IEEE Medal of Honor to Norman Foster Ramsey

The Institute of Electrical and Electronics Engineers has presented its highest award, the Medal of Honor, this year to Norman F. Ramsey of Harvard University, for "fundamental contributions to very high accuracy time and frequency standards exemplified by the cesium atomic clock and hydrogen maser oscillator."

Born in Washington, D.C., on 27 August 1915, Ramsey studied in the United States and England, receiving a PhD from Columbia University in 1940 and a DSc from Cambridge University in 1964. His diverse research interests have led to key contributions in determining magnetic moments, the structural shape of nucleons, the nature of nuclear forces and the thermodynamics of energized populations of atoms and molecules. Notably, Ramsey invented the method of using separated oscillatory fields for exciting resonances, which provides extremely high resolution in atomic and molecular spectroscopy and forms the practical basis for the most precise atomic clocks. Additionally, in collaboration with his students, he invented the atomic-hydrogen maser, which allows still greater spectroscopic resolution and serves as the basis for atomic clocks having the highest levels of stability for periods extending to several hours.

During World War II, Ramsey joined the MIT Radiation Laboratory where he headed groups that developed the first three-centimeter-wavelength magnetrons and the related radar systems; later he became a group leader at Los Alamos Laboratory. In 1947 he joined the faculty at Harvard University, becoming Higgins Professor of Physics in 1966.

Ramsey was the executive secretary of the group that established Brookhaven National Laboratory and the first chairman of its physics department. He served as the first science adviser to the Secretary General of NATO from 1958–59. He was a founding Trustee of Universities Research Association for the construction of the 200-GeV accelerator at Batavia, Illinois, and served as president of the Association from 1966–72. A fellow of The American Physical Society, Ramsey served as president of APS from 1978–79 and has been the Chairman of the Board of Governors of the American Institute of Physics since 1980.

RAMSEY

1983 Ernest O. Lawrence Awards

Energy Secretary Donald Hodel has presented the 1983 Ernest Orlando Lawrence Memorial Award to five scientists and engineers, each of whom will receive a medal, a citation and $5000. The award is given to US citizens who are at relatively early stages of their careers and already have made noteworthy contributions to the development, use or control of atomic energy. The recipients of the 1983 Lawrence award are James F. Jackson, Michael E. Phelps, Paul H. Rutherford, Mark S. Wrighton and George B. Zimmerman.

Jackson, who earned his PhD in nuclear engineering at the University of California and currently works as personnel director at the Los Alamos National Laboratory, is recognized for his contributions to reactor safety, including work on the transition phase of breeder reactors and on physical techniques to assess the safety of light-water and breeder reactors.

Phelps, a nuclear chemist at the School of Medicine, University of California, Los Angeles, has made outstanding contributions to nuclear medicine, notably the development and application of positron tomography to the study of human brain chemistry.

Rutherford received his PhD in physics from Cambridge University; he is now associate director of the Princeton Plasma Physics Laboratory. In his research, Rutherford contributed to the basic theory of plasma confinement, plasma instabilities, plasma transport and impurity behavior; his work has helped produce, in recent years, an excellent agreement between computer simulations and experimental results.

Wrighton, professor of chemistry at MIT, received his PhD from Caltech. He is honored for his insights into inorganic photoprocesses, particularly processes that occur at semiconductor surfaces, and for imaginative advances in the modification of electrodes, including incorporation of catalytic materials.

Zimmerman, a computational physicist at Lawrence Livermore National Laboratory, is recognized for his work in developing computer methods for problems in fusion research. He is best known as the principal creator of LASNEX—said to be the world's most complex physics simulation program—which simulates the processes expected to occur in inertial-confinement fusion.

ACA Awards to Jerome Karle and Herbert A. Hauptman

Jerome Karle and Herbert A. Hauptman received the A. Lindo Patterson Award of the American Crystallogra-

phic Association at its May 1984 meeting in Lexington, Kentucky, in recognition of their major contributions to the theory of direct methods of crystal structure determination.

Hauptman received his PhD in mathematics from the University of Maryland in 1955 and is now Director of the Medical Foundation of Buffalo in Buffalo, New York. Karle received his PhD in physical chemistry from the University of Michigan in 1944 and is head of the Laboratory for the Structure of Matter at the Naval Research Laboratory in Washington, D.C.

Working together at the Naval Research Laboratory during the 1950s, Hauptman and Karle analyzed the statistical properties of the intensities and phases of waves scattered in crystal diffraction experiments. Starting with the known intensities, their theories permit one to predict the phase of a scattered wave and also to calculate the probability that this prediction is correct; thus one can avoid some of the false signals that occur in this analysis. When these phases are known for enough reflections, the crystal structure is solved.

The "direct methods" based on this work as developed by them and others are now in very wide use in crystal-structure research. For crystals of some complicated compounds containing many independent atoms of similar scattering power no other method is effective.

This award honors the memory of A. Lindo Patterson (1902–1966), who discovered the vector function that bears his name while he was an unpaid guest at Massachusetts Institute of Technology during the Great Depression. Later he taught physics at Bryn Mawr College and then studied the structures of biological compounds at the Institute for Cancer Research in Philadelphia.

Karle and Hauptman share an award of $2000. They presented lectures at Lexington entitled "The origin and basis of direct methods and some recent developments with macromolecules" and "Combining direct methods with anomalous dispersion."

NAE awards to Harold E. Edgerton and Simon Ramo

The National Academy of Engineering gave its highest honor, the 1983 Founders Award, to Harold E. Edgerton, Institute Professor Emeritus, Massachusetts Institute of Technology. NAE President Robert M. White cited Edgerton for his "seminal achievements in ultra-high-speed photography which have captured and revealed hitherto unseen beauty and order in phenomena which range from the arts