

molecular simulation to study the classical model, originally proposed by Hubert James and Thomas Keenan, for solid methane's phase transitions. An account of that work, "A Monte Carlo study of phase transitions in a fcc octupolar array," was published in 1981 in the *Journal of Chemical Physics*. Subsequently, Nosé collaborated with Yoshiaki Ozaki, Kazuo Maki, and Yosuke Kataoka to explain the recently measured inelastic neutron scattering spectrum of methane on graphite.

After receiving his DSc, Nosé moved to Canada, where he was briefly a research associate in the Institute for Material Research at McMaster University in Hamilton, Ontario. He then moved to Ottawa, where from 1981 to 1983 he was a Natural Sciences and Engineering Research Council fellow in the chemistry division of National Research Council Canada (NRCC) and then until 1984 a research associate at NRCC. His three years in Canada were remarkably productive, and he wrote a number of highly original and much-cited works. In particular, he contributed methodological extensions of the Anderson-Parrinello-Rahman molecular-dynamics schemes that enabled computer simulations of structural phase transitions in molecular crystals.

While still at NRCC, he produced the truly unique contribution to the field of computer simulation: the Nosé thermostat. Two articles on this topic were submitted in 1983 and appeared the following year, somewhat delayed by referees who had difficulty accepting the new and highly original formulation. The articles—"A unified formulation of the constant tempera-



Shuichi Nosé

ture molecular-dynamics methods," in the *Journal of Chemical Physics*, and "A molecular-dynamics method for simulations in the canonical ensemble," in *Molecular Physics*—remain key pedagogical texts, and their importance cannot be overemphasized. They spawned new applications and encouraged generalizations by the computational science community.

In April 1984, following a call from Ryogo Kubo, Nosé returned to Japan as a research assistant in the department of physics at Keio University. Initially, Nosé became interested in melting and crystallization and published a highly cited article on the topic in 1986. In 1988 he became a lecturer, in 1989 an associate professor, and in 2003 a professor. Nosé published a frequently quoted review article on constant-temperature molecular-dynamics methods in 1989. For his influential work on the constant-temperature method, he was honored in 1989 with the IBM Science Prize. During the 1990s Nosé carried out research on colloidal systems and was particularly interested in the Car-Parrinello methodology for ab initio molecular dynamics.

Nosé was a rare and remarkable individual. He was an immensely gifted scientist who loved his family greatly. His highly original and creative work has had an immense impact on the fields of computational science and statistical physics. We cherish the memory of the years we worked with him and are saddened by his passing.

Yosuke Kataoka
Hosei University
Tokyo

Michael L. Klein
University of Pennsylvania
Philadelphia

Dieter Joseph Sigmar

Dieter Joseph Sigmar died in Austin, Texas, on 31 July 2005 after a lengthy and courageous battle with multiple sclerosis. During his long and productive career, he played a key role in the US and international magnetic-fusion energy and plasma-science programs.

Dieter was born in Vienna, Austria, on 11 April 1935. He received his undergraduate degree in physics in 1960 from the Technical University of Vienna. After receiving his PhD in nuclear physics there in 1965, Dieter spent four years as a staff scientist at Oak Ridge National Laboratory (ORNL). He then went to MIT in 1970 as a postdoctoral fellow working with Bruno Coppi in the physics department and stayed on as an associate professor in the nuclear engineering department until 1976. While at MIT, Dieter did seminal work on collisional transport theory in tokamaks, including a classic review article with Steven Hirshman on the role of impurities. Collisional transport remained his interest even after his retirement and is the subject of the superb textbook *Collisional Transport in Magnetized Plasmas* (Cambridge U. Press, 2002), which he coauthored with Per Helander.

For the next nine years he worked at ORNL, where he became the associate head of theory. He returned to MIT in 1985, where he served at various times as head of theory, acting director, and deputy director of the Plasma Science and Fusion Center while maintaining his ties to the nuclear engineering department.

At ORNL and then as theory head at the PSFC, Dieter pursued his interest in the role of alpha particles in burning tokamak plasmas. He made important contributions to the understanding of collisional transport in tokamaks and the behavior of alpha particles in fusing plasmas. He incited the national and international fusion communities to focus their attention on stability and transport issues associated with fast particles, and he urged experimentalists to develop techniques for observing alpha-related phenomena.

During Dieter's tenure as acting director of the PSFC, he realized that the US edge-physics program needed strengthening because of the increasingly important role of the edge region and the need for a divertor at the edge of a tokamak reactor to handle the heat load. He responded by establishing a divertor physics program at the PSFC and subsequently was appointed by

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

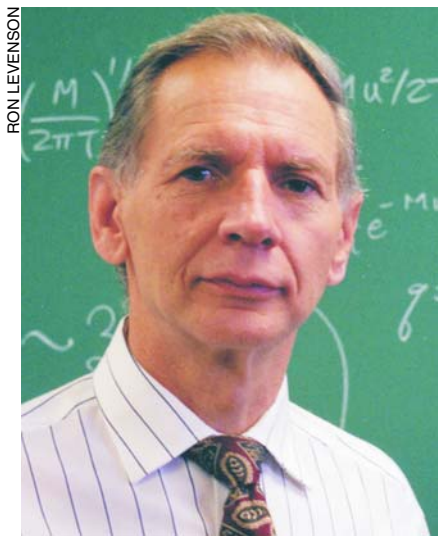
Philip Bartlett Smith	1923–15 December 2005
Wendell Gene Holladay	23 August 1925–9 December 2004
David Stephen Saxon	1920–8 December 2005
Gerald F. Tape	29 May 1915–20 November 2005
Alexandru A. Marin	25 June 1945–14 November 2005
Richard B. Dunn	14 December 1927–29 September 2005
Peder Gregers Hansen	11 January 1933–20 July 2005
Tatiana A. Germogenova	10 April 1930–27 February 2005
Edward Pollack	28 April 1931–11 February 2005

the US Department of Energy to head the US divertor task force. His work and the work of other members of that task force provided many new insights into our present understanding of divertor operation and developed important capabilities in the numerical modeling of divertors.

Both the alpha-particle and divertor research efforts at the PSFC led to productive collaborations in the international fusion community. Those research endeavors are now considered crucial aspects of the current US and world fusion programs as they head toward their goal of building ITER, the International Thermonuclear Experimental Reactor.

Dieter helped develop and maintain a superb theory program at MIT, one that has made many outstanding contributions to magnetic-fusion energy research, and he enhanced the visibility of the PSFC and its Alcator C-Mod experimental program in the international fusion community. Dieter retired from MIT in 2001 because of ill health. Upon his retirement, DOE recognized his efforts on behalf of magnetic fusion by presenting him with a Distinguished Associate Award.

Dieter was appointed A. O. Professor of Plasma Physics at the Techni-



RON LEVENSON

Dieter Joseph Sigmar

cal University of Vienna in 1981 and was elected a corresponding member of the Austrian Academy of Sciences in 1996. He established theory exchanges between MIT and both Chalmers University of Technology in Sweden and the Culham Laboratory in England, and he fostered US collaboration with Russian and Japanese scientists. As a result of his

pioneering work on alpha-particle theory, Dieter served on the deuterium-tritium program advisory committee of the Princeton Plasma Physics Laboratory's Tokamak Fusion Test Reactor and was a co-organizer of an international alpha-particle workshop. He served on many other DOE committees, including the theory coordinating committee and the US ITER steering committee. He was a member of the board of editors for the plasma physics journals *Nuclear Fusion* (10 years) and *Physics of Fluids* (4 years), and helped organize several national and international meetings.

While Dieter's many scientific contributions to fundamental plasma theory are well documented and heralded, his personal impact on shaping the intellectual lives of the next generation of plasma theorists was equally important. Dieter had an unsurpassed knack for arousing intellectual curiosity in his peers and the ability to passionately stimulate the pursuit of knowledge to achieve a deeper level of understanding. He was, at his core, a deeply caring individual. It was this dual aspect of his personality—a keen intellect tempered by a genuine concern for people—that made Dieter a unique

individual who will be deeply missed by all who were fortunate enough to have known and worked with him.

Peter Catto
Miklos Porkolab

*Massachusetts Institute of Technology
Cambridge*

Steve Hirshman

*Oak Ridge National Laboratory
Oak Ridge, Tennessee*

Paul Singer

Paul Singer, an Israeli theoretical particle physicist and an influential and farsighted advocate for the sciences in Israel, passed away on 22 February 2005 in Haifa, Israel, after a brief fight with cancer.

Born on 22 July 1934 in Roman, Romania, Paul immigrated to Israel after graduating from high school. He served in the Israeli army, in which he reached the rank of captain, and concurrently completed his first physics degree in 1956 at the Technion–Israel Institute of Technology in Haifa, Israel. After receiving his MSc in 1958, he obtained his DSc in 1961 in theoretical physics at the Technion under the supervision of Nathan Rosen, who coauthored the famous Einstein-Podolsky-Rosen (EPR) paper.

Paul spent the next two years at Northwestern University, working with Laurie Brown, and the following year at Columbia University, where he joined the group of the young Nobel laureate T. D. Lee. While he was at Northwestern, a light particle, the η meson, was discovered. To explain the high decay rates of the η and K mesons into three pions, Paul and

Brown postulated, in a 1964 paper, a light two-pion resonance state, the “Brown–Singer particle,” which was later named σ and then $f_0(600)$. That state remains the subject of theoretical and experimental studies.

In 1964 Paul joined the physics department at the Technion as an associate professor; he was promoted to full professor in 1969. One of the first elementary-particle physicists at the Technion, he was instrumental in building up both the particle-theory and experimental groups. From 1990 until his retirement in 2002 he held the Charles Wolfson Chair in Physics.

Paul’s research subjects included muon capture; rare radiative decays of light mesons; and K, D, and B mesons and their corresponding baryons, in the standard model and beyond. His papers with Eduardo Massó and Lars Bergström on the effect of the top quark in kaon decays were quite influential. A unique aspect of those collaborations was the combination of the other authors’ quantum chromodynamics approach for studying nonleptonic weak decays along with Paul’s deep knowledge of the pre-QCD methods. The so-called BMS parameter, named after Bergström, Massó, and Singer, is still used frequently by experimentalists to parameterize the K_L Dalitz decay. In recent years, Paul’s long and fruitful collaboration with Svjetlana Fajfer and her group yielded more than 20 papers on various aspects of rare D and B decays.

Paul was always keen on connecting theoretical results with experimental measurements. As soon as a calculation was completed, he was the first to study the feasibility of its measurement. In his most cited paper, written in 1987 with Nilendra Deshpande, one of us (Eilam), Peter Lo, and Josip Trampetić, Paul’s extensive understanding of radiative K decays—knowledge demonstrated in his papers with one of us (Moshe)—led to the use of radiative B decays for predicting the mass of the top quark. Paul was very proud of that prediction when the top was discovered in 1994 at Fermilab.

During Paul’s terms as chairman of the Technion physics department (1969–72 and 1974–76), research there flourished and expanded in condensed matter physics, particle physics, low-temperature physics, and other “hot” subjects. As the Technion’s vice president for academic development (1976–80) and as its senior vice president (1990–94), Paul led the institute to new heights in research and in teaching. He contributed to the

PAUL SINGER



Paul Singer

successful absorption of many students and scientists from the former Soviet Union and was instrumental in defining and executing a long-range program for the Technion.

His most important and influential positions were the chairmanships of the Israel Science Foundation (1995–2000) and of FIRST (*Bikura*)—Focal Initiatives in Research in Science and Technology (2002–05). Under his leadership, the ISF turned into the largest provider of funds to basic research in Israel. The ISF budget doubled to more than \$50 million per year, which led to an increase in both the number of grants and the funding per grant, and to a significant increase in the quality of research in all disciplines. Novel, innovative, interdisciplinary, and even risky subjects received support from the Bikura Foundation. As deputy chairman of the Israeli Directorate of the European Union’s fourth, fifth, and sixth framework programs for research, technological development, and demonstration (1997–2005), he advanced Israel’s standing in the European Union and thereby increased Israeli scientists’ share of EU support. In 2003 Paul was awarded the Rotary International Prize for Advancement of Higher Education in Israel. Despite all his assignments, his heart was always with physics and he continued to be active in research well after his retirement.

Paul was a person with great integrity, honesty, humor, and wisdom. We sorely miss a true friend, colleague, mentor, and collaborator.

Gad Eilam
Michael Gronau
Moshe Moshe

*Technion–Israel Institute of Technology
Haifa*

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