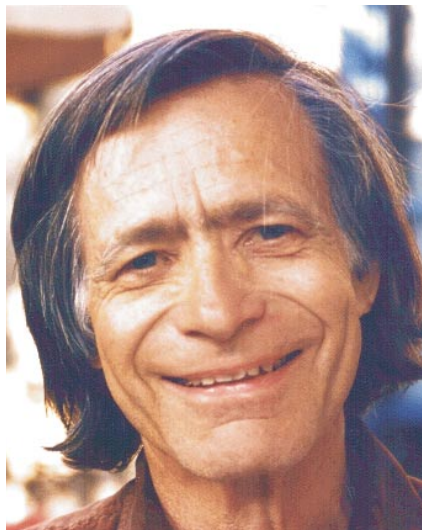


Dirac Medal Honors Work in Turbulence

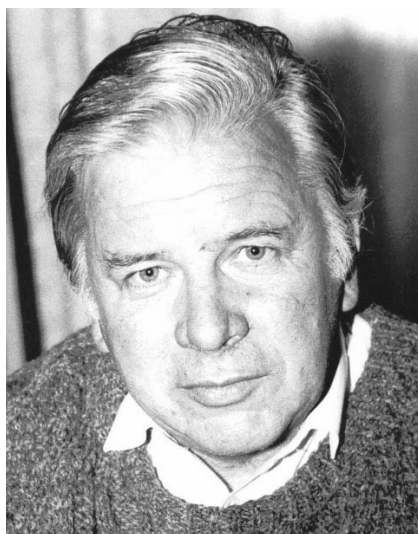
To mark the occasion of P.A.M. Dirac's birthday on 8 August, the Abdus Salam International Centre for Theoretical Physics in Trieste, Italy, awards the Dirac Medal annually on that date to recognize contributions to theoretical physics and mathematics. This year, the ICTP honored **Robert H. Kraichnan** and **Vladimir E. Zakharov**. The pair share the prize for their "distinct contributions to the theory of turbulence, particularly the exact results and the prediction of inverse cascades, and for identifying classes of turbulence problems for which in-depth understanding has been achieved," says the ICTP.

Kraichnan, who has been a research agency grantee and a consultant to a variety of organizations since 1962, has done "pioneering research on field-theoretic approaches to turbulence and other non-equilibrium systems," according to the ICTP. In par-



Kraichnan

ticular, he has predicted the inverse energy cascade and forward enstrophy cascade in two-dimensional turbulence. He developed soluble, self-consistent dynamical models that shared invariances and conservation properties with the Navier-Stokes equation and gave quantitatively good predictions of low-order turbulence statistics. Central to this work is the direct-interaction approximation model. Kraichnan also introduced the "rapid change" model of advection of a scalar field by a random velocity field. For



Zakharov

the first time in a turbulence-related problem, the model exhibited anomalous scaling that could be demonstrated analytically.

Zakharov, who directed the Russian Federation's Landau Institute for Theoretical Physics in Moscow until this past June, has contributed to a deeper understanding of weak turbulence, which has broad physical applications to the theory of wind-driven waves in the ocean, to wave turbulence in the solar corona, and to the kinetics of Bose-Einstein condensation. His achievements include "putting the theory of wave turbulence on a firm mathematical ground by finding turbulence spectra as exact solutions and solving the stability problem, and in introducing the notion of inverse and dual cascades in wave turbulence," says the ICTP. Zakharov is a professor of mathematics at the University of Arizona, Tucson.

The two medalists each received a \$5000 cash prize.

EPS Recognizes Efforts in Particle Physics

The high-energy particle physics division of the European Physical Society honored several people in July at the International Europhysics Conference on High Energy Physics in Aachen, Germany.

David Gross, **David Politzer**, and **Frank Wilczek** shared the 2003 High Energy and Particle Physics Prize for their "fundamental contributions to quantum chromodynamics,

the theory of the strong interactions." The citation went on to say, "By demonstrating that the theory is asymptotically free, that the couplings become weak at large momentum transfers, they paved the way for showing that the theory is correct." Gross is the Frederick W. Gluck Professor of Theoretical Physics and director of the Kavli Institute for Theoretical Physics at the University of California, Santa Barbara. Politzer is a professor of theoretical physics at Caltech and Wilczek is the Herman Feshbach Professor of Physics at MIT.

Guillaume Unal, a researcher at Laboratoire de l'Accélérateur Linéaire (LAL) in Orsay, France, received the Young Physicist Prize for his "contribution to the analysis of NA48 data [from the CERN Super Proton Synchrotron], whereby direct *CP* violation in *K* decays was established."

The Gribov Medal went to **Nima Arkani-Hamed** for his "original approaches to hierarchy problems in the theories of fundamental interactions. In particular, [he considered] the possibility of large extra dimensions where only gravity can propagate and [explored] its broad phenomenological implications." Arkani-Hamed is a professor of physics at Harvard University.

The Outreach Prize was awarded to **Rolf Landua** and **Nicholas D. Tracas**. According to the EPS, Landua, a research physicist at CERN, "has very efficiently collaborated, on a voluntary basis, in most of the education activities of the Education and Technology Transfer division (ETT) at CERN." Tracas was cited in part for "promoting the public image of physics in Greece, in particular through programs for high school teachers." He is an associate professor of physics in the School of Applied Sciences of the National Technical University in Athens, Greece.

Recipients of Highest US Civilian Honor Include Teller

President Bush awarded the Presidential Medal of Freedom to 11 individuals, among them physicist **Edward Teller**, who was honored for his lifetime achievements. Medals were bestowed during a ceremony on 23 July at the White House.



Teller

According to the citation, Teller, who was born in 1908 in Budapest, Hungary, left Europe “to escape the rise of Nazi Germany. After arriving in America, he established himself as a premier physicist. His work on national defense projects such as the Manhattan Project and the Strategic Defense Initiative helped protect our Nation and bring about the end of the Cold War.”

“In my long life,” said Teller, “I had to face some difficult decisions and found myself often in doubt whether I acted the right way. Thus the medal is a great blessing for me.”

For the past 28 years, Teller was a consultant to the Lawrence Livermore National Laboratory, where he was a director emeritus. He also was a senior research fellow at Stanford University’s Hoover Institution on War, Revolution and Peace.

Teller died at his home in Palo Alto, California, on 9 September.

In Brief

The United Kingdom Atomic Energy Authority gave the nod to **Chris Llewellyn Smith** to direct its Culham division, located near Abingdon, England. A senior research fellow in physics at Oxford University, Llewellyn Smith took his post on 8 September. He succeeds **Derek Robinson**, who died in December 2002.

The University of California, Santa Cruz, has added a new faculty member. In July, **Sriram Shastry** joined the university as a professor of physics. He previously had been a professor of physics at the Indian Institute of Science in Bangalore, India.

At the Third International Conference on Inertial Fusion Sciences and Applications in Monterey, California, last month, the American Nuclear Society bestowed its 2003 Edward Teller Medal on two recipients: **Larry Suter** and **Hideaki Takabe**. Suter was cited for his “seminal work on almost all aspects of laser hohlraum physics.” He is the associate program leader for inertial confinement fusion theory and design at Lawrence Livermore National Laboratory. Takabe, who is a professor in

the Institute of Laser Energetics at Osaka University in Japan, was acknowledged for his “pioneering work on laser–plasma interactions, atomic physics, and hydrodynamic instabilities of laser implosions.”

After 16 years as director of the Russian-based Ioffe Physico-Technical Institute, **Zhores Alferov** stepped down in June to become the institute’s scientific supervisor. **Andrei Zabrodskii**, former deputy director of the institute, is the new director.

Joe Kilkenny became manager of the General Atomics inertial fusion

technology division in La Jolla, California, in June. Formerly a senior physicist at Lawrence Livermore National Laboratory, Kilkenny replaced **Jill Dahlburg**, who is now a senior scientist for science applications at the Naval Research Laboratory in Washington, DC.

The Pennsylvania State University’s physics department has added two new assistant professors to its ranks. **Alejandro Perez** joined the faculty in August and **Réka Albert** became a faculty member in June.

Obituaries

Olli V. Lounasmaa

Olli V. Lounasmaa, a pioneer of ultra-low-temperature physics and engineering, died on 27 December 2002 while swimming in the Arabian Sea on his vacation trip to the Indian state of Goa.

Born on 20 August 1930 in Turku, Finland, Olli received his master’s degree in experimental physics from Helsinki University in 1953. He continued his studies in the Clarendon Laboratory at Oxford University. His PhD project, under the supervision of Ron Hill, was to measure the thermodynamic properties of liquid helium-4 between 1.5 and 20 K. At Clarendon, he learned about and adopted the visions of such celebrated low-temperature physicists as Francis Simon, the head of the lab, and Nicolas Kurti, the pioneer of nuclear cooling, and discovered the importance of the in-depth theoretical support supplied by Brebis Bleaney and Roger Elliott. In those days, the supply of liquid hydrogen for precooling purposes was the principal bottleneck that forced different groups to take turns cooling down their experiments. Olli demonstrated his organizational skills among the graduate students by becoming the self-styled clearing agent for the liquid hydrogen supply.

After graduating in 1958, Olli gained further international experience as a postdoctoral researcher at the Argonne National Laboratory from 1960 to 1964. Under the leadership of Oliver Simpson, Olli constructed one of the first liquid helium-3 evaporation refrigerators and launched a series of specific-heat studies on rare earth metals down to a temperature of 0.4 K.

In 1965, Olli was appointed professor of technical physics at the Helsinki University of Technology. In



Olli V. Lounasmaa

the 1960s, academic research in Finland enjoyed improved funding. Combined with a good supply of bright students, Olli started an ambitious and energetic research program of the then lowest temperature regimes by focusing first on refrigeration and measuring techniques. He developed adiabatic demagnetization cooling, $^3\text{He}/^4\text{He}$ dilution refrigeration, nuclear cooling, and the adiabatic compression of liquid ^3He , known as Pomeranchuk cooling. It is from this work that nuclear cooling, performed with a powerful superconducting magnet and reliable precooling with $^3\text{He}/^4\text{He}$ dilution refrigeration, became the accepted technique in cryogenics. With his managerial skills and straightforward no-nonsense attitude, he built his low-temperature laboratory in 10 years from nothing to an international center—a task that serves as a model for science management.

Olli organized and hosted the 14th International Conference on Low-