

## Globetrotters made of niobium

The accelerator modules for the European XFEL are international

The European XFEL X-ray laser will use accelerator modules of the newest generation. These high-tech devices are operated using superconducting technology at temperatures similar to those of outer space. The concept was developed and brought to practical application by the international TESLA Collaboration led by DESY.

Meanwhile, the construction of the accelerator complex for the European XFEL is in full swing and the participating institutes and companies are preparing the series production of the 101 modules, each of which contains eight niobium cavities. The manufacture and assembly of these high-tech components are extremely complex. Highest precision and quality are required to ensure that the electron beam can later be accelerated to the design energy of 17.5 giga-electronvolts.

DESY is coordinating the international consortium of institutes that participate in the construction of the European XFEL accelerator. DESY experts impart their knowledge to optimise the production of accelerator modules at the various manufacturing sites all over the world. Thus one of the already finished modules has recently been completely taken apart to be reassembled again at CEA Saclay, France, as part of a training unit. All the modules for the European XFEL will later be assembled, measured and adjusted in Saclay – a highly complicated affair for which a simple blueprint is insufficient and which



In DESY's building 28 the cavities and the so called cold mass are mounted.

requires a substantial technology transfer. If the assembly is successful, the module will be transported back to DESY where it will have to pass a series of tests in the hall of the specially erected Accelerator Module Test Facility. This AMTF hall is where all the resonators and accelerator modules from the series production will later be checked under operating conditions before being installed in the European XFEL tunnel. Polish experts are responsible for these tests – their work is one of the so-called in-kind contributions by the partners participating in the European XFEL. Here too, the experience of DESY is

being passed on as part of the test of the first modules.

Overall, seven institutes from different countries are involved in the production of the accelerator modules. Besides DESY, these are CEA Saclay, LAL Orsay, INFN Milano, IPJ Swierk, CIEMAT Madrid and BINP Novosibirsk. The rest of the 16 institutions of the international Accelerator Consortium participate in the remaining accelerator sections.

Before a module is finally in place in the accelerator tunnel, it has gone through a

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### inForm double issue

You are leafing through an exceptional issue: this time, DESY inForm is being published as a double issue October–November. Because of the Open Day, the authors, editors, translator and graphics designer are so busy that the next regular issue will be circulated in December – as a double issue again.

### High coherence at LCLS

One of the key parameters of free-electron lasers is coherence, the degree of synchronisation of the light waves. A team of scientists led by DESY's Ivan Vartaniants has now scrutinised the coherence properties of LCLS in California and published the results in Physics Review Letters. Evaluation of LCLS: first class with distinction.



## DIRECTOR'S CORNER

Dear colleagues,

on 1 July, Ulrich Gensch, who headed the Zeuthen institute with much skill and great success since 1998, entered into a well-deserved retirement. I would like to cordially invite you to his farewell colloquium on 21 October in Zeuthen. Ulrich Gensch made a great contribution to the merging of our two institutes. DESY in Hamburg and in Brandenburg became a German-German success story. The German government recently acknowledged Ulrich Gensch's achievements by awarding him the Federal

Cross of Merit First Class. Let me use this opportunity to express our congratulations and appreciation to our Ulli.

As from 1 October, Zeuthen is now headed by Professor Christian Stegmann, an internationally renowned scientist who came to DESY from the University of Erlangen. His area of expertise, astroparticle physics, will be strengthened in Zeuthen in the coming years to make the institute an international beacon.

Christian Stegman has the ideal leadership personality and he will tackle this vision

of the future with a lot of charisma. We are very happy to have won him for this position. Many thanks also to Hans-Jürgen Grabosch, who provisionally took over the leadership of Zeuthen and ensured a smooth Gensch-Stegmann transition.

Recently, the DESY directorate and the PR department moved to the remodelled front sector of the long-standing building 1. Just come and have a look at it. One of our principles is openness and transparency. You will recognise during your visit that this motto has also received a

clear architectural form. I am sure you will like it.

Next to these new rooms is the location of the PIER office, where Christian Salzmann, the new head, and Stefanie Tapaß, the coordinator of the graduate school, took up their positions. Our strategic partnership with the university thus continues to pick up speed.

Yours,  
Helmut Dosch

long journey. This begins with the niobium sheets, which are provided by manufacturers from Austria, Japan and China. From these sheets, the companies Research Instruments in Bergisch-Gladbach, Germany, and Zanon, Italy, will form the superconducting accelerating structures, the cavities. The series delivery is to start in early summer 2012. Up to eight cavities per week will then be delivered to DESY and thoroughly tested, before traveling on to Saclay where the modules are assembled. These yellow tubes are manufactured in Italy and China and act like giant thermos bottles, shielding the cold of space inside from the outside air. In addition to the cavities, they will also contain quadrupole magnets from Spain and radio frequency couplers from France. The finished modules will then travel back to DESY to be tested in the AMTF hall and prepared for final installation in the accelerator tunnel.



A test module which was assembled in Saclay is arriving in the AMTF hall.

During the production phase, one module per week will find its place in the tunnel – it will thus take two years to install the entire 101 modules of the accelerator. What now arises between

Hamburg-Bahrenfeld and Schenefeld is not only the “light of the future”, but also a real prime example of European and international cooperation. (uw)

# OPERA challenges Einstein

## Are neutrinos faster than light?

In case this is true, it is a sensation: at the end of September, scientists of the OPERA collaboration published measurements that would turn Einstein's theory of relativity topsy-turvy.

The experiment at the Gran Sasso Mountain in Italy, in which a group of the University of Hamburg is also involved, studies neutrinos that were shot through the earth into the detector by an accelerator at CERN, 730 kilometres away. Actually, with OPERA, the scientists wanted to investigate the so-called neutrino oscillations, the transformation of muon neutrinos generated at CERN into other kinds of neutrinos. When the scientists examined the data collected within three years, their findings caused a great deal of astonishment and disbelief: the neutrinos were reaching the detector too early. Indeed, the particles, which have an energy of 17 giga-electronvolts, were expected to arrive at the detector 60 nanoseconds later. The measured flying time suggests that the particles travel with a speed greater than the speed of light – a fact which is forbidden by the special theory of relativity.

Years ago, the MINOS experiment in the United States already detected a divergence in the same direction; however, the measurements were not nearly that precise at that time. The OPERA researchers presented their results at a special seminar at CERN and asked the scientific community to thoroughly check the effect and carry out measurements at other sites. It remains to be seen whether, after the insight that we are only able to explain five per cent of the universe with our models, we will also have to admit that the special theory of relativity – one of the cornerstones of modern physics – is wrong. (tz)



Christian Stegmann introduced himself to the Zeuthen staff on 5 September.

## New head of DESY in Zeuthen

### On 1 October Christian Stegmann followed Ulli Gensch

On 5 September, Christian Stegmann introduced himself as the new head of DESY in Zeuthen. He assumed office on 1 October and represents the Zeuthen institute in the DESY directorate. Stegmann thus follows a joint nomination by both the University of Potsdam and DESY.

Until now, Christian Stegmann, who was born in 1965, was a professor at the University of Erlangen-Nürnberg. The astroparticle physicist works at the H.E.S.S. experiment (High Energy Spectroscopic System), a system of Cherenkov detectors in Namibia. This instrument allows scientists to explore cosmic showers of ultrahigh-energy gamma particles.

“DESY is a famous name in the German scientific community, and the Zeuthen institute is very active in particle and astroparticle physics. I am looking forward to assuming new responsibilities here in Zeuthen,” Christian Stegmann said to his Zeuthen colleagues on his first visit. “We are very happy to have won Chris-

tian Stegmann as a renowned expert in astroparticle physics,” said Helmut Dosch, chairman of the DESY directorate. “With the simultaneous appointment at DESY and the University of Potsdam, he will further strengthen astroparticle physics in Zeuthen and expand DESY as a national centre in this field of research.”

Stegmann has been connected with DESY for a long time. At the end of his diploma physics studies at the University of Bonn, he graduated at the ZEUS experiment in Hamburg. In 1995 – after his doctorate at the University of Freiburg – Stegmann came to DESY in Zeuthen and carried out research at the HERA B detector for five years. After this, Christian Stegmann focused on earthbound astroparticle physics.

Stegmann takes over the direction of the Zeuthen institute from Hans-Jürgen Grabosch who was the acting manager after the retirement of the long-term Zeuthen director, Ulrich Gensch. (ub)

## October

- 3-5** German-Japanese Workshop  
Modern Trends in Quantum Chromodynamics  
DESY, Zeuthen
- 4-7** TERASCALE ([www.terascale.de/limits2011](http://www.terascale.de/limits2011))  
School on Data Combination and Limit Setting  
DESY, Hamburg
- 17-20** Workshop (<http://llrf2011.desy.de>)  
2011 Low-Level Radio Frequency Workshop  
DESY, Hamburg
- 19** Informationsveranstaltung Gesund Bleiben  
Männergesundheit  
Christian Wülfing, DESY, Hamburg, Seminar room 1, 16 h
- 19** Science Café DESY (<http://sciencecafe.desy.de>)  
Spuk im Labor – Wissenschaftliche Erforschung rätselhafter Phänomene  
Walter von Lucadou, Axel Lindner, DESY-Bistro, 17 h
- 21** Colloquium  
Verabschiedung von Ulrich Gensch  
DESY, Zeuthen, 14 h
- 26** Public Lecture  
Die Tierwelt auf dem DESY-Gelände  
Jan Tolkiehn, DESY, Hamburg, auditorium, 19 h
- 27-28** Meeting  
PITZ Collaboration Meeting  
DESY, Zeuthen
- 28** DESY Choir Concert  
Political songs  
DESY, Hamburg, canteen annex, 20 h
- 29** Event  
DESY's Open Day and Science Night  
DESY, Hamburg, 12 - 24 h

## November

- 1** Staff meeting  
DESY, Hamburg, auditorium and DESY Zeuthen, Sem. Rm. 3
- 2** Jentschke Lecture  
Making Light of Mathematics  
Michael Berry, DESY, Hamburg, auditorium, 19 h
- 9** Science Café DESY (<http://sciencecafe.desy.de>)  
Transmutation – Wird der Traum der Alchimisten wahr  
Werner Maschek (KIT Karlsruhe), DESY Bistro, 17 h
- 21-25** Workshop (<http://mpi11.desy.de>)  
Multi-Parton Interactions at the LHC 2011  
DESY, Hamburg
- 23** Science Café DESY (<http://sciencecafe.desy.de>)  
Präzision in der Physik – Vermittlung zwischen Dichtung und Wahrheit  
Gudrit Moortgart-Pick, DESY Bistro, 17 h
- 23** Event ([www.weltmaschine.de/tagderweltmaschine](http://www.weltmaschine.de/tagderweltmaschine))  
Tag der Weltmaschine  
DESY and nationwide

### 3D accelerator cinema

A virtual tour is already possible: DESY's IPP group has composed the whole accelerator tunnel of European XFEL from CAD models. In the stereo projection room one can get a timely impression of the planning status in a 1:1 model and can reveal in a very early stage difficulties and collisions at the later installation of the massive components.

# Gustav Weber deceased

H1 founding father was 85 years old

by Frank Lehner

DESY mourns for its former research director, Professor Dr. Gustav Weber, who died on 2 September at the age of 85.

In 1964, Gustav Weber came to DESY from CERN as a leading scientist, and later became professor of experimental physics at the University of Hamburg. From 1973 till 1978, he was director of research at DESY. During this time, he shaped the research programme at the double storage ring DORIS and ensured the timely completion of the experiments at the electron-positron storage ring PETRA. He was a member of the JADE experiment, which made far-reaching contributions to our understanding of the standard model of particle physics.

In the 1980s, Gustav Weber was the founding father of the international H1 collaboration at the electron-proton storage ring HERA. He gave priority to the integration of institutes from the former GDR and Eastern Europe, thus creating the basis for many years of successful scientific cooperation with Eastern Europe from which DESY still benefits today. With his great commitment, Gustav Weber achieved and induced a lot at DESY. After becoming emeritus professor in 1990, for many years he continued to actively take part in scientific events in the collaboration and he was a welcome guest at many discussions.

## Next door – and right in the middle of it

DESY neighbours visit the Zeuthen institute



Ulrich Gensch (right) gives a tour of the Zeuthen campus for the neighbours.

On the evening of 30 August, about 50 Zeuthen neighbours visited the DESY campus in Brandenburg.

For the first time, DESY had invited neighbours from about 85 households to come to this event. In a lecture and a guided tour, Hans-Jürgen Grabosch and Ulrich Gensch presented the research facility, the scientific projects and the extension plans.

The participants were very pleased about

this invitation, showed great interest and appreciated the casual way of getting to know each other. Many questions and lively discussions about the history, current projects and planned research projects of the institute suggest that the event was successful. The participants – both DESY and its neighbours – were confident that there will be more events of this kind in the future. (ub)

## Finally digging again ...

Start of construction of FLASH II



There is a new construction site on the DESY campus: at the end of September, excavators started to dig into the FLASH accelerator tunnel to prepare the addition of a second undulator section. The 30-million-euro project FLASH II is an extension of the existing free-electron laser due to be completed in 2013. (tz)

# PIER is taking shape

The office of the DESY-University partnership is now established

As from 1 October, the PIER office is staffed. Christian Salzmann took up his work as new head with the support of PIER Graduate School coordinator Stefanie Tepas and assistant Mascha Gollub.

Christian Salzmann comes from the University of Aachen and he gained experience in the cooperation of a Helmholtz centre with universities within the framework of JARA. Some days ago, he moved to Hamburg together with his partner and child. "I am looking forward to starting to work here," Salzmann said. "PIER is an attractive task. I see a great potential for both partners, but I am also sure that there is much work ahead of us in order to cope with the challenges and to meet the demands." The head of the physics department of the University of Hamburg and chairwoman of the PIER management, Daniela Pfannkuche, is looking forward to the cooperation: "It is obvious that we can only build up PIER as a joint enterprise. We have a lot of ideas and it is wonderful to have an office now that as-



First briefing (from left): Daniela Pfannkuche (University of Hamburg), Stefanie Tepas (PIER), Irene Strebl (DESY), Christian Salzmann (PIER).

sists us with the implementation." For the time being, the PIER office is located in building 1a, but there are

plans to move it later to a building of the University of Hamburg on the Bahrenfeld campus. (tz)

# A detector in the garden

ARGUS installed as an outdoor exhibit



The ARGUS particle detector has now started its third stage of life. Initially a detector at the DORIS storage ring, it opened up exceptional insights into particle physics and, among other things, was the first to verify the transformation of the so-called B mesons into their antiparticles. Then, for many years, ARGUS was a visitors' attraction in the DORIS hall. Last year, it had to make way for the OLYMPUS experiment which was installed at DORIS.

A group of technicians and workshop staff headed by Richard Stromhagen have newly conserved the 500-tonne colossus and installed it as an outdoor exhibit at the DESY main gate. With a wind- and weather-proof protection and in company of other exhibits, it will spend the next stage of its life there and tell DESY visitors about its discoveries. (tz)

## Foundation of Helmholtz Institute Freiberg

On 29 August 2011, German federal research minister Prof. Dr. Annette Schavan and Saxon minister-president Stanislaw Tillich handed out a symbolic silver key to the founding director Prof. Dr. Jens Gutzmer. This was the official foundation of the Helmholtz Institute Freiberg for Resource Technology, an external institute of the Helmholtz Centre Dresden-Rossendorf that will be located on the campus of the Technical University Bergakademie Freiberg.

The Helmholtz Institute will focus on high-tech metals such as gallium, indium, germanium, lithium or elements belonging to the group of rare earths. These are important raw materials for the electronics industry, including innovative energy technologies. "With regard to limited resources and at the same time increasing demand, it is more and more important to use raw materials in a material-efficient way. The goal of the Helmholtz Institute is to provide appropriate technologies for industry in accordance with cost-efficiency and ecology", said the director of the Helmholtz Institute Freiberg, Prof. Dr. Jens Gutzmer.

[www.helmholtz.de/hermann](http://www.helmholtz.de/hermann)



A mere child's play.

## Relativistic hula-hoop in the rain

The DESY library collects curious publications

As a child, many people have tried to twirl one or more hula-hoops with an elegant hip swing and found out: you have to experiment persistently to succeed. The fact that it is possible to mathematically describe the ideal way to hula-hoop is one of the amazing things you can find in the list of „Recent curiosities in the world of physics“ on the DESY library website. It is a link to several scientific publications which at first glance do not necessarily seem to make much sense. "For our documentation, we are constantly browsing through the publication lists of scientific journals", says Kirsten Sachs from the library, "and when amusing titles or papers attract our attention, we gladly share them with all DESY people." These publications offer a great variety of themes, sometimes even with a direct connection to everyday life. One paper

investigates, for example, whether – relativistically speaking – it is better to run or walk slowly through the rain to minimise the possibility of getting soaked; mandatory reading this summer. In another example, scientists analyse basketball games of the past years and find out that the time and number of goals can be mathematically described. Even the recent financial panic is subject to the laws of physics. In any case, it is fun to visit the website from time to time.

By the way, most people intuitively do the right thing – when it starts raining, run as fast as you can! (tz)

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### Tevatron closed down

After 28 years of research activity, the Tevatron was closed down on 30 September. The experiments at the proton-antiproton accelerator at Fermilab made great discoveries like the top quark and the tau neutrino. The analysis of the collision data of both the D0 and CDF experiments are still ongoing.

### Enrico Fermi prize for Dieter Haidt

Together with the Italian Antonino Pullia, DESY physicist Dieter Haidt has been awarded the Enrico Fermi prize of the Italian Physical Society. He is honoured for his contributions to the discovery of weak neutral currents, an important basis for the Standard Model of particle physics.