Some of Hemley's recent accomplishments include the discovery of new phenomena in hydrogen at megabar pressures; the observations of new transformations in molecular materials and novel high-pressure molecular compounds; the creation of new materials under pressure, including superconductors, magnetic structures, and superhard materials; and the novel behavior of glasses and amorphous solids under pressure. Hemley continues to develop new high-pressure techniques, including optical methods, synchrotron radiation for diffraction and spectroscopy, and transport measurements.

In 1976, Mao and his colleagues were the first to create a static pressure of 1 megabar—a million times the ambient pressure at sea level and double what had previously been achieved in a laboratory. Since then, they have progressively improved the multi-megabar technique and coupled it with analytical methods, including synchrotron x-ray diffraction, infrared, Raman, Brillouin, fluorescence, and Mössbauer spectroscopies, according to the institution.

Since 1985, in collaboration with Hemley, Mao has further improved both the technique of creating such pressures and the methods of analyzing what happens to substances exposed to them, the foundation says.

Hemley and Mao have observed and described such extreme-pressure phenomena as the occurrence of new types of molecular bonds; the creation of new, extremely hard materials, superconductors, and magnetic structures; and pressure-induced crystallization and amorphization, the foundation says.

Hemley and Mao received their prize of $1 million Swiss francs (about US$800 000) during a November ceremony in Bern, Switzerland.

In Brief

Philip H. Bucksbaum has joined the faculty of Stanford University to direct the new Ultrafast Science Center, a partnership between Stanford and the US Department of Energy. Bucksbaum will also be a professor at SLAC and in Stanford's applied physics department. Through the winter term he is continuing as the Peter Franken Distinguished Professor of Physics at the University of Michigan, where he has been since 1990. Bucksbaum was named to his new post last October.

Michael L. Coats has been named director of NASA's Johnson Space Center in Houston, replacing **Jefferson D. Howell Jr**, who is on assignment as a visiting professor to the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin. A former astronaut, Coats began his new position last November and is responsible for overseeing the center, which is NASA's primary operations center for space flight. Coats is the ninth director in Johnson's 44-year history. He had been vice president of Lockheed Martin Astronautics in Denver.

The American Association of Physics Teachers in College Park, Maryland, has named **Charles H. Holbrow** its senior staff physicist, a new position for the society. Holbrow is Charles A. Dana Professor of Physics Emeritus at Colgate University in Hamilton, New York, a visiting physics professor at MIT, and a visiting associate at Harvard University's physics department. He began last October at his AAPT post, in which he is developing programs to help make the society more useful to college and university physics faculty.

Ohio University in Athens, Ohio, has hired **Madappa Prakash** as a physics professor. As part of his new position, Prakash is also a member of the university's Institute of Nuclear and Particle Physics and is contributing to a newly funded joint research initiative between nuclear physics and astrophysics. Prior to beginning at his post in September 2005, Prakash was a research professor at Stony Brook University in Stony Brook, New York.

William M. Yen, Graham Perdue Professor of Physics at the University of Georgia in Athens, has been selected as winner of the ICL Prize for Luminescence Research and will receive the international award at July ceremonies in Beijing. The honor from the International Conference on Luminescence is being given for Yen's "pioneering discoveries in the dynamics of solid state optical processes and for exceptional leadership in the field of luminescence." The prize was established in 1984 and is awarded in conjunction with the tri-annual International Conference on Luminescence. Yen will receive a plaque and C2000 (about $2500).

Obituaries

Alastair Graham Walter Cameron

Alastair Graham Walter Cameron, one of the key discoverers of stellar nucleosynthesis and a founder of modern nuclear astrophysics, died of a heart attack in Tucson, Arizona, on 3 October 2005.

Al was born in Winnipeg, Canada, on 21 June 1925. Son of a biochemistry professor at the University of Manitoba, Al was raised in an environment in which scholarly and professional work was valued. At the age of four, he addressed all men as "Doctor" in an early attempt to form a general hypothesis from limited data. He excelled in science and math and was entranced by the notion of space travel. He did his graduate work in nuclear physics under Leon Katz at the University of Saskatchewan, and in 1952 received the first physics PhD there. The deep knowledge he developed of both experimental and theoretical nuclear physics proved a key to the creative work he would later undertake.

A report that Paul Merrill had discovered technetium in a red-giant star intrigued Al because of the neutrons required to produce Tc—which has only radioactive isotopes—and turned Al's attention to problems in astronomy, the source of neutrons in stars, and thermonuclear reaction rates. Looking for a place where he could pursue his new interests, he joined the Chalk River Laboratories of the Canadian Atomic Energy Commission.

By the early 1950s, mechanisms for producing the elements were a major focus of interest. The specific energy-producing nuclear reactions in stars had been shown earlier by Hans Bethe and Edwin Salpeter. Efforts by George Gamow, Ralph Alpher, and Robert Herman to explain cosmic

PHYSICS TODAY is changing the way it publishes obituaries. Some will continue to appear in print, but most will be available only online (see PHYSICS TODAY, October 2005, page 10). Subscribers can visit http://www.physicstoday.org/obits to notify the community about a colleague's death and submit obituaries up to 750 words, comments, or reminiscences. Each month, recently posted material will be summarized here, in print. Select online obituaries will later appear in print.

elemental abundances with a primordial fireball model failed for elements heavier than beryllium. Merrill's discovery proved that elements were being made in stars and that the elemental abundances reflected ongoing production, not a single episode of nucleogenesis. A time scale for the universe was by then very roughly known and stellar evolution models were being developed. Using meteoritic and stellar data and exploiting the nuclear shell model, Hans Suess and Harold Urey presented abundances of all the nuclear species in 1956. This stew of complex observations was the template to explain.

Two magisterial reports were produced by 1957: "B^2FH" (by Margaret and Geoffrey Burbidge, Willy Fowler, and Fred Hoyle) from the beehives of Caltech and Cambridge University, and "AGWC" (by A. G. W. Cameron) from the seclusion of Chalk River. Those works immediately changed the whole field of astronomy and astrophysics and laid out the processes and framework for the synthesis of nuclei as natural results of stellar evolution over the history of the universe. Nuclear astrophysics, an area of active research, has its origins 50 years ago in those reports. All work on abundances of elements in stars, gamma radiation from short-lived nuclei, and chemical evolution of the interstellar medium (ISM) is discussed in terms of those general models.

Following John Reynolds's 1960 discovery of relics of radioactive iodine-129 in meteorites, Al began to consider both the galactic environment and the solar system. While continuing his work on nuclear astrophysics, Al spent the bulk of his career on formation of the solar system from the ISM. Al's profound knowledge of classical physics and nuclear astrophysics, coupled with his drive to understand the origin of things, led to a flowering of that multidisciplinary field. One cannot look into any aspect of stellar nucleosynthesis—from Big Bang debris to star formation from a chemically evolving ISM—without finding Al's footprints, students, and guiding thoughts.

Al moved to the US in 1961 because of the greatly increased scientific opportunity following a major expansion of space-science research in the US. Despite having helped create a new field, he, of course, found no good academic positions—it took some time for academic departments to recognize that the new arena was an intrinsic part of astronomy. Al joined NASA's Goddard Institute for Space Studies in New York as a senior scientist. He developed close relationships with the physics department at Yale University as a visiting lecturer and trained several students who went on to have distinguished careers, and in 1966 he became a professor at Yeshiva University. He flourished at those

Recently posted death notices at http://www.physicstoday.org/obits:

Willem Wamsteker
23 November 1942–25 November 2005

Marcel Alonso
6 February 1921–11 November 2005

William O. Baker
15 July 1915–31 October 2005

Willis Harlow Shapley
2 March 1917–24 October 2005

Yardley Beers
12 April 1913–1 October 2005

William E. Parkins
1 March 1916–30 September 2005

Walter Raymond Gustafson
14 February 1915–28 September 2005

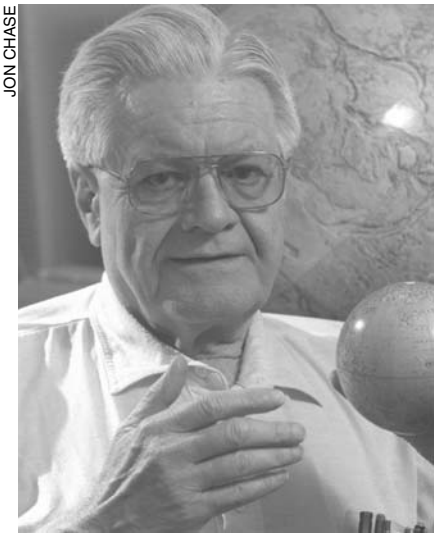
Gordon Gould
17 July 1920–16 September 2005

Victor Grigorievich Lifshits
21 July 1941–20 July 2005

Robert W. Decker
1927–11 June 2005

See www.pt.ims.ca/7372-25

See www.pt.ims.ca/7372-26


JON CHASE

Alastair Graham Walter Cameron

institutions and, with David Arnett, Carl Hansen, and James Truran, produced massive lecture notes—really outstanding monographs.

When Harvard University decided in 1973 to renovate its astronomy department, Al was invited to join the faculty and played a guiding role in the renovation. The result was the Harvard–Smithsonian Center for Astrophysics. He served on the National Academy of Sciences's committee for planetary and lunar exploration (COMPLEX) and as chairman of the NAS space science board, where he played a leading role in defining scientific goals of space exploration. On his "retirement" in 1999, he joined the faculty of the Lunar and Planetary Laboratory of the University of Arizona.

Some kids are very happy if they can find a couple of pieces that fit into a puzzle, and they will try hard to fill out the rest. Al had a very different approach. Having found or identified a few pieces of the puzzle, he then created a whole structure from a detailed ab initio model based on theoretical considerations and embedded the pieces in that structure. His deep insights, knowledge of physics, and powerful computational abilities led to structures of great complexity and texture.

In 1975, Al gave a joint Caltech–Jet Propulsion Laboratory colloquium entitled "The Origin of the Solar System" to an audience of several hundred scientists. Starting with the ISM, gas dust, and plasma, Al traced formation of the Sun, protoplanetary disk, giant gaseous planets, rocky terrestrial planets, and the Moon. He stood stationary and spoke in a steady clear fashion, guiding the audience through the detailed dynamics he had obtained through massive computation. Occasionally he would raise a hand to emphasize a point; the gesture seemed to be a way of pointing to one of the computers that had been grinding through a program. At the end, the audience sat in awed silence until someone in the rear of the room asked, "What did you do on the seventh day?" Al responded, "I rested."

Al's ability to formulate broad problems in an even broader framework was a resource for the whole scientific community. Nuclear astrophysics, star formation (including metal-free stars), interstellar communication, giant gaseous protoplanets, terrestrial planets, asteroids, meteorites, making the Moon by a giant impact—all these were his playthings. His re-investigations of each problem of "formation" led to new versions and visions of how things were formed. Al was a sort of cosmic Buddha who could tell you detailed histories of each of the universes he had thought about; each was a full thing unto itself. Al's general approach used first principles and theory as both guides and methods, and he incorporated some data that were critical and some that simply caught his fancy. Because of his great intellect and powerful analytical and computational powers, he tended to hold phenomenological models in disdain. Al once told authors of a new phenomenological model, "I have noticed over the years that the arguments that appeal to you are primarily observational and experimental and that theory is secondary. For me it is the other way around: Theory and theoretical consistency are primary and observations are secondary (which is not to say that they are not of primary importance and on occasion can be the tail that wags the theoretical dog)."

Al would appear at meetings in a suit, his shirt pocket bulging with pens of all colors, and he'd be carrying some calculating device, which grew from a pocket slide rule to a hand calculator to a series of laptop computers. He would eagerly show the simulation of a Mars-sized projectile impacting proto-Earth or a supernova shock wave hitting the protosolar nebula. He was always helpful in explaining things that one needed to know or ought to have known. A very work-centered person, Al was never egocentric and almost never criticized others. He simply wanted to get on to the next piece of intellectual excitement and the intense pleasure of orchestrating a bank of computers to play some scientific symphony that he was composing. He considered that he worked on cosmogony—the generation or creation of the universe (or parts thereof). Cosmology was just discourse on the science of the universe.

Gerald J. Wasserburg
California Institute of Technology
Pasadena

Shiing-Shen Chern

On 3 December 2004, Shiing-Shen Chern died in Tianjin, China, of a heart attack, and the mathematics community lost one of its legendary greats. Chern's pioneering ideas influenced not only his own field of differential geometry, but also many parts of mathematics and theoretical physics. He played a crucial role in the founding of mathematics institutes in both the US and China. As a teacher, colleague, and friend, he was revered for his warmth and gentle nature.

Chern was born in China's Zhejiang province on 28 October 1911. His undergraduate education was at Nankai University in Tianjin. In 1936 he completed his doctoral work with Wilhelm Blaschke at the University of Hamburg in Germany. Chern spent a year in Paris studying with Élie Cartan before returning to China to assume a professorship at Tsing Hua University. He visited the Institute for Advanced Study in Princeton, New