

postdoctoral positions at Oxford University and at the University of Alberta in Edmonton, Canada, before becoming a research associate at Alberta in 1973. In 1979, he joined the faculty of the biochemistry department at Saskatchewan and headed the department for five years, beginning in 1998. In 2001, he was appointed as Canada Research Chair in Structural Biochemistry. His research interests include the study of protein crystallography, particularly the enzyme phosphoenolpyruvate carboxykinase.

Delbaere recently completed the first half of a sabbatical at Oxford, where he examined the structures of kinases. He is spending the second half of his sabbatical at the University of Auckland in New Zealand, where he plans to work on the structures of proteins involved in tuberculosis.

In other ACA election results, **Douglas Ohlendorf** (University of Minnesota, Twin Cities) was reelected to a three-year term as the society's treasurer. **Simon Billinge** (Michigan State University) was elected to a four-year term on the continuing education committee and **Cathy Drennan** (MIT) began her four-year term on the communications committee. **Ward Smith** (Argonne National Laboratory) also took office for a four-year term on the data, standards, and computing committee.

## In Brief

Effective 1 January, **Bertil Andersson** began serving a five-year appointment as chief executive of the European Science Foundation, based in Strasbourg, France. Andersson was president of Linköping University and a professor of biochemistry at Stockholm University. He succeeded ESF Secretary General **Enric Banda**, who plans to return to Barcelona, Spain, to take his post as a research professor with the CSIC, an autonomous, multidisciplinary public research body affiliated with the Ministry of Science and Technology.

**Art McDonald**, a subatomic physicist from Queen's University in Kingston, Canada, and director of the Sudbury Neutrino Observatory, received the 2003 Gerhard Herzberg Canada Gold Medal for Science and Engineering in November at a gala dinner held in the National Gallery of Canada in Ottawa. The Natural Sciences and Engineering Research Council awarded the medal, NSERC's highest honor, to McDonald in honor of his contributions to science, particularly his leadership of SNO. The

council promises to fund McDonald's research to the tune of Can\$1 million (about \$780 000) over 5 years. McDonald has announced that, in honor of his student André Hamer, who died in February 2003 (see PHYSICS TODAY, November 2003, page 88), part of the award will support prizes for the top NSERC postgraduate scholarship winners.

**Madeleine Jacobs** took her new post as the executive director and CEO of the American Chemical Society on 1 January. She succeeded **John K. Crum**, who retired after 20 years in that position. Jacobs previously was the editor-in-chief of the weekly *Chemical & Engineering News*. Her successor is **Rudy M. Baum**, who had served as the magazine's deputy editor-in-chief.

**Heino Finkelmann** and **Mark Warner** are the winners of the 2003 Agilent Technologies Europhysics Prize, awarded by the European Physical Society and funded by the Palo Alto, California-based Agilent Technologies. The scientists were cited for their "discovery of new phases of polymer liquid crystal elastomers and the experimental and theoretical studies of their extraordinary properties." Finkelmann is a professor in the Institute of Macromolecular Chemistry at the University of Freiburg in Germany. Warner is a professor of theoretical physics in the Cavendish Laboratory at the University of Cambridge, UK.

**Louis F. DiMauro**, senior scientist at Brookhaven National Laboratory, will join the faculty of Ohio State University this summer as the Edward E. and Sylvia Hagenlocker Chair in Physics.

During a ceremony in November in Rome, the European Commission

presented the 2003 Descartes Prize to two teams of researchers. The first team, led by **Richard Friend**, Cavendish Professor of Physics at the University of Cambridge in the UK, won, in part, for having "achieved breakthroughs in light and image display screens, paving the way for a new range of innovative applications such as pliable TV and computer screens and switch-on wallpaper." The team split its €700 000 (about \$890 000) share of the prize. **Veronique Dehant**, head of the time, Earth rotation, and space geodesy section at the Royal Observatory of Belgium in Brussels, led the second team. Its project "breaks new ground in overcoming the difficulties caused by variations in the Earth's rotation axis," says the citation, "with a new model which improves the accuracy of global positioning and navigation systems from 2 meters to within only 2–3 centimeters." The team shared the €300 000 (about \$380 000) prize.

In October, **Stuart MacCormack** became the product engineering manager for high-power fiber lasers at Spectra-Physics in Mountain View, California. He had been a staff scientist at JDS Uniphase in San Jose. Also joining Spectra-Physics that month was **Jim Harrison**, now director of engineering for the diode lasers group, which is based in Tucson, Arizona. He was previously the vice president of engineering for the semiconductor laser group at Coherent in Santa Clara, California.

Astronomer **Steve B. Howell** started working last summer at the WIYN Observatory and the National Optical Astronomy Observatory in Tucson, Arizona. He previously had been with the University of California, Riverside, as a senior research scientist.

## Obituaries

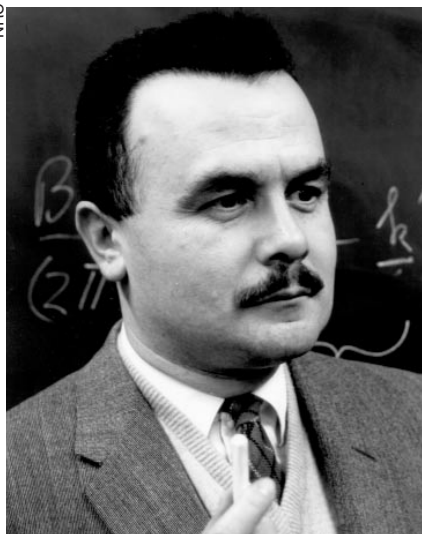
### Bertram Neville Brockhouse

**Bertram Neville Brockhouse**, professor emeritus at McMaster University, who shared the 1994 Nobel Prize in Physics with Clifford Shull, died on 13 October 2003 in Hamilton, Canada.

Bert was born in Lethbridge, Canada, on 15 July 1918 and grew up in Vancouver. He began his elementary school education in a one-room schoolhouse a few miles from the family farm. Completing high school at

the height of the Depression, and with limited employment prospects, he moved with his family to Chicago in 1935. There, he took evening courses in radio repair and design that earned him a position as a laboratory assistant in an electrical firm and allowed him to repair radios on his own time. After three years in Chicago, the family returned to Vancouver.

In 1939, soon after Canada was at war with the Axis powers, Bert enlisted in the Royal Canadian Navy and went to sea as a sonar operator before eventually rising to the position of electrical sub-lieutenant. After



**Bertram Neville Brockhouse**

his discharge from the navy in 1945, he took advantage of a veterans' program to begin studies at the University of British Columbia, where he majored in physics and mathematics.

On completion of his bachelor's degree in 1946, he obtained summer work in the electrical standards section of the National Research Council in Ottawa. During that summer, Bert, a motorcycle enthusiast in his youth, rode his motorcycle three-quarters of the way across North America, from Vancouver to Ottawa, via Chicago—no mean feat. He subsequently completed a master's degree in physics at the University of Toronto. His doctoral studies there, initially supervised by Edward Bullard, earned him his PhD in 1950 with a thesis on the effects of stress and temperature on the magnetic properties of ferromagnetic materials.

That same year, Bert began work at Chalk River Nuclear Laboratories of the National Research Council of Canada's Atomic Energy Project near Ottawa. There, he would do the work that won him the Nobel Prize. He collaborated with Donald Hurst, Myer Bloom, G. Goldschmidt, and N. Page in studying the resonant scattering of slow neutrons by strong absorbers. Ultimately, members of the group proposed the idea of studying the inelastic scattering of slow neutrons, an effort deemed feasible because Chalk River's National Research Experimental (NRX) reactor was then the world's highest flux beam reactor.

By 1952, Bert had designed and built a triple-axis machine to measure the frequency distribution of phonon excitations in crystals. After much experimentation with a variety of techniques both at Chalk River and at

Brookhaven National Laboratory over the next few years, Bert and his collaborators ultimately developed the famed triple-axis spectrometer with all angles adjustable so that it was possible to carry out scans as a function of energy at fixed momentum transfer—the so-called constant-Q technique. By 1958, a triple-axis spectrometer was operating at Chalk River's new National Research Universal reactor, with much enhanced neutron flux as compared with NRX, and the stage was set for great progress. Triple-axis spectrometers adorn high-flux beam reactors around the world to this day, and the constant-Q technique is in frequent current use.

Using the constant-Q triple axis and other inelastic neutron scattering techniques, Bert and his collaborators were very quickly able to carry out a remarkable series of seminal measurements. Those included measurements of the phonon dispersion curves in metals such as aluminum and lead, semiconductors such as silicon and germanium, and insulators such as the alkali halides. Bert's work measuring insulators, done in collaboration with David Woods and William Cochran, led to the development of the famed shell model.

In addition to the seminal work on phonon dispersion curves, Bert pioneered studies of other elementary excitations in solids including spin-wave excitations (magnons) and crystal-field excitons. Key members of the Chalk River group at that time, in addition to those previously named, included Alec Stewart, Roger A. Cowley, and Gerald Dolling. Of course, the facilities at Chalk River and Bert's own successful experimentation drew many great visiting scientists from around the world including P. Iyengar, M. Sakamoto, K. Rao, L. Becka, H. Watanabe, B. Dasannacharya, and J. Bergsma. Even after Bert moved to McMaster, the group that he established at Chalk River continued to flourish, and many scientists, including ourselves, received their first training in neutron scattering there.

From 1962 until he retired in 1984, Bert was a professor of physics at McMaster. His presence was instrumental in building up a research-intensive department through the 1960s, and he served as chairman of the physics department at McMaster from 1967 to 1970. An interdisciplinary materials research institute at McMaster, founded by Howard Petch and James Morrison in 1969, was renamed the Brockhouse Institute for Materials Research in 1995. There, as

Circle number 38 on Reader Service Card



at Chalk River, Bert mentored many students who have gone on to have significant careers in physics.

Although greatly admired for his intellect and novel ways of approaching problems, Bert is remembered for his affection and his humble, gracious manner. Shortly after the announcement that he was a winner of the Nobel Prize, for example, Bert told a gathering of Canadian undergraduate physics students at McMaster that he used to think that his work was not so important, but recent events had forced him to reconsider. He is also remembered for his love of the arts: He often sang opera at work and he appeared in a number of amateur theater productions including a George Bernard Shaw play and Gilbert and Sullivan operettas. Even during the most hectic and productive time in his career, Bert found time to be a devoted family man with six children and, ultimately, 10 grandchildren.

Although Bert's passing is mourned by his many friends and colleagues, we have been inspired by a life of great accomplishment.

**Robert J. Birgeneau**

*University of Toronto  
Toronto, Canada*

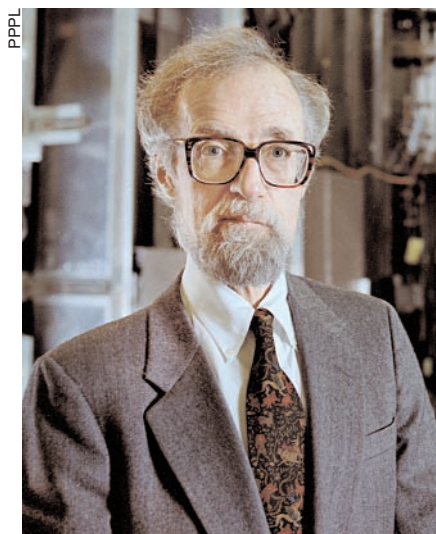
**Bruce D. Gaulin**

*McMaster University  
Hamilton, Canada*

## Harold Paul Furth

**H**arold Paul Furth, professor emeritus of astrophysical sciences at Princeton University in Princeton, New Jersey, died of heart failure on 21 February 2002 in Philadelphia. Harold was a highly original thinker, an inventor, and a major figure in the field of plasma physics. His life's passion was to produce energy through nuclear fusion. For a quarter of a century, Harold was the architect, authority, and driving force behind the US effort in nuclear fusion for peacetime use.

Harold was born in Vienna, Austria, on 13 January 1930. His father had escaped from a prisoner-of-war camp during World War I, and, via China, had returned to Vienna. There, he ran the successful family hat-making business "Fefzfabriken" ("Fefz Factory"), but his real love was literature. Harold's uncle was Paul Harteck, codiscoverer of the deuterium-deuterium fusion reaction. In the summer of 1939, Harold's father, whose family was of Jewish origin, escaped to Switzerland. In the end, Fefzfabriken was lost in World War II, and Harold inherited instead a love of both physics and literature.



**Harold Paul Furth**

After studying at the French-speaking Ecole Internationale in Geneva, Harold went to New York City in 1941. In 1947, he graduated at the head of his class from the Hill School in Pottstown, Pennsylvania. He then attended Harvard University until 1951, when he earned his BS in physics. After a year at Cornell University, he returned to Harvard as a graduate student from 1952 to 1956.

In 1956, while still a student at Harvard, Harold joined the University of California Radiation Laboratory, first in Berkeley and later at the Livermore branch (now Lawrence Livermore National Laboratory). His wit and literary prowess, along with his skills in physics, quickly became evident. That year, he published an irreverent poem in the *New Yorker* called "Perils of Modern Living." In it, he imagined "Dr Edward Teller," his laboratory mentor, encountering "Dr Edward Anti-Teller." Teller had explained that, on contact, matter with antimatter would explode, and in Harold's poem, that indeed was the result:

Then shouting gladly oe'r the  
sands,  
Met two who in their alien  
ways  
Were like as lentils. Their right  
hands  
Clasped and the rest was  
gamma rays.

In 1960, Harold submitted to Harvard his thesis on magnetic analysis of K meson interactions in emulsion nuclei. Meanwhile, together with Stirling Colgate at Livermore, he invented methods of confining hot plasma, which included numerous pinch configurations and the levitron, a device in which a large current-carrying ring

was levitated within a vacuum chamber. Those early devices were plagued by plasma instabilities that defied conventional explanation. The prevailing paradigms imagined the plasma as a perfectly conducting fluid. However, visualizing what happens when twisting plasma columns in turn twist the magnetic lines of force imbedded in them, Harold recognized how even the small electrical resistance of plasma could alter the gross structure and stability of magnetic traps. In 1963, together with Marshall Rosenbluth and John Killeen, Harold published in *Physics of Fluids* the influential paper "Finite Resistive Instabilities of a Sheet Pinch"—one of the most cited papers in modern plasma literature—that explained the underlying physics of both manmade plasma traps and natural phenomena such as Earth's magnetotail.

Harold joined Princeton in 1967 as a professor of astrophysical sciences and co-head of the experimental division at the Princeton Plasma Physics Laboratory (PPPL). Harold showed, in increasingly larger and more sophisticated devices, how powerful magnetic fields can confine plasma, even as the plasma is heated to thermonuclear temperatures, or tens of millions of degrees Kelvin. In 1969, he immediately recognized the significance of the Russian success in confining plasma using the tokamak configuration. Quickly confirming the favorable Russian results, Harold redirected the Princeton program to explore a series of innovative tokamak variations.

Following the oil embargo in 1973, when the escalating prices and the perceived scarcity of fossil fuels threatened national security, the time was ripe for the US to vigorously explore new energy sources. It was Harold who articulated for the nation the very real promise in harnessing nuclear fusion as an alternative energy source.

When more expensive options were being proposed at a historical meeting of the Atomic Energy Commission in late 1973, Harold went to the blackboard and said, "Well, if this is what you want to do, I will tell you how to do it." Thus, Harold put forth the basic ideas behind the Tokamak Fusion Test Reactor (TFTR). His approach prevailed as the cheapest and surest one, relying on his recent idea of exploiting fusion reactions that arise from injected energetic ions. With colleagues John Dawson and Fred Tenney, Harold had earlier (1971) predicted that, because of the reactions caused before the ions reached equilibrium