

## An Important Milestone for the CSSB

Topping out the new building on the DESY Hamburg campus



Photo: DESY, Gisela Köhler

Clear blue skies light by bright autumn sunshine provided the perfect back drop for the Centre for Structural Systems Biology's (CSSB) topping out ceremony on September 9, 2015. Hamburg's Scientific Senator, Katharina Fegebank, Karl Eugen Huthmacher from the German federal government, Schleswig-Holstein's Scientific Minister, Kristin Alheit, Chairman of the DESY directorate, Helmut Dosch, and other representatives of CSSB's nine partners joined CSSB Scientific Director Matthias Wilmanns in celebrating this important milestone.

On a stage set to the right of the CSSB building, Helmut Dosch welcomed approximately 250 guests to the topping out ceremony. "CSSB combines the excellent possibilities of the DESY light sources with additional powerful methods thus further-

ing our understanding of the molecular processes of infections and disease patterns. This is the foundation for the development of customized drug treatments which will ultimately result in more effective control of infections," he explained. Following Helmut Dosch's welcome address CSSB Scientific Director Matthias Wilmanns spoke of the importance of interdisciplinary collaboration at CSSB and his hopes for the centre. "Research is similar to sports: by uniting the strengths of the CSSB Partners we aim to become the best and to use our combined expertise to generate cutting-edge insights into the mechanisms of the infection process," he explained "We would like to make important and vital contributions to improve the protection of our society from emerging infections."

Hamburg's Scientific Senator, Katharina Fegebank, emphasised the important role the CSSB will play for the city of Hamburg, "The CSSB is already an excellent research institute. The new building

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Dear DESY colleagues,

I really had a wonderful time at DESY! My first contact with DESY was approximately 20 years ago when I was the Hamburg representative in the Administrative Council. Now, after 13 years as Director of Administration, I will conclude this great professional phase and on 1 November, I will assume office as the Administrative Director of the European Molecular Biology Laboratory EMBL in Heidelberg. Many thanks to all of you for your companionship, your tolerance and also for your support during my time here at DESY.

I left the GKSS in Geesthacht, as it was called back then, and came to DESY because of its international reputation, its Hanseatic cosmopolitanism and because it was well-known among German research institutions for its legendary collegial management culture. At the beginning of my first appointment, in 2002, I was able to take part in the Scientific Council's evaluation of TESLA and European XFEL and in the subsequent political vote in favour of the implementation of the large-scale facilities in Germany. This was also the time of the PETRA III project, the last important years of HERA operation, the decision to build the European XFEL in 2004 and the conversion of the centre to a photon science user laboratory. Moreover, these were the years during which the Helmholtz Association became increasingly important. The Helmholtz Association developed its structure and classification as a national research organisation with its own president, its own evaluation system and mechanisms for distributing funds, and with strong national research centres.

With the decision to build the European XFEL with European cooperation, DESY has realised a large-scale project within an uncommon constellation. The European agreement process to start European XFEL GmbH in 2009 took longer than we originally planned. The in-kind contributions at photon science facilities work

differently than those at particle physics facilities. At both a national and international level, the costs of large-scale facilities for science tend to be increasing at an alarming rate; DESY, however, managed to reasonably implement the European XFEL without considerable overhead costs. In addition, an effective collaboration between European XFEL and DESY which ensures the successful construction and operation of this facility has been established.

I am very impressed with the large number of success stories which I have witnessed at DESY over the past years. What is the reason for this? It is not only the collegiality of the directorate but also and above all the consistency and enthusiasm of the many individuals at this research centre who endeavour to build large-scale research facilities.

Why would someone working in such a good position at such an exceptional research centre even wish to leave? The international aspect of my work has always held a particular appeal for me. Going to EMBL is the logical next step from a nationally structured research area to an exclusively internationally structured organisational framework. I am especially looking forward to continuing an active exchange with my DESY colleagues through the EMBL Hamburg Outstation which is located on the DESY campus. The change from operator to user provides a great opportunity for me to look at my own work from another standpoint. Our heads are round so our thoughts can change direction. I will attempt to do this by changing perspectives, while maintaining a connectedness to DESY.

Thanks to all of you for our collaborative work over the past years.

Yours

Christian Scherf

will only enhance the existing framework. Closer exchange between many disciplines, shorter ways and DESY particle accelerators on CSSB's doorstep; these are all things that will move infection and immunization research forward and will contribute to the worldwide scientific reputation of the metropolitan region," she explained.

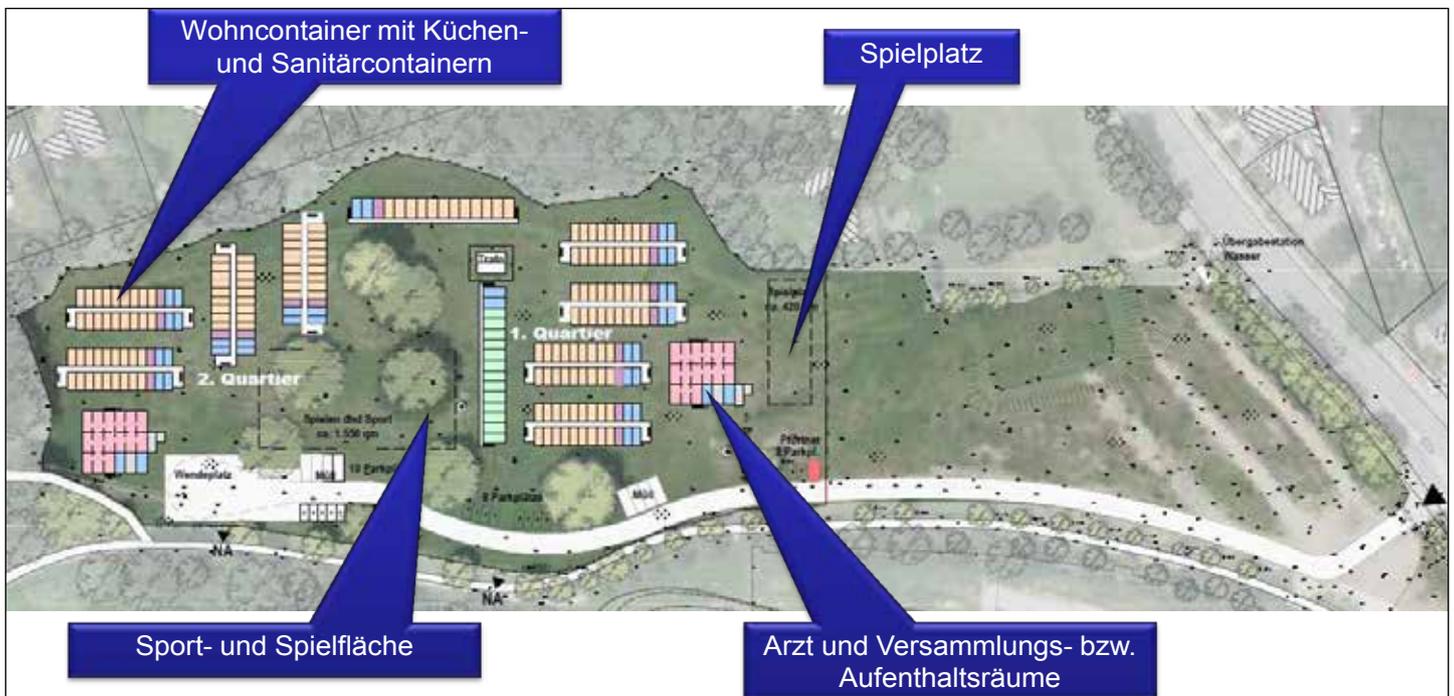
The ceremony concluded with the topping out speech given by Ingo Ehbrecht, the Foreman of the construction company



Celebrated the completion of the shell (from left): Matthias Wilmanns, Karl Eugen Huthmacher, Kristin Alheit, Helmut Dosch and Katharina Fegebank.

Wayss & Freytag. Standing on the 3rd floor scaffolding and dressed in traditional foreman's attire, Ehbrecht toasted DESY, the building's architect Hammeskrause Architekten, and the construction workers with a rhyming speech.

His shot glass was then smashed against the building which according to tradition brings both luck and blessings. Finally, the topping out wreath, decorated with the CSSB colours, was hoisted above the building marking the end of the ceremony. Guests were then invited into the building's ground floor for a barbeque buffet. "I am glad that we had the chance to celebrate this important milestone in the company of so many good friends and supporters of CSSB," stated Matthias Wilmanns. (mp)



The planning of the District Office for Altona "Parkplatz Grün".

## Refugees welcome!

Accommodation for refugees to be established in close proximity to DESY – how can we help?

You have seen it in the news: a great number of people are currently fleeing from civil war areas, many of them come to Germany, also to Hamburg. Several buildings are being erected to accommodate refugees in the vicinity of DESY, offering (winter-proof) shelter to people in need: on Notkestraße, three-storey modular houses are being planned for up to 650 refugees, ready for occupancy in spring 2016. Moreover, construction works have started on the "green" HSV parking area north of the DESY campus for accommodation for 900 people, which will become operational in consecutive stages. An office building on Albert-Einstein-Ring is also being discussed as potential accommodation.

Public events have taken place in Zeuthen and in Hamburg to inform about refugee accommodation and asylum policy and – although so far no refugees have arrived in Zeuthen – a group promoting a culture of welcome was established in Zeuthen.

Even though DESY has no room for accommodation, it has always had a special relationship with its neighbours. Therefore, many DESY colleagues are now thinking of how they can help the

future neighbours as well as refugees living further away. "DESY, a publicly funded research centre, is not able to provide direct financial aid or allow employees to leave their work for longer periods to give assistance to refugees," said Christian Haringa, acting director of administration from 1 November. "What we can do of course is supply our infrastructure for concrete problems, bundle information and encourage our staff to engage in voluntary activities. DESY staff have shown great solidarity in similar situations in the past."

As a central information platform to bundle and coordinate help, the website [www.desy.de/refugees](http://www.desy.de/refugees) is being created. The goal is to bring together ideas and volunteers, announce and organise actions. Many ideas are conceivable; for example, to give the refugees access to the internet via wireless LAN from the DESY campus so that they can keep contact with their relatives; integrative events such as movie and music nights in the auditorium and social gatherings in the canteen, with DESY colleagues offering homemade specialities to their neighbours; additional places at in-house language courses or experiments at the school-lab, groups for handicraft work

or sport. Should any proposal seem to be impracticable or too expensive at first sight, creative ideas will perhaps be developed to realise these projects.

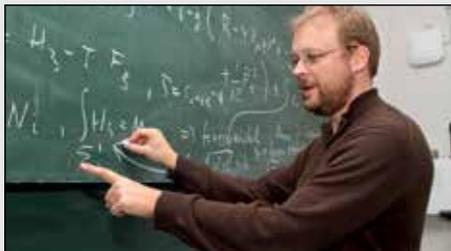
To avoid reinventing the wheel, the website will also ensure the synchronisation of relief actions with other neighbours' initiatives and with the accommodation operators.

Carolin Hahn from the directorate's office volunteers as personal contact for the Hamburg campus. She says: "We will quickly get to know our new neighbours and learn which kind of help is best. Already now, I am looking forward to the ideas and assistance provided by the DESY colleagues." Ulrike Behrens, head of the support group, volunteers as personal contact for Zeuthen. (tz)

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Jensen Prize for DESY theorists  
Alexander Westphal



DESY scientist Alexander Westphal has been awarded the J. Hans D. Jensen Prize by the University of Heidelberg for his outstanding contributions to string theory. Westphal is particularly interested in the phenomenon known as inflation, which is believed to have caused the size of the universe to increase by a factor of at least one hundred septillion within the first fraction of a second after the Big Bang. Westphal is examining how the various models of inflation can be incorporated in string theory. The J. Hans D. Jensen Prize has been awarded annually since 2008 to outstanding scientists working in the field of theoretical physics. The award was established and is funded by the Klaus Tschira Foundation.

**Free-Electron laser prize for DESY pioneers**

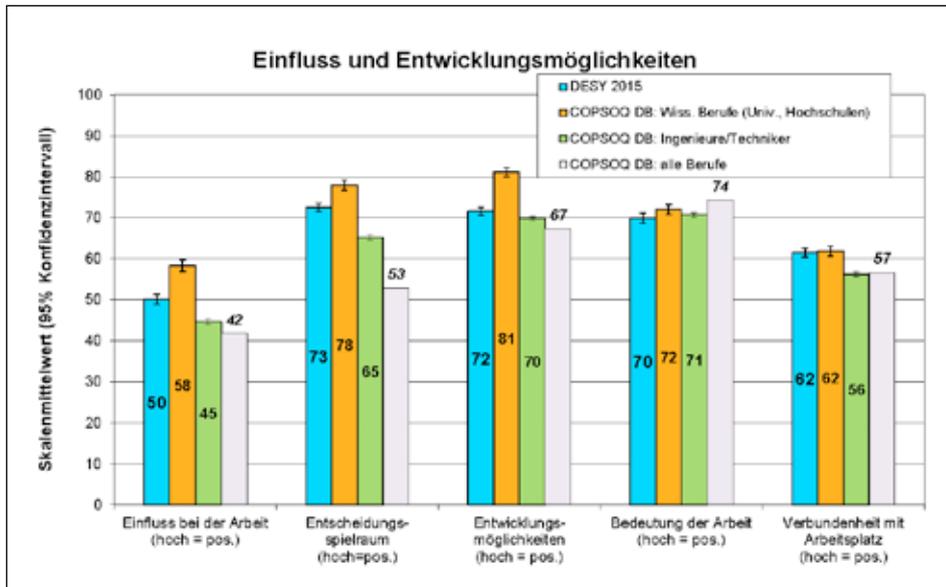
This year's FEL Prize has been awarded to the two DESY researchers Mikhail Yurkov and Evgeny Schneidmiller at the Free-Electron Laser Conference (FEL 2015) in South Korea for their pioneering work in developing and improving free-electron lasers (FELs). Right from the start, Yurkov and Schneidmiller were instrumental in designing the FEL at DESY's TESLA Test Facility, which gave rise to FLASH in 2005. They also made key contributions towards improving the performance of FLASH. At the European XFEL, they are very strongly involved in calculating and optimising the FEL processes. "I would like to offer the prize-winners my heartiest congratulations," said Reinhard Brinkmann, the director of DESY's accelerator division. "Both of them have developed many excellent new ideas and concepts for free-electron lasers in numerous papers, and are held in high esteem by the scientific community."



Mikhail Yurkov and Evgeny Schneidmiller with the Director of DESY's Accelerator Division, Reinhard Brinkmann, and the Chairman of the DESY Board of Directors, Helmut Dosch (first row, from right to left).  
Photo: DESY, Marta Mayer

# Room for decisions

Results of the DESY staff survey on psychological stress



DESY employees rated their influence and development opportunities generally positively.

*By Natascha Peleikis*

This spring, DESY staff members had the opportunity to participate in a survey on psychological stress, based on the Copenhagen Psychosocial Questionnaire (COPSQ). More than 50 percent of DESY employees filled out the corresponding online questionnaire administered by the research institute for occupational sciences FFAW (Freiburger Forschungsstelle für Arbeitswissenschaften). The survey covered the following areas: job requirements, influence and development possibilities, social relationships and management, life and job satisfaction, and health and wellbeing.

"Overall the survey results are quite satisfactory," said Hans-Joachim Lincke from FFAW. "DESY employees rated influence over their work, scope for decision-making regarding holidays and breaks, and the social support particularly positively. Job satisfaction is also highly valued."

To classify the results, comparative data from specific professional groups available from other surveys was used (see figure). The resulting analysis shows that DESY provides more scope for creativity and decision-making than the average employers in Germany, also

more than technicians and engineers typically have – however less than employees are usually granted at other scientific institutions. In occupational psychology, scope for creativity and decision-making are considered to be resources, i.e. working conditions that help make work easier. "Apart from the overall results, there are various results for individual areas and sub-units," said Lincke. "These results may differ in a positive or a negative way from the overall results." Overall, the survey provides a solid basis for future decisions and it fulfils the requirements of a risk assessment of psychological stress.

"We are happy about the good participation rate of 52 percent," said DESY director Helmut Dosch. "The survey provided us with valid and meaningful results from all areas. Fortunately, the available resources are more predominant than the psychological stress factors. However, we must look very carefully at how much organisational aspects of DESY account for specific stress factors in a group or a team. The directorate will examine this very carefully and follow up on this, together with the heads of divisions and groups."



It's time again on Saturday, 7 November: The Hamburg DESY campus opens its doors to the public – for twelve hours, from noon to midnight. More than 100 attractions will be presented to the expected 15 000 to 20 000 visitors, more than 1000 helpers participate in this major event. In addition to unique insights into the large accelerators and light machines, DESY and its campus partners again offer a colourful children's programme and fascinating lectures – from particles in the universe to molecules as movie stars.

In case you wish to invite family and friends: DESY DAY postcards are available at PR, foyer of building 1. (uw)

## From Hamburg to Geneva

DESY particle physicist Eckhard Elsen becomes CERN Director for Research and Computing

Particle physicist Eckhard Elsen, a true Northern German, has been at DESY for 25 years. Next year, however, he's heading south: the next CERN Director-General Fabiola Gianotti appointed him to join her management team and, for five years, Elsen will be head of the complete scientific programme and of scientific computing.

"I am very happy here at DESY, but Fabiola made me an (unexpected) offer I could not refuse," said Elsen. He almost missed the call from Geneva because he was about to start for a five-day hike in South Africa. There, in the wilderness, he had a couple of days to think about his appointment.

Elsen was born in 1955 in Oldenburg. He studied physics in Hannover and in Hamburg. Once here, he directly joined the JADE experiment at PETRA; at that time the electron-positron accelerator was used to search for the top quark. After working in the United States and at CERN he became professor in the field of B-physics at the University of Heidelberg in 1989.

Elsen came back to DESY in 1990 and joined H1 at HERA, also taking the role of spokesman for three years. Following this, he focused on accelerator science. His project was the further development of superconducting cavities for the International Linear Collider ILC. "Accelerators are one step on the journey to new insight



in particle physics," said Elsen. "The global efforts show that we will be able to make major progress, for example by continuing to keep the ball rolling also at DESY."

But it's not only research that plays a substantial role in Elsen's daily tea-powered routine: he also spends a considerable amount of time coordinating EU projects and doing science policy. He is member or chair of numerous scientific committees, among others the Large Hadron Collider Committee (LHCC) – a role that profoundly introduced him into the requirements of LHC experiments; the committee plans, discusses and reviews the complete scientific programme of the Large Hadron Collider.

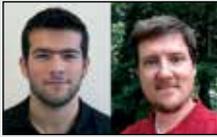
Within the coming years, many scientists expect the LHC to provide a deeper understanding of the Higgs mechanism and first hints of new phenomena which for example explain dark matter. Apart from the Large Hadron Collider and scientific computing ("Big Data"), a field on which the LHC places enormous requirements, there are numerous smaller projects at CERN which fall into Elsen's responsibility. The course for future European and global particle physics strategies will also be set during his term of office.

Elsen does not only like to take up challenges in particle physics and science policy but also in sports. The passionate runner has successfully mastered several marathons, toured the Kilimanjaro with his daughter on bicycle and walked round the Fujiyama with two DESY colleagues for charity. Running and hiking helps him to organise his thoughts and (as in South Africa) to take vital decisions.

"My heartfelt wish is to strongly and broadly establish particle physics as a field of basic research in Europe and all over the world. Physics addresses the curiosity of people in a fundamental way," said the future research director. "Of course, I can see a considerable potential for close collaboration between DESY and CERN." (bw)

**Neutrino Dissertation Prize: two winners at DESY**

A twofold pleasure for the IceCube group at DESY in Zeuthen: Juan Pablo Yáñez (left) and Jakob van Santen have won two of the three newly established dissertation prizes of the Global Neutrino Network, GNN. With his thesis at Humboldt University Berlin, Yáñez could constrain the allowed region for two parameters for neutrino oscillations. That was the first demonstration that IceCube is able to deliver precision results in the field of neutrino physics. Van Santen has written his thesis at the University of Wisconsin and later joined DESY as a postdoc. He has analysed the energy spectrum and angular distribution of high-energy neutrinos and provided new, important information on the recently discovered astrophysical neutrinos.

**ATLAS Award for DESY scientist Nicholas Styles**

For his outstanding contributions to the improvement of the particle detector ATLAS at the world's largest accelerator LHC in Geneva, DESY scientist Nicholas Styles has been awarded with one of this year's ATLAS Outstanding Achievement Awards. The award recognizes outstanding contributions to the detector; scientific data analyses are excluded. Styles, from the ATLAS group at DESY, wrote essential software for the reconstruction and simulation of particle tracks and contributed significantly with detailed studies to the design of the planned detector upgrade of ATLAS, as outlined by the award committee.



Outstanding Achievement Awards. The award recognizes outstanding contributions to the detector; scientific data analyses are excluded. Styles, from the ATLAS group at DESY, wrote essential software for the reconstruction and simulation of particle tracks and contributed significantly with detailed studies to the design of the planned detector upgrade of ATLAS, as outlined by the award committee.

**CNRS silver medal for Fabian Zomer**

Physicist Fabian Zomer has been awarded the silver medal of the french research organisation CNRS for his outstanding work. Zomer, who today is professor at the Université Paris Sud, started as a post-doc in the H1 collaboration, bringing him later to construct and bring to success the HERA Fabry-Perot cavity, which was the most precise polarimeter operated at the HERA ring. Later he started to work on pluri-disciplinary projects such as X-ray lasers and optical equipments on the Extreme Light Infrastructure (ELI), his principal activity today. The CNRS medal awards go to researchers of all ages and all disciplines each year. It is the third time one of them is imparted to an active or former H1 member after Emmanuelle Perez (2002) and Yves Sirois (2014).



# Magic magnetism

## DESY school-lab summer holiday course on magnetism was a winner

By Kim Susan Petersen and Bettina Abmann

As part of the Hamburg summer holiday programme, the DESY physik.begreifen school-lab tested a brand new format. For the first time, students from ages 13 to 15 were given the opportunity to attend a two day practical course about the theme, magnetism. A total of 17 young people took advantage of this offer.

again next year. Including the topic of magnetism as part of the regular practical course programme of the Hamburg school-lab is also a possibility. This would provide a good offering for classes in grades 7 and 8 and according to Hamburg teacher would meet the current needs for such programmes.



The course was a success due, in part, to the numerous demonstration experiments that Matthias Stolper (MKS4) kindly loaned to the programme last year. Other highlights were the DESY magnetic levitation train and other hands-on activities such as the assembly of a mini robot using a vibration motor, a button cell and a toothbrush head. The students were so engrossed in the task of fine tuning their robots they forgot to take their breakfast break. This could also be due to the fact that it was pouring outside – either way, the participants definitely had a lot of fun!

Lastly, another unexpected benefit of the practical course was a considerable amount of leftover liquid nitrogen. And what do physicists do with leftover liquid nitrogen? Well, throw things into it, of course – like gummy bears and bananas – the outcome of this can be seen in both animated and non-animated images on the DESY school-lab's Facebook page. Enjoy!

**INFO**

[www.facebook.com/DESYSchuelerlabore](http://www.facebook.com/DESYSchuelerlabore)

As a result of the positive feedback, the school-lab plans to offer this format

## German-Turkish Science Day on 5 December

Turkey is an emerging scientific nation and shows a major interest in research collaboration with DESY and the European XFEL. Within this framework, many activities already took place, supported by the Federal Ministry for Education and Research, among other things a roadshow in Turkey. In January, there will be a professional workshop of cooperation with Turkey in Hamburg.

In order to offer Turkish people living in Hamburg the opportunity to get insight into the fascinating research facilities at DESY and the XFEL, a small German-Turkish Open Day will take place on 5 December (from noon to 5pm). Particularly pupils of Turkish nationality or origin from Hamburg schools are invited. We are looking for interested colleagues who want to help to organize this event. Please contact PR.

## Photowalk 2015



Photo from HERA-Tunnel: Dana Barthel. The other two images: Patrick Huber

End of September, DESY in Hamburg welcomed 45 amateur and professional photographers participating in the DESY Photowalk. The event was part of the Global Physics Photowalk, which took place on the same weekend at seven other research centres around the globe. The photographers had the opportunity to take pictures of the HERA tunnel, the PETRA III „Max von Laue“ experimental hall, the FLASH „Kai Siegbahn“ ex-

perimental hall and the CFEL building. At the end, they all met for coffee and cookies and exchanged views about this successful day. The 30 best photographs sent in by the participants will be shown in an exhibition at the Hamburg Open Day on 7 November 2015. The top three of the photos will enter the international photowalk competition, and a jury and the public will select the favourites.

# PIER Fellowships, Workshops and Seed Projects

## Call for applications for PIER funding instruments

By Christian Salzmann

For the second time this year, PIER calls for applications for the PIER funding instruments PIER Seed Projects, PIER Workshops and PIER Fellowships. The calls for proposals were opened mid-October, the closing date is the beginning of January 2016. Apart from the “small” research projects already funded since 2011, for the second time, workshops and guest scientists will be financially supported. The goal is to promote the generation of new research ideas – of course within the framework of PIER research fields and PIER partners.

The aim of the PIER Seed Projects is to pick up new research ideas and to enable their quick implementation. This funding line supports finding, testing, further development and implementation of novel ideas in research and development in the four PIER research fields.

The funding concentrates on innovative ideas in research and development projects at an early stage where a rapid and non-bureaucratic financial support can significantly contribute to advances in knowledge.

PIER Workshops promote institutional and interdisciplinary cooperation within PIER, thus stimulating and advancing idea-finding processes of scientific work on a sustainable basis. Therefore, PIER workshops can be differentiated from academic, lecture-oriented workshops in that they are aimed at a small peer group. PIER workshops are characterised by topics which reach beyond what specialized scientific communities are concerned with, by offering a sufficient amount of time for participants to engage in discussions, and by attracting scientists from different organisations

and disciplinary fields. The aim of the workshops is to create new ideas and new cooperation.

With the PIER Fellowships, PIER offers guest stays to researchers at any stage of their career. Stays of guest scientists will be funded for a period ranging from two weeks to up to two months. The guest stays – in terms of PIER funding – must be aimed at developing new ideas in an interdisciplinary or inter-institutional context. Accordingly, PIER fellows should have an intensive exchange with more than one group or institution during their stay.

### INFO

[www.pier-hamburg.de/funding](http://www.pier-hamburg.de/funding)  
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+49 40 8998 5501



#### **Upgrade of first H.E.S.S. camera in Namibia**

In July, a team of ten colleagues from Zeuthen upgraded the first of four H.E.S.S. I gamma-ray cameras in Namibia. For these instruments, which had been in operation for 10 years, Zeuthen developed a complete renewal of electronics and ventilation.

Preceding this campaign, these components were thoroughly tested for some months in a copy of the camera set up in the Zeuthen factory hall. "The tests in the laboratory were quite essential," said Stefan Klepser, head of the project. "However, they cannot fully mimic the real conditions in the desert. I'm very relieved that all installations could really be accomplished within the three weeks that we planned for."

The mechanical components and more than 200 electronic boards were mostly manufactured in DESY workshops. "The design of the electronic boards was a big challenge. Many of the circuit boards are composed of more than 1000 single pieces," explained electronics developer Holger Leich. "Luckily, they were manufactured by colleagues in Hamburg, so we could get exactly the high quality standards we needed." The timely dispatch and customs clearing was also guaranteed by the forwarding department in Hamburg.

For H.E.S.S. as well, the software requires at least half of the development work. Gianluca Gavitto from Zeuthen lead the systems' functional integration on site that took several weeks. "Since the whole camera works with Ethernet technologies, we have made use of current technologies, part of which are also used at Google or Facebook. This has accelerated and simplified the development and improved the stability of the system."

Now, this work has proved successful: The first pictures that show the impact of cosmic gamma-rays in the atmosphere could now be taken. This means green light for the production and installation of the remaining three cameras in 2016.

Photos: Stefan Klepser

### Open doors for the mouse

On 3 October, the vacuum lab of the physik.begreifen school-lab in Zeuthen participated for the third time in the “Open doors for the mouse” event. What happens, when that substance that surrounds us always and everywhere is missing: the air? At the “door opener day”, families with children from the age of 8 had the opportunity to get to the bottom of this question with experiments around the topics of air pressure and vacuum.

### Helmholtz school-labs at open day at the Federal Ministry of Research

The school-labs of the Helmholtz Association are very popular: Last year, about 80,000 children and young people took advantage of the offers provided by 30 labs, and more than 2,500 teachers benefitted from its advanced professional education.

Not least, this was due to their continuous public presence. End of August, the school-labs participated in the open day of the Federal Ministry for Education and Research. Almost 9,000 visitors had the opportunity to gather information about the work of the Helmholtz Association school-labs when they came to see the new building of the ministry.



Federal Minister of Research, Johanna Wanka, at the booth of the Helmholtz school labs.

### Netzwerk Teilchenwelt is growing

The nationwide education network *Netzwerk Teilchenwelt*, aimed at communicating particle physics and astroparticle physics to young people and teachers, has some new members: the universities of Kiel and Duisburg-Essen have joined the network as new sites, and the universities of Tübingen and Rostock have expanded their offers to include astroparticle physics. This adds further weight to the existing multi-topic programme, covering particle physics, hadron and nuclear physics, and astrophysics. During the second funding period, *Netzwerk Teilchenwelt* has developed and built more than 30 additional experimental kits for measuring cosmic particles at DESY in Zeuthen. These experiments allow young people to track down particles from outer space and to conduct their own research projects. Until now, they have been able to do this at 13 different sites within *Netzwerk Teilchenwelt*. Now, four further universities are giving young people and teachers in their region access to astroparticle physics.

# Experiments and food for thought

physik.begreifen school lab at the Universal Children's Festival



By Karen Ong

At the end of September, approximately 48,000 guests visited the 29th annual Universal Children's Festival organized by the KinderKinder Society on the grounds of the Hamburg Wallanlagen city park. For the first time, the Hamburg DESY school-lab joined the group of exhibitors. This year, the festival coincided with the Universal Children's Day, so it seemed natural that the motto of this event should be UN Children's Rights. The children could participate in a small rally with the opportunity to discover the ten UN Children's Rights. For this purpose, the organisers selected ten booths distributed over the festival site, each featuring one of the children's rights on a banner. When the children reached the booths, they could ask for a stamp and after collecting all the stamps on their children's rights card, they were awarded with a small prize. Appropriately enough, at the DESY school-lab booth, the children could receive the “right to education” stamp.

Numerous creative, sports and music activities were presented to the children on the festival grounds and the DESY school-lab's purpose was to encourage the young visitors to conduct research. With a booth full of experiments and many questions to think about, the school-lab team made both the young and grown-up visitors wonder and ponder. There were

many questions to be solved together, for example: “Air - what is it, really” or “What happens when you remove the air that surrounds a balloon or a chocolate marshmallow?” The young people were also fascinated by the fruitless effort to pull apart the Magdeburg hemispheres. While children were doing the experiments, their parents were given a small overview of the DESY research centre.

The effort paid off. The presentation not only aroused the curiosity of many children but also helped to eliminate the prejudice that physics is dry and boring. Children have the right to education and, with the physik.begreifen school-labs, DESY also contributes a little bit to enforce this right.



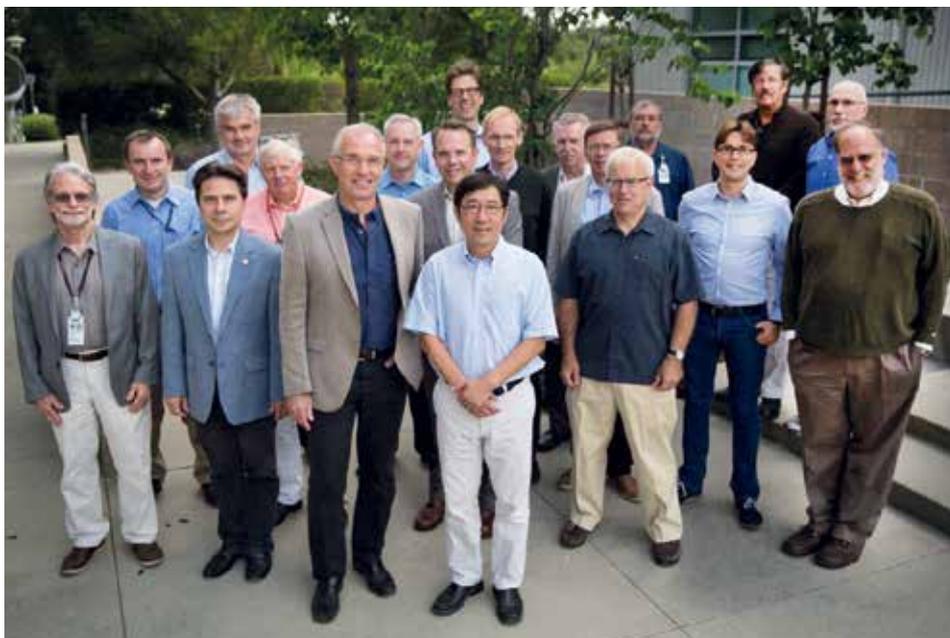


#### Happy Birthday, Wilfried Buchmüller!

More than one hundred invited guests joined the DESY Theory Group at the beginning of July to celebrate Wilfried Buchmüller's 65th birthday. In addition to many international colleagues and friends, the "Who's Who" of German theoretical high-energy physics came to DESY to mark the special occasion with a celebratory colloquium.

The first day was devoted to the work of Wilfried Buchmüller (first row, second from right) himself and his fundamental contributions to modern particle physics. Following a welcoming address by Joachim Mnich, further lectures were given by Christian Schwanenberger, Tsutomu Yanagida, Andrei Linde and Roberto Peccei.

The second day gave an overview of the current areas of research, including many interesting papers presented in particular by Wilfried Buchmüller's former PhD students. The Theory Group was especially pleased that the event did not mark the retirement of Wilfried Buchmüller, but that he will continue to be a valuable contributor to DESY for some time to come.



#### SLAC and DESY join forces at bilateral strategy meeting

The SLAC National Accelerator Laboratory in the U.S. and DESY will work closer together in the future: That was the outcome of a meeting of senior managers of both labs who convened 16-17 July at SLAC to discuss a joint strategy for more collaboration. "The meeting was a wonderful opportunity to openly discuss the potential that the two world-class research centres have together," said the chairman of DESY's board of directors, Helmut Dosch.

"SLAC and DESY have so many things in common, and we already work on many projects together," said SLAC Director Chi-Chang Kao. "Meetings like this help us identify how we can work on the most challenging problems even closer and better together."

#### Ada Yonath receives Roentgen Medal at RACIRI Summer School

Nobelist Ada Yonath has received the renowned Roentgen Medal of the city of Remscheid at the third summer school jointly held by the Röntgen-Ångström Cluster (RAC) and the Ioffe Röntgen Institute (IRI). Yonath,



who held a keynote address for the about 70 participants, received the Roentgen Medal from the hands of the mayor of Remscheid, Burkhard Mast-Weisz, for her achievements that partly took place at DESY. The RACIRI Summer School was being held in Germany for the first time this year.

#### Chadwick Medal for pioneering ZEUS physicist

The British Institute of Physics (IOP) has awarded particle physicist Amanda Cooper-Sarkar the Chadwick Medal and Prize 2015 for her work in the field of research into



the structure of the proton by using deep-inelastic scattering of leptons on nuclei. The award is made biennially for distinguished research in particle physics. Cooper-Sarkar is one of the most renowned particle physicists in this field. As a longtime member of the international ZEUS collaboration at the HERA storage ring, she worked mainly with data from the HERA experiments. Among others, she had a leading position in the analysis for the recent publication by the H1 and ZEUS experiments.

#### Two DESY spin-offs funded by Helmholtz Enterprise

The Helmholtz Association is providing support to two companies that have recently been set up to exploit research coming out of DESY. The start-up suna-precision GmbH will receive 100 000 euros from the Helmholtz Enterprise programme. The DESY spin-off founded in 2014 by Nicolas Stübe and Alke Meents, both from DESY, will provide nano-positioning systems for the scientific market worldwide. The other company receiving funding is Cycle GmbH, whose CEO, Damian Barre, is assisted by Franz Kärtner as co-partner. The company was started in 2015 as a spin-off of the Ultrafast Optics and X-rays Group at the Centre for Free-Electron Laser Science CFEL and supplies innovative products that use ultrafast laser technology for scientific and industrial applications. Cycle GmbH receives 130 000 euros from Helmholtz. Both funding figures are being doubled by DESY.

# From metal sheet to particle accelerator

Passing the halfway point: 50 XFEL accelerator modules have been tested at DESY

By Ricarda Laasch

In September, the 50th accelerator module for the X-ray laser European XFEL was tested at DESY. One hundred accelerator modules are needed for the two-kilometre-long electron accelerator of the X-ray free-electron laser. Each module consists of eight cavities, the actual accelerating structures. This is the first of a three-part series of DESY inForm articles about how these technological masterpieces are manufactured. Part 1 is about cavities; their production will be completed before the end of this year.

Two firms have been commissioned with the cavity production: Research Instruments (RI) in Germany and Zanon in Italy. "This is the first time we have ordered cavities virtually ready for operation from industry," emphasises Axel Matheisen (MKS) who together with Waldemar Singer (MPL) leads a team of engineers and technicians at DESY supervising these firms. In the past, industry had only carried out the mechanical production steps. "For that reason, our greatest concern was whether we would manage to convey the necessary knowledge in a way that the companies are able to produce complete cavities," said Matheisen. The tested cavities prove that this knowledge transfer worked perfectly.

At the beginning of the long production process, there is a square niobium sheet with an edge length of 26.5 centimetres and a thickness of 2.8 millimetres. For the construction of the accelerator, the purity of 14 700 sheets is tested at DESY before being dispatched to the two production firms. There, the sheets are deep-drawn to so-called half cells which gives them the appropriate shape for further processing. A stamp is used to obtain the required hollow pattern.

Subsequently, 18 half cells are welded together to form one cavity. Since niobium oxidises very easily, this cannot be done with a flame. Instead, the half cells are welded together with an electron beam in a vacuum chamber. The advantage: this procedure is very clean. For



Cavity production at Zanon in Italy. Photo: DESY, Heiner Müller-Elsner

this reason, the 9-cell cavity must be protected from new contamination during further processing.

For accelerator operation, the quality of the cavity's inner surface is extremely important. It must not only be clean but also exceptionally smooth. "In past times, the cavities were delivered to us and we did the rest. This went quite well with ten or occasionally with 30 cavities per year. But it was clear that this would not be

possible with some 100 cavities per year," Matheisen said. For the construction of the European XFEL, the firms had to learn to carry out the surface treatment according to the "DESY recipe" and to work in a nearly dust-free cleanroom. "This was completely new for the firms and therefore, communication was extremely important," Matheisen pointed out. The most important steps in this process are pickling, baking, tuning, dressing and rinsing.

For pickling, various different acid mixtures are filled into the cavity. The acid reacts with the metal surface of the cavity and removes processing residues and polishes the surface. The acids' mixture ratio and the extent of the pickling procedure have been optimised during many years of research at DESY. Baking follows pickling: The cavity is heated at 800 degrees centigrade for several hours in a humidity-free vacuum environment. During this treatment,

tensions in the metal originating from shaping and welding are released and the fine crystal structures of niobium are newly arranged.

After getting out of the oven, the cavity is tuned. In order to accelerate particles during operation, electromagnetic fields are induced to oscillate in the cavity and, eventually, the oscillation will turn into resonance. For this aim, however, the shape of each cavity cell must be exactly tuned to the accelerator frequency of 1.3 gigahertz. In the process of tuning, the resonance frequency is measured and when it diverges from the desired frequency, the cavity must be retuned. For this purpose, the cavity shells are pressed and pushed accordingly. Slight shape alterations can significantly improve the resonance.

The next step is dressing: The cavity is welded into its helium tank. Liquid helium cools down the cavity in operation to minus 271 degrees centigrade to generate superconductivity and remove heat. Subsequently, a total of four antennae are to be mounted onto the cavity. One of it feeds the electromagnetic field into the cavity, the others recover it at the opposite end. "Doing this kind of mounting in a cleanroom is not the average, not even for industry," said Matheisen. "It is not usual work to set bolts and nuts in a cleanroom; it requires practice and, above all, patience since all procedures must be carried out slowly."

The production is completed with rinsing: The inner surface of the cavity is sprayed off for some hours with high pressure ultrapure water of 100 bar. Now, the cavity with a vacuum inside leaves the cleanroom. Packed in a special case, it is shipped to DESY by lorry. However, the cavity is not yet ready for installation into a European XFEL module. It will first have to demonstrate its qualities!

*Read about this in part 2 of this series.*

## Equal opportunities in physics

September saw the kick-off meeting of the EU project GENERA in Brussels. Over the next three years, GENERA (Gender Equality Network in the European Research Area) will be investigating ways in which more opportunities can be created for talented female physicists. DESY has assumed a leading role in this project, which comprises 13 partners.

"Physics still remains a field of research with comparatively few women. But a number of examples show us that mixed teams produce clearly better research results," says the project coordinator, DESY's Thomas Berghöfer. "We will take a close look at the everyday life of physicists, in order to draw up standards for analysing and improving lop-sided situations within the context of GENERA, which can then be applied to other disciplines too." In the course of the project, gender equality plans are to be tailored to the institutions involved, and implemented there. The project is being funded by the EU, which is making available 3.2 million euros as part of its Horizon2020 programme. <http://www.genera-project.com>

## EU funds design study for plasma accelerator

The European Union supports the development of a novel plasma particle accelerator with three million euros from the Horizon2020 program. The EU project EuPRAXIA (European Plasma Research Accelerator with excellence In Applications) will produce a design study for a plasma accelerator of electrons with pilot users from photon science and high energy physics. Plasma acceleration promises to shrink costs and size of particle accelerators for science, medical applications and industry significantly.

"EuPRAXIA will define the missing step towards a new generation of plasma accelerators with the potential for dramatically reduced size and cost," said EuPRAXIA coordinator Ralph Assmann from DESY. "It will ensure that Europe is kept at the forefront of accelerator-based science and applications." The EuPRAXIA consortium includes 16 laboratories and universities from five EU member states. In addition, it includes 18 associated partners from eight countries, involving leading institutes in the EU, Japan, China and the United States.

# Light at the end of the tunnel

Several civil engineering works on the Hamburg campus will be concluded already this year

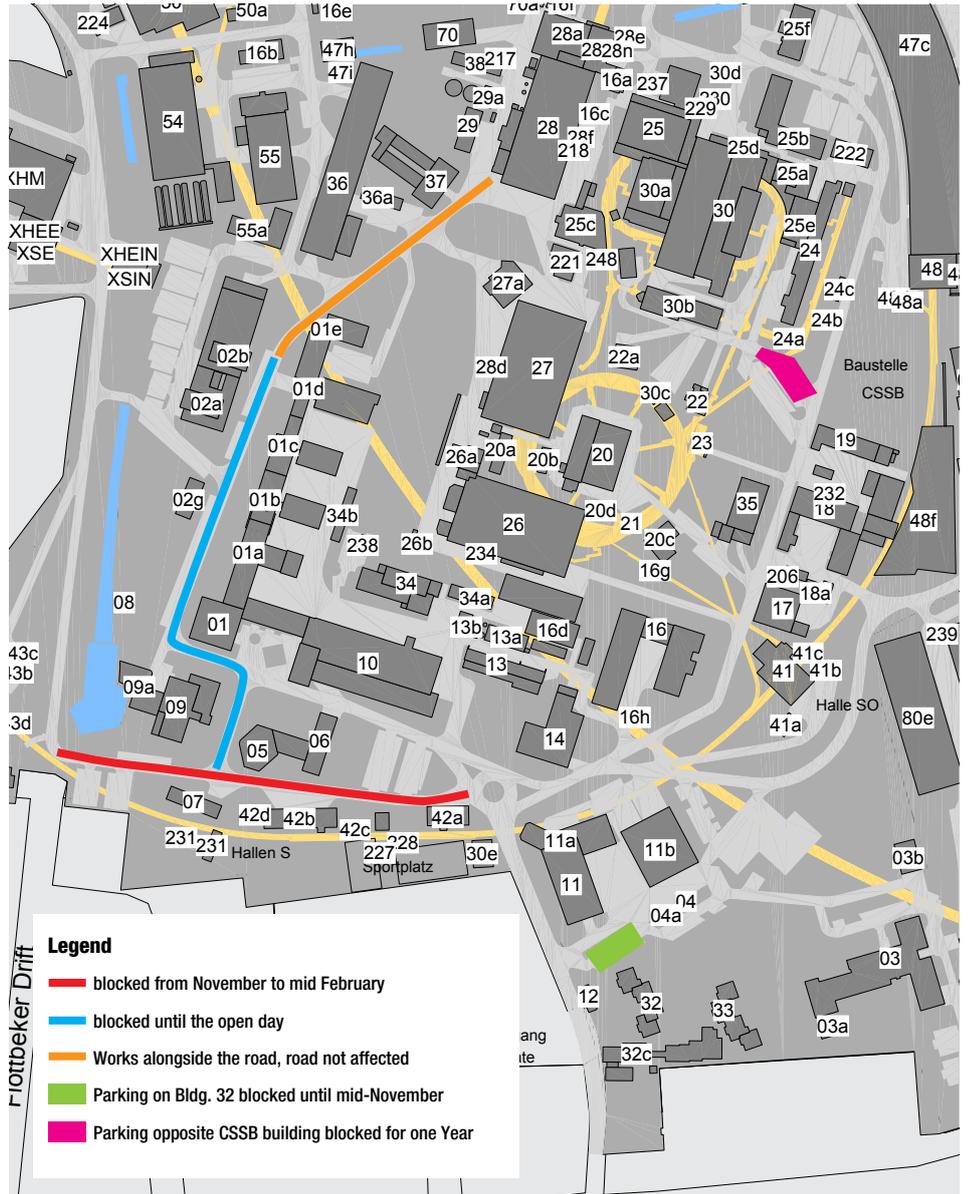
It was about time to replace or newly install old pipelines, some of them dating back to the early days of DESY, in order to secure the supply of drinking, fire-fighting, cooling and warm water.

This necessary work will be finished by the end of the year. Only the civil engineering work on the road in front of building 7, starting beginning of November, will not be concluded before mid February of the coming year. Therefore, the parking area behind the canteen will not be accessible until February.

The so far decentralised cooling water supply will be converted to central supply. The first step has now been concluded with the current works. In a second future step, the cooling water supply will be extended to a ring pipe. Among others, the computing centre will substantially benefit from this measure. The IT group will change the cooling of their high-performance computers from air to water cooling. Even with a clever air conveyance, the dissipation of the enormous heat load still represents a major challenge – not easy to handle and expensive. Water cooling is much more efficient and of great economic and ecologic advantage. The computing centre will become “green”.

The pipes between building 1e and 28 will be installed alongside the road. Only a narrow section will be closed for the works, so the road will still be trafficable. A drinking water pipeline will be installed beneath the parking area in the neighbourhood of building 32 (guest house). Parking is not possible until mid of November.

Interior construction of the CSSB building has started. Therefore, the parking area opposite to the building is currently occupied by various companies involved and will only be accessible after one year. Pavement works on the courtyard in front of the auditorium foyer have been completed and the auditorium is now accessible again from the main entrance to the auditorium foyer. (hw)





## DESY to go!

**Just in time for autumn again DESY umbrellas on offer**

DESY has new souvenirs: The popular T-shirts are now available in three child sizes 80/86, 110/116 and 146/152. Just in time for autumn DESY umbrellas are back in the program, this time in a slightly more stable version that will hopefully cope well with the north German wind speeds. The rest of the souvenir offer is unchanged.

Sales in the PR department (Hamburg), Building 1, in Zeuthen via ExpS.

# DESYs summer school

115 summer students from 28 nations



For eight weeks, 115 summer students were given the opportunity to gain practical insight into research at both DESY institutes, Hamburg and Zeuthen. DESY is hosting one of the largest and most international summer schools throughout Germany. This year, the young researchers came from 28 nations. It is the internationality that makes the DESY

summer student programme extremely popular, including the practical experience provided in genuine research projects. The students were integrated into the workgroups of DESY's research fields particle and astroparticle physics, accelerator physics and photon science and they experienced everyday life of science at first hand. A series of

lectures with the necessary theoretical fundamentals complemented the practical experience. "Apart from science, the contact among the students is of central importance and the diversity of nationalities creates a special atmosphere," said co-organiser Olaf Behnke from Hamburg.

## Bavaria meets Brandenburg

DESY school-lab project brings high-school students and scientists together

Since the beginning of this year, within the framework of a project seminar, the physik.begreifen school-lab in Zeuthen collaborates with the Korbinian-Aigner high-school of the Bavarian town Erding. Until summer, 14 upper secondary school pupils participating in this seminar carefully examined a web platform for the evaluation of experiments with cosmic particles, provided by DESY to Cosmic-Lab. In the future, the web portal will be made available to interested young people who, for example within the framework of a seminar paper, want to work intensively on cosmic particles. With the purpose to create a pupil-friendly offer, DESY incorporated this project seminar. According to the motto "from pupils for pupils", an optimised web portal is being developed to be used by young people all over the world, independent

from the vicinity to a research centre. One project seminar is supposed to give insight to pupils of upper secondary classes to the world of employment, thus rendering valuable assistance for their study and career choice. "The project work with external partners supports young people in their personality development" said Carolin Schwerdt, scientific coordinator of the Cosmic school project of the Zeuthen school-lab.

In September, the second phase of the project seminar started with a two-day visit to DESY in Zeuthen. As online platform testers, the seminar participants discussed doubts and problems and developed solutions in cooperation with DESY. Thereafter – with the scintillation counter experiment CosMO and the "Kamiokannen" experiment – the partici-

pants carried out independent experiments to measure cosmic particles. Until the end of the year, the young students will have the opportunity to borrow the experiment sets created within the framework of the *Netzwerk Teilchenwelt*-particle and astroparticle physics project for pupils and teachers. With these sets, the pupils will work on their own issues at the project seminar. The teachers and scientists are quite sure that this collaboration offers both parties a very realistic and thorough impression of the project partner: This cooperative work allows young people to learn a lot about specialised discussions and communication outside the school, and scientists become familiar with the needs and interests of young students. (ub)



## Science on Tap

Scientists quench visitors' thirst for knowledge in 30 Hamburg pubs

A completely new way of learning about science has just been tested in Hamburg for the first time. On 15 October, 30 pubs and bars around the city offered Science on Tap! Particle accelerators, lasers and black holes, strings and nanoparticles, proteins and dark matter, Higgs particles and quarks – researchers talked about their field of interest in vivid and easily understandable terms, for about half an hour each, and discussed them with the audience in a convivial atmosphere.

The response was overwhelming: virtually all the pubs were packed; the audiences listened with great enthusiasm and asked many questions. The scientists, men and women alike, also enjoyed the Science on Tap Experiment enormously. And the publicans were pleased to welcome new patrons to their premises.

“Hamburg has some wonderful scientists, who are tremendously passionate about their field of work,” emphasises Hamburg’s Senator for Science Katharina Fegebank, the patron of the event. “Science on Tap presents these topics in places where you would least expect them, and in doing so it forges a connection between the citizens of Hamburg and their science.”

DESY director Helmut Dosch, who himself gave a talk in a bar in the St. Pauli district, considers the event a complete success: “Our scientists are very happy to have the chance to give people a better understanding of what they are doing. Science on Tap brings together glowing enthusiasm and refreshing cold drinks, in agreeable surroundings. That’s a wonderful achievement!”

The idea for Science on Tap was one that Jan Louis, of the II. Institute of Theoretical Physics at Hamburg University, had picked up in Israel. The Science on Tap events held by the Weizmann Institute of Science in Tel Aviv are well-established there and highly successful. “We hope this event will kindle people’s enthusiasm for the natural sciences in unconventional, casual surroundings – and at the same time demonstrate how fascinating research is, but also how important,” he says. “Science is a part of our culture, just as much as an evening in the theatre or socialising in a pub.” The event was organised by DESY, CUI, PIER and the Special Research Field (SFB) 676 of the University of Hamburg, and is to be held every year. (tz)

Otmar D. Wiestler is new president of the Helmholtz Association

Otmar D. Wiestler, former Chairman of the Board of Directors at the German Cancer Research Center, has assumed office as President of the Helmholtz Association on 1 September. He is taking over from Jürgen Mlynek, who has stepped down after ten years and two terms in office.

Cancer researcher Wiestler has ambitious plans. “I will visit all 18 Helmholtz Centres by the end of the year to get a good idea of the overall workings of the association,” he said. “I want to gain direct insight into the research activities and profiles of our centres, speak personally with our employees, exchange ideas with them, and hear any suggestions they have, especially our young researchers”. In addition, Wiestler would like to discuss future plans and potential challenges with the centres’ directors and come up with a set of recommendations for the further development of the Helmholtz Association.

“I am confident that we can complete a full cycle of innovation within our fields of expertise,” said Wiestler, “from basic research to further research and development right through to application and back.” This would also require, he adds, forming strategic partnerships with universities, non-university research institutes and companies. Wiestler also intends to provide even greater support for young researchers, as he believes “Helmholtz has great potential to attract the best and brightest minds to our research community”.

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

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