



CERN Bulletin

Nos 05 & 06 – 2 & 9 February 2011

LHC to run in 2012 an interview with Rolf Heuer and Steve Myers



Bulletin: First of all, what's the big news from Chamonix this week?

Heuer: Well, the worst kept secret in particle physics has been confirmed: the LHC will run in 2012. We've been fairly confident for some time now that postponing the long shutdown by a year was the right thing to do, but we couldn't confirm it until after everything had been carefully considered in Chamonix this week.

Bulletin: So what was the main argument for postponing the long shutdown?

Heuer: With the LHC running so well in 2010, and further improvements in performance expected to come, there's a real

chance that exciting new physics may be within our grasp by the end of the year. If nature is kind to us and the Higgs particle has a mass within the current range of the LHC, we could have enough data in 2011 to see hints, but not enough for a discovery. The same is true for the lightest supersymmetric particle: if it is within reach of the LHC's current energy reach, the data we expect to collect in 2011 will put it almost within our grasp. Running through 2012 will give us the data needed to turn such hints into discovery, or to fully explore this energy range if there's nothing to be discovered before we move to higher energy.

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Bulletin: The other thing our readers will want to know is what energy we'll be running at this year and next.

Myers: We decided to stay at 3.5 TeV. That's a simple statement, but a lot of hard thought went in to it. Essentially, the reason boils down to this: increasing by 0.5 TeV would marginally increase our sensitivity to heavier new particles, and significantly increase the rate we're able to collect data for lighter ones. However, a careful objective analysis of the situation showed that the risk is too high for the expected increase in sensitivity.

Bulletin: Is there any other way of increasing the rate of data collection?

(Continued on page 2)

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LHC to run in 2012 - an interview with Rolf Heuer and Steve Myers

(Continued from page 1)

Myers: That's certainly what we hope to do. The experience we gained running the machine last year suggests that we should be able to run with three times more bunches of protons in the beam, and further squeeze the beam by a factor of more than two at the collision points. Improvements

like these should allow us to increase the intensity by a factor of three at least.

Bulletin: Any final words?

Heuer: Well, with the first beams of 2011 due to be circulating by the 21st of February

and with the LHC running through to mid-December, I think we're in for a very exciting year of physics.

Myers: Anyone who wants to know the full details can come to the post-Chamonix briefing in Building 222 on 9 February.

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LHC Report: The shutdown work is nearing completion

The technical teams are putting the finishing touches to the work planned for the winter shutdown. At the Linac2, the PS Booster and the PS, work will be completed next week and hardware tests will be carried out soon after. POPS, the new powering system for the PS, will be commissioned for the first time in the coming days after the necessary preliminary tests have been carried out.

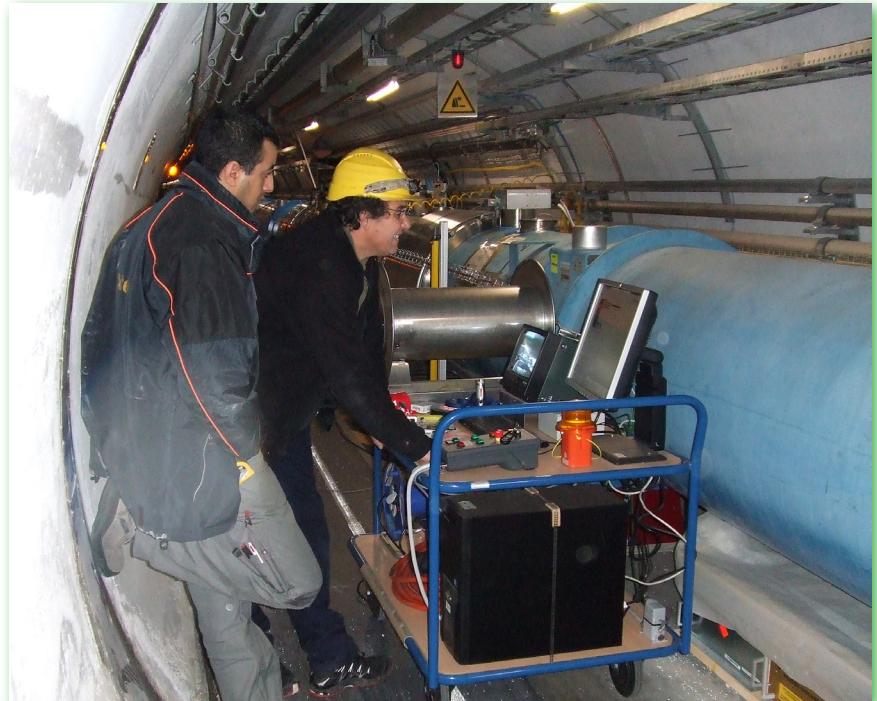
At the SPS, various magnets have been replaced over recent weeks and the performance tests on the main power supply and other hardware tests will be able to start shortly. After that, the machine will be ready for operation with beams again.

The extensive activities in the LHC are progressing very well: maintenance work and inspections essential for reliable operation, on top of the consolidation and upgrade activities that got under way in previous weeks and are needed to improve the performance of the machine, have almost been completed.

As planned, all the activities in the tunnel will be finished by 4 February. 75% of the machine is now full of liquid helium, and the first powering tests will start this week in order to qualify the electrical circuits. For personnel safety reasons, these tests will be initially performed during night shifts.

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The work planned for the LHC injector chain during the winter shutdown is nearing completion. The PS Booster (PSB) and PS will be closed to access next week, and the control of machine access will be transferred to the CERN Control Centre in preparation for the resumption of machine operation. Hardware tests are being performed in all the machines.



Tests are under way in the LHC tunnel.

Far from a finale for Fermilab physics

"We plan to extract every bit of physics we can from this final Tevatron running period," Fermilab Director Pier Oddone wrote in a column for *Fermilab Today*. "The Tevatron has already exceeded all expectations and, given the large data sets, we will continue to find new results and discoveries in the Tevatron data for years to come."

This spring, particle astrophysicists at Fermilab will ship to Chile components of a 570-megapixel camera scientists will install on the Blanco telescope as part of the Dark Energy Survey. The camera will study light from distant galaxies to examine the accelerating expansion of the Universe.

Scientists on the Cryogenic Dark Matter Search experiment this year will enlarge their detector, which saw a tantalizing but inconclusive hint of dark matter particles in 2009. Fellow dark matter hunters in the COUPP collaboration will improve their bubble-chamber-style detectors and move them to a well-shielded underground area at Canada's SNOLAB. Fermilab astrophysicists will study the effects of collisions of high-energy particles with the Earth's

The closure of Fermilab's Tevatron this autumn will mark the end of an historic era in particle physics. But as physicists continue to comb through data from the Tevatron detectors, the laboratory will continue to pursue a greater understanding of the make-up of the Universe on multiple experimental frontiers.

atmosphere at the Pierre Auger Cosmic-Ray Observatory.

Scientists on Fermilab's MINOS, MiniBooNE and Minerva collaborations will continue to tease out properties of the elusive neutrino particle. In 2013 scientists plan to switch on the laboratory's largest neutrino detector yet. The 14,000-ton NOvA detector will search for neutrino oscillations in a facility currently under construction in northern Minnesota. Scientists are in the stages of planning two additional neutrino experiments, MicroBooNE and the Long-Baseline Neutrino Experiment, and the Mu2e muon-to-electron conversion experiment.

As the Tevatron's 26 years of operation come to a close, Fermilab will continue to pursue physics at the high-energy frontier through its collaboration with CERN.

"Fermilab is and will remain a very strong part of the LHC programme," Oddone wrote.

In addition, the US Department of Energy's Office of Science supports Fermilab's plan to develop Project X, a proposed high-intensity proton accelerator that would work with parts of the existing accelerator complex to provide beam to muon, kaon and nuclear physics experiments. Project X would use superconducting radio-frequency cavities, a technology Fermilab scientists and their international partners hope to use in future accelerators to succeed the LHC and the Tevatron.

Kathryn Grim



In August 2010, construction crews began installing the roof over the enclosure that will house the NOvA detector. Photo by Dan Traska of Einarson Flying Service.

ALICE on the move

Paolo Giubellino, the new ALICE spokesperson, talks with enthusiasm about what has already been done by the ALICE collaboration and what is yet to come. He has recently taken over from Jurgen Schukraft, who led the collaboration from its earliest beginnings. "We had a very exciting first year of operation, with many interesting results coming up in a very short space of time," says Giubellino, a heavy-ion-physics expert from the Italian National Institute for Nuclear Physics (see box for details). "The Christmas technical stop wasn't a break for us as we upgraded the detector, completing the installation of the electromagnetic calorimeter (EMCal), which will extend ALICE's capability to study the properties of the quark gluon plasma through its interaction with particle jets. In addition, we added three modules to the Transition Radiation Detector (TRD), thereby increasing its acceptance by 50%." The TRD installation will be completed during the next shutdown, while the latest addition to the ALICE detector, the DCAL, will have to wait for the long LHC shut down.

In parallel with the hardware upgrade, the ALICE collaboration – more than 1000 scientists from 116 institutes in 33 countries – is working on the analysis of data taken during the one-month ion run in November last year. "In the field of ion physics the results from the experiments drive the research and often come before the theory. Before operating the LHC, nobody could really say what characteristics strongly interacting

A new management, new modules for its sub-detectors and an increased capacity to probe the properties of the quark-gluon plasma. The new year bodes well for ALICE and ion physics as quarks and gluons prepare to unveil their most profound mysteries.

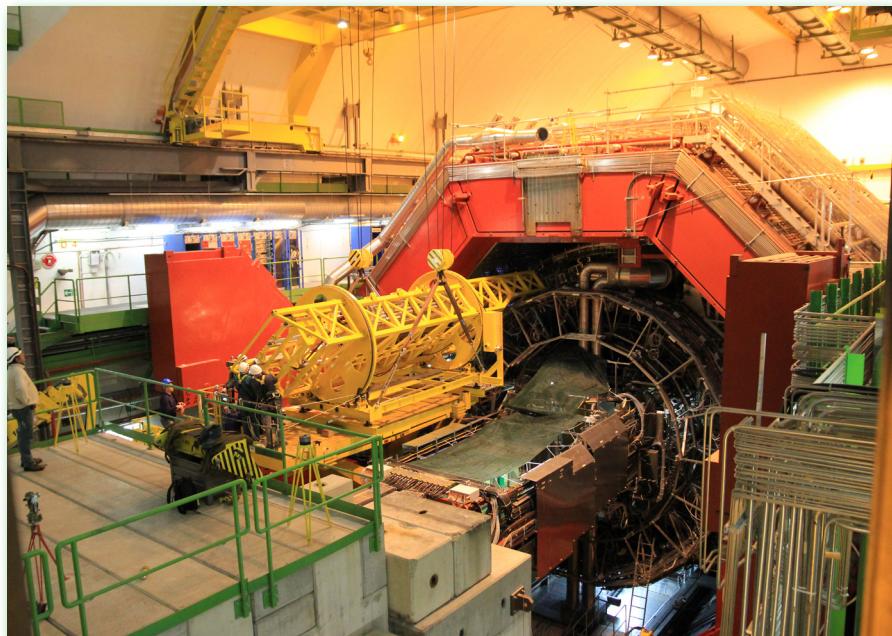
matter would have at such high energies. Already with the first measurements we have established that it still exhibits behaviour close to that of an ideal liquid and that the energy loss of fast partons, the "jet quenching", is surprisingly large. We have also measured the energy density reached in the collisions, which is about three times higher than at RHIC, while the interaction volume is twice as large. Our data analysis went very fast because the LHC is a very powerful instrument: even with the data taken at low luminosity in 2010, the reach in many variables already exceeds that of RHIC. Another big advantage of ALICE with respect to previous heavy ion experiments is its very high accuracy in the identification of the particles produced by the collisions," explains Giubellino.

So, while busy analyzing last year's data, ALICE is also getting ready for an exciting new year. The internal organisation of the collaboration very naturally moved from 'primacy' of the technology to 'primacy' of the physics. As of 1st January 2011, not only does ALICE have a new spokesperson and new deputy spokespersons but it also has new chairs of its Collaboration Board, the Conference Committee and the Editorial Board, new coordinators for its detectors (Muon Detector, Time Projection Chamber and Inner Tracking System), a new Upgrade Coordinator and new conveners for some of

its physics groups. "Thanks to the great job done by the past management, ALICE is in very good shape. The data analysis phase will automatically increase the need for closer collaboration among all the members and the fact that I come from an external institute will hopefully be of help in meeting this requirement. ALICE is ready to enter a new, very dynamic phase of its history," concludes Giubellino.

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Since completing his studies at Torino University and the University of California, Santa Cruz, Paolo Giubellino has dedicated most of his scientific career to the physics of high-energy heavy-ion collisions, first in HELIOS, then in NA50 and finally in ALICE. He was involved in ALICE right from the very first feasibility studies, and later took on a number of responsibilities within the experiment, including as project leader for the inner tracking system, chair of the Conference Committee, Upgrade Coordinator and, for the past six years, deputy spokesperson. He has been active in the development of silicon detectors and is a member of the ICFA Instrumentation Panel. He has served in many scientific committees and panels and is currently chair of the G-PAC at GSI and a member of the scientific committee of IN2P3. He also chaired the working group entrusted with writing the "Phase Transitions" chapter of the NUPECC long-term plan.



Installation of one of the new EMCal modules in the detector.

Powering CERN and the LHC

CERN's annual electricity consumption is around one terawatt hour (TWh), which roughly corresponds to a fifth of the consumption of the Canton of Geneva. However, during periods when all the machines are operating at the same time,

our demand can reach the equivalent of a third of Geneva's total consumption. While the grid of the Geneva public utility company SIG (Services Industriels de Genève) covers distances of around 50 km, the CERN network is concentrated into a much smaller area. "Our network is very dense and complex," says François Duval, head of the EN/EL group, which is responsible for CERN's electrical installations. "What's more, it has evolved to meet CERN's growing energy needs over the years without any real overall plan. With 1,000 high-voltage circuit-breakers (about twice the number of the SIG network), it's not necessarily the optimum set-up you'd design and build today."

A complex network, high-power installations and thousands of users requiring a high level of availability all combine to present a significant challenge for the 75 members of the EN/EL group, who are continually busy planning and performing maintenance, consolidation and modernisation work. "We take advantage of every technical stop to replace the UPS batteries which kick in when the main power supply fails and provide emergency power for at

CERN's electricity network is denser than that of the Canton of Geneva, is powered by two different national grids and has to provide users with an availability rate as close to 100% as possible. To ensure the smooth running of the machines throughout the period of LHC physics operation, the teams from the EN Department are implementing a continuous programme of consolidation and modernisation on all the Laboratory's sites, but the biggest projects will have to wait until the long technical shutdown scheduled for 2013.

least a few minutes," explains Duval. "Over a long period, by the end of 2011, we will have replaced all the distribution cables between the different points of the SPS."

New cables can be buried without disturbing the operation of the machines but other work will have to wait until the long technical shutdown scheduled for 2013. "We are preparing for 2013 with plans for the renovation of several interconnecting substations, including a complete overhaul of the main one on the Meyrin site, which dates back to 1965," explains Duval. "In addition, the relocation of electronic equipment to prevent radiation damage will involve significant recabling work in several sectors of the LHC."

Modernisation of the electrical installations is needed to ensure the continued high performance of the whole network but also to improve the way the Laboratory manages energy and make it more ecological. "Various projects are currently under study at CERN, such as recovering the energy released into the air by the accelerators' cooling towers. For our part, we only install

transformers with high-tech materials nowadays, in order to keep energy losses to the minimum," concludes Duval.

For those who still remember the incident of the bird that was thought to have caused a major power cut by dropping a piece of bread on a sub-station, François Duval wishes to set the record straight: "The episode with the bird and other incidents of that kind have very little effect on the network and never compromise CERN's power supply." End of story!

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Did you know?

CERN's electricity network

CERN is supplied by RTE, the French electricity company, via a dedicated 400 000 volt line. If needed, CERN can request SIG to provide an emergency supply of 60 MW, which is enough to run the Laboratory without its machines.

The LHC's electricity consumption represents approximately 45% of CERN's total consumption, and the experiments account for a further 15%. The rest is used to power the smaller accelerators and experiments and the various buildings.

More detailed figures are given below:

CERN's total annual electricity consumption is 1TWh -1,000,000 MWh or 1,000,000,000 kWh.

- * 40 to 45% is for the LHC (including 12 to 14% for cryogenics and 7 to 9% for cooling and ventilation)
- * 10 to 12% is for the LHC experiments (ATLAS, CMS, ALICE and LHCb)
- * 28 to 32% is for the SPS (including 6 to 7% for the North Area experiments)
- * 2 to 3 % is for the PS + Booster + Linac
- * 5 to 6% is for the Computer Centre (B513)
- * 7 to 9 % is for offices and restaurants, etc.



An electrical installation on the CERN site.

The new "Jardin de Capucine" crèche brings a breath of fresh air for young CERN parents

In 2008, the "Jardin de Zébulon", a private bilingual crèche for children aged 1 to 4, was opened by Ariane Boucheron at the Technoparc industrial estate in Saint-Genis Pouilly (France). The following year, the number of places was increased from 20 to 37 to meet demand. The "Jardin de Zébulon" has taken in a number of children of CERN personnel ever since it was created.

With no let-up in the demand for new crèche places, Ariane Boucher is currently engaged in the construction of a new centre, the "Jardin de Capucine", next-door to the existing crèche. Forty places at the new crèche will be reserved for people working at CERN. "This new agreement has been drawn up in response to a long-standing need and will help members of the CERN personnel to reconcile professional with family life," says Rolf Heuer. "We plan to reserve a number of places for associate members of the personnel, who sometimes come to CERN for short periods and therefore have specific needs." Ideally located between CERN's two main sites in Meyrin and Prévessin, the two private crèches are determined to meet the increased demands of parents in terms of quality of service. "The key to our success lies in the quality of care we offer the children, as well as the flexibility and availability we offer in order to meet parents' requirements," stresses Ariane Boucher.

On 19 January 2011, CERN's Director-General, Rolf Heuer, signed an agreement with the company "Le Jardin de Zébulon" for the provision of 40 places at the "Jardin de Capucine", a new private crèche due to open this autumn.

How the crèche will operate

The "Jardin de Capucine" will accommodate children aged **4 months to 4 years**. The crèche will be open all year round, with the exception of French public holidays and CERN's two-week end-of-year closure.

It will open from 7.30 a.m. to 7.30 p.m. Mondays to Fridays.

Children can be enrolled for regular attendance of between 1 and 5 days per week. Enrolment must be on the basis of a minimum day of 9.30 a.m. to 3.00 p.m.

Children will be supervised by a 12-person educational team, who will be managed by the head of the crèche and assisted by a qualified nurse. Meals will be prepared by a professional cook on the premises. The crèche will be subject to the same requirements as public establishments and will not open until it has received all the necessary authorisations.

The crèche's educational philosophy will be geared towards development through discovery and its activities will be bilingual (English and French).



CERN Director-General, Rolf Heuer, and Ariane Boucher sign the agreement for the new crèche.

Le Jardin de Capucine

Crèche et halte garderie privée Bilingue Français et Anglais



Un nouvel art de vivre original pour vos enfants âgés de 4 mois à 4 ans en accueil régulier ou occasionnel

Réservez aux membres du CERN

"Ouverture au quatrième trimestre 2011"

Technoparc Saint-Genis-Pouilly
60 Rue Clément Ader
01630 St-Genis-Pouilly
Tél: 06 45 63 72 74

Site Internet
www.lejardindecapucine.com

Allocation of places, enrolment and tariffs

Places will be open to the children of **all categories of members of the CERN personnel**, irrespective of their place of residence (France or Switzerland).

In allocating places, priority will be given to parents who already have a child in the crèche, to single-parent families, to families where both parents work and to associated members of the personnel; in other cases, places will be attributed on a first-come, first-served basis.

Enrolment is **now open**. The enrolment formalities must be completed with the crèche manager directly.

The tariffs, which cover day care, meals, snacks and nappies, vary according to the age of the child:

- * For children up to 12 months: 1550 euros per month for full-time care or 77 euros per day,
- For children aged between 1 and 4 years: 1450 euros per month or 72 euros per day.

Le Jardin de Capucine

Mrs Ariane BOUCHER

60 rue Clément Ader

Tel ++33 (0)6 45 63 72 74

info@lejardindecapucine.com

www.lejardindecapucine.com

Further information, in particular details of the opening date, will be published on the following website:

<https://cern.ch/hr-services/Ben/Social/Capucine.asp>

HR Department

Best value for money

Until 2008 every contract at CERN was adjudicated on a "lowest compliant bid" basis, i.e. to the firm submitting the cheapest technically compliant tender. Since then, however, the CERN Financial Rules, including the Procurement Rules, have undergone an in-depth revision, and the 'best value for money' adjudication basis has been introduced.

According to the new adjudication method, service contracts, which include the provision of contractors' personnel working on the CERN site, are awarded to the firm offering the given service with the best quality-price ratio. The procedure is designed to guarantee a better quality of the services offered to CERN. "In the adjudication process, the price usually accounts for 70%", says Cristina Lara, Head of the Industrial Services and General Infrastructure section. "The more complex the technical requirement, the greater the weighting of the quality score can be." In general, the criteria and the score they are given in assessing the quality

Last week, the Industrial Services and General Infrastructure section of the Procurement and Industrial Services group received dozens of bids in a single day! The bids were submitted in response to four invitations to tender to be adjudicated on a 'best value for money' basis. This adjudication method, introduced at CERN in 2008, ensures that quality is given as much priority as cost containment in the process of awarding industrial services contracts.

are defined by the Department requesting the service, in collaboration with the Procurement and Industrial Services group, before the invitation to tender is sent out.

The 'best value for money' adjudication method enables bidders to offer added value and this improves the quality of the service purchased by CERN. On the CERN side, the adjudication process represents an increased challenge for both the Procurement and Industrial Services group and the Department concerned, which remains in charge of all the technical aspects of the invitation to tender. "The number of documents we prepare for the invitation to tender has significantly increased and the content has become more complex", explains Cristina Lara. "In addition, the bids we receive contain such an important

amount of information and documents that their analysis needs to be spread over several days. With the old criteria, we used to evaluate only the lowest bids among those that were technically compliant, while now all technical bids have to be evaluated".

The volume and complexity of the daily work has increased, but the results are definitively encouraging for the members of the Industrial Services team: "The quality of services performed by contractors on the CERN site is demonstrably higher than before 2008," confirms Cristina Lara. "Firms are encouraged to consider the technical aspects of the future contract as much as the price in their bid. In CERN's interests, firms have been enabled to change their approach, which used to be purely financial, and to integrate qualitative aspects."

The next step for the Procurement and Industrial Services group will be to develop "e-tendering", an improved, modern and safe method for firms to submit their bids electronically. The photograph illustrating this article is striking but it might happily be the last one picturing heavy boxes full of documents to be sorted through!

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Members of the Industrial Services and General Infrastructure section with the dozens of bids received in a single day.

CERN Courier has a new look

Originally conceived as an internal newsletter, the CERN Courier first appeared

in August 1959 in an edition of 8 pages with a print run of 1000. From the start it generated interest outside CERN, with its articles not only on CERN but also about particle physics around the world. The number of copies doubled in the first 6 months in response to the external demand. As CERN prepares to welcome new Member States in the coming years, it's even more fitting that the magazine should continue to address a global readership, now totalling some 25,000 and extending throughout the many countries that have an interest in particle physics.

It's therefore important that the CERN Courier should remain appealing to this extensive audience, both visually and in content. The previous design dated back to 1998 when IOP Publishing took over the production work on the magazine and introduced a more dynamic layout with colour throughout. This included distinct pages for News and Features, with regular sections, such as Astrowatch and Bookshelf, which have since grown with the addition of Sciencewatch, Archive and the back page Viewpoint or Inside Story.

The new design by Andrew Giaqunito and Jesse Karjalainen at IOP Publishing retains this structure but brings a more contemporary, cleaner look. At the same time it retains the authoritative style appropriate to a magazine that will continue to serve the worldwide particle-physics community in the future, in particular as CERN extends geographically.

We hope that readers enjoy the new look!

During more than 50 years of existence, CERN's well-known magazine has changed several times in appearance. Now, for the first time since the 1990s, it has a new look for the new decade.



Christine Sutton

The new cover of the CERN Courier.

Young scientists in the making

Imagine a white box that rattles and gives off a strange smell when you shake it... How would you go about finding out what's inside it without opening it? Thirty primary-school teachers from the Pays de Gex

and the Canton of Geneva tried out this exercise on Wednesday 26 January 2011 at the site of the LHCb experiment for the launch of the "Dans la peau d'un chercheur" teaching project. This follows on from the "Draw me a physicist" project run last year in collaboration with local primary schools.

The aim of "Be a scientist for a day" is to acquaint children aged 9 to 12 with the experimental method. It is co-sponsored by Geneva University's "PhysiScope" group, the local education authorities of the Pays de Gex (Inspection de l'éducation nationale) and Geneva (Service de la coordination pédagogique de l'enseignement primaire) and the Faculty of Science and Education. The 670 pupils taking part will need to use an investigative method to unlock the secret of the white box, just like CERN scientists attempting to detect particles which cannot be seen with the naked eye.

The project will run from February to June. The first step towards cracking the riddle will involve elaborating an experimental method, where the pupils will make a series of assumptions and carry out various experiments. After that the schools will interact

Some 700 local primary-school children will be trying out the scientific method for themselves from February to June. After "Draw me a physicist", the latest project "Dans la peau d'un chercheur" ("Be a scientist for a day") is designed to give children a taste of what it's like to be a scientist. Both schemes are the fruit of a partnership between CERN, "PhysiScope" (University of Geneva) and the local education authorities of the Pays de Gex and the Canton of Geneva.

over a network and compare their ideas, share their thoughts, and send questions to CERN scientists via a dedicated website. In April and May, the kids will visit a CERN experiment or take part in a PhysiScope event, a great opportunity to grill the physicists on their own experimental methods. Finally, these budding young scientists will present an official lecture of their own, just like real scientists.

"It's an exciting new venture, which has sprung out of the rich partnership developed between the education authorities of Geneva and the Pays de Gex, and Geneva University's "PhysiScope" group," explains Corinne Pralavorio, who is responsible for CERN's communications with its local community. "It's great that we've managed to integrate the project into the school curriculum this year and that the children will be cooperating across the French-Swiss border."

For more information, visit the website at:

www.cern.ch/danslaopeaudunchercheur

Corinne Pralavorio



Teachers involved in the "Dans la peau d'un chercheur" project try to determine the contents of the mystery boxes during their training session.



Juliette Davenne (left) and Marie Bugnon (centre) from CERN's Communication Group, prepare the mystery boxes for primary schools with Olivier Gaumer (right) of PhysiScope.

New learning resource features CERN

STEM stands for Science, Technology, Engineering and Mathematics – the four cornerstones of the curriculum featured on the STEM Works website. It is part of a nationwide

push in Northern Ireland to highlight how important STEM subjects are to both academia and industry. CERN worked closely with the Northern Ireland Council for the Curriculum, Examinations and Assessment (CCEA) to develop educational

A new educational website, STEM Works, has been launched this month, presenting science and technology in an industrial context for students aged 11-14. Developed with contributions from CERN, the site highlights the Laboratory as a “real-world” example of the opportunities available to science graduates. While the site was developed in Northern Ireland, STEM Works addresses issues of global relevance.

content for the site. “The CCEA STEM Works site is a high-quality online resource with which I am very proud to have been involved,” said Steve Myers, speaking in Belfast at the launch event for the website. “Hopefully we show that STEM-related work

can be a hugely exciting and rewarding career path.”

Along with lesson plans and ideas for teachers, STEM Works hosts three new videos about the physics of the LHC and the lives of the scientists working at CERN. Visitors can hear the personal accounts of CERN scientists from Northern Ireland, including Belfast-born Steve Myers and Conor Henderson. They describe their lives as researchers, exploring how childhood curiosity led to a subsequent career in science, and discuss the importance of the research they carry out at CERN.

STEM Works encourages schools to develop relationships with STEM-related organisations like CERN, and even provides a directory of local organisations for teachers to access. The Northern Ireland Minister of Education, Catriona Ruane, also attended the launch event and spoke of the importance of presenting science to young students: “Resources such as this website help to spark their imagination in the STEM subjects, which can lead to new and fascinating discoveries. All of this opens up the potential for different and exciting career paths which they may not have considered.”

While the STEM Works resources are designed to fit into the new Northern Ireland curriculum, they can easily enhance learning experiences at any school. Visit the website:

[http://www.rewardinglearning.org.uk/
STEM](http://www.rewardinglearning.org.uk/STEM)

to explore the free teaching material available for download.

Katarina Anthony



Students share their projects with Steve Myers, Richard Hanna (CCEA), and Catriona Ruane (Education Minister).

CERN and Google team up for Science Fair

The Google Science Fair (<http://www.google.com/events/sciencefair/>) invites young people aged

CERN partners up with Google to present the world's first online global science competition: the Google Science Fair.

13-18 to conduct innovative science projects and present their results for the chance to win once-in-a-lifetime experiences and opportunities. CERN will offer a three-day visit to the Laboratory to one of the winners, and Rolf Heuer, CERN Director-General, will be on the prestigious panel of judges. Nobel laureates, science entrepreneurs and science communicators will have the difficult task of choosing the winners.

“Google is a company that was born from scientific experimentation and in that spirit we are interested in promoting science, technology, engineering and maths (best known as STEM) education all over the world,” says Samantha Peter, Education Product Marketing Manager at Google. “By creating a large competition where students can get immersed in these subjects and have the opportunity to share their projects

with people around the world, we believe that students’ interest in STEM will increase, encouraging budding scientists to help solve current and future world issues.”

“When an organisation with the visibility of CERN teams up with a group with the global outreach of Google, we have a better chance of getting young people excited about science,” says James Gillies, head of the Communication Group. He may just be on to something, as thousands of students from around the world have already signed up to take part in the fair.

Katarina Anthony

Breaking away to South America

1 1 000 kilometres is one long bike ride! And yet, that's what Peter Dreesen did, travelling from Quito, Ecuador to Ushuaia, Argentina. Peter, an engineer in the TE Department, is no novice: the year before, he cycled from Paris to Peking, a distance of 13 500 kilometres, in just over four months. His latest voyage began last August, when he loaded his bicycle and boarded a plane for South America.

In the saddle

After a week of acclimatisation at three thousand metres altitude, Peter left Quito on 6 August 2010. He arrived in Ushuaia (*el fin del mundo*, the end of the world, as it's known in South America) on 12 December 2010. He recounts: "It was a bizarre sensation to arrive in the city and have the road

In December 2010, Peter Dreesen of CERN's Technology Department (TE) returned from a long trip to South America. In four months he traversed the entire Andean range, from the equator to a latitude of 55 degrees south—on a bicycle!

just end there. Normally, you get to a place, and there's a road that carries on to somewhere else."

Although the trip was organised for a group of 40 cyclists by a specialised tour operator (Bike-Dreams), it demanded personal preparations beginning a month in advance. This covered more than just physical training: "I had a special bike manufactured," says Peter. "I wanted one with a belt-drive rather than a chain, because of problems I encountered in 2008 in China."

In following the line of the Andes from north to south, the tour participants went through no less than five countries (Ecuador, Peru, Bolivia, Argentina and Chile)

on a route where the climbs totalled more than 150 kilometres. As a solitary cyclist, Petrus had some memorable experiences. He recalls crossing the Salar de Uyuni salt flats in Bolivia: "This is a lake which is so rich in salt that you can actually cycle on the salt crust that covers it. It is situated at a height of 3 650 metres above sea-level, and is about one-third the size of Switzerland—and there isn't a single road!"

Off-piste

Although the route was planned out in advance, Peter allowed himself to break away a few times, in order to see a particular church, village or interesting archaeological site. "Sometimes it happened that we arrived in the middle of a fiesta, with music and people dancing. Passers-by would stop and join in the festivities: bus drivers, their passengers, a passing truck driver, a policeman. And then the music would come to its end, and everyone carried on their way."

No sooner had he reached home than Peter began to think about new expeditions. So what's next? North America, then Africa. Thousands of kilometres of beautiful scenery await!

You can find photographs from Peter's trip here :

picasaweb.google.com/picapeter>ShowShort?authkey=Gv1sRgCN6liaGawNDUowE#

Anaïs Schaeffer



Peter Dreesen on the Salar de Uyuni Lake, Bolivia.



Peruvian promenade.

When science inspires art

Swiss video-maker Pipilotti Rist (her real name is Elisabeth Charlotte Rist), who is well-known in the international art world for her highly colourful videos and creations, visited CERN for the first time on Tuesday 18 January 2011. Her visit represented a trip down memory lane, since she originally studied physics before becoming interested in pursuing a career as an artist and going on to develop her skills at the Academy of Applied Arts in Vienna.

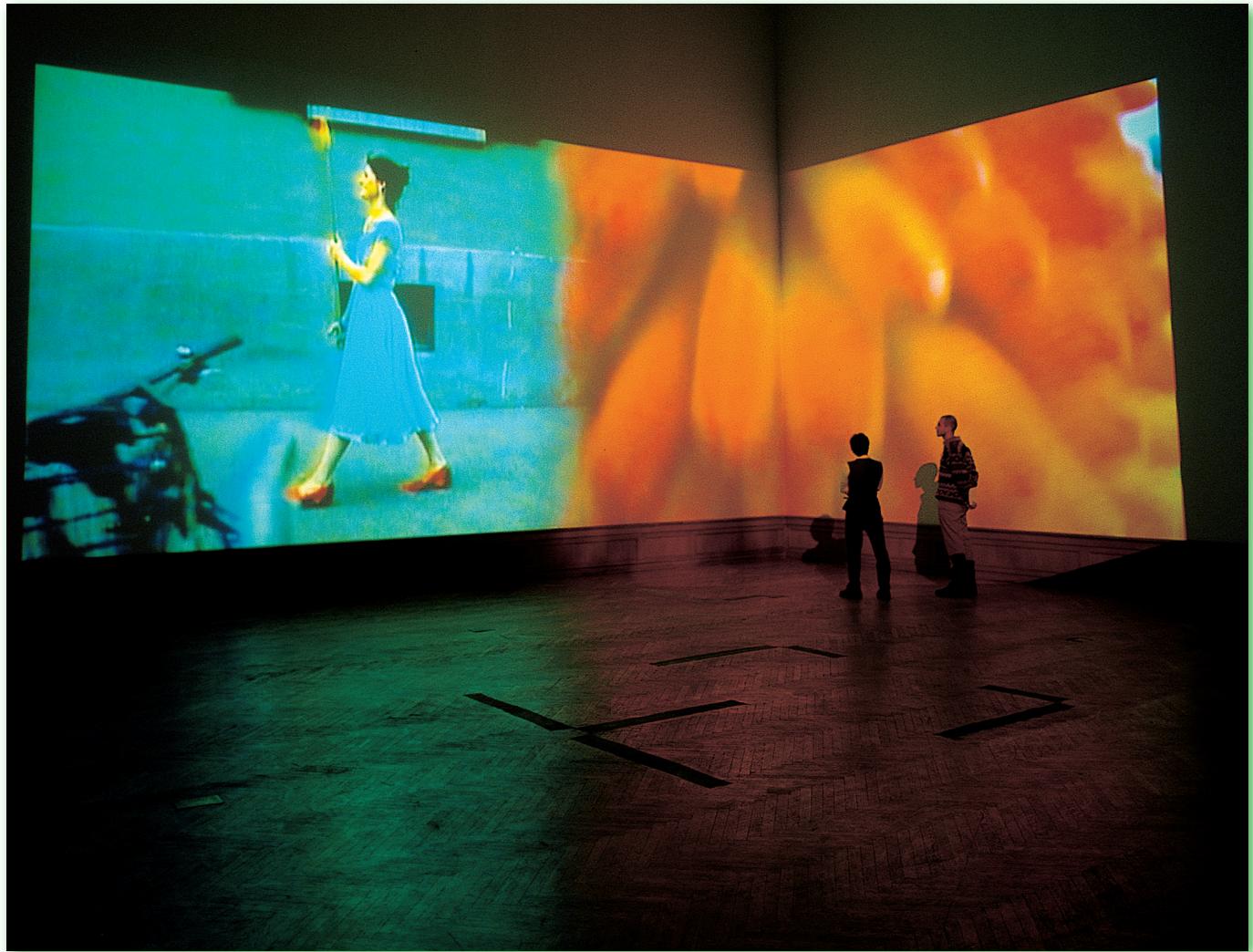
On Tuesday 18 January 2011, artist Pipilotti Rist came to CERN to find out how science could provide her with a source of inspiration for her art and perhaps to get ideas for future work. Pipilotti, who is an eclectic artist always on the lookout for an original source of inspiration, is almost as passionate about physics as she is about art.

As an introduction to CERN and its activities, Ariane Koek, who is responsible for CERN's new cultural policy, took Pipilotti Rist on a visit to ATLAS and ISOLDE. "This visit symbolised the objective of CERN's new cultural policy, which is to allow art and science to cohabit within the Organization. It

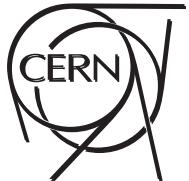
is an excellent way for artists and scientists to exchange information and for artists to get inspiration for their work," underlines Ariane.

To find out whether the spirit of CERN has left its mark on Pipilotti Rist's work, we shall have to await her future creations.

Anaïs Vernède



Ever Is Over All, 1997, audio video installation by Pipilotti Rist. View of the installation at the National Museum for Foreign Art, Sofia, Bulgaria. © Pipilotti Rist. Courtesy the artist and Hauser & Wirth. Photo by Angel Tzvetanov.



Lunchtime Film Presentation

TV News Magazine Presentation: Einstein by Schweizer Fernsehen (2009)

In this episode of Einstein, students from the University of Zurich explain the LHC physics experiments with chocolate and coffee cups. Using these ordinary items, the young researchers demonstrate what happens when two protons collide and how they are measured and detected. They also visit the CMS and LHCb detectors. Other topics in this episode include studies of crash test dummies to determine the right kind of protection needed for winter sports, such as skiing and snowboarding; image researchers at the University of Zurich poll people on the effects of image versus hard facts; the enormous potential of LED lights as the source of light for the future; and scientists determine that our closest ancestors are not the chimpanzee or orangutan, but the common marmoset.

**Due to room issues last time,
Einstein will be presented on
Friday, 11 February from 13:00 to 14:00
in the Council Chamber**

Language: German

Carolyn Lee



Ombuds' Corner Le coin de l'Ombuds

In this series, the Bulletin aims to explain the role of the Ombuds at CERN by presenting practical examples of misunderstandings that could have been resolved by the Ombuds if he had been contacted earlier. Please note that, in all the situations we present, the names are fictitious and used only to improve clarity.

Management or communication?

Following the internal restructuring of a unit, a disagreement developed between the leader of the team and its members. Fred challenged John, the manager in charge of the unit, about his strategy, arguing that his plans would not be beneficial. However, Fred fully recognized that John was entitled to make such a decision as the leader of the team.

Unfortunately, the misunderstanding escalated to the point of impasse, before either of them had had the chance to fully explain - or listen to - their arguments and motivations. John and Fred stuck to their positions, which they were no longer willing to discuss in confidence. Neither was happy about the situation, as they both wanted the same thing: a clearly organized and effective unit. In

this environment, the team suffered from the situation.

As long as the team considered the difference as a purely organizational matter to be resolved inside the unit, the Ombuds was not involved, as it is not part of his mandate to discuss managerial decisions.

However, when Fred and John recognised that their communication problems were affecting their disagreement, they decided to ask a neutral third party to facilitate a mutual understanding. From that point on, the Ombuds, for example, was then able to gently help them move past their fixed positions in order to discuss their real interests. Given the fact that they shared a common main interest, they quickly resolved the situation and developed a win-win solution

that satisfied them both as well as the entire team.

Conclusion

In general, some difficulties in teams are considered purely as managerial matters. However, most of the time communication problems prevent open discussion and mutual understanding. Discussing these matters early with the Ombuds, for example, will help to define where the problem lies. Such an informal chat does not require any commitment, as the Ombuds will not interfere with managerial decisions.

Contact the Ombuds early!

<http://cern.ch/ombuds>

Vincent Vuillemin

* Names and story are purely fictitious.



News from the Library

The CERN Library provides access to numerous and diverse information services of interest to the CERN community. Among them, Zentralblatt MATH stands out from our offer of online databases.

Zentralblatt MATH covers more than 3 million articles published in about 3500 journals, from 1826 to the present. Most bibliographic records are linked to the online published article.

It covers all areas of pure and applied mathematics and also theoretical computer science, mathematical quantum and statistical physics, classical, solid and fluid mechanics and general relativity

Zentralblatt MATH: it's not all about maths

and astronomy. Therefore, this database is useful in many disciplines beyond mathematics. It is daily updated and allows advanced search functionalities. Among other things, it includes the content of the Electronic Research Archive for Mathematics, the European Mathematical Information Service, and the Mathematics Preprint Search System.

Please note the "Online Ordering" button next to every bibliographic record: it allows you to order the original document from the Technische Informations Bibliothek (TIB) Hannover, if the article is not accessible online or if the journal is not held by the Library (please check the library catalogue first: <http://cdsweb.cern.ch>). An agreement

with TIB allows CERN readers to order documents without logging in. PDF will be provided if the German copyright legislation permits it, otherwise photocopies are sent.

Access the database:

<http://www.zentralblatt-math.org/>

Please give feedback to:

library.desk@cern.ch

CERN Library



Official news

Members of the personnel shall be deemed to have taken note of the news under this heading. Reproduction of all or part of this information by persons or institutions external to the Organization requires the prior approval of the CERN Management.

EXTENSION OF THE PRE-RETIREMENT PROGRAMMES

Following recommendation by the Standing Concertation Committee and approval by the Director-General, please note that:

- the Progressive Retirement Programme has been extended by one year, from 1 April 2011 until 31 March 2012; and
- the Part-Time Work as a Pre-retirement Measure has also been extended by one year, from 1 January 2011 until 31 December 2011.

Further information is available from the following sites:

https://cern.ch/admin-eguide/retraite/proc_ppr.asp

https://cern.ch/admin-eguide/retraite/proc_pTp.asp

*Human Resources Department
Tel. 73903*

OFFICIAL HOLIDAYS IN 2011

(Application of Article R II 4.39 of the Staff Regulations)

Official holidays in 2011 (in addition to the special leave during the annual closure):

- | | |
|------------------------|--|
| - Saturday 1 January | (New Year) |
| - Friday 22 April | (Good Friday) |
| - Monday 25 April | (Easter Monday) |
| - Sunday 1 May | |
| - Thursday 2 June | (Ascension day) |
| - Friday 3 June | (compensation granted for 1 May) |
| - Monday 13 June | (Whit Monday) |
| - Thursday 8 September | ("Jeûne genevois") |
| - Thursday 22 December | (compensation granted for 24 December, Christmas Eve) |
| - Friday 23 December | (compensation granted for 25 December, Christmas) |
| - Saturday 24 December | (Christmas Eve) |
| - Sunday 25 December | (Christmas) |
| - Thursday 29 December | (compensation granted for 31 December, New Year's Eve) |
| - Friday 30 December | (compensation granted for 1 January 2012, New Year) |
| - Saturday 31 December | (New Year's Eve) |

*Human Resources Department
Tel. 73903*



CERN HEALTH INSURANCE SCHEME

CHANGES IMPLEMENTED ON 1 JANUARY 2011

In addition to the information provided in the Official News section of the Bulletin concerning the CHIS, the following changes are in place since 1 January 2011.

Benefits

The list of benefits (hr-services.web.cern.ch/hr-services/Ben/chis/doc/reglement.pdf#Page=30) including the ceilings will remain initially unchanged while the CHIS Board prepares proposals to the Director-General, who has been authorized by the Council to take timely measures to limit the increase of the CHIS expenses, by encouraging the use of health care providers and treatments which provide the best quality-to-cost ratio.

Termination of the agreement with "La Metairie"

Attempts to find an agreement with the management of "La Metairie" on the conditions to continue to collaborate failed. The present agreement that CHIS, as well as the other international organisations (WHO, ILO, ITU, UNOG) had signed, therefore came to an end on 31 December 2010. As a result, the rules applicable to hospitals without an agreement will apply to "La Metairie" as from 1 January 2011.

Note that CHIS has negotiated agreements with several other hospitals providing similar services. Do not hesitate to call the UNIQA Head Office for more information.

MedSave, the new partner when travelling to USA

Medsave USA is a service provider and UNIQA's partner for hospitalizations in the United States. Through this partnership, CHIS members have access to one of the largest networks of health care in the US and benefit from advantageous tariff agreements.

More information available on the Medsave USA site at:

www.medsaveinternational.com

More information available on the CHIS site at:

cern.ch/chis

HR Department
Tel. 74125



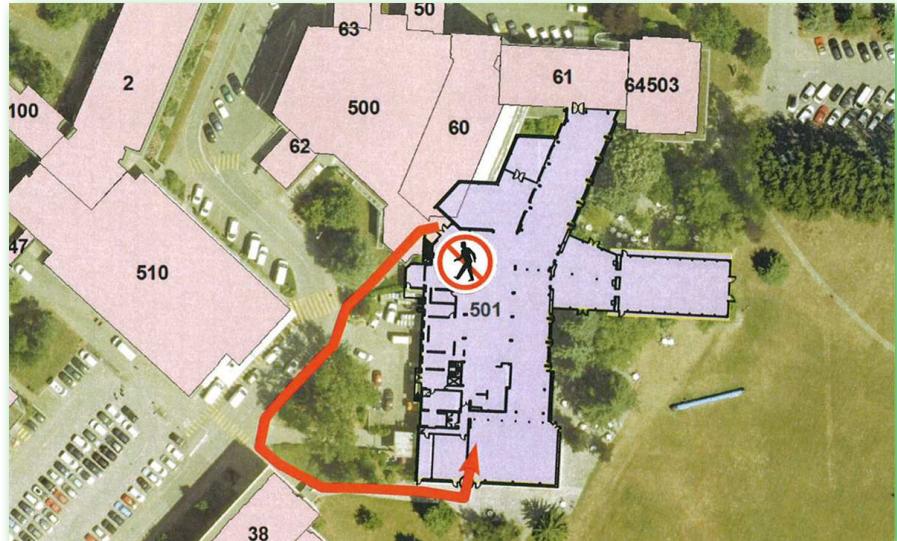
WORK AT RESTAURANT NO. 1

Concerning the replacement of the flooring in the free-flow level of Restaurant No. 1, we would like to inform you that access to the restaurant from the Main Building will be closed between 31 January and 6 February.

During this period, access to the restaurant will be through the south entrance, opposite Building 40 (see map); paper cups and plates will be used, and the opening hours for lunch will be extended from 11.00 am. to 3 pm in order to guarantee service to the users.

Thank you for your understanding and cooperation.

GS/SE Group



HAPPY 25TH BIRTHDAY !!!!

The dreaded PC virus turned twenty-five this month. The first ever computer virus was created in January 1986. Dubbed "©Brain", it was designed to infect DOS-based PCs. While this instance was relatively harmless and its creators claim honourable intentions, the world has changed since then. Today's viruses and worms are malicious and are aimed at making profit. They attack everything connected to a network: Windows PCs, but also Linux PCs and Macs; iPhones and other mobile devices; the operating system directly, but also applications like Adobe Reader (PDF), Firefox, etc.

So, make sure that you protect your computers from viruses and malware. Any unprotected computer connected to the Internet is likely to be infected within minutes! Keep your system up to date.

- * Enable the regular automatic installation of updates/patches. If you can, use operating systems managed by CERN's IT Department;
- * Use anti-virus software. The CERN anti-virus solution is free even for your home and private use;
- * Do not install doubtful software or plugins. Indeed, software from untrusted sources may infect or compromise your computer...;
- * Do not open unexpected or suspicious e-mails or attachments. Delete them if they do not concern you or if they look strange. If in doubt, contact Computer Security@cern.ch;
- * Stop-think-click. Do not click on suspicious links, but only on those whose origin you can trust.

More recommendations can be found on the Security Team's web site: "https://security.web.cern.ch/security/recommendations/en/how_to_secure_your_pc.shtml"

*The Computer Security Team
P.S.*

The very first virus warning at CERN we are aware of dates back to October 1989: "<https://security.web.cern.ch/security/reports/en/announcements/Computer%20Virus%20Warning%201989.pdf>">"Computer Virus Warning to all users of IBM Compatible PCs". It is still valid: "Do not panic ... Cross your fingers" :-)

Interestingly, the first virus targeting Macs (called "Elk Cloner") came out five years earlier in 1981! The first ever virus, "Creeper", was detected as early as the 1970s.

CERN TECHNICAL TRAINING: AVAILABLE PLACES IN FORTHCOMING COURSES

The following course sessions are scheduled in the framework of the 2011 CERN Technical Training Programme and places are still available. You can find the full updated Technical Training course programme in our web catalogue (<http://cta.cern.ch/cta2/f?p=110:9>).

Software and system technologies

Business Objects Basic	21-feb-11	22-FEB-11	English	2 days
CERN openlab/Intel Computer Architecture and Performance Tuning Workshop	08-Feb-11	09-Feb-11	English	2 days
Introduction to Databases and Database Design	10-Mar-11	11-Mar-11	English	2 days
JAVA 2 Entreprise Edition - Part 2: Enterprise JavaBeans	16-Mar-11	18-Mar-11	English	3 days
JCOP-Joint PVSS-JCOP Framework	14-Mar-11	18-Mar-11	English	4.5 days
Linux LPI 101 - Introduction à Linux et LPI 102 Administration systèmes sur Linux	8-Mar-11	11-Mar-11	Français	4 jours
ORACLE-SQL	16-Mar-11	18-Mar-11	English	3 days
Oracle Databases: Advanced PL/SQL Programming	21-Mar-11	23-Mar-11	English	3 days

Electronic design

LabVIEW for beginners	21-Mar-11	23-Mar-11	Bilingual	3 days/3jours
Siemens - STEP7: Level 1	15-feb-11	18-feb-11	Français	4 jours

Mechanical design

ANSYS Parametric Design Language	16-Mar-11	18-Mar-11	English	3 days
ANSYS Workbench advanced	31-Jan-11	03-Feb-11	English	4 days
CATIA-Smartteam Base1	25-Jan-11	08-Feb-11	Français	6 jours
CATIA-Smartteam Base2	22-feb-11	10-Mar-11	Français	7 jours

Office software

ACCESS 2007 - Level 1 : ECDL	14-Mar-11	15-Mar-11	Français	2 jours
Dreamweaver CS3 - Level 2	10-Feb-11	11-Feb-11	Français	2 jours
EXCEL 2007 - Level 2: ECDL	21-Feb-11	22-Feb-11	Français	2 jours
Indico Advanced - Conference Organization	24-Mar-11	24-Mar-11	Français	3 heures
Indico for beginners - Meeting Organization	18.feb.11	18.feb.11	Français	2 heures
Powerpoint 2007 - Level 2	21-Feb-11	22-Feb-11	Français	2 jours
Project Planning with MS-Project	15-Mar-11	21-Mar-11	Français	2 jours
Sharepoint Collaboration Workspace	24-Feb-11	25-Feb-11	English	2 days
Sharepoint Collaboration Workspace	21-Mar-11	22-Mar-11	Français	2 jours
Sharepoint Collaboration Workspace Advanced	14-Mar-11	14-Mar-11	Français	0.5 jour
Sharepoint Designer (Frontpage) - Level 1	14-Feb-11	15-Feb-11	Français	2 jours
Sharepoint Designer (Frontpage) - Level 2	10-Mar-11	11-Mar-11	English	2 days

If you are interested in attending any of the above course sessions, please talk to your supervisor and/or your DTO, and apply electronically via EDH from the course description pages that can be found at: <http://cta.cern.ch/cta2/f?p=110:9> under 'Technical Training' with the detailed course program. Registration for all courses is always open – sessions for the less-requested courses are organized on a demand-basis only. CERN Technical Training courses are open only to members of the CERN personnel (staff members and fellows, associates, students, users, project associates, apprentices and employees of CERN contractors, with some restrictions). In particular, quoted prices and programmes refer specifically to the CERN community.



Language training

Formation en langues

Cours d'anglais

Kerstin.fuhrmeister@cern.ch
Nathalie Dumeaux Tel. 78144
nathalie.dumeaux@cern.ch

GENERAL AND PROFESSIONAL ENGLISH COURSES

The next session will take place:
from 28 February to end of June 2011
(1 week break at Easter).

These courses are open to all persons working on the CERN site, and to their spouses.

For registration and further information on the courses, please consult our Web pages:

[http://cta.cern.ch/cta2/
f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4254%2CD](http://cta.cern.ch/cta2/f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4254%2CD)

or contact kerstin.fuhrmeister@cern.ch or Nathalie Dumeaux, tel. 78144.

ORAL EXPRESSION

The next session will take place from 28 February to end of June 2011 (1/2 weeks break at Easter).

This course is intended for people with a good knowledge of English who want to enhance their speaking skills.

There will be on average of 8 participants in a class.

Speaking activities will include discussions, meeting simulations, role-plays etc. depending on the needs of the students.

Duration: 30 hours

Price: 720 CHF (for a minimum of 8 students)

[http://cta.cern.ch/cta2/
f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4250%2CD](http://cta.cern.ch/cta2/f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4250%2CD)

WRITING PROFESSIONAL DOCUMENTS IN ENGLISH

The next session will take place from 28 February to end of June 2011 (1 week break at Easter).

This course is designed for people with a good level of spoken English who wish to improve their writing skills.

Duration: 30 hours

Price: 720 CHF (for 8 students)

Timetable will be fixed after discussion with the students.

[http://cta.cern.ch/cta2/
f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4301%2CD](http://cta.cern.ch/cta2/f?p=110:9:230045968901998::NO::X_COURSE_ID,X_STATUS:4301%2CD)

NEW COURSES

Specific English and French courses -Exam preparation/

We are now offering specific courses in English and French leading to a recognised external examination (e.g. Cambridge, DELF and BULATS).

If you are interested in following one of these courses and have at least an upper intermediate level of English or French, please enrol through the following link

English courses

http://cta.cern.ch/cta2/f?p=110:9:1375795393410117::NO::X_COURSE_ID,X_STATUS:4133%2CD

French courses

http://cta.cern.ch/cta2/f?p=110:9:1375795393410117::NO::X_COURSE_ID,X_STATUS:4132%2CD

For registration and further information on these courses, please consult our Web pages: <http://cern.ch/Training>

or contact kerstin.fuhrmeister@cern.ch or Nathalie Dumeaux: Tel. 78144.



Seminars

••••••••••••

MONDAY 31 JANUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

TH JOURNAL CLUB ON STRING THEORY

14:00 - TH Auditorium, Bldg. 4

TBA

M. SCHMIDT-SOMMERFELD

TUESDAY 1 FEBRUARY

HR SEMINAR

08:30 - Globe, Bldg. 80

INDUCTION PROGRAMME - 1st Part

N. DUMEAUX, S. LYNNE HOBSON, E. MACARA,
D. SERAFINI / CERN

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

ACADEMIC TRAINING

LECTURE REGULAR PROGRAMME

11:00 - Bldg. 222-R-001 - Filtration Plant

LHC 2010: Summary of the Odyssey So Far and Near-Term Prospects (1/3)

P. SPHICAS / CERN

INTC

13:30 - Council Chamber, Bldg. 503

39th Meeting of the INTC

P. BUTLER / UNIVERSITY OF LIVERPOOL

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA

J. CASALDERREY SOLANA / CERN

ISOLDE SEMINAR

14:30 - Bldg. 26-1-022

The information about nuclear structure contained in binding energy differences: the example of delta Vpn

P.-H. HEENEN / UNIVERSITÉ LIBRE DE BRUXELLES

WEDNESDAY 2 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

ACADEMIC TRAINING

LECTURE REGULAR PROGRAMME

11:00 - Bldg. 222-R-001 - Filtration Plant

LHC 2010: Summary of the Odyssey So Far and Near-Term Prospects (2/3)

P. SPHICAS / CERN

THURSDAY 3 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

ACADEMIC TRAINING

LECTURE REGULAR PROGRAMME

11:00 - Bldg. 222-R-001 - Filtration Plant

LHC 2010: Summary of the Odyssey So Far and Near-Term Prospects (3/3)

P. SPHICAS / CERN

TH SEMINARS

11:00 - TH Auditorium, Bldg. 4

Collider Cross Talk / Search for SUSY in Events with Jets and MET with CMS

M. STOYE / CERN

CERN COLLOQUIUM

16:30 - Council chamber, Bldg. 503

DESERTEC – Clean Power from Deserts for a Sustainable World with 10 billion People

G. KNIES / DESERTEC FOUNDATION

MONDAY 7 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

TH JOURNAL CLUB ON STRING THEORY

14:00 - TH Auditorium, Bldg. 4

TBA

I. ANICETO

TUESDAY 8 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

WEDNESDAY 9 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

TH COSMO COFFEE

11:00 - TH Auditorium, Bldg. 4

Infrared Issues in de Sitter space

R. HOLMAN / CARNEGIE MELLON U.

THURSDAY 10 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

FRIDAY 11 FEBRUARY

SCHOOLS, SEMINARS AND COURSES

09:00 - Council Chamber, Bldg. 503

EDIT2011

PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - TH Auditorium, Bldg. 4

Accessing the Inflaton Quantum State via Non-Gaussianities

R. HOLMAN / CARNEGIE MELLON U.