

Upstream from OPERA: extreme attention to detail



Underground installations of the CERN Neutrinos to Gran Sasso (CNGS) project.

First ingredient: a stable beam

CERN produces neutrinos by sending a beam of protons to hit a target. The collisions produce a secondary beam, which mostly consists of pions and kaons that decay in flight within an evacuated tunnel. Their decay products are muons and muon-neutrinos. An absorber stops the pions and kaons that do

Two weeks ago, at a seminar held at CERN, the OPERA collaboration revealed their astonishing observation: neutrinos might move faster than light. The finding is currently under scrutiny in the scientific community. While the result downstream at Gran Sasso speaks for itself, upstream at CERN things are no less intriguing, with high-tech GPS systems, novel techniques for accurately measuring the time, and unique ways keeping the initial particle beam stable. Take away one ingredient and the accuracy needed for the final measurement is spoiled.

not decay, while the resulting muons are absorbed by rock within a kilometre and the muon-neutrinos continue through the earth's crust towards Gran Sasso. "In order to provide OPERA with a very stable neutrino

(Continued on page 2)

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A word from the DG

Science driving facilities for particle physics

This week, CERN played host to the 10th ICFA (International Committee for Future Accelerators) seminar, which brought together some 200 scientists, government agency representatives and lab directors from around the world to take the pulse of our field. ICFA seminars take place every three years, and this time the emphasis was on science as the driving force for facilities.

The theme of this year's seminar could not have been more timely.

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beam, it is crucial that the primary proton beam first hit the target in a very precise way. Any change in its alignment, as well as any change in the subsequent focusing elements, is reflected in changes to the muon beam and therefore to the neutrino beam," explains Edda Gschwendtner, the physicist in charge of the CERN Neutrinos to Gran Sasso (CNGS) secondary beam. The flux and profile of the muons, the 'sister particles' of the neutrinos, are continuously monitored and the beam is stopped automatically by an interlock system if a deviation from the nominal values is detected. Should an anomaly in the beam persist, a team of experts is on stand-by around the clock to intervene and fix the problems.

Second ingredient: time measurements

Any measurement of velocity implies a calculation of the time needed to cover the given distance. Beams Department engineers Javier Serrano and Pablo Alvarez, in collaboration with OPERA researchers, have been performing OPERA's time measurements with outstanding accuracy. "We measure the time using very accurate GPS receivers," says Javier. "We provide the experiment with a time measurement made between the Beam Current Transformer (BCT) – an instrument that monitors the intensity profile over time of the primary proton beam and is positioned just before the target – and a point just before the experiment's electronics." Researchers from the OPERA team have measured other possible contributions to the time of flight of the neutrinos, as well as the delay calibrations not included by CERN's calculations.

At Gran Sasso, the GPS time receiver was positioned at the surface. An 8km optical fibre linked that reference point with the heart of the detector where the neutrinos arrive. Special techniques were applied in order to accurately measure the length of the optical fibre – and therefore the associated delay – for the overall timing calibration. "The optical fibre length calibration was a limiting factor in previous experiments that attempted to perform measurements of the particles' time-of-flight," continues Javier Serrano.

After an initial phase in which the synchronisation accuracy with CERN needed by OPERA for their neutrino oscillation measurements was at the level of 100 ns, CERN and OPERA experts proposed reaching for nanosecond accuracy. "This opened the way to a real time-of-flight measurement. From our experience, we knew that the metrology labs around the world use time-measurement techniques that can reach an accuracy of 1 ns," says Javier Serrano. No sooner said than done. The GPS receivers, the antennas

and the cables that were to be installed at CERN and in Gran Sasso were taken to the Swiss Metrology Institute (METAS) for accurate calibration. Later on, after OPERA researchers found their neutrino velocity result, direct independent measurements were performed by CERN's Pablo Alvarez and experts from the German Institute of Metrology (PTB) in order to cross-check the time calibration on the two sites. "In addition to all this, we installed caesium atomic clocks on both sides of the neutrino beam," explains Javier Serrano. "These clocks are very stable and can be used to provide an additional check of the GPS time transfer and to increase its precision."

The CERN timing experts, in collaboration with the OPERA team, provided a very accurate time distribution of the primary proton beam, which is assumed to correspond to the profile of the neutrino beam arrival time. This plays a crucial role in the off-line calculation of the neutrinos' time of flight.

Last but not least: positioning

CERN surveyors also used GPS receivers to provide an accurate position for the target and the BCT, the points at the origin of the time measurement. On the Italian side, OPERA researchers worked collaboration with Mattia Crespi's geodesy group from the University of Rome to measure the position of the centre of the detector using both GPS and other standard topographical techniques, linking the surface GPS points to the underground cavern. This involved stopping the traffic on one side of the motorway from which the Gran Sasso Laboratory caverns are accessed. "We provided OPERA with the co-ordinates of the target here at CERN, which were transformed into a global co-ordinate system (ETRF2000). Using this data, the OPERA team and the Rome group were able to combine measurements from the two sides to accurately calculate their distance. The determination of the beam line elements at CERN came with an overall uncertainty of 2 cm as it was based not only on GPS data but also, for the underground points which cannot be measured by GPS, from precise measurements performed at the time of the LEP construction," says Dominique Missiaen, Head of the Survey section at CERN.

Next steps

Checks, checks and even further checks – this is the approach being taken by the CERN experts. "We know the beam very well, but in this context it is important to carefully study all details of the beam again. This applies to the muon beam in particular," says Edda Gschwendtner. "Ideally, a neutrino near-detector with excellent

time resolution would provide a valuable cross-check. In the absence of this option, muons remain very good indicators of the properties of the neutrino beam we send towards Gran Sasso."

"Many ideas are currently being exchanged within OPERA and CERN, but I think a better understanding of the time structure of the neutrino beam at its source would contribute to the quality of the measurements," concludes Pablo Alvarez.

Are you wondering when we will have a second measurement of the neutrino's time of flight? Dear old Albert might have told us: "Relatively soon".

CERN Bulletin

Watch the animation of the CERN to Gran Sasso neutrino beam:

<http://cdsweb.cern.ch/record/986729>



Did you know?

Did you say "GPS"?

How can experts reach such a high accuracy using GPS receivers? Are they the same instruments as the ones we have in our cars? Not exactly... Standard GPS systems installed in cars typically use only one of the two or three available signals emitted by the global satellite system – each one with a different encoding. In this way, standard GPS receivers are able to provide co-ordinates of a given point within about 10 metres. On the other hand, the GPS instruments used by surveyors and time experts can analyse all three signals as well as the carrier waves themselves, and can therefore reach a much higher accuracy, down to a few millimetres and nanoseconds. "In addition, the experts perform their measurements over a long period – up to 24 hours for precise position determination – and then apply statistical corrections to get a very precise result," says Mark Jones from the Survey Section at CERN.

LHC Report: Steady as she goes

There is a little over three weeks to the end of this year's proton run and the operations team is trying to squeeze in a number of special runs for dedicated studies. These include testing the machine with a beam with a 25 ns bunch spacing (which would open the way to doubling the number of bunches), and performing a high "pile-up" run in which single bunches with maximum intensity are collided. This would allow ATLAS and CMS to probe the effects of an exceptionally high number of collisions per bunch crossing on their detectors. Currently, at the start of a fill, ATLAS and CMS are seeing a peak of 20 events per bunch crossing. With an increased bunch current and an even lower β^* this figure could go even higher.

Despite the usual ups and downs, over the last fortnight the LHC has succeeded in delivering of the order of 500 inverse picobarns a week. The machine parameters are now at 1380 bunches, 1.3×10^{11} protons per bunch, and using the smallest possible beam sizes that the SPS can currently produce. These settings, together with the 1 m β^* squeeze, have allowed ATLAS and CMS to receive over 10 inverse picobarns an hour at the start of a fill.

LHCb has also passed the 1 inverse femtobarn mark, warranting a small celebration in the CERN Control Centre.

Preparation for the LHC ion run is in full swing. Intense ion beams were successfully produced and accelerated up to the LHC injection energy through the LINAC3, LEIR, PS, and SPS.

Mike Lamont for the LHC Team

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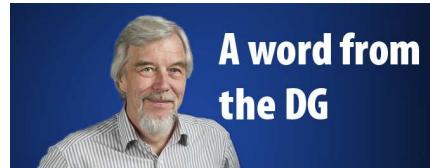
"We'll miss you." The Tevatron was given a final salute on the LHC1 screen on 30 September 2011, the day of its shutdown.

Upstream of OPERA: extreme attention to detail

(Continued from page 2)

Do you have ideas, questions and/or suggestions?

The CERN Press Office and CERN publications such as The Bulletin are not in a position to judge any new theories explaining OPERA's result. However, the peer-review process is a very well established method that the scientific community has put in place to discuss theories, ideas and results. If you think your ideas or work are worth further exploration, we advise you to follow the standard procedure used by scientists and submit your work through the established channels (each publication has its own set of rules, so please consult the relevant web sites).



A word from
the DG

(Continued from page 1)

Science driving facilities for particle physics

With austerity the global norm, it is more important than ever for science to point the way to the facilities we need, and for the global community to ensure that those facilities are planned at the global level.

The LHC is already a machine for the world, and although CERN's Member States have carried the bulk of the cost, it would not have been possible without contributions from around the globe. In the US, Fermilab's focus has moved away from the high-energy frontier to the intensity frontier, which is every bit as important for all of us. While in Japan, the major labs, including KEK, are still recovering from the earthquake, but it's safe to assume that they will soon resume their leading position in their traditional areas of strength.

I have singled out these three labs for a mention simply because one of them hosted the seminar, while the Directors of the other two are incoming and outgoing ICFA Chairs, but the whole point of the ICFA seminar is to show the continuity and diversity of our field. Around the world, interest in and

engagement with particle physics are growing, and that's why each participant at the ICFA seminar received a new ICFA publication, Beacons of Discovery, making the case for particle physics as a global endeavour.

The ICFA seminar has a very special place in the particle physics conference circuit. Coming around only once every three years and bringing together leaders representing every facet of the field, the seminar provides a unique opportunity to gauge the state of particle physics globally, and to get a feeling for regional trends. This time, the trend was clear: always collaborative, the time has come for particle physics to coordinate globally.

Whether it be for developing new science-led machines for the frontiers of our field, ensuring that the technical knowledge generated in pursuit of our science finds its way to people who can make it work in other areas, or for enthusing the upcoming generation, we're better off together. This was the clear message from this week's ICFA seminar.

Rolf Heuer

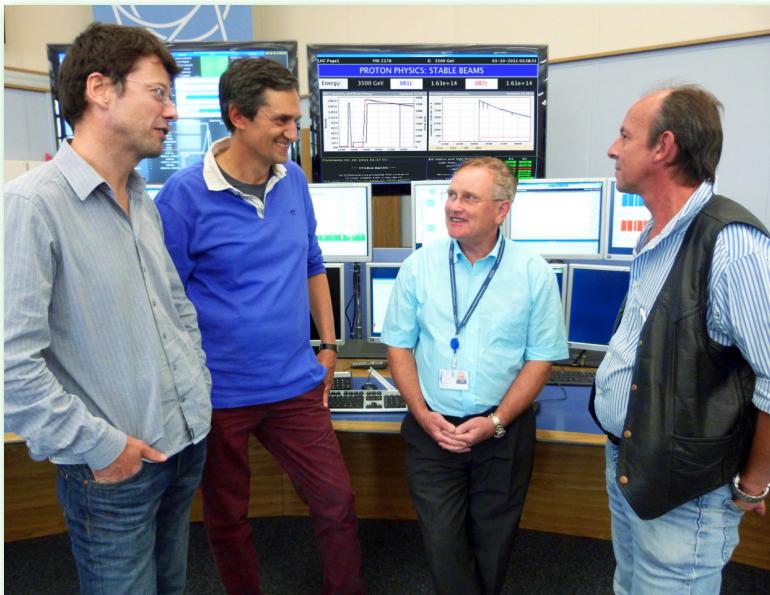
No mission is impossible for LHCb

LHCb is the CERN experiment specialising in the study of b-quarks, whose properties and behaviour are likely to provide physicists with important hints on several physics processes, including some new physics. "One inverse femtobarn of luminosity corresponds to about seventy billion b-quark pairs decayed in the LHCb detector," explains Pierluigi Campana, LHCb Spokesperson. "Such high statistics will allow us to reach an unprecedented accuracy in most of the core physics processes that we study."

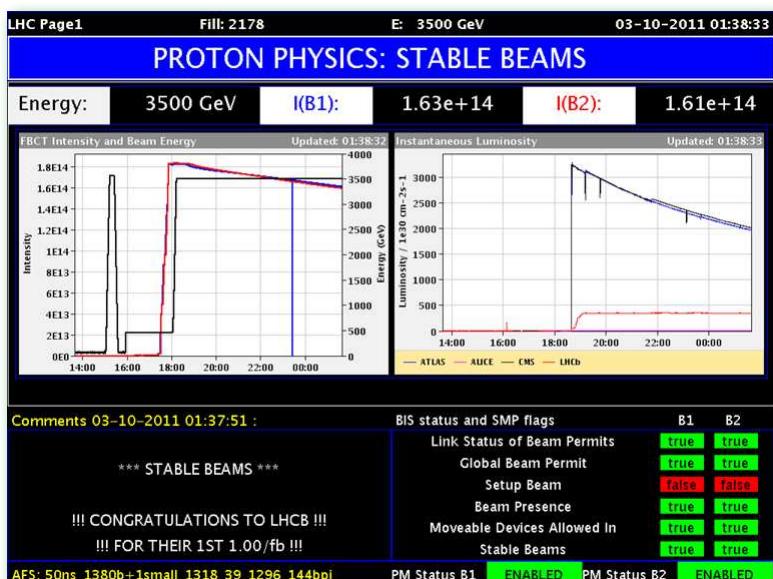
At the beginning of this year, such a high luminosity seemed a very challenging

Time: 01:37:51 am, 3 October, 2011. The LHC is producing million collisions per second in its detectors. But at that time, one collision is "more special" than the others in the LHCb detector: the milestone of 1 inverse femtobarn of luminosity is surpassed. What was considered as "mission impossible" at the beginning of the year is now "mission accomplished".

objective. The excellent performance of the LHC, several months of hard work and a new strategy changed the situation. "Early this year, at the Chamonix meeting, we discussed applying luminosity leveling systematically – something which we had only proposed and tried a few times in 2010. By slightly displacing the colliding beams with respect to each other at the LHCb interaction point and continually reducing the separation, LHCb can run flat at the highest luminosity for entire fills while preserving



Mike Lamont (Operations Group Leader), Pierluigi Campana (LHCb Spokesperson), Steve Myers (Director for Accelerators and Technology), and Paul Collier (Head of the Beams Department) celebrate the LHCb milestone.



The LHC1 screen congratulates LHCb for its new record.



Did you know?

LHCb film shortlisted by Japan Prize Festival

"LHCb - A Beauty Experiment", a short documentary on LHCb, has been short-listed by the NHK Japan Prize Festival. Every year, the festival awards the very best in global educational media. The film was produced by the CERN Visual Media Office. Visit YouTube to see the film in different resolutions or with subtitles at http://www.youtube.com/watch?v=rsmBMuTFdkA&feature=player_embedded.

the collision rate for ATLAS and CMS," says Richard Jacobsson, LHCb run coordinator.

Although sometimes theory differs from practice, thanks to the tight collaboration between the LHC and LHCb, this time the idea worked and the LHCb experiment has been running at full steam since then. "The huge amount of data collected so far will allow us to significantly increase the accuracy of our results. It also increases the statistics of various rare decays and makes their study possible. Moreover, we can now think of exploring new avenues and processes that we never imagined having access to so early," says Pierluigi Campana.

The new explorations could include studies of time-dependent charge-parity violation in the B_s system that could be hiding still unknown processes, and the measurement of the γ CKM angle whose value could provide a better knowledge of the quark interactions as well as hints of new physics. "The results we presented at the summer conferences were based on a set of data that was only one third of what we have now. We expect to have extended our knowledge about a variety of physics phenomena, some of which might be unexpected, in time for the winter conferences at the beginning of next year," says Pierluigi Campana.

The LHCb detector will continue to collect data until the LHC switches from protons to ions in November. It will also be fully operational during the two-day proton-ion run, scheduled a few weeks from now.

CERN Bulletin

Touching base with OPERA

According to the OPERA strategy, the results of the measurements are in the hands of the scientific community and, as for any other scientific result, several months will be needed before other groups will be able to perform an independent measurement. In the meantime, the OPERA Collaboration is dealing with an avalanche of emails from the scientific community, members of the general public, and the press. "We are replying to many interesting suggestions," says Antonio Ereditato, Professor of Particle Physics at Bern University and Spokesperson of the OPERA Collaboration. "Given the result, we were of course expecting a large response. We are evaluating all the input. Some of the questions concern points that were not explicitly shown during the seminars but will be described in the final version of the scientific paper."

So far, the main reactions have focused on the Earth's rotational effects, subtle general relativity issues, the technology used to measure time and distance, and the analysis methods. "After carefully considering all these points, we still have no indication of any large systematic effect that we could have overlooked. However, we are just at the beginning of the screening process by the community and we will have to wait longer," says Ereditato.

The investigation is just beginning. The OPERA Collaboration is acquiring more statistics to improve the quality of the measurement. Others will do the same in the coming months. "Even if another experiment confirms our result, it will not yet be a discovery but proof that the explanation of such an effect could not be trivial," says Antonio Ereditato. "We will keep studying the performance of our detector, we will keep looking carefully at the tiny details within the analysis, and we will keep collaborating with colleagues from other experiments. Even if neutrinos seem to travel faster than light, Science must not rush as the understanding of Nature is in no way a trivial exercise."

The scientific response

The Bulletin has contacted some of the experiments around the world that are likely to reproduce the OPERA's measurement. Here follows their statements:

Three seminars – at CERN, at Gran Sasso and in Japan – and an article calling for the scrutiny of the scientific community: the OPERA Collaboration opened its research publicly. In addition to huge press coverage, this triggered welcome reactions from colleagues around the world, many of whom will attempt to independently interpret and reproduce the measurement. OPERA's Spokesperson touches base with the Bulletin.

Borexino:

Borexino is installed in the same LNGS underground hall (Hall C), about 20 metres upstream of the OPERA experiment with respect to the neutrino flight direction from CERN. The volume of the Borexino detector is larger than that of OPERA, and Borexino is able to collect a larger number of events produced by CERN neutrinos.

The main goal of the Borexino experiment is the study of solar neutrinos and geoneutrinos. At present, the experiment is not equipped with the special timing devices required to measure the neutrino time-of-flight from CERN with the accuracy required to cross-check the OPERA results, which would be possible only by installing new timing devices.

After preliminary discussions, the Borexino Collaboration has expressed interest in performing an independent measurement to cross-check the result from OPERA. However, the discussion has barely started and is still ongoing. A decision has not been yet been made.

In an optimistic scenario, the Collaboration could be in a position to collect data by the start of the beam run in February 2012, but this depends on the successful implemen-

tation of necessary improvements, which cannot be fully evaluated at this time.

LVD

The LVD Collaboration has a great interest in the issue raised by the recent OPERA measurement. The experiment, designed to detect gravitational stellar collapses, can also detect neutrinos from the CERN beam. However, the Collaboration has to evaluate carefully if it can contribute a significant result with their detector as it is, or if it has to change, modify or add some detector parts.

T2K

Based on an initial assessment of the experiment's current capability, T2K cannot make any definitive statement to verify the OPERA measurement of the speed of neutrino. The Collaboration will assess the possibility of improving their experimental sensitivity in order to cross-check the OPERA anomaly in the future. Such a measurement with an improved system, however, could take a while to achieve.

MINOS

The MINOS Collaboration is planning to improve its measurement of the neutrino time-of-flights since its last result in 2007, with better-controlled systematics and about 10 times more data. The first update should be in about 6 months. There will be a further improvement (which was already planned) for the MINOS+ experiment, starting in 2013, which will take very high statistics, and higher energy data. This should give a total error of 5-10 ns on the final measurement.

CERN Bulletin



The CERN Main Auditorium was crowded as OPERA Physics co-ordinator Dario Autiero presented the results of their research (23 September 2011).

Let the flowers grow...

A Physics Laboratory occupying a territory of the size of a small village, with sites scattered across an even larger area, has a considerable potential impact on the environment. Energy and water consumption, waste management... these are all aspects of the same problem or, in the representation, petals of the same flower. Each one should be carefully studied and dealt with.

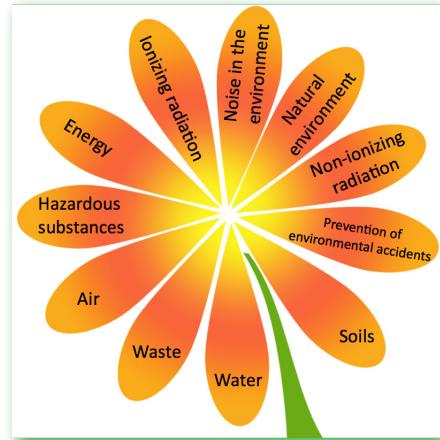
The nine members of the Environment Services section deal with matters that concern these and other aspects of the CERN's policy for the protection of the environment. "Last year we identified eleven domains within the policy and that cover the various activities of the Laboratory," explains Sonja Kleiner, Section Leader. "In order to help Department Leaders, Safety Officers and members of personnel to reduce the impact of their activities on the environment we provide them with professional advice and useful best practices. We also continuously monitor the entire CERN area and call on expert intervention if needed."

On top of eleven basic domains is the protection of the public and the environment

The Environmental part of CERN Safety policy is represented by a flower whose petals are the various domains of its application. The Environment Services section within the Occupational Health and Safety and Environmental Protection Unit is in charge of monitoring the impact of the Laboratory on the environment. You are called on to make every effort to reduce this impact as much as reasonably achievable. Read why and how...

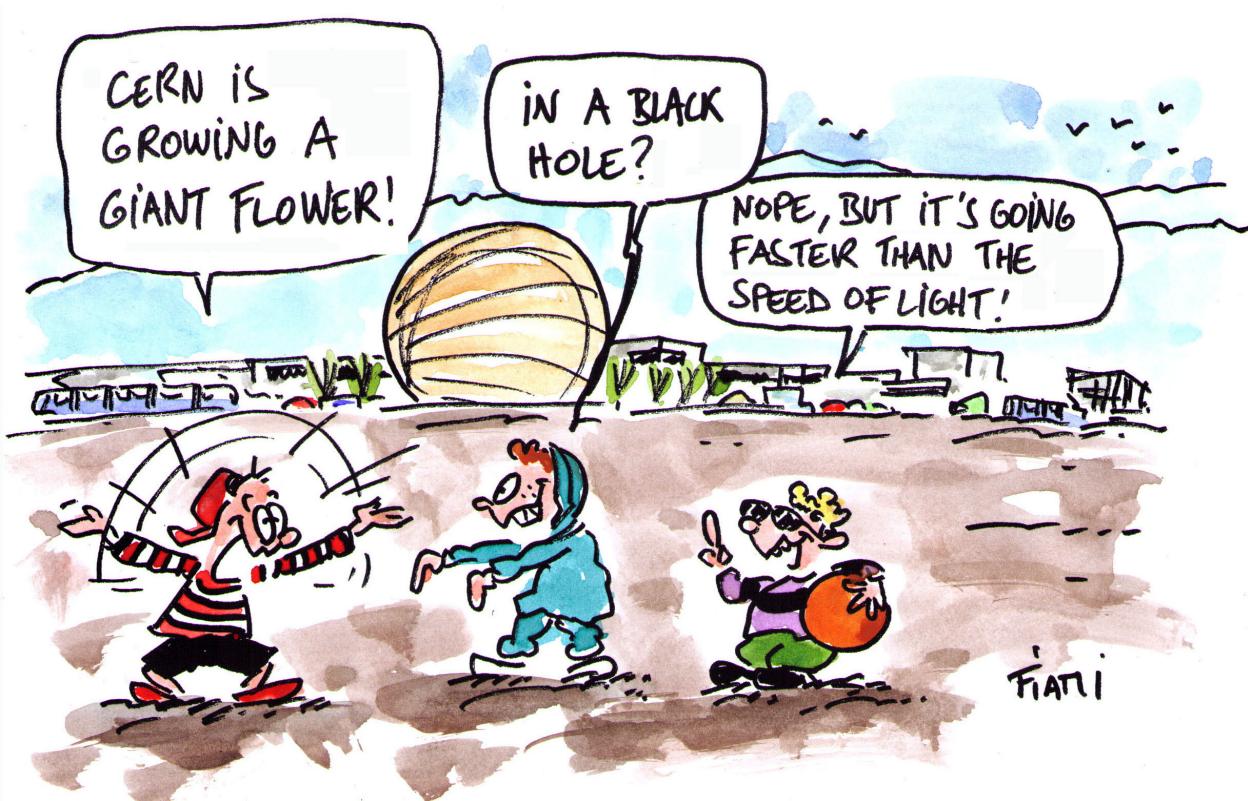
against ionizing radiation. This is accomplished by members of the Environment section in close collaboration with the Radiation Protection Group of the HSE Unit. "At CERN, radiological issues are integrated into the general policy that deals with all environment-related issues," explains Pavol Vojtyla, environmental radiation protection expert and a member of the section. "About two hundred and forty measuring stations and sampling points cover the CERN sites and beyond. They constantly provide information about the radiation levels and look for possible man-made radioactive substances. We use very sensitive instruments because the maximum radiation levels we monitor are extremely low. We also analyse several thousands of samples in our laboratories every year. These include, for example, filters from ventilation monitoring stations and samples of water continuously released from the sites."

As any other flower, CERN's Safety policy for environmental aspects requires care. Active participation of all members of personnel to



help reduce CERN's environmental impact is strongly encouraged. This can easily be done by reading and following the HSE Advice page. Also, if you are starting a new project or you are planning an equipment upgrade, it is good practice to contact the Environment Services Section from the very beginning. This would help you make sure that the impact of your activity on the environment is as low as reasonably achievable, that is precisely the objective of CERN's Safety policy for environmental aspects. Do your part and let the flower grow!

CERN Bulletin



"Light" might be the answer

Signals, perhaps signs, but no Higgs boson yet... While the experimentalists continue to collect and analyse precious data, theorists are evaluating the various theoretical models and monitoring the likelihood of theirs being the right one. "So far, the experimental data collected by the experiments strongly confirm what we were expecting from the Standard Model," says Ignatios Antoniadis. "Several parameters that, according to the theory, are strongly linked to the Higgs boson have now been measured with a very high precision. In all the plots, we see that the best fit is obtained if we assume a small-mass Higgs. In other words, everything we know up to now seems to be in excellent agreement with the existence of such a particle."

Despite the extremely good performance of the LHC and its experiments, researchers are not likely to get a final answer this year, but rather next year. And if we need to wait

Higgs or not Higgs, light or heavy? Light Higgs, says Ignatios Antoniadis of CERN's Theory Group. The particle is still hiding but there are some signals that could potentially point to a small-mass Higgs boson. Staying in the realm of hypothesis, how would such a Higgs shape the Universe? How would it impact existing theories such as supersymmetry and extra dimensions? And finally, how could superluminal neutrinos fit into all this?

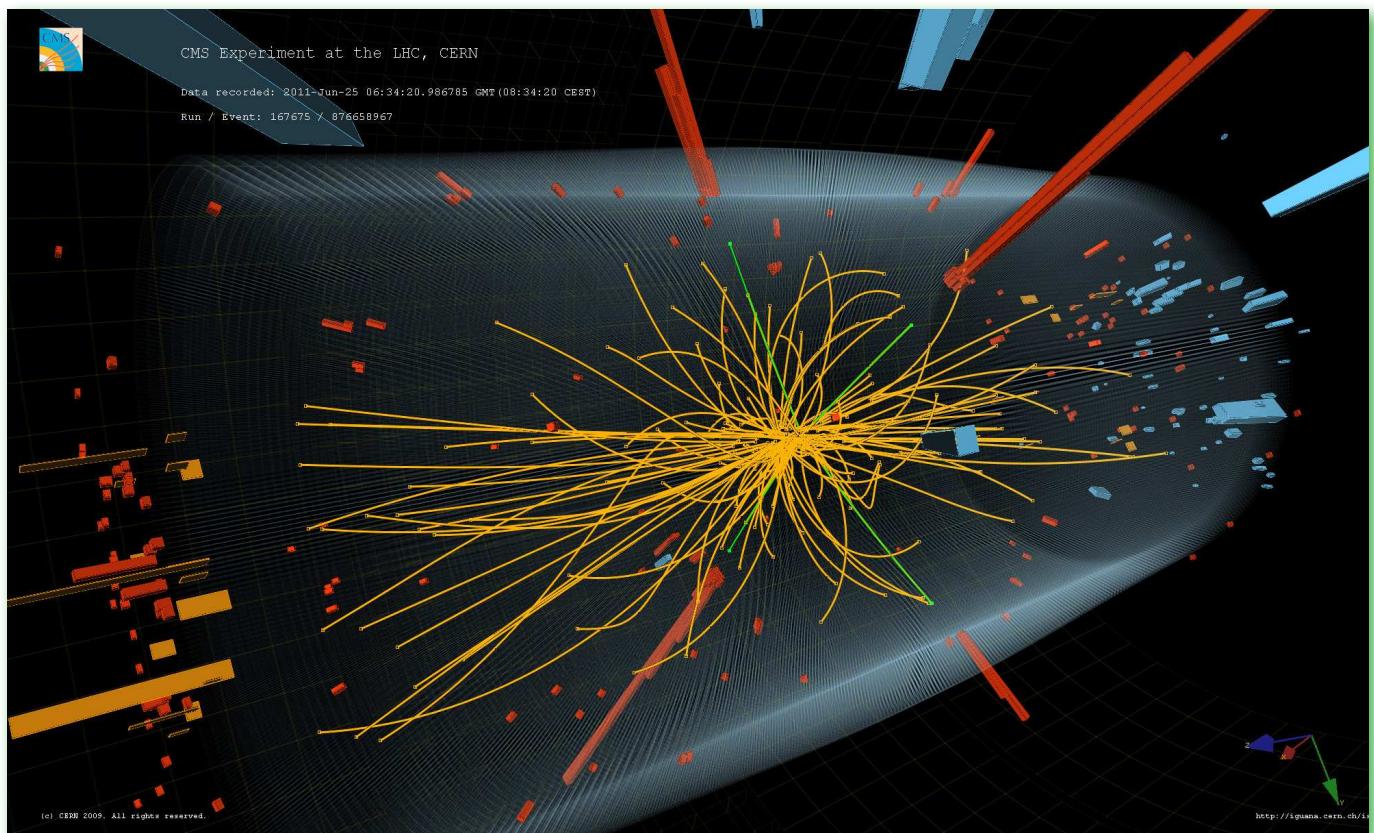
a few more months for the Higgs, we will have to wait much longer than this to clarify whether supersymmetric particles exist or not. "Although the data seems to be narrowing the mass region in which supersymmetric particles could lie, technically speaking we cannot yet exclude their existence," confirms Ignatios Antoniadis. "I believe that, to get a final answer, we will need to wait until the next high-energy phase of the LHC, which is expected to start in 2014."

If the Higgs exists, its mass will also tell us something about the supersymmetric world. "A light Higgs is compatible with supersymmetry, whose theoretical models predict the existence of an elementary particle with the properties of the famous boson. On the other hand, a heavy Higgs

would basically exclude supersymmetry, at least that which we could theoretically expect to discover at the LHC," explains Antoniadis. If supersymmetric particles are not found, extra dimensions could become a very strong alternative scenario to describe what is out there in the Universe. "Extra dimensions do not constrain the mass of the Higgs. There are extra dimension models that remain consistent without a Higgs boson at all," he continues.

Extra dimensions recently came into the limelight in the discussions that followed OPERA's announcement. "OPERA's results indicate a violation of the absolute limit of the speed of light. Existing experimental constraints from measurements done on neutrinos from supernovae imply that such an effect should strongly depend on the energy of the particles. Theories with extra dimensions may, in principle, accommodate such effects, but in my view we should wait for independent experimental confirmation," concludes Antoniadis.

CERN Bulletin



Real CMS proton-proton collisions events in which 4 high energy electrons (red towers) are observed. The event shows characteristics expected from the decay of a Higgs boson but is also consistent with background Standard Model physics processes.

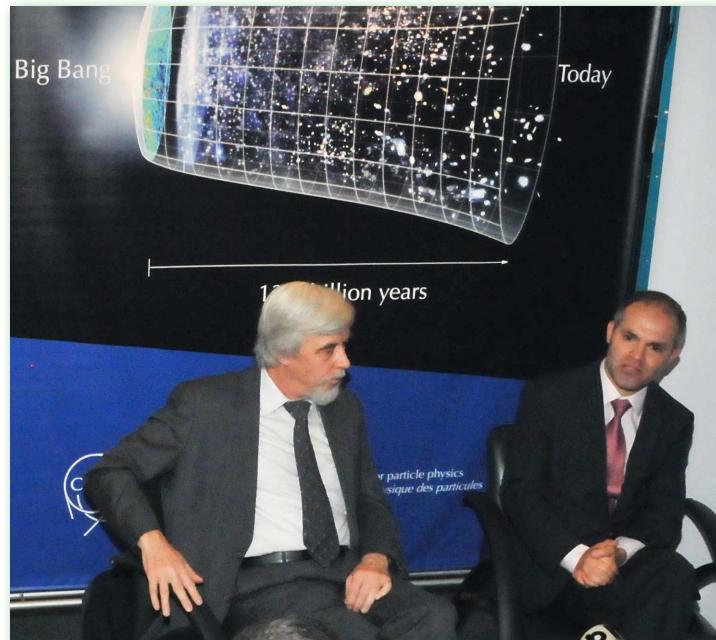
CERN School of Physics travels to Romania

Every year, the School of High-Energy Physics hosts students from around the world to learn from the best in the HEP field. The Schools began in the 1960s as a CERN initiative and, since 1971, schools have been jointly organised by CERN and the Joint Institute for Nuclear Research (JINR) in Russia. "This year, we hosted almost 100 participants from 31 countries," says Nick Ellis, director of the CERN Schools of Physics. "The Schools have always been a fantastic opportunity for the next generation of particle physicists

From 7-20 September, students at the European School of High-Energy Physics brought their enthusiasm for physics to Cheile Gradistei, Romania. This was the school's first time in Romania, which is set to become a CERN Member State in 2015.

to learn and to network with their future colleagues."

Students attended a comprehensive programme of lectures and discussion sessions, and were also given the opportunity to discuss their work with their teachers and peers during a student poster session. "We also asked the students in each discussion group to work to dissect both the theoretical and the experimental aspects of a single LHC paper," says Ellis. "These discussion group projects were enormously successful during our Latin American School earlier this year, and were just as popular in Romania!" For the final day of classes, CERN Director-General, Rolf Heuer travelled to remote Cheile Gradistei to speak to the CERN School students and teachers. "Rolf gave a lecture to the students about CERN's scientific programme. It was a great opportunity for students to interact with Rolf personally," says Ellis.



Director General Rolf Heuer and Minister Daniel Petru Funeriu gave a joint press conference at the CERN exhibit.

With Romania set to become a member state of the Organization, links between the two are growing closer. In parallel with the School, an exhibition about CERN for the general public opened at the Central University Library Carol I in downtown Bucharest. The Romanian organizers arranged for the CERN School participants to stay in Romania for an extra day, giving them the chance to visit the Romanian capital and the exhibition.

In addition, the students were able to attend Rolf Heuer's public lecture at the University of Bucharest on 20 September where he was introduced by Daniel Petru Funeriu, Romania's Minister for Education, Research, Youth and Sports. During a joint press conference with the DG, the Minister described Romania's membership in the Organization as the "top priority" for his office. Over the next five years, Romania will ramp up their contributions to the Organization towards that of a normal Member State. In 2015, CERN Council will decide on Romania's application for full membership.

CERN Bulletin



Students from the 2011 CERN School of High-Energy Physics.

At the heart of CERN for one night

The second edition of CERN Researchers Night was a great success, with international participants as well as a substantial local contingent.

Some 200 young people aged 13 to 18 registered on the event's website and spent two hours in one of the control rooms of the LHC machine and its experiments. Laëtitia Pedroso, a member of the Communication Group who participated in the organisation of this event, noted with satisfaction: "Most of the pupils came from neighbouring France and Switzerland, but we also welcomed Italian, British and Polish visitors. Compared with last year, this year's pupils came from a greater variety of schools, which shows that the event is gaining more recognition."

Researchers Night has become a highlight for the local public, as it is an opportunity to see parts of CERN that are normally closed. "I learned a lot from this visit," said Paulo, a pupil in the Cycle d'Orientation de Cayla, a Geneva secondary school. "CERN's Control Centre experts explained to us how the accelerator works and what has to be done to get the particles to collide."

Some 200 young people, mostly from neighbouring Switzerland or France – but also from Italy, Great Britain and Poland – took part in Researchers Night on Friday, 23 September. Interviewed by the Bulletin after they had returned from the control rooms of the LHC and its experiments, the pupils were full of enthusiasm following, by all accounts, an unforgettable evening.

"I love physics, I love everything to do with the future, and I'm very happy to be here!" exclaimed Rafael, from the Cycle d'Orientation des Colombières, also in Geneva. Arthur, a pupil from a French secondary school—the Lycée Saint-Michel, in Annecy—had a chance to visit LHCb, and added: "We talked about matter and anti-matter, we saw real particle tracks, and we saw some real collisions!" Marjorie, a pupil at the same school, was surprised to see the results of an identification exercise by the ATLAS team showing examples of the kinds of traces that would be left in the wake of a Higgs boson.

The evening ended late, as befits a 'Researchers Night'. It was the end of a long day for Corinne Pralavorio, who is responsible for local communication at CERN. Her assessment of the event: "The local public seems to appreciate this kind of initiative. Researchers Night gives young people the

opportunity to experience the reality of research for two hours; an experience that is all the more fantastic for taking place after nightfall. I'm happy at the end of the event to see young people inspired and motivated by physics!"

For those who missed this opportunity: you can still visit CERN (although not all the control centres) from Monday to Saturday by making a reservation with the CERN Visit Service.

CERN Bulletin



Participants of the 2011 Researchers Night enjoy their visit to CMS.

Playing soon at a planetarium near you

"The full-length show will go from the Big Bang to galaxies to underground experiments and possibly AMS before coming to ATLAS for the final third or fourth," explains Michael Barnett from Lawrence Berkeley Lab (LBL). While much of the media attention has focused on the Higgs boson, this project will show how an experiment like ATLAS can search for dark matter and explain other great mysteries in physics.

"We are working with George Smoot, experts from seven major planetariums worldwide, and many others. We have

Seeking to popularise the broad research programme undertaken by the LHC experiments, three members of the ATLAS collaboration, Michael Barnett, Kaushik De and Reinhard Schwienhorst, had the idea of reaching new audiences through a planetarium show. Given the thousands of planetariums worldwide, this project could have an astronomical impact...

award-winning people who will do script-writing, narration, music, etc," confirms Michael Barnett.

The first step was to produce a spectacular 55-second planetarium clip. "The biggest challenge was to develop the software to adapt an image for a dome" comments Joao Pequenao, also from LBL, who was instrumental in the making of this clip.

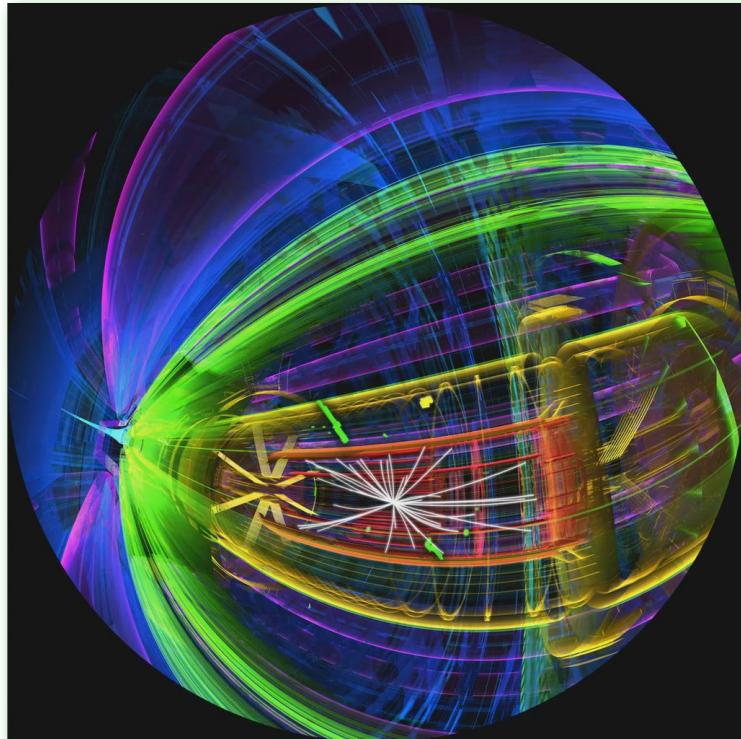
"What's really neat is that now people can feel as if they are inside the detector or the LHC tunnel."

The University of Texas in Arlington (UTA) has a full-dome planetarium located right next to the ATLAS Grid Tier 2 Centre. "Its staff has developed multiple shows for NASA, and is looking forward to working on their first project for the LHC," says Kaushik De from UTA. "Tens of thousands of young students come to the planetarium every year. For the ATLAS show, a licensing fee is not planned, which I think will increase its outreach effect."

A full-dome video projector is required to display this show, something not every planetarium has. Hence, a subset of those involved in this mega project from Michigan State University (MSU) led by Reinhard Schwienhorst developed in parallel a smaller scale initiative – a 35-minute feature titled "Relics of the Big Bang" that premieres Friday 7 October at the Abrams planetarium. "It explains the connection between the LHC and ATLAS with cosmology and the Big Bang, with a special emphasis on MSU's involvement in this research. It will be made available to other planetariums having similar equipment," says Reinhard Schwienhorst, a member of the ATLAS Collaboration from Michigan State University. This project involved students from the arts and sciences communication, professional writing and physics programmes.

These two initiatives will greatly contribute to bringing the physics of the LHC to new audiences and reaching audiences worldwide. Make sure to keep an eye out for it at your local planetarium.

CERN Bulletin



A snapshot from the ATLAS planetarium show looking distorted when not projected onto a dome (courtesy of Joao Pequenao).



A view of the LHC control room as seen when projected on a dome, but appearing distorted when seen on a flat screen. (courtesy of UTA planetarium).

Indian President visits CERN

Upon arrival, Pratibha Patil was greeted by CERN Director-General Rolf Heuer, as well as senior Indian scientists working at CERN, and various department directors. After a quick overview of the Organization, Rolf Heuer and the President addressed India's future collaboration with CERN. India is currently an Observer State of the Organization, and is considering becoming an Associate Member State.

A short stop in LHC operations gave Steve Myers and the Accelerator team the opportunity to take the President on a tour through the LHC tunnel. From there, ALICE's Tapan Nayak and Spokesperson Paolo Giubellino took Pratibha Patil to the experiment's cavern. Then it was up to the ALICE control centre, where the President had the chance to video chat with physicists working in India.

Pratibha Patil ended her visit with CERN's Indian community, who were given the opportunity to meet their President and pose for a quick "family photo".

See the video at:

<http://cdsweb.cern.ch/record/1387921>

Katarina Anthony

Luis Álvarez-Gaumé to speak at El Ser Creativo 2011

Over the course of the conference, 21 speakers will have the chance to share their opinions and ideas for 21 minutes each – the estimated time that the human brain is able to maintain complete focus. Among the Nobel Prize winners, scientists, doctors, and thinkers invited to this year's conference is Luis Álvarez-Gaumé, a theoretical physicist at CERN. Having made significant contributions to the understanding of gravitation, minimal supergravity theory and supersymmetry, Álvarez-Gaumé was an obvious choice to be invited to share his thoughts about the theory and reality of current physics ideas with the conference attendees.

During the weekend of 19 October, 2011, Madrid will host this year's *El Ser Creativo* – a three-day conference celebrating new ideas that can change the world.



A webcast will be available to stream the entire conference live at:

<http://www.elsercreativo.com/>

Jordan Juras

On 1 October, her Excellency Mrs Pratibha Devisingh Patil, President of India, picked CERN as the first stop on her official state visit to Switzerland. Accompanied by a host of Indian journalists, a security team, and a group of presidential delegates, the president left quite an impression when she visited CERN's Point 2!



Her Excellency Mrs Pratibha Devisingh Patil, at the signing ceremony.

A Chat with James Watson

On 6 September, Nobel laureate James Watson paid a visit to CERN. In this interview, he shares his views with CERN's Paola Catapano.

See the video at:

<http://cdsweb.cern.ch/record/1388543>

An exact “Tour de France” passes through CERN

The words “out of the ordinary” are not used lightly by a man who has scaled France’s highest peaks in extreme conditions and conquered the world’s greatest climbs (mainly solo), from Alaska to Patagonia. “I had never visited a physics lab before today,” confesses Lionel Daudet, sitting at a table in the CERN cafeteria. “You get the feeling that knowledge is being built here. When I crossed this particular border into CERN it was like crossing a bridge and I realised that, as a mountaineer, I have a lot in common with researchers.”

Whether you’re an explorer in the literal sense or a researcher plumbing the depths of the Universe, the aim is similar – to push human boundaries and venture into the unknown. “It was fantastic to meet physicists today. Their work is so exciting and very much like mine – I’m trying to reach the summits of the Earth while they’re trying to reach the summits of knowledge. It’s not that different,” muses Lionel.

After scaling the Mont Blanc, crossing the Chablais, and paddling 80km across Lake Geneva in an 8-seater pirogue, the adventurer took time out to reflect on his

In August 2011, the renowned French mountaineer Lionel Daudet set off from Mont Blanc on a “Tour de la France exacte”, strictly following the 5,000 km of land borders and coastline without using a single motorised vehicle. And about a week into his expedition, the French border led him... to CERN of course... where he described his experience as out of the ordinary.

visit to CERN, and what touched his heart most was the CERN spirit. “I feel total affinity with the spirit of openness that has underpinned CERN’s development and I share your aim of pushing back the frontiers of knowledge, which must always come before national interests. For me, frontiers are bridges, not barriers. This goes without saying here at CERN because, in addition to the twenty Member States, the lab is open to scientists from all over the world. CERN is a great example for the world to emulate,” he concludes.

Lionel Daudet continues his voyage along France’s borders and you can follow his progress over the coming twelve months by visiting his website where, among other things, you can track his precise position at any given time.

CERN Bulletin



Lionel Daudet at one of the posts marking the French border in Meyrin (next to the Linac 4 building).

Pauline Gagnon's Blog: Did we build the LHC just to find the Higgs?

Despite the media focusing mainly on the Higgs boson, this search only represents one of the many aspects we hope to cover with the LHC. Granted, the Higgs boson brings such an elegant solution to the problem of the origin of mass that its high popularity among physicists has reached even the general public.

But the LHC could be opening the door to parallel worlds, extra dimensions or the discovery of as many new particles as the ones we already know. These are but some of the exciting questions we are trying to address.

By exploring the world of infinitely small particles, many of us hope to provide answers to the origin of our universe. The ALICE experiment aims to study the properties of quark-gluon plasma, a state of matter that existed only immediately after the Big Bang.

What happened just after the Big Bang? Why did matter overtake anti-matter when in a laboratory, they are created in equal amounts? Where is this asymmetry coming from? This is precisely what the LHCb experi-

There are bosons and bosons, and if the Large Hadron Collider (LHC) were built only to find the Higgs boson, you would be absolutely right to think all physicists belong to the first category. But the fact is, the LHC does much more than search for Higgs bosons.

ment wants to elucidate. And it has already taken great strides in this direction.

Finding out what dark matter is made of is certainly high on the LHC agenda. Dark matter was postulated in 1934 by Fritz Zwicky to explain why rotating galaxies don't simply fly apart under the effect of centrifugal forces. Some unseen but huge quantities of matter seem to provide the necessary gravitational field needed to hold them together. It is hard to dismiss it since dark matter and dark energy account for about 95% of all matter in our universe! But this strange type of matter, unlike stars and galaxies, does not emit any light, hence its name. It only responds to gravitation, leaving much room for speculation on its nature.

Many different hypotheses have been proposed to explain the nature of dark matter but so far, we have not succeeded in identifying particles associated with it. This mystery remains to be solved even though some experiments claim to have seen it, while others contradict these observations.

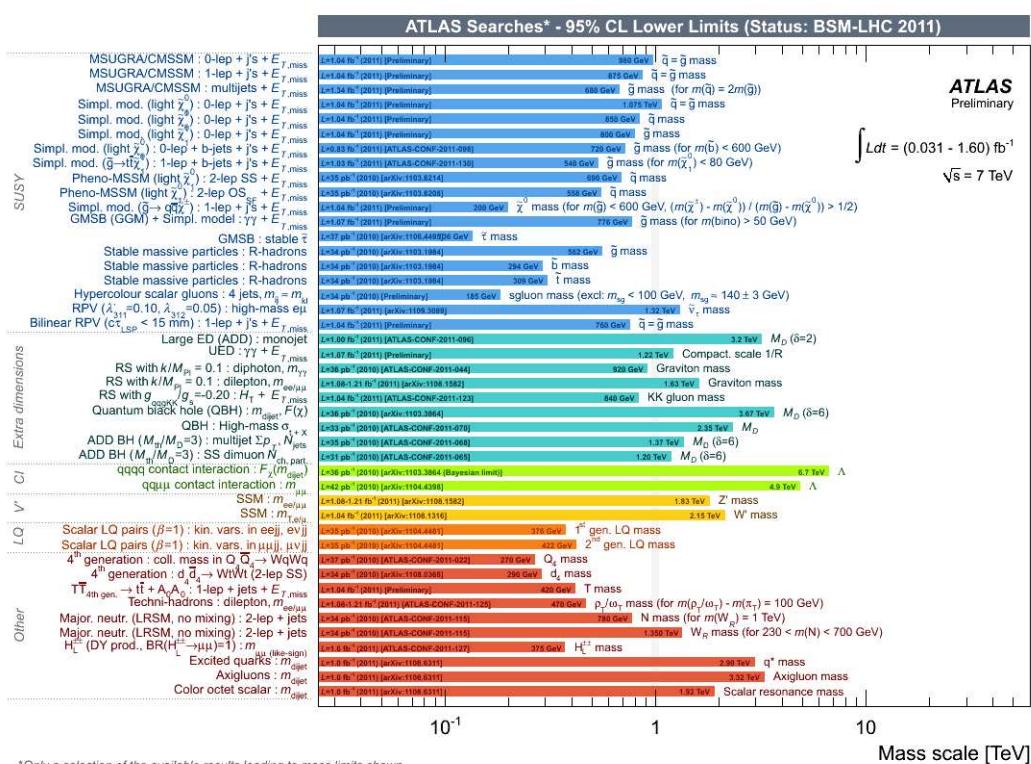
Many of us, including myself, hope to get a glimpse at a parallel world called the Hidden Valley, a hypothetical world made of dark matter, with very few exchanges with our universe.

Both ATLAS and CMS, being such versatile experiments, can look for many different types of dark matter candidates. One possibility is proposed within supersymmetry (or SUSY for short), a theory so popular, many think it could be the first one to be discovered with the LHC.

SUSY is seen as the simplest extension one could make to the Standard Model to fill in a few holes left open in our current theory. As it stands, we have two categories of particles, the fermions and the bosons. The first ones are the building blocks of matter, the second are force carriers. These two sets of particles behave completely differently. Fermions have half units of spin (one basic property like the electric charge) whereas bosons either have spin 0, 1 or 2. SUSY associates a super partner to each particle such that each fermion would come with a "sfermion" (as in supersymmetric fermion) with integer spin associated to it. It is the same for the bosons. Heavier particles would be associated with light ones, and vice-versa. That way, everything would seem much more balanced, getting rid of the puzzling differences among all the elementary particles, ranging from ultra light to super heavy.

Supersymmetry has everything to be successful except that it has not manifested itself yet, despite all our attempts at unveiling it.

What would you say if you found out we do not live in a four-dimensional world, (three dimensions of space and one of time) but rather one containing extra hidden dimensions? This is at least what some theorists suggested, predicting that these dimensions are so small that they are not readily available to us. To visualize this, imagine you are a tightrope walker. To you, only one-dimension is accessible: you can move forward or backward. But for an insect walking on the same



A selection of recent results obtained by the ATLAS experiment in search for new discoveries. In blue, searches for various supersymmetric models, in turquoise, models involving extra dimensions, and the other colors showing even more exotic models.

(Continued on page 14)

Did we build the LHC just to find the Higgs?

(Continued from page 13)

taut cable, it is also possible to go around the cable, giving it access to an additional dimension that is inaccessible to you.

Why should we need this? Extra dimensions would explain why gravitation is so weak. We physicists have long pondered over the huge discrepancy between, say, the electromagnetic force and gravita-

tional force: 41 orders of magnitude at the scale of the nucleus! Just think how much stronger a small fridge magnet is compared to gravitation. Bring it close enough to the fridge and the magnet can overcome the gravitational attraction of a whole planet! If extra dimensions exist, they would provide a place where most of the strength of the gravitational force could be leaking to, leav-

ing only a small fraction of it for us to feel on the macroscopic scale.

Who needs science fiction when we have particle physics? Enough strange puzzling questions and even stranger possible answers to blow your mind!

To be alerted of new postings, follow me on Twitter: @GagnonPauline

Pauline Gagnon



Computer Security
Sécurité informatique

Security Bingo

I personally...

Want to check your security awareness and win one of three marvelous books on computer security? Just print out this page, mark which of the 25 good practices below you already follow, and send the sheet back to us by 31 October 2011 at either Computer. Security@cern.ch or P.O. Box G19710.

Winners^[1] must show that they fulfil at least five good practices in a continuous vertical, horizontal or diagonal row. For details on CERN Computer Security, please consult <http://cern.ch/security>.

[1] In the event of more than three credibly correct replies, we will draw from the pool of replies.

...am concerned about computer security.	...run on my computer anti-virus software with up-to-date signature files.	...lock my computer screen whenever I leave my office.	...have chosen a reasonable complex password.	...have restricted access to all my files and data.
...am aware of the security risks and threats to CERN's computing facilities.	...protect confidential documents and do not make them public.	...am vigilant before opening mail attachments.	...understand the risks of clicking on strange links.	...regularly patch my computer.
...will never disclose my password to someone else.	...do not run prohibited applications.	...have brought my mouse to the CERN Computer Animal Shelter (http://cern.ch/c-a-s).	...respect copyrights and do not share music or films.	...immediately delete "Phishing" emails.
...do not run file sharing applications.	...never install plug-ins.	...never type my CERN password at Internet cafés.	...know how to contact Computer. Security@cern.ch	...never installed rogue wireless access points.
...have followed one or more security training sessions.	...do not store my music or films in a public place.	...have read, understood and agreed to the CERN Computing Rules.	...have distinct passwords for CERN, Facebook, Amazon, and others.	...protect my laptop against theft.

Computer Security Team



Official news

ADMINISTRATIVE CIRCULAR NO. 2 (REV. 5) – RECRUITMENT, APPOINTMENT AND POSSIBLE DEVELOPMENTS REGARDING THE CONTRACTUAL POSITION OF STAFF MEMBERS

Administrative Circular No. 2 (Rev. 5) entitled "Recruitment, appointment and possible developments regarding the contractual position of staff members", approved by the Director-General following discussion in the Standing Concertation Committee meeting on 1 September 2011, is available on the intranet site of the Human Resources Department:

<https://cern.ch/hr-docs/admincirc/admincirc.asp>

It cancels and replaces Administrative Circular No. 2 (Rev. 4) entitled "Recruitment, appointment and possible developments regarding the contractual position of staff members" of September 2009.

*Department Head Office
Human Resources Department*

OPERATIONAL CIRCULAR NO. 9 – PRINCIPLES AND PROCEDURES GOVERNING COMPLAINTS OF HARASSMENT

Operational Circular No. 9 entitled "Principles and Procedures Governing Complaints of Harassment", approved by the Director-General following discussion in the Standing Concertation Committee meeting on 21 March 2011, is available on the intranet site of the Human Resources Department:

<https://cern.ch/hr-docs/opcirc/opcirc.asp>

Operational Circular No. 9 is applicable to any person working at or on behalf of CERN.

It cancels and replaces Administrative Circular No. 32 entitled "Principles and Procedures Governing Complaints of Harassment" of February 2000.

*Department Head Office
Human Resources Department*

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.



Take note

EDUCATION FEES: INDEXATION OF THE AMOUNTS FOR ACCOMMODATION, MEALS AND SCHOOL TRANSPORT FOR THE 2011-2012 ACADEMIC YEAR

At its meeting on 1 September 2011, the Standing Concertation Committee approved the calculated indexation of the amounts for accommodation, meals and school transport for the 2011-2012 academic year. Accommodation fees for the 2011-2012 academic year will be paid in the form of a lump sum of 545 CHF per month (paid at the rate of 100%). The amount used for the calculation of meal payments will be 18.50 CHF per meal (paid at the rate of 75%). The ceiling for school transport fees has been set at 627 CHF for the 2011-2012 academic year.

*Education Fees Service
Tel. 72862 / 71421
Human Resources Department*

*Site Services Section
GS Department*

REMINDER - EXTENSION/ SUPPRESSION OF ALLOWANCE FOR DEPENDENT CHILDREN AGED 20 TO 25

Members of the personnel with dependent children aged 20 to 25 (or reaching 20 during the 2011/2012 school year), for whom an allowance for dependent children is currently paid, are invited to provide the Education Fees Service with a:

SCHOOL CERTIFICATE

Unless we receive, by 31 October 2011 at the latest, a school certificate or similar written proof (contract of work placement, sandwich courses or apprenticeship) covering your child / children for the school year 2011/2012, we will be obliged to stop payment of the allowance for dependent children as well as affiliation to the health insurance at the appropriate date and retroactively if necessary.

*Education Fees Service
Mailbox C20000
schoolfees.service@cern.ch
Tel. 72862 / 71421
Human Resources Department*

*GS-IS-LS Service
GS Department*

ANNOUNCEMENT BY THE LOGISTICS SERVICE

Please note that CERN will dispatch or deliver only packages that relate to official orders or contracts. Individuals are not authorised to have private merchandise delivered to them at CERN and private deliveries will not be accepted by the Goods Reception services.

Thank you for your co-operation.

THE CERN BRANCH OF THE UBS HAS A NEW MANAGER

After seven years at the helm of the CERN branch of the UBS, Mr. Denis Mellet retired on 1st October.

Denis Mellet has always striven to develop harmonious relations, in a climate of trust, between CERN and the staff of the bank. He has succeeded in maintaining a pleasant atmosphere within his team. We would like to thank him for his work and wish him a happy retirement.

He is succeeded by M. Ezio Mangia, who has worked for many years in the bank's branches department.



Take note

PREPARATION FOR RETIREMENT SEMINAR

The Human Resources Department is organizing a **Preparation for Retirement Seminar**, which will take place **on the afternoon of 18 and 21 October 2011 in the Main Auditorium and on 19 October and 15 and 16 November 2011 in the afternoon in the Council Chamber**. 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 availability of places.

Registration: In view of the number of people concerned, you are requested to register in advance via Indico at the following address:

<https://indico.cern.ch/conferenceDisplay.py?confId=141029>

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

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

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

Presentations: The speakers will be experts either within or outside the Organization. Each speaker will make a presentation, underlining the key points for prospective pensioners to note and/or take into account. They will then take questions. Most of the presentations will be given 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 presentations with comments based on their own experience. The details of the (provisional) programme can be found at:

<https://indico.cern.ch/conferenceDisplay.py?confId=141029>

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 on 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:

cern.ch/hr-services/Int/WYLC/default.asp

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

Best regards,

Anne-Sylvie Catherin
Head of Human Resources Department

VACCINATION AGAINST SEASONAL INFLUENZA: A REMINDER

At this time every year the Medical Service suggests that you should get vaccinated against seasonal flu.

We would like to remind you that vaccination is the best method of protecting yourself and others against this contagious illness which can have serious consequences for certain people, especially those suffering from chronic medical conditions (e.g. chronic pulmonary, cardiovascular or kidney disease or diabetes), pregnant women, people suffering from obesity ($BMI > 30$) and those over 65.

As the Medical Service does not supply the vaccine, you must purchase it from a pharmacy (in France without the need for a prescription). From the beginning of October you can then bring your vaccine to the Infirmary (Building 57-Ground floor) and get vaccinated without an appointment between 9 a.m. and 12 a.m. and 2 p.m. to 4:30 p.m..

For the purposes of health insurance reimbursement, you can get a prescription from the Medical Service either on the day of the injection or beforehand.

Reminder: The Medical Service cannot provide this vaccination service for family members or retired members of the personnel.

For further information and new 2012 recommendations, please consult:

- * Flyer "seasonal Flu" from the Medical Service: https://espace.cern.ch/Medical-service/site_documents/flyergrippeGBweb.pdf
- * The WHO recommendations in English : <http://www.who.int/topics/influenza/en/index.html>
- * Recommendations of the Swiss Federal Office of Public Health (OFSP) in English: <http://www.vaccinateagainsttheflu.ch/en-us/vorsorge-und-hygienemassnahmen.html>
- * Recommendations of the Haut Conseil de la santé publique (in French only): https://espace.cern.ch/medical-service-fr/site_documents/Forms/AllItems.aspx

Medical Service - GS Department



Take note

CCIS
CAMERA
DI COMMERCIO
ITALIANA
PER LA SVIZZERA
Fondata nel 1909

Italy at CERN

10 – 13 ottobre 2011



From 10 to 13 October 2011
Industrial Exhibition
Bldg 500 & 61

ITALY AT CERN – INDUSTRIAL EXIBITION

Nineteen companies will present their latest technology at the industrial exhibition "Italy at CERN". Italian industry will exhibit products and technologies which are related to the field of particle physics.

Individual interviews will take place at either the companies' exhibition stands or in the Main Building's conference rooms. The firms will contact relevant users/technicians but any user wishing to make contact with a particular firm is welcome to use the contact details which are available from each secretariat of department or to get in touch with Karine ROBERT.

You will find below the list of exhibitors.

List of Exhibitors :

Agilent Technologies - via Varian 54 - 10040 Leini (TO)

<http://www.agilent.com/chem/vacuum>

Pioneer in vacuum technology since the 50's.

CAEN S.p.A. - via Vetraia, 11 – 55049 Viareggio (LU)

<http://www.caen.it/>

Data-Acquisition Electronics (standard VME, NIM, CAMAC solutions) and powered Crates.

CECOM S.r.l. - via Tiburtina Km 18,700 – 00012 Guidonia Montecelio (RM)

<http://www.cecomweb.com/>

Specialized in high precision machining and design.

Iniziative Industriali S.r.l. - COSMI Group - via Teodorico, 5 - 48122 Ravenna

<http://www.gruppocosmi.com/>

Design, supply and installation of plants in the energy sector and chemistry.

C.S.C. S.p.A. - via Lago Maggiore 7 - 36015 Schio (VI)

<http://www.csc-schio.com>

Special welding, design and manufacturing of components for energy, aerospace industry and scientific research.

Dimensione S.p.A. - via VIII Marzo n° 8 - 10095 Grugliasco (TO)

<http://www.gruppodimensione.com/>

General contractor specialized in civil works and in high tech electrical and HVAC installations.

Information: K. Robert / GS-SEM-LS / 74407
GS Department

Fantini Sud S.p.A. - Strada P.le Casilina per Sgurgola n° 52 - 03012 Anagni (FR)

<http://www.fantinispa.it/>

Production of plants and equipments in all the phases of the project.

RICA - Divisione IRCA S.p.A. - via Podgora 26 - 31029 Vittorio Veneto (TV)

www.zoppas.com

Heating elements and systems, with thermal control for domestic and industrial applications

Lungari Giuseppe S.r.l. - via Repubblica di S.Marino 44 – 41122 Modena

<http://www.lungarigiuseppe.it/>

Milling and grinding works on large size tooling machine.

MAPRad S.r.l. - via C. Colombo 19/i - 06127 Perugia

<http://www.maprad.com/>

Radiation Hardness Studies and Qualification for electronics.

REVEN.GE S.r.l. - via Sansovino, 217 - 10151 Torino

<http://www.revenge.it/>

Project and development of high tech solutions for IT projects..

RIAL VACUUM S.r.l. - via Tito ed Ettore Manzini, 7/a - 43126 Parma

<http://www.rialvacuum.com/>

Ultra-high vacuum and cryogenic sector applications.

SAES Getters S.p.A. - viale Italia, 77 - 20020 Lainate (MI)

<http://www.saesgetters.com/>

Development and production of getters for a variety of scientific and industrial applications.

Sarvadon S.r.l. - via Circonvallazione, 3 - 11024 Châtillon (AO)

<http://www.sarvadon.org/>

Manufacturing of steel, stainless steel, and aluminum.

SEA ALP Engineering Consortium At Criotec Impianti S.r.l. - via F. Parigi, 32 10034 Chivasso (TO)

<http://www.criotec.com/>

Joint venture of 7 partners for projects of plants and machinery for high energy research.

STRUMENTI SCIENTIFICI CINEL S.r.l. - via dell'Artigianato 14 – 35010 Vigonza (PD)

<http://www.cinel.com/>

Production and turnkey solutions for synchrotron light and particle accelerator research equipments.

ECOR RESEARCH - via Friuli, 11 Z.I. - 36015 Schio (VI) -

<http://www.ecor-research.com/>

Designs, manufactures, assembles and manufactures stainless steel and special alloys for the Food Industry, Pharmaceutical, Aerospace and Scientific Research.

VAQTEC S.r.l. - c.so Grosseto 437 – 10151 Torino

www.vaqtec.com

Manufacturer and distributor of competitively priced quality products for use in high and ultra high vacuum environments.

V.C.S S.r.l. - via Moneta 2/a Quartiere SPIP – 43100 Parma

<http://www.vcs-pr.it/>

A machine tool production company specialised in the VACUUM – HIGH VACUUM and UHV sectors.



Take note



Save lives
Give your blood

**On Wednesday 2 November 2011
From 8.30 to 16.00**

BLOOD DONATION

**CERN
RESTAURANT 2**

Organized by EFS (Etablissement Français du Sang) of Annemasse

**Number of donations during the last blood donation:
- 147 donors in July 2011**

Let's do better !!!

**Give 30 minutes of your time
to save lives...**



<http://www.dondusang.net>



Take note

EXHIBITION - MATHEMATICS, A BEAUTIFUL ELSEWHERE

From 21 October 2011 to 18 March 2012, the *Fondation Cartier pour l'art contemporain* will present the exhibition Mathematics: A Beautiful Elsewhere, an exhibition developed in association with the *Institut des Hautes Études Scientifiques* (IHÉS) and under the patronage of UNESCO. For this unprecedented event, the foundation invited mathematicians to work with artists with whom it has previously worked to create an exhibi-

tion that allows visitors to see, hear, do, interpret and think about mathematics. By bringing mathematics into its premises, the *Fondation Cartier* is itself undergoing the "sudden change of scenery" described by mathematician Alexandre Grothendieck.

More information is available at:

http://fondation.cartier.com/files/press_file_2202_en.pdf

Fondation Cartier pour l'art contemporain
261, boulevard Raspail 75014 Paris

<http://fondation.cartier.com>

Private Visit

For professors, researchers and all the staff of Mathematics departments and Physics laboratories, 24 October 2011 from 12 a.m. to 7 p.m. at the *Fondation Cartier pour l'art contemporain*.

Reservation required through the Visitor Service:

info.reservation@fondation.cartier.com /
Phone : +33 (0) 1 42 18 56 67



Safety Training Course

SAFETY TRAINING: SCHEDULED SESSIONS IN SEPTEMBER AND OCTOBER 2011

The following training courses are scheduled in September – October. You can find the full Safety Training programme on the Safety Training online catalogue.

If you are interested in attending any of the below courses, please talk to your supervisor, then apply electronically via

EDH from the course description pages, by clicking on SIGN-UP.

Registration for all courses is always open – sessions for the less-requested courses are organized on a demand-basis only. Depending on the demand, a session will be organised later in the year.

Alphabetical order (original course titles are maintained)

Conduite de chariots élévateurs

17-OCT-11 au 18-OCT-11, 8h00 – 17h30,
en français *

Laser Users

28-OCT-11, 9h00 – 12h30, en anglais

Radiological Protection

11-OCT-11, 13h30 – 17h30, en anglais
18-OCT-11, 8h30 – 12h30, en anglais
18-OCT-11, 13h30 – 17h30, en français
28-OCT-11, 13h30 – 17h30, en anglais

Recyclage Habilitation - Personnel électrique effectuant des opérations du domaine de tension BTA

14-OCT-11, 9h00 – 17h30, en français

(*) Session in French with possibility to have the documentation in English.

Isabelle Cusato (HSE Unit)



External meeting

Geneva University Physics Department

24, quai Ernest-Ansermet
CH-1211 Geneva 4

Wednesday 12 October 2011

PARTICLE PHYSICS SEMINAR

at 17.00 hrs – Stückerberg Auditorium

"Towards 3+1 Neutrino Mixing"

Par Prof. Carlo Giunti, INFN Torino

I will review the recent experimental indications in favor of short-baseline neutrino oscillations. I will discuss their interpretation in the framework of neutrino mixing schemes with one or more sterile neutrinos which have masses around the eV scale. Taking into account also cosmological constraints, I will present arguments in favor of 3+1 neutrino mixing with one sterile neutrino at the eV scale.

Information :

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

Organizer : G. Pasztor



Seminars

TUESDAY 11 OCTOBER

LHC SEMINAR

11:00 - TH Auditorium, Bldg. 4

Heavy flavor physics with the CMS experiment

V. CHIOCHIA / UNIVERSITÄT ZÜRICH (CH)

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

BPS Saturated String Amplitudes: K3 Elliptic Genus and Igusa Cusp Form

S. HOHENHEGGER / MPI MUNICH

WEDNESDAY 12 OCTOBER

TH COSMO COFFEE

11:00 - TH Auditorium, Bldg. 4

Hidden sector dark matter models for DAMA/CoGeNT/INTEGRAL

J. CLINE / MCGILL U.

CERN COMPUTING COLLOQUIUM

14:00 - Kjell Johnsen Auditorium, Bldg. 30/7-018

Evolving Commercial Instrumentation to Meet Needs of Scientific Research

J. TRUCHARD / NATIONAL INSTRUMENTS PRESIDENT AND CEO

WEDNESDAY, OCTOBER 12, 2011 FROM

TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

Electroweak Baryogenesis in Two Higgs Doublet Models

J. CLINE / MCGILL U.

THURSDAY 13 OCTOBER

TH BSM FORUM

14:00 - TH Auditorium, Bldg. 4

Superluminal neutrinos in long baseline experiments and SN1987a

L. PANIZZI / IPN LYON

FRIDAY 14 OCTOBER

PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - TH Auditorium, Bldg. 4

Cosmic magnetic fields and their relation to the baryon/lepton asymmetry in the Universe

O. RUCHAYSKIY / CERN-TH

TUESDAY 18 OCTOBER

LHC SEMINAR

11:00 - Council Chamber, Bldg. 503

Searches for Exotic Physics with the ATLAS Detector

D. FORTIN / TRIUMF (CA)

PREPARATION FOR RETIREMENT SEMINAR

13:00 - MAin Auditorium, Bldg.500 & Council Chamber, Bldg. 503

Préparation à la retraite - 2011 - Preparing for retirement/HR-SPS-HIS

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA

P. HESLOP / DURHAM

WEDNESDAY 19 OCTOBER

TH COSMO COFFEE

11:00 - TH Auditorium, Bldg. 4

TBA

C. CAPRINI (/ PHT CEA SACLAY)

ISOLDE SEMINAR

14:30 - Bldg. 26-1-022

TBA

S.G-HA PARK/ (SUNGKYUNKWAN UNIVERSITY)

THURSDAY 20 OCTOBER

COLLIDER CROSS TALK

11:00 - TH Auditorium, Bldg. 4

Search for Resonances in the Dijet Mass Spectrum from 7 TeV pp Collisions

M. GOUZEVITCH / LABORATOIRE LLR

FRIDAY 21 OCTOBER

DETECTOR SEMINAR

11:00 - 40-S2-B01 - SALLE BOHR

Digital Silicon Photomultiplier For Low Light Detection In High Energy Physics

T. FRACH / PHILIPS TECHNOLOGIE GMBH

PARTICLE AND ASTRO-PARTICLE PHYSICS SEMINARS

14:00 - TH Auditorium, Bldg. 4

Boltzmann-like transport theory including quantum coherence

K. KAINULAINEN / U. JYVASKYLA, U. HELSINKI & CERN-TH

Friday 18 November 2011

John Adams Lecture

LHC – Bold Beginning

Dr. Mike Lamont, CERN

14:30 - Council Chamber, CERN

Following interesting initial commissioning in 2010, the LHC is now performing beyond expectations. After a brief recap of the timeline, an attempt is made to identify the contributory causes to the LHC's present success. Existing and future challenges are discussed.