

AT APRIL MEETING, APS AND AAPT RECOGNIZE OUTSTANDING WORK

At the joint meeting of the American Physical Society and the American Association of Physics Teachers held in April in Washington, DC, several individuals were honored for their contributions to physics.

AAPT presented the 1993 Oersted Medal to Hans Bethe. APS awarded the Tom W. Bonner Prize jointly to Akito Arima and Francesco Iachello; Martin C. Gutzwiller received the Dannie Heineman Prize for Mathematical Physics; David N. Schramm was the Julius Edgar Lilienfeld Prize winner; Robert B. Palmer, Nicholas P. Samios and Ralph P. Shutt shared the W. K. H. Panofsky Prize; Mary K. Gaillard received the J. J. Sakurai Prize; Christopher Barnes and Justin Mortara were given Apker Awards; Harvey Brooks was presented with the Forum Award; Ewine van Dishoeck received the Maria Goeppert-Mayer Award; and Ray Kidder and Roy Woodruff were given the Leo Szilard Award.

Bethe was cited by AAPT for his "far-reaching influence on physics and physics teaching." Bethe is perhaps best-known for his theory of energy production in the stars. He has also worked on the quantum theory of atoms and collisions and the theory of supernovae. "He has touched the lives of most physicists in the world in one way or another," the award citation said. In physics education, Bethe is noted for writing clear, understandable reviews, including a three-part paper on nuclear physics published in *Reviews of Modern Physics* in 1936-37.

Bethe earned a PhD in physics from the University of Munich in 1928 and then worked at several universities in Germany and England before joining Cornell University in 1935. During World War II he headed the theoretical physics division at Los Alamos. He is now an emeritus professor of physics at Cornell.

The Bonner Prize was awarded jointly to Arima and Iachello for "the development of the interacting-boson



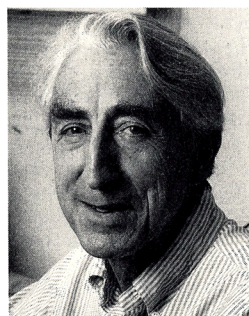
Hans Bethe



Akito Arima



Francesco Iachello



Martin C. Gutzwiller



David N. Schramm



Robert B. Palmer



Nicholas P. Samios



Ralph P. Shutt



Mary K. Gaillard

model, their recognition of the role of dynamical symmetries in nuclear structure, and for the impact of their work on the entire field of algebraic modeling in nuclear physics." The two developed the interacting-boson model in the 1970s to describe the structural and collective properties of

spherical, transitional and deformed nuclei. The model also describes electron and proton scattering from nuclei, as well as the static and transition densities of protons and neutrons.

Arima earned a DSc in nuclear physics from the University of Tokyo

in 1958. After serving as a research associate at Argonne National Laboratory, he joined Tokyo's physics faculty. Since 1989 he has been president of the university.

Iachello received a PhD in theoretical physics from MIT in 1969. He worked at the Niels Bohr Institute in Copenhagen and then the Politecnico di Torino in Italy before joining the Kernfysisch Versneller Institute in Groningen, the Netherlands, in 1974. From 1978 to 1982 he divided his time between Groningen and Yale University, where he is currently a professor of physics.

"For the incisive studies of the semiclassical limit of quantum mechanics and in particular his trace formula relating the quantum spectrum to periodic classical orbits," Gutzwiller was given the Dannie Heineman Prize for Mathematical Physics, awarded jointly by APS and the American Institute of Physics. In addition to quantum mechanics, Gutzwiller has studied the correlation of electrons in metals. His approach has found many applications in magnetism, semiconductors and superconductors.

A native of Switzerland, Gutzwiller earned a PhD in physics from the University of Kansas in 1953. He worked for Shell Development before joining IBM, Zurich, in 1960. He transferred to IBM's Watson Laboratory at Columbia University in 1963, and since 1970 he has been a research staff member at the T. J. Watson Research Center in Yorktown Heights, New York.

Schramm, the Lilienfeld Prize winner, was cited for "his manifold contributions to nuclear astrophysics and his ability to communicate the joy and excitement of science to a diversity of audiences." Schramm is best known for his work on Big Bang nucleosynthesis, particularly his prediction that there are at most four types of light neutrinos, which was confirmed by experiments at CERN's Large Electron-Positron Collider and the Stanford Linear Collider.

After earning a PhD in physics from Caltech in 1971 and serving as a research fellow there, Schramm joined the University of Texas, Austin, as an assistant professor of astronomy and physics. In 1974 he moved to the University of Chicago, where he is currently the Louis Block Professor of Physical Sciences.

The Panofsky Prize in Experimental Particle Physics was presented to Palmer, Samios and Shutt for "their leadership in the discovery of the omega minus baryon, the convincing piece of evidence for the correctness

of the application of unitary symmetry to the spectroscopy of strongly interacting particles." The award citation noted that "the observation of the omega minus, at the predicted mass of 1675 MeV and with the predicted stability against strong decay, was a dramatic verification of SU(3) ideas of the quark model. It is therefore a fundamental component of the standard model." The experiments that led to the discovery of the omega minus were done in December 1963 and January 1964. A 34-member team that was led by Samios and included Palmer as a chief contributor used Brookhaven National Lab's Alternating Gradient Synchrotron, teamed up with an 80-inch hydrogen bubble chamber designed by Shutt and his collaborators, for this work.

Palmer, Samios and Shutt all work at Brookhaven. After earning a PhD in physics from Imperial College in London in 1960, Palmer joined Brookhaven's physics department. He now divides his time between SLAC and Brookhaven, where he is the head of the Center for Accelerator Physics. Samios earned a PhD in physics from Columbia University in 1957. He joined Brookhaven in 1959, and in 1982 he was named director of the lab. Shutt received a DSc in physics in 1938 from the Technical University of Berlin. The following year he joined the Bartol Research Foundation of the Franklin Institute in Pennsylvania. He began working at Brookhaven in 1947, and he is now a senior physicist with the Relativistic Heavy Ion Collider.

This year's Sakurai Prize went to Gaillard for "contributions to particle physics phenomenology and theory and in particular for her work with Ben Lee and others applying quantum chromodynamics to K-meson mixing and decays and to the bound states of charmed quarks." Gaillard was among the first to describe the properties of the b quark shortly after its discovery, and she has also studied electroweak symmetry breaking.

Gaillard earned a DSc from the University of Paris in 1964. She then joined CNRS, eventually becoming a director of research there. In 1981 she moved to the University of California, Berkeley, where she is a professor of physics.

The Apker Award recognizes outstanding achievement in physics by undergraduate students. Barnes was cited for "his achievements as an undergraduate student at Reed College, particularly his research on the dynamics of fly lines and other classical strings," which grew out of his interest in fly-fishing. After gradu-

ating from Reed in 1992, Barnes attended Cambridge University, where he passed the Tripos examination, earning a certificate of advanced study of mathematics. In September he began graduate study in physics at Princeton University.

Mortara, the other Apker Award recipient, was cited for "his achievements as an undergraduate student at the University of Chicago, particularly his research on the search for a 17-keV neutrino in the beta decay of ^{35}S ." Mortara was part of a team at Argonne National Laboratory doing analysis on neutrino measurements. After graduating from Chicago in 1992, he entered the graduate physics program at the University of California, Berkeley.

Brooks was presented with the 1993 Forum Award for "elucidating the role that science and technology play in modern society, for exemplifying the best in science advising through participation in numerous important studies and for supporting the creation and sustenance of institutions of science and technology policy in the US and abroad." Among other things, Brooks played a key role in the creation of the Congressional Office of Technology Assessment.

Brooks earned a PhD in theoretical physics from Harvard in 1940. After working at Harvard and then Penn State, he joined General Electric in 1946. In 1950 he returned to Harvard, where he was dean of engineering and applied physics from 1957 to 1975. He is currently the Gordon McKay Emeritus Professor of Applied Physics and the Benjamin Pierce Emeritus Professor of Technology and Public Policy in the Kennedy School of Government at Harvard.

Van Dishoeck received the Maria Goeppert-Mayer Award for "her contributions to the understanding and modeling of molecular processes and their role in astronomical phenomena, particularly interstellar clouds and cometary atmospheres, including both original theoretical work and the observational effort needed to test her predictions." Of particular note is van Dishoeck's work in defining the class of translucent molecular clouds and developing techniques to determine their physical and chemical conditions.

Van Dishoeck received a PhD in natural sciences from the University of Leiden in the Netherlands in 1984. After working at Harvard, the Institute for Advanced Study in Princeton, New Jersey, and then Caltech, she returned to the Netherlands. She is now an associate professor at Leiden.

The Szilard Award went to Kidder

and Woodruff for "courageous efforts to provide the government with reliable and objective science advice on critical issues affecting national security and arms control policy." Through detailed reviews and public testimony, Kidder, a senior physicist at Lawrence Livermore National Laboratory, argued that the US could limit nuclear testing without jeopardizing national security. As a senior official at Livermore, Woodruff objected to the misrepresentation of the Excalibur x-ray laser project, a key component of the Strategic Defense Initiative.

After earning a PhD in physics from Ohio State University in 1950, Kidder worked for the California Research Corporation. He joined Livermore in 1956 and was associate leader of the theoretical division there until retiring in 1990.

Woodruff earned a BS in physics from San Jose State University in 1968 and then joined Livermore, where he was responsible for research projects in advanced nuclear explosive design. He joined Los Alamos National Laboratory in 1990, where he is now the program director for nonproliferation and arms control.

ASA HONORS BLACKSTOCK AND COLLINS AT OTTAWA MEETING

At its meeting in Ottawa, Canada, in May, the Acoustical Society of America bestowed awards on two of its members. During a ceremony at the Canadian Museum of Civilization, the Gold Medal, ASA's highest honor, was given to David T. Blackstock of the University of Texas, Austin, and the R. Bruce Lindsay Award went to Michael D. Collins of the Naval Research Laboratory.

ASA cited Blackstock for "contributions to the understanding of finite-amplitude sound propagation and worldwide leadership in nonlinear acoustics." Blackstock has been instrumental in laying the foundation for modern approaches to nonlinear acoustics theory; he is noted in particular for developing the low-amplitude nonlinear theory of simple waves, which became a framework for existing models of finite amplitude sound. In one application of his approach he proved that solutions for finite-amplitude waves in the pre-shock region and for sawtooth shock waves are actually limiting cases of a single, more general solution for the propagation of finite-amplitude sound. Blackstock's activities in the international acoustics community include serving as chair of the International Commission on Acoustics, and he served as ASA president in 1982-83.

Blackstock earned a PhD in applied physics from Harvard University in 1960. For the next three years he worked for General Dynamics Electronics in Rochester, New York, after which he joined the electrical engineering faculty at the University of Rochester. In 1970 he became a faculty research scien-



David T. Blackstock

tist at the Applied Research Labs of the University of Texas, Austin, and since 1987 he has also been a professor of mechanical engineering there.

Collins was cited for "exceptional contributions to numerical modeling of complex acoustical phenomena and nonlinear inversion methods." An expert in ocean acoustics and acoustical inverse methods, Collins is recognized for his work on elastic, range-dependent parabolic equation methods. He developed a technique to simultaneously focus and localize acoustic radiators in complex ocean environments.

Collins earned a PhD in applied mathematics from Northwestern University in 1988 and then joined the acoustics division of the Naval Research Lab.

MEDALISTS HONORED BY FRANKLIN INSTITUTE

The Franklin Institute of Philadelphia awarded its 1993 medals on 5 May. Among the medalists were Leroy L. Chang, who received the Stuart Ballantine Medal, and Herbert Walther and Serge Haroche, who shared the Albert A. Michelson Medal.

Chang, dean of science and a professor of physics at the Hong Kong University of Science and Technology, was cited for "his pioneering contributions to the scientific study and technological development of quantum well and superlattice heterostructures in semiconductor physics." In 1972 Chang built a molecular beam epitaxy system with which he was able to construct superlattices and quantum wells from alternating layers of GaAs and GaAlAs less than 100 Å thick. He showed that electrons moved via resonant transmission in the resulting semiconducting devices, thus proving the formation of quantum states and opening the way to precisely controlled layered materials with prescribed electronic and optical properties.

Chang earned his PhD in electrical engineering from Stanford University in 1963 and then joined the research staff at IBM's Thomas J. Watson Center. Except for the academic year 1968-69, when he was on the electrical engineering faculty at MIT, Chang was at the Watson Research Center until he took early retirement; for the latter part of his career there he was manager of quantum structures in the department of semiconductor physics and devices. In February 1993 he assumed his present position in Hong Kong.

Walther, codirector of the Max Planck Institute for Quantum Optics, in Garching, Germany, and a professor of physics at the University of Munich, and Haroche, a professor of physics at the Ecole Normale Supérieure in Paris, were recognized for "their contributions to quantum optics, especially for the successful demonstration of micromaser action and the experimental verification of fundamental quantum mechanical effects in the interaction of light and matter." Walther invented the micromaser, in which a few atoms at a time pass through a small resonating cavity and give off microwave radiation from single-photon transitions in excited atoms. Haroche developed