Island, New York. He researched electroluminescence and semiconductor surfaces. During the 1962 academic year, he served as a visiting professor of physical metallurgy at the University of Illinois at Urbana-Champaign. There, his research involved using the electron microscope to observe dislocations in crystals.

Frankl became a professor of physics in 1963 at Penn State, where, with support from the Office of Naval Research and NSF, he initially investigated the interactions of crystals surfaces with various probe particles. In the early 1970s, his emphasis shifted to studying how the beams of helium atoms diffract from surfaces of various crystals, including alkali halides, diamond, and graphite. That highly sensitive technique yielded very precise information about atomic positions and interaction forces. Notably, Frankl's experiments with William E. Carlos provided the first confirmation, in 1979, of the prediction of band structure effects for adatoms. Not long after, those results were shown to be consistent with thermodynamic data from groups led by J. Greg Dash, David L. Goodstein, and Oscar E. Vilches.

During his 25 years at Penn State, Frankl also spent time as a visiting senior research associate at the University of Sussex, England (1969–70), where he worked on the nucleation of films on solid substrates. He spent a year (1978–79) as a visiting research physicist at the University of California, San Diego, where his research was on coherence effects in atomic beam diffraction. Later (1986–87), he was a visiting fellow of Fitzwilliam College at the University of Cambridge. There, he examined the instrumental effects involved in determining line shapes in atomic beam scattering.

Frankl published two books, *Electrical Properties of Semiconductor Surfaces* (Pergamon Press, 1967) and *Electromagnetic Theory* (Prentice Hall, 1986). He also was the electronics and semiconductors divisional editor for the *Journal of the Electrochemical Society* and associate editor of the *Review of Scientific Instruments*.

After Frankl retired from Penn State in 1988 with the rank of professor emeritus of physics, he retained his enthusiasm for physics, manifested by his frequent attendance at departmental functions. In addition, he enjoyed bridge, golf, woodworking, photography, and traveling. He brought the same high standard to those leisurely activities as he did to his research and teaching. He was a greatly admired colleague whose ideas, curiosity, and humor we sorely miss.

Moses H. W. Chan

Milton W. Cole

J. D. Maynard

Pennsylvania State University

University Park

Derek Charles Robinson

Derek Charles Robinson died of cancer on 2 December 2002 in Oxford, England. At the time of his death, he was director of the United Kingdom Atomic Energy Authority's Culham Science Centre near Abingdon and head of the UK's fusion program.

Born on 27 May 1941 in Douglas on the Isle of Man, Derek gained a first class physics degree at the University of Manchester in 1962 followed by a PhD at Manchester in 1966 under the supervision of Sam Edwards. His doctoral research involved the study of plasma turbulence in the ZETA experiment at the UKAEA's Atomic Energy Research Establishment near Harwell; in particular, he showed how unwanted turbulence in the plasma could be suppressed by shaping the confining magnetic fields. That work helped to establish a magnetic confinement system, the reversed field pinch, which is still studied today.

After receiving his PhD, Derek joined the ZETA team and went on to examine experimentally and theoretically a number of aspects related to plasma stability and confinement. His efforts included further work on turbulence, studies of relaxed states, and the application of a new scattering technique using lasers to measure the temperature of the plasma.

Derek's ZETA experience proved very timely. In 1968, Soviet scientists at the Kurchatov Institute in Moscow claimed that they had made a breakthrough in achieving temperatures of 10 million kelvin, 10 times higher than had been achieved before, using another magnetic confinement system—the tokamak. Derek was sent to work at the Kurchatov as an exchange scientist. There, he acted as the link with the Russian scientists when diagnostics staff from the UKAEA's Culham Laboratory were invited to take their equipment to Russia to confirm the Russian measurements—a remarkable development in those cold war days. The UK team showed that the performance of the Soviet machine actually exceeded the claims made for it, and the tokamak went on to become the main line for international fusion research throughout the world. Derek also made some seminal contributions to the theory of insta-

Derek Charles Robinson

bilities of plasmas during his year in the Soviet Union, as shown in papers he presented at the 1969 Dubna conference: "Stability Close to the Magnetic Axis in a Toroid for Vanishing Pressure Gradient" and "A Criterion for the Hydromagnetic Kink Instability of a Cylindrical Pinch Discharge."

Derek returned to Culham Laboratory, which by then had become the UK's center for fusion research. As one of the first tokamak experts in the West, he played a big part in pushing forward this new line of research. He was the driving force behind the construction of several new tokamaks at Culham in the 1970s and 1980s—those were relatively small but specially designed devices aimed at investigating critical issues. More recently, in the 1990s, Derek helped to pioneer an innovative variant of the conventional tokamak, known as the spherical tokamak, which shows considerable promise as a power plant concept in the longer term and which is now being actively pursued in several other countries including the US.

On the international front, Derek contributed to the design of a large tokamak JET, the Joint European Torus, which was subsequently built and exploited as a European project at Culham. And then, as the UK person on several of JET's supervisory bodies, he helped to guide JET to many successes, most notably the attainment in 1997 of physical conditions very close to those needed in a fusion power plant. More recently, he also made important contributions to the design of ITER, a larger JET-like tokamak currently being proposed as a world project to produce sustained burning plasmas in the power plant regime.

Derek was very active in building up the international fusion program that exists today in nearly 50 countries. As well as his year in the Soviet Union, he spent several months in Japan and Australia and made one of the first tours of Chinese laboratories by a Western scientist. He also had many interactions with scientists in small or less-developed countries and helped those scientists get started in fusion research. Derek took a special interest in younger staff; he maintained a significant involvement with students throughout his career and helped to create the next generation of fusion scientists, many of whom have now moved on to senior positions in fusion centers around the world, as well as in other scientific fields.

In 1996, Derek was appointed director of the Culham Science Centre and subsequently guided the laboratory through an important period of change, including the construction of a larger spherical tokamak, the Mega Amp Spherical Tokamak, also known as MAST; the reorientation of JET as a user facility; and a UK government review of fusion—all of which went well. In 2001, Derek became a vice president of the Institute of Physics and, later that year, chairman of the IOP's publishing board. He held those two positions until his death. He was elected a fellow of the Royal Society of London in 1994.

Derek was a great ambassador for fusion, promoting its potential in meetings with politicians and other decision makers. On that front, he traveled widely, making contact with key people in many countries and achieving much progress in gaining support for the pursuit of fusion as a future source of energy.

Frank Briscoe
Culham Science Centre
United Kingdom Atomic Energy Authority
Abingdon, England

Douglas Howard Sampson

Douglas Howard Sampson, a renowned theoretical atomic physicist and a professor emeritus of astronomy and astrophysics at the Pennsylvania State University, died from a hemorrhagic stroke on 8 December 2002 in State College, Pennsylvania. He had retired in 1997 after 32 years of service to the university, and had maintained an active research program up to the day of his death.

Doug was born in Devils Lake, North Dakota, on 19 May 1925. He was raised without running water or electricity on a homestead, built by