

Laying of cornerstone at DESY

Federal Government, Hamburg and Schleswig-Holstein sign European XFEL participation agreement

In a few months, the former DESY playing field will see a very different kind of power contest. Instead of probing the speed of runners or football skills temperatures and field strengths will be under test in the new accelerator module test facility (AMTF), one of the major DESY contributions to the X-ray laser European XFEL. Construction started end of July – the cornerstone was laid on 21 July by Federal Research Minister Annette Schavan, Hamburg's Science Senator Herlind Gundelach and Schleswig-Holstein's Research Minister Jörn Biel. They also signed a national German agreement for the participation in the X-ray facility. With 90 million Euros, the federal states Hamburg and Schleswig-Holstein will cover nearly 16 percent of Germany's contribution to the construction of the European XFEL.

On this festive occasion, many DESY spectators also suffered sunburn. A bright outdoor ground cover had been laid out to cover the soil on the sports ground to fight dirt and mud, since the first metre of top soil had already been removed. However, the rain of the preceding days ceased, and there was bright sunshine on 21 July – which was then strongly reflected by the light surface. During the whole ceremony – speeches, agreement signing and stonewalling – the sun was shining on the heads of about 500 DESY staff, so everyone highly welcomed the barbecue and drinks afterwards.

In the future, the usual temperatures in the hall will be much lower: as of 2011,



Politicians as builders: Jörn Biel, Annette Schavan and Herlind Gundelach (from left) during the AMTF ceremony.

the hall will be used to test the technical properties of the superconducting accelerator modules for the European XFEL at minus 271 degrees centigrade, before the twelve-metre modules weighing ten tons are moved to the main tunnel to become a 1.7-kilometre-long electron accelerator. The cavities, structures made of pure niobium that later will accelerate the particles, will also be tested in the hall.

"The construction start of the module test hall is a symbol for the strong German participation in this project," says the Chair of the DESY Board of Directors, Helmut Dosch. "Our experts will also be in charge of the construction of the com-

plex particle accelerator for the European XFEL." Federal Research Minister Annette Schavan points out that "the construction of the European XFEL strengthens Germany as a research area. The research ministers from Schleswig-Holstein and Hamburg and the German government today emphasised their joint commitment to implement this facility as soon as possible." The agreement between the Federal Government, Hamburg and Schleswig-Holstein is the basis for a long-term collaboration of Federal Government and participating States and DESY during the complete construction and operation phase of the European XFEL – a period of several decades. (baw)

First light at PETRA III

On 17 July researchers saw the first light of PETRA III at beamline P09. Three months after the first particles circled the newly overhauled PETRA ring, the light source passed the next important function test. The appearance and behaviour of the observed light spot show that the

PETRA III components are well adjusted already. The first test experiments are planned for September to figure out the features of the optical systems like monochromators under thermal load.



DIRECTOR'S CORNER

Dear colleagues,

the outcome of the Helmholtz evaluation has impressively confirmed that we are a research centre of top international ranking. The projects and concepts of all our research fields have received very good ratings, several of them with the best grades that the evaluators only use very rarely.

This is a great result, achieved with your dedicated work in the laboratories, workshops and administration. Many

thanks to all of you. This success, however, does not mean we can put our feet up. Instead, let's continue to work with dedication and a spirit of innovation to strengthen our position in international competition. This also requires an optimal infrastructure. The InfraFit project has made it evident that we can and must improve our work flows and the integration of our central technical structures.

I would like to quickly address adequate measures

and structural improvements and ask all of you for your constructive collaboration.

Of course we can fully implement our future research projects only with the necessary funding. Hence, the final agreement from our Russian partners to provide funding for the European XFEL is a historic milestone.

This European project, very important for DESY, makes good progress. Curiously enough, we also benefit from the current economic and

financial crisis. The promised extra funds from both economic stimulus packages are perfect for the badly needed redevelopment measures on our campus. I am looking forward to seeing what will happen after the German federal elections – whether the promises to invest “more money into research and education” will come true.

Yours,
Helmut Dosch

Brainstorming the dynamics of the microcosm

New laser sources propel photon science into a new age

Instruments, like microscopes, allow us to see things that our eyes cannot. Some instruments can probe even deeper: new light sources, based on conventional lasers or free-electron lasers (FELs) are now emerging, which emit ultrashort, extremely bright light pulses from infrared to X-ray. With these sources the observation of the motion of electrons and atoms in matter on atomic scale and in real time comes in reach.

On 24 and 25 June researchers from all over the world took part in a “Brainstorming Meeting” at DESY on “Perspectives for time-resolved studies and imaging with laser based and FEL photon sources”. The goal was to bring together experts in conventional laser and FEL research, with a few but top-class speakers and with lots of time for discussion. “This was a successful and stimulating meeting with 101 participants and many productive discussions,” says Henry Chapman (CFEL),

one of the organisers and speakers.

FLASH has been the successful testbed for FEL science for many years. Josef Feldhaus from DESY described recent progress and gave examples of outstanding science done at FLASH. Zhirong Huang (SLAC) reported on the exciting results obtained in the start-up phase of SLAC's Linac Coherent Light Source LCLS. The LCLS first lased in April this year, outperforming the design expectations and successfully proving that FELs also work in the X-ray region. Even before experiments have begun on any of the new light sources, participants brainstormed dreams of even shorter and more powerful pulses at high repetition rates, inspired by recent work carried out with laser-generated attosecond pulses, which reach the smallest timescales ever accessed in exploring atomic, molecular and solid systems.

Ferenc Krausz (MPI of Quantum Optics,

Munich) demonstrated that in pilot studies on these laser-based sources the monitoring and steering of the motion of electrons in atoms, molecules and solids have already been achieved. Andrea Cavalleri (CFEL) showcased the possibilities these sources offer for the dynamics of complex systems.

Dame Louise Johnson (Diamond Light Source, Oxford) outlined that images of components of cells could yield a wealth of information if taken with the right resolution in space and time. Henry Chapman gave an overview on the progress of time-resolved imaging made at FLASH. Intense, ultrashort photon pulses are a very attractive means to create well characterised ultrashort electron pulses for time-resolved electron diffraction. [\(jde\)](#)

Inter award

DESY intern wins prize for her work

Former DESY intern and student-to-be Tanja Auge has won a prize for her work on particle physics.

Her potential was already recognised by her tutor, Peter Schade, during her internship in the FLC group. "Her quick grasp and perception were amazing," said Schade. In November 2007, the then 15-year-old school girl from Wedel spent two weeks at DESY in the FLC group.

She wrote a term paper, called „special effort“, for her recent Abitur, the German final exams for secondary school, and presented the 40-page paper on her research at DESY in a lecture at school. Tanja Auge was now honoured with a prize from the Margret Bechler foundation. The prize money will not be paid in cash but instead, it will fund Tanja's travel and living expenses for an internship in a country of her choice. Tanja plans to start the internship already in the coming semester break.

Before becoming an intern, Tanja had read a short introduction to the standard model of particle physics. She familiarised herself with the topic and came to DESY prepared; she was quick on the uptake of her jobs and even solved master classes tasks. Soon she was able to start work with real data for the investigation of the exchange particle Z^0 .



This autumn Tanja Auge starts to study mathematics at the University of Hamburg. "I dream of returning to the university as a lecturer," she says. *(it)*



Ready to be packed up and shipped: these cavity tuning machines were sent to Fermilab in custom-made transport boxes.

On tour

Two cavity tuning machines on their way to Fermilab

When groups from different countries collaborate in the development of a machine, the standard procedure is to send the people involved to the machines. A team of engineers and technicians from DESY, Fermilab and KEK decided to do just the opposite: they sent the machine to the people. On 3 August, two big pieces of equipment constructed by the DESY MHF-SL group went on tour to the United States – to Fermilab near Chicago.

The machines in question are cavity tuning machines. Their purpose is to ensure that the shape of the superconducting accelerating structures, or cavities, needed for the European XFEL or the International Linear Collider ILC, correspond exactly to the construction plan. Only this way, the electromagnetic fields within the cavity will accelerate particles.

The cavity tuning machines measure each individual cavity cell and shape it into the ideal form. The goal is to eventually make these highly automated machines available to industry for XFEL cavity mass production.

However, two essential elements are still missing in these machines: steering electronics and software. This is part of the United States' contribution to the

cooperation in research with superconducting cavities, and this equipment will be added in the US.

For transport, each machine was split into two pieces and packed in especially manufactured containers. "Of course we fear that something may break, but we did our best to prevent this," said Wolf-Dietrich Möller, head of MHF-SL.



For one week, the DESY team and the packaging company were busy with the professional packing of the machine. Subsequently, the containers were transported by air.

Mid of August, a DESY team followed the journey of the containers and helped to assemble the machines on site at Fermilab. In the end, it was again people who were sent to the machines. *(gh)*

September

- 4** Lord of the Rings
Colloquium honouring Gustav-Adolf Voss
on the occasion of his 80th birthday
15 h, DESY Hamburg, auditorium
- 10** Science Café DESY (<http://sciencecafe.desy.de>)
Zahlenmystik – Oder warum im Alltag vieles mit einer 1 beginnt!
Martin Köhler, 17 h, DESY Bistro
- 16** Public Lecture
Teilchenphysikshow aus Bonn
19 h, DESY Hamburg, auditorium
- 20-23** GISAS 2009 (<http://gisas2009.desy.de>)
Satellite Conference of SAS2009
DESY, Hamburg
- 21-25** (www.desy.de/Icecube2009)
IceCube Collaboration Meeting
Humboldt-Universität zu Berlin
- 24** Science Café DESY (<http://sciencecafe.desy.de>)
Was es nicht gab, wurde eben konstruiert –
50 Jahre Konstruktion bei DESY
Rolf Pamperin, 17 h, DESY Bistro
- 30 Sept. - 1 Oct.** ESLS-RF Meeting (<http://esls-rf-2009.desy.de>)
13th ESLS-RF Meeting 2009
DESY, Hamburg

October

- 8** Science Café DESY (<http://sciencecafe.desy.de>)
Illuminati – Die wahre Geschichte der Antimaterie
Philip Bechtle, 17 h, DESY Bistro
- 12-14** TERASCALE (<http://www.terascale.de/statistics2009>)
Statistics School
Karlsruhe
- 20-24** TERASCALE (<http://www.terascale.de/pdf2009>)
PDF School
DESY, Hamburg
- 28** Public Lecture
Wie die Astroteilchenphysik zu DESY kam
Christian Spiering, 19 h, DESY Hamburg, auditorium
- 29** Science Café DESY (<http://sciencecafe.desy.de>)
Neutrinos – Die Geheimschrift des Kosmos
Christian Spiering, 17 h, DESY Bistro

INSIGHT – Open Day in Zeuthen: amazing how strong the effect of air pressure can be. The experiment was made in collaboration with the Zeuthen volunteer fire brigade. In a strongly heated and sealed drum, the air pressure is reduced by cooling with cold water. The air pressure outside crushes the drum.



From TT to V

Karsten Wurr appointed head of administration department

On 1 August, Karsten Wurr became head department manager (VL) in the administration department (V). Since 2004, Wurr – with a PhD in chemistry – had been head of technology transfer (TT) which was decisively structured by him.



Karsten Wurr

Further training in the Helmholtz Management Academy and a deeper insight in DESY administration when participating in the „infra fit“ project persuaded Wurr to take over the “exciting and comprehensive spectrum of tasks” of a chief department manager as the successor of Gunther Held.

The new administration manager has two major concerns: “On the one hand I want to strengthen the approachability and service-orientation of the administration department. My scientific background will surely help me to understand the concerns of the colleagues from science.”

On the other hand it is information, incorporation and representation of the colleagues from administration that Wurr considers important. Decisions should not be made over the heads of those involved, but new solutions should be worked out in mutual agreement.

For Wurr it is crucial that all colleagues are aware of “the main issue to which everyone is contributing individually” – i.e. to assure DESY’s position as a successful research centre. This makes it necessary to agree targets in all sectors, a prerequisite to facilitate efficient and effective working. (gh)

Energy conservation

New frequency inverter at HERA saves more than 1000 Euros a day

There is a 200-kilogramme frequency inverter two floors deep in the underground halls of HERA hall West since June 2009. It’s the size of a regular household refrigerator and its job is to power a HERA main pump with reduced drive which circulates the one-time cooling water to warm up the magnets and the tunnel air, saving DESY more than 1000 Euros a day.

The HERA accelerator was switched off in July 2007. It had run for 20 years and is now poised to take up new tasks. The tunnel is located 25 metres below surface and has a length of 6.3 kilometres. If the tunnel would be left without air conditioning, it would cool down to ground temperature of 11 degrees centigrade, producing a damp atmosphere in the tunnel, causing the precious accelerator components to corrode and rendering them useless. In order to conserve these valuable components it is necessary to heat the tunnel. This is done via the former cooling water system. The heat requirements amount to about 400 kW. During accelerator operation, the delivery rate of the cooling water system pump was 1600 kW. After the shutdown, most of the pumps were powered down. The remaining pumps still consumed 550 kW. In order to avoid

overloading, both main pumps had to be throttled, which brought a considerable noise disturbance in HERA hall West. The throttling can be avoided by reducing the drive. The DESY workshop groups MKK1 for electricity and MKK2 for water cooling found out that a single pump with half the drive would be sufficient. For this purpose, they installed the frequency converter. With 50 kW, the delivery rate of the pump was even reduced to one tenth.

Even though the required temperature of the tunnel could not be covered by the waste heat of the pump, there is sufficient free waste heat available from the helium cryogenic plant and the hall West cold water generator.

„In the past, the waste heat was dissipated through the cooling towers; today, we use it to warm up the tunnel. Currently, 500 kW less are needed for the conservation of the HERA accelerator. This means we save about 50 Euros per hour. Thus, the 20 000-Euro frequency inverter had paid itself off after two and a half weeks. The noise disturbance in HERA hall West has been considerably reduced which makes it possible to use the hall for assembly work and exhibitions,” says Jens-Peter Jensen, head of the MKK group. (it)

“Girls’ Day” at DESY school lab

Special day offers an easier access to physics

by Nicola Brenner-Ziegeler

On 27 May, the DESY equal opportunities representatives organised the first day at physik.begreifen that was exclusively for fourth-grade school girls. School lab head Karen Ong and her team want to awaken interest and fascination for physics in young people at an early age. Equal opportunities wanted to know whether girls perform experiments differently when they are in a girls-only group or together with boys from their class. The feedback from the girls and teachers was very positive. The girls said that they had more courage to do things

because – without boys – they did not feel watched and thus tried out things and made assumptions without the fear of being laughed at by the boys.

The teachers added that the girls had the impression that they were taken seriously and supported. The girls were not only fascinated by the experiments but also by the possibility to “work like a real scientist”.

After this test, the equal opportunities group recommends to establish school lab days at DESY for girls only, thus offering them an easier access to physics.

The construction site Schenefeld as seen from a helicopter on 17 June 2009. The camera points to the east, i.e. against the future direction of flight of the photon beams.

The borders of the research campus are clearly visible. In the foreground, two crane units are constructing the walls of the large building pit for the future experiment hall. The contours of the other five building pits can be made out all along the site. The yellow bentonite facility is located right in the middle, the white concrete factory near the left border.



European XFEL – a bird’s eye view

The looks of the construction sites are changing nearly every day.



Fair and square: fitting the European XFEL logo. Short and focused texts: like the flashes of the new X-ray laser. Sharp images: in anticipation of the future experimental results.

The new flyer “Enlightening Science” is aimed at people who would like to know more about the essentials of the European XFEL at a glance. The six-page flyer is available in English and German. You can get a copy at the PR department (Building 1) and on the 5th floor of AER19, or download it from the website: www.xfel.eu > Documents.

Very often, the whole insight reveals itself only when things are seen from a distance. This was what everybody involved in the construction of the European XFEL felt when they first say the new aerial photographs. In principle, they know each and every corner of “their” construction site and have a realistic notion of its dimensions and of

what is currently happening there. The view from above and from different directions did surprise them, however. The pictures show that work on all three sites is proceeding at full speed, and also that the European XFEL construction project is one of the largest in the Hamburg area.



A fascinating view of the construction site DESY-Bahrenfeld. In this picture several PR guides, who are usually escorting groups of visitors around the DESY site, are just returning from an inspection of the new vista.

Element 112 shall be named “copernicium”

At the GSI, Helmholtz Center for Heavy Ion Research, five new elements have been discovered in the past 30 years. Recently, the discovery of the so far last element 112 was officially recognised by the authorised commission IUPAC. To honour Nicolaus Copernicus, Sigurd Hofmann and his discovering team agreed on proposing the name “copernicium” for the new element, with the symbol “Cp” in the periodic system of elements. The next step is the endorsement of this proposal by IUPAC. Only then the new element will be given its name. It is 277 times heavier than hydrogen, thus being the heaviest element in the periodic system.

Twenty-one scientists from Finland, Germany, Russia and Slovakia participated in the experiments for the discovery of element 112. With the 120-metre-long GSI particle accelerator, scientists shoot zinc ions onto a lead foil to produce element 112. With nuclear fusion, the atomic nuclei of zinc and lead melt to an atomic nucleus of the new element

www.helmholtz.de/hermann



DESY's first table football tournament was characterised by internationality, equality, dedication and fervour.

Moreover, the sportspeople were professionally catered.

In the background of the bottom picture you can see the eventual champions Jan Dreyling-Eschweiler and Attila Abramowski.

Kick it!

Table football tournament at DESY

The table football game always attracts the attention of visitors in the DORIS experimental hall. Many users and DESY staff often use the two tables to take a break from data-taking and experimenting.

On the occasion of DESY's 50th anniversary, table football fans organised the first DESY table football tournament, which started on 15 June. A third table was bought especially for this championship. Moreover, a barbecue and drinks were organised for the finals.

As many as 62 teams divided into 16 groups participated in the preliminary rounds, and 16 teams qualified for the finals.

The final round took place on 9 July in the FLASH experimental hall. Among the 90 spectators and players were physicists, technicians, engineers and doctoral and diploma students from several DESY groups. “Table football is a good compensation for brain work. Moreover, it is a very communicative sports activity that brings together DESY staff from all sectors,” said Jan Dreyling-Eschweiler, University Hamburg diploma student and one of the tournament winners. Together with his partner, Hamburg university PhD student Attila Abramowski, he reached the finals undefeated, coming up against the finalists Ernst Untiedt and Jan-Peter Kurz (HASYLAB) and winning the final 2:1 in three rounds. Third winners were Lars Lottemoser and Felix Beckmann (GKSS).

The second DESY table football tournament is scheduled for next year.

Apart from top-level research, table football also seems to have a future at DESY. *(it)*

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Project management DESY in new rooms

The project management group PT-DESY holds a housewarming party on 28 September, from 11:30 to 15:00 h, at their new location in Albert-Einstein-Ring 21, second floor (between DESY gate Luruper Chaussee and Novotel, in the building next to the European XFEL project team). You will be treated to refreshments and a tour of the offices, and

Kristina Böhlke and her group will present their activities. The move was necessary because the number of staff in PT-DESY has increased. The range of services includes BMBF project funding, European research funding and strategy planning, and expert information for the public.