of engineering science (1972–1977) and has been University Professor of Physics there since 1980. He has also been a visiting scientist at various universities including MIT (1963–64) and Stanford University (1977–78).

Arthur L. Schawlow was named as an honorary member of The Optical Society of America in October. According to the Society's by-laws, only one out of every thousand members can be recognized in this way. Schawlow is currently the seventh honorary member of OSA and the twentieth person ever to hold the honor.

Schawlow, who has done research in optical and microwave spectroscopy, nuclear quadrupole resonance, superconductivity and lasers, shared the Nobel Prize in physics in 1981 with Nicolaas Bloembergen and K. M. Siegebahn for his contributions to laser spectroscopy (PHYSICS TODAY, December 1981, page 17). He received his PhD from the University of Toronto in 1949, and worked at Columbia University and at Bell Labs before coming to Stanford University in 1961.

APS awards work in plasma physics

At the November meeting of the American Physical Society and its Division of Plasma Physics, two awards for contributions to plasma physics will be presented. Harold P. Furth of Princeton University will be given the James Clerk Maxwell Prize by the Society, and five physicists who worked on the Alcator A experiment at MIT will share the APS Plasma Physics Division award for excellence in plasma-physics research; they are Bruno Coppi, D. Bruce Montgomery and Ronald R. Parker of MIT, Leonardo Pieroni of the CNEN Laboratorio Gas Ionizzati in Frascati, and Robert J. Taylor of the University of California, Los Angeles.

The James Clerk Maxwell Prize is given annually by APS to recognize outstanding contributions to plasma physics; it includes a cash award of \$3500, donated by Maxwell Labs.

Furth was cited by the Society "for his extraordinary scientific and intellectual leadership of research on toroidal magnetic confinement fusion. His outstanding technical contributions range from his pioneering investigations of resistive instabilities to his mastery of magnetic topology which has led to new configurations of confinement."

FURTH

Furth is being recognized for the application of a theory he developed describing fluid behavior of plasmas to the tokamak fusion reactor. Classical theory had assumed that plasmas had perfect conductivity; working with John Killeen of Livermore and Marshall Rosenbluth of the University of Texas, Furth determined how the finiteness of its resistivity would change the stability of the plasma. Once you cease assuming the plasma is a perfect conductor, you need to estimate its actual resistivity to determine how big an effect this has on plasma behavior. Subsequently, work with the tokamak fusion reactor at Princeton has shown that the plasmas in the tokamak are well described by this theory.

He is now working on research with the Tokamak Fusion Test Reactor. "In particular we hope to learn about the confinement of plasmas within reactor parameters. It is the first time one will have genuinely achieved the reactor-plasma regime of 100 million degrees, and good enough confinement." Their goal is not just to break even, but to achieve an ignited, self-heated plasma and to use the Tokamak Fusion Core Experiment to make a much longer-burning pulse (100 seconds or more), Furth said.

Now director of the Plasma Physics Lab and professor of astrophysical sciences at Princeton, Furth received his PhD from Harvard University in 1960. He continued his research interests at the Lawrence Radiation Lab of the University of California, Berkeley, until 1967, when he came to the Princeton Plasma Lab as co-head of the Experimental Division.

The APS Division of Plasma Physics gives its annual Award for Excellence in Plasma Research to recognize a "specific discovery or achievement" in plasma physics. This year's winners will share equally the \$5000 cash prize that accompanies the award. Coppi, Montgomery, Parker, Pieroni and Taylor are cited by the Division "for basic experimental contributions to the understanding of tokamak plasma physics and the advancement of magnetic fusion research into the reactor plasma regime."

The five award winners were scientific leaders of the Alcator A team at MIT, which around 1978 succeeded in resolving a number of fundamental questions regarding the ohmic-heating regime in tokamaks. In their experiments on the Alcator A (which is able to operate at strong magnetic fields—up to 10 T), they were able:

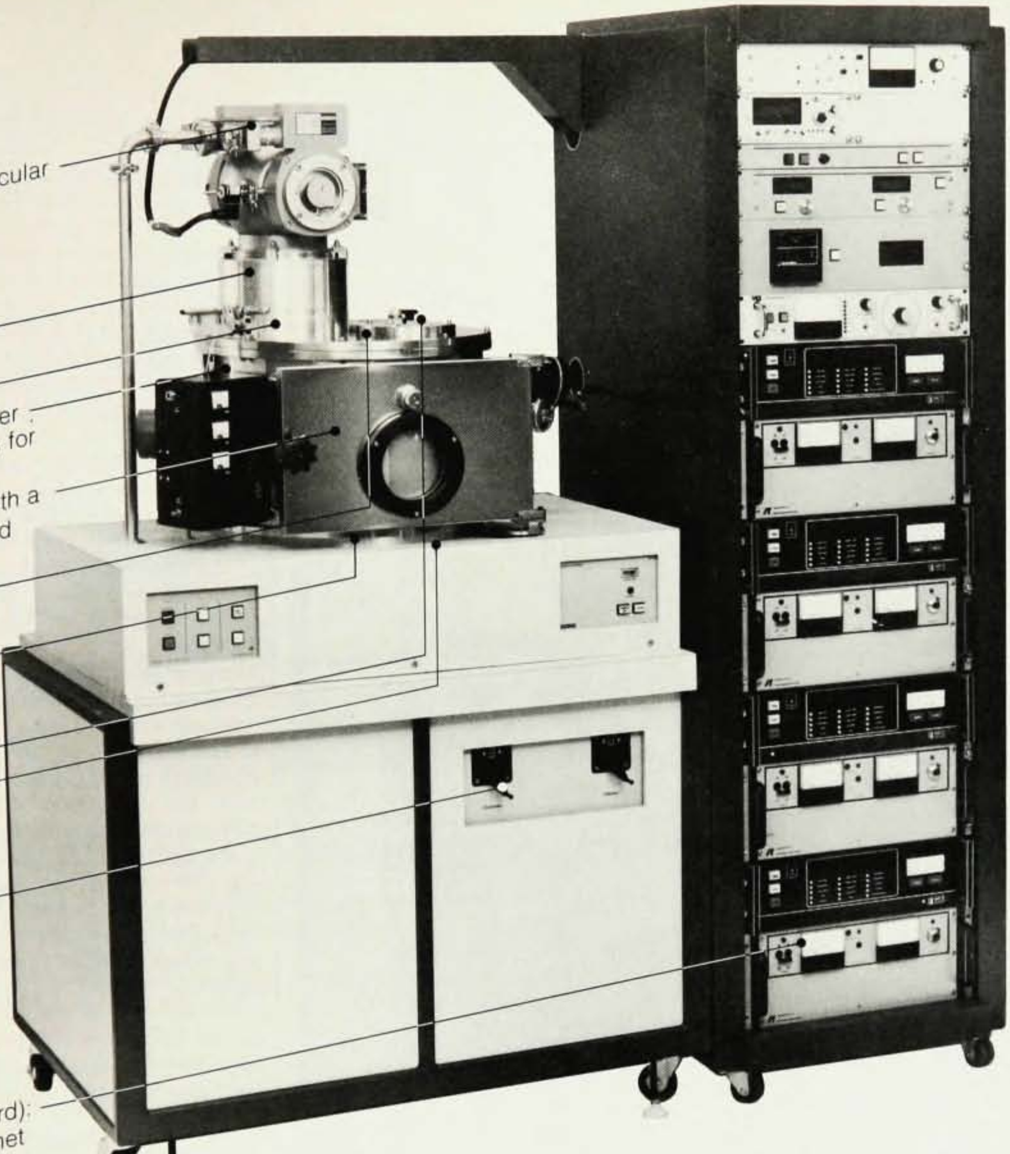
- ▶ To show that an absolute density limit for the tokamak did not exist, but rather that the density limit depends on ohmic heating power. They thus succeeded in increasing the previous limiting value tenfold.
- ▶ To produce high-purity plasmas and use them to show that resistivity was not anomalous by demonstrating Spitzer resistivity in hydrogen over a wide parameter range.
- ▶ To clarify the scaling of confinement time with density, showing that τ_{E_e} is proportional to density when one takes into account its dependence on such factors as field strength and temperature.
- ▶ To increase the maximum value of Lawson numbers $n\tau$ achieved in the tokamak, permitting the study of tokamak plasmas with well-equilibrated electrons and ions. This has led to observations of tokamak regimes dominated by neoclassical transport for the first time.

Wieder and Chadi win Vacuum Society prizes

In November the American Vacuum Society presents its awards for 1983. Herman H. Wieder of the University of California, San Diego, receives the Medard W. Welch Award and D. James Chadi of the Xerox Palo Alto Research Center wins the Peter Mark Award.

Each year the AVS commemorates the dedicated efforts of Medard W. Welch in founding and supporting the Society by honoring "truly outstanding theoretical or experimental research." Wieder is cited "for his contributions to growth of thin semiconductor single-crystal films, and most importantly, for research leading toward III–V MOS technology."

Wieder has influenced the development of electronics and electro-optic technology based on III–V materials. He is a leader in InP technology, showing that metal–insulator–semiconductor transistors are practical for this material; for the older GaAs technology, only metal–semiconductor devices had been practical. Working at the Naval Oceans Systems Center, Wieder's group was the first to demonstrate high-quality InP metal–semiconductor field-



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effect transistors. He was also one of the first to explore the advantages of ternary and quaternary III–V compounds based on indium for applications in fast switching and electro-optics. He is perhaps most distinguished for his range of interests in the field working in materials, film growth, interface properties, and device concepts.

After graduating from the University of California, Los Angeles, in 1949, Wieder joined the National Bureau of Standards to work on ferroelectric materials. In 1953 he came to the Navy as head of the Dielectrics and Semiconductors Branch of the Naval Weapons Center in Corona, California; he has served as head of the Semiconductor Physics Branch of the Naval Electronics Laboratory Center (in 1970) and as head of the Electronic Material Science Division of the Naval Oceans Systems Center (in 1973). In 1981 he retired from the Navy to join the faculty of the University of California, San Diego, in the electrical engineering and computer sciences department.

The Peter Mark Award is presented annually to a young scientist or engineer (no more than 35 years old) for outstanding theoretical or experimental work, some of which was published in the Journal of the Vacuum Society. Chadi is noted by the AVS "for innovative, accurate models and theoretical techniques applied to surface-structure determinations."

His studies of the atomic and electronic structure of semiconductor surfaces have provided considerable insights in the area. Chadi determined a model for the GaAs (110) surface structure that has increased our understanding of the photoemission data for GaAs. He has also contributed to our understanding of silicon surfaces, including the role of buckled dimers on the (100) face, a possible model for the 7×7 surface, the electronic states due to steps and the importance of spin and polarization to determining surface electronic properties.

Chadi obtained his PhD in physics from the University of California, Berkeley, in 1974. Since his graduation he has pursued his research interests at Xerox, Palo Alto.

obituaries

Werner Brandt

Werner Brandt, professor of physics at New York University and a pioneering investigator of the interaction between charged particles and condensed matter, died on New Years Day in Sweden following a prolonged illness. He was 57 years old.

Born in Kiel, Germany, on 19 May