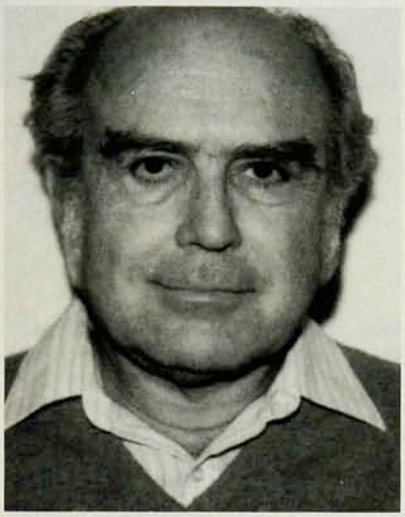
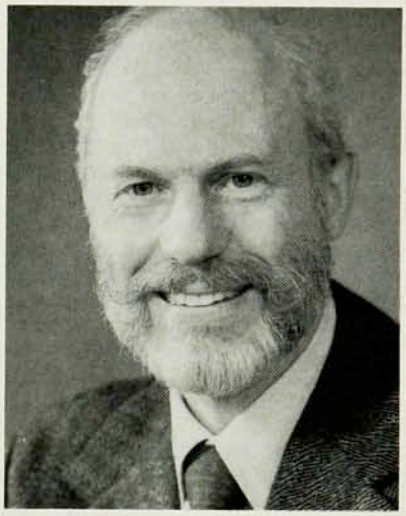
# BRUNO ZUMINO AND BRYCE DEWITT RECEIVE DIRAC MEDALS

The International Centre for Theoretical Physics in Trieste, Italy, has named Bruno Zumino (University of California, Berkeley) and Bryce S. DeWitt (University of Texas, Austin) to receive the 1987 Paul A. M. Dirac Medals.

Zumino was honored as one of the "leading experts" in field theory over the last 25 years. He received his doctorate in mathematical sciences from the University of Rome in 1945. He became a research associate at New York University in 1951, was named a full professor in 1960 and served as head of the physics department from 1961 to 1969. In 1969 he went to CERN, where he served as director of the theory division for 1970–73. Zumino went to Berkeley in 1981 as a professor of physics. In collaboration with Julius Wess (University of Karlsruhe, FRG) he contributed fundamentally to the study of chiral anomalies in gauge theories with fermions and formulated a four-dimensional supersymmetry—in particular, the first renormalizable Lagrangian field theories to realize supersymmetry in four-dimensional space–time. In 1976 Zumino and Stanley Deser (Brandeis University) constructed one of the first supergravity theories in four dimensions. In addition, Zumino has worked on applications of Kähler geometry in extended supergravities and of differential geometric methods in the study of anomalies.



Bruno Zumino



Bryce S. DeWitt

DeWitt was cited for his "fundamental contributions to the study of classical and quantum gravity and non-Abelian gauge theory." DeWitt received his BS (1943), MA (1947) and PhD (1950) from Harvard University. He was a Fulbright Fellow at the Tata Institute for Fundamental Research (Bombay, India) in 1951–52 before becoming senior physicist in the Radiation Laboratory of the University of California (Berkeley and Livermore) in 1952. In 1956 he became a research professor of physics at the University of North Carolina (Chapel Hill); he served as director of the university's Institute for Field Physics. He went to the University of Texas in 1972 as professor of physics and director of the university's Center for Relativity. In 1986 he became the Jane and Roland Blumberg Professor of Physics. DeWitt was one of the pioneers of the quantum effective action; he invented the background field method; and he helped develop the methodology of ghost loops in gauge theory. In addition, he did work that led to the development of the Wheeler–DeWitt equation, which underlies much work in quantum cosmology, and the Schwinger–DeWitt equation, which finds application in string theory calculations and field theory in curved space–time.

# DOE HONORS SIX PHYSICISTS WITH 1987 LAWRENCE AWARDS

The Department of Energy in July honored six physicists with E. O. Lawrence Awards, which are intended to recognize outstanding contributions in science and engineering related to atomic energy. Each award consists of a citation, a gold medal and a $10 000 prize.

James W. Gordon (Los Alamos National Laboratory) was cited for "his outstanding innovations in the design and development of nuclear weapons with tailored effects, and for his broad achievements in the study of nuclear weapons effects and vulnerability." Gordon received his BS (1961) and PhD (1968) from the University of Kansas. He was a member of the technical staff at Kaman Sciences (Colorado Springs, Colorado) from 1968 until 1974, when he became a member of the Los Alamos staff. In June 1985 he became leader of the thermonuclear applications group. Gordon has made many contributions to national defense, including the analysis of nuclear weapon designs and weapon systems, and the development of accurate, efficient computer codes for studying weapon effects. He

has studied weapon systems of potential adversaries to assess their effect on US national security and their vulnerability to US weapon systems.

Miklos Gyulassy (Lawrence Berkeley Laboratory) was honored for "his leadership in developing theory of direct experimental relevance, especially the use of hydrodynamics to describe matter flowing in relativistic heavy ion collisions, and for his studies of pion interferometry." He received his AB (1970) and PhD (1974) from the University of California at Berkeley. After holding a postdoctoral position at the University of Frankfurt (1974–76), he became a member of the Lawrence Berkeley staff in 1976. Gyulassy has been senior staff scientist in the nuclear science division there since 1981. He was cited for his work in 1979 on using pion interferometry to determine the time and length scales involved in relativistic nuclear collisions and for his analysis of the degree to which nuclei exhibit hydrodynamic flow at Bevalac energies. Recent observations of nuclear flow at Lawrence Berkeley have provided the first experimental constraints on the equation of state of dense nuclear matter.

Sung-Hou Kim (University of California at Berkeley, and Lawrence Berkeley Lab) was recognized for "his important contributions to the field of structure determination of biological macromolecules and macromolecular complexes." Kim received his BS (1960) and MS (1962) from Seoul National University, and his PhD (1966) from the University of Pittsburgh. He was a research staff member in the MIT biology department from 1966 until 1972, when he became a professor of biochemistry at Duke University. He went to Berkeley as professor of chemistry in 1978, and since 1979 has concurrently served as Faculty Senior Scientist in the Lawrence Berkeley chemical biodynamics division. Kim has applied x-ray diffraction techniques to the study of protein and nucleic acid structures and interactions. In 1973 he solved the atomic structure of the phenylalanine transfer RNA molecule of yeast, and he later proposed molecular models for DNA damaged by chemicals and ultraviolet light. He and his group recently determined the first structure of an oncogene product, the protein made by the *ras* gene.

James Kinsey (MIT) was honored for "his application of spectroscopic methods to the study of molecules in the process of dissociating, which provides both a dynamic and a structural picture of chemical reactions." Kinsey received his BS (1956) and his PhD (1959) from Rice University. He held postdoctoral positions at the University of Uppsala, Sweden, and at the University of California at Berkeley from 1959 until 1962, when he joined the MIT chemistry faculty. He served as chairman of the department from 1977 to 1982; in January 1988 he will become dean of natural sciences at Rice. Kinsey's cited achievement resulted from his realizing that spectra taken from molecules in the process of dissociating could provide dynamical as well as structural information. In addition, he invented Fourier transform Doppler spectroscopy, and he pioneered the use of laser-induced fluorescence to study the reaction center and to measure the internal state distribution of molecules formed by interacting beams.

J. Robert Merriman (Oak Ridge National Laboratory) was honored for "his outstanding technical contributions and leadership in the field of uranium enrichment and fuel cycles, particularly his development of the fluorocarbon absorption process, improvements to gaseous diffusion technology, and the development of the advanced gas centrifuge and the atomic vapor laser isotope separation processes." He holds a BE from Vanderbilt University (1963) and an MS (1966) and PhD (1975) in chemical engineering from the University of Tennessee. Merriman has worked in uranium isotope separation at Oak Ridge since 1963, initially under the Union Carbide program and later with Martin Marietta. He was vice president of Marietta's Enrichment Business Services until his appointment in 1987 as associate director of nuclear and engineering technologies at ORNL.

David Moncton (Exxon Research and Engineering, Annandale, New Jersey) was cited for "the development of high-resolution synchrotron x-ray scattering techniques and their applications to diverse materials systems." Moncton received his MS (1973) and PhD (1975) from MIT. He was at Bell Laboratories from 1975 to 1981, and at Brookhaven National Laboratory from 1982 to 1985, when he joined Exxon as senior research associate. This year he is also serving as interim associate director of Argonne National Laboratory, with responsibility for the proposed 7-GeV Advanced Photon Source. Moncton and George Brown (Stanford Synchrotron Radiation Laboratory) designed and built a high-resolution x-ray diffraction system in 1980. With it Moncton and his collaborators performed a series of experiments that could not be done with normal x-ray sources, such as studies of the structure and melting of freestanding liquid crystal films. (See PHYSICS TODAY, March 1985, page 68.) In addition, he and his coworkers have extensively studied monolayer films physisorbed on graphite; more recently Moncton's studies of magnetic x-ray scattering have led to a revision of models of the structure of incommensurate rare earth magnets.

**Recipients of the Lawrence Award** were honored at a ceremony in July. Pictured in the front row, from left to right, are Sung-Hou Kim, Secretary of Energy John Herrington, James Gordon and J. Robert Merriman. In the back row, from left to right are James Decker, acting director of the DOE Office of Energy Research, James Kinsey, Miklos Gyulassy and David Moncton.