

Faces & Places

FACILITIES

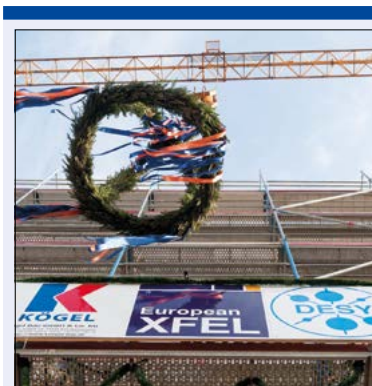
NSLS-II dedicated at Brookhaven

In a ceremony on 6 February, Ernest Moniz, the US secretary of energy, dedicated the National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory (BNL). The new facility continues the 32-year legacy of research at Brookhaven's first light source, NSLS, which led directly to the awarding of two Nobel prizes and contributed to a third. The planning, design and construction of NSLS-II spanned 10 years before it delivered its "first light" in October 2014. It provides beams 10,000 times brighter than NSLS, and when the 30 beamlines are all completed it will be able to support thousands of scientific users each year.

NSLS-II is a \$912-million user facility of the US Department of Energy's Office of Science, which produces extremely bright beams of X-ray, ultraviolet and infrared light. With \$150 million in funding through the American Recovery and Reinvestment Act of 2009, it has come online on time and under budget.



At the ceremony, Department of Energy secretary Ernest Moniz, centre, recognized Brookhaven site office manager, Frank Crescenzo, left, and NSLS-II project director, Steve Dierker, for their leadership on the project. (Image credit: BNL.)



A topping-out ceremony for the headquarters building of the European XFEL took place in Schenefeld in the German federal state of Schleswig-Holstein on 18 February. The event marked a milestone in the construction of the X-ray free-electron laser. The symbolic "tree" made its way to the roof by crane, as the ceremony began with the traditional toast given by the foreman of the site in honour of the construction workers. (Image credit: European XFEL.)

APPOINTMENT

Ratoff takes over at the Cockcroft Institute

The Cockcroft Institute at Daresbury Laboratory has appointed Peter Ratoff as its new director from 1 March. A founding member of the institute when it was established in 2004, he has been acting director since Swapan Chattopadhyay took up a new appointment in the US in July 2014 (CERN Courier September 2014 p32).

As professor of experimental particle physics and head of the Physics Department at Lancaster University, Ratoff's research has focused on the design and construction of particle detectors and experiments at particle accelerators and colliders, in particular for testing the Standard Model in both strong and electroweak sectors. He takes over at a time when the institute's portfolio contains challenging new research projects, ranging from upgrades of the LHC at CERN to a ground-breaking R&D programme in light sources at Daresbury.

The Cockcroft Institute is a joint venture in accelerator science and technology involving the Universities of Liverpool and



Peter Ratoff, left, at the farewell for Swapan Chattopadhyay, right, in July 2014. (Image credit: DL Media Services.)

Manchester, Lancaster University and the Science and Technology Facilities Council. Dedicated to the design and optimization of new accelerator technologies at the LHC, as well as at other accelerator laboratories around the world, the institute enables UK scientists and engineers to play a major role in accelerator design, construction and operation.

Faces & Places

AWARD

Lahri to receive the Hevesy Medal

Susanta Lahiri of the Saha Institute of Nuclear Physics, Kolkata, is one of two awardees for the 2015 Hevesy Medal, “for his outstanding and sustained contribution in heavy-ion-induced radioisotope production, tracer packet technique, converter targets, and green chemistry”. The 2015 award goes also to Kattesh Katti of the University of Missouri-Columbia.

Lahiri is recognized for a rich career during which he has developed and maintained active international collaborations with leading physics and chemistry institutes, including CERN, notably for the development of high-power targets in the EURISOL Design Study

and the LIEBE test project at ISOLDE, and in research on radiopharmaceuticals and superheavy elements. In a long list of achievements, Lahiri launched the conference series on Application of Radiotracers and Energetic Beams in Sciences (ARCEBS). He will receive the award at the 10th International Conference on Methods and Applications of Radioanalytical Chemistry (MARC X), another major conference in the field.

The medal is named after George de Hevesy, who received the Nobel Prize in Chemistry in 1943 for his work on the use of isotopes as tracers in the study of chemical processes. The Hevesy Medal was



Susanta Lahiri. (Image credit: S Lahiri.)

established 25 years later as the premier international award of excellence in radioanalytical and nuclear chemistry.

OUTREACH

New exhibition on CERN opens in Egypt

The Bibliotheca Alexandrina in Egypt is one of the most culturally inspiring, yet unexpected, places to find an exhibition about CERN and particle physics. “The Alphabet of the Universe: from CERN to North Africa and the Middle East” was inaugurated on 19 January in the Planetarium Science Centre (PSC), one of the main attractions in the modern library

in Alexandria. In an area of 400 square metres, the exhibition covers four main themes: what we know, open issues, accelerators and detectors, computing and applications.

The 40 exhibits, designed by CERN and the PSC, were handmade in Egypt. Some were inspired by and based on existing CERN exhibitions but most were created from scratch. The Higgs field is explained using pistons that can be pushed to feel the difference in resistance, and therefore mass. Mesons and hadrons are explained with black and white magnetic pieces that can be put together only according to the allowed combinations. The exhibition also includes a presentation of CERN as the world’s largest particle-physics laboratory,



“The Alphabet of the Universe” exhibition in Egypt. (Image credit: Bibliotheca Alexandrina.)

where different cultures work together on cutting-edge science.

The exhibition will remain in Alexandria until the end of the year.



John Bell, the theoretician from CERN who is deservedly best known for his ground-breaking theorem, has been honoured in his native Belfast with the naming of a new street after his work. “Bell’s Theorem Crescent” celebrates the famous 1964 paper that laid the basis for emerging new technologies such as quantum computing (CERN Courier September 2014 p34). The unveiling of the new street name – which marked the start of the first-ever Northern Ireland Science Festival – was attended by Belfast lord mayor, Nichola Mallon, relatives of John Bell (Ruby McConkey, centre left, and Robert Bell, centre right), and representatives from Northern Ireland’s science community. (Image credit: Stakeholder.)

CONFERENCE

Poland looks at participation in future accelerators



Participants at the round table: left, from left to right, Agnieszka Zalewska, Ewa Rondio, Andrzej Siemko, Roman Pöschl, Alain Blondel, Tadeusz Lesiak, Roy Alexan; right, from left to right, Manfred Kramer, Robert Zwaska, Max Klein, Lucie Linssen, Marek Jeżabek. (Image credit: Epiphany Conference organizing committee.)

Around 110 particle physicists gathered together on 8–10 January for the Cracow Epiphany Conference on Future High Energy Colliders. The meeting took place at the headquarters of the Polish Academy of Arts and Sciences, in the heart of the city.

Rather than the three biblical Magi searching for the baby Jesus – traditionally celebrated at Epiphany – the conference brought together physicists in search of a strategy for future European participation in new accelerator projects. To guide them, several world-class experts provided the participants with 24 illuminating talks. All of the relevant proposed accelerator schemes, both linear (ILC in Japan and CLIC at CERN) and circular (CEPC/SppS

in China and FCC at CERN) came under scrutiny, with special attention paid to accelerator issues as well as the physics potential and detector prerequisites. The LHC upgrade together with CERN's R&D studies of future superconducting magnets were also discussed. Separate talks were devoted to the AWAKE project of plasma acceleration at CERN, and to Fermilab's programme of intense proton beams aimed at neutrino physics.

The conference concluded with an excellent overview by Agnieszka Zalewska, the president of CERN Council, which was followed by a round-table discussion. Led by Marek Jeżabek, the general director of Cracow's Institute of Nuclear Physics

Polish Academy of Sciences (IFJ PAN), the discussion concentrated on options for European contributions to future projects for particle physics.

Following its two-decades-long tradition, the Epiphany meeting provided a useful platform for young researchers to present their scientific achievements, with 17 interesting talks. The inspiring and friendly atmosphere of the conference, with lively discussions after the talks and during coffee, was particularly motivating for the young attendees.

● For more about the Epiphany conference, visit epiphany.ifj.edu.pl/current. The proceedings will be published as the July 2015 issue of *Acta Physica Polonica B*.

OUTREACH

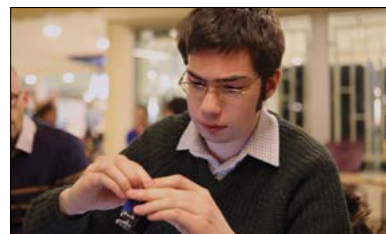
Build your own Lego LHC

A PhD student working on the ATLAS experiment has created a replica of the LHC using Lego bricks. Nathan Readioff, from the University of Liverpool, has submitted his design to Lego Ideas, and now awaits the 10,000 votes needed for it to qualify for the Lego Review, which decides if projects become new Lego products.

Readioff's design is a stylized model of the LHC, showcasing the four main experiments ALICE, ATLAS, CMS and LHCb, but on a micro scale. Each detector is small enough to fit into the palm of the hand, yet the details of the internal systems are intricate and revealed by cutaway walls. Every major sub-detector is represented by a Lego piece. The models are not strictly in scale with one



Left: A computer simulation of the miniature Lego LHC. (Image credit: N Readioff.) Right: Nathan Readioff tests his designs. (Image credit: Kate Shaw.)



another – for example, the LHC dipoles are oversize – but they use the same size of base to maximize the detail that can be included, and give a more uniform look to the set.

While working on the Lego LHC, Readioff learnt a surprising amount about CERN and the various detectors. He also learnt how to assemble a robust Lego model, and questions the designs recommended by computer simulation. His replica has parts that hold

together well, to help the builder assemble each detector within minutes.

To build your own miniature LHC, download the complete instruction manuals and parts lists at <https://build-your-own-particle-detector.org>. To vote for Readioff's Lego LHC design, register with Lego Ideas and click the "Support" button on the Lego LHC page <https://ideas.lego.com/projects/94885>.

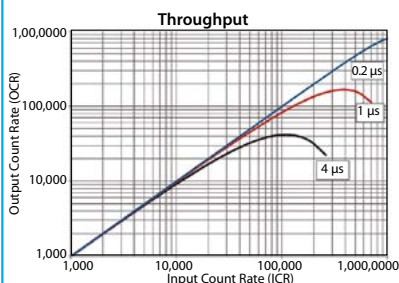
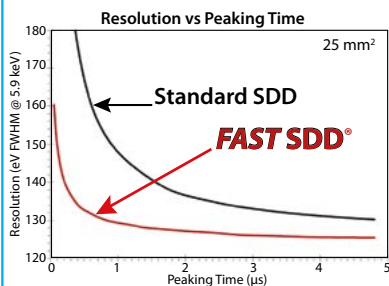
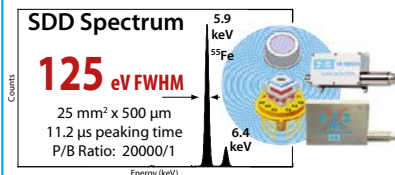
Silicon Drift Detectors

- Solid State Design
- Easy to Use
- Low Cost

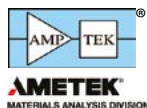
FAST SDD®

Count Rate = >1,000,000 CPS

Resolution	Peaking Time
125 eV FWHM	4 μ s
130 eV FWHM	1 μ s
140 eV FWHM	0.2 μ s
160 eV FWHM	0.05 μ s



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Faces & Places

VISITS



The Nepalese minister for health and population, **Khaga Raj Adhikari**, right, visited CERN on 29 January. Following a general introduction to the laboratory's activities by CERN's head of international relations, **Rüdiger Voss**, he was presented with a temperature-sensitive mug depicting the history of the universe. Later, the minister visited the CMS experiment and the Antiproton Decelerator. (Image credit: CERN-PHOTO-201501-018 – 10.)



On 30 January, **Carlos Moedas**, the European commissioner for research, science and innovation, visited the CMS underground experimental cavern, with CERN's director for research and computing, **Sergio Bertolucci**, left. The visit also included the Computing Centre and the area where magnets for the SESAME light source in Jordan are being tested. (Image credit: CERN-PHOTO-201501-019 – 2.)



During his visit to CERN on 17 February, the Lithuanian minister of education and science, **Dainius Pavalkis**, third row, right, met teachers taking part in the Lithuanian Teachers' Programme – one of many national programmes organized by CERN. He also heard about the LHC Computing Grid project and saw the CMS underground area. (Image credit: CERN-PHOTO-201502-033 – 5.)

MEETINGS

The **25th International Workshop on Weak Interactions and Neutrinos**, WIN2015, will be held at the Max-Planck-Institut für Kernphysik in Heidelberg on 8–13 June. The workshop offers a significant opportunity to assess the experimental and theoretical status of the field, and initiate collaborative efforts to address current physics questions. The programme includes plenary and parallel sessions on electroweak theory and Higgs physics, neutrino physics, astroparticle physics and flavour physics, as well as highlight talks on topics with significant developments. For further details and registration (deadline 3 May), see www.mpi-hd.mpg.de/WIN2015/.

POETIC6, the 6th edition of the **International Conference on the Physics Opportunities at an ElecTron-Ion Collider**, will take place at Ecole Polytechnique in Palaiseau, France, on 7–11 September. While the central theme will be the physics of a future electron-ion collider, the workshop will also cover related physics in the CEBAF, RHIC and LHC experimental programmes. The conference will primarily cover developments on the theory/phenomenology side, but accelerator and experimental developments of interest will also be reviewed. The aim is to foster exchanges between theory, phenomenology and experiment. For more information, visit poetic6.sciencesconf.org.

OBITUARY

Charles Townes 1915–2015

The inventor of the laser, Charles Hard Townes, passed away on 27 January at the age of 99. He made significant contributions in many areas of physics and remained active until his last year, when declining health intervened.

Townes was born in 1915 in Greenville, South Carolina. Following undergraduate work at Furman University, he did graduate work at Duke University and then Caltech, where he received his PhD in 1939. He then moved to Bell Labs in New Jersey, where he remained throughout the Second World War, designing radar-based bombing systems.

After the war, he became interested in using shorter, microwave wavelengths for molecular spectroscopy. The challenge was to generate sufficiently intense beams. He conceived the idea of putting the gas in a resonant cavity – by absorbing an incident photon, the gas would be stimulated to emit a coherent burst. In 1954, he and his students built such a device: an ammonia maser.

By 1958, he was interested in shorter, visible wavelengths. He and his brother-in-law, Arthur Schawlow, conceived the idea of a laser, using mirrors in a gas tube to produce a cavity. For this work, Townes shared the 1964 Nobel Prize in physics. Today, lasers are used in household items from laser printers to DVD readers. In research, they are even being used for particle acceleration – the BELLA facility



Charles Townes. (Image credit: Lawrence Berkeley National Laboratory.)

at Berkeley recently accelerated electrons to 4.2 GeV, in a 9-cm-long accelerator (*CERN Courier* January/February 2015 p9).

In 1967, Townes moved to Berkeley, where he acquired an interest in astronomy. One of his first activities was to build a maser amplifier and microwave spectrometer, to search for radiation from the vibrational modes of complex molecules. By 1968, he and Jack Welch had observed ammonia and water signatures from the core of the Milky Way, confounding many astronomers who did not believe that molecules could survive in space. They went on to discover

water masers operating in space. These observations initiated a new area of astronomical research.

Townes then grew interested in other aspects of infrared astronomy, searching for heat sources in outer space, and pursuing precision infrared spectrometry. In 1985, he and Reinhard Genzel observed swirling gas clouds orbiting a massive object now known to be a black hole. Townes developed high-resolution interferometric arrays, using them to study the dust that surrounds old stars and even to search for signals from extra-terrestrial civilizations.

Throughout his life, Townes maintained an interest in the intersection of science and religion. His seminal 1966 article “The Convergence of Science and Religion” established him as a unique voice – among scientists, in particular – seeking commonality between the two disciplines. For this work, he received the 2005 Templeton Prize.

Townes is survived by his wife of 74 years, Frances Hildreth Townes (née Brown), four daughters, six grandchildren and two great grandchildren.

● *Based – with permission – on the obituary by Robert Sanders published on the UC Berkeley News Center website, <http://newscenter.berkeley.edu/2015/01/27/nobel-laureate-and-laser-inventor-charles-townes-dies-at-99/>.*

NEW PRODUCTS

AMS Technologies provide high-power laser diodes up to 150 mW with a wavelength range from 650 nm to 1120 nm in different packaging options. Single-frequency laser radiation, precisely balanced in narrow linewidth and tunability, will excite, detect or manipulate atoms such as rubidium or caesium. A variety of AR-coated diodes are available for external-cavity set-ups, which can cover wide wavelength ranges. For further information, visit www.amstechnologies.com/products/optical-technologies/components/lasers-light-sources/lasers/diode-lasers/view/dfb-dbr-lasers/.

Goodfellow has expanded its offering to include custom manufacturing and finishing of components to customers' precise specifications. Services include, but are not limited to, precision machining, cutting, turning, rolling, drilling, grinding, and milling;

forming, bending, and shaping; coating with almost any metal or polymer to a defined thickness; and surface treatment, mechanical polishing and chemical polishing. Contact Goodfellow at info@goodfellow.com.

Intersil Corporation has introduced the ISL8203M, a dual 3A/single 6A step-down DC/DC power module that simplifies power-supply design for FPGAs, ASICs, microprocessors, DSPs and other point-of-load conversions in communications, test and measurement systems. The module's compact 9.0 × 6.5 × 1.83 mm footprint combined with 95 % efficiency provides power-system designers with a high performance, easy-to-use solution for low-power, low-voltage applications. The encapsulated module includes a PWM controller, synchronous switching MOSFETs, inductors and passive components to build

a power supply supporting an input voltage range of 2.85 V to 6 V. For more information, visit www.intersil.com/products/ISL8203M.

ULVAC Technologies, Inc., has introduced the HELIOT 900 helium leak detector, which features a fast pumping speed to detect small leaks quickly, and a simple tablet-style interface. Fast response time, fast background clean-up and a 7" Android touch-screen display/controller make the system highly productive. The pumping speed of 5 l/s shortens the time for the helium background to drop. The device can detect helium or hydrogen, and several programmable configurations help to automate leak-test operations. The HELIOT 900 series features a multiple valve design for the highest sensitivity: 10⁻¹² torr-l/s. For more information, contact Evan Sohm, e-mail esohm@us.ulvac.com, or visit www.ulvac.com.