

People and things

tions were predicted to be about 62 millibarns at 500 GeV collision energy.

Later, when antiprotons were available in large quantities at CERN, physicists first compared proton-proton and proton-antiproton collisions at the ISR, discovering that the proton-antiproton cross-section also rose. However the most important measurement came from the SPS proton-antiproton collider at 546 GeV collision energy, when the UA4 group found that the reaction rate was behaving as predicted. However, by measuring the real part at 546 GeV, one hoped to get some insight into the total cross-section at much higher energies to gauge the total collision rate of other proton colliders like Fermilab's Tevatron, now operating at 1800 GeV, proposals like CERN's LHC at 14 TeV (14 000 GeV), or the US Superconducting Supercollider (SSC). The surprise was that rho turned out to be about twice the predicted value.

At the second International Conference on Elastic and Diffractive Scattering, organized by R. Cool, K. Goulianos and N. N. Khuri recently at Rockefeller University, Giorgio Matthiae's detailed account of the UA4 results was followed by an intense debate between theorists. Some argued that the result was an illusion due to the differential cross-section deviating from a simple exponential behaviour, but this was not well accepted. Others maintained that the usual assumption of proton-proton and proton-antiproton cross-section equality at high energies might be wrong. However a calculation giving the low energy proton-antiproton reaction rate, recently measured at the LEAR (Low Energy Antiproton Ring) at CERN, as an

integral over the difference between the proton-proton and proton-antiproton cross-section, is consistent with no such difference at high energies.

There remains the possibility that above a certain energy, the reaction rate suddenly rises, with observable consequences even for the Fermilab collider. The rise might be due to conventional physics or it could be something new.

This modest experiment in an unglamorous field, deserted by many experimentalists and abandoned by most theoreticians because of calculational difficulties, might be a pointer to new physics, accessible at CERN and at Fermilab.

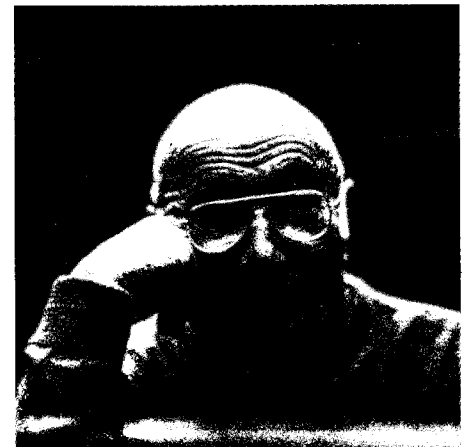
From André Martin

*Yakov Borisovich Zeldovich
1914-1987*

Soviet theorist Yakov Zeldovich died in Moscow in December. From 1931, he made fundamental contributions to the theories of adsorption and catalysis, of combustion kinetics, of detonation and shock waves and of fission chain reactions. His particle physics work began in the 1950s and included the formulation of several fundamental concepts. He also proposed looking for parity violation in atoms to trap ultracold neutrons. While continuing his particle physics work, in the 1960s he went on to become a world authority on cosmology and astrophysics. Until the last day of his life this generous man continued to be a source of ideas and inspiration. As well as the highest accolades of the USSR, he also received important recognition in the US, the UK, East Germany, Hungary and in the international sphere.

He had accepted an invitation to visit the CERN Theory Division in the spring.

Yakov Borisovich Zeldovich 1914-1987



FELLOWS IN ACCELERATOR TECHNOLOGY

Brookhaven National Laboratory

Applications are invited from individuals with a Ph.D. degree and/or major training in the physical sciences or engineering who wish to launch careers in accelerator design and development.

Successful candidates will be appointed Fellows in Accelerator Technology through the Center for Accelerator Physics, in Brookhaven National Laboratory (BNL) accelerator physics organizations. Appointments are for a period of one year, renewable for a second year. Fellows are expected to select their investigations from among the general objectives of the accelerator physics program at BNL.

The Alternating Gradient Synchrotron (AGS) Department is responsible for the operation of a 200 MeV proton linac, and the 30 GeV AGS which provide proton, polarized proton and heavy ion beams. New BNL initiatives are underway in: the acceleration of heavy ions in the AGS; the construction of a 1.5 GeV booster synchrotron for protons and heavy ions; a proposal to build a relativistic heavy ion collider (RHIC); a study of a high intensity upgrade of the AGS (AGS II); and, research and development effort directed towards the Superconducting Superior Collider (SSC).

The National Synchrotron Light Source (NSLS) Department is responsible for the operation of two electron storage rings, with energy of 0.75 and 2.5 GeV, for the production of synchrotron radiation. The NSLS development program is directed toward improving the ring performance, new undulator and wiggler insertion devices, and coherent radiation sources.

The Center for Accelerator Physics promotes R&D in all areas of accelerator physics and is building the Accelerator Test Facility, consisting of a 50 MeV linac, a NdYag laser, and a high power CO₂ picosecond laser to study laser acceleration of particles and coherent radiation sources.

Scientists and engineers of any nationality are eligible to apply. Salaries are competitive, and Fellows are eligible for comprehensive employee benefits and relocation allowances. Candidates should send a detailed resume to: C. Pellegrini, National Synchrotron Light Source Department, Building 725B, Brookhaven National Laboratory, Associated Universities, Inc., Upton, L.I., NY 11973. Equal Opportunity Employer m/f.

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NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES INC.



EUROPEAN SYNCHROTRON RADIATION FACILITY Grenoble, FRANCE

The ESRF is a state-of-the-art Synchrotron Radiation source to be built in Grenoble, FRANCE, to meet the needs of the European scientific community for X-rays of high brilliance.

The accelerator part consists of:

- a 850 metre circumference storage ring with 32 straight sections to accommodate wiggler and undulator source
- a fast cycling synchrotron used as an injector for the storage ring
- a 400 MeV positron preinjector.

We invite applications for a post of:

SAFETY AND RADIATION PROTECTION ENGINEER

to be responsible to the Director General for all aspects of safety and radiation protection, including:

- analysis of the risks and design of protection
- application of legal regulations and preparation of internal safety rules
- definition and operation of the radiation monitoring system
- design of shielding and interlock
- organisation of information and training of staff and users.

You must have relevant formal training at university level, and several years experience of safety in a comparable laboratory, demonstrating the personality and drive necessary for high responsibility.

Please send a curriculum vitae, date of availability and names of three referees by **15 February 1988**, to:

ESRF
Personnel Office/Ref.167.87
BP 220
38043 GRENOBLE Cedex - FRANCE

Research Scientists

Continuous Electron Beam Accelerator Facility (CEBAF)

Located in Newport News, Virginia, CEBAF will be a 4 GeV high-intensity, continuous wave electron accelerator utilizing superconducting RF technology. Its scientific goal is to study the structure of the nuclear many-body system, its quark substructure, and the strong and electroweak interactions governing the behavior of this fundamental form of matter.

A range of full-time positions is open in the Research Division for scientists who can contribute both to the development of state-of-the-art tools for a new generation of physics experiments and to the long range scientific effort. Significant areas of research during the construction phase will include design of high resolution and large acceptance spectrometers, design of instrumentation for experimental equipment and halls, and development of the physics program.

Applicants should submit a curriculum vitae, a list of publications, and three professional references to: **Employment Manager, CEBAF, 12070 Jefferson Avenue, Newport News, VA 23606.**

CEBAF

The Continuous Electron Beam Accelerator Facility

An equal opportunity employer M/F/H/V

On people

The prestigious Enrico Fermi Award of the US Department of Energy 'for exceptional and altogether outstanding scientific and technical achievement in the development, use or control of atomic energy', went in 1987 to Gerald F. Tape and to Luis W. Alvarez.

Tape, former Deputy Director of Brookhaven National Laboratory, President of Associated Universities Inc. (the Brookhaven operating organization), member of the US Atomic Energy Commission and US Representative to the International Atomic Energy Agency, was cited for his 'distinguished career in the administration, development and advancement of US and international atomic energy, as well as contributions to the nonproliferation of atomic weapons, with special recognition for his integrity'.

Alvarez, who won the Nobel Physics Prize outright in 1968, received his Fermi Award for 'the importance and breadth of his pioneering contributions in the physical sciences and their application to high energy physics, nuclear accelerators, instrumentation, paleontology, archaeology and astronomy'.

Accelerator and plasma physics specialist John Lawson recently retired from the Rutherford Appleton Laboratory, UK. After early work with UK synchrotrons, he went on to make major contributions to accelerator theory. In 1955, plasma physics and the problem of fusion power came under his fruitful attention, the result being the famed 'Lawson Cri-

teria'. In later years his broad knowledge and deep insight have been solicited frequently throughout the world. His book 'Physics of Charged Particle Beams' remains a classic.

Hans C. Sens of NIKHEF, Amsterdam, and the University of Utrecht has been appointed a member of the Netherlands Royal Academy of Sciences.

Phil Livdahl retires

Fermilab Deputy Director Phil Livdahl has retired after twenty years of participation in the life of the Laboratory. He was amongst the first recruits for the construction of the Fermilab accelerator having responsibility for the linac construction and then participation in completion of the main ring.

Phil Livdahl took over as Acting Director at that difficult transitional phase when Bob Wilson left and has remained in the top management ever since. He is highly respected for his accelerator expertise, for his reliability and conscientiousness in management and for his human qualities.

Phil Livdahl will not be lost to the accelerator community because his retirement takes him to the West Coast where he will continue work on the proton medical accelerator at the Loma Linda Medical Center.

Pierre Amiot

Pierre Amiot, who died last year, should have been credited in the CERN Courier as one of the driving forces behind CERN's first bubble chamber. We regret the error.

Making history

The CERN history project yielded its first fruits a year ago with the publication of a volume covering the years of the creation of CERN (see March 1987 issue, page 27). 17 November brought together many of the leading figures from the second period under study – covering the construction and first operation of the proton synchrotron through to the end of 1965 when the intersecting storage rings were authorized. The historians presented their findings for comment before preparing the second volume.

Chris Quigg, formerly head of the Fermilab theory group and now Deputy Director of Operations for the Central Design Group of the proposed US Superconducting Supercollider (SSC), gave the third Bernard Gregory Lecture (in English) at CERN and (in French) in Paris in November. The title was 'To explore the 1 TeV level'.



The Max-Planck-Institut für Physik und Astrophysik, Munich,

is offering the position for a

Ph. D. Physicist

We are looking for an experimental physicist with experience in low temperature condensed matter physics to participate in the development of solar neutrino and dark matter detectors.

The appointment will be for three years with a possibility of extension.

Applications (including curriculum vitae, list of publications, and the names of two referees) should be sent as soon as possible to

Prof. N. Schmitz
Max-Planck-Institut
für Physik und Astrophysik
Föhringer Ring 6
D - 8000 München 40
Fed. Rep. of Germany

Faculty Positions

Experimental High Energy Physics Space Physics Experimental Nuclear Physics

The University of Kansas invites applications for three tenure-track positions at the Assistant or Associate Professor level in the Department of Physics and Astronomy. Individuals having strong research interests, experience, and capabilities in the experimental areas of particle, nuclear, and space physics are sought.

Two positions are tenable in fall, 1988 and one in fall, 1989. Consideration of applicants will begin on January 15, 1988 and continue until these positions have been filled.

Requirements are: PhD in physics and demonstrated research achievement in one of the specified areas. Duties include the conduct and supervision of research as well as graduate and undergraduate teaching. The particle physics group is currently involved in the ARGUS collaboration at DESY as well as research at Fermilab, and is supported by the NSF. The space physics program is currently involved in NASA flight projects for Voyager, Galileo, and Ulysses as well as solar terrestrial research funded by the NSF. The nuclear physics program is currently involved in heavy-ion accelerator physics and is funded by the DOE. Salary range is from \$ 32,000 to \$ 45,000 for the 9-month academic year; starting salary and rank depend on qualifications and experience.

Applications should be sent to:

Professor J.P. Davidson,
Chairman
Department of Physics and Astronomy,
University of Kansas,
Lawrence, Kansas, 66045,

and should include a curriculum vitae, a statement of professional plans and the names of three references.

The University of Kansas is an Affirmative Action/Equal Opportunity Employer. Applications are encouraged from all qualified people regardless of race, religion, color, sex, disability, veteran status, national origin, age or ancestry.

Project Deputy Director of Experimental Systems

Reporting to the Project Director of the Advanced Light Source, the **Project Deputy Director of Experimental Systems** bears primary scientific/technical responsibility for the design and specification for the initial complement of insertion devices, photon systems and associated components for the Advanced Light Source and planning for future insertion devices and photon systems for the facility.

The incumbent will ensure that the physics design criteria are properly translated into engineering designs and components. Will direct appropriate R & D activities associated with experimental facilities, ensure that R & D objectives are defined and accomplished and develop plans for operational modes of the experimental program. Will recruit, develop and manage scientific and technical personnel and organize the staff required for support and operations of the experimental facilities. Will plan, develop and manage a modest size in-house research and development group. Will organize and participate in scientific and technical reviews, workshops and seminars.

The successful candidate must have a proven record of substantial managerial responsibility and excellent scientific and technical judgement. Must have demonstrated success in the recruitment, development and management of scientific/technical personnel within a project environment. Must have ability to translate user requirements into specifications and design criteria for experimental facilities and must be able to effectively interact with potential users.

Knowledge of the technology of insertion devices and optical systems as applied to the generation and exploitation of synchrotron radiation, as well as an understanding of the environment in which user-based synchrotron radiation research is carried out (equivalent experience at other user-based facilities may be appropriate) are desirable.

Prefer a Ph. D. in the physical sciences, engineering or other related fields.

To apply send two copies of resume to:

Lawrence Berkeley Laboratory
1 Cyclotron Rd, Employment Office 90-1042
Berkeley, CA 94720
Refer to Job A/4432

An Equal Opportunity Employer M/F/H.



**LAWRENCE
BERKELEY
LABORATORY**

RICE UNIVERSITY

RESEARCH POSITIONS IN EXPERIMENTAL INTERMEDIATE AND HIGH ENERGY PHYSICS

The Bonner Nuclear Laboratory invites applications for two or three research positions beginning as soon as spring of 1988. One appointment, at the level of Assistant Research Scientist, is for an initial three-year period. The successful candidate for this position will have some postdoctoral research experience during which he or she will have demonstrated capabilities for leadership and independence in research. This appointment may be renewable; after five years it may lead to some university support and possibly to promotion to Associate Research Scientist. The other appointments, postdoctoral fellowships, are for one year, but should be renewable for up to three years.

Rice has experimental programs in both intermediate energy and high energy physics. These programs include approved and ongoing experiments at BNL, FNAL, CERN, TRIUMF, and LAMPF. A wide variety of physics is studied, including spin polarization, high transverse momentum jets, the gravitational acceleration of antimatter, and heavy ions. Our group currently consists of six experimental and two theoretical faculty, three postdoctoral fellows, and about fifteen graduate students. The style of the laboratory is that most group members participate in all experiments; in particular, this enables postdoctoral fellows to gain a wide variety of experience by working in both fields.

Rice is a small, private university, dedicated to excellence in the academic enterprise. The beauty and serenity of the campus, the proximity of dynamic Houston, the fourth largest city in the U.S., the temperate climate, all these contribute to making Rice an extraordinary location for study and research.

Rice University is an Equal Opportunity Employer.

Resumes should be sent to:

Professor B. E. Bonner, Director
Bonner Nuclear Laboratory
Rice University, Houston, TX 77251-1892

President of the Chinese Academy of Sciences Zhou Guangzhao (left) visited CERN on 27 November to discuss continuing collaboration with scientists from China. An agreement prolonging the existing Protocol was signed with CERN Director General Herwig Schopper.



ESO/CERN Symposium

The 3rd ESO/CERN Symposium on Cosmology, Astronomy and Fundamental Physics will be held at the Palazzo Re Enzo, Bologna (Italy) from 16 to 20 May. The preliminary programme covers: First results from new colliders – Ultrarelativistic nuclear collisions – Standard model of fundamental interactions – Supernova 1987a: observations and interpretations – Dark matter: evidence, candidates and detection – Large scale structure of the universe – Microwave background radiation – High redshift objects – Dynamical parameters of the universe – Underground laboratories – Perspectives for high energy physics – Beyond the standard model, while invited speakers include A. Dressler (MWLCO, Pasadena), M. Geller (CfA, Cambridge, MA), W. Hildebrandt (MPPA, Munich), M. Koshi-ba (CERN, Geneva), R. G. Kron

(Yerkes Observ., Chicago), L. M. Lederman (Fermilab), D. Lynden-Bell (Cambridge), S. Ozaki* (KEK, Japan), F. Pacini (Florence), R. B. Partridge (Haverford College, USA), R. D. Peccei (DESY), C. Rubbia (CERN), M. Satz (Bielefeld), Y. Tanaka* (ISAS, Tokyo), M. S. Turner (Chicago/Fermilab), N. Vittorio (Rome, 'La Sapienza'), L. Woltjer (ESO); (* to be confirmed).

The symposium's aim is to establish the status of knowledge and provide a forum for interdisciplinary discussions, with equal time for formal lectures and general discussions. A poster session is also foreseen. The audience, mainly of astrophysicists and particle physicists in roughly equal numbers, will be limited to about 250. Participation is by invitation only. Those definitely interested should write as soon as possible to: Scientific Secretariat, 3rd ESO/CERN Symposium, Istituto di Fisica 'A. Righi', Via Irnerio 46, I-40126 Bologna, Italy. Tel. 051/24 44 90 – Telex 52 06 34 – Telefax 24 72 44.

Books

Quantum Field Theory and Quantum Statistics is the title of an impressive two-volume collection of 64 essays from 83 contributors, mainly from the USSR, Europe and the US, marking the sixtieth birthday (1984) of Soviet theorist Efim Samoilovich Fradkin. Edited by I.A. Batalin and G.A. Vilkovisky of the Lebedev Institute, Moscow, and C.J. Isham of London, and published by Adam Hilger in the UK, this valuable 'encyclopedia' of modern theory reflects Fradkin's wide interests and numerous important contributions.

'Frontiers of Physics', published by Adam Hilger, contains the lectures given at the seventh UK Institute for High Energy Physics, held at Imperial College, London, in August 1986, covering string and lattice theory. Lecturers were asked specifically to be 'provocative and stimulating to an experienced and/or jaded audience'. Editor is Ian Halliday of Imperial College.

'La matière première', a new book by Michel Crozon from the College de France, traces the history, the major discoveries, and the experimental techniques of high energy physics research. It is published by Editions du Seuil, Paris.

Fortran, the main programming language for scientific and numerical work, continues to evolve to meet emerging needs. The latest form, Fortran 8x, looks ahead to the supercomputer era. 'Fortran 8x Explained' is a new book by Michael Metcalf of CERN and J. K.

Accelerator Engineers & Technicians

CEBAF, now under construction in Newport News, Virginia, will be a 4 GeV, high-intensity continuous wave electron accelerator based on superconducting RF technology. The accelerator will provide a unique capability for the detailed study of nuclei.

The challenges of building this facility offer great potential for professional growth for engineers and technicians in the following areas:

CRYOGENICS

Construction of the two largest 2 K refrigeration systems in the world. Projects include a 5 kW, 2 K refrigerator, 1.5 km of transfer line, contamination detection, and a cryogenic test facility for production and R&D testing.

ELECTRICAL

Construction of a large RF power system, a state-of-the-art accelerator control system, instrumentation and control for complex experimental equipment, and power supplies for conventional and superconducting magnets.

MECHANICAL

Construction of cryogenic equipment for superconducting cavities, superconducting magnets for spectrometers, conventional magnets for beam transport, and other complex experimental apparatus.

CEBAF is located in a pleasant mid-Atlantic coastal location near Colonial Williamsburg and the Chesapeake Bay. For prompt consideration, please send résumé along with salary history to: **Employment Manager, CEBAF, 12070 Jefferson Avenue, Newport News, VA 23606.**

CEBAF

The Continuous Electron Beam Accelerator Facility

An Equal Opportunity Employer, M/F/H/V

PHYSICS DEPARTMENT OF STANFORD UNIVERSITY

announces an opening for the position of

PROFESSOR

in Theoretical Particle Physics
and Quantum Field Theory

The Physics Department of Stanford University has an opening for a tenured faculty position in theoretical particle physics and quantum field theory.

The applicants must have demonstrated ability to do significant independent work and must show promise of making a major impact on the field in the years to come. Excellence in the teaching of physics at both the undergraduate and graduate levels is an important requirement for the position.

Stanford University is an equal opportunity employer. We are specially interested in having applications from women and minority persons.

Interested persons are requested to send a resume containing curriculum vitae, a list of publications and names of at least three references to

**Professor Leonard Susskind
Chairman, Theoretical Physics
Appointment Committee
Department of Physics
Stanford University
Stanford, California 94305 - 4060
USA**

Those wishing to draw the committee's attention to potential candidates are invited to write to the same address.



EUROPEAN SYNCHROTRON RADIATION FACILITY Grenoble, FRANCE

The ESRF is a state-of-the-art Synchrotron Radiation source to be built in Grenoble, FRANCE, to meet the needs of the European scientific community for X-rays of high brilliance. The accelerator part consists of:

- an 850 m circumference storage ring with 32 straight sections to accommodate wiggler and undulator sources
- a fast cycling synchrotron used as an injector for the storage ring
- a 400 MeV positron preinjector.

We invite applications for a post of:

ENGINEER EXPERT IN MICRO GEODESY

RESPONSIBILITIES:

1. **On site:** installation of geodetic networks • installation and control of synchrotron equipment
2. **In the metrology room:** development of the automatic levelling system • participation in study of a method of automatic alignment • setting up an interferometric calibration base

QUALIFICATIONS

Chartered engineer with 5 years experience in the field of micro geodesy and metrology, a sound knowledge of computer tools (programmes, compensation by least error squares, experience of micro computers and software interfacing).

Please send a curriculum vitae, date of availability and names of three referees by **29 February 1988**, to:

**ESRF
Personnel Office / Ref-171.87
BP 220
38043 GRENOBLE Cedex - FRANCE**

Reid of Harwell, UK, published by Oxford University Press. Both Metcalf and Reid are members of the X3J3 Fortran standards committee.

CERN Computing School 1988

Now an annual event, the next CERN Computing School will be in Oxford, UK, from 14-27 August, organized in collaboration with the Rutherford Appleton Laboratory. The school aims to attract about 80 postgraduate students and research workers in physics and computing, mostly from CERN Member States or research centres working in close contact with CERN, and perhaps some from further afield. The programme covers software engineering, document preparation, communications and networks, hardware, data acquisition, computer-aided electronics design etc. Information from Mrs. Ingrid Barnett, Secretary, CERN School of Computing, CERN, 1211 Geneva 23, Switzerland.

Meetings

The XXIV International Conference on High Energy Physics ('Rochester' Conference) sponsored by the International Union of Pure and Applied Physics (IUPAP), will be held in Munich, West Germany, from 4-10 August. Attendance is by invitation only. Further information from K. Bacherer, Max-Planck-Institut fuer Physik und Astrophysik, PO Box 40 12 12, Foehringer Ring 6, D-8000 Munich 40, West Germany. Earn/bitnet KAB AT DMOMPI11.

The International Symposium on Weak and Electromagnetic Interactions in Nuclei (WEIN-89) will be held in Montreal from 15-19 May 1989. Further information from Pierre Depommier, Nuclear Physics Laboratory, University of Montreal, P.O. Box 6128, Station A, Montreal, Quebec, Canada H3C 3J7 or via bitnet at WEIN at UMTLVR, PIERRE at TRIUMFCL, or POM at CERNVM.

Chinese beams

At the new Beijing electron-positron collider ring (BEPC), 1.15 GeV particles from the linac made a few turns just before Christmas. Higher energies await commissioning of the ring's radiofrequency system.

Lyndon Evans described CERN's proton-anti-proton collider for the third in the series of John Adams Memorial Lectures.

Electronic Mail

The CERN Courier editorial desk can be contacted through electronic mail using the EARN/BITNET communications network. The Editor's address is

COURIER@CERNVM

For subscriptions (free!), changes of address, etc. the contact is

MONIKA@CERNVM

