Prize to **Philip Coppens**, a distinguished professor in the chemistry department at the State University of New York at Buffalo, for "his contribution to the experimental measurement and theoretical understanding of electron density distributions in crystals." The 1995 prize went to **Hugo M. Rietveld** of the Dutch Reactor Center in Petten, the Netherlands, for developing a widely used method for analyzing powder diffraction patterns.

OBITUARIES

Roman Smoluchowski

Roman Smoluchowski died in Austin, Texas, on 12 January 1996.

Born in Zakopane, Poland, on 31 August 1910, he received his master's degree in physics from the University of Warsaw in 1933 and a doctorate in physics and mathematics from the University of Groningen in The Netherlands in 1935. He then worked for a year at the Institute for Advanced Studies in Princeton.

In 1936, Roman returned to Poland as head of the department of physics of metals at the University of Warsaw. Early during World War II, he escaped from German-occupied Poland, and an invitation from Princeton University to become an instructor in physics enabled him to come to the US, which then became his permanent home.

In 1941, Roman became a research physicist at the General Electric Research Laboratory in Schenectady, New York, and stayed until 1945. Between 1946 and 1959, he held professorships at the Carnegie Institute of Technology, first in metallurgy and eventually in physics. In addition, beginning in the early 1950s, he was associated with the solid-state physics group at Brookhaven National Laboratory, spending many summers there. In 1960, he returned to Princeton as a professor in the department of mechanical engineering and as the first director of the interdepartmental program in solid state and materials science. Roman remained its director until 1976.

At Princeton, Roman taught both undergraduate and graduate courses and maintained an active and prolific research program. He applied his knowledge of radiation damage phenomena to the structural nature of the lunar surface prior to the lunar landings during the Apollo missions. He also turned his attention to problems in solid-state astrophysics, including the gravitational collapse and the resulting interior structure and magnetic field of Jupiter and the outer planets. This work is now being tested with data from the Galileo spacecraft probe.

Roman retired from Princeton as professor of solid-state sciences emeritus in 1978 and became a professor of physics and astronomy at the University of Texas at Austin. In his later

ROMAN SMOLUCHOWSKI

work, he studied the interactions of dust and ice particles in space with their environment. This resulted in important new understandings of the properties of interstellar dust grains, planetary ring systems, the icy satellites of the outer planets and the thermal evolution of cometary nuclei.

During his scholarly career, Roman made important contributions to a number of areas: the role played by structural defects in the properties of solids, magnetism and order–disorder transformations in metals and alloys, the mechanisms of radiation damage, the formation mechanisms and stability of point defects in the alkali halides, the application of solid-state physics to the properties of biological hard tissue and materials problems in astrophysics. In the early 1960s, when several Brazilian universities were establishing modern research activities in materials science, Roman invited several physicists from Brazil to join his research activities in the US and also visited their home universities.

In the course of his career, he served on and chaired many advisory committees and boards for the National Research Council of the National Academy of Sciences, the Department of Defense, Oak Ridge National Laboratory and several educational institutions. He was the first chair (in 1947) of the division of condensed matter physics of the American Physical Society.

Roman was a pleasure to work with, although it was not always easy to match his enthusiasm, energy and insight. He and his wife Louise made their home a welcoming place to colleagues and students. Roman will be remembered as someone who lived a full and contributory life, and we shall never forget his warm personality, his charm and his infectious booming laugh.

ANITA COCHRAN
WILLIAM COCHRAN
University of Texas at Austin
G. JAY DIENES
DAVID O. WELCH
Brookhaven National Laboratory
Upton, New York
PETER EISENBERGER
BARRIE S. H. ROYCE
Princeton University
Princeton, New Jersey
SERGIO MASCARENHAS
University of São Paulo
São Paulo, Brazil

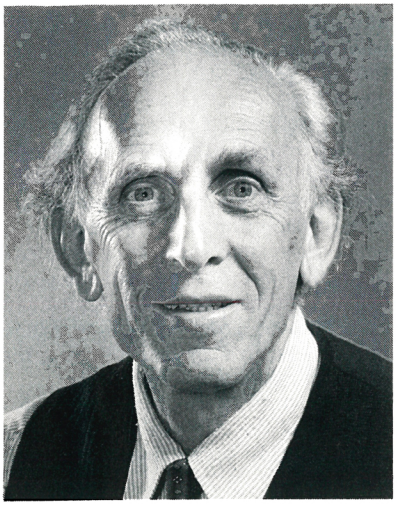
George Bekefi

George Bekefi, a professor of physics at MIT since 1961, died on 17 August 1995 at the age of 70, following a battle with leukemia.

George was born to an artistic family in Prague, Czechoslovakia. Soon after the German occupation began in 1939, George made his way to England under the aegis of a private British organization that undertook to rescue Czech Jewish children. There he earned a BSc in physics from the University of London in 1948. Also in 1948, seeking adventures in the New World, George departed for Montreal, where he studied at McGill University. He received a PhD in physics in 1952 and stayed on as a lecturer and assistant professor. His research interests then were in electromagnetism, particularly the effects of wave diffraction on aberrations of optical systems.

In 1957, George joined Sanborn C. Brown and William P. Allis at MIT's Center of Gaseous Electronics in the Research Laboratory of Electronics (RLE). Gaseous electronics soon began to play an important role in the operation of the newly discovered laser, in which the ionized gas became the lasing medium. These MIT studies were eventually incorporated in a book that George edited: *Principles of Laser Plasmas* (Wiley, 1976).

At the Second Conference on the Peaceful Uses of Atomic Energy, held in 1958 in Geneva, with controlled thermonuclear fusion declassified, new research vistas opened for many young scientists. At MIT, George and his students began to explore linear and



GEORGE BEKEFI

nonlinear wave propagation in hot plasmas and the various emission processes from this novel medium. The work culminated in his classic monograph, *Radiation Processes in Plasmas* (Wiley, 1966).

In the mid-1970s, George was ready to explore new fields. Earlier, during a 1966 Ford Foundation visiting fellowship at the University of Oxford, he had worked with Hans Motz, a pioneer of free-electron lasers. Thus began George's love affair with relativistic electron beams, an affair that flourished until his very last days. In addition to his research at MIT's RLE and Plasma Fusion Center, he was an active participant in experiments at Brookhaven National Laboratory and the CERN Linear Collider.

Also in the 1970s, together with Miklos Porkolab, George conceived the highly original Versator II tokamak research program at MIT. It was the first tokamak to demonstrate the feasibility of driving substantial plasma current with plasma waves, a step that was crucial to the development of the steady-state tokamak reactor concept. In 1972–73, George traveled on a Guggenheim fellowship to the University of Paris in Orsay and to the Hebrew University of Jerusalem. In 1978, he served as chairman of the division of plasma physics of the American Physical Society. During his career, George received seven patents.

George was an enthusiastic and popular teacher with a particular love for the freshman and sophomore physics courses at MIT. He and Alan Barrett were coauthors of the text *Electromagnetic Vibrations, Waves and Radiation* (MIT Press, 1977). In 1976, in collaboration with Abe Bers, George restructured the MIT interdepartmental graduate plasma physics course, which has been successfully taught since then.

George was much loved for his ready wit and engaging manner. No matter what the subject, a conversation with George was always interesting and joyful. His early life experience, his broad education and his love of physics combined to create a personality that was thoughtful and sympathetic. His passing leaves a great void among his colleagues and many friends.

ABRAHAM BERS
BRUNO COPPI
DANIEL KLEPPNER
MIKLOS PORKOLAB
Massachusetts Institute of Technology
Cambridge, Massachusetts

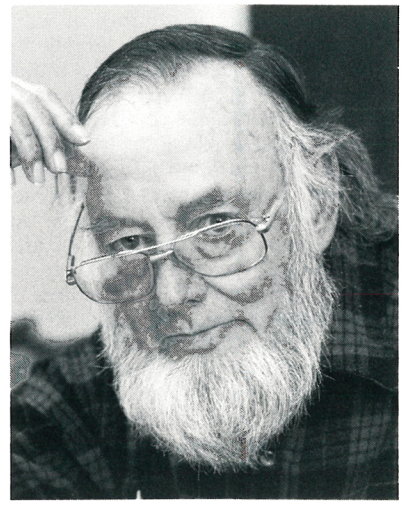
Joseph Murray

Joseph J. Murray, a world-renowned leader in the design, construction and operation of electromagnetic beams for the transport of high-energy particles from accelerators, and a longtime member of the Stanford Linear Accelerator Center faculty, died on 29 January 1996 at the age of 72.

After receiving his PhD in physics in 1954 at Caltech, working on β-ring spectroscopy, Joe Murray joined the accelerator group under Ed Lofgren at what is now the Lawrence Berkeley National Laboratory. There he began a series of designs for a crossed electric and magnetic field particle separator, which led eventually to his major innovation, the use of heated glass plates to maintain gradients as high as 200 kV/cm. The plates were used in almost all of the experiments run by Luis Alvarez's group using the large Berkeley bubble chamber and separated beams of kaons, pions and protons up to energies of 1 GeV.

Joe joined SLAC in 1967, along with the team that had operated the Alvarez 72-inch chamber. In a short time, he designed and installed a single-stage separated beam, based on the radiofrequency structure of the SLAC beam, for the 82-inch chamber and designed the two-stage beam separator for the large-angle solenoid spectrometer. In this work, Joe demonstrated his outstanding ability to combine an intuitive, analytical and practical approach with a deep understanding of the physics principles involved.

He then turned his attention to producing high-energy quasimonochromatic gamma-ray beams by backscattering visible high-intensity laser light off the main electron beam. This gamma-ray beam led to a whole range of succesful gamma-ray induced particle experiments. The techniques and analysis developed for this beam have led recently to a highly successful Compton polarimeter used to measure the longitudinal polarization of the main electron beam from the Stanford Linear Collider (SLC).



JOSEPH MURRAY

In the later stages of his career, Joe applied his knowledge to the beam problems associated with the SLC and his contributions were essential to its success. He also found time to pursue his own ideas and experiments, notably on gamma rays radiated by positrons channeled in crystals.

He spent most of his free time with his family. He loved the sea and was an accomplished diver and sailor.

Joe will be remembered for the precision and completeness of his work and for his willingness to provide guidance to anyone requesting it. His contributions to SLAC and to beam physics in general will benefit many laboratories worldwide for a long time to come.

WOLFGANG K. H. PANOFSKY
JOSEPH BALLAM
Stanford Linear Accelerator Center
Stanford, California

David Powell Shoemaker

David Powell Shoemaker died suddenly on 24 August 1995 in Albany, Oregon. He was born in Kooskia, Idaho, on 12 May 1920 and received a BA in 1942 from Reed College, and a PhD in 1947 from Caltech, both in chemistry. Following a fellowship year abroad, he returned to Caltech as a senior research fellow (1948–51) before going on to MIT as an assistant professor. He moved to Corvallis in 1970 as chairman of the chemistry department of Oregon State University and retired there in 1984.

As a graduate student, David was