AAPM Recognizes Achievements in Medical Physics

At the annual meeting of the American Association of Physicists in Medicine, held in Milwaukee in July, **James Purdy** was presented with the William D. Coolidge Award for his distinguished career in medical physics. As a pioneer of three-dimensional treatment planning, Purdy, a professor in radiation physics and the chief of the physics section of the division of radiation oncology at the Washington University School of Medicine, in Saint Louis, has had a "substantial impact upon the field of radiation oncology" the award citation noted. Purdy was also cited for his role in many scientific and professional organizations and for his contributions to the medical physics literature.

JAMES PURDY

The Award for Achievement in Medical Physics went to **Robert Gorson**, professor emeritus of radiology, radiation therapy and nuclear medicine at Thomas Jefferson University in Philadelphia. This award is given for outstanding career achievement in medical physics practice, education or organizational affairs and professional activities.

The Farrington Daniels Award was given to **Marek Maryanski**, president of MGS Research in Guilford, Connecticut; **Geoffrey Ibbott**, director of medical physics and assistant professor of radiation medicine at the University of Kentucky Medical Center; **Peter Eastman**, a graduate student in applied physics at Stanford University; **Robert Schulz**, professor emeritus of therapeutic radiology at Yale University and vice president of MGS Research; and **John Gore**, professor of diagnostic radiology and applied physics at Yale. Their paper "Radiation Therapy Dosimetry Using Magnetic Resonance Imaging of Polymer Gels" was recognized as the best paper on radiation dosimetry published in *Medical Physics* in 1996.

The Sylvia Sorkin Greenfield Award, given for the best overall paper published in *Medical Physics* during the previous year, went to three colleagues in the Imaging Research Laboratories at the John P. Robarts Research Institute, in London, Ontario. **Ian Cunningham**, also of the radiology departments at the London Health Sciences Centre in Ontario and the University of Western Ontario, **Aaron Fenster**, also of the radiology department at Western Ontario and **Michael Westmore**, also a graduate student in the medical biophysics department at Western Ontario, won for their paper "Angular-Dependent Coherent Scatter Measured with a Diagnostic X-Ray Image Intensifier-Based Imaging System."

Canadian Physicists Honored

At its annual congress, held in June at the University of Calgary, the Canadian Association of Physicists honored five individuals.

The association presented the 1997 CAP Medal of Achievement to **Donald W. Sprung**, a professor of physics emeritus at McMaster University, for "his seminal theoretical work on nuclear forces, nuclear structure, quantum transport and other subjects."

Douglas Bonn received the 1997 Herzberg Medal for "his experimental microwave work contributing to a greater understanding of the nature of high-temperature superconductors." Bonn is an associate professor of physics and astronomy at the University of British Columbia and an associate of the Canadian Institute for Advanced Research.

The 1997 Award in Industrial and Applied Physics went to **J. A. (George) Dobrowolski** for "his innovative solutions to problems in the design, fabrication and evaluation of multilayer systems and graded index films for optical applications, including anti-counterfeiting devices." Although officially retired, Dobrowolski remains at the National Research Council of Canada as a guest worker.

Ernest L. McFarland garnered the 1997 Medal for Excellence in Teaching Undergraduate Physics. McFarland, a physics professor at the University of Guelph, was recognized for "his outstanding skill, innovations and achievements in education."

The 1997 Prize in Theoretical and Mathematical Physics, given jointly by CAP and the Centre de Récherche Mathématique, was awarded to **Ian Affleck**, a professor of physics at the University of British Columbia and a fellow of the Canadian Institute for Advanced Research. Affleck was cited for "his very successful work in theoretical condensed matter physics highlighting field-theoretic methods and related mathematical physics."

IN BRIEF

In June the Astronomical Society of the Pacific honored **Eugene Parker** with its highest award, the Catherine Wolfe Bruce Gold Medal. Parker, the S. Chandrasekhar Distinguished Service Professor Emeritus in Physics and Astronomy & Astrophysics at the University of Chicago, was cited for distinguished contributions to the field of astronomy over his lifetime.

At the same gathering in June, ASP presented its 1997 Maria and Eric Muhlmann Award to **Edward Nather** for "recent significant observational results made possible by innovative advances in astronomical instrumentation, software or observational infrastructure." Nather is the Rex G. Baker, Jr, and McDonald Observatory Centennial Research Professor of Astronomy at the University of Texas at Austin.

In July, **Daniel Cox** and **Warren Pickett** became professors in the department of physics at the University of California, Davis. Cox was formerly a physics professor at Ohio State University, and Pickett was a senior scientist at the Naval Research Laboratory in Washington, DC.

David Campbell and **Jacques Kools** recently joined CVC, a supplier of thin film process equipment located in Rochester, New York. Campbell, who had been a member of the research faculty at Clarkson University's Center for Advanced Materials Processing, will be the New York process technology and applications development director. Kools, formerly a research scientist at Philips Research Laboratory in The Netherlands, is CVC's data storage PVD product director.

The 1997 Hewlett-Packard Europhysics Prize of the European Physical Society was awarded last month to **Albert Fert** of the University of Paris-South, **Peter Gruenberg** of the Jülich Research Center and **Stuart P.**

Parkin of IBM's Almaden Research Center in San Jose, California. The three are being recognized for "their discovery and contribution to the understanding of the giant magnetoresistance effect in transition-metal multilayers and their demonstration of its potential for technological applications."

In May, **Eugene G. Arthurs** assumed the presidency of Cleveland Crystals, Inc in Cleveland, Ohio, succeeding **Lee R. Shiozawa**, who is now chairman of the board and chief scientific officer. Arthurs had been the president of Oriel Instruments in Stratford, Connecticut.

Eta Kappa Nu, the national honor society for electrical engineers, presented **Jerry M. Woodall** with its 1997 Vladimir Karapetoff Eminent Members' Award in May. Woodall, the Charles William Harrison Distinguished Professor of Microelectronics at Purdue University, was recognized for "the invention of the GaAlAs/GaAs heterojunction, and for the invention, development, and realization of devices that use this materials system."

This month, **Henry Hemmendinger**, who heads the Hemmendinger Color Laboratory in Princeton, New Jersey, is to receive the 1997 Godlove Award from the Inter-Society Color Council at its annual meeting in Baltimore. The award announcement takes special note of Hemmendinger's work "to establish and to publish methods for precision spectrophotometry of reflecting materials."

In July, **Arun M. Jayannavar** received the 1996 International Center for Theoretical Physics Prize, which was granted this year in honor of the late Nevill Mott. Jayannavar, who is a research fellow and assistant professor at the Indian Institute of Science in Bangalore, India, was honored for "his significant contributions to the physics of disordered quantum conductors and related issues of mesoscopic physics."

OBITUARIES

Robert Henry Dicke

Robert Henry Dicke, Emeritus Albert Einstein Professor of Science at Princeton University, died on 4 March 1997, at the age of 80, after a long bout with Parkinson's disease. Throughout his struggle with severe physical handicaps, he retained his intellectual power and love of science.

Five years after Bob's birth in St. Louis, the family moved to Rochester, New York. Bob commenced his undergraduate education at the University of Rochester and transferred to Princeton University as a member of the class of 1939. While an undergraduate, he wrote his first paper in astronomy, on globular star clusters modeled as gas spheres. Returning to Rochester, Bob completed graduate work in just two years and earned a PhD in physics in 1941. He then rushed off to do wartime research at MIT. His contributions to the MIT Radiation Laboratory Series of books—the "Bible" of microwave technology—are impressive for their deliberate emphasis on symmetry and their grounding in first principles. He invented the microwave radiometer and used it to measure atmospheric absorption at centimeter wavelengths; this absorption was a limiting factor in the wartime drive toward shorter wavelengths for better radar resolution. He found time for a little pure research, using the radiometer to detect thermal radiation from the Moon and to show that the temperature of radiation from "cosmic matter" at 1 to 1.5 cm is less than 20 K. He was to return to the question of the cosmic background radiation two decades later.

ROBERT HENRY DICKE

After the war, Bob returned to the Princeton physics department, where he began to explore the rich nature of the quantum mechanical interaction of radiation and matter. The spontaneous buildup of radiation from atoms with population inversions is called Dicke superradiance, in recognition of his elegant analysis of the effect. Bob was the first to point out that a simple open resonator formed from two mirrors is much more effective for containing laser radiation than the traditional closed cavities of microwave technology. He and his student Bruce Hawkins did one of the first optical pumping experiments, on a beam of sodium atoms.

In 1953, Bob theorized that collisions of radiating atoms in a gas cell can suppress Doppler line broadening. The effect, physically the same as Mössbauer narrowing of gamma-ray lines, arises because collisions effectively confine each atom to a box that can be small compared to the wavelength of the emitted radiation. In classical physics, the radiation is then frequency modulated, the fixed central frequency appearing as a spike in the spectrum. In terms of quantum physics the recoil from the momentum of the emitted photon is not large enough to change the quantum number of the motion of the atom in the box, so with a high probability there is no change in kinetic energy of the atom and hence no Doppler shift in the photon. The collisions must not change the internal state of the atom, of course. Bob noted that hydrogen and the alkali–metal atoms can most easily satisfy this constraint because they have no ground-state orbital angular momentum. In 1955, Bob and his student Robert Romer demonstrated the effect in a gas cell with one narrow dimension. In the same year, Bob and his student James Wittke obtained a substantial improvement in the measurement of the hyperfine line of atomic hydrogen, the advance in part coming from the use of Dicke collisional narrowing. Now, Dicke narrowing is a key element in the atomic clocks of the Global Positioning System satellite navigation system.

In 1956, Bob turned to what he always called "gravity physics"; he became a central figure in the renaissance of gravitation and cosmology as branches of modern physics. From 1956 to 1964, he led an experimental test of the equivalence of passive (gravitational) and inertial mass—the near equality of gravitational accelerations of test masses of different composition—that improved the classical experiment of Roland, Baron Eötvös of Vásárosnamény, by a factor of 300, to 1 part in 10^{11}.

In another experiment, with his student Lloyd Kreuzer, Bob showed that passive and active gravitational masses agree to about 4 parts in 10^5, where the passive mass is measured by the force of gravity on a given body and the active mass by the force of that body on another. They used a body immersed in a fluid of another composition. At neutral buoyancy the passive mass distribution does not depend on where the body is in the fluid, but if active and passive masses are not equal, the distribution does affect the gravitational field as measured by the force on an object external to the container of fluid.

In 1961, Bob and Carl Brans proposed a generalization of Einstein's