DESY inFORM.

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Staff Magazine of the Research Centre DESY

Campus development DESY 2030

The future look of the DESY sites in Hamburg and Zeuthen

Plenty of room for people and top-level research: In the coming years, the project team will implement numerous plans, ideas and drafts of the DESY 2030 campus development. Picture: DESY, Gesine Born

By Tobias Piekatz

The DESY campus is not only a place for excellent top-level research, the DESY locations in Hamburg and Zeuthen are also flagships for science and important anchor points for innovation and technology. Campus development is thus an important issue in the DESY 2030 strategy process, and the directorate has accordingly established the DESY 2030 campus development project.

Within this project, various construction and renovation plans will be coordinated and implemented on the campus. In addition to these structural topics, the project also entails all sorts of coordination and optimisation processes between the campus partners, especially with the City and the University of Hamburg. In order to realise the many different projects with the help of various other divisions in Hamburg and Zeuthen, the campus development team will be expanded in the coming months.

The financial framework is in place: At the end of June, thanks to the decisive support of Hamburg Bundestag member Johannes Kahrs in particular, the budget committee of the German Bundestag approved 71.5 million euros for the DESY campus development. With the co-financing of the federal states of Hamburg and Brandenburg and the funds already raised from the project "Sustainable Campus", the project has a total of 118.9 million euros at its disposal for the expansion and renovation of the

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Dear colleagues,

After the successful commissioning of the European XFEL and the first user experiments in 2017, things continued to progress very well in the course of this year. After connecting the last two radio frequency stations in the tunnel, the team at DESY responsible for the accelerator operation was able to demonstrate the full beam energy of 17,5 GeV for the first time. After the first undulator branch with the beamlines SASE1 and SASE3, the fast beam distribution system on the second branch is now also in operation, and an FEL beam could be generated simultaneously in the SASE2 beamline – exactly one year after the first lasing at SASE1 in May 2017.

Our next major accelerator project, the upgrade of PETRA III to PETRA IV, is increasingly moving into focus. The concept for this new storage ring with extremely high beam brilliance in the PETRA tunnel has made good progress. However, the challenges posed by such a machine at the limits of feasibility in terms of technology and beam physics are also becoming apparent.

Accelerator research at DESY is getting further impetus with the decision of the Helmholtz Association to support the ATHENA project on laser plasma acceleration. The six participating centres will receive a total of 30 million euros. DESY is coordinating the project together with the Helmholtz-Zentrum Dresden-Rossendorf. It is also the location of the research focus on electron plasma acceleration.

Finally, a comment on my own behalf: At the end of 2018, after eleven and a half years, my activities as head of the M division and member of the directorate will come to an end. Although I will still have the occasion to thank the many people at DESY for the good and trusting cooperation, I would like to already take this opportunity to express my heartfelt thanks. I will once again be involved in research and projects as a leading scientist – indeed, there is no lack of numerous possibilities and projects at DESY!

Yours,
Reinhard Brinkmann

Hamburg and Zeuthen sites. The exact allocation of funds is determined by a steering committee to which all DESY directors belong.

The campus as a place to live and work

The DESY 2030 campus development has the following priorities at the two locations in Hamburg and Zeuthen: The team is committed to the "best host" principle. This means that the research-related services will be expanded to international standards with a special focus on user communities. To this end, laboratory and office space must have a modern design and the social and family needs of employees and guests must be taken into account. These rather "soft" topics about living and working conditions on the DESY campuses are summarised under "work and life @ DESY". This also includes child care, modern workplaces for employees and a modern canteen concept.

The future campus planning and design in Hamburg and Zeuthen are to be linked even more closely. DESY's "One lab – one campus" approach is the focus here. The goal is to create a meta-laboratory for science and research that is not only attractive for DESY staff members but also for scientific cooperation partners and guests from abroad. In addition to excellent research conditions and facilities, this also requires an appropriate constructional infrastructure with sufficient green spaces and places for communication.

The Bahrenfeld science location

In Hamburg, DESY is advancing the campus development together with the University and the City of Hamburg. The First Mayor Peter Tschentscher has declared the idea of developing the DESY and university campus into a north German research campus with international appeal a top priority. Since then, the vision of the future for a redesign of the science location Bahrenfeld is being worked out in a common model. The overall consideration of the urban space around the DESY campus leads to many new aspects being incorporated into the considerations and merging into a holistic concept. DESY is closely involved in planning and decision-making at all levels. The DESY campus development project team will outline the plans in an appropriate way in due time and of course also discuss the further developments with you.

View of the new campus: In front of the DESY Hamburg terrain model, Bundestag members Swen Schulz and Johannes Kahrs (from left) talk to DESY directors Helmut Dosch and Christian Harringa about the 2030 campus development. Picture: DESY, Axel Heimken

Only a draft so far: Until 2030, new centres and research buildings are to be built on and around the DESY campus in Hamburg. Picture: DESY, Reimo Schaaf

Master plan for the campus in Hamburg

1 PETRA IV experimental hall
2 Wolfgang Pauli Centre, WPC
3 Canteen concept
4 DESYUM visitor centre
5 Integrated hall/workshop concept
6 Centre for Water Science, CWS
7 Centre for X-ray and Nano Science, CXNS
8 Innovation centre
9 Centre for Structural Systems Biology, CSSB, expansion stages II and III
10 University of Hamburg, Physics
11 Max Planck Institute for the Structure and Dynamics of Matter, MPSD, incl. extension
12 Lecture building “Light and Schools”

The campus in Hamburg

The campus planning for Hamburg already includes some concrete projects:

- The planning for the DESYUM visitor centre is the most advanced, and the architectural competition is about to be launched.
- The canteen concept is being coordinated with the Hamburg Ministry of Science, Research and Equality (BWFG), the University of Hamburg and the student administration. A decision will be taken by the end of the year.
- In order to support the plans of the University of Hamburg to move large parts of the natural sciences faculty to the Bahrenfeld campus, DESY will soon have to start relocating the “Reemtsma halls”.
- Besides new building projects, the DESY construction division is working on a comprehensive renovation concept to be implemented from 2019.
- Further plans, such as the new accelerator control room, will soon be set up as projects.

New logo for DESY magnets

They hang on numerous magnetic boards: the DESY magnets. In order to update the logo on these practical helpers, the PR department has produced suitable stickers that you can pick up from the Hamburg PR department and from the secretary’s office in Zeuthen.

Beautiful view: The architectural competition for the campus development has already started in Zeuthen, where new institutes such as the Science Data Management Centre (centre left) are to be established. Picture: DESY

First vision for the master plan of the Zeuthen campus

1 Staff building
2 Science Data Management Centre, SDMC
3 Extension of office rooms and guest flat
4 Extension of seminar rooms
5 Roof extension for office use
6 Education centre

The campus in Zeuthen

First steps have also been undertaken in Zeuthen:

- The two-phase architectural competition was launched at the beginning of September. In the first phase, it is to produce the master plan for the campus development and, in the second phase, the design of the Science Data Management Centre (SDMC) for the international gamma-ray observatory CTA as well as the canteen. The master plan will include the localisation of the strategic projects resulting from the demand planning (SDMC, canteen, training centre and campus centre) as well as a comprehensive, integral campus planning.

- In parallel, an overall renovation plan is being worked out. Part of it will be implemented as early as 2019.

- The conference and training facilities are to be expanded and modernised in accordance with fire protection requirements.

The greatest challenge for the two DESY locations will be to implement and coordinate the numerous measures and construction sites within a tight time frame. The coordination with the campus partners and the neighbourhood is also an important task in this process. It is particularly important that research at DESY should not be restricted during the construction phase.

DESY staff members can get involved in a number of ways: Starting in 2019, DESY will regularly carry out campus surveys in which employees can participate online or via printouts. There will also be short surveys on individual aspects. Through the previous campus survey and the DESY kick-off, the campus development department has already collected numerous suggestions and ideas and is in the process of considering and implementing them. These include new, roofed and more numerous bicycle racks, meeting rooms, outdoor facilities, sports offers or the improvement of public transport connections: We're at it!

Tobias Piekatz is head of the DESY 2030 campus development project group.

INFO

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Mobility on the DESY Hamburg campus

On the way by shared taxi, city bike and bus

By Tobias Piekatz

Mobility is undergoing a change, particularly in big cities. More and more people deliberately do without a car or simply don't find any parking space near their home and use public transport or bicycles instead. This is also true for the DESY employees. The expansion of the Bahrenfeld science location also includes the subproject Mobility, where DESY will be closely involved and which is to take the needs of everyone into account.

Electric shared taxi: The IOKI shuttles can be ordered via app. Pictures: DESY, Marta Mayer

IOKI

The City of Hamburg has applied to host the 2021 Global Public Transport Summit and is therefore currently implementing many new projects. DESY supports the application and is also engaged in the pilot project IOKI of Deutsche Bahn in cooperation with Verkehrsbetriebe Hamburg-Holstein (VHH). The goal of IOKI is to improve suburban train connections in areas with poor accessibility.

How does it work? Using the free IOKI Hamburg app, you can call an electrically powered shared taxi in the Hamburg districts of Osdorf and Lurup – and thus also on the DESY campus. This taxi will take you to the nearest bus stop or train station, or take you home from a bus or train stop. Tickets are available for the normal HVV tariff. An algorithm automatically collects passengers with similar routes in car pools. You can even take a shared taxi right on the DESY campus. There are three IOKI stops on the campus from which the shared taxis are starting.

A charming side effect is that DESY will be able to make the e-charging stations available to campus users in the long term.

Bus connection

In discussions with VHH, more issues could be settled for DESY: With the timetable change in December, the bus line 2 is to travel directly to the European XFEL campus in Schenefeld. This still requires the approval of the political bodies in the Pinneberg district, however. But it is already certain that all busses of line 3 will continue to Stadionstraße from December and thus also connect DESY.

Cargo bicycles

As part of the "Sustainable Campus" project, three cargo bicycles have been purchased. These bicycles can carry loads of up to 180 kilogrammes, and thanks to their powerful electric motors, they are ideally suited for quick transport on the campus. The bikes are available for free and can be booked through the DESY website like all other vehicles.

Bookable load carriers: These transport bikes can load up to 180 kilogrammes.

Rental Stadtrad bikes: In the future, there will be even more rental stations on the campus.

Stadtrad bikes

Meanwhile, there are two Stadtrad bike stations on the DESY Hamburg campus, in front of Buildings 6 and 25b. The city bikes can be rented through the Stadtrad app. The University of Hamburg also plans to install a Stadtrad station near CFEL. DESY is working with the Hamburg authorities to extend the network of Stadtrad stations in the vicinity of the campus.

INFO

https://vhhbus.de/ioki-hamburg/
https://stadtrad.hamburg.de
https://v1.desy.de/dienstleistungen/mobilitydesy

Qualification with distinction

Two DESY apprentices, Carsten Patzke (left) and Lucas van Tuyl, were honoured by the Hamburg Chamber of Commerce for their outstanding vocational training qualification.

Van Tuyl completed a vocational training in electronics for devices and systems, Patzke became an IT specialist. Both received their awards at a ceremony presenting Hamburg's best trainees. The Chamber of Commerce congratulated them on their outstanding performance and emphasised that such results are only possible "if capable young people are instructed and motivated in committed training companies." The Chamber of Commerce honoured DESY as "Excellent Training Company 2018".

Georg Forster Fellowship for Sara Taheri Monfared

The Alexander von Humboldt Foundation awarded Sara Taheri Monfared from the Institute for Studies in Theoretical Physics and Mathematics (IPM) in Tehran, Iran, a Georg Forster Fellowship. With these research fellowships for experienced researchers, the Foundation enables highly qualified scientists from abroad to spend extended research stays in Germany. Taheri Monfared will stay in the CMS group at DESY for 1.5 years on the Georg Forster Fellowship. She will work mainly on strong interactions and analyse HERA and LHC data.

Alexander Grohsjean wins CMS Research Prize

DESY scientist Alexander Grohsjean was awarded a scholarship from the worldwide CMS research collaboration. In this programme, the LHC Physics Center (LPC) at Fermilab in the USA honours international scientists who are to decisively strengthen and advance the physics programme of the CMS experiment at the European particle physics research centre CERN in cooperation with the LPC. To this end, the prize winners will be able to use research resources at Fermilab and develop new approaches together with their colleagues. Apart from travel funds, the prize is endowed with half a year's salary. The scholarship runs for one year and starts in March 2019.

A push for data science

Helmholtz Association supports new graduate school with six million euros

Growing data archives: DESY's research facilities produce huge amounts of data. In the new graduate school, young scientists will learn how to process and use such information intelligently. Picture: DESY, Heiner Müller-Elsner

The amount of data produced is constantly growing. Their processing and intelligent use is one of the great challenges of our time and makes data science a key technology for current and future research. A new graduate school for data science will therefore be established in Hamburg: the "Data Science in Hamburg – Helmholtz Graduate School for the Structure of Matter", or DASHH for short. There, young scientists will receive interdisciplinary and application-oriented training in the processing and analysis of large volumes of data generated when studying the structure of matter. The Helmholtz Association is supporting the initiative of DESY, the University of Hamburg, the Hamburg University of Technology and five other northern German research institutions with almost six million euros over the next six years.

In its new strategy, DESY has also identified data science as a priority field of action in order to master the tremendous challenges posed by data-intensive research. DASHH is one of the pillars of this new data science initiative. "Together with the universities, we want to establish computer science geared towards the natural sciences on the Bahrenfeld campus and offer very good research opportunities to PhD students in the field of big data," says Helmut Dosch, the chairman of the DESY Board of Directors. "They will have the chance to further develop IT systems and analytical methods at the highest level using extremely interesting data from cutting-edge research."

Key fields of application are structural biology, materials science, physics with ultrafast X-ray pulses and particle physics. The DASHH graduate school will offer highly talented young researchers from all over the world the opportunity to do their doctorate. In the research groups, they will be working on the challenges posed by large amounts of highly complex scientific data. They might for example develop special software solutions for data management, processing and analysis, or come up with entirely new computer-aided data science methods.

The places at the graduate school will be awarded annually following an international call for applications. The first round of calls will probably take place in the first half of 2019. *(tz)*

Doubly excellent!

Two clusters of excellence on the Hamburg campus

A huge success for Hamburg: All submitted projects were awarded the cluster of excellence grant.

Picture: University of Hamburg, Schöttmer

It took two years of waiting – but now it is certain: The University of Hamburg is to receive funding for four top-level research projects, including two with DESY participation, as part of the German federal and state governments' excellence strategy. All the submitted Hamburg clusters of excellence prevailed over the competition, among 88 competing cluster proposals. The 57 approved clusters will receive annual funding of around 385 million euros in total over seven years.

DESY is involved in the two clusters of excellence Advanced Imaging of Matter (AIM) and Quantum Universe. With AIM, the cluster of excellence Center for Ultrafast Imaging (CUI) will be continued on the Hamburg campus. In this cluster, scientists from DESY and the University of Hamburg, together with colleagues from European XFEL and the Max Planck Institute for the Structure and Dynamics of Matter, will use X-ray lasers to gain a better understanding of how superconductivity, drugs and energy production function at the molecular level and work out how to control these in a targeted manner in the future. In the Quantum Universe cluster, scientists aim at combining all the disciplines and topics of particle physics into an overall picture in order to unlock the universe's remaining mysteries.

"I am very proud that with AIM and Quantum Universe, both excellence proposals in which DESY is significantly involved have been approved," says DESY director Helmut Dosch. "The fact that we were able to bring two excellence projects to our campus stresses the outstanding importance of research into decoding the structure of matter here in Hamburg and attests to the fruitful close cooperation of DESY and the University of Hamburg."

DESY is also involved in two other clusters of excellence: Christian Schroer, leading scientist at PETRA III, is participating in the Hamburg project "Understanding Written Artefacts". DESY is also a partner in a cluster of excellence of Kiel University: In "Precision Medicine in Chronic Inflammation", the researchers are investigating chronic inflammatory diseases.

The University of Hamburg is now entering the finals for the university of excellence trophy. Next year, up to eleven universities of excellence are to be selected, which will receive a further 148 million euros per year. By winning four clusters of excellence, the University of Hamburg has successfully qualified itself for the title, since a minimum of two clusters of excellence is needed for application. *(khü)*

AWARDS

Saša Bajt elected Fellow of the Optical Society

DESY group leader Saša Bajt was elected Fellow of the Optical Society (OSA). She was recognised "for her major contributions to EUV and X-ray optics," as the society announced. With 21 000 members in more than 100 countries, the Optical Society is the leading scientific association in the field of optics and photonics. Bajt heads the multilayer optics group at DESY. Among her recent achievements are novel multilayer Laue lenses (MLL) that Bajt devised and built together with her team. These sophisticated optics create an unrivalled small and bright X-ray focus, thus providing new insights into the nanocosmos. For these unique X-ray optics, Bajt's team has recently received both the Polish Synchrotron Radiation Society (PSRS) Award and the 2018 Innovation Award from *Microscopy Today*, the official magazine of the Microscopy Society of America.

Helmholtz Doctoral Prize for Oleg Gorobtsov

Oleg Gorobtsov from DESY Photon Science was awarded the Doctoral Prize of the Helmholtz Association for his outstanding doctoral thesis on coherent X-ray scattering methods. In his thesis, Gorobtsov developed novel concepts for exploiting the coherence of hard X-ray radiation, thus pioneering the further establishment of this new research field at modern X-ray light sources. Gorobtsov successfully applied his ideas at synchrotron radiation sources such as PETRA III and at free-electron lasers such as LCLS in the USA and FERMI in Italy.

Otto Stern Prize for Tobias Kroh

Tobias Kroh from the CFEL ultrafast optics and X-rays group was awarded the Otto Stern Prize of the physics department of the University of Hamburg for the best master's thesis in physics. Using an infrared short-pulse laser system, Kroh investigated theoretical predictions for the generation of so-called higher harmonics at the Massachusetts Institute of Technology. The sophisticated experiment could only be carried out because of his "good physical understanding and his experimental skills," emphasised group leader Franz Kärtner from DESY, who supervised Kroh's work.

Kerstin Borras elected APS Fellow

Kerstin Borras, leading scientist at DESY and Helmholtz Professor at RWTH Aachen University, was elected Fellow of the American Physical society (APS). She was honoured for her outstanding contributions to particle physics, particularly "for exemplary leadership at DESY, at Fermilab in the USA and at CERN." With more than 50 000 members, the APS is the second largest physics association in the world after the German Physical Society (DPG). Scientists who have made extraordinary contributions to research or important research or technology developments can be elected APS Fellow – an honour that is awarded to only half a percent of APS members per year.

International Helmholtz Fellow Award for Richard Saykally

The Helmholtz Association presented the International Helmholtz Fellow Award to five excellent scientists. One of them is Richard Saykally, a physical chemistry scientist proposed by DESY who is working at the University of California, Berkeley, on quantum effects at the smallest molecular units of water and on catalytic processes. "He is one of the most prominent physical chemists of our time, and we are looking forward to continuing our close cooperation with him," says Jochen Küpper from CFEL, who is a research partner of Saykally together with DESY scientist Simone Techert.

Zdenek Herman MOLEC medal for Francesca Calegari

DESY scientist Francesca Calegari was awarded the Zdenek Herman MOLEC Young Scientist Prize. Calegari was honoured for her promising work in femtosecond and attosecond laser spectroscopy. The physicist received the prize at the international MOLEC conference in France at the end of August. The prize consists of a bronze medal and is awarded in honour of the Czech chemist Zdenek Herman.

International cooperation in FEL research: German and Chinese scientists at a workshop at DESY in June.

Picture: DESY

DESY cooperates with China

New Helmholtz International Lab for FEL research

Scientists from Germany and China are joining forces in free-electron laser research: DESY and the Shanghai Institute of Applied Physics (SINAP) have decided to pool their resources in the CAS–Helmholtz International Laboratory for FEL Science and Technology (CHILFEL), which also includes European XFEL and ShanghaiTech University. The Helmholtz Association supports the research collaboration as a Helmholtz International Lab with 300 000 euros per year over six years.

CHILFEL, which will start on 1 January 2019, will form the basis for common research projects and infrastructures to be used jointly by the partners in Hamburg and Shanghai, as well as for a wide range of mobility and exchange programmes to promote young scientists.

China is on its way to becoming a major scientific power and has been able to chalk up some significant achievements in the field of free-electron lasers (FELs) in recent years. In addition to a modern synchrotron radiation source, a free-electron laser in the soft X-ray range went into operation in Shanghai some years ago. Approval has recently been granted for the ambitious SHINE project, an FEL for short-wavelength X-ray light on the Shanghai research campus, based on superconducting accelerator technology.

"These rapid developments in China are opening up numerous opportunities for DESY to collaborate closely at eye level in order to further advance the development of FELs," explains Wilfried Wurth from DESY, the scientific coordinator of CHILFEL on the German side. "After a series of several successful workshops, the joint laboratory has now been established so as to exploit the great scientific and technological potential of the partners for joint research and development work in the FEL field." As a further building block on the way to institutionalised cooperation with European XFEL, the newly founded FEL partnership between Hamburg and Shanghai receives substantial support from China's research policy makers.

The scientific programme of CHILFEL will initially be based on five pillars: scientific applications at FELs using soft and hard X-rays, development of FEL methods and instruments, FEL seeding and synchronisation, detector development and development of superconducting cavities. Overall, 25 scientists from Hamburg and Shanghai are associated within the programme. *(tz)*

Networking: A symposium took place at MIT as part of the delegation trip. One of the speakers was Wilfried Wurth, leading scientist at DESY. Picture: MIT/Sampson Wilcox

DESY delegation trip to Washington and Boston

Networking with US scientific elite

By Frank Lehner and Marion Stange

A delegation of Hamburg science institutions with strong DESY representation, headed by Hamburg's Second Mayor and Senator of Science, Research and Equality Katharina Fegebank, visited the US east coast cities of Washington and Boston. The goal of the delegation trip was to establish closer scientific relations between the United States and Hamburg. The trip took place at the beginning of September in the run-up to the talent fair GAIN (German Academic International Network). The GAIN initiative helps German researchers working in North America to maintain their ties with German science. Moreover, it supports scientists who want to return to Germany.

In Boston and Washington, the DESY delegation exchanged views with local faculty representatives and conferred with US science and funding agencies.

Embedded in the delegation trip was a symposium organised by PIER at the Massachusetts Institute of Technology (MIT), with researchers from DESY, the University of Hamburg (UHH) and MIT. The scientists laid the foundation for establishing a joint Grand Challenges Research Network. The aim of the network is to tackle major scientific challenges in common research projects, for example in structural biology, medicine, nanotechnology and quantum electronics.

The two-year development phase of the network is financially supported by the Hamburg Ministry of Science, Research and Equality (BWFG). During this period, the PIER office will coordinate activities in two areas: On the one hand, a kick-off workshop with researchers from DESY, UHH and MIT will be held in Hamburg in January 2019, with the purpose to identify common research topics with a particularly high potential for both sides. In order to advance the cooperation, young scientists from Hamburg will then spend several months working in MIT research groups.

On the other hand, highly qualified MIT students will be invited to complete research internships on the Bahrenfeld campus. This will give the students the opportunity to become acquainted with the excellent research environment in Hamburg at an early stage, with the perspective to attract them as top talents to Hamburg in the future.

NEWS

New PIER Seed Projects selected

By Marion Stange

Five Hamburg research teams can rejoice: Their projects were selected for funding among 13 submitted applications in the recent call for PIER Seed Projects. The projects come from the PIER research fields of infection and structural biology, nanoscience, photon science and accelerators. For their implementation, DESY, the University of Hamburg (UHH) and the University Hospital Eppendorf (UKE) will provide a total of 240 000 euros over the next two years through the PIER Idea Fund.

According to the jury, the projects are particularly worthy of support because they not only demonstrate outstanding scientific quality and originality but also consistently focus on cooperation across institutions. In some cases, the planned cooperation even extends beyond the circle of PIER partner institutions, with some projects involving researchers from the Bernhard Nocht Institute for Tropical Medicine (BNITM), the European Molecular Biology Laboratory (EMBL) and the Max Planck Institute for the Structure and Dynamics of Matter (MPSD) as co-applicants. BNITM and EMBL are partners of the Centre for Structural Systems Biology (CSSB), which was established on the Hamburg Bahrenfeld campus in 2017.

"As jury members, we found this intense networking of researchers from different institutions on the Bahrenfeld campus particularly impressive", explains Franz Kärtner, chairman of the PIER Executive Board. "The more research institutions on the campus can be involved, the better. This also strengthens the multidisciplinary orientation of the research campus."

The now completed call for proposals for the PIER Seed Projects was the eighth since the founding of PIER in 2011. Besides providing seed money for joint DESY and UHH research projects, PIER also supports workshops and short visits of researchers from abroad. Applications for PIER Workshops and PIER Short Visits can be submitted continually.

PIER (Partnership for Innovation, Education and Research) is the strategic partnership of DESY and UHH. On behalf of the two institutions, PIER promotes joint research and innovation activities, particularly of young scientists. PIER focuses on the fields of particle and astroparticle physics, nanosciences, photon science, infection and structural biology, theoretical physics and accelerator research.

INFO

www.pier-hamburg.de/funding/

Contact: info@pier-hamburg.de

“Bring the world together”

Former CERN director general talks at RACIRI Summer School

By Peter Wibbeling

About 70 young scientists attended the RACIRI Summer School on the Rügen island in August. At the 6th joint summer school of the Röntgen Ångström Cluster (RAC) and the Ioffe Röntgen Institute (IRI), participants were introduced to state-of-the-art methods of materials investigation using X-ray and neutron beams. The motto of the summer school this year was “From Basic Science and Applications to Technologies inspired by Nature”. Lectures covered topics such as “Soft Matter & Bio-Materials”, “Energy and Environment” and “Nature-inspired Technologies”. This year, the RACIRI Summer School took place in Germany for the second time.

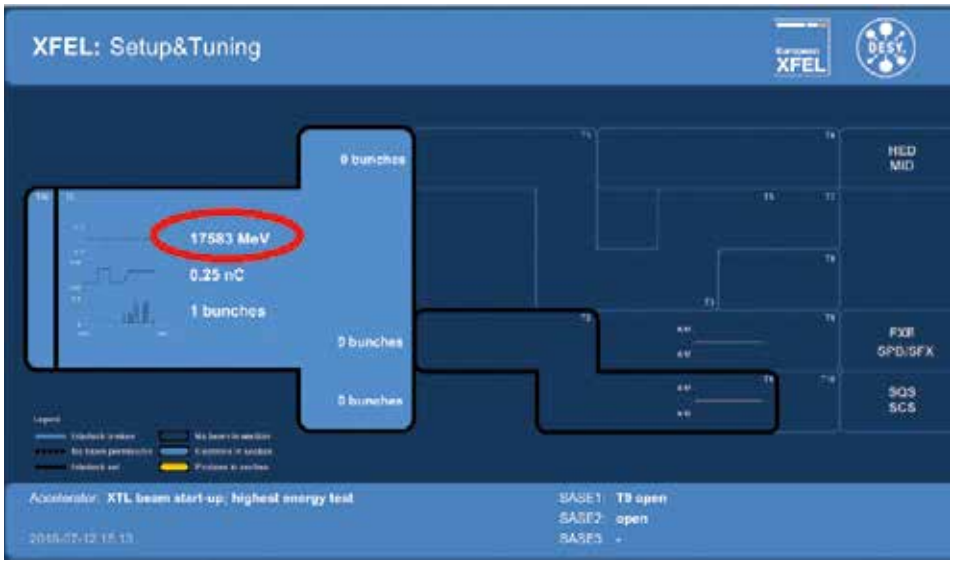
A highlight of the event was the keynote lecture of Rolf-Dieter Heuer (photo above) on the topic “Lessons learned in science diplomacy”. Heuer is chairman of the Group of Chief Scientific Advisors of the European Commission, former CERN director general, president of the SESAME Council and vice-president of the German Physical Society. In his lecture, Heuer described the roles of CERN and the SESAME radiation source in Jordan as “innovate, discover, publish, share and bring the world together”. This was also his concluding appeal to the young researchers.

The RACIRI Summer School is a joint initiative of Germany, Russia and Sweden in the field of materials and nanosciences, with a regional focus on large-scale facilities in the Baltic Sea region. The Röntgen Ångström Cluster is an association of German and Swedish research centres, the Ioffe Röntgen Institute is a German and Russian research cooperation to advance collaboration at large-scale research facilities.

Pictures: Claas Abraham

Design energy achieved

Super microscope accelerates electrons to 17.5 GeV



View of the European XFEL control monitor: For the first time, the accelerator reached an electron energy of 17.5 GeV (here in the unit megaelectronvolts: 17583 MeV, encircled in red).

The experiments at Europe’s new X-ray laser European XFEL have been running for about a year. For the first time, the super microscope has now accelerated electrons to an energy that is higher than that of any other X-ray free-electron laser in the world so far. At the beginning of July, the superconducting linear accelerator brought electrons to an energy of 17.5 GeV (gigaelectronvolts), the intended design energy of the accelerator. Since the initial commissioning of the facility at an energy of 14.9 GeV in 2017, the acceleration energy has been successively ramped up.

Staff and operators of the DESY accelerator division have now put the last part of the 96-module accelerator into operation and accelerated the electrons beyond the previous benchmark. “This is a tremendous success for the superconducting accelerator technology that has been pioneered by DESY and its international partners over the last three decades”, says Winfried Decking, head of European XFEL accelerator operation.

The accelerator of an X-ray free-electron laser such as the European XFEL provides the high-energy electrons that are used to generate the intense, ultrashort laser pulses. The first user experiments were carried out with light generated by electrons with energies of up to 14 GeV. In the future, the accelerator will be operated in an energy range between 8 and 17.5 GeV, depending on the requirements of the experiments. The increased energy range will enable the European XFEL to generate a broader spectrum of X-ray laser light, giving users more flexibility in their methods and the possibility to try out techniques that were previously not possible at free-electron lasers.

The superconducting TESLA accelerator technology is also responsible for another unique feature of the European XFEL: It allows for acceleration of up to 27 000 electron bunches per second and thus for production of 27 000 X-ray laser flashes per second, compared to the up to 120 flashes at X-ray lasers with conventional accelerator technology.

The first scientific experiments at the new facility have already shown that investigations are possible with an ultrafast X-ray pulse sequence in the megahertz range. The results were published at the end of August by a large international research group led by DESY. *(tz)*

Consulting service to go

DESY Start-up Office on campus tour

Three days of coffee and questions: The start-up advisors informed interested parties about the many aspects of company spin-offs. Picture: DESY, Marta Mayer

Bright sunshine and mild temperatures – conditions couldn't have been better for the first coffee camp-out of the DESY Start-up Office under the motto "Wake up, start up!". Over a cup of coffee in mid-September, DESY employees had the opportunity to find out how DESY supports spin-offs from research. The DESY 2030 strategy specifies that DESY aims to become the starting point for further start-ups in the Hamburg and Brandenburg regions.

At central points on the campus, the consultants from the Start-up Office answered questions over three days, providing detailed information on many aspects of company start-ups. What does a spin-off from research really mean? Which ideas can be developed into sustainable business models and how? What kind of support does DESY provide?

All in all, the camp-out was very successful, with many interesting discussions, new contacts with people interested in innovations and start-ups, and even newly identified spin-off potentials.

Among the available support offers on the campus for those interested in starting up a business are pitch trainings. The first took place in mid-October. Here, participants learned that a catchy, short presentation of ideas and products is particularly important for the success of a young enterprise – to win potential customers or investors, but also to find co-founders for a business idea.

In addition, those interested in founding a company can attend regular "entrepreneurship lunches" where they can exchange ideas over a common lunch in the cafeteria. *(mb)*

INFO

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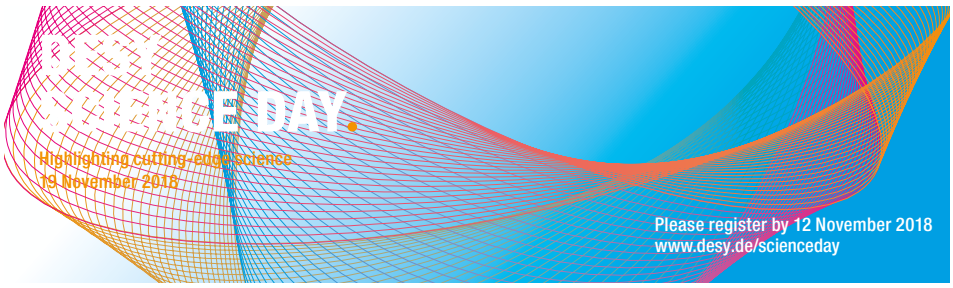


NEWS

Italy now European XFEL shareholder

At the beginning of October, the Italian research organisations INFN and CNR officially became shareholders of European XFEL GmbH. The Italian National Institute for Nuclear Physics (INFN) and the National Research Council (CNR) together now own 2.9 percent of the company's shares, one third going to INFN and two thirds to CNR, making Italy the fourth largest funder after Germany, Russia and France. Italy has been a European XFEL partner country since the foundation of the company. With the acquisition of the shares, the Italian shareholders now also have full voting rights in the European XFEL Council.

New DESY start-up: KönigsSystems

The start-up KönigsSystems offers high-tech services for research and development. "For KönigsSystems, we are building on our experience in science and industry," explains Aram Kalaydzhyan, who has been with DESY for eight years and is now seizing the opportunity to set up his own high-tech company. The team consisting of physicists and engineers wants to develop rapid and cost-efficient designs of vacuum, cryogenic and opto-electronic systems for experiments.

German-Canadian network for quantum computing and data analytics established

The Helmholtz centres DESY and Forschungszentrum Jülich, the Canadian particle accelerator centre TRIUMF and the companies D-Wave Systems Inc. and 1QBit have signed a Memorandum of Understanding in Canada in order to pool their strengths in the research and use of quantum computers, data analytics and in particular machine learning. The idea for the cooperation came from a Helmholtz delegation visit to Canada led by Helmholtz President Otmar Wiestler.

Committment for refugees

For several years already, DESY staff members have been very active in helping refugees. In addition to guitar lessons and breakfasts, they have been organising an annual collection of clothing and other much needed items. Recently, at a summer festival for refugees on the Volkspark grounds, Jochen Barnstedt and Anna Kazakova have informed people about internships and training at DESY. A central contact person is still needed for volunteers inside and outside the research centre. Interested employees in Hamburg can contact Carmen Schüler for further information:
carmen.schueler@desy.de
Ulrike Behrens is the contact person in Zeuthen:
ulrike.behrens@desy.de

"Wissen vom Fass" science talks honoured

When scientists in Hamburg fan out to the pubs and bars of the city to offer the guests entertaining insights into their work in half-hour lectures – then is the time for "Wissen vom Fass" (Science on Tap). This science communication format developed by DESY and the University of Hamburg has now been awarded the "Hochschulperle" (University Pearl) of the month of September by the Stifterverband donors' association.

International Conference on Ultrafast Phenomena

Nearly 500 participants from almost 30 countries attended the XXI International Conference on Ultrafast Phenomena in Hamburg in mid-July. The European Physical Society (EPS) organised the UP2018 conference with the support of DESY, the University of Hamburg and European XFEL. The conference takes place every two years and is considered the leading and most important international forum for scientists and engineers working in research and technology development for the generation, manipulation and exploitation of ultrashort pulses.

TeVPA conference in Berlin

In August, about 400 scientists from 36 nations met at the TeVPA conference in Berlin to discuss current topics in astroparticle physics. The event was primarily organised by DESY in Zeuthen. Special subjects were the recent discovery of gravitational waves and electromagnetic radiation emitted by a merging pair of neutron stars as well as the first location of the source of a high-energy cosmic neutrino in an active galactic nucleus, which could thus be identified as a place of acceleration of cosmic rays. This localisation is also of great importance for multi-messenger astronomy, i.e. the study of the universe with various cosmic messengers (neutrinos, gravitational waves, cosmic radiation, electromagnetic radiation). The observation of different cosmic messengers allows insights into the physics of cosmic particle accelerators.

Fifth teacher training in Hamburg

Teachers discover DESY research

By Kim Petersen

DESY has long been supporting teachers who, as knowledge mediators, play an essential role in promoting the interest of their pupils in the natural sciences. Within the framework of the DESY teacher training, interested teachers from all over Germany have the opportunity to take part in current research on the DESY campus in Hamburg during a five-day research stay.

Research-related advanced training: DESY scientist Doris Eckstein explains the work in the CMS cleanroom to participants of the teacher training course. Picture: DESY, Marta Mayer

With 25 teachers – more than ever before – the fifth round took place this year in October. It made apparent that the DESY teacher training is becoming more and more known throughout Germany: While in the past years participants mainly came from the greater Hamburg area, this time the majority travelled from other federal states, such as Bavaria and North Rhine-Westphalia.

What is also new this year is that, for the first time, the participants were able to choose among three main areas of training: particle physics, accelerator physics and photon science. Depending on the participants' preferences, the research stay consisted either mainly of guided tours, lectures and workshops – for example at the DESY test beam or in the CMS cleanroom – or of project-based, intensive cooperation in a DESY research or service group.

Erhard Werner from Lower Saxony was there for the third time – with great enthusiasm. "The work in the research groups as well as the presentations and guided tours continuously offer examples of applications that allow me to make my own teaching much more interesting," says Werner. "Moreover, I noticed that many scientists share my opinion that philosophy, mathematics and physics can only be understood together. At DESY, work is consistently interdisciplinary."

Such a programme can only be carried out thanks to the commitment of many staff members, as research director Joachim Mnich emphasised in his welcome address on the first day of the event. He took the opportunity to thank the more than 30 colleagues from DESY and the University of Hamburg who contributed to this year's training. They enabled the teachers to experience the fascination of current research, bring it to their schools and hopefully pass it on to their pupils.

INFO

www.desy.de/forschungsaufenthalt

Picture: DESY, Marta Mayer

Picture: DESY, KuV

Summer students 2018: 117 participants from 41 nations

Summer is the season when the summer students are flocking to DESY. The programme has been held at DESY for almost 50 years, "with ever increasing applications," says Olaf Behnke, co-organiser in Hamburg. Social media also spread information about interesting support programmes more quickly, so this year the team had to work its way through 800 applications. Eventually, a total of 117 students from 41 nations came to the DESY locations in Hamburg and Zeuthen for seven weeks. "A core element of our programme is that the participants are integrated in one of the numerous research groups at DESY," says Behnke. This includes projects in photon science, particle and astroparticle physics as well as accelerator research. This year, for the first time, the summer students were also able to participate in ongoing experiments at the European XFEL. The programme conveys not only theoretical knowledge. "Our participants do not only feel like students, but also like scientists." The application period for the 2019 summer student programme runs from 15 December 2018 to 31 January 2019. *(khü)*

More information: **http://summerstudents.desy.de**

Brilliant beamline

Longest PETRA III beamline takes up operation

With the PETRA III beamline P21, the fourth beamline in the "Ada Yonath" experimental hall started operation. After the first X-ray beam reached the experimental hutch on 27 August, the scientists took a first diffraction image of a test sample on 5 September.

P21 is a special beamline in several respects. At 165 metres from the undulator to the last experimental station, it is the longest PETRA III beamline. DESY has built it with financial support from Sweden, and it is being operated in collaboration with the KTH Royal Institute of Technology in Stockholm and the University of Linköping. P21 is also the first PETRA III beamline with an in-vacuum undulator.

Pleased to see first light at P21: DESY scientist Wolfgang Drube, research director Edgar Weckert, Johan Holmberg from the Swedish Research Council and beamline scientist Ulrich Lienert (from left). Picture: DESY

After the commissioning that has now started, first users are expected at the beamline for materials sciences research with high-energy synchrotron radiation already this year. Regular user operation will begin in summer 2019. *(tz)*

Campus day in Zeuthen

On 10 September, more than 150 colleagues celebrated the annual campus day in Zeuthen. The afternoon started with a tour of the campus, during which participants could get an insight into the projects of other groups and explore hidden passages and rooms in the building. Exchange and getting to know each other was also possible during the subsequent sports programme: volleyball, football or table tennis. Culinary highlights included a new creation – the DESY waffles – and juicy cocktails mixed by the management team. The DESY Zeuthen band provided musical accompaniment until the evening. *(ub)*

New DESY development: waffles with logo for the Zeuthen summer party. Picture: DESY, Frank Stephan

Very successful Day of Knowledge

4500 visitors stormed TUHH

By Miriam Huckschlag

"…can generate pressure as high as the one 1000 kilometres deep inside the Earth…" a young visitor echoed the words of DESY scientist Rolf Treusch in disbelief while alternately lifting the partly heavy exhibits of the large-volume press from the table.

Under the motto "Technology and Digital Worlds", the Day of Knowledge took place for the second time on 22 September. In cooperation with DESY and 19 other Hamburg science institutions, the Hamburg Ministry of Science, Research and Equality (BWFG) stages this science day in annual alternation with the Night of Knowledge. 4500 Hamburg citizens interested in technology and research followed the invitation to Harburg to visit the Hamburg University of Technology (TUHH), which opened its premises on the occasion of its 40th anniversary.

Foto: ACT

Crowds at the DESY booth: Many visitors were interested in the DESY programme at the Day of Knowledge.

Picture: BWFG

It was not yet 13:00 h when the first curious guests streamed through the TUHH corridors, quickly discovering the fascinating and entertaining hands-on activities at the DESY booth. In addition to a ball linear accelerator, a drawing table and badge machine for the little guests, a particle-o-mat, a cleanroom model with appropriate clothing and a cavity model, the exhibit table with exemplary DESY research exhibits was a favourite attraction. There, the visitors had the opportunity to talk to DESY scientists about photosynthesis, dark matter, materials science or plasma acceleration. Half-hour lectures provided the visitors with more in-depth information on current research topics at DESY.

"Had we known beforehand that so many people would come, I would have brought my whole group with me," laughed DESY photon scientist Simone Techert, surrounded by curious children. In spite of the never ending rush of visitors at the DESY booth and completely overcrowded lectures, both DESY staff members and visitors were in high spirits. For all DESY participants, the Day of Knowledge was an absolute success that calls for continuation.

20 years of “AG Faszination Physik” at DESY

Pupils’ study group celebrates anniversary

“Mr. Tausendfreund has made a lasting, positive impression on my life,” says Felix Tennie, today a postdoc in Oxford. “The participation in his study group made it clear to me that I definitely wanted to study physics,” adds Gotthold Fläschner, now a PhD student at the Swiss Federal Institute of Technology ETH Zürich.

More than just teaching: For 20 years, Waldemar Tausendfreund has been dedicated to conveying physical knowledge to young people. Picture: DESY, Marta Mayer

Felix and Gotthold were school children when they attended Waldemar Tausendfreund’s pupils’ study group “Faszination Physik” at DESY many years ago. For 20 years, enthusiastic pupils have been pilgrimaging to the DESY campus every week on Fridays and Saturdays to spend their free time dealing with black holes, dark matter or the electron velocity in metals. Weird, you might think, but the name says it all: fascination of physics. A name that should be read with an exclamation mark!

Waldemar Tausendfreund founded the study group and he has been supervising it ever since. Before he dedicated himself to teaching the natural sciences, particularly physics, at DESY 20 years ago, Tausendfreund had been a solid-state physicist, then a secondary school teacher. Even today, many students of the study group ask themselves what it might have been like to experience such a captivating teacher at school. They got to know and still get to know him as someone who, with his comprehensive education, is able to arouse curiosity and delight especially in the natural sciences.

In addition to the weekly meetings, excursions supported by DESY offer the study group members numerous opportunities to gain insight into academic life. A special event is the annual Christmas party at which current and former members meet and exchange ideas.

Meanwhile, generations of science enthusiasts have emerged from Tausendfreund’s talent pool, many of whom today generate and impart knowledge themselves. You can find them everywhere – in Germany, Switzerland, Great Britain, Canada or Australia. It would be wonderful to find such study groups conveying the fascination of physics in many places all over the world, and specially someone like Waldemar Tausendfreund, who communicates knowledge of physics equipped with cheese sticks, grape juice, a blackboard, chalk and immense dedication.

By members & alumni of “AG Faszination Physik”, represented by Felix Tennie and Gotthold Fläschner

INFO

http://faszination-physik.desy.de

Dark Matter Day

Planetarium show on dark matter

31 October was a special day. Not only because of Halloween or because it was an official holiday in northern Germany for the first time. It was also International Dark Matter Day – and as DESY scientists too are searching for dark matter, DESY and the Hamburg Planetarium showed the film “The Phantom of the Universe” twice on 31 October.

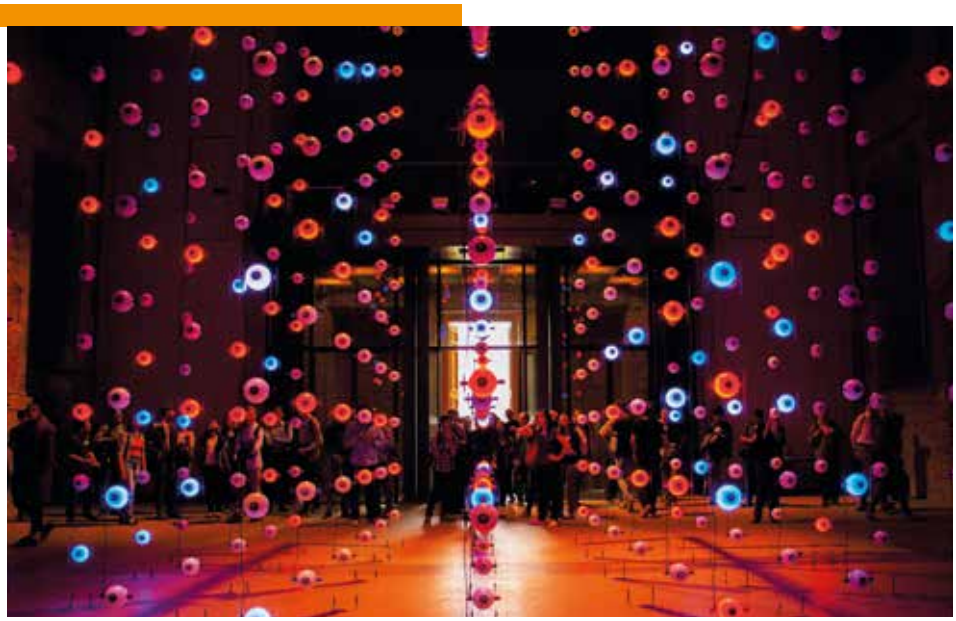
The film follows scientists hunting for the mysterious dark matter – from the big bang to its hoped-for discovery, for example at the Large Hadron Collider (LHC) particle accelerator at CERN. It is a 360 degree experience developed by scientists and accompanied by sound effects from the Skywalker Sound studio, which is also responsible for the sound backdrop in the Star Wars films. At the event, DESY scientists answered questions about dark matter and particle physics.

At the same time, the first conference bringing together experts from various dark matter research fields was held at DESY in Hamburg from 29 to 31 October.

Dark matter is one of the major unsolved mysteries of physics. Nobody knows what dark matter is, what it looks like and how it behaves. However, many observations have shown that it must exist and that it even accounts for about 85 percent of the matter in our universe. In fact, we know only about 15 percent of the matter in our universe – all the rest is dark… *(baw)*

INFO

www.darkmatterday.com



The sound of neutrinos: In his art project, the artist Tim Otto Roth translated data from the IceCube project at the South Pole into coloured light and sound. Picture: DESY, Ashley Jones

AIS³ [aiskju:b]

Premiere of light and sound installation by artist Tim Otto Roth

With more than 3000 visitors, the premiere of the light and sound installation AIS³ came to a successful end on 16 September. The artist Tim Otto Roth was inspired to build his "Astroparticle Immersive Synthesizer³ – AIS³ [aiskju:b]" by the neutrino telescope IceCube, which spies for high-energy elementary particles from outer space, the neutrinos, in the perpetual ice of Antarctica. DESY supported the artist in the realisation of his project.

IceCube was the data provider for the light and sound installation, which allowed visitors to immerse themselves in the events at the South Pole and experiencing neutrino impacts virtually in real time. "This project allows an audience that does not have close connections with science to experience the fascination of science," says Christian Spiering, former head of the IceCube group at DESY and founder of the Global Neutrino Network. "The unconventional approach to a current research topic offers a sensory experience that augments our classical communication of research."

The light and sound installation [aiskju:b] consisted of 444 spherical loudspeakers hanging from thin wires in the empty hall of the cultural church St. Elisabeth in Berlin. Using current data from the IceCube experiment, the measured energies were translated into coloured light and tones blending into different sounds in the room. Visitors could move between the loudspeakers and thus follow the movement of the ghost particles across space.

The supporting programme coordinated by DESY also attracted many people: an exhibition on IceCube research at the South Pole, teacher training, guided tours for school classes, evening lectures and the reception of the TeVPA conference in the installation. The programme concluded with the Physics and Art[efacts] symposium initiated by Tim Otto Roth and Christian Spiering, with experts from physics and art, science historians, musicologists and media scientists as well as an audience that was keen to debate.

The next stages of the installation are already fixed: In 2019, the [aiskju:b] project will be on view in Munich and Aachen, and presentations abroad are also planned. *(ub)*

HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES

New Helmholtz Office in Tel Aviv

The Helmholtz Association intensifies its collaboration with Israel. To this end, it has opened a new Helmholtz office in Tel Aviv at the end of October. It is the fourth international office of the research association. "We chose this location because we have found our long-term collaborations with Israeli partners to be incredibly dynamic," says Helmholtz President Otmar Wiestler. "This country is capable of cutting-edge research at a top international level in many areas of science, including medicine, chemistry or physics. And Israel is among the best in the world when it comes to the broad field of digitalisation." Helmholtz now wants to further expand the existing fruitful cooperation.

The new office will be located in a central co-working space in Tel Aviv. "Many young entrepreneurs are represented here," says Billy Shapira, head of the new Helmholtz Office. "This start-up scene has a fascinating energy, and it puts us in close proximity with potential new partners." Prior to taking up this role, Shapira held positions of responsibility at Hebrew University of Jerusalem for many years, serving most recently as chancellor.

DESY and many Israeli research institutions also want to cooperate even more closely in the future. "We have a long and fruitful cooperation with a number of Israeli partners," says DESY director Helmut Dosch. "We would like to expand this success story by strengthening existing cooperations and creating new ones."

www.helmholtz.de

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