

DOE bestows Fermi awards on Courant and Livingston

The US Department of Energy last December honored Ernest D. Courant (Brookhaven National Laboratory) and the late Stanley Livingston with Fermi Awards for their contributions to the physics and design of particle accelerators. The Enrico Fermi Award is the highest scientific award given by DOE, and includes a Presidential citation, a gold medal and \$100 000 for each recipient.

Courant was cited for "his many contributions over more than three decades to the physics of acceleration of charged particles, including his role in the invention of alternating gradient focusing, which is the essential mechanism of strong focusing now used in accelerators of the highest energies, and for his many studies of beam interactions and instabilities that have been of critical importance in accelerator design." Courant received his BA (1940) from Swarthmore College, and his MS (1942) and PhD (1943) from the University of Rochester. After working for some time on reactor theory in



COURANT

Montreal and Chalk River, Canada, and at Cornell University (1946-48), he went to Brookhaven National Laboratory in 1947. He initially studied theoretical aspects of the Cosmotron, a

proton synchrotron whose design and construction was led by Livingston. Courant developed theories of the growth of and loss in particle beams, and particle orbits. At Livingston's suggestion he began studies that showed that alternating gradients of an appropriate magnitude could form the basis of a new and much stronger particle-beam focusing system. Courant has taught at the University of Cambridge, Yale University, Princeton University and the State University of New York at Stony Brook. He is now senior physicist at Brookhaven.

Livingston, who died on 26 August 1986, was cited for "his leadership contributions to the development of nuclear accelerators over a half-century, from his involvement in the designing of the first cyclotrons to his role in the discovery of strong (alternating gradient) focusing, now used throughout the world for the design of nuclear accelerators and particle beams of the highest energies." (See page 88).

American Geophysical Union honored eight in 1986

The American Geophysical Union last year honored several individuals for their contributions to geophysics and related fields.

James C. I. Dooe received the 1986 Bowie Medal, the highest award bestowed by the union for having "broken new ground in mathematical hydrology and in the development of scientific programs and cooperation." He received his undergraduate degree from University College Dublin (1942) in science and civil engineering, and master's degrees from the National University of Ireland (1952) in civil engineering and from the University of Iowa (1956) in fluid mechanics and hydraulics. Dooe held several engineering positions with the Irish government (1942-1958), and he served four elected terms in the Irish Senate (1961-77). He was a professor of civil engineering at

University College Cork from 1958 until 1970 when he became a professor of civil engineering at Dublin. Throughout his career Dooe has pursued two lines of research: He has worked extensively on unsteady flow in open channels, recently extending his results to channels of arbitrary shape and to arbitrary friction laws. In addition he has made fundamental contributions to a systems approach to hydrology, including a mathematical formulation of the unit hydrograph (the response of a drainage basin to a unit impulse of rain), models of surface water runoff and groundwater problems, and work on a linear theory of hydrologic systems. He has participated in many international scientific organizations. Dooe retired from Dublin in 1986.

George E. Backus (Scripps Institu-

tion of Oceanography) received the 1986 Fleming Medal for his "important, original contributions to mathematical geophysics." He received his BS (1948), MS (1950) and PhD (1956) from the University of Chicago. He worked on Project Matterhorn at Princeton University (1957-58) and taught mathematics at the Massachusetts Institute of Technology (1958-60) before becoming an associate professor of geophysics at the University of California at San Diego, where he was named full professor in 1962. Backus went to Scripps in 1960. In 1957 he and Arvid Herzenberg (then at the University of Manchester, now at Yale) independently confirmed Walter M. Elsasser's hypothesis that a fluid sphere could undergo dynamo action if its axisymmetry were broken, an important result for geomagnetic dynamo theory.