

Faces & Places

AWARDS

Sinclair is awarded first CAP-TRIUMF Vogt Medal

David Sinclair is to receive the inaugural Canadian Association of Physicists (CAP)-TRIUMF Vogt Medal for his exceptional vision and contributions to the study of neutrino physics in the pioneering Sudbury Neutrino Observatory (SNO) and for exemplary leadership in establishing the SNOLAB facility.

Named in honour of Erich Vogt, a Canadian nuclear physicist and one of the founders of TRIUMF, the CAP-TRIUMF Vogt Medal has been established to recognize outstanding experimental or theoretical contributions to subatomic physics.

In 2002 the SNO experiment, situated 2 km underground in the Vale/Inco Creighton Mine near Sudbury, Ontario, solved the long-standing solar neutrino problem by finding direct evidence that neutrinos change type as they escape through the Sun (*CERN Courier* May 2007 p26). Sinclair, who is professor of physics at Carleton University, Ontario, and a senior scientist at TRIUMF, was one of the leaders of the experiment.

Sinclair returned to Canada to participate



David Sinclair, recognized for his leadership in the SNO experiment. (Image credit: Carleton University.)

in the SNO project after 16 years at Oxford University, where he worked on research on the structure of nuclei and also designed the first dedicated carbon-dating facility, which was used to date the Turin Shroud. He is now director of facilities development

for SNOLAB – an expansion of the facilities constructed for SNO – and is currently developing a detector, EXO, to search for neutrino-less double beta decay. He will receive the medal during the 2011 CAP Congress on 16 June.

PHYSICS IN INDIA

Atul Gurtu retires from the Tata Institute

Atul Gurtu, a senior professor at the Tata Institute of Fundamental Research (TIFR) in Mumbai, has retired after a career in particle physics spanning four decades. During this time he has been deeply involved in particle-physics research in India and committed to fostering relations with international laboratories and institutions.

As part of the TIFR team in the era of the Large Electron-Positron (LEP) collider at CERN, Gurtu played a key role, together with Som Ganguli and several doctoral students, in the precision measurement of the properties of the Z boson and the determination of the mass and width of the W boson. In recognition of this, Gurtu was invited to join the LEP Electroweak Working Group at its inception in 1991. He was nominated by CERN to be a contributor on the properties of W and Z particles for the Particle Data Group, of which he continues to be a member.

Since the mid-1990s he has been at the



Atul Gurtu. (Image credit: TIFR.)

heart of Indian participation in the CMS experiment at the LHC, becoming the spokesperson of the India-CMS group in

2003. He oversaw the successful contribution of Indian groups to CMS and laid the ground for many Indian researchers and students to analyse physics data. He has been deeply involved in the Grid-related activities of the India-CMS and India-ALICE groups, as well as participating in setting up the Tier-2 centre of the Worldwide LHC Computing Grid at TIFR.

Gurtu has also been active in organizing and promoting Indian participation in future facilities, such as the International Linear Collider, and has been the Indian representative on the Funding Agencies for Large Colliders committee since 2004. More recently, he has worked towards a possible formal participation of India in CERN and was the Indian link-person with CERN.

Following his retirement, he will continue to work with CMS and to press the case for deepening the ties between India and CERN to the mutual benefit of both.

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SCHOOLS

Successful course heralds rebirth of accelerator school

The Joint US-CERN-Russia-Japan School held a course on Synchrotron Radiation and Free Electron Lasers on 6–15 April, at the Ettore Majorana Foundation and Centre for Scientific Culture in Erice. With a programme of lectures, discussion sessions and student presentations, it attracted 65 participants from 22 different countries, with around half from Europe and the other half from Russia, Asia and the Americas. In addition to the academic programme, the students had the opportunity during a one-day excursion to visit archaeological

sites at the Temples of Segesta and Selinunte.

Feedback from the participants was extremely positive, praising the expertise and enthusiasm of the lecturers, as well as the high standard of the lectures. The course was the first to be organized under the umbrella of the Joint US-CERN-Russia-Japan School for nearly a decade. Its success is encouraging the organizers to re-launch the Joint International Accelerator School, which ran on a roughly two-year cycle from 1985 to 2002. The next school would be held somewhere in Asia.



Roger Bailey, left, and Bill Barletta, representing the CERN and US elements of the Joint Accelerator School.

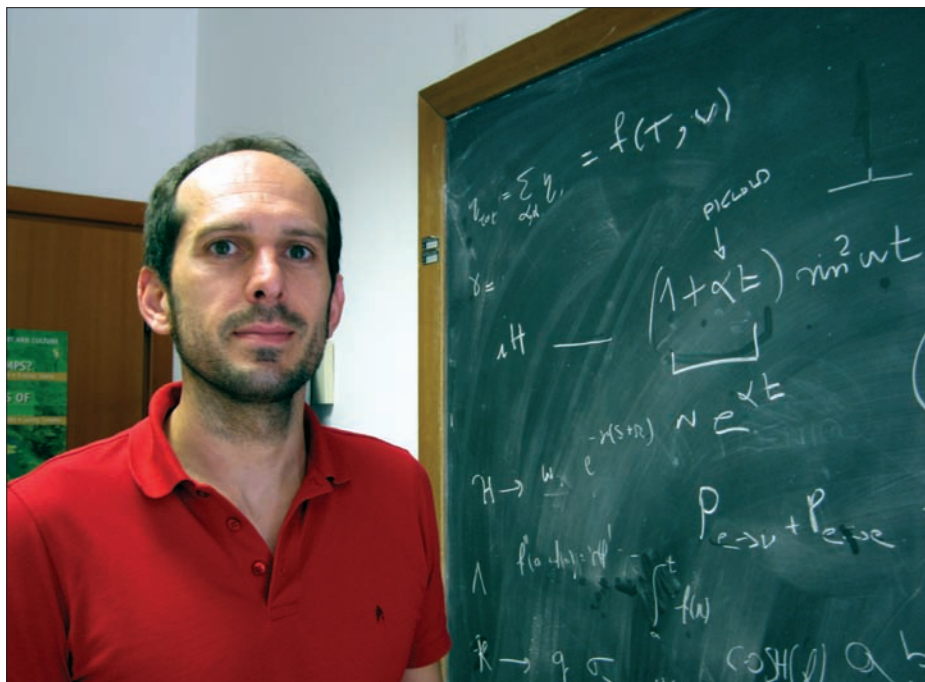
QUANTUM MECHANICS

European researchers prepare for fundamental Action

Quantum mechanics is arguably the most successful physical theory in the history of science. It set out to explain the atomic structure of matter and has since led to revolutionary technologies. Despite many successes, however, the debate about the precise formulation of the theory, its range of validity and the quantum-to-classical transition, it is still open. These open problems continue to be the subject of intense theoretical and experimental research, leading to novel and cutting-edge experiments, with the promise of further technological developments. Now, for the first time, a network is to co-ordinate research in this fascinating area of physics.

Within the context of the intergovernmental framework for European collaboration on science and technology (COST), European members of the quantum-foundations community met in Brussels on 11 April for the first meeting of the COST Action, “Fundamental Problems in Quantum Physics”. This project is establishing the first network in the world dedicated to quantum mechanics and its fundamental and fascinating problems.

The Action involves the participation of more than 40 scientists from 20 European and neighbouring countries, and will co-ordinate



Angelo Bassi from the University of Trieste chairs the COST Action on Fundamental Problems in Quantum Mechanics. (Image credit: A Bassi.)

scientific research, meetings, training schools, workshops and conferences within the community over the next four years. During this first meeting, Angelo Bassi of the University of Trieste and Deltef Dürr of Ludwig-Maximilian University, Munich, were elected as chair and deputy-chair of the Action, respectively, and four working groups were established. These reflect the four major research topics involved.

The working group on “Quantum theory without observers” is chaired by Nino Zanghì, of the University of Genoa. As John Bell stated: “The formulations of quantum mechanics that you find in the books involve

dividing the world into an observer and an observed, and you are not told where that division comes – on which side of spectacles it comes, for example, or at which end of my optic nerve [...] So you have a theory that is fundamentally ambiguous [...]” (*The Ghost in the Atom*, 1986). This is the famous “measurement problem” of quantum mechanics and the aim of research in this area is to resolve the ambiguity by giving a consistent, paradox-free formulation of quantum theory.

“Effective descriptions of complex systems” forms the topic of the second working group, with Irene Burghardt, of

the Goethe University, Frankfurt, as chair. One of the fast-growing areas of research in quantum mechanics is the quantum-to-classical transition. The issues at stake are not only conceptual – how the classical world emerges from the underlying quantum dynamics – but also technological. Novel advances in molecular physics, the most fascinating being energy transfer in photosynthetic systems, will depend a great deal on whether these complex systems retain quantum properties or behave classically. The problem is much debated. The general question is to understand how phenomenological laws, like transport equations describing the behaviour of molecular systems, derive from the underlying microscopic dynamics, which is quantum mechanical.

The third working group, “Quantum

theory meets relativity”, is chaired by Fay Dowker, Imperial College London. The post-Einsteinian world view is that of a four-dimensional universe in which the laws of physics obey the principle of relativity. However, the marriage of relativity and quantum mechanics turns out to be problematic. First, infinities in quantum field theories indicate that they are not the final theories of nature. Second, the Bell inequalities prove the nonlocality of nature, which deepens the tension with relativity. Third, the problem of quantizing gravity has not been fully resolved. Releasing the tension between quantum mechanics and relativity is a major open problem.

Last, Beatrix Hiesmayr of the University of Vienna chairs the working group “From theory to experiments”. Recently, the Nobel laureate Anthony Leggett stated: “I’m

inclined to put my money on the idea that if you push quantum mechanics hard enough it will break down and something else will take over – something we can’t envisage at the moment” (*New Scientist*, 2010). The spectrum of research is wide, and ranges from quantum optics, to molecular, atomic and subatomic physics. Experiments that aim to push quantum superpositions towards the macroscopic scale, involving a larger and larger number of particles, are particularly popular. The most famous experiments are diffraction of macromolecules, opto-mechanical interferometers, as well as superconducting-devices. The technological efforts required are enormous – but so, too, are the expected future pay-offs.

• For more information, see www.cost-esf.org/domains_actions/mpns/Actions/mp1006.

DETECTORS

Industry meets academia on silicon photomultipliers

On 16–17 February, CERN hosted the first industry/academia matching event on silicon photomultipliers (SiPMs) and related technologies. It was promoted by HEPTEch, the technology-transfer network created by CERN and its member states to enhance technology transfer in the high-energy-physics community. The event attracted around 140 participants from academia (67%) and industry (33%), representing 43 public research organizations and 21 companies.

SiPMs represent the state of the art in low-light detection, with single-photon sensitivity and genuine photon-number resolving capability. Their characteristics and costs make them increasingly attractive to particle-physics experiments and for research applications, notably in medical imaging and fluorescence detection in life science. However, turning an SiPM into a real detecting device or instrument requires the development of appropriate front-end electronics and data-acquisition systems, together with the resolution of non-trivial issues related to the integration of a large number of sensors. These developments fall into the domain of particle physics, which has pioneered the use of SiPMs over the past decade. Today, this community has significant expertise and technological know-how that can be beneficial to other fields.

The event, organized over two half-days,



An industry exhibition stand on display during the event.

aimed to foster an exchange between various stakeholders from industry and academia, as well as to provide an overview of state-of-the-art technologies and define a roadmap towards collaborative R&D for the development of key solutions for SiPMs in different applications. The programme was split into two parts: on the first day, review talks addressed ongoing developments on the sensors and their applications in various domains; on the second day, companies

presented their profiles, products and development projects.

The first day started with an overview of SiPM production and readout electronics and their use in high-energy physics experiments. A review of the application of SiPMs in medical imaging followed. In this field, many groups are carrying out an enormous R&D effort, in particular to improve the light-detection efficiency and the timing performance of SiPM-based

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detection modules. The astroparticle-physics community has also demonstrated an increasing interest in the use of SiPMs, namely for photon detection in future experimental set-ups. Interesting perspectives for the use of SiPMs also exist in life-science imaging, a domain that increasingly needs the excellent timing characteristics of these devices.

The presentation of the industry view on medical imaging highlighted the importance of taking into account market constraints, business prospects and proper intellectual-property management when transferring such technologies to industry. The series of review talks ended with a field report on the technology transfer of an SiPM readout kit, illustrating the transfer potential of technologies and expertise that are available in the particle-physics community.

The second day was reserved for companies to present their product portfolio and research capabilities, as well as their availability to participate in joint R&D programmes with academia. It gave a taste of how industry is actively extending the development of this technology as well as its eagerness to increase business prospects.

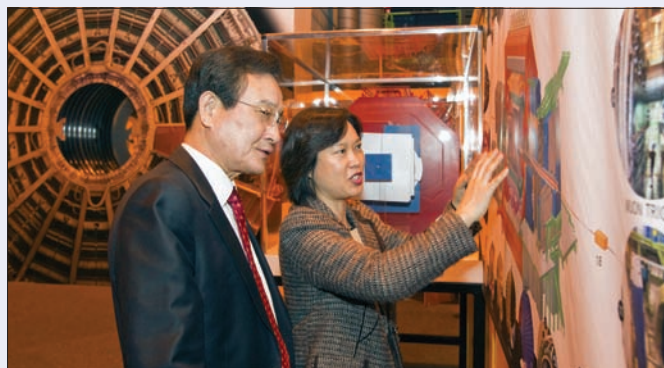
An important aspect of the event was the possibility for the different communities to make contact and merge their interests. There were lively discussions around the demonstrations that were set-up by researchers to promote their technologies. There were also opportunities to meet at the various company booths. Sixteen technology fact-sheets were made available on the event's website, including job offers and CVs, which turned the meeting into a true market place for everyone involved.

A feedback questionnaire that circulated soon after the event showed that the participants were highly appreciative of the organization, venue and structure, reflecting the importance of selecting the speakers in a way that keeps a good balance between their personal visions and the needs of the community they represent. Many participants recognized that carrying out collaborative R&D with industry is crucial for academia to have access to and acquire expertise in this field for its own research purposes.

The participants expressed their strong interest in a follow-up event, with more emphasis on technology-transfer aspects and related services with a view to increasing the effectiveness of collaboration between academia and industry.

● For more details about the HEPTEch network, see www.heptech.org, and for the SiPM event, see <http://indico.cern.ch/internalPage.py?pageId=0&confId=117424>.

VISITS



Jae-Il Byun, left, Korean chair of the education and scientific technology committee in the national assembly, right, visited CERN on 15 March. Here he is at the ALICE exhibition with **Jin Sook Kim**, a member of the ALICE collaboration and Gangneung-Wonju National University.

Phil Mjwara, director-general, department of science and technology, ministry of science and technology for the Republic of South Africa, centre, was welcomed to CERN on 21 March by **John Ellis**, CERN adviser for South Africa, left, and **Felicitas Pauss**, head of international relations. His visit included the CERN Control Centre, the ATLAS visitor centre and the ISOLDE facility.



Israeli president **Shimon Peres**, second from left, came to CERN on 29 March. During his visit he toured the ATLAS underground experimental area with **Giora Mikenberg**, left, of the ATLAS collaboration, Weizmann Institute of Sciences and Israeli industrial liaison office, **Rolf Heuer**, CERN's director-general, and **Fabiola Gianotti**, ATLAS spokesperson. The president also visited the CERN computing centre and met Israeli scientists working at CERN.

On 20 April, **José Manuel Barroso**, president of the European Commission, left, visited CERN. His tour included the CMS control room and the CMS underground experimental area, together with **Guido Tonelli**, the CMS spokesperson.





A Ukrainian task force, led by **Volodymyr Semynozhenko**, left, head of the Ukrainian Agency for Science, Innovation and Information, visited CERN on 17–18 March. Seen here with him at the ALICE exhibition are, from left to right: **Boris Grinyov**, first deputy-head of the State Agency on Science, Innovation and Information of the Ukraine; **Gennady Zinovjev**, ALICE and the Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine; **Yu Avksentiev**, deputy-minister, Cabinet of Ministers of the Ukraine; **Yuriy Panasiuk**, deputy-head, Trade and Economic Mission to the Permanent Mission of the Ukraine to the UN office and other international organizations in Geneva; and **Paolo Giubellino**, the ALICE spokesperson.

MEETINGS

Muon Collider 2011: Physics – Detectors – Accelerators will take place in Telluride, Colorado on 27 June – 1 July. The workshop will review the physics case for a muon collider, accelerator R&D progress, the outstanding challenges, future plans and opportunities for new and existing groups to participate in further research and development. For more information, see <http://conferences.fnal.gov/muon11> or contact Cynthia M Sazama, e-mail: sazama@fnal.gov.

The International Workshop on Early Physics with Heavy-Ion Collisions at the LHC (**EPIC@LHC**) will be held in Bari on 6–8 July. The aim is to bring together experimentalists and theoreticians to discuss the results of the first measurements with heavy-ion collisions provided by the LHC at the end of 2010. Results from ALICE, ATLAS and CMS will be presented, together with recent results and progress from experiments at RHIC and the SPS. The workshop will help to refine the perspectives and guide the future studies on heavy-ion collisions at the LHC. For more information, see www.ba.infn.it/EPIC.

COOL11, the Workshop on Beam Cooling and Related Topics will take place at the Pansionat “Dubna” in Alushta, Crimea, on 12–16 September. The main goal is to

highlight the state of the art in the physics and engineering of beam cooling systems and related techniques, including electron, stochastic, laser and muon (ionization) cooling. The programme includes applications of beam cooling to traps, heavy ion and antiproton beams. Presentations of new developments and techniques as well as of the status of existing and future facilities are invited. For more information, see <http://cool11.jinr.ru>.

The **6th International Accelerator School for Linear Colliders** will take place on 6–17 November at the Asilomar Conference Center, Pacific Grove, California. Organized by the ILC Global Design Effort, the CLIC study and the ICFA Beam Dynamics Panel, the school is hosted by SLAC and sponsored by several funding agencies and institutions. The first two and a half days will be an introductory overview of TeV-scale lepton colliders, followed by two elective courses, on accelerator physics and RF technology. The school will accept a maximum of 70 students from around the world. They will receive financial aid for attending, including travel (full or partial). There will be no registration fee. The application deadline is 30 June. For more information, see www.linearcollider.org/school/2011 or e-mail icschool@slac.stanford.edu.

CELEBRATION

Sergei Matinyan celebrates his 80th year

January 2011 marked the 80th birthday of Sergei Matinyan, a prominent Armenian theoretician and outstanding mentor.

Born in Tbilisi, Georgia, Matinyan established the first high-energy physics laboratory there before moving to Armenia in 1970 as deputy to Artem Alikhanian in the Yerevan Physics Institute and head of the theory laboratory. He was instrumental in organizing the Soviet-American workshops on gauge theories held in Yerevan in 1980s. Attended by many major figures, these were essential events at the time of the Iron Curtain.

He has obtained important results, particularly in the asymptotic theory of hadron interactions, ground-states in non-Abelian Yang-Mills theory and chaos in fundamental physical theories. Recent work has been on nanoscience. Under his supervision, some three dozen students have gained PhDs in quantum field theory, phenomenology, grand unification, supersymmetry (supergravity) and statistical mechanics.



Sergei Matinyan, now 80, is a well known theoretician. (Image credit: Yerevan Physics Institute.)

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OBITUARIES

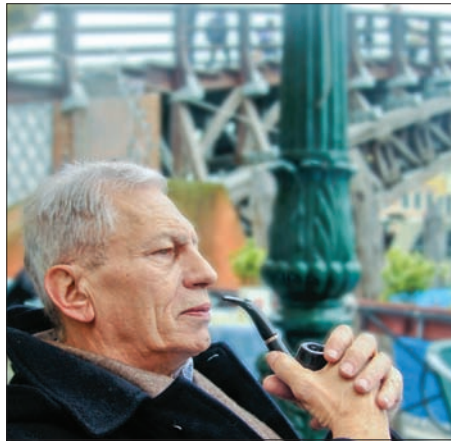
Emilio Pagiola 1937–2011

CERN physicist Emilio Pagiola passed away on 22 February following a long illness.

After obtaining a degree in physics from the University of Padua, Emilio joined CERN in March 1966 as an experimental physicist in the Track Chamber Division – at a time when the bubble-chamber technique was an important part of high-energy physics research. As a member of the CERN-Heidelberg-Saclay collaboration, he was active in low-energy formation experiments using beams from the Proton Synchrotron. His particular contribution was a novel partial-wave analysis of $\bar{K}$ -N interactions. This was a time of resonance hunting, leading to the SU(3) classification scheme of Murray Gell-Mann and Yuval Ne'eman as well as the quark model of Gell-Mann and George Zweig. In this work, Emilio made many contributions to the analysis software and built a wide reputation as a computer wizard.

In particular, he made significant contributions to the editing programme PATCHY used for maintaining source material and managing large volumes of source code. It allowed multilevel replacements of material at the level of single FORTRAN statements, as well as the selection of versions according to control cards. Although intended for use only at CERN, PATCHY turned into a general-use editing package on many systems using CERN programs. Emilio also contributed to other software packages, such as HYDRA, a modular program for bubble-chamber data analysis.

Less known is Emilio's contribution to the early version of the popular HBOOK histogram package – the ancestor of the PAW and ROOT analysis systems. HBOOK was derived from a subroutine named HISTME,



Emilio Pagiola. (Image credit: S Pagiola.)

written by Emilio, to which three entry points were added: HBOOK, HFILL and HISTDO.

In the mid-1970s, with the start of the Super Proton Synchrotron at CERN, a programme of neutrino physics using the Big European Bubble Chamber (BEBC) was initiated. The measurement devices (ERASME) had been developed to measure events in hydrogen, and had to be adapted to handle neutrino interactions in neon, which are more complex because of converted photons and secondary interactions. Emilio led the ERASME team in a crash effort to produce an interactive measurement system that could easily guide a physicist or a scanner through the difficult measurement of such events. This interactive system was a great success and was used throughout the BEBC neutrino programme. Emilio also co-authored several papers reporting results from these experiments.

He was one of the first to recognize and

exploit the possibilities of interactive graphics as an analysis tool and, in particular, was the first – in the 1980s – to bring the NeXT computer to CERN. This was a crucial tool in the development at CERN of the World Wide Web, as described in *How the Web Was Born*, the book by James Gillies and Robert Cailliau. Emilio's knowledge of computers and computing was outstanding and he was always several years ahead of the majority of physicists in recognizing the best software and hardware tools that could be used. For example, he dedicated much effort in CERN's Physics Division to obtain the desktop computing facilities that all physicists now take for granted.

Emilio was a scientist gifted with unconventional intelligence, a critical mind and broad culture, ranging from science to history, politics and finance. His passion for music was legendary. Up until the end of the 1970s, he was part of a small group of about 10 physicists – calling themselves the Red Guard – who met once a week for a brainstorming session in the office of the division leader, Charles Peyrou, to discuss subjects of physics or mathematics not necessarily directly connected to CERN's scientific programme.

After retiring from CERN in 2002, and even during the years of his illness, Emilio continued to come to the laboratory to meet colleagues and friends and to discuss the latest developments in the field with them. His ideas and criticisms were always much appreciated.

Emilio will be sorely missed. Much sympathy goes to his wife Maria, their two sons Stefano and Federico, and their families.

● *His friends and colleagues.*

Peter Harold Sharp 1940–2011

Peter Sharp, a talented experimental physicist, a superb strategist, a trouble-shooter par excellence and an eternal optimist, passed away on 11 March.

Peter began his scientific career in 1960 at the UK Atomic Energy Authority at Harwell, working on the development of the NIMROD accelerator for the Rutherford High Energy Laboratory. Two years later, he started his undergraduate studies and obtained his

bachelor's degree from the University of London in 1965. On his return he began working towards his PhD, which was awarded in 1971 on an experiment at NIMROD. He remained at what became the Rutherford Appleton Laboratory (RAL) until 2000, when he joined the CMS experiment at CERN.

Peter's achievements at RAL included two ground-breaking projects. As leader of the RAL group on the WA69 experiment

at the Omega Spectrometer at CERN he was responsible for the construction of a large ring-imaging Cherenkov detector in the early 1980s – the first major use of this kind of detector. Then, as head of the Electronics Division at RAL (from 1986) he was heavily involved in the construction of the first pipelined electronics and trigger system for the ZEUS experiment at HERA, DESY, which was to be – in some senses – a

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prototype for experiments at the LHC. In 1995 Peter became director of technology and in 1998 director of instrumentation at the UK Central Laboratory of Research Councils, based at RAL.

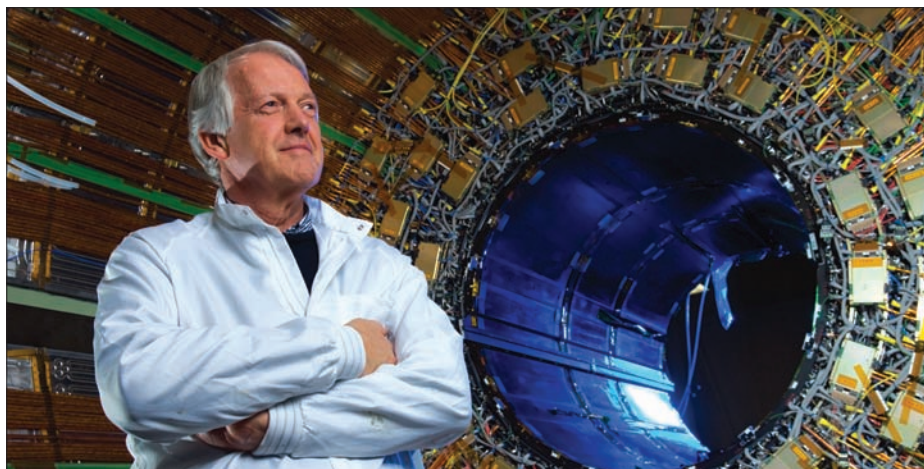
The wide scope of Peter's knowledge of instrumentation in particle physics meant that his advice was continually sought by the peer-review bodies of major laboratories in the field. He provided this to great effect, especially through the Detector Research and Development Committee and the LHC Committee at CERN, and the Topical Workshops on Electronics for Particle Physics.

However, it is in the past decade that many of us came to appreciate Peter's unique talents. His contribution to the successful completion and commissioning of CMS was immense. It is no exaggeration to say that the smoothly running scientific instrument that is CMS today owes a great deal to Peter's skill, foresight, leadership and tenacity – and, not least, his powers of persuasion.

His impact on LHC experiments started in the early 1990s. He was one of the few people who drove the development of the radiation-hard deep-submicron (DSM) electronics that have had a major impact on CMS and other experiments. Peter had the vision to see what was needed: investment in people and commercial design-tools; and a systematic approach to requirements, specifications and reviews. He understood the importance of, and built links to, industry and fostered closer links with CERN and other European laboratories. The use of DSM technology was to become a crucial element in the design of CMS and is now recognized as a key underlying technology.

DSM technology was first used in CMS in 1999 for the redesign of the electronics chain for the tracker and subsequently in the redesign of the electronics chain for the crystals of the electromagnetic calorimeter. The challenge of meeting the calorimeter's exacting performance requirements and escalating costs were causing concern for its timely success. Peter, by then the electronics co-ordinator for CMS, played a crucial role in the redesign, the restructuring of the electronics project and in working out a plan of production that could fit into the highly compressed time remaining before the LHC became operational.

His many skills were soon called on again, this time in the CMS tracker project, where the challenges of large-scale component manufacture and the complexity of timely assembly and integration were a concern. Peter recommended restructuring the project and was asked to step in. He offered crucial technical oversight and leadership during a pivotal period in



Peter in front of the CMS tracker during its construction. (Image credit: S Boreham/STFC.)

the construction, which resulted in the high-quality silicon tracker CMS now has.

Throughout all of these challenges, Peter's bold personality was there for all to see, marked by charm, integrity and generosity of spirit. His long and valiant battle against severely debilitating illnesses over the last two years only served to emphasize the optimism and total commitment that characterized his professional life. His keen

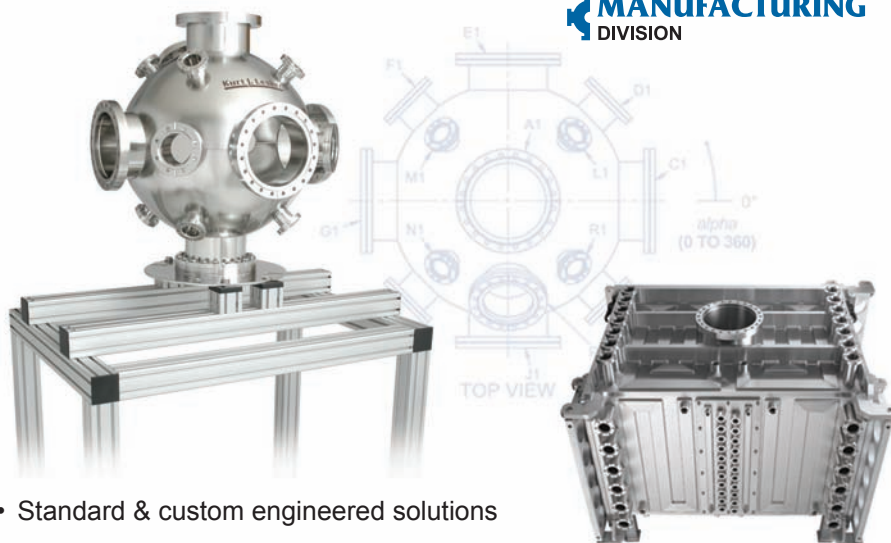
intellect was never dimmed and the latest news from CMS was what he most wanted to hear. True to form, up until his last days, he was enquiring about the experiment, still discussing its upgrades – forever looking forward into the future to the new challenges in his own inimitable way.

Peter is survived by his wife, Betty, and their daughter Cathy and son Jonathan.

● *His friends and colleagues.*

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Maximilian Kreuzer 1960–2010

Theoretical physicist Maximilian (Max) Kreuzer, professor at the Vienna University of Technology (TU Vienna), passed away on 26 November, just two years after learning that he had an aggressive blood cancer. He did not lose hope but fought the disease heroically and with a clear mind, keeping up his scientific work until the end. He had established a vibrant string-theory group at TU Vienna with a sizeable number of students and postdocs.

Max is well known in the string-theory community for his work with Harald Skarke on the classification of reflexive polytopes in four dimensions and hence of a huge class of Calabi-Yau manifolds. (These are used by string theorists to compactify 10-dimensional superstring theories into 4-dimensional ones, at the same time encoding particle-physics models in the geometry of hidden dimensions.) Prior to their work, only the 16 two-dimensional reflexive polytopes had been classified completely. In 2000, following several years of computer-assisted work, he and Skarke obtained all 473 800 776 reflexive polytopes in four dimensions and an equally voluminous catalogue of Calabi-Yau manifolds and their topological properties.

Max studied physics and mathematics at TU Vienna, where he graduated in 1986



Max Kreuzer. (Image credit: TU Vienna.)

as a student of Wolfgang Kummer with a thesis on grand unification, before starting his postdoctoral career at the University of Hanover. There, he made himself known by solving a problem of classification, namely of anomalies in quantum field theory, in well cited work with Norbert Dragon and Friedemann Brandt. He was drawn into superstring theory during his next

postdoctoral position at the University of California, Santa Barbara.

As a CERN Fellow (1991–1993), Max continued his work on string theory and evolved into one of the world experts on the construction of Calabi-Yau manifolds. Many people remember him from those days as a likeable, witty colleague with a sharp mind. During that time, his daughter Maria was born. After he left for Vienna, he kept close ties with the Theory Division (TH) at CERN, not least via the numerous PhD students he sent. Suzy Vascotto, who was in the TH secretariat when Max was a fellow at CERN, says, “I don't know why his smile has kept so fresh and clear in my memory, as there were so many people around before and after him in TH. But some people have stood out over the years, and he was one of them.”

Max will be remembered like this by all who had the privilege of working with him and becoming his friend.

● *Wolfgang Lerche, CERN, Anton Rebhan, Vienna University of Technology.*

A commemorative scientific meeting will take place at the International Erwin Schrödinger Institute, Vienna, 25–28 June, organized by Ludmil Katzarkov, Johanna Knapp, Anton Rebhan, and Emanuel Scheidegger.

NEW PRODUCTS

Lake Shore Cryotronics Inc has introduced the new Model 335 temperature controller, the first two-channel model with user-configurable heater outputs delivering a total of 75 W of low-noise heater power. Output 1 functions as a current output while output 2 can be configured in current or voltage mode. The controller's zone-tuning feature allows seamless measurement and control of temperatures from 300 mK to more than 1500 K. For more information, tel +1 614 891 2244; e-mail info@lakeshore.com; or see www.lakeshore.com/temp/cn/335po.html.

Maxon Motor has announced the new brushless direct current motor EC 40. The palm-sized motor features a neodymium permanent magnet, stainless-steel housing and welded flanges. It has a flat speed/torque gradient of about 3.6 rpm/mNm, mechanical time constant of 2.1 ms, permissible speed of 18 000 rpm and 89% efficiency. For more information, contact Pierre Lebet, e-mail

pierre.lebet@maxonmotor.com; or visit www.maxonmotor.ch.

Narda Safety Test Solutions GmbH has introduced the EHP-50D isotropic field analyser, an improved version of the probe for measuring low-frequency electromagnetic fields from 5 Hz to 100 kHz. Simultaneous measurement of all three axes coupled with a dynamic range of up to 150 dB ensures that signals can be captured quickly, reliably and over a wide range. Equipped with a datalogger and lithium-ion battery, the EHP-50D can operate for up to 24 hours in stand-alone mode. For more information, tel +49 7121 9732 777; e-mail support@narda-sts.de; or see www.narda-sts.com.

Pfeiffer Vacuum has announced a new version of the gas-cooled Roots pump OktaLine G, with pumping speeds in the range 250–12 000 m³/h. It is ideal for low- and medium-vacuum applications in

research and development. The heated gas is cooled on the pressure side and partially returned to the suction chamber, allowing for continuous operation in high pressure ranges. Energy-efficient drives and the use of frequency converters lower energy consumption by up to 20%. For further details, e-mail Nicole.Ackermann@pfeiffer-vacuum.de; or visit www.pfeiffer-vacuum.com.

Physik Instrumente LP has released a new miniature hexapod parallel positioner for vacuum applications. The M-811.STV vacuum-compatible hexapod measures 130 mm in diameter and 115 mm in height for easy integration into vacuum chambers. It has a load capacity of 11 lb (5 kg), actuator resolution of 0.04 µm, repeatability of ±0.5 µm, velocity to 10 mm/s and includes digital controller and software. A non-vacuum version is also available. For more information, e-mail info@pi-usa.us, or see www.pi-usa.us.