist at the General Electric Research and Development Center in Schenectady, New York, has been named to a specially created chair at the Rensselaer Polytechnic Institute: Institute