Robert Fred Mozley

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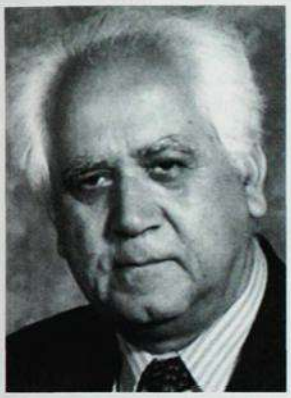
WE HEAR THAT

AAPM Honors Achievements in Medical Physics

The American Association of Physicists in Medicine announced its award winners for 1999 at its annual meeting, held in Nashville, Tennessee, in July.

Faiz M. Khan, a professor and the head of the physics section in the radiation oncology department at the University of Minnesota's Medical School in Minneapolis, received the William D. Coolidge Award, the society's highest honor. Khan was recognized for his distinguished career in medical physics that spans more than 30 years, for his contributions to AAPM, and for his contributions to the medical physics literature.



KHAN

The Award for Achievement in Medical Physics, given for achievement in medical physics practice, education, or organizational affairs and professional activities, went posthumously to **Joe Windham**, who died in December 1998. Windham was the head of the radiological physics and engineering division of the department of diagnostic radiology at the Henry Ford Hospital in Detroit.

The Farrington Daniels Award, given for the best paper on radiation dosimetry published in *Medical Physics* during the previous year, went to **David W. O. Rogers** for his paper entitled "A New Approach to Electron-Beam Reference Dosimetry." Rogers is the leader of the ionizing radiation standards group at the Institute for National Measurement Standards of the National Research Council of Canada in Ottawa, and an adjunct professor of physics at Carleton University, also in Ottawa.

Willi A. Kalender and **Marc Kachelriess** were presented with the Sylvia Sorkin Greenfield Award for their paper entitled "Electrocardiogram-Correlated Image Reconstruction from Subsecond Spiral Computed Tomography Scans of the Heart." This award is given for the best paper (other than on radiation dosimetry) published in *Medical Physics* during the previous year. Kalender is the director and a professor at the Institute of Medical Physics at the University of Erlangen-Nürnberg in Germany, and an adjunct associate professor in the medical physics department at the University of Wisconsin—Madison. Kachelriess is a physicist at the same institute.

Rebecca Fahrig, of the J. P. Robarts Research Institute, at the London Health Sciences Centre in Ontario, Canada, won the John R. Cameron Young Investigators Award. The other Young Investigators Award winners were **Indrin Chetty** of UCLA and **Kenneth Ruchala** of the University of Wisconsin—Madison.

OBITUARIES

Robert Fred Mozley

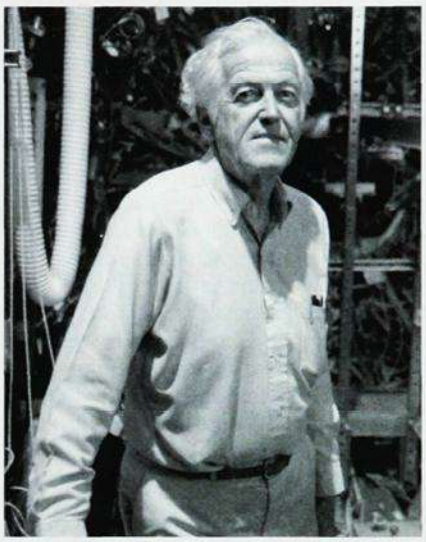
Robert Fred Mozley, a former associate director of the Stanford Linear Accelerator Center (SLAC), died in Stanford, California on 24 May from complications following abdominal surgery.

Born in Boston on 18 April 1917, Mozley received an AB from Harvard University in 1938. Following a short interval teaching high school in Hawaii and traveling extensively in Asia, he returned to the US in 1941, shortly before the US entered World War II. During the war, he worked at the Sperry Gyroscope Co, where he designed a range-tracking device for the tail-gun radar of the B-29 bomber.

From 1945 to 1950, Mozley was a graduate student at the University of California's Berkeley campus under the supervision of Luis Alvarez. He worked on the Berkeley 32 MeV proton linear accelerator, while, at the same time, embarking on a very ambitious thesis experiment to determine the halflife of the neutron by capturing decay electrons from neutron decay in an electron storage ring.

His neutron experiment was brought to an abrupt end by the explosion of a bank of nitrogen-filled cylinders. Consequently, he started a new PhD topic—namely, the determination of the atomic number dependence of positive photo-pion production using an apparatus built by Jack Steinberger. Mozley earned his PhD in 1950.

Mozley moved to Stanford University in 1953 and greatly improved the design and performance of the control system of the MARK III GeV linear accelerator, which he used to carry out numerous experiments. He then participated with his colleagues in the preliminary design of the SLAC electron linear accelerator, which led to the 1957 construction proposal for SLAC. He continued work at SLAC until his retirement in 1987.



ROBERT FRED MOZLEY

While at SLAC, Mozley led a group that developed a two-meter-long streamer chamber, which was completed in 1967. The installation was used in a series of photoproduction experiments, which, among others, discovered the ρ' meson resonance. The experiments on the streamer chamber included work with kaon beams on hydrogen targets, and measurements of the form factor of the K_{long} decays and of deep inelastic muon scattering.

Starting in 1979, Mozley's group led a five-university collaboration to build the third (MARK III) large solid single spectrometer at the Stanford Positron Electron Accelerating Ring (SPEAR). Experiments on that detector produced a number of important measurements in the spectroscopy of charmed mesons, radiative J/φ decays, and refined the precision of parameters in tau physics.

Mozley's work on the MARK III experiment led to the construction of a similar detector at the Beijing Electron-Positron Collider, which, in some sense, is the heritage of his work at SPEAR.

After his retirement, Mozley main-

tained his interest in elementary particle physics, but concentrated his work on arms control. He worked as a staff physicist for the Federation of American Scientists in 1987–89 and participated in a cooperative project with the Committee of Soviet Scientists for Peace and against the Nuclear Threat. He maintained a strong interest in arms control for the rest of his life, contributing articles to *Science and Global Security*.

Starting in 1989, he became associated with the Center for International Security and Arms Control (now International Security and Cooperation) at Stanford. There, he worked on numerous issues on the technical aspects of nuclear nonproliferation and published a book, *The Politics and Technology of Nuclear Proliferation* (University of Washington Press, 1998), which constitutes a basic reference on the subject.

Mozley was a quiet, but exceedingly effective leader in high-energy particle physics. As an experimental physicist, he was inventive, hardworking, and resourceful. Throughout his career, he tackled important problems that challenged human ingenuity. Always deeply and genuinely concerned for everyone, he was respected by coworkers and colleagues for his fair and honest approach to problems. His contributions to science, his gracious personality, and his friendly cooperation will be long remembered by everyone who knew him.

Walter Toki
Colorado State University
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James Albert Phillips

James Albert Phillips, a pioneer in fusion physics at Los Alamos, died of a heart attack on 1 December 1998, in Los Alamos, New Mexico.

Jim was born on 17 May 1919, in Johannesburg, South Africa, where his parents were American missionaries. After arriving in the US in 1935, he attended Carleton College, receiving a BS in mathematics in 1942. He earned his MS and PhD in nuclear physics at the University of Illinois in 1943 and 1949, respectively. While still a graduate student, he worked on the Manhattan Project in Oak Ridge, Tennessee, where he supervised ten employees working on the Calutron isotope separator.

In November 1949, Jim joined a small group in Los Alamos's physics division that was measuring the fusion

James Albert Phillips

cross-sections of hydrogen and helium isotopes. In 1952 the same physicists formed a pioneering group under James Tuck to study harnessing the fusion energy of the hydrogen bomb for peaceful uses. The program started out as the classified project Sherwood, and the group was sometimes jokingly referred to as Friar Tuck and his merry men. In those early days of fusion research, Jim made important contributions to the long series of experiments that explored the basic properties of toroidal pinches (then known as perhapsatrons) and linear pinches (Columbus pinches).

In March 1957, Jim became the leader of P-14, an experimental group whose aim was to explore the potential of the stabilized Z-pinch as a path to a fusion reactor. In 1958, this group constructed a fully operational toroidal Z-pinch PS-4 that was transported, assembled, and demonstrated at the first Atoms for Peace Conference in Geneva, Switzerland. Further research on toroidal pinch experiments continued under Jim's leadership. In the face of serious difficulties, which resulted in rather cool plasmas, the group's toroidal Z-pinch studies were halted in 1961.

During the next five-year period, Jim's group studied a series of other topics, some of which exploited the late John Marshall Jr's coaxial plasma accelerator (gun) to inject plasma into magnetic bottles. Among the topics was an axisymmetric magnetic cusp formed by a pair of equal radii coils slightly separated along a common axis. This configuration was later replaced by the caulked surface cusp, which was formed by a solenoid, an interior poloidal current ring, and an axial conductor along the axis. The aim of latter configuration was to mitigate the observed high plasma loss by outward flow along the field lines in the cusp region. The study of the coaxial gun by Jim's group led to the Mather dense plasma focus, which remains a potent neutron source to this day.

In 1966, Jim and his group reconsidered the Z-pinch approach. Realizing that, with short current rise times, theta pinches could achieve plasma temperatures above 1 keV, they conjectured that shorter rise times would also enable Z-pinches to overcome the temperature limitations that had brought their Z-pinch research to an end five years before. The group then developed new engineering techniques (magnetic energy storage and transfer) to shorten the current rise times in Z-pinches to produce strong shock heating. At that time, new theory predicted stability would be enhanced by means of a reversed toroidal magnetic field in the outer region of the pinch. Together, the new engineering and theory led to the ZT series of shock-heated reversed-field pinches (RFPs), of which the first, ZT-1, was constructed under Jim's direction in 1972.

Jim's contributions to physics were not confined to Los Alamos. He served as chairman of the division of plasma physics of the American Physical Society in 1967 and as Southwestern regional secretary for the APS in 1970–75. And in 1975–79, he took a leave of absence to head the physics section at the International Atomic Energy Agency in Vienna, Austria. When he returned, he was made a laboratory fellow and continued his career as a team leader for RFP startup. He conceived and demonstrated experimentally a new slow ramp startup technique on the last Los Alamos RFP, ZT-40M.

After retiring in 1987, Jim continued his work as a laboratory associate. He spent many hours analyzing the Los Alamos RFP database, as well as data received from his numerous colleagues in the RFP experimental groups in Italy, Japan, Sweden, at the University of Wisconsin, and the University of Colorado. Armed with insights from these studies, he developed new ideas for improving the design and operation of the RFP. At the time of his death, Jim was preparing a paper, with the two of us as coauthors, which included a model of the observed RFP sawteeth field fluctuation waveforms as being produced by a rotating helical kink.

A cheerful, optimistic person, Jim was always ready to talk about physics, or any other topic, and is missed by those who experienced his warm personality.

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