cations of a strong electronic tendency to form inhomogeneous states in a variety of highly correlated materials. Drawing on Vic's experience with the 1D electron gas, the pair proposed a mechanism for high-temperature superconductivity that relies on intrinsic electronic inhomogeneity. The existence of electronic inhomogeneities provides an explanation of the notably small superfluid density found in underdoped cuprates. The inhomogeneities also explain the remarkable superconducting fluctuations that contribute to some of the so-called pseudogap phenomena above T_c. Although the theory of superconductivity in the cuprates remains contentious, Vic's work continues to influence theoretical and experimental studies of these fascinating materials.

At Brookhaven, Vic's leadership tremendously influenced research in condensed matter physics. He spent terms as leader of the condensed matter theory group, head of solid-state physics, and scientific program head for the High-Flux Beam Reactor. A brilliant theorist, he had a talent for interacting with experimentalists that made the Brookhaven physics department an especially attractive place for staff and visiting experimentalists and theorists. He was generous with his time and extremely supportive of his colleagues. Vic was eager to discuss the latest experimental results and would willingly explain new theoretical ideas and repeat his explanations as many times as his colleagues needed.

Physics was central to Vic's life. Even in his last few years, he did not allow the physical challenges imposed by ALS to keep him away from his work. Outside of the lab, he was an avid swimmer (a water-polo player in his youth). He always took great pride in his family, including his wife, three children, and seven grandchildren.

We remember Vic for his open and forthright character. Despite his many accomplishments, he was not arrogant and was happy to discuss physics with any interested party. His friendship, guidance, leadership, and insights are sorely missed.

John Tranquada
Myron Strongin
Peter Johnson
Brookhaven National Laboratory
Upton, New York
Steven Kivelson
University of California, Los Angeles

Mario Iona

Mario Iona, emeritus professor of physics at the University of Denver (DU) in Colorado, died of a heart attack on 27 February 2004 in Denver. A prolific author, Mario devoted more than 60 years to the improvement of physics teaching.

Mario Iona

Mario was born on 17 June 1917 in Berlin, Germany. His father had been a student of Peter Debye and Max Born in Göttingen and was an industrial physicist who worked with x rays. Setting out on a career in physics, Mario entered the Theoretical Institute of the University of Vienna, in Austria. At the time, Austria had been annexed by Nazi Germany, but because he held Italian citizenship by birth, he was spared having to give the "Heil Hitler" salute to his professor at the beginning of each lecture. To keep his options open, he took most of the courses required for certification as a physics teacher. His studies, though, were hampered when the Nazis dismissed his major professor, Hans Thirring. Mario subsequently completed his PhD thesis on electron optics in 1939 under Roman Sexl.

Having received a scholarship at the University of Uppsala in Sweden, Mario left Austria in 1939, one week before Adolf Hitler's army invaded Poland. Working with Ivar Waller, he carried out research on crystal vibrations. His parents had immigrated to Chicago; because of the U-boat menace to transatlantic ships, he later joined them in spring 1941, following a wintertime trip through Finland, the USSR, and Japan. Mario began work on neutron diffusion with Samuel K. Allison at the University of Chicago. Because Mario had come from Germany, he lost his clearance to do research and subsequently became a teaching assistant and, later, an instructor at Chicago.

Mario joined Marcel Schein's cosmic-ray research group, which had conducted experiments in laboratories established by MIT on Colorado's Mount Evans. His work with that group led to his joining the DU faculty in spring 1946. From 1947 to 1982, Mario directed the DU High Altitude Laboratories, a premier site for the investigation of cosmic rays.

Mario's first publication in physics education, "On the Use of Units for Force and Weight in Physics Textbooks," which appeared in 1944 in the *American Journal of Physics*, was the start of his lifetime service with American Association of Physics Teachers committees that were charged with advancing metrication in the US and with educating students and the public on the correct use of SI (Système Internationale) units. He was a leader in AAPT and served for many years as representative from the Colorado–Wyoming section and as chair of the section representatives. Throughout his service to AAPT, he was a central figure in maintaining the academic vitality of the Colorado–Wyoming section.

Mario will perhaps be best remembered for his intrepid campaign to call attention to errors in physics textbooks, especially in precollege texts. His column Would You Believe? was a regular feature in *The Physics Teacher* for 24 years. Unfortunately, he never ran out of material for the column. For that work, Mario received AAPT's Distinguished Service Citation in 1971 and its Robert A. Millikan Award in 1986.

A consultant to many area school districts, Mario was also the president of the Colorado–Wyoming Academy of Science and adviser to the DU Society of Physics Students for 20 years and to the national organization of Sigma Pi Sigma for 40 years. He was proud of having installed eight Sigma Pi Sigma chapters in the western US. In the late 1950s, he created the Denver Area Physics Teachers, which continues to meet quarterly at DU as an informal gathering of high-school physics teachers. He arranged programs in which teachers could share their experiences and could hear about new developments in physics from invited speakers. Although Mario formally retired from DU in 1986, he remained active in physics education for another 15 years.

Mario's selfless service to his profession is exemplified by the Iona family gift, in 2000, of a lounge within DU's department of physics and astronomy for members of the Society of Physics Students and Sigma Pi Sigma. His colleagues and former students remember him with great appreciation and high personal regard for his academic integrity and for his devotion to physics education.

Herschel Neumann
University of Denver
Denver, Colorado
Albert Bartlett
University of Colorado
Boulder

Edwin Albert Power

Edwin Albert Power, emeritus professor of applied mathematics at University College London, distinguished for his pioneering contributions to nonrelativistic quantum electrodynamics (QED), died on 31 January 2004 in London after a short illness.

Edwin Albert Power

Power was born in Honiton in southwestern England on 12 February 1928. He entered University College London in 1945 at age 17 and graduated with a BSc (1948) and an MSc (1949), both in mathematics. For postgraduate study, he worked on meson production in proton–proton collisions with John Gunn at the University of Glasgow. In 1951, the university awarded him the Kelvin Prize for the best physics thesis submitted for a PhD that year. He then returned to the mathematics department at University College, where he was promoted to professor of applied mathematics in 1967 and, in 1991, was made a fellow of University College for his contributions to mathematics and services to the college.

In 1953, Power was awarded a Commonwealth Fund Fellow (now called Harkness fellowship) and traveled to the US to spend one year at Cornell University and another year at Princeton University. At Princeton, he and John Wheeler wrote an important paper in 1957 on thermal geons (their abbreviation for gravitational–electromagnetic entities), which they studied within the framework of classical Einstein–Maxwell theory. The paper was republished in a collection of Wheeler's papers entitled *Geometrodynamics* (Academic Press, 1962).

Power's research was on the interaction between the quantized radiation field and particles—nuclei and atomic or molecular electrons—moving at nonrelativistic speeds. Using methods he and his colleagues had largely developed themselves, he worked within the framework of nonrelativistic QED. In 1959, he and Sigurd Zienau published in the *Philosophical Transactions of the Royal Society of London* a seminal paper on the Coulomb gauge in QED and its applications to the shape of spectral lines, the nonrelativistic Lamb shift, and other phenomena. The work was timely, given the rising experimental interest in low-energy particles in atoms and molecules that interact with each other and with radiation when relativistic corrections are negligible. Power's results were more precise, and gave a clearer physical picture, than the conventional semiclassical calculations, which did not consider the quantization of the radiation field.

Power's interests included circular dichroism and optical activity, interactions between chiral (optically active) molecules, and nonlinear optics. Other researchers have used his methods in resonance energy transfer and aspects of intermolecular forces. In these applications, the underlying theory, known as molecular QED, involves the coupling of molecular multipole moments to the quantized radiation field. Power had a gift of expressing his results in ways that were easily visualized; for example, in *Magic Without Magic* (W. H. Freeman, 1972), a volume dedicated to Wheeler, he showed how the retarded Casimir–Polder potential between neutral atoms could be seen as the consequence of zero-point energy depression of the modes of the radiation field coupled to polarizable matter systems.

Power retired in 1992 but continued to be active in research until 2003. His last research effort, which involved a collaboration with one of us (Thirunamachandran), was the derivation of the electric and magnetic fields of moving multipoles by solving Maxwell's equations without specifying the gauge or using the electromagnetic potentials. They first used the method to get the Feynman formulas for the fields of a moving charge. A central feature of the derivation is that it requires the integration of a differential equation that is first order in time.

Power's much-used book, *Introductory Quantum Electrodynamics* (American Elsevier, 1964), was based on postgraduate lectures he gave in Chile and in Boulder, Colorado. He lectured carefully and lucidly, and his introductory talks on mathematics for chemists at University College were models in their combination of well-judged content and precision. He was an entertaining speaker. At a conference on the electromagnetic vacuum, he said of his work, "For several years I have been working on nothing, and the college has been paying me!"

Although Power's academic base was University College, he held visiting appointments elsewhere, including at Cornell University, the University of Southern California, Australian National University, the University of Palermo, and the University of the West Indies. His graduate courses in QED inspired many to take up research in the field.

Power appeared reserved but formed close friendships and showed a warm interest in colleagues, collaborators, and friends. He was a devoted family man. He and his wife, Anne, took pleasure in the pastime of orienteering, in which they had to race on foot to find their way, point-to-point, with map and compass and a minimum of clues. He was a modest, nonassertive scientist and an effective communicator who made important forward steps in his field. There are few like him. He is sadly missed.

David Craig
Australian National University
Canberra
Thuraiappah "Thiru" Thirunamachandran
University College London
London, England

Peter Wootton

Peter Wootton, medical physicist and professor emeritus of radiation oncology at the University of Washington, Seattle (UW), died at his home in Bellevue, Washington, on 3 May 2004 after a 3½-year battle with pancreatic cancer.