

PEOPLE

Wagner heads DESY

Albrecht Wagner (58), professor of experimental physics at Hamburg University and former research director of the DESY Laboratory, Hamburg, takes over as Chairman of the DESY Directorate. He succeeds Bjoern H Wiik, who died in a tragic accident on 26 February.

Following studies at Munich's Technical University, Goettingen, and Heidelberg, where he graduated, Wagner became a research associate at Heidelberg and the Lawrence Berkeley Laboratory. From 1974 to 1986 he carried out his scientific work with experiments at DESY's storage rings, DORIS and PETRA, and at CERN between 1989 and 1990. In May 1984 he became professor of experimental physics at Heidelberg, and in June 1991 accepted a chair at Hamburg. During that same year, he was offered the

direction of DESY's research department.

Wagner has been involved in the planning, construction and operation of the Opal experiment at CERN's LEP storage ring since 1982. Since 1991 he has also focused on physics at electron-positron linear colliders. In recent years he has served as scientific counsellor for the German Federal Ministry of Research, CERN, the American SSC accelerator project, the Karlsruhe Research Centre, the GSI Heavy-Ion Research Institute in Darmstadt and the ELSA project in Bonn.

Wagner is a member of the Nuclear Physics European Collaboration Committee NuPECC, the Scientific Committee Frascati Laboratory in Italy, the Scientific Policy Committee for the Fundamental Nuclear Physics State Scientific and Technology Program in Moscow and the



Albrecht Wagner becomes Chairman of the Directorate of the DESY Laboratory, Hamburg.

Lepton Collider Advisory Committee of the Japanese KEK Laboratory. In 1994 he became a fellow of the American Physical Society.



A recent meeting, *Symmetries and Reflections*, at the State University of New York, Stony Brook, marked the retirement of C N Yang as Einstein Professor and director of the Institute for Theoretical Physics, and it attracted many distinguished physicists from all over the world. **C N Yang** (left) is seen here with **Robert Mills**. Their joint 1954 papers led the way to the new gauge theories that have allowed so much fresh insight into physics.

Bulgaria joins CERN

At the meeting of CERN's governing body, Council, in June, Bulgaria formally became the organization's 20th member state. Bulgarian physicists already participate in the L3 and Delphi experiments at LEP and in the CMS experiment for the LHC.

Long-term objectives are firmly centred on the LHC collider, which is scheduled to come into operation in 2005. However, the LEP electron-positron collider, CERN's research programme, is scheduled to cease operations next year and director general Luciano Maiani outlined a "limited but first-class" research programme for the interim which includes the new Compass experiment (see px), the new antiproton decelerator, the ever-popular ISOLDE on-line isotope separator and several other experiments.

Possible additions to this approved and funded programme are the proposal to send CERN neutrinos to the Italian Gran Sasso Laboratory, 700 km away (*CERN Courier* November 1998, p13), and a new CERN facility to provide neutrons for a range of basic science and for nuclear waste transmutation studies. These projects depend on external supplementary funding being found, and, in the case of the neutrino project, the drawing up of a suitable scientific programme.

Also at the June meeting, Council approved

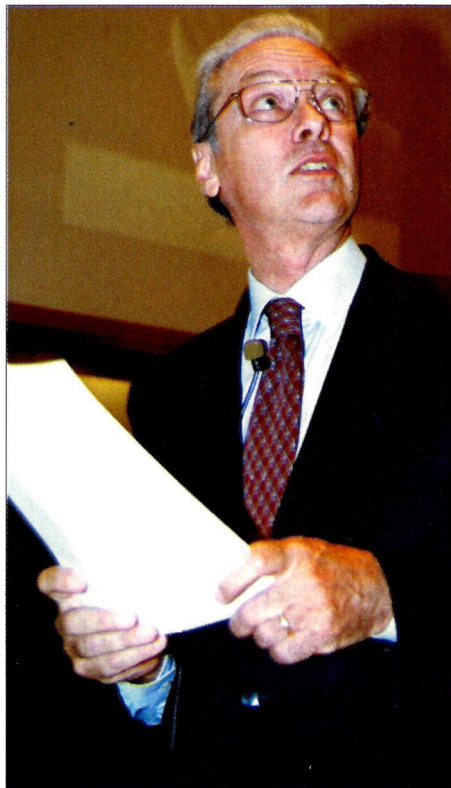


Raising the flag as Bulgaria becomes CERN's 20th member state.

the establishment of a new CERN Education and Technology Transfer Division (ETT) to implement a well focused action in strategic fields, in which CERN communicates to society at large its scientific results, their cultural and educational implications, and as the technologies and methods developed in the process.

Jean-Pierre Delahaye was appointed leader of CERN's Proton Synchrotron (PS) division for three years from 1 January 2000. Steve Myers was appointed leader of the SL (SPS and LEP) division for three years from 1 January 2000. Juan-Antonio Rubio was appointed leader of the new ETT division for three years from 1 January 2000. Karl-Heinz Kissler was appointed leader of SPL (Supplies, Procurement and Logistics) division for three years from 1 April 2000.

Ugo Amaldi is honoured



Ugo Amaldi – widely admired.

A special seminar at CERN on 8 June, marking the 65th birthday of Ugo Amaldi, underlined his wide-ranging and widely admired contributions to science, covering experiment, theory, accelerators, applications, education and literature. Like his illustrious father, CERN pioneer Edoardo, Ugo's contributions to science appear to stem from a deep sense of duty rather than personal ambition.

Amaldi's experimental physics career spans a long series of experiments, which over the years have made significant contributions to our increased understanding of particle interactions at increasingly complex installations (described at the seminar by Paul Langacker of Pennsylvania).

Amaldi, founding father of the Delphi experiment at CERN's LEP electron-positron collider in the 1980s, gathered together an enthusiastic band of collaborators to work on a major new detector, incorporating technology that was very challenging at the time (recalled by Danielle Treille of CERN).

He was also the Chairman of the working

group for what was to become the HERA electron-proton collider at DESY Hamburg, approved for construction in 1984 and now one of the major machines on the world scene (covered by Günter Wolf of DESY).

Also on the machine side, in the 1980s Amaldi made pioneer contributions to the development of far-sighted ideas on linear electron-positron colliders, including the use of superconducting radiofrequency technology. Only now are such machines emerging as one of the main avenues for future high-energy physics progress (described by Wolfgang Schnell of CERN).

As accumulated results from many experiments underlined the coherence of the contemporary Standard Model, at the end of the 1980s and early 1990s, Amaldi and his collaborators pointed out that the extrapolated results from these experiments did not converge to a common point at high energy, as would be required by a Grand Unified Theory synthesizing both strong and electroweak interactions. Convergence required the appearance of new effects, such as supersymmetry, at energies not yet attained in the lab. Langacker pointed out the irony of such heavyweight theoretical ideas coming from a physicist mainly known as an experimentalist.

Amaldi's most recent contribution returns to an early career theme. After the potential of particle beams for cancer therapy was pointed out in the 1930s, Enrico Fermi pushed for a new Istituto Superiore di Sanità in Rome to provide the necessary machines and beams. It was at this institute that Amaldi made his first contributions to physics, working on radiation protection. Some 30 years later he promoted the use of ion beams for therapy in Europe and masterminded the TERA Foundation to provide hadron beams for cancer therapy, skilfully managing administrators, funding agencies, and machine and medical specialists (recounted by M Goitein, Northeast Proton Therapy Center, Boston).

Ugo Amaldi is the scion of an illustrious Italian scientific family. Both his father and his grandfather wrote standard texts. He has continued and extended this distinguished tradition, which now even extends to a fourth Amaldi generation (F Enriques, Zanichelli, Bologna).

MEETINGS

A two-day conference, **Probing Luminous and Dark Matter**, on 24–25 September at the University of Rochester will be looking at future directions in particle physics and will also serve as a symposium to honour 40 years of achievement by Adrian Melissinos.

Speakers will include Charles Bamber, Barry Barish, David Burke, Bill Carithers, Erwin Gabathuler, Leon Lederman, Kirk McDonald, Yoriyo Nagashima, Stephen Olsen, Joe Rogers, Nick Samios, Yannis Semertzidis, Pierre Sikivie, Pierre Sokolsky and Edward Thorndike. Lectures will cover high-energy cosmic rays, the LIGO project, RHIC, Axions, experiments with gas jets, Muon g-2, collider physics, the NLC, laser acceleration, strong-field QED, neutrinos, B physics, deep inelastic scattering and gravitational waves.

For more information and hotel reservations, see the Web page at <http://www.pas.rochester.edu/> and click on "Adrianfest", or contact Judy Mack on "judy@pas.rochester.edu" or tel. (716) 275 4840.

The 3rd Workshop on Physics and Detectors for DAPHNE, the new high-luminosity Frascati Phi-Factory, will be held at the National Frascati Labs of INFN on 16–19 November. Three experiments – DEAR, Finuda and KLOE – will soon start to take data. The workshop will be devoted to a review of the experimental and theoretical issues relevant or close to DAPHNE physics.

Registration (before 1 September) and more information are available at "<http://wwwsis.lnf.infn.it/dafne99/>".



Felicitas Pauss (right) of ETH Zurich, one of the speakers at this year's Nathiagali Summer College, Pakistan (p35) with a student from Lahore. (G Fraser.)

This year's **Neural Computation in High-Energy Physics**, also known as NCHEP-99, will be held in Maale Hachamisha in Israel on 13-15 October.

Neural computation is a developing discipline that deals with mathematical modelling of brain functions and with applications of these models to a range of problems. Its main tools are neural networks—mathematical models based on elements that possess the characteristics of neurons. In the last decade, physicists have developed many tools that make use of the neural network approach. These are successful in pattern recognition for triggering HEP detectors, as well as general classification problems.

The workshop, sponsored by the Israel Science Foundation, will follow the NCST-99 conference on Neural Computation in Science and Technology (at the same location), which covers areas of neurobiological modelling and computational applications. Information about NCST-99 is available at "<http://neuron.tau.ac.il/NCST-99>".

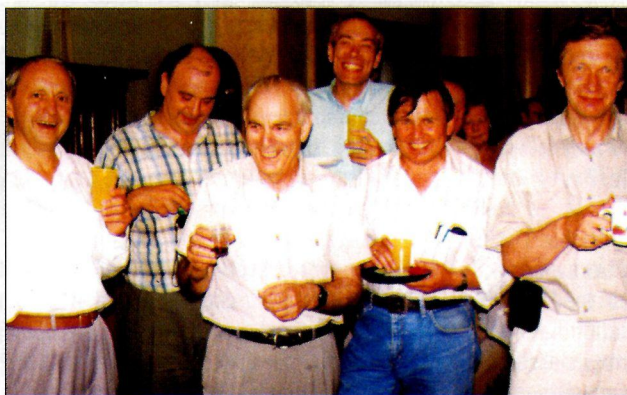
Invitations have been issued to various experiments, running or in the design phase, to present their concepts for trigger designs. Participants at this workshop will include B Denby (co-founder of the AIHENP series), C Kiesling (H1), J M Seixas (ATLAS), A Sokolov (DELPHI) and J Varela (CMS). D Horn will summarize the new trends and ideas discussed at the NCST-99 workshop. The scientific organization of the workshop is handled by H Abramowicz and D Horn from Tel Aviv. Information is available at <http://neuron.tau.ac.il/NCHEP-99>".



At a meeting of the European Committee for Future Accelerators (ECFA) in Denmark earlier this year, CERN director-general **Luciano Maiani** (left) had discussions with Danish research minister **Jan Trøborg**.



CERN delegation meets Chinese President Jiang Zemin in Beijing. Left to right: **Mr Shu**, vice-president of the Chinese Academy of Sciences, CERN director of Collider Programmes **Roger Cashmore**, adviser on CERN non-Member State Relations **John Ellis**, President **Jiang Zemin**, CERN director-general **Luciano Maiani**, CERN LHC project director **Lyn Evans** and Minister of Science and Technology **Zhu Li-Lan**.



Lev Okun (centre) surrounded by his former students at a special event in Moscow to mark his 70th birthday. He will be honoured at CERN on 21 September. Left to right: **Alexandre Dolgov**, **Michail Voloshin**, **Lev Okun**, **Michail Vysotsky**, **Nikolai Nikolaev** and **Victor Novikov**.



Korean Science and Technology Minister **SEO Jung-Uck** (centre) was at CERN in June with Ambassador **KWON Soon-Tae**. Among those he met was **Michel Della Negra** (left), spokesman of the CMS experiment at CERN's LHC collider.

Clifford Charles Butler 1922–1999

Clifford Charles Butler, who was the co-discoverer with George Rochester in 1946–1947 of “V-particles”, died on 30 June. Their discovery can be seen as the first step towards the understanding of the quark nature of matter.

Butler spent the war years at the University of Reading. His first research contributions were in electron diffraction, but by 1947, Rochester and Butler had become members of Patrick Blackett’s group at Manchester. Under Blackett’s guidance they used a cloud chamber with a magnetic field to study the products of the interactions of high-energy cosmic rays in a block of lead. On 15 October 1946 they found an unusual forked track looking like an inverted “V”. This was subsequently interpreted as the decay of a neutral particle (now known as a K-meson), which had to be extremely long-lived on the nuclear timescale. In May 1947 they found a second such long-lived particle. This time it was electrically charged.

To increase the cosmic-ray exposure, the Manchester magnet and chamber were transported to the Pic du Midi in the French Pyrenees, and it became clear that the “V-particles” fell into two separate classes, now known as hyperons and K-mesons.

Their long life was only explained in 1952 by Pais, who suggested that the particles were created in pairs. They could be created in fast nuclear reactions, but once separated from their partner they were no longer able to interact rapidly. Gell-Mann and Nishijima clarified

this picture by identifying a new quantum number, called “strangeness”.

In 1953, Butler moved with Blackett to Imperial College in London, where Butler became a full professor in 1957, heading the High-Energy Nuclear Physics group. He quickly recognized the importance of Glaser’s 1952 invention of the bubble chamber, and the first West European hydrogen bubble chamber was built by his group. This led to the 1.5 m UK National Hydrogen Bubble Chamber, used at the Rutherford Laboratory and at CERN. In 1964, Butler succeeded Bernard Gregory as chairman of CERN’s Track Chamber Experiments Committee.

Becoming deeply involved in science administration, Butler then became head of the Imperial College Physics Department, which was one of the largest multigroup research departments in Europe, while still leading the High Energy Nuclear Physics group. Between 1966 and 1969 he also served as dean of the Royal College of Science. Butler was a good, kind man who cared about the best interests of his staff, and he led a department that was proud of the standards and achievements in both its teaching and its research.

Butler left Imperial College to become director of the Nuffield Foundation from 1970 to 1975, and from 1975 to 1985 he served as vice-chancellor of Loughborough University of Technology. He never lost his interest in physics, playing vital roles in IUPAP – secretary-general (1963–1972), vice-



Clifford Butler 1922–1999.

president (1972–1975) and president (1975–1978). IUPAP generally, and Butler in particular, helped to maintain relations between physicists on both sides of the Iron Curtain during the depths of the Cold War.

Ian Butterworth



UK Institute of Physics (IOP) President **Sir Gareth Roberts** (right) at CERN on 9 July with (right to left) IOP council vice-president and distinguished particle physicist **Peter Kalmus**, CERN engineer **Tim Watson** and IOP director of science **Peter Cooper**.

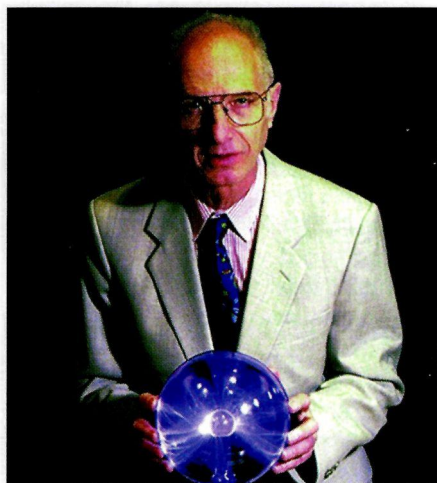
AWARDS

The High-Energy Physics prize

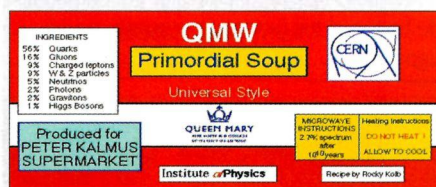
The prestigious High-Energy Physics prize of the European Physical Society goes to Gerard ‘t Hooft of Utrecht “For his pioneering contribution to the renormalization of non-Abelian gauge theories, including the nonperturbative aspects of those theories”. The award was given at the International Europhysics Conference on High-Energy Physics held on 15–21 July in Tampere, Finland.

Russian Academy of Sciences member

CERN director-general Luciano Maiani has been elected a foreign member of the Russian Academy of Sciences.

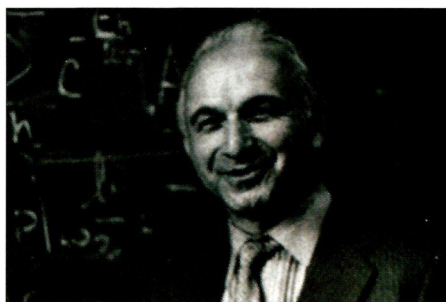


Peter Kalmus of London's Queen Mary and Westfield College recently toured the UK for the Institute of Physics Schools and Colleges lecture "Particles and the universe". The lecture was given in about 40 venues to a total audience of nearly 10 000 school students. The realization that the great diversity of the universe stems from a limited number of elementary particles interacting through a few fundamental forces is one of the major achievements of 20th-century physics. (M Kalmus.)



Among Peter Kalmus' "exhibits" was a can of "primordial soup".

Efim Fradkin 1924–1999



Efim Fradkin 1924–1999.

After 50 years of creative activity at the forefront of theoretical physics, Efim Fradkin died in Moscow on 25 May. His research extended from pioneering the functional method in quantum field theory and discovering, simultaneously with Schwinger, its Euclidean formulation, to basic work in string theory.

He was born in a Jewish neighbourhood near Minsk. At 16 he the university there for a year. The famous mathematician I M Gel'fand, who occasionally lectured there, recognized Fradkin's outstanding abilities and, to support him, gave him 100 roubles. However, the war intervened and Fradkin's family were killed. He joined the army and was wounded in the Battle of Stalingrad.

Fradkin appeared in Moscow in 1948 and was adopted by I E Tamm and V L Ginzburg at the Theoretical Department of the Lebedev Physics Institute, which became his home for the remaining 50 years of his scientific life.

"In the theatre of operations known as theoretical physics, Efim's attacks have been

launched along the whole front," wrote Bryce DeWitt in Fradkin's festschrift. Fradkin pioneered conformal field theory and contributed to the theory of turbulent mixing. He developed the Batalin–Fradkin–Vilkovisky method for quantizing general constrained systems, found new ways to solve spin lattice models, tackled the problem of grand unification via exceptional groups and studied transfer processes in plasma.

Fradkin introduced the method of Green's functions in relativistic statistics and discovered, alongside Landau and Pomeranchuk, the zero-charge behaviour of QED (better known in the West as the Landau pole). He discovered open algebras and invented the first example of gauge supergravity. His relativistic eikonal approximation and the Efimov–Fradkin non-perturbative calculus gave birth to whole new trends of research.

Fradkin was awarded the Stalin state prize in 1953, the I E Tamm prize in 1980 and the Dirac medal in 1989 and was the first recipient of the Sakharov medal in 1996. He was a foreign member of Accademia Pontaniana in Naples and a full member of the Academy of Sciences of Russia. He was a member of CERN's Theory Division, as guest professor of the director-general, in 1996/7.

Fradkin acted as a magnet for young theorists. When his coffin was exposed at the Lebedev Institute, two generations of disciples kept guard. For them – and for the whole community of theoretical physics – his passing was a tremendous loss.

Werner Ruckstuhl 1952–1999

The sudden death of our colleague Werner Ruckstuhl has deeply shocked our scientific community, particularly at NIKHEF, where he worked for the last 10 years.

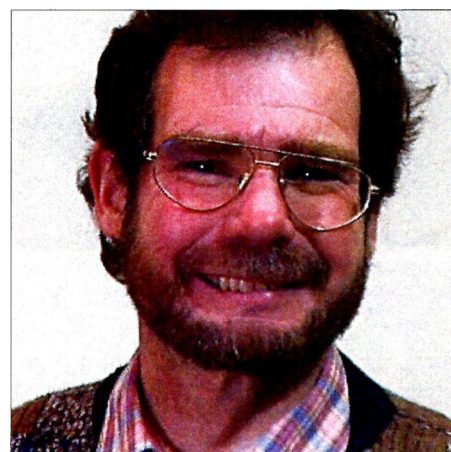
Werner, Swiss born and ETH-Zürich educated, did his PhD on muonic atoms, for which he was awarded the ETH medal. Via Caltech, where he studied lepton universality at the PEP ring at SLAC, and Geneva University as a member of the L3 team at CERN's LEP, he first came to NIKHEF in 1990 to set up the

physics analysis for the Dutch DELPHI group at LEP. His interests soon returned to B physics – having pushed for a B factory at the Swiss PSI lab. Via the GAJET proposal he led NIKHEF into the LHCb experiment at CERN's LHC collider and became the Dutch team leader.

Werner was an excellent, all-round experimental physicist. His catching enthusiasm, in combination with his great sense of humour, stimulated many young physicists. He also made categorical choices – he came to NIKHEF, moved with his family to the Netherlands and became a Dutch citizen.

His absence is strongly felt not only at NIKHEF, but also at CERN and DESY.

Ger van Middelkoop



Werner Ruckstuhl 1952–1999.