

Construction start of two new experimental halls

Two new large DESY construction sites for the PETRA III extensions



The planned design of the new experimental hall in the north of the PETRA ring. Illustration: Renner Hainke Wirth Architekten

While construction of FLASH II is still running at full speed, the diggers will be digging at two other construction sites at DESY: construction of the PETRA III extension north started beginning of December, the extension east in mid-December. Within the coming nine months, two construction firms will build new experimental halls at two sites of the PETRA accelerator, each containing up to five beamlines. In the same way as the other PETRA beamlines, they will be equipped with special undulator magnets generating the coveted research light. This will relieve the currently threefold-overbooked experimental stations in the existing "Max von Laue" PETRA hall and expand the wide range of scientific applications at the synchrotron light source.

At first, there will be a search for "treasures of the soil" at both construction sites. "At a proper distance to the currently running PETRA accelerator, we will start

to remove the soil in layers, hoping not to find any war relicts," said project leader Wolfgang Drube. The building pit in the east must have a considerable depth because PETRA is located considerably below ground level at this site. This is why the road between the east and west of the DESY campus will be blocked during the period of construction. Cars will be diverted via the grounds of the Reemtsma halls.

On 3 February, the PETRA accelerator will be shut down for one year and dismantled for about 70 metres in the hall areas. In the hall zones, the PETRA tunnel will be taken down and the building pits will be enlarged to their full size. The next step will be the complex construction of the experimental halls, with each hall having its own peculiarities. "Although they look similar from the outside, the halls are quite different," said Drube. "In the east, the experiments are located below ground, the

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hall has three storeys and, because of the bad subsoil, we need lower foundations and a one-metre thick concrete slab. In the north, we are on ground level, but we must enlarge the DESY grounds to some extent for the lorry access road. On the other hand, we only need a 80-centimetre floor slab."

Beginning of November 2014 will be the end of the first construction phase of both experimental halls, followed by the installation of windows, frontages and technical equipment. Parallel to this, the new part of the PETRA storage ring, including the new undulators in the hall area, will be built up again and take up op-



The east extension building will have three storeys. Illustration: Renner Hainke Wirth Architekten



DIRECTOR'S CORNER

Dear colleagues,

the year 2013 is drawing to a close; a year with many outstanding scientific results and new projects being advanced with high dynamics on our research campus.

DESY's flagship project, the construction of the European X-ray laser European XFEL, continues to make good progress. Our accelerator team makes all the necessary preparations for the installation of the superconducting cavities. The know-how transfer for industrial fabrication of this cutting-edge technology is a great success – despite some hurdles – and shows how we, in collaboration with industry, are extending the limits of what is technically feasible. Within a considerable international competition, we will make all efforts to keep and expand our leading position in the world.

This also includes the construction of FLASH II which is proceeding according to plan. In September we held the topping out ceremony for the impressive new experimental hall. The plan is to start FLASH II operation in 2015. After the shut-down due to construction, FLASH will take up measuring operation in February 2014.

PETRA III looks back on a very successful operating year; extremely sophisticated research projects were carried out producing outstanding insights and remarkable publications. Moreover, two technological world records were broken: with a novel X-ray lens, it was possible to generate the finest X-ray beam of the world and – at test operation with reduced electron energy – the most brilliant electron beam of the world. Both are pioneering milestones on the way to the “ultimate storage-ring X-ray source” which is currently designed on the drawing boards of accelerator laboratories worldwide.

Construction of the new Centre for Structural Systems Biology (CSSB) officially began with the ground breaking by federal minister Johanna Wanka and senator Dorothee Stapelfeldt. The federal minister emphasised the importance of the new centre for Northern Germany.

The overheated market situation in the construction sector forced us to extend the time period for our construction projects. This is why the Nanolab construction start was postponed to 2016.

In our particle and astroparticle physics collaborations we also achieved many impressive results. The election of Kerstin Borras as deputy spokesperson of the CMS experiment stresses the importance of DESY at the LHC. This year, the ATLAS and CMS experiments won the High Energy and Particle Physics Prize of the European Physical Society. With a view to the future, we launched a strategy for Germany's financial support of

the LHC upgrade, which will surely gain additional momentum due to the Nobel Prize in Physics awarded to François Englert and Peter Higgs.

At the neutrino experiment IceCube at the South Pole, the detection of ultra-high energy neutrinos from the far cosmos brought about the final breakthrough – a milestone, which our colleagues in Zeuthen can justifiably be very proud of.

Remembering our company outing makes me feel happy – it was simply wonderful. This day was very good for all of us. The open days which took place in combination with the Long Night of Sciences in Zeuthen and with the Science Night in Hamburg achieved a new record with 1000 visitors in Zeuthen and 19 000 visitors in Hamburg. I was really very proud to see your enthusiasm and engagement while presenting your activity area at DESY.

In 2013, we lost Gustav-Adolf Voss. He was one of the most influential personalities of our research centre and he passed away at the age of 84. We will always hold him in high regard.

Since August 2013, new statutes rule our research centre, with the supreme body being a foundation council instead of the former administrative council. The foundation council focusses on both, financial-administrative and scientific-strategy topics. Its members include the funding agencies as well as also four representatives from science, economy and public life.

In the past months, many colleagues have contributed to the preparation of proposals for the new programme-oriented funding period (POF III), beginning in 2015. I am very satisfied with the results and really optimistic to obtain positive evaluations providing budgeting reliability until 2019.

At this point, I would like to express my heart-felt thanks to all of you for your extraordinary work. Without your dedication in all DESY divisions, this dynamic development of our research centre would not have been possible.

I wish you, your families and friends restful holidays, a Merry Christmas and a Happy New Year in good health, joy of living and good luck.

Yours,
Helmut Dosch.

Under one roof

New ILC cavity laboratory opens

Cavity experts always have one goal in mind: to reach a higher gradient for the superconducting accelerator structures – in serial production. The cavity production for the X-ray laser European XFEL runs at full speed. However, the precondition for industrial production of the cavities for the International Linear Collider is to reliably obtain the intended gradient of 31.5 megavolts per metre. In fact, some of the European XFEL cavities already reach this value, but the yield of ILC-compatible cavities is still too small.

As a step to reach higher gradients, scientists at DESY have brought together under one roof all inspection and processing machines in the newly opened ILC HiGradeLab. “We will pursue two approaches in the laboratory,” said Aliaksandr Navitski from the DESY linear collider group FLA. “For one thing, we want to understand where defects occur in the cavities’ production.” For this aim, the experts use various inspection techniques, including the OBACHT inspection robot (DESY inForm 5/11) or the replica method that produces a copy of the cavity surface. Defects, for example imperfect welding seams, obstruct the optimal diffusion of the electromagnetic field in the cavity and inhibit the optimal gradient.

The other approach is to optimise existing cavities. “For this purpose, we are testing



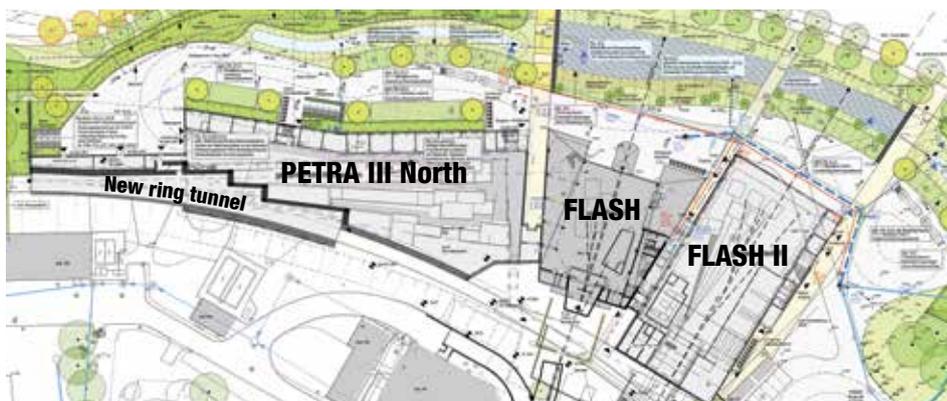
The inspection robot OBACHT examines the superconducting accelerator components from the inside.

Photo: Dirk Nölle/DESY

two additional methods. One of these is a local grinding and the other a polishing process called centrifugal barrel polishing,” Navitski said. The latter submits the cavities to a polishing process in a centrifuge with different polishing agents, taking up to four steps over a period of up to 40 hours. “With the close interlocking of our inspection and processing tools, we expect a major progress in reliably reaching high

gradients – first of all for the industrial production of ILC cavities,” Navitski summarised. One goal has already been achieved today: the inspection tools ensure a high quality of the European XFEL cavities. (gh)

eration in January. “By the end of the year, we want to have finished two of the new beamlines in the tunnel so that we can complete its construction during accelerator operation in the northern experimental hall,” said Drube. In the course of additional short operation interruptions, a total of eight beamlines are to be built until the end of 2016, three of them in international cooperation. (tz)



Ground plan showing the ensemble of the PETRA III and FLASH experimental halls. Map: Freiraumplanung Becker-Nelson

December

- 14** Sunday Lecture „Potsdamer Köpfe“
Higgs-Jagd an der Weltmaschine – Physik am Large Hadron Collider LHC
Thomas Naumann, DESY
Bildungsforum Potsdam, 11:00 h
- 17** Staff- and Employees meeting
DESY, Zeuthen, SR 1-3, 14:00 h
- 17+18** DESY Christmas Event
Klingende Zahlen – Musikalisch-mathematische DESY-Weihnachtsshow
Michael Bratke
DESY, Hamburg, auditorium
17 Dec, 17:00 h, public Event
18 Dec, 16:00 h, DESY internal Event
18 Dec, 19:00 h, public Event

January

- from 7** Occupational Health Management
Bewegte Pause (an 2 Tagen in der Woche)
DESY, Hamburg, Tuesdays and Wednesdays, 11:00-13:00 h
- 14-16** Workshop (www.terascale.de/schools_and_workshops)
Fast Monte Carlo in HEP
DESY, Zeuthen
- 20** Event (www.eintagvorort.de)
Ein Tag vor Ort – Besichtigungsprogramm für Studenten der DPG
DESY, Zeuthen, 10:00-15:00 h
- 21** Employees meeting
DESY, Hamburg, auditorium, 10:00 h
Video broadcast to Zeuthen
- 22** Science Café DESY (<http://sciencecafe.desy.de>)
Das tiefste „Loch“ der Erde – Geophysik des Erdinneren
Hanns-Peter Liermann, DESY, Hamburg, DESY Bistro, 17:00 h
- 29-31** Meeting (<http://photon-science.desy.de/usersmeeting>)
Photon Science Users' Meeting
DESY, Hamburg

February

- 12** Public Lecture
Futuristisch in jeder Hinsicht: Das Center for Free-Electron Laser Science und seine Forschung
Robin Santra, DESY, Hamburg, 19:00 h
- 26** Science Café DESY (<http://sciencecafe.desy.de>)
Das Fliegenhirn – Ein Parallelcomputer auf kleinstem Raum
Alexander Borst, DESY, Hamburg, DESY Bistro, 17:00 h

IceCube

The IceCube Laboratory at the Amundsen-Scott South Pole Station, in Antarctica, hosts the computers collecting and pre-processing raw data. Only events selected as interesting for physics are sent to the University of Wisconsin-Madison, where they are prepared for use by any member of the IceCube Collaboration, in which DESY is the second-largest partner. The world's largest particle detector has recently detected the first high-energy neutrinos from the cosmos. Photo: Sven Lidstrom, IceCube/NSF

Email and calendar migration at DESY

Extensive changes are coming up at DESY with regard to emails and calendars. In the first quarter of 2014, the central email services will be migrated to a new product (Zimbra). This is done for various reasons. As from 8 April 2014, support of part of the currently used software (Exchange) will not be continued by the producers and therefore has to be substituted. At this opportunity, the second central system (UNIX mail) will also be migrated to Zimbra. In the future, the central email service will therefore be available on a consolidated basis.

The new product Zimbra especially offers improved possibilities for users, including new functions and access possibilities to all current (mobile) devices. Above all, the merging of the so far different systems to Zimbra will make possible to use the calendar functionality in the same manner throughout DESY.

Before the start, the data of all users must be migrated to the new system. This will take place in an automated way, with the possible necessity of manual reworking by the users. All users will be informed in due time about the migration procedure. Existing programmes like Outlook, Thunderbird and Pine may still be used in the future. Their necessary adaptations to the new central systems will mostly be carried out automated when these programmes are installed with central mechanisms, e.g. NetInstall. Since Zimbra provides a fully adequate web access, it offers the perspective to work web browser based in most cases and therefore independently from special programmes, as for example Outlook.

For questions concerning the email migration please contact UCO (Tel. 5005, uco@desy.de)

„Shut-off“ of Windows XP

On 8 April 2014, Microsoft will stop support for the Windows XP operating system. This means that there will be no more updates for emerging security gaps. After about a decade of productive and stable application, this is also the end of the WinXP era at DESY. Normal user operation with WinXP machines will no longer be possible. Niches will continue to exist only in particularly isolated computer network sectors. This applies only for special solutions which are not adaptable because of technical or cost reasons – excluding internet and email access.

Accordingly, users who are still working with Windows XP should urgently consider the migration to the DESY standard Windows 7. The corresponding group administrators or the UCO (Tel. 5005, uco@desy.de) will help.

Martin Gloris

New ways of professional orientation

Voluntary social year in science, technology and sustainability

As from September 2013, DESY in Zeuthen provides a place to do a voluntary social year in the field of science, technology and sustainability. This particular form of voluntary social year offers young people a completely new professional orientation opportunity for their future career.

This is also the opinion of 18-year-old Leon Jungkurth from a small town of Thuringia. In summer, he applied for this position at DESY and he won against many competitors. “Already at school, I was interested in science and technology topics. However, after finishing second-

The example of DESY in Zeuthen as a place to do such a voluntary social year shows that this is a good possibility to familiarise motivated young people at an early stage with special topics of science, technology and sustainability. Apart from the concrete professional experience during this year community spirit, professional and competence and social skills are conveyed to the volunteers who learn to assume responsibility and gain concrete work experience. During this year, the young people are employed on a full-time basis, including social insurance. At the end, they receive a qualifying certificate. Moreover,



Zeuthen voluntary Leon Jungkurth (left) discusses measuring results at the cosmic lab. Photo: Christine Iezzi/DESY

ary school, I was not quite sure about how to continue with my professional orientation.” Since he liked to do research and experiments in order to better understand processes, Leon was especially motivated to apply at DESY. Currently, Leon’s field of activity is in the experiment support group, including image processing, poster design, experiments in the cosmic school lab and also the set-up of an astroparticle physics exhibition for the open day in Hamburg. Many other exciting projects await the young high-school graduate – in February, he will take up activities in the mechanical training workshop in Zeuthen.

the host organisation Internationaler Jugendgemeinschaftsdienst ijgd (international youth community service) offers pedagogical guidance. During 25 seminar days throughout the year the volunteers meet to jointly learn. In cooperation with recognised basic and advanced training institutions, the ijgd carries out targeted theory and practice programmes. Summarising the first weeks of experience at DESY: the voluntary social year programme is a good thing for all parties involved. (ub)

PhD students this way, please.

Opening ceremony and scholarship awards of the PIER Helmholtz Graduate School

By *Mirko Siemssen*

With a ceremonial act end of October, the PIER Helmholtz Graduate School symbolically opened its doors for PhD students. In attendance of about 80 invited guests, the Graduate School team particularly welcomed the new scholarship holders of the Joachim Herz Stiftung. Since this year, the PIER Helmholtz Graduate School (PHGS) is the common roof for doctoral training at DESY and the University of Hamburg, and it represents the "E" in PIER, the „Partnership for Innovation, Education and Research“.

who do not only stand out by their professional expertise but also by their social interest and engagement going beyond science. This year, in a multi-level selection process, five excellent young researchers competed against 130 applicants from more than 30 nations: Zhipeng Huang from China, Rajkiran Tholapi from India, Maria Kokkinidou from Greece and Max Rose and Hendrik Schlicke from Germany. "The scholarships give the talented young scientists the opportunity to shape their lives independently and autonomously, thus



The new fellows of the Joachim Herz Stiftung: Zhipeng Huang, Max Rose, Hendrik Schlicke, Maria Kokkinidou (not on the picture: Rajkiran Tholapi). Photo: Marta Mayer/DESY

"The Graduate School is a new and important element of decades of cooperation between both institutions - the University of Hamburg and DESY," said Claudia S. Leopold, Vice President of the university. DESY Director Helmut Dosch pointed out that already now graduates are much valued by universities, research centres and employers in industry – and this will further increase with the comprehensive PHGS qualification programme. "Indeed, our mixture of research infrastructure and university expertise is unique and it will continuously expand, true to the old Chinese proverb: "What does not become better, does not remain good"."

Under the PHGS roof, the Joachim Herz Stiftung grants several full scholarships every year to outstanding young scientists

strengthening their personal and professional competences," said Andrea Pauline Martin, vice-chairwoman of the foundation's executive board.

The PIER Helmholtz Graduate School is funded by the Helmholtz Association, DESY, University of Hamburg and the Joachim Herz Stiftung. First activities include career days for doctoral students, German and English courses, the sponsoring of field trips, research trips and leisure activities which also are meant to promote interpersonal collaboration. "These events are much in demand. This shows us how important a central focusing of such activities is", said Robin Santra, spokesman of the PHGS.

Photon Science Users' Meeting 2014

The next DESY Photon Science Users' Meeting "Research with Synchrotron Radiation and FELs" will take place on 30-31 January 2014 in conjunction with the European XFEL Users' Meeting which will take place on 29-31 January 2014. Both meetings will be held on the DESY campus in Hamburg. The three-day event comprises sessions on research with free-electron lasers (FELs) and synchrotron radiation sources, satellite workshops, and a joint DESY Photon Science-European XFEL poster session on Friday (31st) afternoon, which will be accompanied by a vendor exhibition. Register at:

<http://photon-science.desy.de/usersmeeting>

Two-million-Euro grant for molecule tamer

For his work on the control of complex molecules, Jochen Küpper from the Hamburg Center for Free-Electron Laser Science (CFEL) was granted two million Euros by the European Research Council (ERC). The council supports Küpper's project "Controlling the Motion of Complex Molecules and Particles" (COMOTION) through an ERC Consolidator Grant for five years starting in early 2014. The aim of the project is to develop methods to control, e.g., to transport, to sort, and to align complex molecules like peptides and proteins, but also larger objects, such as virus particles or picoplankton.

Congratulations on 45 years of service

In October, Christian Stegmann congratulated two Zeuthen employees celebrating their 45th anniversary at the institute: Olaf Gräber (centre) from the electronics group and Siegfried Schulze (right) from the technical infrastructure group. Both started to work at the Institut für Hochenergiephysik IfH, which in 1992 became the second location of DESY.



Photo: Christine Iezzi/DESY

European research area

The European Commission has published this year's ERA Progress Report of the European research area. In detailed country analyses, the commission also summarises the state of the individual scientific systems. The goal is to further develop the ERA, to build a cross-border labour market for scientists and to provide more dynamics to competition all over Europe. Moreover, access to research infrastructures and data is to be further increased.

In the current report, the commission demands a better coordination of the member states for the advancement of ERA – progress is still taking place at different rates throughout Europe. Simultaneously, the commission recognises that the budgetary difficulties of individual states endanger their national scientific systems and innovative growth. A new feature of the ERA report is its integration into the so-called "European Semester". This allows the states to directly influence ERA politics – which is not possible when this is exclusively done by the commission.

In fact, it is a matter of a lot of money. In the midterm, the question arises as to where national funding goes to and whether the states are to invite tenders throughout Europe, towards the completion of ERA. Originally, the European Semester was implemented solely for the purpose of evaluating national draft budgets and stabilising European growth. The member states and the commission agreed upon this procedure in 2011, in the face of the economic and financial crisis.

<http://www.helmholtz.de/perspektiven>



Shooting of "No Horizon Anymore" by Keith Reimink. Photo: Patrick Cullis

Short & cold

Best of Antarctic film festivals

A perfect title for the film event in November, in Berlin at the Acud cinema and at DESY in Zeuthen. DESY film enthusiasts selected real treasures of entertainment and information from a great variety of short films shown at the South Pole International Film Festival and the Antarctic Winter Film Festival, and many interested spectators had the opportunity to convince themselves of this. Many people working at the stations, including not only scientists but also carpenters, electricians and cooks, participated in the creation of the submitted films. They give an impression of the nature of the sixth continent and of the people living together and working for many months at the research stations, isolated and often during months of darkness, at temperatures of down to minus 70 degrees centigrade. The second part of the event presented the South Pole documentation "No Horizon Anymore" by Keith Reimink, giving an impressive insight into every-day life at the South Pole and introducing all scientific experiments at the pole.

What do "bunny boots" and "camembert" have in common? Both are main actors

in one of two short films: both govern every-day life of people who winter under extreme conditions at the pole. The films provide a perfect mixture of bizarre, melancholic and humorous entertainment. "For most people, Antarctica is so far away and – because of the cold at this ice desert – is no desirable place. The selected films convey so much fun and creativity which I didn't expect at such a place," a visitor of the event summed up her impressions.

DESY participates in the international neutrino telescope IceCube at the South Pole. A jury of cineasts from DESY revised and evaluated films of both festivals. Emanuel Jacobi, physicist at DESY, introduced the films. In 2010, he wintered at the South Pole and he also contributed to various short films. A selection of the best short films was presented in this event. Presentations at DESY in Hamburg and in other cities of Germany in 2014 are already in planning. (ub)

INFO

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Publisher
DESY-PR
Notkestraße 85
D-22607 Hamburg

Contact
email: inform@desy.de
telephone +49/40/8998-3613
www.desy.de/inform
(online version + newsletter subscription)

Editors
Gerrit Hörentrup
Till Mundzek (editor-in-chief)
Barbara Warmbein
Ute Wilhelmsen
Thomas Zoufal

Production
Britta Liebaug (layout)
Veronika Werschner (translation)
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