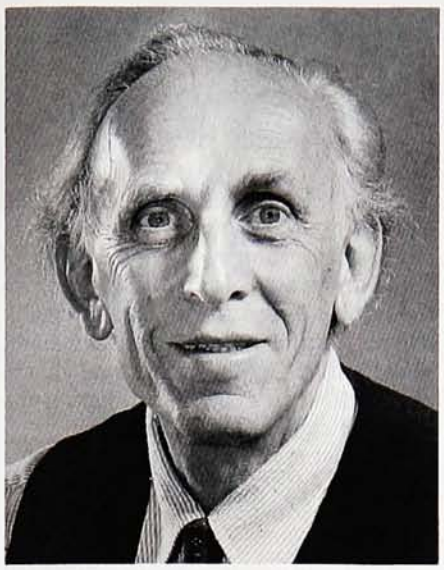
Physics Today

David Powell Shoemaker

Kenneth Hedberg and Verner Schomaker

Citation: Physics Today **49**(7), 85 (1996); doi: 10.1063/1.2807706
View online: http://dx.doi.org/10.1063/1.2807706
View Table of Contents: http://scitation.aip.org/content/aip/magazine/physicstoday/49/7?ver=pdfcov
Published by the AIP Publishing



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

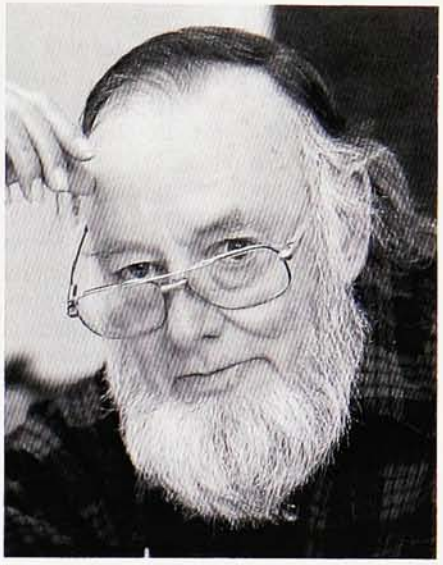
Joseph Murray

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



JOSEPH MURRAY

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).

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

first involved in a number of war-related projects, directed largely by Linus Pauling. When he was a senior research fellow, he and B. Gunnar Bergman worked out the structure of the sigma-phase of the Fe–Cr system, a study that marked the beginning of his main research career, the structures of transition-metal phases. At MIT and later at Oregon State, he and his wife Clara, together with their associates, worked out the structures of a very long list of transition-metal complexes. Many of the binary and tertiary alloy phases (often containing silcon or aluminum) have large unit cells and are very complex, but a common feature is that their interstices are distorted tetrahedra, whence the name "tetrahedrally close packed" ("tcp"). Some representives of this group of compounds later became important as possible storage materials for hydrogen. Following the discovery of quasicrystals in 1984, the building principles of tcp phases were used in the derivation of models of their structures. David was able to make important contributions to this field, and his insight and critical sense were much appreciated.

Early in his MIT career, David also began a notably productive research effort on the structure of zeolites, which included derivation of the structures of the commercially most important zeolites, A and X/Y-Faujasite. He also found time to write (with Carl W. Garland, Jeffrey I. Steinfeld and later Joseph W. Nibler) a widely used laboratory text *Experiments in Physical Chemistry*, (first published in 1962 by McGraw-Hill and now in its sixth edition). Among David's professional services were 15 years on the US National Committee for Crystallography, including 3 years as secretary–treasurer and 3 as chairman (1967–69); organizing chairman of the Eighth International Congress and General Assembly of the International Union (1969); chairman of the American Crystallographic Association (1970); member of the executive committee of the International Union of Crystallography (1972–78); and regional coeditor of *Acta Crystallographica*.

After his retirement, David continued to be active in science despite his failing health. At the regular luncheon meetings of the physical chemists at Oregon State, he contributed his customary insights to the discussions until the last week of his life.

Kenneth Hedberg
Oregon State University
Corvallis, Oregon
Verner Schomaker
California Institute of Technology
Pasadena, California

Gianni Ascarelli

Gianni Ascarelli, a member of the Purdue University physics department for over 30 years, passed away in West Lafayette, Indiana, on 24 September 1995, after a four-year struggle with cancer.

Ascarelli was born in Rome, Italy, on 25 October 1931. In 1938, the family resettled in São Paulo, Brazil, but returned to Italy in 1948. Ascarelli, who had received a BS degree in physics from the University of São Paulo, enrolled at the University of Rome and obtained a physics degree ("Laurea") in 1954.

Ascarelli worked for a short period at the Italian equivalent of the National Institutes of Health. In 1955, he sailed to the US and enrolled as a physics graduate student at MIT. After obtaining his PhD in 1959, he spent two years as a postdoc at the University of Illinois.

In 1961, Ascarelli returned to Italy to assume the positions of group leader with the Italian National Research Council and lecturer at the University of Rome. In 1964, he joined the faculty of Purdue University as an associate professor and was promoted to professor in 1970. Subsequently, he spent several years as a visiting scientist in various places in Europe.

Ascarelli's research interests were initially focused on solid-state physics, with emphasis on the properties of semiconductors and ionic crystals. In the early 1960s, he made several pioneering contributions to solid-state spectroscopy through the innovative use of the modulation techniques he invented. He studied recombination, and low field breakdown processes, as well as nuclear magnetic resonance phenomena in doped semiconductors. By employing optical absorption techniques, Ascarelli established at Purdue a strong effort to explore the physics of excitons and the electron–phonon coupling in semiconductors.

Along with his work on semiconductors, Ascarelli developed a keen interest in the optical properties of biologically relevant materials. He used far-infrared techniques to establish the vibrational spectrum of a number of biological systems. To this end, he began to utilize submillimeter cyclotron resonance with suitable lasers. He also explored the effects of the application of relatively high magnetic fields on biological systems. Having dealt extensively with aqueous solutions, Ascarelli became interested in the intriguing, fundamental problems associated with the mobility and the transport properties of electrons in liquids.

During Ascarelli's last fifteen years or so, his main field of research was the exploration of electron energy levels and electron transport in some nonpolar dielectric liquids, mainly those of the rare gases. He also succeeded in measuring indirectly the exciton effective mass in liquid xenon, in cooperation with a group from the universities of Jerusalem and Hamburg. While measuring electron mobility, he also found an apparent discontinuity in the density of liquid argon along isobars slightly above the critical temperature, and the possibility of a surface phase transition caught his attention. Later on, he was able to resolve this mystery by estimating the effects of capillary condensation.

His last effort was the direct measurement of the effective electron mass in liquid rare gases, using cyclotron resonance.

Ascarelli's research was characterized by an attempt to identify an issue on which there might be a conceptual or an experimental difficulty, and then design an experiment to resolve the question.

He also made important theoretical contributions, such as his model of the electron mobility in rare-gas liquids. From a comparison of the model calculations and experiment, he was able to evaluate the density dependence of the effective mass of electrons in liquid argon and xenon. He continued his experimental work even when his last illness made it very difficult.

He was an outstanding experimentalist. Always full of ideas and plans, he was meticulous in the execution of his projects, being involved in every detail. His very fruitful and imaginative experimental work was based on a deep and thorough understanding of the relevant theories. He was always open to new ideas and developments, and by giving advice and engaging in discussion he contributed to the research of many people who consulted with him.

Fluent in French, English, Italian and Portuguese, Ascarelli was able to give physics lectures in all these languages. He was a rigorous person, demanding much from his students and colleagues alike. This trait, along with his urge to firmly uphold his moral principles and opinions, caused at times disagreements and misunderstandings. He was a loyal, pleasant and helpful colleague and friend. He will be missed by many.

Roberto Colella
Gabriele F. Giuliani
Hisao Nakanishi
Purdue University
West Lafayette, Indiana
Jean-Paul Jay-Gerin
University of Sherbrooke
Sherbrooke, Quebec, Canada
Itzhak T. Steinberger
Hebrew University of Jerusalem
Jerusalem, Israel ■