DESY inFORM.

07+08|13
Newsletter of the
Research Centre DESY

Superconducting cavities non-stop

Serial production of the European XFEL cavities has started

Production of superconducting cavities in the cleanroom of the Italian firm Zanon. Photo: Heiner Müller-Elsner

For DESY staff, especially the TESLA accelerator technology developers, they were a familiar sight – the shiny curves of the nine-cell cavities for the superconducting linear accelerator. This era is coming to an end. With the start of the serial production of the European XFEL cavities, the world's most beautiful (and presumably most expensive) "corrugated pipes" are being supplied by two companies, completely welded in a titanium tank which is the vessel for the helium needed as a coolant for operation at minus 271 degrees centigrade.

After a start-up phase and pilot production, the first cavities of the serial fabrication are now reaching DESY. "Every Thursday, Zanon and Research Instruments deliver six to eight cavities – by now we already received more than 50," said Detlef Reschke from MHF-sl. As the "cavity owner", he is responsible for the logistics of the individual production and testing processes. He prefers the longstanding DESY word "caretaker" because, after production, the high-tech tools need much individual care: testing, follow-up treatment in many ways, high-pressure rinsing, testing. This includes the participation of many working groups and Reschke is the one who ensures that everything is done properly for each cavity.

A total of more than 800 of these superconducting cavities are needed for the

CONTINUED ON PAGE 2

DIRECTOR'S CORNER

Dear colleagues,

on the occasion of the official inauguration of the CFEL building on 14 June, I talked about our future projects with State Secretary Dr. Georg Schütte from the Federal Ministry of Education and Research and Dr. Dorothee Stapelfeldt, Senator for Science and Research of Hamburg. It is always impressive for me to hear that our research institute is highly recognised by the Federal Ministry and the Hamburg Senate, that these institutions trust in our competences and innovative drive, and that policymakers are enthused by the dynamism of our research centre.

Currently, our most important project, the European X-ray free-electron laser European XFEL, is making further progress. The XFEL accelerator team, headed by Dr. Hans Weise, is successfully coordinating the construction of the superconducting accelerator. The construction of FLASH2 is also going well, despite of the harsh winter, which caused small delays. Moreover, we are now entering the hot construction phase of the two PETRA III extension buildings. You can't miss the preparation work on our campus; the same is true for the Centre for Structural Systems Biology CSSB, which will be built at the east end of the Max von Laue experimental hall.

Another important project for us is the visible participation of DESY in the LHC intensity upgrade at CERN, which is now being prepared. We want to contribute our expertise in detector development and we will have to create the corresponding infrastructure in the coming years. There is also very good news from Zeuthen: our colleagues in Zeuthen have made a significant step forward in the new astroparticle project CTA. The Federal Ministry gave high priority to this international project and regards DESY as an important national partner. This represents a giant step forward to reach our goal to create a new national centre for astroparticle physics at DESY in Zeuthen.

Our funding agencies are right when they say that things run smoothly at DESY: our success with the complex projects is based on extremely motivated and competent staff members working at our research centre.

Let me take the opportunity to thank you for your excellent work and at the same time wish you all the best for a relaxing summer vacation. I am looking forward to see you on 13 August, the new date for the postponed staff meeting, and at our joint staff outing on 29 August.

Yours,

Helmut Dosch

European XFEL's accelerator. After industrial production, the first test is carried out in the AMTF hall, the accelerator module test facility at DESY. A Polish operating team checks the correct field strength and accelerating properties with the help of the vertical test stands. After passing this initial test, the cavities are shipped to France to be assembled with all other components into a twelve-metre-long accelerator module. If the cavity fails the test, it is either rinsed with ultra-pure water or is submitted to a chemical follow-up treatment. "On average, the cavities reach an accelerating gradient of 28 megavolts per metre," said Reschke. "This is more than we expected. Only six cavities had to be re-treated and there have been no real failures." Some of the cavities even reached almost 35 megavolts per metre, the top gradient for the International Linear Collider.

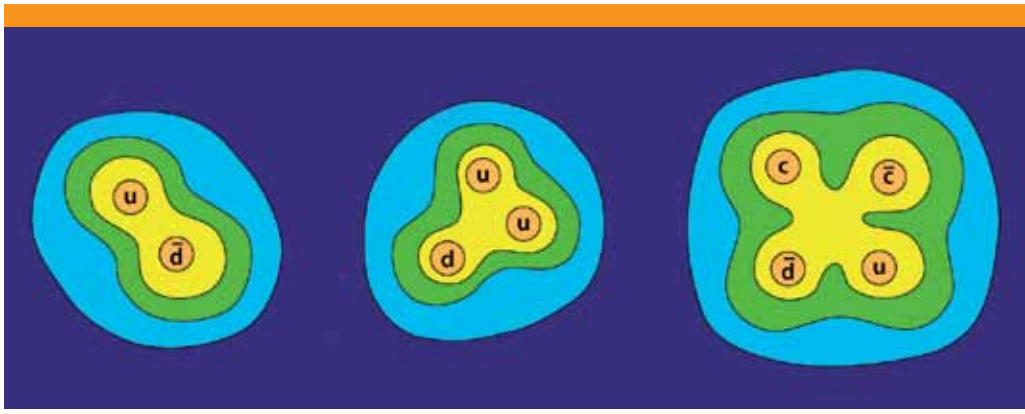
Bernd Petersen, head of the DESY cryogenics and superconductivity group, and leader of the AMTF hall, is pleased. "I could never have imagined that a reliable serial production of such a sophisticated technology could be taken up so soon." The first 22 approved cavities have already left for France for assembly – eight at a time are installed in one accelerator module, together with a focusing quadrupole, several supply tubes and super-insulation components. The modules that are mounted in Saclay near Paris are again returned to DESY – the first completed serial modules are expected to arrive in Hamburg in autumn. Here, again in the AMTF hall, they will be tested at one of the three module test facilities before being equipped with RF conductors and transferred into the tunnel. At that time, at the latest, the AMTF will be in continuous operation.

In a two-year production phase, one accelerator module per week will "roll off the line". Moreover, all assembly parts have to be shipped in time to the assembly facility in France. DESY will only store a small buffer of perhaps 30 cavities to compensate production fluctuations. *(tz)*

Tetraquark!?

Two experiments discover hints of a new particle composed of four quarks

The particle zoo will possibly be enriched with a complete new genus: at two experiments in China and Japan, physicists observed hints of an extremely elusive particle which seems to be composed of four quarks. This so-called tetraquark would be a novelty. So far, physicists only know particles composed of two quarks, the so-called mesons, or of three quarks, the baryons, which also include the nucleons proton and neutron.



So far, physicists know particles composed of two quarks, such as the pion (left), and of three quarks, such as the proton (centre). The resonance $Z_c(3900)$ (right) seems to consist of four quarks. Image: APS/Alan Stonebraker

With the Chinese BESIII and the Japanese BELLE detectors, the scientists investigated another elusive particle, a so-called resonance. Both groups independently observed that this Y(4260) resonance often decays into another, so far unknown resonance, which was dubbed $Z_c(3900)$. The number in brackets indicates the mass in megaelectron-volts (MeV). A total of 159 $Z_c(3900)$ particles were observed by the BELLE team, 307 showed up in the BESIII data.

$Z_c(3900)$ in turn decays into a J/Psi particle and a positively charged pion, as both groups report in the journal "Physical Review Letters". From this, the physicists deduce that the new particle is composed of a total of four quarks: charm, anti-charm, up und anti-down. "From what we know, the tetraquark is a plausible explanation for the observations," explains theorist Ahmed Ali, who did not participate in the experiments, but together with other colleagues from the DESY theory group had predicted a possible four-quark state. "In 2011, we suggested that BESIII and BELLE should take a close look at this field," said Ali. "In doing so, we made a prediction for the mass which was not far from the one that was measured now."

In the meantime, the Chinese group found hints of additional four-quark states, Ali says. Already previously, BELLE spotted possible four-quark candidates. "There is growing evidence that tetraquarks may exist," says Ali. "This would mean that so-called diquarks – i.e. double quarks - would be added to the basic building blocks of matter, bringing along both, completely new perspectives and challenges." *(tim)*

References:

"Observation of a Charged Charmoniumlike Structure in e+e-→π+π-J/ψ at √s=4.26 GeV"; M. Ablikim et al. (BESIII Collaboration); Phys. Rev. Lett. 110, 252001 (2013); DOI: 10.1103/PhysRevLett.110.252001

"Study of e+e-→π+π-J/ψ and Observation of a Charged Charmoniumlike State at Belle"; Z. Q. Liu et al. (Belle Collaboration); Phys. Rev. Lett. 110, 252002 (2013); DOI: 10.1103/PhysRevLett.110.252002

"It is quite a sensation"

DESY particle physicist Torben Ferber is one of the German co-workers at BELLE and one of the co-authors of the scientific publication on the tetraquark. In an interview with the Helmholtz Association, he illustrated the discovery:

Why is this newly discovered particle so special?

The special thing is that so far we have never seen it in this way. All basic building blocks of matter that we know and that are composed of quarks – for example the proton or the neutron – consist of two or three quarks. These are no spectacular particles, as we see them very often. The newly discovered particle does not fit into this model, because it is composed of four quarks. We have been searching for it for a long time; the fact that we found it is quite a sensation.

When you have been searching for this particle, does that mean that there was a theory that it should exist?

Yes, this is based on quantum chromodynamics. It explains why quarks interact with each other. According to this theory, particles may in principle be composed of four quarks – but not in any combination. However, this has so far only been a theory. In reality, nature could have decided against their existence. In fact, it did not. Now it is the task of theorists to verify what this means and to make predictions that tell us, the experimental physicists, what we have to search for in the future. This is what makes it so exciting.

If there are particles of four quarks, is it possible that they may even have five?

Indeed, this is possible. The next step is that theorists should tell us into which products this new particle is to decay. Its lifetime is very short and it already decays after 10^{-23} seconds (less than a quadrillionth of a second). But into what exactly? There was something special at its discovery: the particle was observed almost simultaneously at the Japanese BELLE experiment and at the BESIII experiment in China. When two experiments observe the same kind of event independently, this is especially significant for physicists. It verifies that this was not due to a measurement uncertainty of the detector.

Who detected it first?

Both published it on the same day.

Is this sheer coincidence?

No, the date of publication was coordinated; you are usually more or less informed about what the other groups do. In this case, some of the authors even contributed to both papers.

The ILC is now ready for construction

International Linear Collider publishes Technical Design Report

When a project reaches an important milestone, a celebration is in order. However, if this project has no home laboratory but was developed in many different institutes from around the world right from the beginning, where should the celebration be held? The International Linear Collider, which published its Technical Design Report on 12 June, solved this problem in a creative and democratic way and just decided to celebrate in all three participating regions of the world.

The European ILC director and DESY physicist Brian Foster (center) hands out the Technical Design Report – fresh from the press – to CERN director Rolf Heuer, representing ICFA. Photo: Anna Pantelia

At three consecutive events in Asia, Europe and America, there was a global official handover of the Technical Design Report of the next-generation particle accelerator to the International Committee for Future Accelerators ICFA, which coordinates the planning of future particle accelerators worldwide. Scientific symposiums, public lectures and even a virtual "tossing of the baton" via videoconference marked the transition of planning to the possible construction of the ILC. The Technical Design Report presents the latest, most technologically advanced and most thoroughly scrutinised design for the ILC.

"The Technical Design Report basically says that we are ready to go ahead," said Barry Barish, Director of the ILC's Global Design Effort. "The technology is there, the R&D milestones have been achieved, the physics case is clear, and we could start construction tomorrow. All we need is a clear political statement, and there are strong signs from Japan that it could bid to host the project."

"DESY particle physics and accelerator scientists have made substantial contributions that helped the International Linear Collider reach the milestone Technical Design Report, virtually the maturity certificate of this project," said DESY Research Director Joachim Mnich. "We will continue to work also on detector technologies to harvest a maximum of scientific insight with this precision machine of particle physics."

The Technical Design Report (TDR) marks the completion of many years of globally coordinated R&D and completes the mandate of the Global Design Effort. It contains all the elements needed to propose the ILC to collaborating governments, including a technical design and implementation plan that are realistic and have been optimised for performance, cost and risk. *(baw)*

INFO

www.linearcollider.org/from-design-to-reality

Dark matter – a light move?

By Axel Lindner and Babette Döbrich

The question concerning the nature of "dark matter", which is about four times more abundant than ordinary matter in the universe, is one of the most important and pressing questions of modern physics. For many years, a lot of effort has been made to search for the so-called Weakly Interacting Massive Particles (WIMPs) as an element of dark matter. The hypothetical WIMPS are very heavy elementary particles and scientists hope to detect them at the LHC. However, extreme lightweights may also be an element of dark matter. The also hypothetical axion is an example of such Weakly Interacting Slim Particles (WISPs). Currently, there is only one experiment worldwide – ADMX in the United States – searching for this kind of dark matter. According to the opinion of initiators from DESY and the University of Zaragoza, this is not enough. At the DESY workshop "Dark matter – a light move", sponsored by the Helmholtz Alliance for Astroparticle Physics, they discussed ideas with cosmologists, radio astronomers, particle physicists and engineers to carry out novel experiments searching for light dark matter.

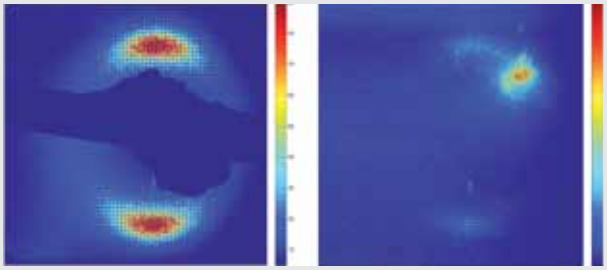
Again, it was shown that DESY offers excellent research possibilities with its infrastructure. With ALPS II, DESY is already engaged in WISP physics. Currently, first drafts for new experiments are being developed and, perhaps, it will be possible to present concrete project proposals very soon.

INFO

Presentation slides of the workshop at: http://bit.ly/13uFawA

FLASH makes magnetisation invisible

Surprising effect discovered at the free-electron laser



At low intensity the magnetisation becomes visible (left), at high intensity the magnetic scattering signal breaks down (right).

An international team of scientists has observed a new effect at DESY's free-electron laser FLASH: the extremely intensive X-ray light of FLASH makes the magnetisation of materials invisible within a few femtoseconds (a quadrillionth of a second). The researchers present their results in the scientific journal "Physical Review Letters".

Resonant magnetic X-ray scattering is an established method to investigate the magnetic properties of materials at conventional synchrotron radiation sources. It can, for instance, make the single magnetic domains visible – areas of uniform magnetisation. The researchers now employed this method at the X-ray laser FLASH. Its ultra-short and brilliant X-ray flashes are ideal to trace ultra-fast magnetisation changes that were triggered by an additional optical laser and detected by a weakly focussed X-ray beam of limited intensity.

However, when the experimenters put their sample of cobalt and platinum layers into a strongly focussed X-ray beam, they were confronted with a surprise: above a certain X-ray intensity, the magnetisation could not be measured anymore; the magnetic diffraction image of the sample disappeared almost completely. "The nature and intensity of the diffraction changed instantaneously," said DESY scientist Leonard Müller, lead author of the study. "The interaction of the X-ray light excites the electrons of the material in such a strong way that the diffraction image fades out and eventually disappears." The scientists conclude that the X-ray flash does not only probe the sample but also changes its properties on a time-scale which must be even shorter than the incredibly short flash itself.

Reference: "Breakdown of the X-Ray Resonant Magnetic Scattering Signal during Intense Pulses of Extreme Ultraviolet Free-Electron-Laser Radiation"; Phys. Rev. Lett. 110, 234801 (2013); DOI: 10.1103/PhysRevLett.110.234801

X-rays reveal secrets of metallic glass

PETRA watches hidden nanocrystals grow

Thanks to the superior X-ray vision of DESY's light source PETRA III, scientists have watched nanocrystals grow live inside a metallic glass. The method allows to follow the growth of metallic crystals from sizes as small as two nanometres (billionth of a metre) in real-time and may lead to an optimisation of these high tech materials. "The technique can also be applied to other materials and may be used to follow crystallisation processes during chemical reactions in real-time," said DESY scientist Jozef Bednarcik, lead author of a scientific paper appearing on the front cover of the journal "Physical Chemistry Chemical Physics".

X-ray diffraction pattern of metallic glass. The bright rings correspond to nanocrystals whereas much broader and less intense rings correspond to the amorphous matrix.

Metallic glasses are advanced magnetic materials that find broad application in sensors, transformers and other fields of electronics and electrical engineering. Different from what their name might suggest, metallic glasses are not optically transparent. The name glass refers to their amorphous internal structure that is as disordered (amorphous) as in conventional glass.

Metallic glasses are produced from molten alloys that are cooled so rapidly that they simply have no time to build an ordered internal structure. In a second step, this amorphous precursor is heated again to let magnetic nanocrystals grow inside the amorphous glass. "It's like a pudding with raisins inside," explains Bednarcik. Depending on the size and number of the 'raisins', the magnetic properties can be fine-tuned.

Bednarcik's team heated raw, amorphous stripes of a metallic glass, taking a snapshot of the internal structure with PETRA's X-rays every twelve seconds. "We could see crystals grow live already at sizes of two or three nanometres," says Bednarcik. This sort of investigation can elucidate the crystal growth in-situ and in real-time, leading to a better understanding of the process. With this knowledge, manufacturers of various nanocrystalline substances can optimise their production processes as well as the properties of their materials.

Reference: "In situ XRD studies of nanocrystallization of Fe-based metallic glass: a comparative study by reciprocal and direct space methods"; Phys. Chem. Chem. Phys., 2013, 15, 8470-8479; DOI: 10.1039/C3CP44445G

Uwe Seeler at DESY

Football idol Uwe Seeler (centre) visited DESY's apprentice workshop on occasion of the annual Hamburg Chamber of Commerce campaign for more apprenticeships. The honorary training counsellor of the Chamber of Commerce and its president Fritz-Horst Melsheimer (second from left) marvelled at the Stirling motor which was built by DESY apprentices. Photo: Lars Berg

August

13 Staff Meeting
Report of the chairman of the board: News, Mission and Vision
DESY, Hamburg, auditorium, 10:00 h

15 Information event
Leistungsentgelt 2013
DESY, Hamburg, auditorium, 10:00 h

15 Public lecture
Wolfgang Paul – Der Teilchenfänger
Ralph Burmester, Deutsches Museum Bonn
DESY, Hamburg, auditorium, 19:00 h

28 Science Café DESY (http://sciencecafe.desy.de)
Mit „Licht-durch-die-Wand" auf der Suche nach der dunklen Seite des Universums
Axel Lindner, DESY, Hamburg, DESY Bistro, 17:00 h

29 Event
DESY-Betriebsausflug
Volkspark, Hamburg, 10:00-16:00 h

September

2-6 Workshop (http://qcd-lhc.desy.de)
QCD@LHC
DESY, Hamburg

4 Event
Groundbreaking ceremony CSSB
DESY, Hamburg, 14:00 h

10-19 Workshop (https://indico.desy.de/event/CASPAR2013)
CASPAR – Cosmic Rays Acceleration, Sources and Propagation: A Rendez-vous
DESY, Hamburg

12 Event (http://mint.desy.de)
2. Mädchen-MINT-Tag bei DESY
DESY, Hamburg, auditorium, 9:00-16:00 h

13 Choir concert & string quartet
„Vom Tafeln und Bechern"
DESY, Hamburg, canteen annex, 20:00 h

24-27 Theorie-Workshop (https://th-workshop2013.desy.de)
Nonperturbative QFT: Methods and Applications
DESY, Hamburg

25 Heinrich Hertz Lecture
The String Magic
Cumrum Vafa, Harvard Universität
DESY, Hamburg, auditorium, 17:30 h

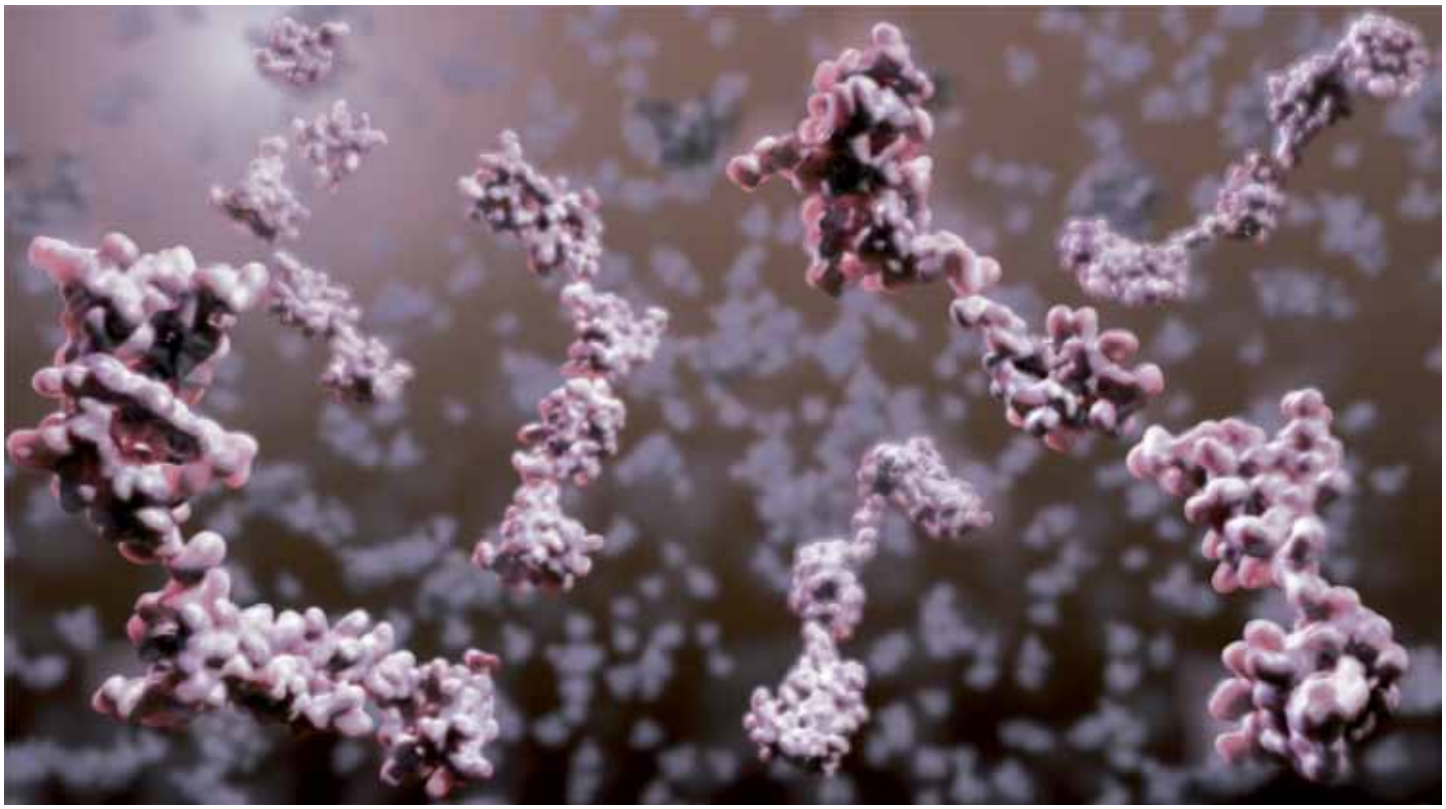
25 Science Café DESY (http://sciencecafe.desy.de)
Wie funktionieren eigentlich Computer?
Martin Köhler, DESY, Hamburg, DESY Bistro, 17:00 h

25 Event (http://cern.ch/icd2013)
2. International Cosmic Day
Participation worldwide possible!

+++ 2 November: DESYs Open Day and Night of Knowledge +++
All current events: www.desy.de/veranstaltungen

X-ray experiments from the living room

PETRA beamline P12 offers fully automated remote access to users



Complex biomolecules are often objects of investigation with small-angle X-ray scattering SAXS. Image: Spronk | 3D (www.spronk3d.com) for WeNMR - A worldwide e-Infrastructure for NMR and structural biology (www.wenmr.eu)

By Manuel Gnida

Most people would agree that the invention of the internet has facilitated their lives tremendously. A large number of tasks can now be organised and completed online from the comfort of one's own home, saving time and often money. Users of the experimental station P12 at DESY's PETRA light-source can now even perform X-ray experiments from their living rooms, if only they wanted to. P12 is PETRA's first fully-automated beamline that users can control from any place in the world. Remote access is not only convenient but it can also help scientists from institutes with tight travel budgets to pursue research at PETRA.

The research at P12, operated by the European Molecular Biology Laboratory (EMBL), concentrates on small-angle X-ray scattering (SAXS) – an increasingly popular technique researchers employ to study nanometer-scale structures of proteins and other biomolecules in solution as well as their interactions. One nanometer is a millionth of a millimeter. "Scientists that choose to perform remote SAXS experiments at P12 obtain the exact same results as they would as on-site users," says EMBL researcher Dmitri Svergun, whose group is in charge of the beamline.

"Remote experiments only become possible if all beamline parts and the software system are fully automated," Svergun explains. In 2005 – then operating EMBL beamline X33 at DESY's former X-ray source DORIS – his group began automating all steps of the SAXS data collection and processing procedure. Four years later, Svergun steered the world's first remote SAXS experiment at X33 while giving a course to students in Singapore. "Within only five minutes, we had determined the shape of a protein at the other end of the world," he says. Since then, the group has made a series of improvements to their setup, which is now operational at PETRA beamline P12.

The fully automatic sample changer at P12. Photo: EMBL

The main work load for a remote user is the preparation of a large number of samples before the experiment, as José M. de Pereda from the Spanish National Research Council in Salamanca knows. Last year, his team became PETRA's first ever remote user group. "We had to prepare all the protein samples, each at multiple dilutions, within a short amount of time. Then the samples were transferred to a specific 96-well plate, frozen, and shipped to Hamburg," he says. "The preparation of the plate required a little extra organisation." Once the samples had arrived in Hamburg, a local contact placed the 96-well plate in the beamline's automatic sample changer – a robot that loads samples one by one into the X-ray beam and also takes care of intermittent cleaning cycles. The Salamanca scientists connected to the beamline over the internet and controlled the experiment with the beamline's graphical user interface.

While researchers collect data at P12, the beamline's data analysis software automatically processes the accumulating data and provides scientists with an initial characterization of their samples. The processing pipeline includes tasks such as checking data quality, correcting for background signals, computing overall particle parameters, and determining protein shapes for each measurement. After the data collection, researchers transfer the processed data to their home laboratory for continued, in-depth data modeling. "The data collection process at P12 was simple and intuitive," Pereda emphasises. "We were absolutely satisfied with the data we obtained, and we will certainly consider collecting SAXS data remotely again."

However, remote data collection may not be for everyone. For biological SAXS, remote access is limited to samples that are stable and do not need to be modified by the scientist during the experiment. At other PETRA beamlines, experiments cannot be standardized because they frequently involve complex apparatuses and individual demands that differ from user to user. Nevertheless, in the field of biological SAXS, Svergun sees remote data collection on the rise. "Although it is not widespread yet, the number of remote users will grow, once remote experiments become more common in our working culture," he says. Between 95 and 97 per cent of the macromolecular crystallography users at the Stanford Synchrotron Radiation Lightsource, USA, choose remote access all or some of the time. A look at those numbers for this other popular technique in structural biology suggests that Svergun may be right.

INFO

A video explaining biological SAXS is available at:
http://www.wenmr.eu/wenmr/wenmr-small-angle-x-ray-scattering-animation

First magnet in FLASH2

Six-ton dipole will send electrons into the beam dump

The dump magnet is mounted in FLASH2.

Photos: Dirk Nölle

The first magnet has recently been installed in the tunnel of DESY's new X-ray laser FLASH2. The six-ton dipole is the largest magnet of the new facility. In the future it will separate the electron beam from the X-ray beam and dispatch the particles into the so-called beam dump, the particle grave. The X-ray laser light in contrast will be conducted across the tunnel of the PETRA III storage ring to the measuring stations of the new FLASH experimental hall which is currently under construction.

With the project FLASH II, DESY doubles the experimental possibilities with soft X-ray laser light. The construction of the facility and of the new experimental hall is well under way. "The tunnel is almost complete and is currently equipped with technical infrastructure including power supply, cooling water, air condition and technical gases," said Joachim Spengler, head of the technical infrastructure group at the photon science division.

The connection to the FLASH accelerator is almost concluded. In the future, the fast electrons will be split into the two beamlines FLASH1 and FLASH2 and provide about ten measuring stations with bright X-ray flashes. As soon as the particle switch at the end of the accelerator is finished, this area will be closed again and approved by the German technical inspection authority TÜV to make sure that user operation at FLASH1, which is interrupted since February, will start again at the end of 2013.

Construction in the tunnel of FLASH2 will continue until the end of the year. "We are confident that we will be able to send the first electrons through FLASH2 at the beginning of 2014," said project leader Bart Faatz. First, the electrons will be used to test and to set up the complex arrangement of magnets which in the future will bring the fast electrons to the exact slalom course for the emission of laser light. Currently, the first measuring stations are installed in the new experimental hall which will be completed in 2014. By early 2015 it may be possible to produce the first laser light flash and to start user operation. *(tim)*

INFO

http://flash2.desy.de

Research live

What is the world made of? Where does cosmic radiation come from? And which technologies are needed to unveil these mysteries? On 2 June, at the Open Day at DESY in Zeuthen, more than 1000 visitors took the opportunity to learn more about the work done at DESY.

Curious people had the chance to tour around the laboratories and workshops, learn about research projects, deepen their knowledge in lectures, movies or in discussions with DESY staff members and investigate everyday phenomena with easy experiments. Especially popular were active experiments: building a cloud chamber, physics toys, and a footrace on water, vacuum experiments, detector game, giant soap bubbles and much more.

Visitors actively benefitted from the idea to make the fascinating world of science come alive. “It was wonderful to see lots people coming to our institute to learn something about our research and our daily routine,” said Christian Stegmann, head of the DESY institute in Zeuthen. “We enjoyed it very much.” *(ub)*

JOIN IN.

at the Open Day 2013 in Hamburg

Remember remember: the second day of November 2013 will be the 5th “Science Night” in Hamburg. DESY too will open its doors again and it expects thousands of visitors.

The DESY speciality: DESY adds an “Open Day” to the “Science Night”, extending the opening hours as in the past years from 12 noon to 12 midnight.

Join in! Show your special facet of DESY to the visitors. All people working on the DESY campus Hamburg and at the European XFEL GmbH are cordially invited to contribute their programs to make the Open Day absolutely successful and exciting.

Please register at: http://registrierung-tdot.desy.de

Photos: Christine Iezzi und Sabine Siebecker

CFEL research building officically inaugurated

The research building of the Hamburg Center for Free-Electron laser Science (CFEL) on the Bahrenfeld campus has been officially inaugurated. The 50 million euro construction was funded by the city of Hamburg and the German government. “With the investments in CFEL, the Hamburg Senate promotes its policy to further develop the leading position of Hamburg and the metropolitan region as an international centre of structural research,” said science senator of Hamburg Dorothee Stapelfeldt at the inauguration ceremony. CFEL is a cooperation of DESY, the University of Hamburg and the Max Planck Society. Photo: Lars Berg

Russian research minister Livanov at DESY

In late June the Russian Minister of Education and Science,Dmitry Livanov (centre) visited the construction site of the European X-ray free-electron laser European XFEL in Hamburg and Schenefeld. The European XFEL managing board and the DESY directorate informed the minister, a physicist himself, about the construction progress and the future research possibilities. During the tour around the DESY campus, Livanov – together with DESY’s accelerator director Reinhard Brinkmann (far left) and the managing director of European XFEL Massimo Altarelli (far right) – inaugurated the first test bench, built by Russia, for the European XFEL accelerator modules in the AMTF hall. Russia funds 27 percent of the costs for the European XFEL, the second largest amount after Germany (58 percent).
Photo: Reimo Schaaf

NEWS

Student Prize for CFEL doctoral student

CFEL doctoral student Zheng Li was awarded this year’s Student Prize of the International Conference on Vacuum Ultraviolet and X-ray Physics (VUVX-2013). As a member of the theory division of the Center for Free-Electron Laser Science (CFEL), he is honoured for his outstanding research on the interaction of protons and electron holes in water clusters and other soft condensed matter.

Energy for sustainable research

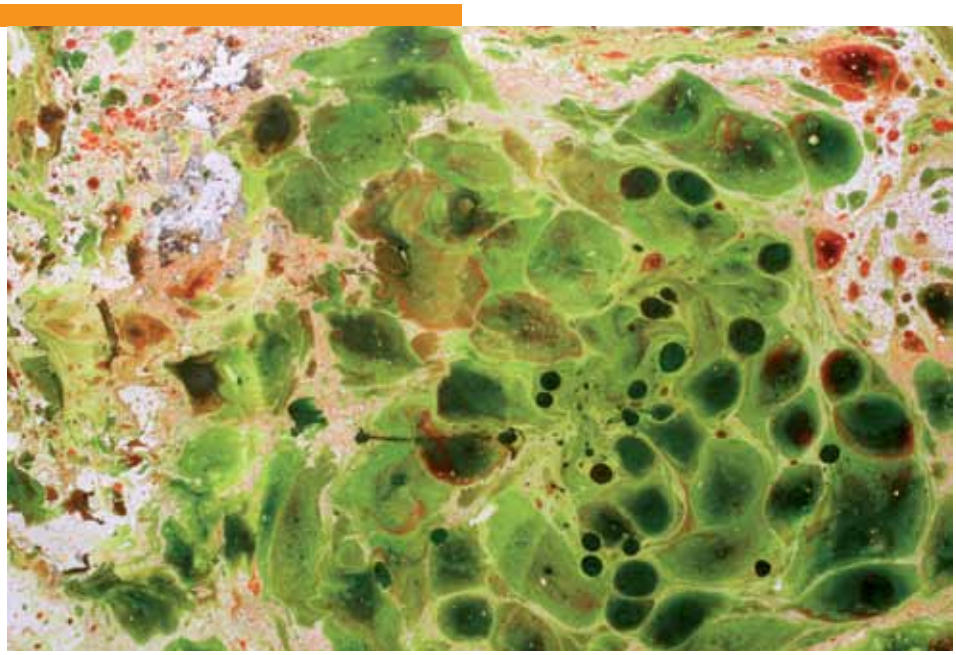
For the second time, about 300 representatives of large-scale research facilities meet to discuss a sustainable energy supply for science. DESY co-organises the workshop that takes place from 23 to 25 October at the European particle research centre CERN. “The goal is to create the awareness for sustainable solutions in the laboratories,” explains co-organiser Frank Lehner from DESY. “This mainly concerns the energy supply, but also other actions on the campus. We have to become greener.” After the first round of the meeting in 2011 at the European Spallation Source ESS in Lund, Sweden, the second workshop will set standards for a sustainable power supply and plan concrete projects. More information:
http://event-energy-sustainablescience2013.web.cern.ch/

Summer students 2013

From 16 July to 15 September, DESY again is host for more than 100 summer students in Hamburg and Zeuthen. The students from about 30 countries get a practical insight into research at the different DESY groups. Moreover, they are offered an extensive programme including lectures and seminars from all DESY research fields.
http://summerstudents.desy.de/

DESY staff outing 2013

„People, particles, activities“, this year’s staff outing – a joint event of both the Hamburg and Zeuthen institutes – takes place in Hamburg’s Volkspark. 29 August, from 10 a.m. to 4 p.m., will be a day full of fun, games and entertainment, provided and organised by colleagues for colleagues. Helpers for this day are always welcome! Refreshments will be served. Please make sure to register until 1 August. Information and registration at:
http://betriebsausflug2013.desy.de



The artistic “detector signal”, developed on deckled-edged paper (56 cm x 76 cm). Photo: Marcel Große

BETTY accelerates paint eggs

Art project inspired by DESY research

By Michael Büker

In an exhibition called BETTY, young artists Terry Vreeburg and Marcel Große presented their DESY-inspired work in Hamburg. In the exhibition space of the art and culture association “2025” in Bahrenfeld, sculptures by Terry Vreeburg and an installation by Marcel Große were shown in June.

Große’s installation featured two custom-made carriages on metal wires that were accelerated towards each other by model rockets. Each carriage had an egg filled with oil paint fixed to it, which were destroyed on impact. Part of the paint that came flying out in all directions landed in water basins below the carriages. The detected “paint signal” was then developed by submerging deckle-edged paper in the basins, creating pictures. Marcel Große explains: “Patterns that are formed in collisions and then captured are an important parallel between my work and physics.”

The exhibition’s title BETTY is no coincidence: “We chose the name because we were intrigued by the kind of research that’s conducted at DESY, right around the corner from our exhibition space,” said Terry Vreeburg. The logo’s appearance leaves no doubt of this: the word “BETTY” sits right in the middle of a modified DESY logo.

At the opening of the exhibition, there was a colourful programme and a barbecue. Young physicist Joeri de Valença from the Netherlands gave a presentation on the parallels between arts and physics. Giving examples from hydrodynamics, stellar astrophysics and fusion research, he appraised common demands of creativity and ingenuity.

The evening of the exhibition was not the first contact between the artists and DESY. As Marcel Große recounts, “we went to DESY to promote our exhibition with our flyers. It was quite a different environment from what we’re used to. We were fascinated by the exhibits of physical machinery around the premises.”

The arts and culture association “2025” is eagerly awaiting a return visit and a tour of DESY in the near future.

HELMHOLTZ ASSOCIATION

Excellent performance of Helmholtz research in Nature ranking

German research is well positioned compared to international standards. This is also shown in the recent Nature Publishing Index (NPI). In 2012, Germany occupied the third position in the ranking, behind the United States and Great Britain.

The NPI lists 200 universities and research institutes according to the number of articles published in 18 Nature-branded journals. “Nature” is regarded as one of the most renowned science journals in the world. Apart from the summarising international comparison, looking at the individual research organisations and universities gives a very positive image of Germany: two German research organisations are among the top twenty worldwide. In the global ranking, the Max Planck Society (MPG) is in third place behind the Harvard and Stanford universities, the Helmholtz Association of German Research Centres occupies position 19.

Altogether, the 82 Max Planck Institutes and 18 Helmholtz Centres provided almost one third of all Nature publications from German organisations and universities. According to the ranking, the University of Freiburg (66th place) is the most successful German university. Other universities among the top 100 are the LMU Munich (70th place), the University of Heidelberg (76), the Leibniz Association (85) and the TU Munich (87).

For the third time, the NPI has been evaluated and published with a global perspective. The index includes the number of publications in the diverse Nature journals.

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