

Positrons are back in the ring

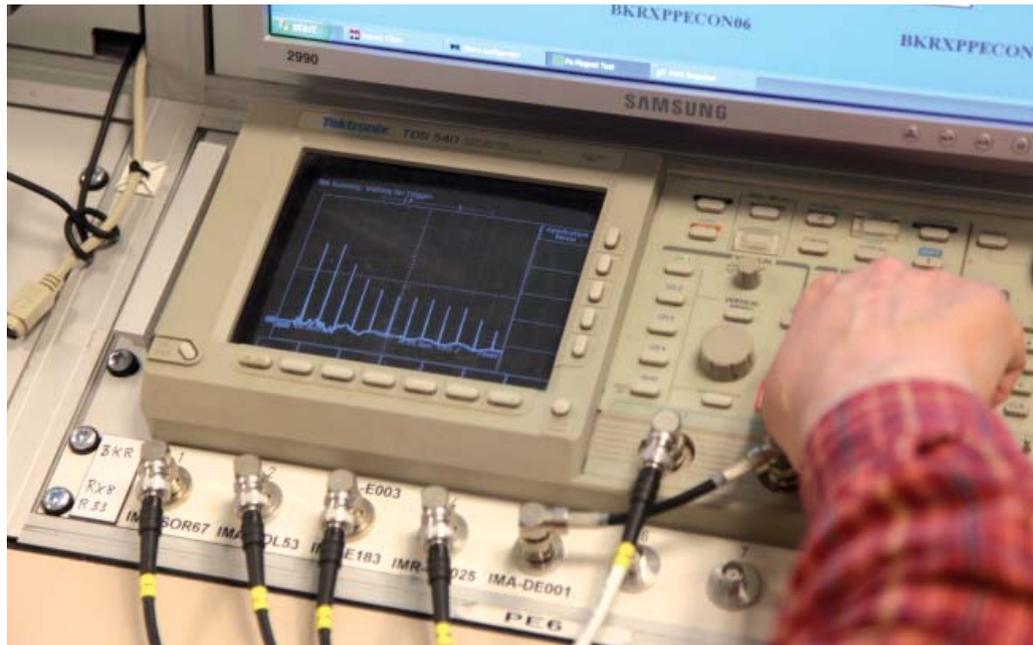
PETRA III has taken up accelerator operation

The control room crew worked through the Easter holidays to eliminate all possible sources of trouble. The first good result came on Easter Monday: despite a damaged magnet in the PETRA ring, the crew managed to inject the first particles. Shortly afterwards, the time had come: after the magnet had been repaired, particles were circling the PETRA ring for the first time since June 2007. At first they only travelled for a few rounds on the calculated path in the accelerator, then for minutes, 130 000 times per second. It works! Positron bunches are being stored in the PETRA accelerator again.

To celebrate this event, DESY accelerator director Reinhard Brinkmann treated the control room team with some champagne. Klaus Balewski, manager of the accelerator upgrade, is also more than pleased: "The upgrade of the machine was more or less a complete rebuilding. The fact that this was realised within 21 months, considering the amount



Easter shift in the accelerator control room.



The first twelve rounds of the particle bunches are visible as peaks on the oscilloscope.

of work, makes it a great performance. I was very curious about the start of PETRA III and I am glad and satisfied that everything went so well. Very special thanks to all persons involved."

Preceding all of this was the most eventful break in PETRA's 30-year history: the complete remodelling of the ring from a former HERA pre-accelerator into the most brilliant synchrotron radiation source worldwide. In only 21 months, the upgrade team cleared out and newly equipped almost the complete PETRA tunnel. The coils of the about 700 bending and focussing magnets weighing up

to 8 tons were replaced, together with the complete 2.3-kilometre-long beam pipe. New vacuum pumps were installed; the cooling water supply and the magnet control were replaced. Altogether more than 700 kilometres of power and signal cables were put in. All this for one goal: to make the new X-ray source available for users around the clock. "The users know that such a large storage ring is difficult to handle," says Hermann Franz who coordinates the equipment in the experiment hall, "but since they only come to DESY for a few hours

CONTINUED ON PAGE 2

DESY at the port birthday

DESY participates in the world's greatest port festival, the Hamburg Harbour Birthday. In collaboration with the partner country Switzerland, the mobile exhibition "Weltmaschine" on the LHC will be presented for the first time from 8 to 10 May, located at the Kehrwiederspitze. For programme and talks, see www.weltmaschine.de and www.hafengeburtstag.de.

Spring concert of the DESY choir

The DESY choir celebrates spring with an a capella concert that takes place on Friday, 8 May at 20 h in the canteen annex. To get in the mood for the Hamburg Harbour Birthday weekend, they present songs from many centuries on the subject of "water". This also explains the unusual concert title: "Drunken sailing in a rubber dinghy".



DIRECTOR'S CORNER

Dear colleagues,

the most pleasant news of the month of April came from the accelerator control room. During the Easter holidays, Klaus Balewski and his team have successfully stored the first particle beam in PETRA III.

This is one of the most important milestones of the PETRA III project and I would like to express my congratulations to the whole team. The installation of the PETRA III experiments is also well underway and it will not

take long until we will see the first synchrotron radiation at PETRA III. The official inauguration of the world's best synchrotron radiation source will take place in late summer.

On the DESY campus, a steady traffic of heavy lorries is going to and from the European XFEL construction area, and you can start to see where the XFEL buildings are to be erected. We hope to conclude the contract negotiations very soon and to proceed to the foundation of the "European XFEL GmbH" in

the coming months. After the speedy progress at LCLS at SLAC I very much hope that the politicians and administrators from those countries where decisions are pending will quickly declare their definite participation.

There is also news from CFEL. Planning for the new building just in front of the PETRA III experimental hall is well advanced. More than 80 percent of the contracts have already been put to tender and construction will start soon.

Last year, many DESY staff members invested a great deal of their time to write our programmes for the Helmholtz evaluation.

This year, the time investment was more or less the same, especially for the PNI programme including the preparation of the site visit at DESY and a three-day evaluation. Let me take this opportunity to say thank you to all those involved.

Yours,
Edgar Weckert

to do their experiments, they want to be able to switch the X-ray beam on and off like a lamp – and we must guarantee its reliability. We are competing with other sources in Europe and worldwide.”

In December 2008, testing of all systems began in the tunnel. The beamline magnets were checked for the correct polarity and for short circuits; the vacuum pumps were tested, together with the new interlock system for personal safety, the RF system and much more. At the end, the go-ahead for beam operation was given.

The most difficult passage for the accelerator's restart were the 300 metres in the new experiment hall, the location for the undulators with their light-producing magnet arrays that are to be positioned very close to the beam. Thus, there were many bottlenecks of only a few millimetres height in the beam pipe, through which the beam must be run.

Like test pilots, the accelerator experts will become familiar with the new PETRA

by thoroughly exploring the limits during beam operation: how much deflection of the beam will be tolerable in the vacuum pipe without danger of scratching the wall? How do particles react to different control pulses from the control room? At the same time, the particle beam is used to enhance the vacuum in the accelerator. The beam pipe is heated with the synchrotron light emitted by the positrons. This way, the vacuum pumps extract the remaining gas particles in

the ring more easily and the pressure is reduced.

The first accelerator test runs are still carried out without some components necessary in future operation. The undulators and the damping wigglers to reduce the oscillation in particle bunches are still wide open. However, in some weeks the first X-ray light is planned to be generated. Three of the 14 undulators are already at their right places. Their magnet halves must only be closed to bring the positrons on a zigzag course. The first test experiments with X-ray light are scheduled for this summer. In short shut down periods, the remaining undulators will be installed in the accelerator and the wigglers will be closed. (tz)



Toasts to a successful restart.

INFO

<http://petra3.desy.de>

Perspectives

The first "Science Photo Walk" at DESY

Camp beds for the night shift at FLASH, technical details in the cryogenic hall, researchers' hands working on sample preparation – on 28 March, 100 amateur photographers took the opportunity to focus their cameras on "live research" at the first "Science Photo Walk", invited by DESY and the GKSS Research Centre. The interest to join this event exceeded all expectations. Since not all applicants could take part there are plans to repeat the photo walk.

As of 7 May, the best "perspectives" chosen from more than 2500 photos will be presented in the "Levantehaus", Mönckebergstrasse: a collection of fascinating insights into the researchers' world, from many different viewing angles.

Would you like to see the photos on the internet? Click here: www.desy.de/photowalk. (LW)

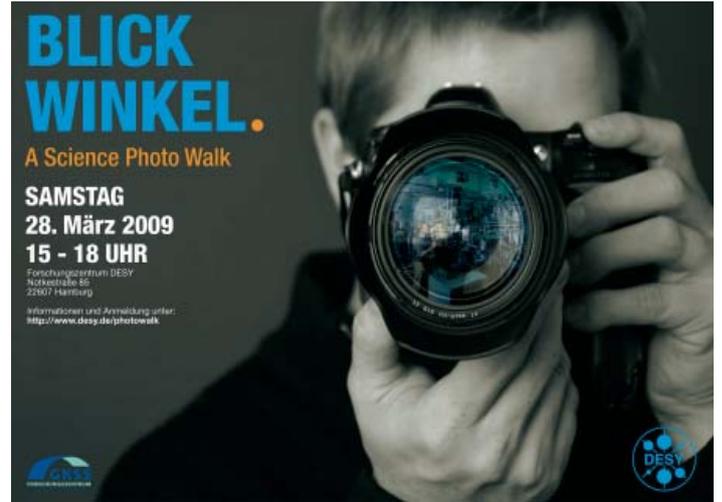


Photo: Dmitriy Leitshchuk

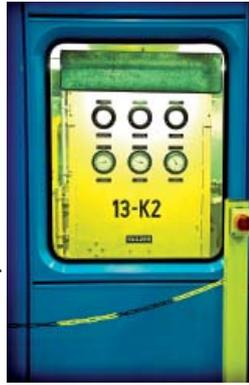


Photo: Christian Mroczek



Photo: Susanne Nüsch



Photo: Thomas Heuer



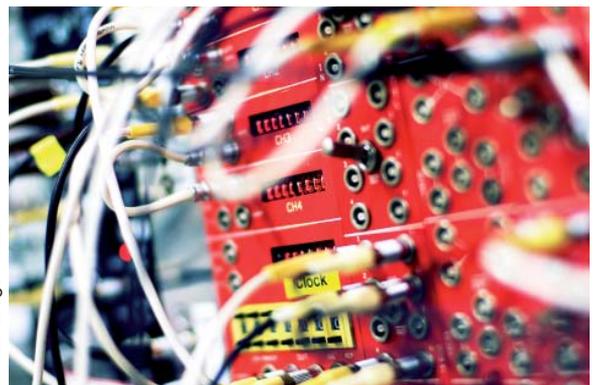
Photo: Rupert Fey



Photo: Sven Malke



Photo: Gregor Huber





A quick view into the experiment hall of PETRA III, taken during the Science Photo Walk.
(Photo: Sven Malke)

WHAT'S ON AT DESY

May

- 4-29** Physics at the Terascale (www.terascale.de/psri09)
Institute on Parton Shower and Resummation
DESY, Hamburg
- 5** 67th Physics Research Committee Meeting
9 h, DESY, Hamburg, auditorium
- 7** Science Café DESY (<http://sciencecafe.desy.de>)
DESYs Aufbruch in die Zukunft in den 60er und 70er Jahren
Eckhard Weiß, 17 h, DESY Bistro
- 7-28** Exhibition (www.desy.de/photowalk)
Photographs of the Science Photo Walk 2009 at DESY
Levantehaus, Mönckebergstraße 7, Hamburg
- 8** DESY Choir Concert
Drunken Sailing im Gummiboot
20 h, DESY, Hamburg, canteen annex
- 8-10** Hamburg Harbour Birthday (www.weltmaschine.de)
Von Hei-di bis High-Tech; Exhibition "Weltmaschine"
Kehrwiederspitz, Hamburg Harbour
- 11-15** PHOTON 2009 (<http://photon09.desy.de>)
International Conference on the Structure and Interactions of the Photon
DESY, Hamburg
- 14** Science Café DESY (<http://sciencecafe.desy.de>)
Mythos, Wissenschaft und wissenschaftliche Mythen
Ilja Bohnet, 17 h, DESY Bistro
- 18** Public Lecture
Titanic – Mehr als nur ein Untergang
Metin Tolan, 19:30 h, DESY, Hamburg, auditorium
- 19** Promotionspreis des Vereins der Freunde und Förderer des DESY
10 h, DESY, Hamburg, auditorium
- 28** Anniversary
5 years DESY School Lab in Zeuthen
18 h, DESY, Zeuthen, Foyer
- 28** Science Café DESY (<http://sciencecafe.desy.de>)
ZEUS, ATLAS oder lieber BaBar – Große Forschungskollaborationen heute
Tobias Haas, 17 h, DESY Cafeteria

June

- 4** Science Café DESY (<http://sciencecafe.desy.de>)
Hunderte von Planeten um fremde Sonnen – Uns noch unbekannte Welten
Waldemar Tausendfreund, 17 h, DESY Bistro
- 10** Public Lecture
Weltbilder auf dem Prüfstand – DESY und die Zukunft der Teilchenphysik
Karsten Büßer, 19 h, DESY, Hamburg, auditorium
- 13** Lange Nacht der Wissenschaften, Berlin and Potsdam
HU Berlin, Adlershof
www.langenachtderwissenschaften.de
- 29-3 July** Physics at the Terascale (www.terascale.de)
Workshop on Detector Understanding with First LHC Data
DESY, Hamburg

5 July: DESY's Open Day (Zeuthen) +++ 6-10 Juli: PASCOS 2009 +++ 7 July: Hertz Lecture 2009 +++ 17-22 August: Lepton-Photon 09 +++ 20-23 September: GISAS 2009 +++ 7 November: DESY's Open Day (Hamburg)

Prevention is better than cure

Safety at DESY – Part 2

by Andreas Hoppe

Almost everybody is familiar with this situation: you just want to fetch something quickly before lunchtime... but the ladder is out of reach. Who cares - a chair will also do! Do I need to take out the fuse? Well, not for this quick electrical repair job. You do not really have the possible consequences in mind or you just believe that nothing will happen.

It seems that this attitude is more common at work than in other situations, where you definitely consider first what could happen: if you want to cross a street, you check first whether it is safe to do so. You stop at the roadside, look left and right and estimate the possible hazards. This is a natural form of self-protection to avoid to be run over.



Adopt this natural form of self-protection at work! Before starting, take your time and think about what kind of work you have to do and what kind of possible hazards may occur. If necessary, take the appropriate measures to protect yourself from injuries. This way, everyone takes care personally for a safe working environment. The French poet Moliere (1622-73) said: "It is not only for what we do that we are held responsible, but also for what we do not do." At work, you should always take your time to evaluate all possible hazards. Never forget to protect yourself adequately. Thus, you do much for your personal safety.

By the way: structured risk assessment for employers is mandatory by law. Currently these risk assessments are being brought up to date at DESY.

Ideal training conditions

New individual safety training system at HASYLAB

Since February, every photon science user gets individual safety information that he or she needs for work in offices, laboratories and experiment halls. The procedure is simple: you log into a computer terminal with your password for the DESY Online Office for Research with Photons DOOR, start the computer-based safety training and choose a language, German or English. Then you select the appropriate training module, and off you go! On clearly structured pages with many pictures you are made familiar with all kinds of hazards and safety measures, from a basic briefing on how to move safely on the DESY campus to the handling of cryogenic gases, strong magnetic fields or radioactive materials. At the end of each module you are asked a few questions. When all answers are answered correctly, you can print out a training certificate. This system ensures that employees and users undergo the appropriate work safety training before getting access to the corresponding laboratories. About 500 users have already taken part in this training system.

An online version of the training sys-

tem will be available in May. With this, it is possible for users from all over the world to prepare themselves at home for work at DESY, thus being able to start research immediately after arrival.

Experts are very interested in the new system. Recently, members of the in-



surance company *Unfallkasse Nord* came to DESY for information about the system and agreed to give financial support to the project. The users too are enthusiastic about this system. The cooperating firm ATO interactive competed for the German occupational safety award 2009. (tz)

European XFEL: Vibrations from the construction site

Where heavy construction equipment is in action, the ground may occasionally tremble. Usually, nobody is shaken by this. But when worried enquiries about the cause and duration of the vibrations pour in from the refrigeration hall, the PETRA III coordinator or the microelectronics lab, construction engineers sit up and take notice. Could different equipment be used, or the groups somehow be warned in advance? What is causing the vibrations?

Meanwhile, a "short communications link" has been set up to quickly give notice of vibration-causing work. The daily routine on a large construction site however rarely allows the exact timing of such works several days in advance.

The vibrations have various origins. Old war ammunition could still be found until the end of the year, and in some cases has to be detonated on the spot. Soil compaction is carried out using vibratory plates. The works on the diaphragm walls (see DESY inForm 04/2009) also cause vibrations: a boulder has to be destroyed during the excavation of the "trenches". Excess concrete on a wall segment must be cut off with a heavy chisel to realise a clean joint between two segments. When the building pit walls will be finished, their upper rim will have to be smoothed. Chisel work may also be necessary for the underwater concrete bottom plate. These works will continue until mid-2010. (pf)

Infrafit phase 3

The DESY infrastructure evaluation continues

Since September 2008, a team of DESY staff members have been working in the “Infrafit” project, designed to make DESY’s infrastructure in Hamburg and Zeuthen “fit” for future tasks and to get the optimum results with the limited DESY resources.

The project is scrutinising sectors of the administration, information technology and the technical infrastructure like workshops and civil engineering.

The first phase was the determination of the status quo. Internal service providers and their customers were interviewed to get information on services and a customer review. The second phase was the analysis of the survey results. Potential problems and their causes were discussed in workshops with experts from other Helmholtz centres and from the Paul Scherrer Institute (PSI) in Villigen (Switzerland).

The third phase of Infrafit begins now: until the end of May, proposals will be presented for the optimisation of working methods and increase of efficiency. Which, for example, is the best provider-customer relationship in the construction sector or in the process of recruiting?

After being discussed in the DESY directorate, the developed improvement suggestions are to be evaluated by an external group of experts headed by Professor Martin Jermann from PSI. (tz)

INFO

<http://infrafit.desy.de> (in German)

Spotting G

Scientists measure the gravitational constant in PETRA hall



Bowling for research: Hinrich Meyer’s experiment is behind the Styrofoam wall.

In a grassroots experiment in the former hall of the JADE detector, four retired professors, one PhD student and one computing expert from DESY are measuring the gravitational constant G to some of the finest precision ever.

The set-up is rather unusual: you climb over the PETRA ring into an area, some eight by five by five metres tall, that is totally clad in Styrofoam. “To keep the temperature constant,” explains Hinrich Meyer, father of the GRAVI experiment. At its heart is a pendulum consisting of two (hollow) mirrors, hidden in a vacuum vessel inside a tower of Styrofoam. The way these mirrors move in relation to each other, detected by a frequency change in the radiofrequency field fed into the set-up, tells the six experiment-

ers exactly how they were influenced by outside forces. The sensitivity is so high that the experiments can see any earthquake with a magnitude of 6.2 or higher, and the scientists have to make their calculations with the tides of the North Sea in mind.

The experiment was born in Wuppertal and moved to Hamburg in 2002, when Meyer retired. “I brought all materials with me,” he says, “I only asked for a little space at DESY to set it up. The advantage of the hall here at DESY is its ground stability and constant temperature.” The “material” consists of the two mirrors hanging from a 2.8-metre pendulum, two granite blocks with wooden “bowling alleys“, several precision-made spheres of different materials and masses, a high-frequency generator and a computer. All parameters are fed into the system with ultra-high precision. Then the

“bowling” starts: Meyer rolls two brass spheres into two nooks on either side of the experiment tower. According to Newton and his law of gravitation, every mass attracts every other mass – so the mass of the 20-kilo sphere will attract the pendulum mirrors, if only minutely, thus changing the distance of the mirrors to each other and changing the frequency. As all other parameters are known, this change lets the team calculate the gravitational constant G to up to four decimal places. $6,6742 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$ is “among the three best measurements in the world,” Meyer says proudly. (baw)

Research Expedition

The Science Year 2009 is themed "Research Expedition Germany". For the first time, a science train will tour through Germany on a "Future Expedition" mission, with twelve themed carriages presenting how science and technology could change our lives in the coming ten years. Many Helmholtz centres are contributing with exhibits, pictures and explanatory texts.

Another novelty is an expedition passport to motivate children to visit some of the research stations to get the passport stamped. In many Helmholtz centres this goes along with an Open Day. Moreover, the Helmholtz Association also provides virtual passport stations on the internet: at www.helmholtz-campus.de, kids and youngsters can download games about science. When the game is successfully completed, the Helmholtz office promises to send a stamp sticker for the expedition passport. Those who collect at least five passport stamps take part in a raffle and can win a participation in a genuine research expedition.

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



Particle physicists for one day at the Masterclasses in Hamburg and Zeuthen.

School meets science

Particle physicist for one day at the Masterclasses

The fifth International Particle Physics Masterclasses took place around the world from 16 March to 3 April, with a record participation of more than 6000 high school students. On 24 March, both DESY sites also participated in this event – in Zeuthen jointly with the Humboldt University in Berlin Adlershof. For one day, school students had the opportunity at the research centres to gain insight into particle physics. After some introductory lectures, they evaluated data which had been recorded at detectors at CERN in Geneva.

In a video conference at the end of the day, the young researchers compared their results worldwide – this way of discussing is important for particle physicists in an international collaboration. The contact with current research in an authentic environment and the possibil-

ity to discuss with scientists are quite fascinating for young people. Sandra Grünewald, who participated in the first Masterclasses in 2005, is now studying physics at the Humboldt University. The Masterclasses influenced her decision to study physics, the 21-year-old explains. "Since 11th grade I wanted to study physics and I hope that some day I will become a particle physicist." There is no better motivation for research centres to continue organising these events for school students. (ub)

INFO

www.physicsmasterclasses.org

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More service, more mobility

You will be able to book some of the vehicles from several DESY groups directly through a central website. By this means, the campus management V1 offers all DESY groups increased mobility on the DESY premises in Ham-

burg. This system will be handled similarly to seminar room booking, with the possibility to check whether vehicles are available and at which DESY group and site they are to be picked up.