

People and things

*Helen Edwards of Fermilab —
E. O. Lawrence Memorial Award.*

On people

Sir Rudolf Peierls, Emeritus Professor of Theoretical Physics at the University of Oxford, has been awarded the Copley Medal of the UK Royal Society in recognition of his fundamental contributions over a wide range of topics and his pioneering work towards nuclear chain reactions.

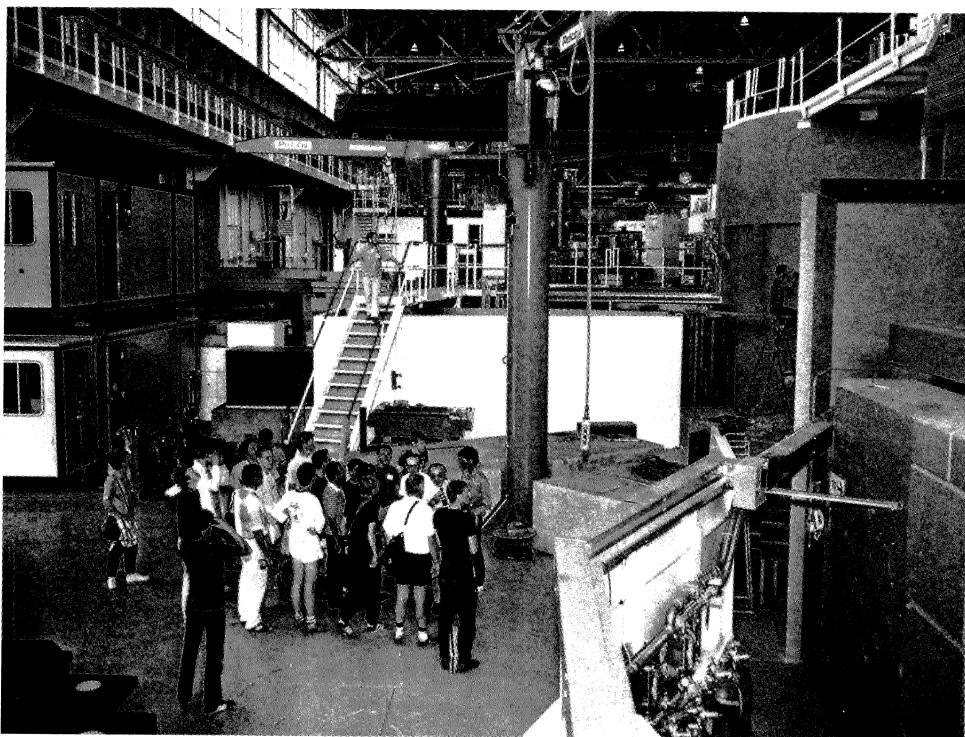
Helen Edwards from Fermilab was amongst the six recipients of the 1986 Lawrence Memorial Awards for her key role in bringing the world's first large superconducting accelerator, the Tevatron, into operation.

Among those who received US National Medals of Science from President Reagan at the White House earlier this year were H. Richard Crane of Michigan, Herman Feshbach of MIT, Robert Hofstadter of Stanford and Chen Ning Yang of the State University of New York, Stony Brook.

Spanish theorist Luis E. Ibanez has been awarded the King Carlos 1st prize for outstanding junior investigators. Alberto Galindo and Pere Pascual shared the prestigious Ramon y Cajal award for their lifetime labours in furthering modern theoretical particle physics in Spain.

In July, some competitors in the XVII International Physics Olympiad in London visited the Rutherford Appleton Laboratory, and are seen here at the ISIS pulsed neutron source. The Olympiad is a competition for pre-university students and involves both theoretical and practical examinations.

(Photo Rutherford Appleton)



Continuous Electron Beam Accelerator Facility (CEBAF) RESEARCH SCIENTISTS

Located in Newport News, Virginia, the CONTINUOUS ELECTRON BEAM ACCELERATOR FACILITY (CEBAF) is building a 4 GeV high-intensity, continuous wave electron accelerator utilizing superconducting RF technology. Its scientific goal is to study the structure and behavior of nucleons and nuclei, their quark substructure, and the strong and electroweak interactions governing the properties of this fundamental form of matter.

We are seeking scientists to fill a number of full-time positions in the research division. Significant areas of research and studies will include spectrometer design and development, instrumentation for experimental equipment and halls, and development of the general physics program. Our philosophy is to find individuals who will both contribute to our long-range research effort and to the development of state-of-the-art tools for a new generation of nuclear physics experiments.

Interested applicants should submit a curriculum vitae, list of publications and three professional references to:

**Personnel Director
CEBAF
12070 Jefferson Avenue
Newport News, VA 23606**

Qualified candidates will be referred to the Research Division Search Committee. Employment will be effective during FY 87.

CEBAF is proud to be an Equal Opportunity Employer.

EUROPEAN SYNCHROTRON RADIATION FACILITY IN GRENOBLE VACUUM SCIENTIST POSITION

The ESRF is dedicated to covering the needs of the European scientific community in the X-ray part of the electro-magnetic spectrum.

The staff in charge of the pre-construction studies is being appointed.

ESRF wishes to recruit the Head of Vacuum Group.

The candidate should have an excellent scientific background for physical and chemical approaches to the vacuum problems that are particularly critical in an electron storage ring. Experience of modern vacuum techniques and technologies will be appreciated.

Curriculum vitae, description of field of interest, date of availability together with names of three referees should be forwarded to the:

**Director General
European
Synchrotron Radiation Facility
BP 220
F-38043 GRENOBLE CEDEX
FRANCE**



The Nuclear Physics section (K) of NIKHEF, the Netherlands' National Institute for Nuclear Physics and High-Energy Physics, has two openings for a position resident at Geneva (CERN) for an

Experimental Postdoctoral Physicist (m/f)

to participate in the New Muon collaboration (NMC) which has an approved research programme on the EMC-effect and related QCD-aspects of nuclei at the 300 GeV muon beam at CERN. They will act as local contact person and supervisor of PhD students of the recently initiated Dutch participation in this programme. Experience in High-Energy and/or Nuclear Physics Instrumentation is required.

The appointment will be for two years with the Foundation for Fundamental Research on Matter (FOM). Information can be obtained from Dr. R. van Dantzig, tel. (20) 5920120 or 430315.

Candidates are invited to apply within a month after appearance of this advertisement, while enclosing a curriculum vitae and names of referees, to

**Prof. Dr. G. van Middelkoop,
Scientific Director
of NIKHEF section K,
P.O. Box 4395,
1009 AJ Amsterdam,
the Netherlands.**

RESEARCH SCIENTISTS EXPERIMENTAL HIGH ENERGY PHYSICS

Supercomputer Computations Research Institute Florida State University

The Supercomputer Computations Research Institute of the Florida State University is seeking qualified candidates for 2 full time permanent research positions in experimental high energy physics. Preference will be given to scientists with strong software orientation willing to investigate the use of vector computers in the analysis of high energy physics data. Hardware experience is desired. Successful candidates will be involved in the ALEPH (LEP) or DO (Fermilab) collider experiments. Applicants should submit a curriculum vitae, list of publications and arrange for three letters of recommendation to be sent to

**Dr. Joseph Lannutti
Director
Supercomputer Computations
Research Institute
Florida State University
Tallahassee, Florida 32306-4052
U.S.A.**

The Florida State University is an Equal Opportunity, Affirmative Action Employer.

Two prominent CERN physicists, experimentalist Charles Peyrou and theorist Jacques Prentki, both now retired, receive 1986 Grand Prix of the Académie française.

Eric Forsyth has been appointed Chairman of Brookhaven's new Accelerator Development Department which is responsible for the Laboratory's role in the proposed US Superconducting Supercollider, the construction of the new Booster for the Alternating Gradient Synchrotron, and the technical development for the proposed Relativistic Heavy Ion Collider.

Dirac Medals

The 1986 Dirac Medals of the International Centre for Theoretical Physics, Trieste, Italy, have been awarded to Yoichiro Nambu and Alexander Polyakov for their important contributions to mathematical physics.

Nambu, of the Enrico Fermi Institute, Chicago, receives the award for his work in spontaneous symmetry breaking, for his formulations of quark models and for his geometrical interpretations of dual resonance models.

Polyakov, from the Landau Institute, Moscow, is cited for his work in applications of scale invariance and topology in quantum field theory, and for the discovery of new field theory solutions (monopoles, instantons).

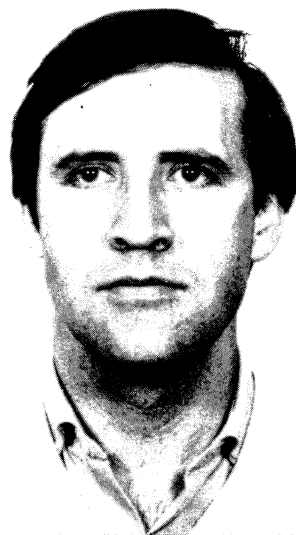
Lev Lapidus

Lev I. Lapidus, a leading physicist at the Joint Institute for Nuclear Research, Dubna, USSR, died on

15 May. For more than 20 years he had been the Vice Director of JINR's Laboratory of Nuclear Problems, and was widely recognized for his theoretical work on a range of particle physics questions.

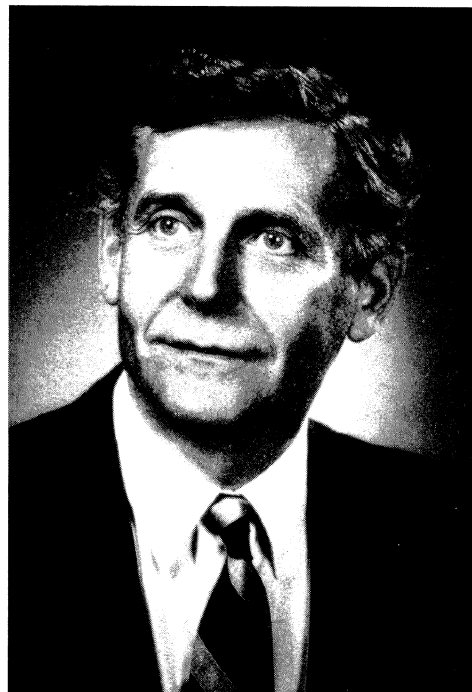
Physics marathon

The Sunday separating the parallel and plenary sessions at the Berkeley meeting (see page 1) coincided with the San Francisco marathon, and five conference participants passed up such attractions as a champagne brunch cruise round San Francisco Bay to run the gruelling 26 mile (42 km) circuit. Dennis Nordstrom, Editor of the Particle and Fields issue of Physical Review, crossed the line in 3 hours 23 minutes, among the first 1000 of the 7000 or so finishers. Daniele Dominici of Florence and Genova took 3 hours 51 minutes, with CERN Courier Editor Gordon Fraser in pursuit 25 minutes behind. Berkeley host Harry Bingham came in later, gallantly paced by Tony Hey from Southampton, UK. Other physicists in the race included Stan Wojcicki of the Superconducting Supercollider Design Group (3 hours 45 minutes) and two students working on the Mark II detector at Stanford — Paul Webber (3 hours 27 minutes) and Eric Soderstrom (3 hours 56 minutes).



▲ Luis E. Ibanez — King Carlos 1st prize (see page 33)

▼ Eric Forsyth is Chairman of Brookhaven's new Accelerator Development Department.



EXPERIMENTAL HIGH ENERGY PHYSICS UNIVERSITY OF HOUSTON INVITES APPLICATIONS FOR

Post Doctoral Research Associate

An opening exists at the University of Houston for a Post Doctoral Research Associate. Recent Ph.D's (0-5 years) in Experimental High Energy Physics with strong hardware background are encouraged to apply. This person will initially live in Houston, Texas, to work on the construction of streamer tubes for the LVD experiment at the Gran Sasso Tunnel, Italy. Later assignments will depend upon the course of development of the experiment and may involve residence in Europe for one more years.

Resumes with the names of at least three persons who can provide professional evaluations should be sent to:

Professor Kwong Lau
Department of Physics
University of Houston –
University Park
Houston, Texas 77004
U.S.A.
(713)749-4617

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Research Positions

The State University of New York at Stony Brook has several positions available to work in development and testing of modules for the uranium absorber – liquid argon calorimetry for the DØ Detector, which will study 2 TeV $\bar{p}p$ collisions at Fermilab. The calorimetry will be calibrated in a beam test program at Fermilab. DØ is expected to have an initial run in 1988. Salary and level of appointment commensurate with experience. Applications, including vitae and 3 letters of reference, should be addressed to:

Professor M. Marx,
Physics Department,
SUNY Stony Brook,
Stony Brook,
NY 11794 USA.

SUNY Stony Brook is an affirmative action/ equal opportunity educator and employer.
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Research and Development Engineer

Hansen Laboratories, Stanford University

Hansen Laboratories invite applications for a staff Research and Development Engineer to develop a new facility for synchrotron radiation and free electron laser research. This facility will enable Stanford University to investigate new areas in accelerator physics, free electron laser physics, medical imaging and materials science. The scope of this position includes the specification, design and operational testing of real time computer control systems, electron beam orbit measurement systems, RF systems and distributed timing systems. These tasks require hardware and software skills as applied to minicomputers and microprocessors as well as high frequency analog and high speed digital electronics skills.

The successful applicant will have an advanced degree in physical science or engineering with a broad technical background encompassing electrical engineering and physics. Work experience should include five or more years of experience with the analysis and design of control and instrumentation systems for particle accelerators and storage rings as documented by engineering practice and publications. Formal education or practical experience in accelerator and storage ring physics is highly desirable.

Qualified candidates are encouraged to submit a resume and cover letter highlighting their qualifications to: Carl Cork, #26577, High Energy Physics Laboratory, Hansen Laboratories, Stanford University, Stanford, CA 94305, U.S.A.

Stanford University is committed to equal opportunity through affirmative action in employment. We are especially eager to identify minority persons and women with appropriate qualifications.

Continuous Electron Beam Accelerator Facility

ACCELERATOR SCIENTISTS

Located in Newport News, Virginia, the CONTINUOUS ELECTRON BEAM ACCELERATOR FACILITY (CEBAF) is building a 4 GeV high intensity, continuous beam electron accelerator for nuclear physics research. This machine will be a 4-pass recirculating electron linac utilizing superconducting RF technology and will provide a beam of exceptionally low emittance and energy spread. Acceleration will be provided by 418 five-cell, 1.5 GHz superconducting cavities, each fed with ≤ 5 kW average RF power. The Accelerator Physics Division of CEBAF has staff positions at various levels for accelerator scientists with expertise in the following:

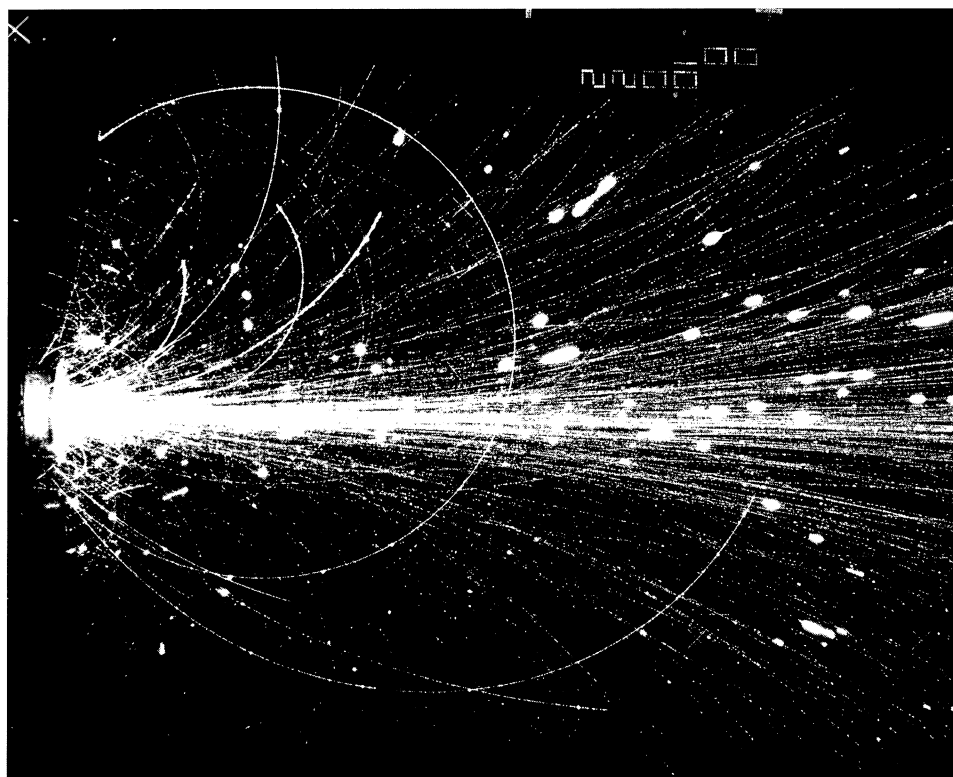
- accelerator operations
- magnet design
- injector design
- transport optics and beam dynamics
- RF and feedback
- instrumentation and control
- collective effects
- E&M calculations and cavity design
- computer simulation

Interested applicants should submit a curriculum vitae, list of publications and three professional references to:

Personnel Director
CEBAF
12070 Jefferson Avenue
Newport News, VA 23606

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A streamer chamber picture showing what happens when 3200 GeV (3.2 TeV!) oxygen ions from the CERN machines hit a target.



CERN's big machines surpass themselves

Already acknowledged as the world's most versatile system of particle accelerators, CERN's complex of big machines put on a spectacular performance after the short summer shutdown.

On 3 September, the new LEP Injection Linac (LIL) was put through its paces and the ejection line tested in readiness for the next step. The next evening the 'Proton' Synchrotron held onto a 500 MeV beam of electrons. In the initial tests, the electrons were not accelerated, but later they were taken up to the 3.5 GeV energy foreseen for injection into the next machine, the SPS, before passing to the new LEP. Thus the PS adds electrons to its already impressive

repertoire of protons, antiprotons, deuterons, alpha particles, and most recently oxygen ions, and the preparations for LEP beams pass another important milestone.

The electrons held only one slot in the complicated 14.4 second PS 'supercycle' supplying also beams of deuterons and oxygen ions ready for injection into the SPS. Thus the PS was hard at work, but supplying no protons at all!

After using the higher intensity deuterons for setting up, on 7 September the big machine had its first taste of oxygen. Suspense as the particles were accelerated to 200 GeV per nucleon — 3200 GeV or 3.2 TeV per ion, the highest

energy beam ever produced! — and fed to waiting experiments. These oxygen beams give currents thousand of times down on those of standard proton beams, and special beam monitoring techniques had to be developed.

At the end of the beamlines, experiments will eagerly search for signs of the long-awaited 'quark-gluon plasma', a new state of nuclear matter. The first physics run is scheduled for November.

Stan Livingston

Stanley Livingston, one of the great accelerator pioneers, died in Santa Fe on 26 August. From collaboration with Ernest Lawrence on the construction of the first cyclotron through to participation as Associate Director in the formation of Fermilab, Stan Livingston was a leading figure in the field.

Probably his most famous era was his time at Brookhaven when he led construction of the first big proton machine, the Cosmotron, in the early fifties. It was during this time that, together with Ernest Courant and Hartland Snyder, he invented strong focusing — one of the crucial steps in the development of accelerators.

He will also be remembered as Director of the Cambridge Electron Accelerator and for his definitive book 'Particle Accelerators' written in collaboration with John Blewett.

PHYSICS THROUGH THE 1990's

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AN OVERVIEW

The *Overview* volume of *Physics Through the 1990s* presents a “big picture” discussion of the state-of-the-science. The volume serves as a detailed but general introduction to the specialized fields presented in other volumes of this comprehensive series.

0-309-03578-3; 1986, 184 pages, paperbound, £14.40/\$18.00

ATOMIC, MOLECULAR, AND OPTICAL PHYSICS

Laser-assisted manufacturing and fiber-optics communications are but two of the products of AMO research. As this volume points out, “AMO physics provides theoretical and experimental methods and essential data to neighboring areas of science such as chemistry, astrophysics, condensed-matter physics, plasma physics, surface science, biology, and medicine.” The book addresses recent advances in atomic, molecular, and optical fields and provides recommendations with a plan of action for further research.

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CONDENSED-MATTER PHYSICS

As this volume explains, “condensed-matter physics is divided roughly into two broad subareas devoted, respectively, to solids and liquids.” Topics include the electronic structure and properties of matter, the structures and vibrational properties of solids, critical phenomena and phase transitions, magnetism, semiconductors, defects and diffusion, surfaces and interfaces, low-temperature physics, liquid-state physics, polymers, and nonlinear dynamics, instabilities, and chaos.

0-309-03577-5; 1986, 328 pages, paperbound, £30.40/\$38.00

ELEMENTARY-PARTICLE PHYSICS

Today's understanding of subatomic structure is vastly more sophisticated than that which produced the first atomic bomb. This volume discusses the behaviour of elementary particles that make up the atomic nucleus – quarks, leptons, and force-carrying particles – and outlines current understanding of theories that integrate this knowledge into a unified picture. It includes an in-depth discussion of accelerators and colliders, and covers instrumentation for elementary-particle research, interactions with other areas of physics, and educational trends.

0-309-03576-7; 1986, 248 pages, paperbound, £23.60/\$29.50

GRAVITATION, COSMOLOGY, AND COSMIC-RAY PHYSICS

“Gravitation, cosmology, and cosmic-ray physics are often regarded as subfields of astrophysics, as well as physics, because they are practiced by using physical techniques in an astronomical setting,” this report begins. The recent discoveries and opportunities of each field are discussed at length. Experimental and theoretical work in gravitation, the current theoretical insight into cosmological questions, and new detectors for cosmic-ray physics are some of the topics covered in this volume.

0-309-03579-1; 1986, 192 pages, paperbound, £23.60/\$29.50

NUCLEAR PHYSICS

Questions facing nuclear physics today include the many dynamic forces that cannot be understood with elementary particles alone. This volume examines major advances in nuclear physics, the impacts of nuclear physics on other disciplines and society, and current frontiers of nuclear research. Recommendations cover new accelerator plans, support of instrumentation, and the need for increased support of nuclear theory.

0-309-03547-3; 1986, 240 pages, paperbound, £23.60/\$29.50

PLASMAS AND FLUIDS

Plasma and fluid physics includes the promising fields of fusion research and space investigation. This report discusses the most important advances in these vital areas over the past decade and recommends a renewed commitment to basic research in plasma and fluid physics. It lists significant recent accomplishments in the fields of general plasma physics, fusion plasma confinement and heating, space and astrophysical plasmas, and fluid physics and lists future research opportunities.

0-309-03548-1; 1986, 336 pages, paperbound, £30.40/\$38.00

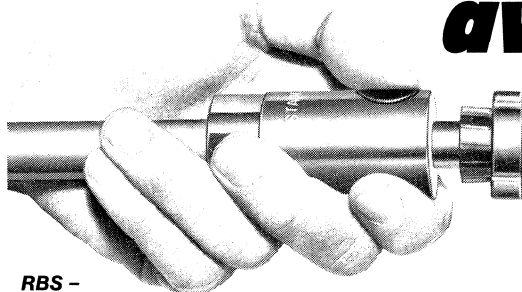
SCIENTIFIC INTERFACES AND TECHNOLOGICAL APPLICATIONS

Unlike the preceding volumes in the series, this book takes a step beyond pure research and looks at the ways physics discoveries have affected society and the economy.

0-309-03580-5; 1986, 288 pages, paperbound, £24.00/\$30.00

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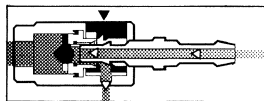
Raccords rapides «Stäubli» avec bouton de sécurité.



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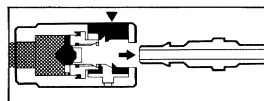
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This year's prizes for Achievement in Accelerator Physics and Technology awarded by the US Particle Accelerator School go to (left to right) Tom Weiland, Helmut Piel and Maury Tigner.

Accelerator Prizes

This year's prizes for Achievement in Accelerator Physics and Technology awarded by the US Particle Accelerator School go to Tom Weiland of DESY for his work in

the development of novel methods for calculating electromagnetic fields in complex structures, and to Helmut Piel of Wuppertal and Maury Tigner, Director of the Central Design Group of the proposed US Superconducting Supercollider, for 'their contributions to making radiofrequency superconductivity a practical reality'.

The results of Weiland's work are used world-wide in the design of accelerators to minimize para-

sitic wake field effects and to optimize the design of radiofrequency cavities. The push to develop superconducting r.f. techniques has paid dividends and has led to its adoption for large new accelerator projects in Europe, the US and Japan.

The prizes will be awarded at the Joint US/CERN Topical School on Particle Accelerators, South Padre Island, Texas, from 23-29 October.

Heraeus

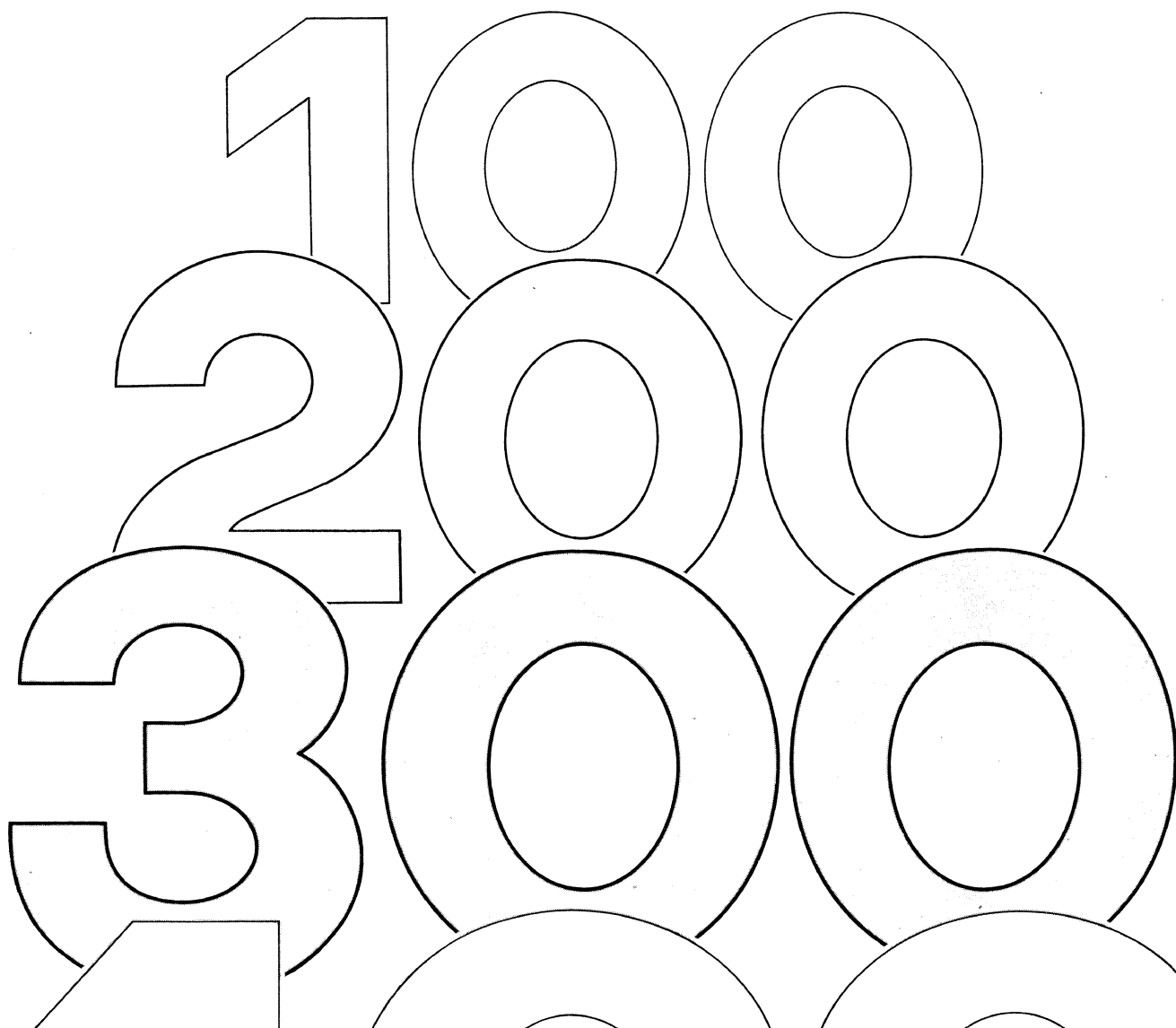
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*SER = Single Electron Resolution

t_r = anode pulse rise time for a delta light pulse

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σ_t = transit time spread for single electron mode

Δt_{ce} = transit time difference centre-edge

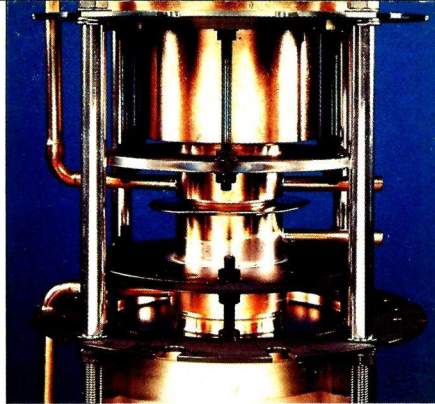
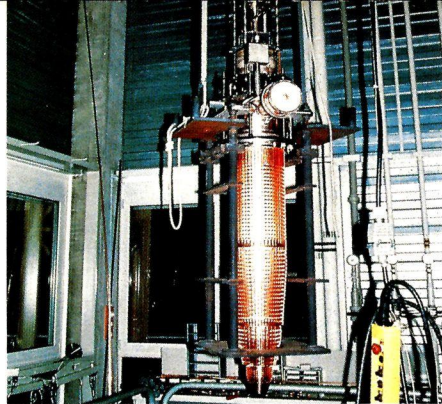
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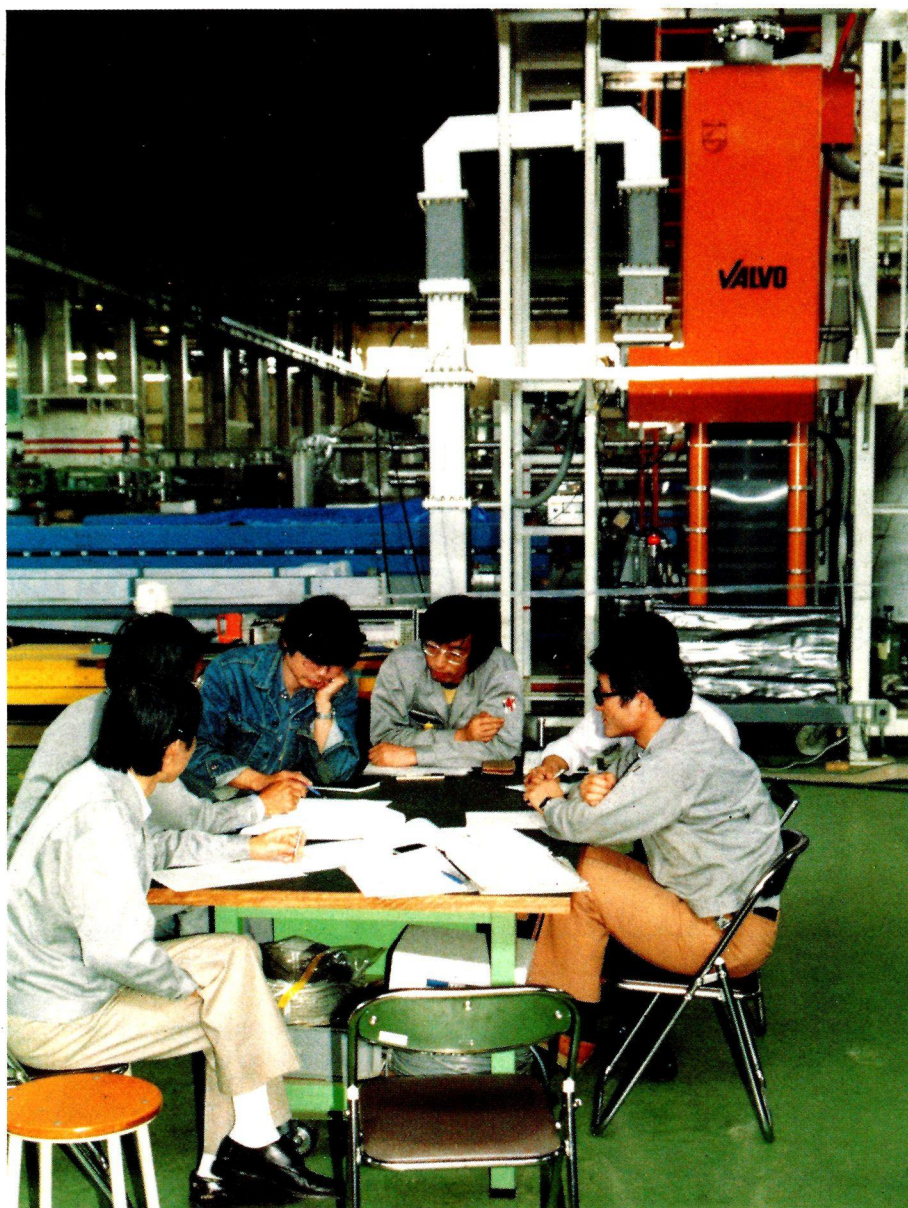
PHILIPS



Good luck.

In November, TRISTAN, the largest ring accelerator built to date, will go into action at the Tsukuba Science City in Japan. It will enhance the research facilities of KEK, the National Laboratory for High Energy Physics.

Power for TRISTAN. We provide it.



PHILIPS wish all those involved at KEK a successful start for the TRISTAN facility, and a future full of rewarding scientific achievements.

The r.f. energy at 508 MHz, needed for particle acceleration is generated by klystrons of 800 kW and 1000 kW output power. Of the installed power of 14 MW, Valvo klystrons provide 9.2 MW. This includes equipment of the 1000 kW stages with 6 YK1303 klystrons.

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In the USA: Amperex Electronic Corp., Hicksville L.I.

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