Obituaries

Peter Havas

Peter Havas, an internationally known theoretical physicist who worked in many aspects of relativity, died from pneumonia on 25 June 2004 in Abington, Pennsylvania, two years after suffering a massive stroke.

Peter was born 29 March 1916 in Budapest, Hungary. In 1921, he and his family moved to Vienna, where he completed his elementary and high-school studies. He received the *Absolutorium* in 1938 from the Technical University of Vienna. At the University of Vienna that same year, his graduate class in cosmology, taught by Erwin Schrödinger, had only met a few times before it was abruptly canceled because of the German invasion and subsequent annexation of Austria. Prior to the annexation, Peter was active in the student underground. In the course of a demonstration, he met Helga Francis Hollering, who was to become his wife.

Having been a leader in the underground student organization that opposed the fascists in Austria, he fled to France with Francis. There, at the Institut de Physique Atomique (now Institut de Physique Nucléaire) in Lyon, he worked in experimental nuclear physics under Jean Thibaud and in theoretical physics with fellow Viennese expatriate Guido Beck. As were all male enemy aliens living in France, Peter was interned at the start of World War II. He was released after a few months by efforts of Francis and was allowed to continue his studies.

The defeat of France forced Peter and Francis to flee again—this time with their daughter. With the help of the International Rescue Committee, they obtained visas to come to the US. The Havas family sailed from Portugal and arrived in New York on 22 June 1941, the day German forces invaded the Soviet Union. Peter subsequently was appointed lecturer at Columbia University while he continued his graduate studies. In 1944, he completed his PhD under Willis Lamb with a dissertation on quantum electrodynamics (QED): "On the Interaction of Radiation and Two Electrons." While lecturing at Columbia, Peter also served as an assistant to Enrico Fermi and to Edward Teller. During 1945–46, Peter taught at Cornell University; he replaced Hans Bethe, who was away doing war research. The following year, Peter accepted an appointment at Lehigh University in Pennsylvania and remained there for 19 years.

H. FRANCIS HAVAS

Peter Havas

Peter, for ethical reasons, refused to engage in war research. That refusal led to his most bitter disappointment when, in 1947, he was not invited to the famous Shelter Island Conference on QED or to the follow-up conference in the Pocono Mountains of Pennsylvania. Both conferences had been designed for those who had engaged in war research.

Thus left behind in QED, Peter changed fields to the classical special relativistic theory of elementary particles. That shift led him naturally to study the equations of motion of point particles and radiation damping in classical field theory based on the work of Paul Dirac. Subsequently, the main body of his work was on equations of motion for compact sources in the general theory of relativity (GRT). Together, with one of us (Goldberg), he constructed a Lorentz-invariant (fast motion) approximation scheme of the GRT equations of motion and carried out an analysis of the first approximation. He continued to study the relationship of conservation laws, equations of motion, and action principles throughout his life. As a means of understanding the Newtonian limit of general relativity, he wrote an important 1964 paper in *Reviews of Modern Physics* that showed that Newtonian gravity could be written in four-dimensional form. His further work on relativistic statistical mechanics and causality rested on the concepts developed in his previous work.

Peter was always interested in the history of ideas. The first part of many of his papers laid out the development of what was known and what was frequently forgotten. Authors who are not aware that physics has a history offended him.

Peter spent the academic year 1953–54 at the Institute for Advanced Study in Princeton, New Jersey, and then several months at the Niels Bohr Institute in Copenhagen. During the summer of 1958, he was a resident research associate at Argonne National Laboratory, where he gave a series of lectures on classical field theory.

In 1965, Peter was appointed professor of physics at Temple University in Philadelphia, where he remained until his retirement in 1981. He was a visiting professor at Birkbeck College of the University of London with Roger Penrose in 1969 and at the University of Göttingen in Germany with Hubert Goenner in 1973. In 1976, he was a lecturer at the International School of Physics "Enrico Fermi" in Varenna, Italy. Peter was a member of the editorial advisory board for volume 2 of *The Collected Papers of Albert Einstein* (Princeton U. Press, 1989).

After retiring from Temple, Peter served as an adjunct professor of physics at the University of Pennsylvania from 1982 to 1988 and at the International Institute of Theoretical Physics at Utah State University from 1987 until 1990. His last published paper was in 1994 as part of a festschrift for Jerzy Plebanski in Mexico. Then, although he stayed active through contact with colleagues, macular degeneration severely curtailed his work. It also curtailed the long happy hikes in the mountains with Francis. Those remained after he stopped the rock climbing he so much loved. Sadly, only two months after Peter died, Francis, who had been active in cancer research, also died.

Peter is remembered as someone who spoke against injustice of all kinds. He opposed the Austrian fascists, the Vietnam War, the Strategic Defense Initiative, and the second Iraq war. In the university senate, he actively protected faculty prerogatives. He is missed.

Harry W. Woodcock
Philadelphia University
Philadelphia, Pennsylvania
Joshua Goldberg
Syracuse University
Syracuse, New York

Behram N. Kursunoglu

Behram N. Kursunoglu, noted theoretical physicist, widely known founder and director of the Center for Theoretical Studies at the University of Miami in Coral Gables, Florida, and organizer of the Coral Gables Conferences, died in Coral Gables on

25 October 2003. He was lunching with his wife, Sevda, and friends Manfred Eigen and Ruthhild Winkler-Oswatitch, when he suffered a congestive heart attack.

Behram was born on 14 March 1922 in the small town of Çaykara on Turkey's border with Georgia. He was sent on scholarship to the University of Istanbul, where he graduated in 1945. Then, on a Turkish government scholarship, he studied astronomy at the University of Edinburgh in the UK. His arrival in London in August 1945 coincided with the news of the bombing of Hiroshima, and he often recounted how he was affected by the newspaper accounts of the Los Alamos project and of the great scientists whose work contributed to the US nuclear program. He soon switched his field of study to physics and was awarded a BSc at Edinburgh in 1949. His teachers included Max Born and Edmond Whittaker.

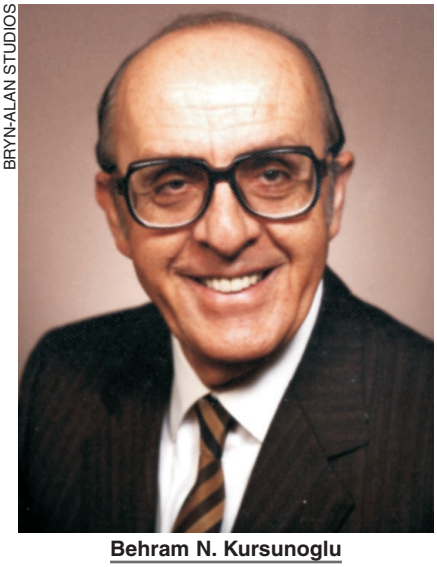
That same year, Behram enrolled at Cambridge University, where he studied with Paul Dirac and others. He became fascinated with Albert Einstein's and Erwin Schrödinger's attempts at a unified field theory. His extensive correspondence with Einstein and Schrödinger led him to propose his own version, which was published in 1951 and in his PhD thesis in 1952. Behram went to Cornell University in 1952 as a postdoctoral fellow under Hans Bethe and worked on proton bremsstrahlung and Tamm–Dancoff methods in nuclear structure.

In 1953, Behram gave a colloquium at Princeton University. A three-hour meeting there with Einstein solidified his dedication to the construction of a unified field theory, which he worked on—with some excursions—for the rest of his life. That same year, he proposed the use of high-energy electron scattering from nuclei to determine the charge distributions of protons and neutrons as well as the heavier nuclei. In 1956, Robert Hofstadter started pursuing that line of research, which earned him a share of the 1961 Nobel Prize in Physics.

After completing his postdoc in 1954, Behram joined the University of Miami as a visiting professor of physics. A year later, he returned to Turkey to perform his military service. He served as an adviser to the General Staff of the Turkish Army and became a founding member of the Turkish Atomic Energy Commission. He returned to Miami as a professor of physics in 1958.

While visiting Argonne National Laboratory in the summer of 1963, Behram informally met Morton Hamermesh, Katsumi Tanaka, and one of us (Meshkov) to discuss convening a winter conference in Miami on the then exploding use of group theory in elementary particle physics. That discussion led to the first of five Coral Gables Conferences on Symmetry Principles at High Energy in January 1964, which brought together a great number of leading scientists.

In 1965 and 1966, Behram invited J. Robert Oppenheimer to the Coral Gables Conferences. Oppenheimer lent his prestige to help Behram found the Center for Theoretical Studies, which was to function as a think tank for distinguished visitors and a training ground for young postdoctoral fellows. Behram served as its director until his retirement in 1992. The center flourished under Behram's leadership during the 1960s and 1970s, when he had as many as 10 postdocs a year and a substantial number of senior visitors.


BRYN-ALAN STUDIOS

Behram N. Kursunoglu

In 1969, Behram brought his old mentor, Dirac, to Miami from Cambridge. Dirac stayed for three years before moving to Florida State University, but continued to visit and participate in the Coral Gables Conferences until his death in 1984. The presence of Dirac at the center and at the conferences helped make Coral Gables a mecca for many of the world's distinguished scientists.

Behram was dedicated to the idea of unity of the sciences, and he strove to make the Center for Theoretical Studies a bastion of interdisciplinary activity. He invited leading figures in chemistry, biology, lasers, and neuroscience to the center in the 1970s and 1980s. In 1971, Lars Onsager, who had recently retired from Yale University, went to the center and brought a talented group of postdoctoral fellows who worked on problems of electrical conductivity in ice.

After Oppenheimer's death in 1967, Behram enlisted Edward Teller as a member of his scientific council. The addition of Teller led the center to focus on nuclear energy and led to the creation of the Global Foundation, which fostered the study of global problems, including the production and use of energy, their impact on the environment, and the problems' economic aspects. In 1977, the foundation's first conference, the International Scientific Forum on an Acceptable Nuclear Energy Future of the World, was attended by leading figures, including Teller, Bethe, Nikolai Basov, Eugene Wigner, and Hofstadter, and many participants from government and private corporations. In 1979, Behram led a delegation consisting of Teller, Wigner, Bethe, and Hofstadter to testify, before the US House Committee on Science and Technology, on the use of nuclear energy and the Three Mile Island reactor accident.

In 1983, under Behram's directorship, the Center for Theoretical Studies inaugurated a groundbreaking course, Nuclear War/Nuclear Peace, at the University of Miami. The course was given in collaboration with the physics and political science departments to large and enthusiastic groups of students. The course led to the creation of a Winter Nuclear Education Workshop for University Professors in 1985; that series lasted until 1991.

Among Behram's other scientific achievements were the prediction of the existence of four different neutrinos (1959); the proposal of the generalization of internal and external symmetries for the elementary particles (1964); a unified theory of hadrons and leptons, which led to the concept of supersymmetry (1968); a postulation of the orbiton, which brings weak and strong interactions to his unified field theory (1975); and the prediction of massivity of neutrinos using the unified field theory (1976). He published his classic treatise *Modern Quantum Theory* in 1962 (W. H. Freeman), which brought wide critical acclaim from Werner Heisenberg and many others.

In addition to those accomplishments, Behram was the Turkish delegate to the United Nations Atoms for Peace Conference in Geneva (1958) and was a consultant to Oak Ridge National Laboratory (1962–64), the Max Planck Institute for Physics and

Astrophysics in Munich, Germany (1961), and the British Atomic Energy Establishment in Harwell (1961). He received the Turkish Presidential Science Prize in 1972 and the Kemal Ataturk Society Prize from that society in 2000. He was particularly pleased by this honor because of his lifelong adoration of Ataturk.

Behram possessed a sharp wit and an open demeanor, qualities important not only for attracting leading scientists to the center, but also for enlisting the participation of local philanthropists to host conference banquets in their homes and on their yachts.

Behram's life was characterized by two powerful visions. First, there was his own research on unified field theory, which persisted when gravitation became a central issue in astrophysics and particle physics. In his later work, he emphasized a running fundamental length parameter related to the cosmological constant and stressed the capacity of his theory to encompass both short- and long-range attractive and repulsive interactions. That work had profound implications for the expansion of the universe. His second vision, which resulted from a deep humanist belief in the interactions of humans, was to convene, in an atmosphere of calm deliberation, some of the greatest minds of our time to investigate the scientific, political, and economic problems facing our civilization. His success in fulfilling both of those visions is noteworthy.

Arnold Perlmutter
University of Miami
Coral Gables, Florida
Sydney Meshkov
California Institute of Technology
Pasadena

Edward Bryant Nelson

Edward Bryant Nelson's long professional career as a physics teacher and research physicist is identified principally with Columbia University and the University of Iowa. He died of age-related complications on 30 April 2004 in Gainesville, Florida, where he and his wife Judith moved after his retirement from the Iowa faculty in 1983.

Born on 26 July 1916 in McHenry, Kentucky, Nelson earned a BS (1937) from Western Kentucky State Teachers College in Bowling Green, an MS (1938) from Vanderbilt University, and a PhD (1949) from Columbia University, all in physics. During the period 1938–49, he taught physics at Western Kentucky and at Columbia and was a research physicist in the Columbia component of the Manhattan Project.

Edward Bryant Nelson

Nelson and John E. Nafe, fellow graduate students in I. I. Rabi's laboratory at Columbia, used the atomic beam magnetic resonance method to make the first experimental measurements of the hyperfine structure of atomic hydrogen and deuterium. The findings of Nafe, Nelson, and Rabi were published in the *Physical Review* in 1947. Behind the closed door of their laboratory, the two hard-working students referred to their mentor as "I. I.," as in "Aye, aye, sir," after responding to his frequent inquiry, "Any results yet?"

In an extended follow-up paper (*Physical Review*, 1948), Nafe and Nelson reported values of the hyperfine transition frequencies with improved precision, namely 1420.410 (±0.006) MHz for hydrogen and 327.384 (±0.003) MHz for deuterium. The relatively small (0.25%) but glaring discrepancy between their experimental values and the prevailing theoretical expectations for the electron spin-flip transition in the ground state of these atoms led theorists to identify the "anomalous" magnetic moment of the electron in the context of relativistic quantum electrodynamics.

In a quite different context, the Nafe–Nelson value for the hyperfine transition frequency in hydrogen facilitated the search for the corresponding emission from atomic hydrogen in remote astrophysical systems. Such emission, discovered by Harold I. Ewen and Edward M. Purcell in 1951, soon became a major component of radio astronomy. Nelson and Nafe also collaborated on two closely related *Physical Review* papers (1949), "The Hyperfine Structure of Tritium" and "A Comparison of the g Value of the Electron in Hydrogen with That in Deuterium," based on their respective PhD dissertations.

In 1949, Nelson joined the physics faculty at Iowa and turned his talents to teaching and to research in experimental nuclear physics using proton beams from Iowa's nuclear accelerators. In collaboration with James A. Jacobs, Richard R. Carlson, and a sequence of graduate students, he specialized in nuclear gamma rays, nuclear energy levels, and the spectra and angular correlations of the products resulting from the bombardment of a wide variety of elements. After Iowa acquired a large Van de Graaff accelerator, he conducted experiments with helium-3 beams up to 6.2 MeV and with lithium beams up to 13.8 MeV.

Throughout his long tenure at Iowa, Nelson was a devoted and enthusiastic teacher. He was a leader in the development and supervision of the undergraduate laboratories and in the training of graduate teaching assistants. His *Physics Laboratory Manual*—the first edition was published in 1961 (William C. Brown)—was used for many years at Iowa and elsewhere. The career total of enrollments in his courses exceeded 10 000 student-semesters. He was active in the programs of the Iowa Academy of Science and the American Association of Physics Teachers, and he wrote and edited examinations for the American College Testing Service.

During the 1960s, Nelson helped design the new buildings for housing the physics and astronomy department and gave special attention to lecture rooms and teaching laboratories. From 1963 until his retirement in 1983, he served as associate head of the department and as principal adviser of undergraduate majors.

Nelson is remembered with affection and admiration by his colleagues at Iowa and elsewhere and by many friends in Iowa City and Gainesville.

James A. Van Allen
Edwin Norbeck
University of Iowa
Iowa City

John Beverley Oke

John Beverley Oke, emeritus professor of astronomy at Caltech, died on 2 March 2004 of heart failure at his home in Victoria, British Columbia.

Born on 23 March 1928 in Sault Sainte Marie, Ontario, Oke earned his bachelor's degree in physics in 1949 and master's degree in astronomy a year later, both from the University of Toronto. He moved to Princeton University, where he earned his doctorate