Peter studied at Merton College, Oxford University, and received a BA in mathematics in 1954 and an MA in 1957. At the Clarendon Laboratory at Oxford, he completed a DPhil in physics in 1957, with a dissertation entitled "Double Beta Decay." He then went to the US, where he joined Henry Primakoff at Washington University in St. Louis, Missouri.

With Primakoff, Peter laid the foundations for the physics of neutrinoless double beta decay. Observation of this process would establish that neutrinos are their own antiparticles and that lepton number is not conserved. In an important insight dating from just after the discovery of parity violation in 1956, they realized that maximum parity violation would greatly suppress neutrinoless double beta decay, making it more elusive than previously thought. But with the discovery of neutrino mass in the late 1990s, elementary particle physicists recognized the importance of searching for this rare decay. Numerous experiments designed to have the very high sensitivity that will be required are currently being developed.

Peter's many contributions to our understanding of the weak interactions included work with James Gelb on the implications of the Mikheyev-Smirnov-Wolfenstein effect for neutrino flavor change in the Sun. With other collaborators, Peter analyzed possible consequences of so-far hypothetical very heavy neutrinos and devised ways to determine directly the space-time structure of the weak neutral current.

In 1962 Peter joined the faculty at Purdue University, where for two decades he carried out an active research program in theoretical physics. He became a naturalized American citizen in 1972. He was appointed an associate division leader at Los Alamos National Laboratory in 1983, with responsibility for the research program in nuclear and particle physics. Named dean of science at the University of Texas at Arlington in 1990, Peter led six science departments and established a strong and thriving high-energy physics group in the physics department there. He was a visiting scientist at the nearby Superconducting Super Collider Laboratory and worked with other universities to encourage a strong physics research community in northern Texas.

From 1997 to 2003, Peter was associate director of the Office of Science in the Department of Energy, with responsibility for DOE's extensive high-energy and nuclear physics research programs and facilities. Major advances during his term in office included the discoveries of dark energy and neutrino oscillations, startup of the B Factory at SLAC and the Relativistic Heavy Ion Collider at Brookhaven National Laboratory, a major upgrade of the Tevatron at Fermilab, and US participation in the Large Hadron Collider project at CERN.


US DEPARTMENT OF ENERGY

Simon Peter Rosen

Peter was elected a fellow of the American Association for the Advancement of Science in 1992. In 2000 he was named professor emeritus of the University of Texas at Arlington and was cited for "years of excellence in teaching, internationally acclaimed research, and administrative service to the University."

While undergoing intensive cancer treatments from 2003 to 2006, Peter continued his efforts on behalf of physics as long as his health allowed and served as senior science adviser to the director of DOE's Office of Science. In 2005 he led the Office of Science's observance of the World Year of Physics; his contributions included writing and speaking about physics, such as a lecture he gave at DOE entitled "Einstein Made Easy: Special Relativity at the Heart of Office of Science Programs." He helped provide DOE support for the American Physical Society's World Year of Physics activities and for "Einstein's Big Idea," a PBS *NOVA* program about special relativity. Peter understood the value of humanizing science for the general public. For him, science and humanity were intimately connected.

During the last year of his life, Peter renewed his close and direct ties to the physics community by managing the theoretical particle physics program at NSF. Once again he could be a steward of the field and nurture young theorists just starting their careers. In early 2006 he also gave his last two invited talks at a neutrino conference in Venice. In the summer he wrote an eloquent tribute to Nobel laureate Ray Davis Jr, whom he called the "discoverer and grand pioneer of the solar neutrino problem." It was published in the *CERN Courier* in September 2006, just a month before Peter died.

Peter was a wonderful man with a gentle soul. He had an appealing low-key charisma and charm, an engaging courtly manner, and a cheerful, quiet sense of humor. His idea of making an angry retort was to write a clever, barbed letter and then, instead of mailing it, to bury it in one of his desk drawers.

A highly accomplished theoretical physicist, a generous and supportive colleague to physicists around the world, and a wise manager of research programs, Peter has had a broad and substantial impact on physics. He will be sorely missed.

Neil Baggett
Potomac, Maryland
Boris Kayser
Fermilab
Batavia, Illinois

Herbert Walther

Herbert Walther, a leader in the field of laser physics and cofounder and former director of the Max Planck Institute for Quantum Optics in Garching, Germany, died on 22 July 2006 in Munich.

Walther was born on 19 January 1935 in Ludwigshafen, Germany. He studied physics at the University of Heidelberg, where he received his *diplom* in 1960 and his PhD in 1962 for studies of the nuclear quadrupole moment of manganese-55, with Hans Kopfermann as thesis adviser. He then left for the University of Hanover, where he was a scientific assistant until he earned his *habilitation* in 1968. After staying there for another year as university docent, he worked in 1969 as guest professor at the Aimé Cotton Laboratory in Orsay, France, and in 1970 as a visiting fellow at JILA in Boulder, Colorado. In 1971 Walther became professor at the University of Bonn and then at the University of Cologne. In 1975 he moved to Munich, where he spent the rest of his career. Until his retirement in 2003, he was a professor of physics at the Ludwig Maximilians University.

In 1976, with Karl-Ludwig Kompa and Sigbert Witkowski, he formed the project group for laser research in the Max Planck Institute for Plasma Physics in Garching. After five years, the project group became an independent institute, named the Max Planck Institute for Quantum Optics. Walther was one of the MPQ's directors until his retire-

ment in 2003, and he stayed active in research until the last days of his life.

Walther was an innovator in his work on lasers and their applications. In his early work, he contributed to the development of narrowband tunable dye lasers and applied them to studies of fundamental aspects of light–atom interactions, including the observation of the Mollow triplet and antibunching in resonance fluorescence. He constructed pulsed lasers for remote sensing of atmospheric pollution and, in the 1980s, of stratospheric ozone. His research activities covered a broad range of scientific areas, including studies of surface scattering and chemical reactions, molecular spectroscopy, scanning tunneling microscopy, ion trapping, cavity quantum electrodynamics, high-magnetic-field physics and quantum chaos using Rydberg atoms, intense-field studies with femtosecond lasers, optical bistability, and nonlinear optics. But his main interest was fundamental quantum optics with one or a few particles; he worked with both neutral atoms and trapped ions. Among his most important achievements were several seminal studies on atom–photon interactions with the one-atom maser, including the collapse and revival of Rabi oscillations, the discovery of Wigner crystals of trapped ions, and the observation of nonclassical radiation emitted by a single ion. He also worked on many theoretical aspects of quantum optics, often with his longtime friend and colleague Marlan Scully. To work with Walther was to share in his enthusiasm for the world of lasers and their applications.

Among Walther's many honors were the 1990 Charles Hard Townes Award and the 2003 Frederic Ives Medal from the Optical Society of America, the 1993 King Faisal International Prize for Science, the Franklin Institute's Albert Michelson Medal in 1993, and the 1998 Stern-Gerlach Medal from the German Physical Society. More than 10 academies were proud to have him as a member, and his scientific work was published in more than 600 papers.

Besides his scientific work, his lasting legacy is the MPQ. By actively recruiting new colleagues as codirectors, he ensured innovation and success for the institute beyond his retirement. The MPQ continues to be one of the world's premier research centers in quantum optics and attracts visitors from all over the world.

Walther's activities encompassed much more than research and were truly monumental. He edited journals, including *Advances in Atomic, Molecular, and Optical Physics*; he organized conferences, such as the annual Soviet–German Seminar on Laser Spectroscopy, even in the days of the cold war. Important administrative positions he held include as vice president of the Max Planck Society and in the senate of the German Research Foundation; his part was crucial in restructuring science in eastern Germany after reunification. His seemingly endless amounts of energy and optimism helped him to remain active even during his long fight against cancer.

MARGOT WALTHER

Herbert Walther

His work will continue and will be multiplied through the excellent group of researchers he educated. The long and impressive list of former graduate students and long-term postdocs who now hold academic positions has more than 20 entries, including Gerd Leuchs, Dieter Meschede, Pierre Meystre, Georg Raithel, Wolfgang Schleich, and the two of us. As a scientist, a teacher, and a person, Walther had a big influence on these and many others.

We will remember Walther for his passion for science, his vision, and his strength. He liked to be in direct control, but he could also delegate and trust. He was a stimulating classroom teacher, an enthusiastic public lecturer, a statesmanlike organizer and presenter at meetings, and a cheerful person in the rustic "witches room" of Ringberg Castle, the Max Planck Society's conference site. He will always be remembered by his immediate family and by the large family he created in science.

Wolfgang Ketterle
Massachusetts Institute of Technology
Cambridge
Gerhard Rempe
Max Planck Institute for Quantum Optics
Garching, Germany ■