KLEMPERER

"significant impact on the scientific understanding of the subtle forces in molecules." Using analytical techniques such as molecular beam spectroscopy, the former Harvard professor has been able to determine the structural details of many important molecules and how electrical properties determine molecular behavior. His most recent investigations, for example, involve the formation mechanisms of molecules in interstellar space—a subject of great cosmological interest.

Klemperer received an AB from Harvard University in 1950 and a doctorate from the University of California, Berkeley in 1954. He had been on the Harvard faculty since 1954 and had been a full professor of chemistry since 1965.

The award, given once every two years by the ACS, was established by the GE Foundation in 1964. Its purpose is "to recognize and encourage outstanding interdisciplinary research in chemistry and physics, in the spirit of Irving Langmuir."

Franklin Institute honors scientists

The Franklin Institute honored eleven scientists and educators for their outstanding scientific and technical achievements at its annual Medal Day in October. Among those recognized were:

▸ Steven Weinberg, Higgins Professor of Physics, Harvard University. He received the Eliot Cresson Medal for his efforts in the development of a unified theory of weak and electromagnetic interaction (in addition to the 1979 Nobel Prize in Physics, see this issue, page 17) and for his contributions to other physical theories.

▸ Richard J. Whitcomb, head of the Transonic Aerodynamics Branch of Langley Research Center, Hampton, Virginia. The Howard N. Potts Medal went to Whitcomb for "his outstanding and innovative contributions to transonic flight." He discovered and verified the "area rule," a revolutionary method for the design of aircraft with reduced drag and increased speed.

▸ Elias Burstein, professor of physics, University of Pennsylvania. Burstein was awarded the John Price Wetherill Medal for his work on the optical properties of solids and their applications in photoconductive technology. He holds the basic patents on extrinsic silicon and germanium infrared detectors.

▸ Benjamin Abeles, senior research associate at Exxon Research and Engineering Company, Linden, N.J. and George D. Cody, group head at the same facility. The pair shared the Stuart Ballantine Medal for their research on thermal conduction in semiconductors and for their development of certain germanium-silicon alloys, materials used in thermoelectric power generators.

▸ Richard G. Brewer, IBM Fellow at IBM Corporation, San Jose, California. The Albert A. Michelson Medal was presented to Brewer "for his many discoveries and contributions to laser physics in the area of nonlinear interaction of intense laser light with molecules." Very precise molecular spectroscopic measurements using nonlinear laser effects, the discovery of stimulated Brillouin scattering in liquids and versatile optical frequency switching techniques for the observation of optical coherence effects in materials are among Brewer's achievements.

Winterberg is Hermann Oberth Gold Medalist

This year's Hermann Oberth Gold Medal has been awarded to Friedwardt Winterberg, research professor at the University of Nevada Desert Research Institute. The Hermann Oberth–Wernher von Braun International Foundation for Space Flight, which presents the gold medal annually, recognized Winterberg for his achievements in the field of thermonuclear propulsion.

Winterberg received an MS from the University of Frankfurt in 1953 and a doctoral degree in nuclear physics from the University of Göttingen in 1955. From 1955 to 1959, he was group leader for theoretical physics at the research reactor in Hamburg, Federal Republic of Germany. In 1959 he became an assistant professor at Case Institute of Technology, and he joined the faculty of the University of Nevada Desert Research Institute four years later.

Winterberg did pioneering work on inertial-confinement fusion more than 15 years ago. He first proposed what is today known as "impact fusion" (fusion achieved through acceleration of macroparticles at fuel targets) in 1963. He

WINTERBERG

contributed the first ideas for starting small thermonuclear reactions with intense electron and ion beams. Beginning in the 1960's, Winterberg showed that thermonuclear microexplosion concepts together with a superconducting magnetic reflector might lead to a good space propulsion system. This idea was used by the British Interplanetary Society in their "Project Daedalus Study," a proposal to send a probe to Barnard's star.

Fowler and Schmidt get astronomy prizes

The Astronomical Society of the Pacific has recently conferred two awards. William A. Fowler, Institute Professor of Physics at Caltech, has won the 1979 Catherine Wolfe Bruce Gold Medal, and Gary D. Schmidt, a postdoctoral researcher at Lick Observatory, received this year's Robert J. Trumpler Award. The Bruce Gold Medal was established in 1898 to recognize distinguished service to astronomy. The Trumpler Award has been presented since 1956 to a recent PhD recipient whose research is "considered unusually important to astronomy." It carries with it a stipend of $500.

Fowler's research has included studies of the origins of the elements, specifically the production of deuterium and helium in the "big bang" and in massive objects. He has also investigated the release of gravitational and nuclear energy from massive objects. Fowler took his doctorate from Caltech in 1936 and joined the faculty in the same year. In 1970, he was chosen the first holder of the Institute Professorship of Physics at Caltech, an endowed chair. He served as president of The American Physical Society in 1976.

Schmidt was honored for his development of a technique to photoelectrically map polarized radiation emitted by galaxies and galactic nebulae. Schmidt received his PhD from the University of Arizona at Tucson.

INSTITUTE FOR THEORETICAL PHYSICS
Future Programs

Programs: During 1980–81 the Institute for Theoretical Physics will have programs in the following areas:
(1) Gauge Field Theories (F. Wilczek*; September 1980–June 1981**). General aspects of gauge theories emphasizing questions of unification, dynamical calculations of symmetry breaking, and gravity.
(2) Valence Fluctuations in Solids (L. Falicov*/W. Hanke*, B. Maple*; July 1980–December 1980**). Fluctuating electronic occupations between f-shells and d-bands; related electron-lattice effects; applications of renormalization group techniques.
(3) The Early Universe (J. Hartle* and G. Steigman*; January 1981–June 1981**). The interaction of particle physics, gravitational physics and cosmology.
(4) Interactions of Nuclei at Medium and High Energies (G. Bertsch*; January 1981–July 1981**). The program will emphasize the application of fermi liquid theory to heavy ion collisions, the consequences of phase transitions at high density and the application of recent models of hadronic interactions.
(5) Nonequilibrium Processes (P. Hohenberg* and J. Langer*; June 1981–August 1982**). Kinetics of phase transitions, hydrodynamic instabilities, instabilities and pattern formation, mathematical methods and problems.
The Institute attempts to foster interdisciplinary approaches within each program and to maximize interactions between different programs.

Workshops: The Institute will hold the following workshops in 1979/80: (1) Polymer Physics (P. Pincus* and J. R. Schrieffer*; January 21–25, 1980**). (2) Lattice Gauge Theories (J. Kogut*; July 28–Aug. 1, 1980**). The workshops will be limited to 30 participants.

Conference: There will be a conference on Stellar Collapse, Supernovae and Pulsar Formation (May 5–8, 1980). Participation will be limited to 150.

The Institute also will have a limited number of postdoctoral openings and a small number of positions for visitors not attached to the above programs.

Physicists wishing to participate in any of the Institute's activities should write to

Professor Walter Kohn, Director
Institute for Theoretical Physics
University of California, Santa Barbara, CA 93106

The Institute has limited funds available for the support of visitors. Where possible, participants are asked to contribute support from their own sources.

* Coordinators ** Approximate dates

The University of California, Santa Barbara is an Equal Opportunity/Affirmative Action Employer.

Conference on the Chemistry and Physics of Coal Utilization

WEST VIRGINIA UNIVERSITY JUNE 2-4, 1980

—Physics and chemistry phenomena of coal utilization.
—Chemistry and physics of coal.
—Possibilities for new science to improve technology.

INVITED LECTURES, PANEL DISCUSSIONS, CONTRIBUTIONS FROM ATTENDEES.

PROGRAM COMMITTEE

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Circle No. 37 on Reader Service Card

we hear that

Former president of the Marine Colloids Division of FMC Corporation, **Harris J. Bixler,** has been named president of Avco Everett Research Laboratory, Inc.

Nobel laureate **J. Robert Schrieffer,** formerly of the University of Pennsylvania, has joined the University of California, Santa Barbara as a full professor. Also appointed full professor was **Guenter Ahlers,** who had previously worked at Bell Laboratories, Murray Hill, N.J.

The Korean Physical Society presented **Akira Isihara,** chairman of the Department of Physics and Astronomy at the State University of New York at Buffalo, with a plaque honoring his development of a Feynman diagram method in statistical mechanics.

Phillip F. Schewe, formerly of Brookhaven National Laboratory, has taken a position as science writer at the AIP Public Information Division.

Norm Brown, an optical engineer at the Lawrence Livermore Laboratory, has won the Rudolph Kingslake Award of the Society of Photo-Optical Instrumentation Engineers. Brown received a medal and a $1000 prize for developing a new method to calculate the shape of aspheric lenses and mirrors.

The Canadian Association of Physicists has installed this year's executive officers. **P. A. Forsyth** of the University of Western Ontario is serving as the new president while **C. C. Costain** of the Canadian National Research Council has succeeded to Forsyth's old post as vice-president. The new vice-president elect is **Paul Marmet** of the Université Laval. **Allan C. McNamara** of the Canadian National Research Council has been chosen secretary-treasurer for 1979–80.

Two theoretical chemists have joined the faculty of the University of Texas. **Henry F. Schaefer III,** formerly at the University of California, Berkeley, is now the W. T. Doherty Professor of Chemistry and the director of the new Institute of Theoretical Chemistry. **Peter J. Rossky,** recently of the State University of New York at Stony Brook, has accepted a position as assistant professor of chemistry.

James M. Lafferty, manager of the Power Electronics Laboratory at the GE Research and Development Center, Schenectady, N.Y., has won the 1979 Lamme Medal of the IEEE. He was cited "for contributions to thermionic emitters and to high-vacuum technology as applied to high-power vacuum switches."

Chia-Wei Woo, chairman and professor of the Department of Physics and Astronomy at Northwestern University has become provost of Revelle College of the University of California, San Diego.

The following physicists have been elected officers and members of council of the Institute of Physics (UK): vice president, **John Goddard** (City of London Polytechnic); treasurer, **John M. A. Lenihan** (Western Regional Hospital Board); secretary, **Edwin R. Dobbs** (University of Lancaster); members of council, **P. K. Carroll** (University College, Dublin), **Peter T. Landsberg** (University of Southampton), **Sir Ieuan Maddock** (British Association for the Advancement of Science, London).

obituaries

Sin-itiro Tomonaga

TOMONAGA

Sin-itiro Tomonaga, recipient of the Nobel Prize for Physics in 1965, died on 8 July 1979. He completed a relativistically invariant formulation of quantum field theory during World War II and applied it to the renormalization theory of quantum electrodynamics right after the war. His memory will remain in many hearts not only because of his scientific achievements but also of his unique personality and good sense of humor.

He was born in Tokyo in 1906 and moved to Kyoto in 1913, when his father was appointed as professor of philosophy at Kyoto University. He entered the Third High School in 1924 and then Kyoto Imperial University in 1926, where he met Hideki Yukawa taking the same classes. After graduating from the university in 1929, he continued his study of quantum mechanics in the same office as Yukawa. Few senior physicists in Kyoto taught them modern physics, so they drew inspiration from visiting lecturers such as Yoshio Nishina.

In 1932 Tomonaga was invited to join Nishina's laboratory at the Institute of Physico-Chemical Research in Tokyo. Nishina and Tomonaga became interested in the positron; then between 1933 and 1935 they discovered and worked on pair creation and annihilation together with a few young associates, Shoichi Sakata, Hiedehiko Tamaki and Minoru Kobayasi.

In 1937 Tomonaga joined Heisenberg's group in Leipzig. There he worked on nuclear matter and attended seminars on cosmic rays. In 1941 he was appointed professor at Tokyo Bunrika University, which was reorganized in 1949 as Tokyo University of Education.

From 1939 through 1943 Japanese elementary-particle physicists were seriously concerned with the discrepancy between the meson proposed by Yukawa and that observed in cosmic rays. Tomonaga, together with Gentaro Araki, demonstrated that negative mesons stopping in dense matter would have to be captured by nuclei, whereas positive mesons should decay. This stimulated experiments measuring the decay of stopped mesons and led Marcello Conversi, E. Pancini and Oreste Piccioni to discover the decay of negative mesons stopped in graphite. He also developed an intermediate coupling approximation in which a large inertial mass reduces the cross section for meson–nucleon scattering. One can see that the inertial-mass term would imply the concept of mass renormalization.

During the war Tomonaga's creativity was further developed. Motivated by Yukawa's conjecture that a relativistically invariant formalism would require a boundary-value problem in the four-dimensional space–time, he developed a covariant formulation of quantum field theory. While performing research for the Japanese Navy he made contributions to a theory of magnetron oscillations and the S-matrix formalism of microwave circuits. The Japan Academy of Science awarded him and Masao Kontani the Academy Prize for the theory of magnetrons.

After the war he and his young associates started a research program to extend the covariant field theory and achieved the renormalization of the theory. During the period of Tomonaga's greatest scientific activity, both living and research conditions in Japan were in the poorest state. Towards the end of the war, he was subjected to air raids, and after the war he lived in one ruined room with his sick wife and three little children. Despite such hardships, he never tired in