

we hear that

sound reproduction, electronic music and speech synthesis, and his service to the Society." The presentation takes place at the Society's May meeting.

Olson was educated at the University of Iowa; he received a BE in 1924, an MS in 1925 and, for experiments on resonance radiation of atoms and on the reflections of atoms from crystal, a PhD in 1928. After two years at the University of Iowa as a physics assistant, he started his career at RCA. From 1930 to 1932 he worked in the company's Photophone Division. In 1932 he became the head of the Acoustic Research Lab in Camden, N.J. Ten years later he moved to a new facility of his design in Princeton, the Acoustic and Electromechanical Lab. From 1966 until his retirement in 1968, he was vice-president in charge of acoustics and electromechanical research.

In the Photophone Division he developed bidirectional velocity and unidirectional cardioid microphones for use in movies. At the same time, he made advances in developing loudspeakers for almost every conceivable application.

During World War II Olson worked on voice communication transducers for use in noisy environments and on underwater transducers operating at frequencies as high as 60 MHz for antisubmarine warfare.

After the war, Olson turned his attention to audio equipment for broadcasting and recording studios and for sound reproduction systems. He demonstrated in a classic experiment that listeners preferred a wider range of sound than they got with the high-frequency cutoff of 5000 Hz that earlier work had established. Olson, with Herbert Belar, created the RCA Electronic Music Synthesizer. Using primitive digital control and analog techniques, the synthesizer could pro-

duce any audio signal that could be conceived and specified by an operator. It became the fundamental instrument of electronic music. Olson also helped develop videotape recording technology and worked on tape coatings.

Olson wrote books on acoustic engineering that have long been standard reference works throughout the world. He served the Acoustic Society as associate editor of its *Journal* for 30 years and as its vice-president and president.

Harvey Mudd bestows 1981 Wright Prize on Luis Alvarez

Harvey Mudd College awarded the 1981 Wright Prize for interdisciplinary scientific accomplishments to Luis W. Alvarez. Alvarez, Nobel laureate and professor emeritus of physics at Berkeley, has received \$20 000, delivered a public lecture, and conducted seminars for students during three days.

Alvarez was educated at the University of Chicago (BS, 1932; PhD in physics, 1936). He has taught at Berkeley since 1938 and has been associate director of the Lawrence Berkeley Lab during the years 1954-59 and 1976-78.

In the 1950s Alvarez and his group made possible the discovery of scores of fundamental particles by their development of large-scale liquid-hydrogen bubble chambers, their invention of semiautomatic track-measuring equipment, and their introduction of programming procedures for computers to reduce track data to physically meaningful form.

Alvarez has made important contributions in many other areas of physics. He was codiscoverer of the east-west effect in cosmic rays, demonstrated orbital electron capture by nuclei, collaborated in building the first proton linear accelerator based on the use of

cavity resonators, and developed the ground-controlled-approach blind landing system, which uses microwave radar.

Last year he theorized that the sudden extinction of dinosaurs resulted from the collision of an asteroid with Earth. Discovering the consistent presence of iridium in samples of soil strata from the time of dinosaur extinction, Alvarez argued that the asteroid's impact ejected so much dust into Earth's atmosphere, that it blocked sunlight, suppressed photosynthesis, and deprived the creatures of their food.

The Wright Prize, made possible by a gift from H. Dudley Wright, aims to honor outstanding scientists and engineers who have transcended the confines of single disciplines.

Frederick Reines wins Oppenheimer Prize

Frederick Reines, professor of physics at the University of California, Irvine, received the 13th annual J. Robert Oppenheimer Memorial Prize. The Scientific Council of the Center for Theoretical Studies at the University of Miami honored Reines with the \$1000 award in recognition of his contributions to elementary-particle physics.

Reines earned ME (1939) and MS (1941) degrees from Stevens Institute of Technology and a PhD from NYU in theoretical physics in 1944. He worked at Los Alamos from 1944 to 1959. He was professor of physics at Case Institute of Technology 1959 to 1966, when he went to Irvine to become professor of physics and Dean of Physical Sciences, which position he held until 1974.

The second experimentalist to receive the prize, his research has concerned nuclear fission, the physics and

OLSON

ALVAREZ

REINES



NEW H₂ CONTINUUM SOURCES

BUT FIRST SOMETHING ABOUT IRRADIANCE — IT'S WHAT COUNTS!

Since light is useless until it interacts with matter, the flux striking the target — *Irradiance* (flux per cm² of target) — is what counts.

Not even a 10 Kilowatt NBS Argon Maxi Arc produces as much irradiance as Quantatec's Krypton or Hydrogen Lyman α sources at their emission lines. Quantatec's rare gas dimer continuum source produces almost as much emission in the region below 200 nm as an NBS 1KW water-cooled Argon arc. With only half the power input of the "Tailor Made" MgF₂ deuterium arc, Quantatec's RF H₂ source has $\frac{2}{3}$ its irradiance.

Quantatec's sources also emit *uniformly* into at least one steradian of solid angle while most arc sources emit into *one tenth to one hundredth* of a steradian. The total useful illumination from a Quantatec source is then 10² to 10⁴ times that from an arc source.

Arc light sources generally have a larger radiance (flux per cm² of source), but a smaller emitting area (= 1mm² vs. 1cm²) than Quantatec's RF sources. Irradiance is proportional to the product of radiance and source area and this favors Quantatec sources over arc sources.



H₂ CONTINUUM SOURCES

The "old reliable" quartz deuterium continuum arc source is not very reliable, stable or long lived. Quantatec's hydrogen continuum RF discharge source, although having about 1/6 the irradiance of the quartz arc, is *ten times* as stable, and has *ten times longer life*. Its MgF₂ window extends the useful range of emission to Lyman α at 121.6nm and below. With only half the power input of the "Tailor Made" MgF₂ deuterium arc, Quantatec's RF H₂ source has $\frac{2}{3}$ its irradiance.

Adjusting the H₂ pressure in Quantatec's source — by changing the temperature of UrH₃ which produces H₂ — sharp H₂ molecular lines are emphasized for wavelength calibration. A mixture of H₂ and D₂ gives even more sharp lines for calibration without the strong broadening characteristic of arcs. Remember, *no special power supply is required*.

LOW COST AND CONVENIENT

Quantatec's sources are *less expensive* per unit of useful light output than any other providing the same emission and have *ten times* their useful life. Because Quantatec's sources are the *size of a flashlight*, weigh less than *one pound*, vacuum mount directly to flat plates, and use *common low voltage* power supplies, they are easier to use than even much more expensive units with less performance.

COMING SOON- QUANTATEC'S "SURROUND 4IT" PHOTOIONIZER

Quantatec continues to develop unique light sources adapted to special situations. Our "SURROUND 4IT" photoionizer for gas chromatography detectors and mass spectrometer ion sources is an example. How would you like a *photoionization mass spectrometer* with the sensitivity of an *electron ionization mass spectrometer* or a *gas chromatography detector* at least *100 times* more sensitive than those now on the market?

GET THE FACTS

If you want hard data to back up these claims just ask us. Contact Dr. Robert A. Young.
9773 Variel Ave., Chatsworth, CA 91311



Responsive R&D from EMR



EMR's position of leadership in the field of light sensing devices and instruments is, among other reasons, due to its superior research and development capability.

Just like the industry giants, EMR's R&D Department is well equipped with the most modern, sophisticated and technologically advanced apparatus. It is also staffed with scientists who are highly respected in their areas of specialization. What sets it apart is that it is largely dependent on people-to-people contact and is not bogged down by the paperwork traditionally associated with larger companies.

That's why so many highly technical light sensing products developed by EMR research are being used in space telescopes, weather reconnaissance instruments, and aerial guidance systems and in many other applications for government, industrial and educational institutions.

Modern facilities, dedicated people and the ability to respond quickly and efficiently...that's R&D at EMR. If your project requires a light sensing tube or instrument of the highest order, and if you prefer to work with people who know and understand your situation, contact EMR. Our people's work isn't hampered by paperwork.

SANGAMO WESTON
Schlumberger

EMR PHOTOELECTRIC

Division of Sangamo Weston
Box 44, Princeton, N.J. 08540
609-799-1000 Telex 843-459

Career Opportunities Currently Exist for Professionals in Engineering and Marketing

Circle No. 46 on Reader Service Card

we hear that

effects of nuclear weapons, scintillation detectors, the free neutrino, and cosmic rays.

German Physical Society awards 1981 prizes

The German Physical Society has awarded its 1981 prizes. Klaus von Klitzing, Technischen Universität München, has won the Walter Schottky Prize in Solid State Physics "in honor of his precise determination of the fine-structure constant from the quantized Hall resistance of the two-dimensional electron gas in semiconductor boundary layers."

Kurt Symanzik, of the Deutsches Elektronen-Synchrotron, Hamburg, is the winner of the Max Planck Medal "for his contributions to Euclidean quantum field theory and its application to the renormalization group."

The Max Born Prize is awarded jointly by the Institute of Physics (London) and the Deutsche Physikalischen Gesellschaft in alternate years to English and German physicists. Cyril Domb, professor of theoretical physics at Kings College, University of London, is the winner "for his outstanding contributions to the field of statistical physics, especially in connection with modern theories of critical phenomena."

in brief

Geoffrey N. Epstein has become assistant professor of physics at Boston University.

The Physics Department of Brown University has appointed **Stephen Libby** of the Institute for Theoretical Physics at Stonybrook, **Junko Shifemitsu** of the Institute for Advanced Study in Princeton, and **Robert Pelcovits**, of Brookhaven National Laboratory, assistant professors.

Steven M. Grimes, formerly of the Lawrence Livermore Laboratory, has been appointed professor of physics at Ohio University.

The first recipient of the American Crystallographic Association's A. L. Patterson Award is **Wayne A. Hendrickson**, a research biophysicist at the US Naval Laboratory in Washington, D. C. He is to receive \$1000 and deliver an address on "Anomalous Scattering and Protein Structure."

The National Endowment for the Humanities has named **Gerald Holton** to deliver the 1981 Jefferson Lecture, the highest honor the federal government

confers for intellectual achievement in the humanities. Holton, professor of physics and professor of the history of science at Harvard University, has done research on the properties of molecules under high pressure, but is best known for work in identifying central themes connecting scientific advances. His studies of Einstein and Kepler reveal that root ideas of out-

standing scientists remain fairly constant despite the spectacular changes that science undergoes decade to decade.

He is cited for contributing "to our understanding of the fundamental human motivations behind scientific achievements" and for presenting "important ethical and value issues related to science and technology."

obituaries

Jorge Andre Swieca

Jorge Andre Swieca died in São Carlos, Brazil, on 22 December 1980. Born in Warsaw, he escaped from Nazism with his family and settled in Brazil. He received his BSc in physics from the University of Brazil in Rio and his PhD in 1963 at the University of São Paulo after having spent one year at the Max Planck Institut with Werner Heisenberg and his coworkers in 1961. His academic career started at the University of São Paulo, where he remained from 1959 up to 1970, when he moved to the Catholic University of Rio. In 1978 he went to the Federal University of São Carlos in São Paulo. There he stayed until his death.

Swieca's scientific contributions are important landmarks within the quantum field theoretic development of almost two decades. He helped recapture confidence in quantum field theory at a time—the 1960s—when its usefulness outside perturbation applications in QED was being questioned. He demonstrated that the finding, that spontaneously broken symmetries produced Goldstone bosons, could be obtained from general field theoretic principles of locality and spectral properties.

Among his finest pieces of work was the structural statement on the connection of charge screening and mass spectrum in Abelian gauge theories. In the last year of his life he worked on the corresponding problem on non-Abelian gauge theories and obtained partial results on what he termed "kinematical color screening." His work on conformal invariance and global operator expansions was also motivated by his interest in the dynamical consequences of mode-independent general principles.

Complementary to this general structural investigation, Andre studied concrete field theoretical models as a source of new dynamical intuition.

At the beginning of the 1970s, several years before terms like "confinement," "color bleaching," " θ vacua" and "the U(1) problem" entered common usage, he developed some physical



SWIECA

ideas relevant to two-dimensional gauge models. Lacking experimental motivation, he first obtained these results by means of internal theoretical logic. He later refined them in his work on screening versus confinement. He was convinced that mathematically controllable models—even if as a result of their two-dimensional nature, they do not represent the reality of elementary particle physics—are valuable theoretical laboratories. Consequently, he thoroughly enjoyed the discovery of a new class of models with an infinite number of conservation laws leading to form factors and an explicitly calculable spectrum S -matrix. In the study of one of these models he found that the understanding of the U(1) problem required the introduction of fractional winding, which in turn transcended the 't Hooft-Atiyah-Singer framework of using a spherical compactified Euclidean space. He also emphasized the exotic statistics of fields that some of these models possess in a natural way and viewed them as special illustrations of the duality first encountered in lattice models of statistical mechanics.

More recently he obtained a more satisfactory understanding of operators generating local kinds in the frame-