

Nos 47 & 48 – 16 & 23 November 2009

## Happily CLOUDy

Jasper Kirkby photographed inside the CLOUD chamber.



While the LHC experiments are fine-tuning their equipment ready for 'glamorous' beams, CLOUD has completed its assembly phase and is starting to take data using a beam of protons from the 50 year-old Proton Synchrotron (PS). Here is a quick tour around a cutting-edge physics experiment that will shed light on climate-related matters.

(Continued on page 4)

## Half way round the LHC

The LHC operations teams are preparing the machine for circulating beams and things are going very smoothly. ALICE and LHCb are getting used to observing particle tracks coming from the LHC beams. During the weekend of 7-8 November, CMS also saw its first signals from beams dumped just upstream of the experiment cavern.

(Continued on page 3)



### A word from the DG

#### Falling walls

It was 20 years ago this week that the Berlin wall was opened for the first time since its construction began in 1961. Although the signs of a thaw had been in the air for some time, few predicted the speed of the change that would ensue. As members of the scientific community, we can take a moment to reflect on the role our field played in bringing East and West together.

(Continued on page 2)

#### In this issue

##### News

- Happily CLOUDy 1
- Half way round the LHC 1
- A word from the DG 1
- CERN's policy in the field of knowledge and technology transfer goes global 3
- From the PS to the LHC: 50 Years of Nobel Memories in High-Energy Physics 5
- Science in cartoons 5
- A celebration of science in the Pays de Gex and at CERN 6
- Open your Eyes and vote! 6
- Teacher in Residence: Bringing Science to Students 7
- Betting on better scientific literacy 7
- MedAustron Board Visits CERN 8
- Space shuttle crew training at CERN 9
- Klaus Goebel - 1926-2009 10
- Jan Koopman - 1957-2009 10

##### Take note

- Language training 12
- Technical training 13
- External meeting 14
- Seminars 15

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## A word from the DG

(Continued from page 1)

### Falling walls

CERN's collaboration with the East, primarily through links with the Joint Institute for Nuclear Research, JINR, in Dubna, Russia, is well documented. Less well known, however, is the role CERN played in bringing the scientists of East and West Germany together. As the Iron curtain was going up, particle physicists on both sides were already creating the conditions that would allow it to be torn down. Cold war historian Thomas Stange tells the story in his 2002 CERN Courier article <http://cerncourier.com/cws/article/cern/28741>.

It was my privilege to be in Berlin on Monday, the anniversary of the wall's opening, to take part in a conference entitled 'Falling walls'. I was one of many speakers invited from all walks of life to speculate on the future walls we hope to breach. I spoke of how particle physics has painstakingly built up the substantial edifice of the Standard Model, and how we hope with the LHC to go beyond. But as well as the science, I also told the story of CERN's role in East-West rapprochement: a timely reminder of the power of science to transcend borders of every kind.

Rolf Heuer



Rolf Heuer and Gianni Deroma

## The truth about birds and baguettes

Last week, a power cut caused by a malfunction in an electrical substation made headlines around the world. Such things happen all the time and the media rarely take notice, but this one was different. The substation in question was one that supplied part of the LHC's cryogenic systems, and the media spotted it instantly.

What's more, the notion that the power cut might have been caused by a piece of bread dropped by a passing bird on the substation in question started to spread. A power cut suddenly became a story too good to ignore. Before you could say 'crumbs', the press office phones were ringing off the hook as journalists demanded to know how it could be that a piece of bread could lay low the world's mightiest machine. Of course, no such thing had happened, and a statement was rapidly concocted. To this day, we do not know what caused the power cut, but it is true that feathers and bread were found at the site.

The truth about birds and baguettes is that two sectors of the LHC warmed by a few degrees while the substation was repaired, and were then cooled back to 1.9K. There was no damage, and no delay. Had we been running, we'd have lost a day or two's worth of beam time, which is nothing unusual when operating a frontier research machine like the LHC. Power cuts are, of course, something that the LHC has been designed to cope with, as have all its predecessors.

The moral of this story is that CERN and particle physics are in the spotlight like never before. The great adventure that is the LHC has caught the public's imagination, and there's a great thirst for information about what we're doing. Headlines about birds and baguettes may be uncomfortable to live with, but it's always worth remembering that this kind of attention is ultimately for the good. Soon, the headlines should be turning from birds to b-quarks, and from baguettes to bosons. It's a day we're all looking forward to.

James Gillies

## Half way round the LHC

(Continued from page 1)



Operators in the CMS control room observe the good performance of their detector.

Particles are smoothly making their way around the 27 km circumference of the LHC. Last weekend (7-8 November), the first bunches of injection energy protons completed their journey (anti-clockwise) through three octants of the LHC's circumference and were dumped in a collimator just before entering the CMS cavern. The particles produced by the impact of the protons on the tertiary collimators (used to stop the beam) left their tracks in the calorimeters and the muon chambers of the experiment. The more delicate inner detectors were switched off for protection reasons.

Six of the eight sectors of the LHC have now been hardware commissioned to allow the passage of beams at 1.2 TeV. The remaining two (Sectors 3-4 and 8-1) will be powered up in the coming week.

If all goes well, in just over one week from now, the beams could circulate in both pipes of the LHC. The first low-energy collisions should follow shortly after.

CERN Bulletin

# CERN's policy in the field of knowledge and technology transfer goes global

**K**TT is a high-priority activity area because of its potential to demonstrate the role of CERN as a source of innovation delivering tangible benefits to society. In particular, through its know-how and its leadership, CERN is today generating innovations applicable in domains such as medical sciences, energy and the environment, as well as many others.

"The measures endorsed by the Directorate on 2 November include a comprehensive policy for managing the intellectual property related to CERN technologies", explains Claudio Parrinello, head of the KTT Group in the DG Department. "This includes a proposal to redistribute part of the income generated by technology transfer projects to the departments and the units hosting the projects, while the remainder will go to a KTT development fund, providing support to new KTT projects".

Another proposal aims to define a policy for CERN spin-off companies, i.e. companies created to exploit the commercial potential of the CERN technology portfolio. "In recent years, several companies have been directly generated by activities that were born at CERN. We are working on measures aimed

On 2 November, the Knowledge & Technology Transfer (KTT) Group presented to the Directorate three proposals that aim to enhance KTT activities. One important aspect of the proposals is the direct involvement of all members of CERN who are strongly encouraged to communicate any ideas for additional applications of their work.

at facilitating and supporting spin-off creation", says Parrinello.

Finally, a proposal for the creation of a CERN Global Network was presented. "Such a network aims to create a global community composed of current and former members of the CERN personnel, research institutions and companies in the Member States, in order to share knowledge on a wide variety of areas and to increase the visibility of CERN partnership opportunities for companies and other organizations (e.g. technology transfer, procurement, recruitment, etc.)", states Parrinello.

The success of KTT activities relies upon efficient communication and cooperation with all members of the personnel and external partners. You are strongly encouraged to communicate any ideas for additional applications of your work (such as know-how, inventions, hardware, software, etc.) by contacting your Departmental KTT Officer or the KTT Group.

CERN Bulletin



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The KTT Group was established in January 2009. Its responsibilities include identifying CERN know-how and technologies with the potential to generate innovation outside high-energy physics, making them visible to potential external partners and then enabling interested parties to access and exploit such opportunities through licensing of patented technologies, contract research, service contracts, etc.

KTT is also responsible for fostering and proposing initiatives aiming to facilitate knowledge exchange between CERN and its partners, and for maintaining and enlarging the European network of experts working on technologies related to life sciences, and, in particular, hadron therapy. The group plays an active role in identifying funding opportunities and in developing and implementing European projects such as ENVISION, PARTNER, ULICE, and ENLIGHT.

**M**any experiments in the world are currently investigating the factors that may affect the planet's climate but CLOUD is the only one that makes use of a particle accelerator. "The proton beam that the PS provides is unique because it allows us to adjust the "cosmic ray" intensity. In this way, we can simulate the difference of particle flux in the atmosphere in going from the ground to the outermost layers of the stratosphere (a factor 100 more intense)", explains Jasper Kirkby, CLOUD's spokesperson.

"There are a lot of observations suggesting that particles hitting the atmosphere might affect the production of clouds and, in turn, the planet's climate", continues Kirkby. "However, given the complexity of the climate and the many parameters involved, a clear answer doesn't exist yet".

The CLOUD detector is optimized for addressing this question like no other experiment so far. "For the first time, we want to do definitive, quantitative measurements of the underlying microphysics", states Kirkby. "CLOUD has been designed to follow all the processes involved from the birth of the embryonic aerosols, which then grow to a big enough size to become the seeds for cloud droplets. CLOUD will also study the effect of cosmic rays on the cloud droplets and ice particles themselves".

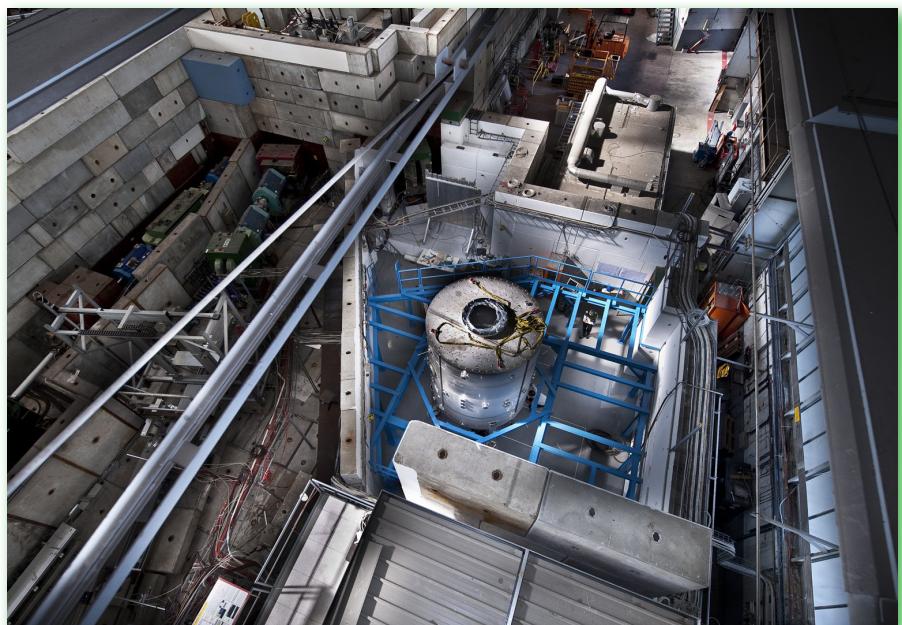
The uniqueness of CLOUD also resides in the fact that the parameters that are likely to produce effects on cloud formation can be controlled in the laboratory. "There is a

huge range of different variables that we have to study, from the different chemicals involved to the different temperatures of the gas in the chamber", says Kirkby. "We will be able to set the temperature in the cloud chamber from -90 °C to +40 °C, which essentially covers the whole of the atmospheric temperatures from the coldest part of the stratosphere to the warmest part of the troposphere".

Climate change is high up on the agenda of governments and experts worldwide. CLOUD has indeed the ambition to address this question too. "One of our collaborators from Leeds University in the United Kingdom has developed a 'global model' of the cloud processes that can affect the climate", explains Kirkby. "Using the Leeds model, we will evaluate the climatic significance of any results that we find in CLOUD".

The idea of simulating cosmic rays with a particle beam was born in 1997. The CLOUD experiment was approved in 2006 and is now finally ready to start taking data with the new, carefully designed aerosol chamber. "If everything goes well, and the physics results are important, we could take data for about twelve years", explains Markku Kulmala, head of the Division of Atmospheric Sciences at the University of Helsinki. "We expect the first results to come fairly quickly. Some will already be available in real time as soon as we switch on the equipment. The results of a more quantitative analysis will be available in about one year from now".

CERN Bulletin



The CLOUD experiment in its final position in the PS East Hall.

# From the Proton Synchrotron to the Large Hadron Collider: 50 Years of Nobel Memories in High-Energy Physics

**A**s a new era in particle physics approaches with the start of the LHC, a symposium to commemorate many significant events that have marked high-energy physics in the past 50 years will be held at CERN on 3-4 December 2009 (see <http://indico.cern.ch/conferenceDisplay.py?confId=70765>).

The list of confirmed distinguished speakers reads like the Who's Who of particle physics of the second half of the 20th Century, including the Nobel Laureates James Cronin, Jerome Friedman, Sheldon Glashow, David Gross, Gerardus 't Hooft, Leon Lederman, Burton Richter, Carlo Rubbia, Jack Steinberger, Samuel Ting, Martinus Veltman, Stephen Weinberg and Frank Wilczek. They will share with us memories of several landmark events that, over the past 50 years, have shaped our field of science. These events include the discovery of the J/ψ particle by Richter and Ting in the 1970s;

the work of Glashow, Salam and Weinberg on the theory of the unified weak and electromagnetic interactions; the discovery of fundamental asymmetries in the K-meson sector by Cronin and Fitch; the contributions to the SPS proton-antiproton collider by Rubbia and van der Meer that led to the discovery of the W and Z bosons in the 1980s; the discovery of the muon neutrino by Lederman, Schwartz and Steinberger; the SLAC experiments of Friedman, Kendall and Taylor in deep-inelastic scattering of electrons in the 1960s; the development of the mathematical basis of the electroweak theory by't Hooft and Veltman in the 1970s; and the discovery of asymptotic freedom in the theory of strong interactions by Gross, Politzer and Wilczek.

The year 2009 also marks the 50th anniversary of the commissioning of CERN's Proton Synchrotron and the 20th anniversary of the start-up of LEP. A review of these CERN

machines that have greatly contributed to the physics developments listed above will be given by Lyndon Evans, Stephen Myers, Emilio Picasso and Guenther Plass, while a look at the future of CERN's accelerator complex will be provided by CERN Director-General Rolf-Dieter Heuer.

Directorate Office

**The seminars will be held in the Main Auditorium with retransmission to :  
Council Chamber, IT Auditorium,  
Prévessin BE Auditorium , Kjell  
Johnsseen Auditorium in building 30,  
Room 40-S2-A01, and via webcast**

We would be grateful if people with reduced mobility could send an e-mail to: [directorate.office@cern.ch](mailto:directorate.office@cern.ch) to announce their participation as well as the name of the persons who will be accompanying them.



## Science in cartoons

**F**iами is famous in Switzerland as a strip cartoon artist and his work has been translated into several languages. Copies of his "Lives of Einstein" and "Lives of Galileo" are on sale in the CERN shop. The "Lives of Galileo" is the official strip cartoon marking the International Year of Astronomy 2009 and will be the subject of a lecture that Fiами will give in the Globe at 8-30 p.m. on Wednesday, 18 November on the occasion of the "Fête de la Science".

You can't just write a cartoon strip on the history of science off the top of your head. Once he has chosen his subject, Fiiami compiles documentation from experts, from libraries and from the Internet. "I am always surprised to see that brilliant scientists reply to my questions when I contact them by e-mail or when I ask to meet them. It's fantastic! The Lives of Galileo took me to the Acatama Desert in Chile to experience one of the purest skies on the planet."

**How do you communicate to people the importance of major scientific discoveries and that science isn't the property of any particular group of individuals or privileged regions? An entertaining strip cartoon illustrating the history of science can succeed where other forms of communication fail.**

not easy to select the ones to highlight. « The Lives of Galileo » is based on six major stages in the history of astronomy : Babylon, Alexandria, Kusumapura on the Ganges, Venice, Greenwich and then, finally, we reach the present day with a class teacher telling her pupils about recent developments in astronomy. The result is an entertaining jaunt through the history of astronomy, during which we discover how

our initial perception of the world as flat and motionless gave way to a realization that the world is a constantly turning globe in an infinite universe.

Fiiami enjoys revealing the real person (mostly men, but sometimes women as well) beneath the scientist: Who was Galileo? How did he live? What gives rise to a Galileo or an Einstein? Another favourite question is: how does science function? As he himself puts it: "The history of science is first and foremost the history of knowledge-sharing and I try to remind the reader that this sharing and transmission of knowledge are the linchpins of progress in our societies". A fact CERN is very well aware of.....

To find out more, go to: [www.fiami.ch](http://www.fiami.ch)

The cartoon strip "The Lives of Galileo" will be shown in a special exhibition at the Musée d'Histoire des Sciences in Geneva and in a series of six educational programmes to be broadcast on Télévision Suisse Romande between 21 and 26 December.

The history of science abounds in gripping stories and it is



# A celebration of science in the Pays de Gex and at CERN

Every autumn, the French Ministry for Higher Education and Research organises the "Fête de la Science". Events are organised across the country to bring science closer to the general public.

The festivities on offer in the Pays de Gex have been devised by the Euroscience Léman Association in partnership with CERN. The Globe of Science and Innovation will play host to a theatrical presentation, lectures and the "Accelerating Science" exhibition. Other events will be held in Divonne-les-Bains, including workshops, film shows and a "Science Café".

The whole thing kicks off at the Globe where events will be organised three nights in a row. Monday 16th will see a performance of "One zero show", a poetic representation of mathematics by Denis Guedj, which is suitable for all. On Tuesday 17th, the public will get the chance to meet CERN scientists and journey "into the dark" with a lecture and debate entitled "Voyage dans le noir". This is an opportunity to learn about the mysteries of black holes, dark matter, dark energy and antimatter. On Wednesday 18th, Galileo will takes centre stage (see article on page 5).

The "Fête de la science" runs from 16 to 22 November this year and CERN will once again be taking part, in partnership with the Euroscience Léman Association. Throughout the week, science will be placed in the spotlight in the Pays de Gex, through a variety of presentations, exhibitions, lectures and workshops.

The focus moves to Divonne-les-Bains from Thursday 19th.

Two exhibitions will be on offer throughout the week. Discover what happened in the first moments of the Universe at the "Accelerating Science" exhibition in the Globe of Science and Innovation, while photographs taken with telescopes will be on display at the "De la Terre à l'Univers" exhibition in Divonne.

For Bernard Pellequer, who is in charge of event scheduling at the Globe of Science and Innovation, the "Fête de la Science" is a key scientific outreach event. "The aim is to get the local community involved and bring science closer to the general public," he explains. "Public interest in this sort of thing is evident, as we have seen in previous years." A large number of visitors can again be expected this year so to ensure you get seats for the various events, you are advised to book ahead.

Antoine Cappelle



Globe of Science and Innovation: +41 (0) 22 767 76 76  
L'Esplanade du Lac (Divonne): +33 (0) 4 50 99 17 73

The full programme of events can be found on the Euroscience Léman website:  
<http://www.euroscience-leman.org>



## Open your Eyes and vote!

This year over 700 short films were submitted for three competitions: the majority for the general fiction category for films up to ten minutes in length, and others for science fiction (20 minutes) and science documentary (30 minutes). "In 2007 we had just one competition open to films from any genre. We decided to add the science related competitions to the second edition to make a stronger link with CERN as a physics lab," explained Quentin King, Chairman of the Selection Committee and member of CERN's film-making club, Open Your Eyes Films. "The entries are extremely diverse and touch on almost every aspect of life. The creativity of short-film makers is incredible. In 2007 we received entries from over 80 countries; the best represented countries were France and the United States." Films with dialogue are required to be spoken or subtitled in either English or French.

He continued: "The aim is to showcase short films to the public in the Geneva area and

The CERN film making club is organizing the second edition of the CinéGlobe International Short Film Festival and everyone is invited to attend a series of selection screenings in November to vote on which they like and think should be publicly shown in the Globe and at the Forum Meyrin in February 2010.

in so doing to raise the profile of the CERN Globe of Science and Innovation as a venue and of CERN as an open lab that plays a cultural role within the community. The Ville de Meyrin is hugely supportive of the Festival. They are providing two afternoons in the Forum Meyrin and they are co-sponsors of the event alongside CERN. That the new edition is taking place is in part due to the encouragement we received from the Bureau Culturel de la ville de Meyrin following the success of the first edition in 2007." Some films selected for the CinéGlobe Festival in 2007 also went on to win awards in other festivals.

This next festival will take place from 16 to 20 February with a programming time of ten and a half hours shared between the three competitions. In 2007 there was just half this time to screen 47 films.

Two awards for each competition will be presented at the end of the festival, including the "Golden CinéGlobe" 2010 for Best Film attributed by the jury of professionals designated by Open Your Eyes Films (in 2007 the jury included the person responsible for short films from TSR) and the "Audience Favourite" award voted by the public during the festival.

Be part of the fun and help the CinéGlobe selection committee to choose the best films by coming to the remaining screenings in the CERN Council Chamber or at the Théâtre du Grütli in Geneva. Full details are available at:

<http://cern.ch/info-oye/pages/Projects/CineGlobe/CineGlobe2010.htm>

Rebecca Learm

# Teacher in Residence: Bringing Science to Students

Baine explains, "It's very important to have a teacher present who can be that middle person between the young people coming here, whom we are trying to enlighten, and the physicists who work at CERN.

The Teacher in Residence can act as an on-site educational consultant."

As Teacher in Residence, Baine's primary project will be to develop teaching modules, or a series of lesson plans, that can help high school teachers around the world incorporate modern particle physics into their curricula. This idea is unusual in that 14 and 15 year old students, the target age

CERN welcomes its first Teacher in Residence, Terrence Baine of the University of Oslo. Baine, who originally hails from Canada, will be concurrently completing his PhD in Physics Education during his time at CERN. Like CERN's High School Teacher Programme (HST), of which Baine is an alumnus, the Teacher in Residence position is designed to help educators spread the science of CERN in a form that is accessible to students and can encourage them to pursue physics throughout their education.

group of this program, are generally given very limited exposure to modern scientific research.

"There's an old adage," observes Baine, "that relates to the teaching of basic knowledge. People must learn to walk before they can run. That's true, but it's nice to let them know why they might want to run... Here's the race that you can be a part of later."



Terrence Baine, first 'teacher in residence' at CERN.

Baine has conducted reviews of national curricula to assess how the lesson plans can be injected into the existing educational framework, while still allowing the teachers the freedom to design their own courses. In order to capture the students' attention,

Baine's modules link core curricular ideas to what he calls a "wow factor," or element of popular culture that the student will recognize and have questions about.

Ultimately, these plans would be available free of charge in a range of languages from a public source such as the CERN website. In addition to targeting schools in several different countries, Baine has also begun working with CERN Outreach to find appropriate schools in the community where the programs can be piloted.

Baine is enthusiastic about his project and its far-reaching effects. "It's very exciting for me, personally. I love teaching, I love my students, but it's nice also to work at another level, to effect change at a different level than in the classroom."

When asked about future projects for the Teacher in Residence program, Baine alluded to the possibility of reaching students in developing countries such as Rwanda and others in sub-Saharan Africa (Baine himself had his first teaching experience in Nigeria). Using videoconferencing, a technique he has applied to bring CERN to his school in Norway, Baine believes that schools with limited resources or facilities can still be exposed to cutting-edge physics.

"That would be a dream... We can use new communication technologies to bring CERN to the classroom."

Daisy Yuhas



## Betting on better scientific literacy

Zimin, who had read about and researched CERN before his visit, felt prepared for the physics at CERN but was greatly impressed by the collaborative "brainforce." He observed that "The organization of all of these people is not less important as an achievement than all of the technical achievements, the collider, the experiments." He was amazed at "how CERN has been able to organize such a grand collaboration of different people from different institutes of countries from all over the world."

Dmitry Zimin, founder of the Russian philanthropic foundation Dynasty, visited CERN on 23 October. Zimin, who is himself a scientist and businessman, founded Dynasty in order to support scientific education and a greater public understanding of scientific thinking. Zimin met the Bulletin to reflect on the experience and what had interested him about CERN.

superstition and reduced scientific literacy that he sees in Russia is "as dangerous as nuclear weapons ...dangerous for the human being." In CERN's collaborative community, therefore, Zimin believes there is tremendous potential for changing this trend of illiteracy.

He expanded that given the collaborative successes within CERN, the next responsibility is to reach out. "What I would call for is to ask this intellectual elite of the world to talk

to governments, to mass media, to opinion-makers in general, to communicate science all over the world, to popularize science and the scientific approach. The general goal of our foundation is exactly this goal, to communicate science and stimulate a scientific vision of the world among people."

Zimin closed by stressing, "I admire the things which are going on here... I really admire the people and the work which is done here."

More information about the Russian philanthropic foundation Dynasty:

<http://www.dynastyfdn.com/english/about>

Daisy Yuhas

At the core of the Dynasty Foundation's ideals is the dissemination of scientific thought. Zimin believes that the spread of

# MedAustron Board Visits CERN

After Steve Myer's opening presentation, the MedAustron visit to CERN continued with a tour of the CMS

cavern and the CERN Control Centre. The visit to Linac3 and LEIR (Low Energy Ion Ring) was of particular interest to the board members because the beginning of the LHC ion injector chain is similar to the accelerator complex that will be at the heart of the MedAustron hadron therapy centre.

This partnership with CERN has existed since EBG MedAustron's participation in the Proton Ion Medical Machine Study (PIMMS) in 1995. The MedAustron hadron therapy complex is based on the PIMMS' conceptual design and the engineering design of CNAO

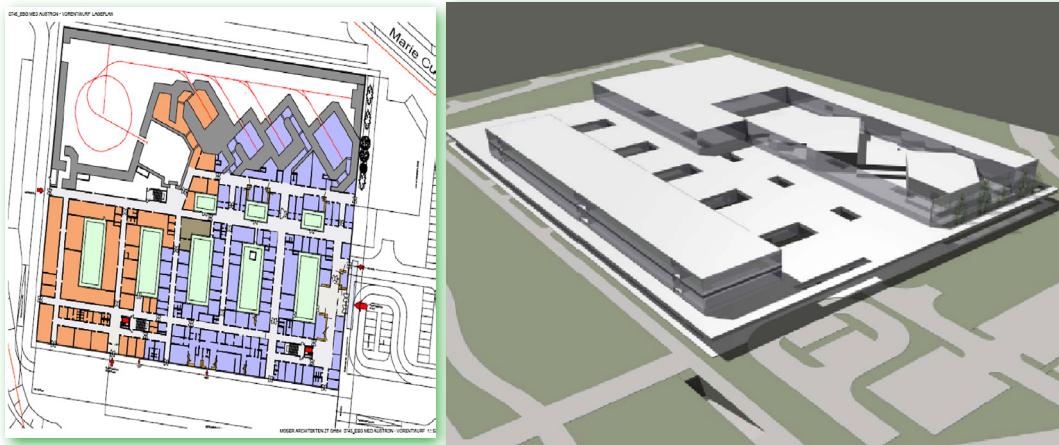
On 14 October, the board of EBG MedAustron, which is overseeing the construction of Austria's hadron therapy centre, visited CERN. The visit recognized the relationship of shared knowledge, technology, and training between CERN and MedAustron.

(Italian Centro Nazionale di Adroterapia Oncologica). The whole complex will occupy a surface of 20 000 m<sup>2</sup>. The accelerator, which is being built in close collaboration with CERN, will have 300 magnets (requiring 700 tons of steel), which will steer beams of protons and carbon ions. About 1200 patients every year will be treated in its three medical treatment rooms.

Four students and sixteen EBG MedAustron scientists and engineers, eight of whom took part in the Austria-CERN PhD program, are currently working and training

at CERN. The MedAustron team at CERN is integrated in various technical groups, studying all aspects of accelerator design for medical applications. The team will return to Austria in 2012 to install the accelerator in the MedAustron building. By then the team will have gained sufficient knowledge to also operate and maintain the facility, which is expected to start operation in 2013. "The strong collaboration with CERN is an essential ingredient for our project and an excellent example of large-scale technology transfer from CERN and high-energy physics", states Klaus Schneeberger, president of the MedAustron board.

CERN Bulletin



The construction work on the MedAustron complex is due to start at the end of 2010 in Wiener Neustadt.



The members of the MedAustron board of directors and the project's contributors in the Salle des Pas Perdus.

# Space shuttle crew training at CERN

**H**eaded by Commander Mark Kelly, a US Navy captain, the crew included pilot Gregory Johnson, a US Air Force (USAF) colonel, and mission specialists Mike Fincke (also a USAF colonel), Andrew Feustel, and Gregory Chamitoff of NASA, as well as Colonel Roberto Vittori of the European Space Agency (ESA). Two flight directors, Gary Horlache and Derek Hassmann of NASA, and the engineer responsible for the Extra Vehicular Activity (EVA) training of the astronauts, Allison Bolinger, also of NASA, completed the group.

They were invited to CERN by Samuel Ting, AMS spokesperson, because in July 2010 they will deliver the AMS detector to the International Space Station. Installing AMS to the exterior of the International Space Station will be quite a delicate operation. The task will require multiple space walks and a lot of attention due to the interference caused by the response of the AMS's powerful superconducting magnet to the life

**From 13 to 16 October, the crew of NASA Space Shuttle mission STS-134 came to CERN for a special physics training programme. Invited here by Samuel Ting, they will deliver the Alpha Magnetic Spectrometer (AMS) detector to the International Space Station (ISS).**

Support System that astronauts wear during their extra vehicular activities.

For two and a half days, Samuel Ting and many representatives of the collaboration's national institutes thoroughly briefed the astronauts about the detector's details, purposes in physics, frontier technology, and in particular, its complex sub-detectors' systems.

In addition to visiting the AMS clean room, the astronauts met Directo-General Rolf Heuer and Director for Accelerators Steve Myers, and visited the CCC accompanied by Paul Collier. The programme also included special "high altitude" training at the request of the astronauts themselves, who could not leave Geneva without a short climb to the Aiguille du Midi at 3900 meters. One could expect no less from people accustomed to working at 400 km altitude in the ISS!

At the end of the visit, Commander Kelly com-

mented: "It is a lot more comfortable carrying this special payload in space, now that we've understood its systems, and how the sensors and the cryogenics work."

Mission specialist Vittori, who has a degree in physics, said he was extremely happy to be part of this unique mission, which brings together his two passions: physics and space. "AMS is not a payload like any other," said Vittori. "It's the result of the efforts of a community of passionate scientists, an investment for all of us, a window in space and time that will most likely answer fundamental questions enabling us to understand who we are and where we're going".

*Paola Catapano*

Related videos:

Neutralinos at the LHC and in Space:

<http://cdsweb.cern.ch/record/1209884>

Interviews with captain Mark Kelly and mission specialist Roberto Vittori:

<http://cdsweb.cern.ch/record/1213290>



Maurice Bourquin (left) explains to the crew the formula of the Universe on the back of the CERN t-shirts (Copyright: Mike Struik)

The STS134 crew in the Lodge at the Aiguille du Midi wearing CERN fleeces. From left to right: Captain Mark Kelly, US Navy; Pilot Gregory Johnson, USAF ret.; Mission Specialist Andrew Feustel; Mission Specialist Mike Fincke, USAF; Mission Specialist Gregory Chamitoff and Mission Specialist Roberto Vittori, ESA and Italian Air Force. (Copyright: Mike Struik)

# Klaus Goebel - 1926-2009

Klaus Goebel, an early leading figure in radiation protection at CERN, passed away on 1 October 2009.

Klaus came to CERN in 1956 together with Wolfgang Gentner for whom he had worked as an assistant from 1954-55, after gaining a diploma in economics and a doctorate in physics at the University of Freiburg, Germany.

During these early years at the Laboratory, Klaus measured isotope concentrations in meteorites and as leader of the Spallation Research Group he used the Synchrocyclotron (SC) to measure isotope production by protons. This interest in trace measurements carried over to his work in CERN's Health Physics Group, which he joined in 1962. He took over successively the radiation protection work at the SC and the Proton Synchrotron as section leader and became deputy group leader. In 1969-70 he spent a sabbatical as a health physicist at the Lawrence Radiation Laboratory in Berkeley, California.

When Klaus came back to CERN the preparatory work for the construction of the Super Proton Synchrotron (SPS) was under



way and in 1971 John Adams called on him as leader of the Radiation Group to design the SPS Radiation Protection System. It was the first computer-controlled on-line radiation detection and alarm system employed inside the accelerator tunnel (radiation damage protection), in experimental areas (radiation protection of people) and for the site (environmental protection).

With the completion of the SPS in 1976 Klaus took over the responsibility for radia-

tion safety for the whole of CERN, changing the name of the group from Health Physics to Radiation Protection. Increasing awareness of radiation risks called for frequent reviews of procedures and for availability of full information both inside and outside the Laboratory, in particular during the planning of the Large Electron Positron collider, LEP.

Public awareness for radiation issues grew tremendously following the Chernobyl accident in 1986. In view of his contributions in the field of radiation protection, Klaus was elected President of the Fachverband für Strahlenschutz (The Swiss/German Radiation Protection Society) in 1988 during the critical period following the accident. While working at CERN his expertise in radiation protection matters was frequently requested, for example, for the spallation neutron source project in Karlsruhe and for the radiation protection system for the JET fusion project in Culham, UK.

Klaus leaves behind his wife Elfriede and two children to whom we convey our condolences.

*His colleagues and friends*



# Jan Koopman - 1957-2009

We deeply regret to announce the death of Mr Jan KOOPMAN on 31 October 2009. Mr Jan KOOPMAN, born on 28.07.1957, worked in the BE Department and had been employed at CERN since 16.09.1984.

The Director-General has sent his family a message of condolence on behalf of the CERN staff.

Social Affairs  
Human Resources Department



At the age of 27 Jan was the last member of SPS-ABM group to be recruited in 1984 and, after a lengthy illness, he has now left us prematurely at the age of 52.

As an electronics engineer, equally at home with analog and digital electronics or real-time microprocessor programming, Jan managed, thanks to his competence, professionalism, determination and enthusiasm, to develop, install and maintain many high-performance devices to measure beam characteristics.

His human qualities, his moral and intellectual integrity, his love of life and his readiness to offer assistance in professional as well as in private life earned him a rapid integration into the team, of which he was a highly appreciated member.

With his death we have all lost a true friend.

*His former colleagues and friends in the ABM and BI groups*

*Although life rolls inexorably towards its close, we must infuse it with love and hope while we have it.*

*Though absence will always be absence, we still have our memories and they bring us some comfort.*

## THANK YOU

We have been deeply touched by the expressions of sympathy and affection from all the friends and colleagues of Frédéric Roussel at CERN. As it is impossible to answer each one, Baptiste, Bénédicte, Guylaine and I would like to express our gratitude to everyone who sent their condolences.

*Sylvie Roussel*



## Take note

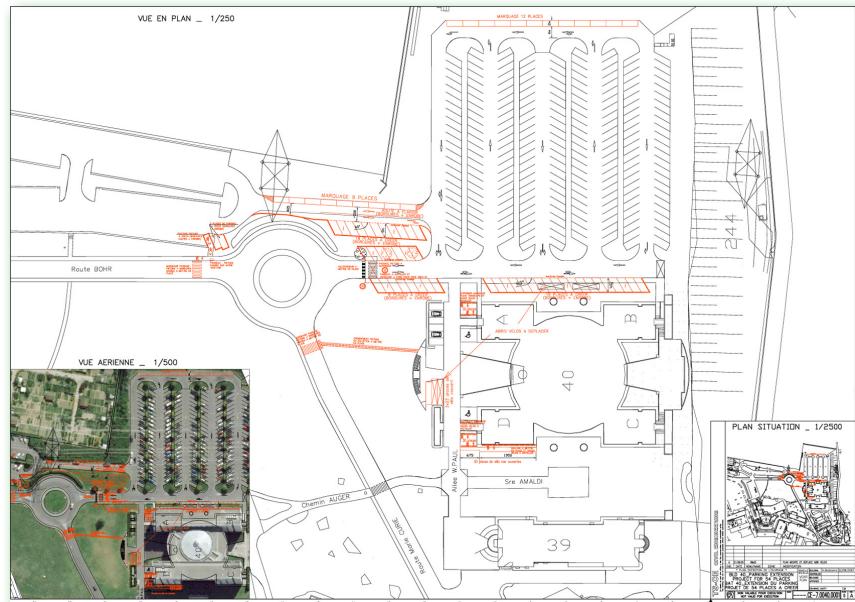
### CERN'S DRINKING WATER

CERN's drinking water is monitored on a regular basis. A certified independent laboratory takes and analyses samples to verify that the water complies with national and European regulations for safe drinking water. Nevertheless, the system that supplies our drinking water is very old and occasionally, especially after work has been carried out on the system, the water may become cloudy or discoloured, due to traces of corrosion.

For this reason, we recommend:

- Never use hot water from the tap for drinking or cooking. If you need hot water, then draw water from the cold water tap and heat it.
- Only drink or cook with cold water. Let the cold water run until it is clear before drinking or making your tea or coffee.

If you have any questions about the quality of CERN's drinking water, please contact: Jerome Espuche (GS/SEM), Serge Deleval (EN/CV) or Jonathan Gulley (DG/SCG).



### EXTENSION OF THE CAR PARK OF BUILDING 40

Work to extend the car park of Building 40 will begin on 16 November 2009 and is scheduled to last until 18 December 2009. See the drawing above for details.

47 additional car parking spaces will be available from the start of 2010.

*CERN - Civil Engineering Section*

### PREPARATION FOR RETIREMENT SEMINAR

The Human Resources Department is organizing a **preparation for retirement seminar**, which will take place on the afternoons of **25 and 27 November 2009**. Similar seminars in the past have always proved highly successful.

Retirement marks the end of a person's working life and the start of a new chapter. This period of transition is experienced differently from one individual to another. In all cases, being well informed and prepared greatly facilitates the change in lifestyle.

#### We would like to draw your attention to the following information:

**Staff concerned:** All staff members aged 58 and above have been sent a personal invitation to attend. Spouses are welcome.

Staff members under the age of 58 who are interested in attending the seminar may also apply. Their applications will be accepted subject to the availability of places.

**Registration:** In view of the number of people concerned and the limited capacity of the Main Auditorium, you are requested to register in advance via Indico at the following address:

<http://indico.cern.ch/conferenceDisplay.py?confId=50273>

You may register for all the sessions or only the subjects of interest to you.

One afternoon each will be devoted to retirement in the two Host States, Switzerland and France respectively. These two sessions are particularly designed for those:

- who are living in one of these countries,
- who intend to take up residence there on retirement,
- who have worked and acquired pension rights there.

**Presentations:** The speakers will be experts from both within and outside the Organization. Each speaker will make a presentation, underlining the key points for future pensioners to note and/or take into account. They will then take questions. Most of the presentations will be in French. However, you are welcome to put your questions in English. Members of the CERN-ESO Pensioners Association (GACEPA) will attend each session and may possibly supplement the presentations with comments based on their own experience. The details of the programme can be found at :

<http://indico.cern.ch/conferenceDisplay.py?confId=50273>

**Questions:** You may submit your questions **in advance** when you register via Indico. They will be transmitted to the speaker concerned to allow him to reply. Naturally, it will not be possible to discuss details of individual cases, for which the various internal and external services are available to you.

**Documentation:** The overhead presentations, the complete video recording and a summary of the question-and-answer sessions will be available on Indico at the same site as the programme.

Please also note that the brochure "When you leave CERN" is available on the Human Resources Department website at the following address:

<https://cern.ch/hr-services/int/doc/depart.pdf>

If you envisage retiring in the coming two or three years, I strongly encourage you to register for this seminar.

*Anne-Sylvie Catherin  
Head of the Human Resources Department*



## Language training

### Language Training

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

### INFORMATION SERVICE ("PERMANENCE")

An information service ("permanence") for language training has been set up. If anyone has a question or requires information on any aspect of English or French training please come to our office (5/4-016) at the following times:

#### **Lucette Fournier**

##### **French courses**

Mondays	13.30 - 15.30
Tuesdays	10.30 - 12.30

#### **Tessa Osborne**

##### **English courses**

Wednesdays	12.00 - 14.00
Thursdays	11.00 - 13.00



## Technical training

### NEW OFFICE SOFTWARE COURSE FORMAT!

Always keen to anticipate your training needs, the Technical Training service is pleased to propose two new Office Software course formats :

- "Focus on...": On a monthly basis we will propose a theme such as "Sharepoint Collaboration Workspace" or "Word 2007" or "charts", etc. You will be invited to send us in advance your questions regarding the proposed topic and register for the course through our Training Catalogue. During the session, our trainer will answer all the questions received and participants will increase their knowledge thanks to the solutions discussed for everyone. The course will last two hours, from 9:00 to 11:00 a.m. - with open questions on the proposed topic at the end.
- "Office software Individual coaching": If one or several specific topics are causing you sleepless nights, you can get the help of our trainer who will come to your workplace for a multiple of 1-hour slots. All fields in which our trainer can help are detailed in the course description in our training catalogue (Microsoft Office software, Adobe applications, i-applications, etc.)

Please consult these new courses in our catalogue:

<http://cta.cern.ch/cta2/f?p=110:9>

*Technical Training Service*  
Technical.Training@cern.ch  
Tel 74924

## NEW COURSES

### JOURNÉE LABVIEW AU CERN (COURSE IN FRENCH)

#### **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](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](http://cta.cern.ch/cta2/f?p=110:9:1375795393410117::NO::X__COURSE_ID,X_STATUS:4132%2CD)

Or contact:

Tessa Osborne 72957 (English courses)  
Lucette Fournier 73483 (French courses)

<http://indico.cern.ch/conferenceDisplay.py?confId=69691>

*Technical Training Service*  
Technical.Training@cern.ch  
Tel 74924



# Technical training

Marie-Laure LECOQ 74924  
ENSEIGNEMENT TECHNIQUE  
TECHNICAL TRAINING  
[technical.training@cern.ch](mailto:technical.training@cern.ch)

## CERN TECHNICAL TRAINING: AVAILABLE PLACES IN FORTHCOMING COURSES

The following course sessions are scheduled in the framework of the 2009 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

Developing secure software	07-DEC-09	07-DEC-09	0.5 day	English
Intermediate Linux System Administration	19-Nov-09	24-Nov-09	4 days	English
JAVA - Level 2	16-Nov-09	19-Nov-09	4 days	English
JCOP - Joint PVSS-JCOP Framework	23-Nov-09	27-Nov-09	4.5 days	English
Oracle Database SQL Tuning	07-DEC-09	09-DEC-09	3 days	English
PERL 5 - Advanced Aspects	10-DEC-09	10-DEC-09	1 day	English
Project Development using Python	01-DEC-09	04-DEC-09	4 days	English
Python - Hands-on Introduction	08-DEC-09	10-DEC-09	3 days	English
Secure coding for Perl	26-Nov-09	26-Nov-09	1 day	English
Secure coding for PHP	25-Nov-09	25-Nov-09	1 day	English
Web Applications with Oracle Application Express (APEX) 3.2	16-Nov-09	18-Nov-09	3 days	English

### Electronic design

Advanced VHDL for FPGA Design	30-Nov-09	04-DEC-09	5 days	English
LabVIEW - Working efficiently with LabVIEW 8	07-DEC-09	07-DEC-09	1 day	English
LabVIEW Basic I with RADE introduction	30-Nov-09	02-DEC-09	3 days	English
LabVIEW Basics 2	03-DEC-09	04-DEC-09	2 days	English

### Mechanical design

CATIA V5 – Surfacique 1	04-DEC-09	16-DEC-09	2 jours	French
CATIA-Smartteam Base 2	25-Nov-09	11-DEC-09	7 jours	French

### OFFICE SOFTWARE

CERN EDMS for Local Administrators	25-Nov-09	26-Nov-09	2 days	English
Dreamweaver CS3 - Level 2	04-DEC-09	04-DEC-09	1 jour	French
Indico - Conference Organization	20-Nov-09	20-Nov-09	0.5 day	English
Indico - Meeting Organization	20-Nov-09	20-Nov-09	0.5 day	English
PowerPoint 2007 - Level 1: ECDL	26-Nov-09	27-Nov-09	2 jours	French
CERN EDMS - Introduction	02-dec-09	02-dec-09	1 jour	French
Sharepoint Designer (Frontpage) - Level 1	07-DEC-09	08-DEC-09	2 days	English

### SPECIAL COURSE

Egroups training	15-DEC-09	15-DEC-09	0.5 jour	French
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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: employees of CERN contractors, with some restrictions). In particular, quoted prices and programmes refer specifically to the CERN community.

Marie-Laure LECOQ 74924  
ENSEIGNEMENT TECHNIQUE  
TECHNICAL TRAINING  
[technical.training@cern.ch](mailto:technical.training@cern.ch)





# External meeting

## GENEVA UNIVERSITY

### École de physique - Département de physique nucléaire et corposculaire

24, quai Ernest-Ansermet  
1211 GENÈVE 4  
Tél: (022) 379 62 73 - Fax: (022) 379 69  
92

#### Wednesday 18 November 2009

PARTICLE PHYSICS SEMINAR  
at 17:00 – Stückelberg Auditorium

#### Highlights of the European Strategy Workshop for Future Neutrino Physics

Dr Ilias Efthymiopoulos, CERN

Beginning of October 2009, a 3 day workshop was organized at CERN to consider the future neutrino physics with emphasis on the development work required for accelerator based neutrino physics. The high attendance and the quality of presentations and discussions made it a success also showing the dynamism and motivation of the European neutrino physicist community. The CERN workshop was an important step in a process where ongoing R&D projects and Design Studies in Europe were presented. At the same time it allowed scientific bodies, like the Panel on Future Neutrino Facilities established by the Scientific Policy Committee in December 2008 at the request of the CERN Council, to collect input and opinions of the European neutrino physics community in view of decisions to come. In the seminar selected highlights from the presentations and the summary discussions will be presented.

Information: <http://dpnc.unige.ch/seminaire/annonce.html>

Organizer: J.-S. Graulich

#### Monday 7 December 2009

PHYSICS COLLOQUIUM  
at 17:00 – Stückelberg Auditorium  
**Topological insulators and topological superconductors**  
Professor Shoucheng Zhang  
Department of Physics, Stanford  
University, CA

Recently, a new class of topological states has been theoretically predicted and experimentally realized. The topological insulators have an insulating gap in the bulk, but have topologically protected edge or surface states due to the time reversal symmetry. In two dimensions the edge states give rise to the quantum spin Hall (QSH) effect, in the absence of any external magnetic field. I shall review the theoretical prediction of the QSH state in HgTe/CdTe semiconductor quantum wells, and its recent experimental observation. The edge states of the QSH state supports fractionally charged excitations. The QSH effect can be generalized to three dimensions as the topological magneto-electric effect (TME) of the topological insulators. Topological insulators Bi<sub>2</sub>Te<sub>3</sub>, Bi<sub>2</sub>Se<sub>3</sub> have been discovered theoretically and experimentally to have surface states consisting of a single Dirac cone.

I shall present realistic experimental proposals to observe the magnetic monopoles on the surface of topological insulators. Topological superconductors and superfluid have been theoretically proposed recently, in both two and three dimensions. They have a full pairing gap in the bulk, and their mean field Hamiltonian look identical to that of the topological insulators. However, the gapless surface states consists of a single Majorana cone, containing only half the degree of freedom compared to the single Dirac cone on the surface of a topological insulators. I shall discuss their physics properties and the search for these novel states in real materials.

A drink with the speaker will be offered after the colloquium.

Organizer: Prof. Markus Büttiker



# Seminars

## MONDAY 16 NOVEMBER

### TH JOURNAL CLUB ON STRING THEORY

14:00 - Bldg. 1-1-025

**TBA**

A. BRINI

### INTC MEETING

14:00 - Council Chamber, Bldg. 503

### Provisional Agenda of the 35th Meeting of the INTC

P. BUTLER / UNIVERSITY OF LIVERPOOL

## TUESDAY 17 NOVEMBER

### CERN HEAVY ION FORUM

11:30 - Bldg. 40-S2-C01

### A comparative analysis of statistical hadron production

H. SATZ

### TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

### Elliptic hypergeometry of supersymmetric dualities

V. SPIRIDONOV

## WEDNESDAY 18 NOVEMBER

### TH COSMO COFFEE

11:00 - Bldg. 1-1-025

**TBA**

M. SLOTH / CERN

### TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

### Cold quark matter

A. VUORINEN / UNIVERSITY OF BIELEFELD

## THURSDAY 19 NOVEMBER

### TH BSM FORUM

14:00 - Bldg. 1-1-025

**TBA**

F. JUGEAU / IHEP

## FRIDAY 20 NOVEMBER

### COMPUTING SEMINAR

9:30 - IT Auditorium, Bldg. 31-3-D04

### Report on the Autumn 2009 HEPiX Meeting - H. MEINHARD / CERN-IT

### JOHN ADAMS' MEMORIAL LECTURE

10:30 -Main Auditorium, Bldg. 500

### Sir John Adams - His Legacy to the World of Particle Accelerators

E. WILSON / CERN/RETired

### TH INFORMAL LATTICE MEETING

11:00 -TH Auditorium, Bldg. 4

### Four dimensional graphene and chiral fermions

M. CREUTZ / BROOKHAVEN NATIONAL LABORATORY

### DETECTOR SEMINAR

11:00 -Bldg. 40-S2-A01

### Selected highlights from the IEEE 2009 Conference - Trends in Gaseous Detectors - A. SHARMA / CERN

### PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - Bldg. 1-1-025

**TBA** - F. TRAMONTANO / CERN

## MONDAY 23 NOVEMBER

### TH JOURNAL CLUB ON STRING THEORY

14:00 - Bldg. 1-1-025

**TBA** - C. PETERSSON / CERN & CHALMERS U.

## TUESDAY 24 NOVEMBER

### INDUCTION PROGRAMME - 2ND PART

8:45 - BLDG. 40-S2-D01

C. GRANIER, L. LEROUX

### SPSC MEETING

09:00 - Main Auditorium, Bldg. 500

### Preliminary Agenda of the 94th Meeting of the SPSC (in preparation) - C. VALLEE / CNRS-IN2P3

### TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

**TBA** - N. IIJUKA

## WEDNESDAY 25 NOVEMBER

### HR SEMINAR

13:00 - Main Auditorium, Bldg. 500

### Preparation à la retraite - 2009 - Preparing for retirement

### TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

**TBA** - M. SLOTH / CERN

### ISOLDE SEMINAR

14:30 - Bldg. 304-1-001

### SHIRAC: The Spiral 2 High Intensity Radiofrequency Cooler for the DESIR Facility

F. DUVAL / LPC-CAEN

## THURSDAY 26 NOVEMBER

### TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

### Strong Coupling and Causality in High-Spin Massive Particles: the Charged Spin 3/2 Example

M. PORRATI / NYU

## FRIDAY 27 NOVEMBER

### TECHNICAL SEMINAR

09.30 - BLDG. 40-S2-C01

### MathWorks Day at CERN

THE MATHWORKS, CH

### EN SEMINAR

11:00- Kjell Johnsen Auditorium, Bldg. 30-7-018

### How can the Library help you? How can you help the Library?

T. BASAGLIA / CERN, GS-SI

### HR SEMINAR

13:00 - Main Auditorium, Bldg. 500

### Preparation à la retraite - 2009 - Preparing for retirement

### PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - Bldg. 1-1-025

**TBA** - D. FORDE / CERN