

FACES AND PLACES

LABORATORIES

NSF funds NSCL with \$100 million

The US National Science Foundation has awarded the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University more than \$100 million to fund operations through 2011. Established in 1963, the NSCL is the largest nuclear-science facility on a university campus in the US and educates about 10% of US nuclear-science doctoral students.

Much of the new funding will support the ongoing operation of the NSCL as a user facility and the work of NSCL nuclear scientists, which includes developing specialized methods of production and in-flight separation of nuclei with unusual proton-to-neutron ratios.

The NSCL's Coupled Cyclotron Facility is one of the leading user facilities for rare-isotope research, serving more



The National Superconducting Cyclotron Laboratory at Michigan State University.

than 700 users from 100 institutions in 35 countries. Fast beam techniques developed there have already advanced efforts to determine the basic properties of rare isotopes. In addition, researchers at the NSCL have implemented ion-trap

techniques for precision experiments after slowing isotopes from more than 100 MeV per nucleon to thermal energies. Associate director Thomas Glasmacher received the 2006 Sackler Prize in the Physical Sciences for developing new, sensitive techniques to study the structure of exotic nuclei.

Currently, the NSCL is implementing the capability to re-accelerate stopped rare isotopes for studies at energies near the Coulomb barrier. In collaboration with its user community, it is developing plans for a significant upgrade to its MSU-based laboratory, with the Isotope Science Facility as its working name.

Further reading

For more information about the NSCL see www.nscl.msu.edu.

COLLABORATION

East meets West at Rencontres in Hanoi

Two Rencontres du Vietnam held in Hanoi in August allowed physicists from Vietnam and neighbouring countries to meet with those from more distant places, including Europe and the US. Organized by Jean Tran Thanh Van, the parallel meetings on Challenges in Particle Astrophysics, and Nanophysics: from Fundamentals to Applications attracted more than 400 participants, including two Nobel laureates, James Cronin and Klaus von Klitzing. Highlights included a tour of the experimental facilities of VATLY, the cosmic-ray research group at the Institute of Nuclear Science and Technology, Hanoi, which is working with the Auger Collaboration under the leadership of Vo Van Thuan, former director of the Institute, and Pierre Darriulat, former research director of CERN.

The meetings also allowed Vietnamese physicists to express their interest in collaborating with CERN, particularly on the Large Hadron Collider (LHC) and on theoretical physics. A group led by Nguyen Mong Giao from Ho Chi Minh City is already participating in the D0 experiment at Fermilab, and is now exploring contacts with



Vietnamese President Nguyen Minh Triet, sixth from right, receives a delegation from the Rencontres at his palace.

the ATLAS collaboration at the LHC, while a group led by Nguyen Mau Chung from Hanoi is working with the LHCb collaboration. The Institut national de physique nucléaire et de physique des particules and the Ecole Polytechnique Fédérale de Lausanne are already supporting these initiatives, as is the president of the Vietnam Academy of Science and Technology, Dang Vu Minh.

Participants in the 2006 Rencontres du Vietnam saw the rapid economic strides now being made by Vietnam. The omens are good for a growing Vietnamese presence at CERN, where several Vietnamese physicists are already active.

ANSWERS FROM P15

Top: This is not used for physics; it is a "Remy" rake known as the "Sun". Attached to a tractor, its task is to rake up the cuttings from those areas of the site given over to grassland. Robust and easy to handle, it enables the work to be carried out in difficult, even acrobatic, positions (such as on "Mount Citron" and the mounds of the Proton Synchrotron ring).

Bottom: No connection with the [other] photo, this many-legged octopus, tended by Mario Grossi, is actually a pile of three "pancakes" destined for a DC electromagnet under construction in NPA Division. The magnet will produce a field of 100 000 gauss and will be used for testing the properties of superconducting samples. Each pancake is made of a rectangular-section hollow conductor, 8.5 mm × 5.5 mm, spirally wound and cast in epoxy resin; it is so arranged that there are 11 parallel water circuits for cooling, but one continuous electrical circuit as in a simple coil. The complete magnet contains eleven pancakes mounted in an iron yoke.

● Taken from *CERN Courier* December 1963 pp156–157, with captions on p158.

AWARDS

APS announces the prizewinners for 2007

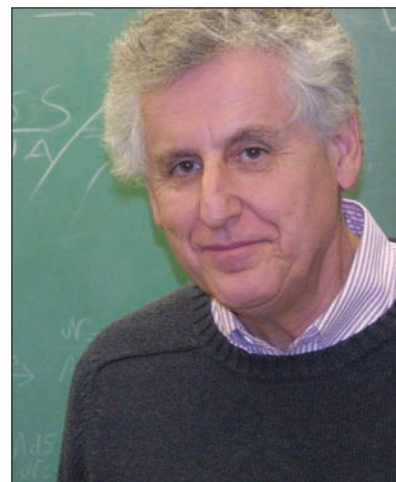
The American Physical Society (APS) has announced its awards for 2007, naming many recipients who work in particle physics and related fields.

The 2007 W K H Panofsky Prize in experimental particle physics, which aims to recognize and encourage outstanding achievements in the field, goes to Italo Mannelli of the University of Pisa/INFN, Heinrich Wahl, of the University of Ferrara and CERN, and Bruce Winstein of the University of Chicago. The award cites their “leadership in the series of experiments that resulted in a multitude of precision measurements of properties of neutral K-mesons, most notably the discovery of direct CP violation”.

The Tom W Bonner Prize for outstanding experimental research in nuclear physics is awarded to Stuart J Freedman of the University of California, Berkeley. He won the prize for “contributions to neutrino physics and the study of weak interactions, in particular for his leading role in the KamLAND experiment, as well as for his work on precision measurements of the beta decay of the neutron”.

In theoretical physics, the J J Sakurai Prize for outstanding achievement in particle physics is awarded to SLAC’s Stanley Brodsky for “applications of perturbative quantum field theory to critical questions of elementary-particle physics, in particular, to the analysis of hard exclusive strong interaction processes”. The Dannie Heineman Prize for mathematical physics goes to Juan Maldacena of the Institute for Advanced Study, Princeton, and Joseph Polchinski of the University of California, Santa Barbara. They receive this award for “profound developments in mathematical physics that have illuminated interconnections and launched major research areas in quantum field theory, string theory, and gravity”.

The Hans A Bethe prize recognizes outstanding work in astrophysics, nuclear physics, nuclear astrophysics or closely related fields. The 2007 award goes to James R Wilson of the Lawrence Livermore National Laboratory for “work in nuclear



Clockwise from top left: Heinrich Wahl who retired from CERN in 2003, joint winner of the W K H Panofsky Prize; Stanley Brodsky, who won the J J Sakurai Prize; Lisa Randall, who won the Julius Edgar Lilienfeld Prize; and Lee C Teng, winner of the Robert R Wilson Prize.

astrophysics and numerical work on supernovae core collapse, neutrino transport and shock propagation”. The citation adds that “his codes re-energized supernovae shocks, launched numerical relativity and magnetically driven jets”.

In another area of particle astrophysics, the Einstein prize for accomplishments in gravitational physics goes to Ronald Drever of the California Institute of Technology and Rainer Weiss of Massachusetts Institute of Technology for “fundamental contributions to the development of gravitational-wave detectors based on optical interferometry, leading to the successful operation of the

Laser Interferometer Gravitational-Wave Observatory”. Gravitational-wave research also features in the Edward A Bouchet award, which recognizes a distinguished minority physicist. This goes to Gabriela Gonzalez of Louisiana State University for “her significant impact on the field of gravitation-wave physics through her many important technical and scientific contributions to the Laser Interferometer Gravitational-Wave Observatory and for communicating the excitement of this field to the scientific community and the public”.

In observational cosmology Amy Barger of the University of Wisconsin-Madison

receives the Maria Goeppert-Meyer award for outstanding achievement by a woman physicist in the early years of her career. She receives the award for “her pioneering efforts in using observational cosmology to provide new insight into the evolution of black holes, star formation rates and galaxies”. Lisa Randall of Harvard University receives the Julius Edgar Lilienfeld Prize for a most outstanding contribution to physics for “her pioneering work on particle physics and cosmology, and her tireless efforts to inspire and engage both specialist and non-specialist, by allegory and fact through publications and presentations”.

The Robert R Wilson Prize is awarded for achievement in the physics of particle accelerators. For 2007 this goes to Lee C Teng of Argonne National Laboratory for the “invention of resonant extraction and transition crossing techniques critical to hadron synchrotrons and storage rings, for early and continued development of linear matrix theory of particle beams, and for

leadership in the realization of a facility for radiation therapy with protons”. Wilson was the first to propose proton therapy 60 years ago (see p24).

In August, the APS awarded the 2006 James Clerk Maxwell prize for plasma physics to Chandrasekhar Joshi, of the University of California Los Angeles (UCLA) for “insight and leadership in applying plasma concepts to high-energy electron and positron acceleration, and for his creative exploration of related aspects of plasma physics”. Now the Nicholas Metropolis Award for outstanding doctoral-thesis work in computational physics goes to Chengkun Huang, also of UCLA. He is rewarded for “his innovative work in plasma physics that led to the development of the QuickPIC code that has revolutionized the simulation of plasma-based accelerator research”. Meanwhile, the award for outstanding doctoral-thesis work in plasma physics, the Marshall N Rosenbluth award, goes to Cameron Geddes of the

Lawrence Berkeley National Laboratory for “experimental and computational studies of channel-guided laser-wakefield accelerators” (*CERN Courier* November 2006 p5).

Dissertation awards also recognise work in several areas of particle physics. The dissertation award of the APS Division of Atomic, Molecular and Optical Physics goes to Brian C Odom of the University of Chicago, for the “measurement of the electron g -factor in a sub-Kelvin cylindrical cavity” (*CERN Courier* October 2006 p35). The Dissertation Award in Nuclear Physics goes to Kathryn K S Mknaitis of the University of Washington, for her work on salt-phase data from the Sudbury Neutrino Observatory to identify day–night variations in the rate of neutrino interactions, and to Magdalena Djordjevic of Columbia University for her work on a theoretical treatment of heavy-quark energy loss in a strongly interacting quark–gluon plasma in which the gluon radiative energy loss was solved to all orders in opacity.

Be in the spotlight

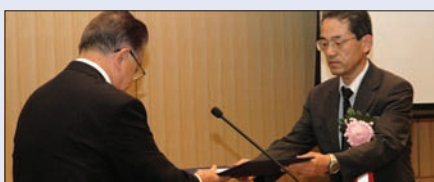
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AWARDS



Rafael Ballabriga, right, a PhD student working in the Microelectronics Group at CERN on the Medipix3 project has won the IEEE Nuclear and Plasma Sciences Society Student Paper Award. Medipix3 is the latest stage in adapting hybrid pixel detectors, developed for particle tracking at the Large Hadron Collider, for single photon counting in applications such as medical X-ray imaging. Ballabriga's prototype chip uses the latest CMOS technology to allow neighbouring pixels to pool information event-by-event, providing precise simultaneous measurements of position and energy. The award was presented at the recent IEEE Nuclear Science Symposium. (Courtesy Bo Yu.)



Tom Haruyama of KEK, right, has won the Commendation of the Research and Education Promotion Fund from the Alumni Association of Keio University Faculty of Science and Technology. It recognizes his development of a pulse-tube cryocooler for liquid-xenon particle detectors. This technology is used at CERN and is being studied for further applications in detectors.

NEW PRODUCTS

SAES Getters and **SUSS MicroTec** have announced technologies that extend the lifetime of wafer-level packaging for micro-electro-mechanical systems (MEMS) applications. SUSS MicroTec's M-Lock

VISITS

Karlsruhe keeps strong links with CERN

On 6–8 October 40 people from the University of Karlsruhe visited CERN. Headed by the rector, Horst Hippler, they included members of the university president's office, senate and administration. After a welcome by Sigurd Lettow, chief financial officer designate at CERN, Maximilian Metzger, secretary general, and Herwig Schopper, former director-general of CERN, the group toured the Tier0 Computing Centre, the tunnel of the Large Hadron Collider, and the CMS detector. Scientists and graduate students from Karlsruhe who work at CERN concluded the visit with a presentation of the CMS Tracker Integration Facility. The close relationship between CERN and Karlsruhe, initiated by Schopper more than 40 years ago, is now continued by Thomas Müller, Schopper's successor at the Institut



Visitors from the University of Karlsruhe in front of the CMS detector, together with Sigurd Lettow and Austin Ball from CERN.

für Experimentelle Kernphysik at Karlsruhe, and by Lettow, former co-head of the Forschungszentrum Karlsruhe.

MEETINGS

IDTB07, the ILC Detector Test Beam Workshop, will be held at Fermilab on 17–19 January 2007. The workshop will discuss the detector R&D programme for the International Linear Collider (ILC) in view of the need for test beams, with the opportunity to evaluate the capabilities of existing facilities. Facility managers will describe the current and future test-beam facilities and their availability. For further information see <https://conferences.fnal.gov/idtb07/>.

INPC2007, the 23rd International Nuclear Physics Conference, will be on 3–8 June 2007 in Tokyo. The conference will comprise plenary talks and parallel sessions and will include a special session commemorating the centennial of Heideki Yukawa's birth, and will be open to the public. Online submission of papers for the conference will be available until 22 January. For further information

about submission and registration visit www.inpc2007.jp.

The **13th Lomonosov Conference on Elementary Particle Physics** will be at the Moscow State University on 23–29 August 2007. These biennial conferences bring together about 300 theorists and experimentalists from different countries to review the current status and future prospects in elementary-particle physics. The programme of the 13th conference will include neutrino physics, astroparticle physics, gravitation and cosmology, and electroweak theory. For registration (deadline 1 March 2007) see the conferences section at www.icas.ru/english/index.htm. For further information contact Alexander Studenikin, chair, e-mail studenik@srp.sinp.msu.ru or Alexander Grigoriev, conference scientific secretary, e-mail ane@srp.sinp.msu.ru.

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ANNIVERSARY

Yuriy Zaitsev celebrates his 70th birthday

Yuriy Zaitsev from the Institute of Theoretical and Experimental Physics (ITEP), Moscow, celebrates his 70th birthday on 5 December. He now looks forward to having spent 50 years at ITEP, where he is a head of the laboratory of heavy quarks and leptons. In honour of his birthday, ITEP is hosting an international colloquium on the most interesting aspects of modern high-energy physics on 7–8 December.

In the 1960s Zaitsev participated in the pioneering measurements of pion–pion interactions at low momentum-transfer at the Joint Institute for Nuclear Research and at ITEP. He then took part in experiments on high-energy particle interactions with nuclei at ITEP and Fermilab during the 1970s.

In 1979 Zaitsev joined the ARGUS collaboration at DESY as a group leader



on the design, construction and operation of the muon detector. In 1997 he received the W K H Panofsky Prize in Experimental Particle Physics of the American Physical Society, together with Henning Schroeder from DESY, for “their leading role in the first demonstration of mixing in the

$B_0-\bar{B}_0$ system”. For the past decade he has coordinated the construction and operation of the muon detector in the HERA-B experiment at DESY, and the construction of the precision muon spectrometer for the OPERA detector in the Gran Sasso underground laboratory.

During the 1990s Zaitsev lectured at the Moscow Engineering Physics Institute and at the High Energy Physics department of the Moscow Institute of Physics and Technology, while also chairing the department in 1997/98. Many young and already mature scientists have received care, attention and advice under his leadership. Zaitsev also applied his professional approach in sport, helping him to become handball champion of the USSR in 1966. At 70 he still competes at the students’ football friendlies.



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OBITUARIES

Wolfgang Schnell 1929–2006



Left: Wolfgang Schnell in 2004, displaying a piece of equipment for the CLIC test facility. Above: Wolfgang with John Adams, PS project leader, in the famous picture that marked the start-up of the PS accelerator in 1959. From left to right: John Adams, Hans Geibel, Hildred Blewett, Chris Schmelzer, Lloyd Smith, Wolfgang Schnell and Pierre Germain (with his back to the camera).

Wolfgang Schnell died on 2 October after an illness that he endured with great courage and lucidity. He was one of CERN's pioneers. After gaining a physics degree from the University of Heidelberg he worked at the Max-Planck Institute there, before joining the Proton Synchrotron (PS) construction team in 1954. He made numerous and significant contributions to accelerator physics and technology throughout his career.

Working in the group led by Chris Schmelzer, Wolfgang achieved a breakthrough in 1959 during the running-in of the PS, which was suffering from substantial beam loss during acceleration with the radio-frequency (RF) programming based on the magnetic field. With his phase-lock feedback system the beam went immediately to 24 GeV with hardly any losses. He later proudly showed his younger colleagues that the electronics of his system was built inside a coffee tin.

Wolfgang then became a member of the design team that studied the next generation of CERN accelerators after the PS – namely the Super Proton Synchrotron (SPS) and the Intersecting Storage Rings (ISR). He contributed significantly to both.

He proposed a travelling-wave structure for the 300 GeV SPS to accelerate the particles, which are already nearly

relativistic at injection energy. A system of four such structures is still used in the SPS, faithfully accelerating protons since 1976 and ions since 1990.

The ISR was the first proton–proton collider. It was constructed in the late 1960s and operated from 1973 to 1983. Wolfgang led the design and construction of the RF system, including the many improvements implemented during the lifetime of the ISR. Examples of the novel ideas that he introduced are the missing-bucket scheme, based on a suggestion of Arnold Schoch, which increased the stacked beam current by a factor of 1.5, and equipping the vacuum chamber with clearing electrodes. He was responsible for the running-in and performance improvements of this tricky accelerator, which eventually stored up to 40 A of protons for each coasting beam in colliding mode and reached beam lifetimes exceeding many months. The final luminosity was 35 times the design value.

During this period Wolfgang discovered the transverse Schottky signal, a type of noise generated by the random transverse motion of the particles. This was immediately used to obtain some indication of the betatron frequencies of the DC beam, which previously could not be measured.

The discovery of this signal led to another of Wolfgang's unique accomplishments: the resurrection and first experimental proof of the stochastic cooling of beams, based on the concept invented by Simon van der Meer in 1968 but considered to be without a practical application. It opened the door to antiproton cooling and, consequently, to proton–antiproton collisions, a technique that was highly successful in the SPS and remains so in the Tevatron at Fermilab.

In 1983 the ISR was shut down in favour of the Large Electron–Positron (LEP) collider and Wolfgang was a leader of the initial study group for this unique facility. He went on to be the driving spirit of the LEP RF group, which constructed the world's largest and most complex RF system. This was based on copper cavities coupled to spherical storage cavities that lowered the power consumption by a factor of 1.4, another of Wolfgang's original ideas. Also in 1983 he and Steve Myers presented the first paper on the parameters of a future proton–proton collider in the LEP tunnel – now the Large Hadron Collider – and participated in the brainstorming about CERN's future in 1985 chaired by Carlo Rubbia. It was then that he proposed an attractive, more practical variant of a two-beam scheme for

a linear electron–positron collider, which is considered to be of strong potential for reaching the highest energies and is being studied at CERN as the Compact Linear Collider (CLIC). Wolfgang led the CLIC study with great enthusiasm for almost 10 years and contributed with various novel ideas even after his retirement.

His accomplishments were internationally recognized, as reflected in his membership of high-level international committees, and by the award of the Prize for Achievements in Accelerator Physics and Technology in

the US and the *Doctor honoris causa* by the University of Heidelberg. He also played a leading role in the management of CERN as director of the ISR department after Kjell Johnsen, and as a prominent member of committees and project teams, and he was renowned for his implementation of a lean management while keeping a keen eye on the essentials.

Wolfgang will be remembered as a friend and a colleague who could create a team spirit, not as a boss but by being a natural leader with contagious enthusiasm. His

ability to solve the most complex RF and beam-dynamics problems by the simplest means based on his deep insight was proverbial. He was always approachable to the young people to whom he was a patient tutor and mentor. He kept in close contact with his technicians and workshop staff to follow the latest developments and to keep his feet on the ground.

Many will be proud to have been part of one of his teams and to have had the honour to work with him. He will be sorely missed. *His colleagues and friends.*

Vitali Kaftanov 1931–2006

Vitali Kaftanov died on 14 September at the age of 74. He was an outstanding Russian physicist, professor and former deputy-director of the Institute of Theoretical and Experimental Physics (ITEP) in Moscow. He was born on 3 December 1931 in Moscow to the family of well known Soviet scientist, Sergey Kaftanov. In 1954 he graduated with honours from Moscow State University, where he specialized in nuclear physics.

In the mid-1950s international contacts began to develop between Soviet scientists and their foreign colleagues. Fluent in English, the young physicist Kaftanov was included in a Soviet government delegation, which participated in international conferences on the peaceful use of atomic energy taking place in Geneva under the auspices of the UN. It was here that Kaftanov met colleagues from the recently founded CERN. He had by then become a scientific researcher at ITEP, where he was working on similar issues to his CERN colleagues.



In 1960 the directorate of CERN made a proposal to the Soviet Academy of Sciences that Soviet scientists could participate in international experiments, and Kaftanov became the first candidate for this role. From then on he had close relations with CERN, spending most of his life in Geneva.

He was also involved in developing scientific technology and cultural collaboration between Russia and Switzerland. For a long time he was head of the neutrino research programme of ITEP, which involved accelerators at CERN, the Institute for High Energy Physics at Protvino and Fermilab.

For the past 15 years Kaftanov was a member of the CMS project at CERN and was one of the founders of the Russia and Dubna Member States (RDMS) CMS Collaboration. As a founding member of the magnet technical board, he was involved in designing and building the CMS magnet. He was also the RDMS technical coordinator for a long time and was key in assembling and commissioning the CMS detector.

Kaftanov's collaborative attitude and devotion to his work won him high regard and the admiration of all who know him. He will be sorely missed.

His colleagues and friends at the CMS collaboration.

Pedro Pascual 1934–2006

Pedro Pascual died on 29 October, aged 72. He made a difference to Spanish particle physics and was the first scientist to bring theoretical high-energy physics to Spain in the early 1960s from his period of learning with Yoichiro Nambu in Chicago. He educated the first highly competitive generation of theoretical particle physicists and led the development of experimental high-energy-physics groups across Spain.

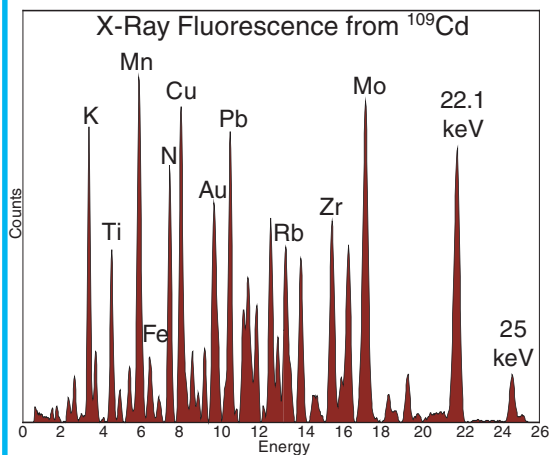


Pascual established the present Spanish system for evaluating researchers by the quality of their work. He also founded the Bidasoa Center for Science, which will now carry his name.

We remember his unlimited capacity for work and his uncompromising enthusiasm for excellence. His spirit will remain with us. *J I Latorre, Physics Department, University of Barcelona.*

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