

Faces & Places

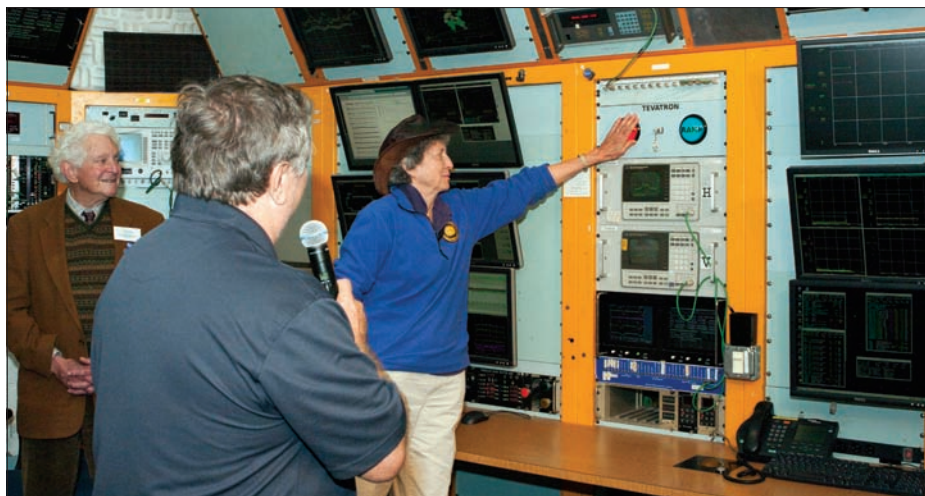
FERMILAB

The Tevatron shuts down for the last time

Thousands of staff members and scientific collaborators flooded Fermilab and watched remotely online from across the globe to see the Tevatron power down one final time on 30 September. Following the shutdown, everyone joined in to celebrate nearly three decades of scientific and technological achievements that have changed the way we understand the world (*CERN Courier* October 2011 p20).

"The Tevatron exceeded every expectation ever set for it," said Fermilab director Pier Oddone, as the 40-minute shutdown procedure began. "As of this moment, the two detectors, CDF and DØ, have recorded nearly 12 inverse femtobarns of data. The collider has reached peak luminosities of $4 \times 10^{32}/\text{cm}^2/\text{s}$, producing several million collisions per second. These numbers were considered totally impossible by scientists and engineers back in the eighties when the machine first came online."

The Tevatron was the world's first superconducting synchrotron, delivering beams to fixed-target experiments until 2000 (*CERN Courier* November 2011 p28). In operating as a proton–antiproton collider from 1987 onwards, it required the development of the world's most intense, consistent source of antiprotons and eventually operated 300 times beyond its original design capabilities. The creativity and tools needed for these achievements generated a globally competitive workforce that has gone on to help design the LHC and



From left: Leon Lederman, former director of Fermilab; Robert Mau, former head of Fermilab Accelerator Operations; and Helen Edwards, former head of the Accelerator Division, abort colliding beams in the Tevatron for the last time. (Image credit: Fermilab Visual Media Services/Marty Murphy.)

countless physics experiments.

The discovery of the τ neutrino by the fixed-target programme was one of the main achievements in neutrino physics worldwide. In the collider runs, the discoveries made by the CDF and DØ experiments include the top quark and a whole new family of baryons. The subsequent precision measurements of the top quark as well as those of the W boson mass have laid the groundwork for the search for the Higgs boson.

Shutting the Tevatron down was a

bittersweet time for employees and users, many of whom had spent most of their careers making the machine one of the most productive sources of physics research in the world. CDF and DØ will continue to deliver analyses from Tevatron data at an average rate of one scientific paper a week for at least two more years.

● Extracted from an article in *Fermilab Today*, where daily news about Fermilab's activities can be found at www.fnal.gov/pub/today/.

APPOINTMENT

Ferroni takes the reins at INFN

Fernando Ferroni has been appointed as the president of the Italian National Institute for Nuclear Physics (INFN), by a ministerial decree announced on 26 October. He replaces Roberto Petronzio who has guided INFN for seven years.

Born in Rome in 1952, Ferroni obtained his physics degree in 1975 at the University La Sapienza of Rome where he is currently professor. A particle physicist, he worked at CERN first in the 1980s on neutrino experiments and then on the L3 experiment at the Large Electron–Positron collider. At the beginning of the 1990s he began collaboration



Fernando Ferroni. (Image credit: INFN.)

with the BaBar experiment at SLAC in studying CP violation in the b quark decay.

Ferroni is currently working at the INFN's Gran Sasso National Laboratory on research into neutrinoless double β -decay with the Cryogenic Underground Observatory for Rare Events (CUORE). He is also involved with LUCIFER, a project financed by the European Research Council to build a background-free detector for neutrinoless double β -decay. The author of more than 700 scientific papers, he has been involved in many international committees on high-energy physics.

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APPOINTMENT

Womersley takes over at STFC

John Womersley has been appointed Chief Executive Officer of the UK's Science and Technology Facilities Council (STFC) for four years from 1 November 2011.

A graduate of Cambridge and Oxford, he has played a leading role in particle physics both in Europe and the US. He worked at the Florida State University and Fermilab, where he was spokesperson for the DØ experiment, before becoming a scientific advisor to the Department of Energy in the US. He returned to the UK in 2005 to become Director of the Particle Physics Department at the STFC Rutherford



John Womersley.
(Image credit:
STFC.)

Appleton Laboratory at a time when it was building and delivering vital components to

CERN's Large Hadron Collider.

In 2007, Womersley took on a broader role at STFC, managing the Science Programmes Office – which oversees the STFC's science and technology strategy, science operations and planning, including the STFC's processes for peer review and research grants, as well as STFC's programmes in education, training and public outreach. He represents the UK in a number of international forums including the Council of the European Southern Observatory and the European Strategy Forum on Research Infrastructures.

SCHOOLS

CAS spreads the word on accelerators

The CERN Accelerator School (CAS) held two courses on accelerators and their physics this summer – one in Spain and one in Greece.

The first, in early summer, was a specialized course on high-power hadron machines. This was organized jointly with ESS-Bilbao and held on 24 May – 2 June. After some lectures recapitulating essential accelerator physics and reviewing different types of accelerator, the course focused on the challenges faced when designing and operating high-power facilities. In addition to the academic programme, participants could take part in a one-day excursion, which included time to visit the famous Guggenheim Museum. The school attracted 69 participants representing 22 nationalities and feedback was extremely positive.

Later in the summer, a course on intermediate-level accelerator physics took place in Chios on 19–30 September, this time organized jointly with the University of the Aegean. This followed the established format of the intermediate schools, with lectures in the mornings and specialized courses in the afternoons. The latter provided “hands-on” education and experience in three topics: “RF measurement techniques”, “Beam instrumentation and diagnostics” and “Optics design and correction”. Participants selected one of the three courses and followed the chosen topic throughout the school. Guided studies and



Participants of the specialized school in Bilbao. (Image credit: Domi Alonso Crespo.)



By the sea in Chios, participants at the intermediate-level school. (Image credit: M Moutafis.)

tutorials on core subjects, seminars and a poster session completed the programme.

This school attracted a lot of interest and participation had to be limited, with 74 students of 22 nationalities attending. The feedback was again positive, with lecturers noting the high standard and motivation of the students. An excursion included visits to the Nea Moni monastery and two medieval villages, Pyrgi and Mesta, followed by a

typical Greek meal in the port of Limena Meston. A small exhibition on CERN was arranged at the Homerion Cultural Centre in Chios and opened by CERN's director-general, Rolf Heuer.

● The next specialized CAS course, on ion sources, will take place in Senec, Slovakia, on 29 May – 8 June 2012. For more information about this next specialized course, see www.cern.ch/schools/CAS.

Prizes galore: from the Standard Model to the FEL

The American Physical Society (APS) has announced many awards for 2012, which include major awards in particle physics and related fields.

Starting with the theoretical side, the 2012 J J Sakurai Prize for Theoretical Particle Physics, which recognizes and encourages outstanding achievement in particle theory, goes to three Europeans: Bryan Webber of the University of Cambridge, Guido Altarelli of Università di Roma Tre (and formerly a CERN theorist) and Torbjörn Sjöstrand of Lund University. They are rewarded for “key ideas leading to the detailed confirmation of the Standard Model of particle physics, enabling high-energy experiments to extract precise information about quantum chromodynamics, electroweak interactions and possible new physics.”

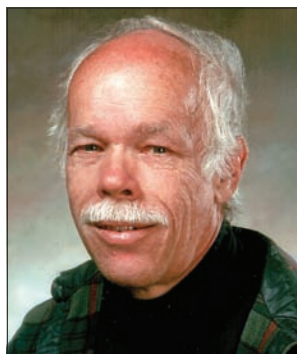
The Dannie Heineman Prize for Mathematical Physics is to recognize outstanding publications in the field of mathematical physics. For 2012 this encompasses particle theory with the award of the prize to Giovanni Jona-Lasinio of the University of Rome “for contributions to the interaction between statistical mechanics, field theory and the theory of elementary particles, including spontaneous symmetry breaking, critical phenomena and a general theory of dissipative systems.”

Symmetry also features in the award of the 2012 Julius Edgar Lilienfeld Prize in recognition of a most outstanding contribution to physics. This goes to Gordon Kane of the University of Michigan “for important contributions to the phenomenology of elementary particle physics, especially supersymmetry, and for his accomplished record as a popularizer of science.” The 2012 Henry Primakoff Award for Early-Career Particle Physics also recognizes theoretical work of this kind. The recipient is Daniel Jafferis of Harvard University for “the construction and study of three-dimensional supersymmetric quantum field theories.” This award is for outstanding elementary particle-physics research performed by a physicist who has not held a PhD for more than seven years.

Theoretical work is also the subject of the 2012 Tom W Bonner Prize in Nuclear Physics. Witold Nazarewicz of the University of Tennessee receives this award “for



Winners of the 2012 J J Sakurai Prize, left to right: Bryan Webber, Guido Altarelli and Torbjörn Sjöstrand. (Image credits: left, University of Cambridge; right University of Lund.)



Left, Bill Attwood and Lillian Hoddeson were among other APS prize-winners for 2012. (Image credits: UC Santa Cruz, far left, and University of Illinois/L Brian Stauffer.)

his foundational work in developing and applying nuclear density functional theory, motivating experiments and interpreting their results, and implementing a comprehensive theoretical framework for the physics of exotic nuclei”.

In experimental physics the Robert R Wilson Prize for Achievement in the Physics of Particle Accelerators this year looks to what has become a major application of accelerators worldwide. John Madey of the University of Hawaii, Manoa, receives the 2012 prize for “the invention and first experimental demonstration of the free-electron laser and important contributions to its conceptual development”. The free-electron laser, or FEL, is a vital tool for producing intense short-wavelength laser light for use in many areas of science (*CERN Courier* December 2010 p17).

The crossover between particle physics and astronomy and cosmology has become increasingly significant in recent years and is recognized in the award of the 2012 W K H Panofsky Prize in Experimental Particle Physics to William B Atwood of

the University of California, Santa Cruz. He receives the prize, which recognizes and encourages outstanding achievements in experimental particle physics, “for his leading work on the design, construction, and use of the Large Area Telescope (LAT) on the Fermi Gamma-ray Space Telescope, enabling numerous new results in gamma-ray astrophysics and fundamental physics.” Attwood was an experimental particle physicist at SLAC for many years and with Peter Michelson of Stanford proposed the concept for a satellite-borne gamma-ray detector that became the LAT.

Finally, a science historian well known to particle physicists, Lillian Hoddeson of the University of Illinois, has been awarded the 2012 Abraham Pais Prize for History of Physics in recognition of outstanding scholarly achievements. As well as co-editing a three-volume series on the rise of particle physics, she has co-authored books on the atomic bomb and on Fermilab, among others. She is currently completing a co-authored history of the Superconducting Super Collider.

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OUTREACH

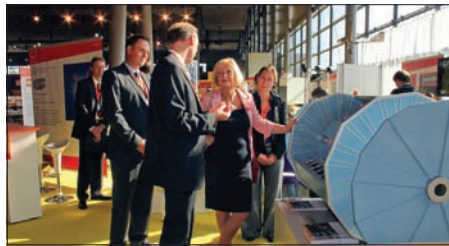
Particle physics is a hit in Hanover

Hanover was the place to be for young Germans interested in science, when the IdeenExpo 2011 for young people took place on 27 August – 4 September. Its aim is to inspire teenagers and young adults, with an aim to redressing the lack of qualified personnel in German science and technology.

With more than 310 000 visitors over the nine days, the exhibition achieved a new record and also provided a showcase for particle physics. At the core of the IdeenExpo were exhibits that give a sense of adventure, provided by companies, universities and research institutes from Lower Saxony as well as the rest of Germany.

The visitors not only received information about starting technical professions but numerous workshops allowed small groups to dive into scientific and technological topics in detail. Finally, a broad programme of science shows, talks, a fun area and evening entertainment with popular bands completed the event.

Students and scientists of the University



Left: Johanna Wanka, minister of science in Lower Saxony, at the ATLAS exhibit at the IdeenExpo. Right: Science-slam winner, Boris Lemmer, centre, with the minister and Dirk Schulte, Salzgitter Service und Technik GmbH, far left, and representatives of the Kurt-Alten Foundation, which supports gifted students and provided the prize money. (Image credit: IdeenExpo.)



of Göttingen introduced the curious visitors to the world of elementary particle physics. With the help of Anne Glück (TU Dresden), co-ordinator of the particle-physics network, Gerrit Hörentrup (DESY), co-ordinator of the mobile exhibition “Weltmaschine”, and the company PHYWE, a provider of school and university lab equipment, they explained ideas with the help of many objects, from TV sets and linear accelerators to a 1:25 model of the ATLAS detector and a diffusion cloud chamber. There were also presentations on the LHC, advice on physics career paths, masterclasses with ATLAS events and a live video conference to CERN, Fermilab and KEK.

The “science slam” finals were clearly the highlight of the entire event. Six scientists

from a range of research fields entered the competition to entertain and inspire a semi-professional audience for 10 minutes with their personal research activities. As expected, the audience not only awarded points for exciting research, but also recognized the high entertainment value in several presentations. As in several earlier national competitions, Boris Lemmer, a PhD student at the Georg-August-Universität Göttingen on the ATLAS experiment, won the competition in front of 1000 spectators with an amazing 99 out of 100 points. The audience was thrilled by his presentation about particle accelerators and in particular the LHC.

● For more about the exhibition and science slam, see www.ideenexpo.de.

WORKSHOP

EPIC days in Bari

The International Workshop on Early Physics with heavy-Ion Collisions at the LHC (EPIC 2011) took place on 6–8 July in Giovinazzo, a resort by the sea a few kilometres from the centre of Bari. Hosted by the Italian National Institute for Nuclear and Particle Physics (INFN), the meeting attracted about 60 participants from all over the world. The workshop brought experimentalists and theorists together in an enthusiastic and friendly atmosphere to discuss results from the first heavy-ion collisions provided by the LHC at the end of 2010.

A few introductory overview talks set the scene. CERN’s Urs Wiedemann opened the first session with his view of the “theory perspective on a small subset of data from the first LHC heavy-ion run”, followed by Helen Caines from Yale, who reported on the latest results from the Relativistic Heavy Ion Collider (RHIC). The main experimental results at the LHC were then illustrated



Light shines on the participants at the EPIC@LHC 2011 workshop in Giovinazzo, Bari. (Image credit: Domenico Elia/INFN).

by John Harris (ALICE), Sebastian White (ATLAS) and Bolek Wyslouch (CMS).

A total of about 40 presentations, both on theory and experiment, were spread over the three days of the workshop in plenary sessions on five topics (global event properties, correlations and fluctuations, baryon and strangeness, heavy flavour and di-leptons, as well as jets and photons). Even if most of the reports naturally focused on

results from the three LHC experiments participating in the heavy-ion programme, there were also presentations from the PHENIX and STAR collaborations, emphasizing in particular the outcome of the recent beam energy-scan programme at RHIC. A talk by Marek Gazdzicki from Frankfurt and Kielce, on “the SPS ion programme and the first LHC data”, suitably contributed to the discussion on

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understanding of the heavy-ion data that now cover two orders of magnitude in centre-of-mass energy.

On the last day the overall discussion was enlivened by the contribution of Itzhak Tserruya of the Weizmann Institute ("From RHIC to LHC: first lessons") and the summary talk by CERN's Karel Šafařík ("Heavy ions in LHC: experimental achievements and prospects"). As well as the inspiring talks and in-depth discussions, the beautiful venue, the Italian food, the excursion to the famous 13th-century Castel del Monte built by the Holy Roman Emperor Frederick II and the memorable conference party with a live performance by a group of musicians all contributed to making this workshop exceed the expectations of participants and organizers.

● EPIC 2011, chaired by Domenico Elia (INFN Bari), was organized by INFN and supported by Dipartimento Interateneo di Fisica Bari, the University of Bari and Fondazione Cassa di Risparmio di Puglia. For the programme and presentations, see www.ba.infn.it/EPIC.

VISITS



The Indian president, **Pratibha Devising Patil**, visited CERN on 1 October. During her tour she saw, top right, the ALICE experiment (with from left to right Paolo Giubellino, ALICE spokesperson, Chitra Narayanan, Indian Ambassador to Switzerland, Rolf Heuer, CERN's director-general, Christy Fernandez, secretary to the president, Rajeev Shukla, Indian minister of state for parliamentary affairs, Tapan Nayak, ALICE and VECC, and Felicitas Paus, CERN's head of international relations); top left, went underground with Vinod Chohan, from the Accelerator Beam Lines & Areas group, far left, and (back to camera) Steve Myers, director of accelerators and technology at CERN; bottom left, greeted Indian physicists at CERN; finally posing with Indian members of the ALICE and CMS collaborations and Indian officials.



Steven E Koonin, US under-secretary for science for the Department of Energy, centre, visited CERN on 14 and 15 September. During his tour of the LHC superconducting magnet test hall he saw one of the superconducting inner-triplet magnets contributed by Fermilab to the LHC. His visit also included the CMS, ATLAS and ALICE experiments as well as the CERN Control Centre.

Austrian state secretary for foreign affairs, **Wolfgang Waldner**, left, was welcomed to CERN by **Felicitas Paus**, head of international relations at CERN, on 19 September. While at CERN, he toured the CMS control room and underground experimental service cavern, the LHC superconducting magnet test hall, and the *Universe of Particles* exhibition in the Globe of Science and Innovation.



On 5 October the directorate of the Vienna Science and Technology Fund (WWTF) and other high-ranking Austrian officials visited CERN. Here **Michael Häupl**, the Lord Mayor and governor of Vienna and president of WWTF is seen in front of a photo of CMS together with **Renate Brauner**, Deputy Mayor of Vienna. (Image credit: M Hoch for CERN.)

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WORKSHOP

Quantum field theory meets collider physics on the Black Sea

The international workshop “Quantum Field Theory and High Energy Physics 2011” was held on the shore of the Black Sea in the Russian resort Sochi on 24 September – 1 October. It was the 20th in the series of workshops started in 1985 by the Skobeltsyn Institute of Nuclear Physics (SINP) of Lomonosov Moscow State University, with the purpose of presenting topics of current interest to young scientists and providing them with a stimulating environment for scientific discussions on new developments in theoretical and experimental high-energy physics and programmes of physics for future colliders. This year’s workshop, QFTHP’2011, was jointly organized by the SINP and the Southern Federal University (Rostov-on-Don) and was attended by 87 participants from 11 countries.

The scientific programme included 62 talks divided between plenary and parallel sessions, almost a third given by young scientists. The major focus was on the presentation of new data from the LHC together with an overview



Participants at the workshop pose for the traditional photo, with a life buoy to symbolize help for basic research worldwide. (Image credit: SINP, MSU.)

of other important results in experimental high-energy physics. The latest results on the apparent superluminal neutrinos detected by the OPERA collaboration were a particular highlight and were eagerly discussed both in the sessions and discussions. At the end of the workshop there was a special talk summarising the work of the Tevatron by Maxim Perfilov of the SINP on behalf of both the DØ and CDF collaborations. This was dedicated to the closing down of the Tevatron on 30 September.

The talks also covered a range of modern theoretical ideas in high-energy physics and field theory. In particular, Lev Lipatov of Saint Petersburg Nuclear Physics Institute drew a parallel between high-energy

scattering in QCD and in gravity theory, and constructed an effective action for reggeized gravitons. The gap between the theoretical and the experimental sides was bridged by Kirill Melnikov of Johns Hopkins University, who reviewed the latest results in next-to-leading-order QCD calculations and their relevance for collider phenomenology.

On the rest-day the participants were given an opportunity to visit the ski resort of Krasnaya Polyana, where the mountain events of the 2014 Winter Olympics will take place, as well as other places of interest around Sochi.

● For further information, see <http://qfthep.sinp.msu.ru>.

CONFERENCE

Particle and nuclear physics convene at MIT

The first Particles and Nuclei International Conference in the LHC era, PANIC11, brought 539 participants to the Massachusetts Institute of Technology (MIT) on 24–29 July. The latest in a triennial series that showcases recent progress worldwide in particle and nuclear physics, PANIC11 took place in the year that not only celebrated the 150th anniversary of the founding of MIT and the century of Ernest Rutherford’s seminal paper on the discovery of the atomic nucleus, but also the 65th anniversary of MIT’s Laboratory for Nuclear Science, which hosted the conference. With strong backing from the US Department of Energy, many national laboratories worldwide, industrial sponsors and MIT, the conference supported the attendance of many young scientists, students and post-docs, who formed the majority of participants and made for a lively conference. Broad international



Attendees at the PANIC11 Rutherford Centennial meeting at MIT. (Image credit: J Knight.)

participation was enhanced by support from the International Union of Pure and Applied Physics for scientists from developing countries.

The conference programme was developed around 12 major themes: quarks

and gluons in hot and dense matter; quarks and gluons in hadrons; neutrino physics and astrophysics; dark matter and cosmology; nuclear and particle astrophysics; Standard Model physics at the tera-electron-volt scale; Tevatron and LHC physics beyond

the Standard Model; heavy-flavour physics within and beyond the standard model; tests of symmetries and conservation laws; kaons, hypernuclei, hadron spectroscopy and exotics; applied string theory; and accelerator physics.

The programme consisted of 24 plenary talks and 304 parallel session talks, as well as a poster session. In addition, there was a plenary presentation on the effects of the 11 March earthquake on nuclear and particle-physics facilities in Japan. There were also well attended public lectures by Brian Cathcart entitled, "Glimpsing the Fly in the Cathedral: Ernest Rutherford and the Atomic Nucleus" and by Jerome Friedman entitled, "Rutherford's Legacy in Particle Physics: Exploring the Proton". On the day before the start of the conference, nine pedagogical lectures, directed at the level of the beginning graduate student, were presented by young researchers, covering the major thrusts in subatomic physics as well as recent advances in accelerators and detectors.

● The proceedings of PANIC11 will be published by the American Institute of Physics early in 2012. Through generous support by the National Science Foundation, in an initiative to make such conferences available to a broad, world audience, video recordings of all pedagogical, plenary and public lectures are available on MIT's Tech TV website at http://techtv.mit.edu/collections/panic11/_videos. The next conference will be hosted by the DESY Laboratory in Hamburg in 2014.



On 13 September, physicists from around the world joined John Ellis, left, at a colloquium to celebrate his 65th birthday, and as he ended his long career as a distinguished CERN staff member and joins King's College London. Here he is in the audience with fellow theorists, Nobel laureate Gerard 't Hooft, front centre, and Chris Llewellyn Smith, former director-general of CERN, front right.

CELEBRATION

Steinberger at 90

When Jack Steinberger won the Nobel Prize in Physics in 1988 together with Melvin Schwartz and Leon Lederman for demonstrating the existence of two types of neutrino in 1962, he commented that the way to win the prize was to do a good experiment while young and then live for a long time. Earlier this year he turned 90, and can look back on a long lifetime of good experiments.

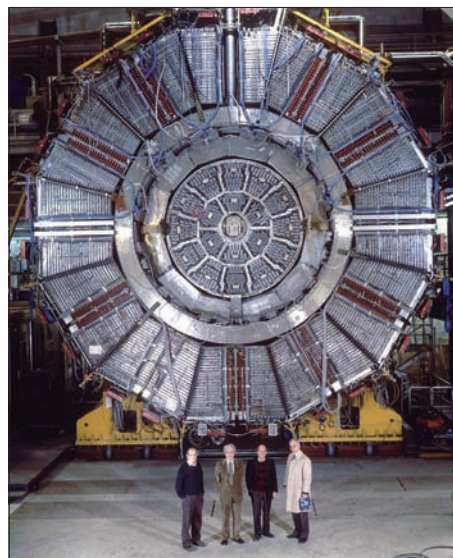
Jack has spent more than half of his life associated with CERN, where he is still a familiar sight. (He joined the laboratory in 1968, but had already been to do experiments at the Proton Synchrotron.) After many years of cycling the 10 km to the lab, he now takes the first bus of the day and logs in to the computer in his office at about 6.30 am. His task is to look through the latest preprints in astrophysics on the arXiv server and print out the handful that catches his eye out of the tens that have appeared since the previous day. His aim still is to learn, something that has characterized his attitude to science throughout his life.

His scientific career in physics began in 1946-8, when he joined the graduate school at Chicago University, at the end of the Second World War. There he learned from a true master, his thesis advisor Enrico Fermi. It was a time when there was much to learn about the new world of particle physics, which was being opened up by experiments with cosmic rays and at the newly developed particle accelerators. His immersion in particle physics continued for nearly 50 years, until the early 1990s. In 1990 he stepped down as spokesperson for the ALEPH Collaboration, which he had led since 1983. At the time ALEPH and the other experiments at CERN's Large Electron-Positron collider were reinforcing the Standard Model of particle physics with great precision, but it was clear that progress in particle physics had become far more difficult than in the days of his thesis experiment.

So Jack turned to learning about other areas of physics and in particular became fascinated by the challenges of cosmology, in particular in the wake of the beautiful measurements of the inhomogeneities of the cosmic background radiation by the Cosmic Microwave Background Explorer in 1992. This took him into physics that he had not needed in particle physics, such as general relativity, hydrodynamics, magneto hydrodynamics. This interest in cosmology



Speaking at the CERN colloquium "From the PS to the LHC: 50 years of Nobel Memories in High-Energy Physics" in December 2009.



The ALEPH detector had at its core a time projection chamber, for years the world's largest. In the foreground from the left, Jacques Lefrançois, Jack Steinberger, Lorenzo Foa and Pierre Lazeyras.

and astrophysics continues today, as do his concerns about society, in particular in relation to energy and climate change.

● For more about Jack's life in particle physics, see *Learning About Particles: 50 Privileged Years* (Springer 2005).

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AWARDS

Letwyler and Gershtein receive Pomeranchuk Prize

Heinrich Letwyler and Semion Gershtein were awarded the Pomeranchuk Prize for 2011 in a ceremony at the Institute for Theoretical and Experimental Physics (ITEP), Moscow, on 29 September. The prize, established by ITEP in 1998 in memory of Isaak Pomeranchuk, is awarded annually to one foreign and one Russian theoretician for outstanding achievements.

Letwyler, of the Albert Einstein Center for Fundamental Physics at the University of Bern, is recognized for major contributions to the foundation of QCD and the development of chiral perturbation theory. In one of his first theoretical papers, Letwyler, with Murray Gell-Mann and Harald Fritzsch, formulated QCD in 1973. A decade later, in 1984–1985, he suggested together with Jürg Gasser a new approach to QCD at low energies, i.e. chiral perturbation theory.

Gershtein, of the Institute for High Energy



Heinrich Letwyler, left, and Semion Gershtein. (Image credit: ITEP.)

Physics, Protvino, received the award for the discovery of vector-current conservation (CVC) and basic work that connects particle physics with cosmology and astrophysics. In 1955, Gershtein and Ya B Zeldovich pointed out that in the vector interaction the β -decay constant is not renormalized by strong interactions. This phenomenon of CVC was the first demonstration of the unified nature of the electromagnetic and weak interactions. In 1966, in one of the first papers to open a new field bridging particle physics and cosmology, they obtained the limit for the sum of stable neutrino masses from the lifetime of the universe.

CORRECTIONS

The article on the early days of the LHC in the November 2011 issue of *CERN Courier* (p21) unfortunately lost a sentence in the first paragraph. It should have read: *Fermilab's project, however, became a reality as the Tevatron. Based on 800 superconducting dipole magnets with a field in excess of 4 T, it involved the first ever mass-production*

of superconductor and represented a real breakthrough in accelerator technology.

Also, the picture on p17 in the article about the discovery of type II superconductivity was wrongly captioned. The picture shows, clockwise from top left: L V Shubnikov; V I Khotkevich; Yu N Rjabinin; G D Shepelev.

Many apologies to all concerned.

NEW PRODUCTS

Maxon Motor has announced the ESCON 36/2 DC, the first in a new servo controller range. The extremely compact, powerful 4-quadrant PWM offers efficient control of brushed permanent-magnet activated DC motors up to about 72 W. For details, contact Barbara Schlup, tel +41 41 662 43 89, fax +41 41 666 1676, e-mail Barbara.Schlup@maxonmotor.com, or see www.maxonmotor.com.

Datel, a business unit of **Murata Power Solutions**, has introduced the DAC-12100 series of low power 12-bit current output digital-to-analogue converters with TTL/CMOS compatible inputs. With a 100 MHz conversion rate, these devices suit speed-critical applications. With an extremely low-glitch energy characteristic

of 3.0 pV-s compared to the industry norm of 100 pV-s, the DAC-12100 generates little switching noise. Murata Power Solutions has also announced the 6000A and 6000B series of surface-mount power inductors. Both series can accommodate high-current throughput and offer a wide range of inductance values. For more information, contact Sarah Smith, e-mail sarah.smith@murata-ps.com, or visit www.datel.com and www.murata-ps.com.

Specialised Imaging Ltd has announced a new range of high-power xenon flash units optimized for use with ultra-high-speed cameras. The SI-IMS300 flash unit offers a high-intensity source with a short duration making it ideal for processes that occur over a short time window. The SI-MSFH500

LETTER

Targeting the proton

It is great that TOTEM is able to see the dip in proton-proton collisions at 7 TeV at the LHC, after it was seen only at the ISR with a maximum energy of 60 GeV, and also to see that the dip moves towards smaller $|\eta|$ (*CERN Courier* October 2011 p7). This was indeed what was expected from various models.

I find the comments on the failure of the models to reproduce the data a little severe, since Bourrely-Soffer-Wu and Petrov predict the dip at the right place, but are off by less than a factor of 2 from the data.

However the main reason for writing is that I see that only 5 lines of a column are devoted to the results obtained by the $p\bar{p}$ colliders, at CERN and at Fermilab in a 3-page article. It is true that TOTEM (and soon other experiments) has taken a big step, but we must remember that $p\bar{p}$ experiments also made a big step at the time, already showing that the proton becomes “larger”. They also showed that the proton becomes darker. The UA4/2 experiment, using a measurement of the real part of the scattering amplitude made a fit that favours a $\log s^2$ dependence for the high-energy cross-section. They predict at 7 TeV, $\sigma_{\text{total}} = 92 \pm 3$ mb. We shall see soon if this is confirmed by present experiments.

To end I would like to say that we are in an exciting period where, while the Higgs appears and disappears, tremendous progress is made by all groups, TOTEM, CMS, ATLAS, ATLAS-ALFA on elastic and inelastic proton-proton scattering. The forthcoming “Blois” meeting in Vietnam, at the end of the year, should be extremely exciting.

● **André Martin**, CERN.

flash system offers the flexibility of four controllable high-intensity flash lights for use in scientific and industrial environments. For further details, tel +44 1442 827 728, e-mail info@specialised-imaging.com, or see www.specialised-imaging.com/products.php.

XP Power has introduced the JHM10 series of board-mounted compact isolated 10 W DC/DC converters. With a maximum leakage current of 2 μ A, the converters have reinforced input-to-output insulation at a working voltage of 250 VAC and provide an isolation of up to 4000 VAC for up to 1 minute, and up to 5000 VAC for up to 10 ms. For more information, contact Steve Head, tel +44 118 984 5515, e-mail shead@xppower.com, or visit www.xppower.com.

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Reliquefaction - Refrigeration Systems



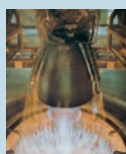
Hydrogen Solutions

Purification - Liquefaction



Storage and Distribution Solutions

Distribution Systems - Storage Tanks -
Dewars



Special Solutions

Special Cryogenic Plant Engineering

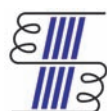


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