

EU supports the LHC high-luminosity study



The CERN team that has successfully built and tested the Short Magnet Coil – a small 40 cm long magnet capable of producing a 12.5 T magnetic field.

The upgrade of the LHC will require about 10 years of design, construction and implementation. The new machine configuration will be called "High Luminosity LHC" (HL-LHC). The similarly named "HiLumi LHC"

is the EU programme that supports part of the design phase of HL-LHC. "Formally, HL-LHC is a new run of the LHC," says Lucio Rossi, Deputy Head of the Technology (TE) Department and HL-LHC project Co-ordinator. "The upgrade will include some key new elements that will increase the LHC's integrated luminosity by up to a

The design collision energy and luminosity of the LHC are already at record numbers, making the machine one of the most complex scientific instruments ever built. However, to extend its discovery potential even further, a major upgrade of the LHC will be required around 2020. This will increase its average luminosity by a factor of 5 to 10 beyond its design value. Fifteen worldwide institutions and the European Union are supporting the initial design phase of the project through the HiLumi LHC programme, whose kick-off meeting will take place on 16-18 November.

factor of 10, enabling us to reach the goal of 3000 fb⁻¹ (per collision point) set by ATLAS and CMS. This initial major upgrade could also prepare the machine for further technical improvements that could allow it to reach a higher energy."

Within the FP7 HiLumi LHC programme, the Japanese Laboratory KEK and the LARP network of US laboratories are partners in the design study alongside 14 European

(Continued on page 2)



A word from the DG

Autumn – a season for renewal

Autumn is not usually thought of as the season for renewal, but in the world of particle physics, this year is different. Around the world, many of CERN's old friends and colleagues are moving on and making way for new faces.

In China, Chen Hesheng, who has been Director of the nation's Institute for High Energy Physics since 1998,

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EU supports the LHC high-luminosity study

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institutions. "We have set up a collaboration in which all partners are involved at the same level," says Rossi. "While we were building the LHC, LARP and KEK were developing new technologies for the next generation magnets. Their research and development activities will be key to the success of HL-LHC."

HL-LHC will rely on a number of key innovative technologies (see box), which represent exceptional challenges. They include: cutting-edge 13 tesla superconducting magnets, very compact and ultra-precise superconducting cavities for beam rotation, and 300-metre-long high-power supercon-

ducting links with nearly zero energy dissipation. "All these new technologies require further study but the project's partners have the necessary know-how to successfully develop them," explains Rossi. "At the kick-off meeting we will synchronize our work to increase synergies among the various laboratories involved in the project. We will touch base on what has been done so far, identify the state of the art in the different fields, and define future milestones."

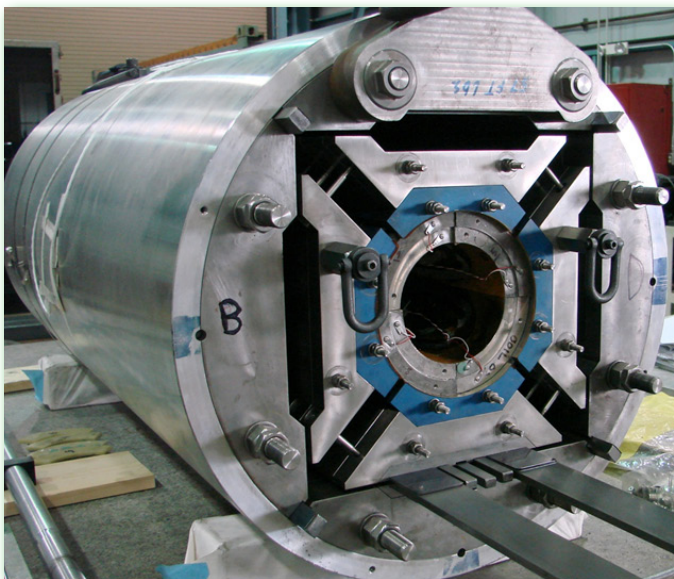
The HiLumi LHC project received a perfect score of 15/15 from the European Commission and was granted the whole amount of the requested funding. "The

involvement of the non-European LARP and KEK laboratories will facilitate the implementation of the construction phase as a global project," concludes Rossi. "The proposed governance model has been tailored accordingly and will pave the way for the organisation of other global research infrastructures."

CERN Bulletin

For information about the first HiLumi LHC Collaboration Meeting, please see :

<https://indico.cern.ch/sessionDisplay.py?sessionId=19&confId=150474#20111118>



The 1 m long quadrupole developed by the US-LARP collaboration. During recent tests, the quadrupole successfully reached 13 T of magnetic field.



Did you know?

Public Session of the HL-LHC Project:

On Friday 18th November, a HiLumi LHC Public Session will take place in the main auditorium of CERN, please come along. For more details see:

<http://cern.ch/hilumiLHC>

New technologies involved in the HL-LHC

HL-LHC focuses on the following elements: new quadrupole magnets for the inner triplets (the magnets that are installed just before the collision points), new "crab" cavities (two per beam) to be installed on either side of CMS and ATLAS (point 5 and point 1 of the accelerator ring) to increase luminosity, an improved collimation system, and a cold powering system.

The LHC superconducting **magnets** that are currently in operation can produce a magnetic field of 8 tesla. The HL-LHC magnets will reach 13 tesla. The HiLumi LHC programme will review and assess the properties of two superconductors: Nb₃Sn (niobium-tin) and Nb-Ti (niobium-

titanium). The first offers better performance (higher critical temperature and field) but is more expensive and presents greater technical challenges.

The power converters are particularly delicate items of equipment that need to be protected from the radiation damage caused by the intense beams of HL-LHC. For this reason, the HL-LHC project includes moving them to the surface and installing 300-metre-long superconducting cables that will bring the power from the surface to the underground installations. The HiLumi LHC programme includes the study of the thermal and electrical performances of a **long electrical transfer line** cooled by supercritical helium. Different types of

advanced conductors - MgB₂, BSCCO 2223 and YBCO - are being analysed, as well as different cooling temperatures ranging from 10 K to 50 K.

In order to fully exploit the inner triplet upgrade, **crab cavities** are needed. These are the instruments of choice for optimum integrated luminosity and are probably the best means of levelling luminosity (to avoid extreme pile-ups that degrade data quality in the experiment). At present, there are a number of proposals for possible designs of Compact Crab Cavities – their detailed study will be part of HiLumi LHC work package number 4.

LHC Report: protons to the right, ions to the left please!

A number of factors have contributed to these impressive totals, including: the increase in the total number of bunches to 1380 during the first part of the year, the high bunch intensity and small beam sizes delivered by the LHC injectors, and the very good aperture in the regions around ATLAS and CMS which have allowed a squeeze to $\beta^* = 1$ m. Despite some persistent issues, overall availability has been acceptable. About 25% of the programmed physics time was spent with

The LHC finished proton physics for the year on Sunday 30 October at 17:00 after delivering around 5.6 fb^{-1} to both ATLAS and CMS, 1.2 fb^{-1} to LHCb, and 5 pb^{-1} to ALICE.

stable beams - not bad at this stage in the LHC's career given its complexity and the operation with high intensity beams.

Over the last two weeks, the luminosity delivery has been a bit fractured, with timeouts for tests with 25 ns beam, and with a high number of events per bunch crossing. The squeeze to 1 m in ALICE was also commissioned in preparation for the forthcoming lead ion run.

As of last Sunday, the LHC has been in machine development. An early high point was the cohabitation of protons and lead ions in the LHC - low intensity beams of protons (clockwise) and lead ions (anti-clockwise) were successfully injected and ramped together. A test of proton-lead collisions will be attempted for the first time in a couple of weeks. This coming weekend (5/6 November) set-up begins for the lead ion run. There is then a five-day technical stop starting on the Monday 7 November, followed by the 4-week ion run.

Mike Lamont for the LHC Team



(Continued from page 1)

Autumn – a season for renewal

is taking up a new position, passing the baton to Wang Yifang. In Italy, Roberto Petronzio steps down after seven years at the helm of INFN, handing over the Presidency to Fernando Ferroni. In the UK, John Womersley has been appointed chief executive of the Science and Technology Facilities Council, taking over from Keith Mason. And in the USA, Jim Siegrist has been appointed to the leadership of the Department of Energy's High Energy Physics Office following Denis Kovar's retirement. Earlier in the year, Victor Matveev was elected to be the next Director of the Joint Institute of Nuclear Research in Dubna, Russia, following the untimely passing of Alexei Sissakian last year.

With Drs Wang, Ferroni, Womersley, Siegrist and Matveev, it's safe to say that high-energy physics will be in

good hands. All have an impressive track record in our field. Dr Wang is leader of the BESIII experiment at BEPC, and instigator of the Daya Bay neutrino experiment scheduled to start full data taking next year. Professor Ferroni has a career spanning the continents, with spells at CERN working on neutrino experiments in the 1980s, and then the L3 experiment at LEP. Dr Womersley has a similar peripatetic career to his credit, beginning as a student on the EMC experiment here at CERN in the 1980s. Dr Siegrist brings a wealth of management experience from his current posting at the Lawrence Berkeley National Laboratory to his new job at the DOE. Last but not least, Professor Matveev's career has ranged widely across our field, and includes the role of Chair of the Board of the Russia and Dubna Member States Collaboration in the CMS experiment at the LHC.

As if five high level changes were not enough, I learned last week that Poland's newly created National Centre for Nuclear Research, which brings together nuclear and particle physics, has appointed a particle physicist, Professor Grzegorz Wrochna as its first director. And on Tuesday this week, Stanford announced that Persis Drell is standing down as director of SLAC. She will remain in office until a successor is in place.

I look forward to fruitful collaboration with all these newcomers in years to come. But while it's always good to welcome new faces, I'd like to end by thanking those who're moving on, and wishing them every success in projects new.

Rolf Heuer

Free access to science... but at what cost?

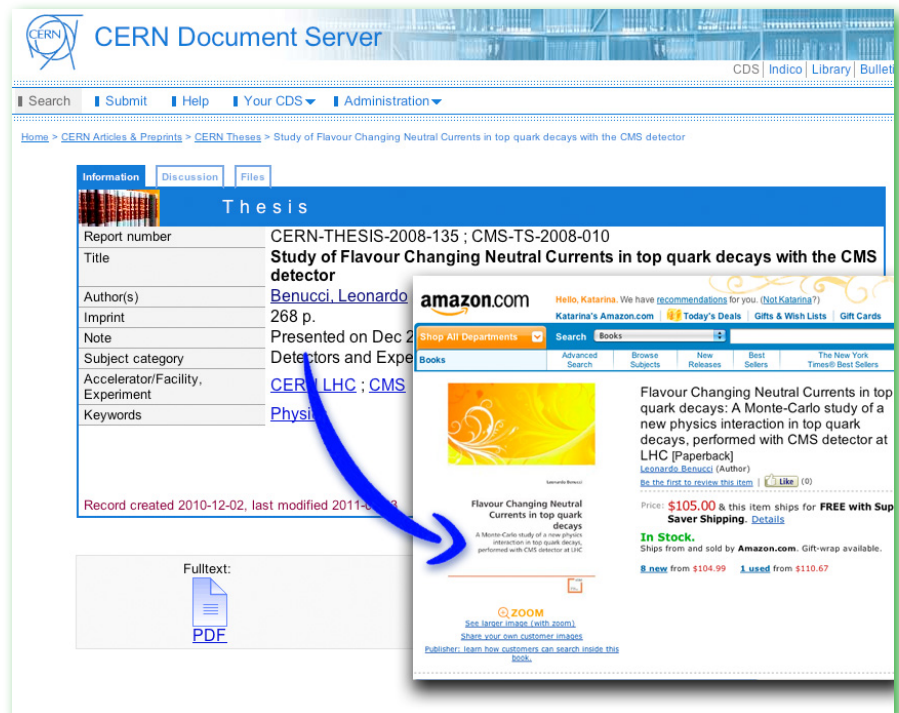
"When I found out, I was really astonished!" admits Tullio Basaglia, head of the Library Section of CERN's Scientific Information Service. Tullio was referring to the distinctly unorthodox practice of certain unscrupulous publishers who are selling freely available information! They simply poach articles from Wikipedia, compile them, bind them into a book, and then sell them at a high price under the name of a non-existent author. Thus, for instance, a certain Lambert M. Surhone who appears to be the author of almost 120,000 books on subjects ranging from US courts of law to cacti...

As Tullio Basaglia explains: "There are two types of documents: what we call 'robot books' and theses. The first are compilations of text poached from Wikipedia. They are nothing more than a series of articles strung together, one after the other, as they appeared online. If you flick through one of these books, you will notice that no attempt has been made to edit the material. The second type concerns the scientific community more directly. These are doctoral theses that are being marketed; at the very least this goes against CERN's principles, if not those of science in the broadest sense."

Marketed? Yes, because in addition to selling these books marked "High-quality content by Wikipedia articles", some of these publishers manage to convince young researchers to entrust them with the publication of their theses. Sometimes the author of the thesis accepts a publisher's offer and the publisher then prints the thesis in the form of a book. So what is the financial advantage? None at all for the author of the thesis (except perhaps for a few free copies) as the publisher scoops up all the revenues from the sale. This is a particularly bitter pill to swallow when you know that some of these theses retail at about 100 euro.

Beyond the purely financial dimension, this calls into question the whole principle of free access. "Our policy is free dissemination of science," stresses Basaglia. "All the theses written at CERN or in collaboration with the Organization should be submitted to the CERN Document Server to which there is

At the last meeting of CERN's Scientific Information Policy Board (SIPB), on 20 October this year, participants were informed of a practice that is disconcerting to say the least: some publishers are compiling books from free access material, which they then market at relatively high prices.



Some theses, which are freely accessible on CDS, are being sold at incredibly high prices on Amazon. The problem is that buyers don't know they are buying theses that are available for free.

free access.* The very idea of selling them is in total violation of these principles."

So who is buying these books? It is quite difficult to believe, but in the case of theses it's the authors themselves who are forking out the money. "It's rather gratifying to see one's name on the cover of a book, especially if it's available through Amazon," admits Tullio. "Some young researchers buy additional copies of their own thesis to give to their family and friends. Some libraries may also be lured into procuring such books because it is very difficult to identify them as doctoral theses."

In addition, it is very difficult to determine the point at which a publication crosses the line of plagiarism. Articles in Wikipedia, appropriately named the free encyclopæ-

dia, are not protected by copyright. And in the case of books based on theses, the author is always a party to the process from the outset. It is therefore up to all of us – science enthusiasts, librarians and researchers, alike – to shoulder our responsibility to ensure access to science remains free.

*More information at:

library.web.cern.ch/library/OpenAccess/SubmitTheses.html

You can consult the presentation Tullio Basaglia gave at the SIPB meeting at:

indico.cern.ch/conferenceDisplay.py?confid=159650

Anais Schaeffer

A new proton spill from CERN to Gran Sasso

The CERN Neutrino to Gran Sasso (CNGS)

beam no longer operates using the standard beam time structure. Instead, a

new type of proton pulse is being produced by CERN's accelerators and sent to the graphite target to generate neutrinos. "We are now producing extremely short beam pulses," explains Edda Gschwendtner, the physicist in charge of the CNGS secondary beam. "During a CNGS cycle we now have a LHC type bunched beam with four bunches, each about 2 ns long. Each bunch contains more than 2.5×10^{11} protons; bunches are spaced by 500 ns. In total, this makes about 10^{12} protons on target for each extraction from the SPS."

The CNGS beam was originally designed to maximize the number of muon neutrinos produced and sent to Gran Sasso. This was done to increase the probability of observing the "oscillations" as muon neutrinos turn into tau neutrinos. However, after the recent measurement of the neutrino's speed, it has

Since 21 October, CERN has been sending a new type of neutrino beam to Gran Sasso. The new configuration is intended to allow OPERA to define the departure time of the neutrinos more accurately and thus check the previous results obtained using the nominal beam configuration.

become important for experiments downstream to receive shorter beam pulses to allow for a more precise definition of the departure time. "The nominal CNGS beam cycle has two pulses each, 10.5 μ s long and has a total of about 4×10^{13} protons on target per cycle. In the present configuration, we have a factor of 40 fewer protons per cycle, but in 4 much shorter pulses. Thanks to a huge effort from many experts in the accelerator sector and to experience acquired with the LHC beam, it was possible to make this special proton beam available and to send it to the CNGS target," says Edda.

"This beam configuration allows experiments to connect each single neutrino event to the corresponding pulse of protons that generated it. In this way, one can obtain the statistical significance of the result, which is comparable to the one obtained

by OPERA, using two orders of magnitude fewer events," says Sergio Bertolucci, CERN Director for Research and Computing. "Moreover, several if not all the possible details of neutrino production during the spill – such as energy distribution, production rate, etc. – become irrelevant. This allows experiments to remove an important source of systematic error."

The experimental teams at Gran Sasso are accumulating data using the beam with the short proton spills. This 2011 technical run will make it possible, in the short time available, to test this new operational mode. This will also help to assess the benefits of a dedicated run with such short proton spills in 2012, when all the four Gran Sasso experiments – BOREXINO, ICARUS, LVD, OPERA – will be in a position to perform independent measurements of the neutrino's time of flight.

The CNGS beam will be kept in this mode of operation until 7 November. After that, there will be a technical stop until 11 November.

CERN Bulletin

Stronger links between CERN and South Africa

iThemba LABS (Laboratory for Accelerator Based Sciences) was established near Cape Town, South Africa almost 50 years ago as the continent's base for the Southern Universities Nuclear Institute that is now used mainly for material science research.

In the 1980s, iThemba built a 200MeV cyclotron and, following its construction, in the early 1990s branched into a new scientific field: radiation and nuclear medicine. While its research focus remained, iThemba began using late-hour "dead time" to produce short- and long-lived isotopes for nuclear medicine applications. Shortly after, iThemba began using the cyclotron for hadron therapy exploiting both protons and neutrons.

Currently, the cyclotron's time is split between 3 areas: nuclear physics research, the production of medical isotopes, and hadron therapy. "We want to extend our role in hadron therapy, bringing this treatment option to more patients in Africa," says Daniel Adams from the Department of Science and Technology, South Africa. As explained by Vincent Spannenberg, Head of Business Management at iThemba LABS: "The only way we can do this without sacrificing our other – equally important – activities is to build a brand-new cyclotron."

iThemba LABS in South Africa is a research facility that, about twenty years ago, started to treat oncological patients with particle beams. Its collaboration with CERN has steadily grown over the years. After becoming a member of the ALICE, ATLAS and ISOLDE Collaborations, today iThemba LABS is planning to buy a new medical-use cyclotron proton facility, and is seeking to strengthen its links with CERN and Europe also in this field by collaborating with ENLIGHT. The cyclotron will be dedicated to proton therapy – the only one of its kind in the southern hemisphere.

Which is where CERN comes in. "We will be sharing CERN and ENLIGHT's know-how in setting up successful collaborations and dealing with issues involving multidisciplinary environments," explains Manjit Dosanjh, a member of the Knowledge Transfer group and Advisor to the DG for Life Sciences. The collaboration with iThemba on ion sources will benefit CERN's own heavy-ion physics programme. "While iThemba already has a significant amount of expertise in cyclotrons, this collaboration with CERN will give us the opportunity to build on its existing knowledge and will also provide it with a training base for new personnel," confirms Vincent Spannenberg.

This cyclotron collaboration with iThemba is but one of the many ways CERN has been collaborating with the African nation. South Africa is a member of ALICE, ATLAS and ISOLDE, and hosted the First African School of Physics last year. "We truly value the co-operation with CERN," concludes Daniel Adams. "By engaging with government



Did you know?

Neutron therapy

iThemba LABS has a long experience in exploiting neutrons to treat tumours. Neutrons are very effective projectiles but, given their neutral charge, they are difficult to guide to hit the target. For this reason, neutron therapy has been taken out of commission in most medical centres. However, combining the particle's natural biomedical properties with iThemba's decades-long expertise, the African research facility has been able to use neutron therapy very successfully for certain types of cancerous tumours, particularly those that are large and slow-growing.

officials as well as collaborating with our accelerator initiatives, CERN is supporting South Africa's emergence on the research-world map. The new proton treatment facility will treat patients from the entire continent, bringing state-of-the-art medicine to a truly large population also in this part of the world."

Katarina Anthony

Developing the smallest possible medical cyclotron

CERN has teamed up with Spain's national scientific research centre (CIEMAT) to develop an avant-garde cyclo-

tron to be used for Positron Emission Tomography (PET). "We plan to make a cyclotron that doesn't need an insulated building or 'vault': a cyclotron small enough to fit inside a hospital lift," explains Jose Manuel Perez, who is leading the CIEMAT/CERN collaboration. "It will be the smallest possible medical cyclotron for single patient dose production and will dramatically reduce costs for hospitals."

While PET technology has transformed imaging techniques, many of its medical benefits have remained confined to highly specialised hospitals. "Studies have found that many isotopes can be used with biomedical tracers for PET scans," explains Jean-Marie Le Goff, HEPTech's Coordinator. "Unfortunately, these isotopes have extremely short half-lives. For example, the ^{11}C isotope, which studies have shown can act as a marker for cancer and Alzheimer's, has a half-life of only 20 minutes."

Imagine a portable medical cyclotron operated in a conventional radioactive facility at a hospital. Imagine a nurse or technician switching it on and producing isotopes at the patient's bedside. Sounds like science fiction? Think again.

To be able to use isotopes like ^{11}C , hospitals need to be able to produce them on site. But how? In 2008, Jean-Marie and his colleague Hartmut Hillemanns came to realize that the technology for a compact medical cyclotron already existed in the physics community. At that point, they began working on what would eventually become the compact CERN/CIEMAT collaboration: producing a cyclotron small enough – and cost-effective enough – to be installed in any typical radiotherapy department.

"The collaboration with CERN is essential for the project's success, as much of the technical know-how is just not available outside the Organization," says Jose Manuel. "We will be working very closely with CERN scientists in various areas, including cryogenics, vacuum technology, beam optics, magnet design, and radiofrequency systems."

While the project is being funded by Spanish industry and CDTI, the Centre for Development of Technology and Innovation, and developed at CIEMAT, some of the work will be carried out at CERN. "A number of CERN experts in the field of accelerator technologies are providing the project with part time consultancy services. All the technical departments, i.e. TE, BE and EN, are involved. Cryogenics and vacuum technologies require in-depth studies and we have already started to take on two students to work on the cyclotron full-time," explains Friedrich Haug, who is responsible for the cryogenics and technical coordination at CERN. "CERN will also provide some R&D and testing facilities for segments of the cyclotron."

In just two short years, the CIEMAT/CERN cyclotron should be commissioned as a research prototype for producing isotopes for medical use. The next phase will consist in turning this prototype into an industrial product, bringing advanced technologies from basic research science to society.

Katarina Anthony

¹ HEPTech: The Technology Transfer Network of institutions active in particle, astro-particle and nuclear physics in CERN Member States.

Dark Matter remains obscure

The OSQAR “Light Shining Through a Wall” experiment was officially launched in 2007 with the aim of detecting axions, that is, particles that might be the main components of Dark Matter. OSQAR uses the powerful LHC dipole magnet to intensify the predicted photon-axion conversions in the presence of strong magnetic fields. “According to the theory, axions have an extremely weak interaction with matter and are not stopped by optical barriers,” says Andrzej Siemko, the OSQAR Technical Coordinator. “From our recent measurements, we learned that our resolution is not yet good enough to allow us to indirectly detect the axions. Our aim for the next two years is to increase the production of axions by increasing the light intensity, and to improve further the sensitivity of our detection system.”

The OSQAR experiment is divided into two sections: the first is designed to produce axions, while the aim of the second is to detect them. Axions may be produced by converting photons generated by a light source – in this case a laser – with the aid of a very strong magnetic field. In the second section, called the “Regeneration Part”, a

It is one of the hidden secrets that literally surround the Universe. Experiments have shown no result so far because trying to capture particles that do not seem to interact with ordinary matter is no trivial exercise. The OSQAR experiment at CERN is dedicated to the search for axions, one of the candidates for Dark Matter. For its difficult challenge, OSQAR counts on one of the world’s most powerful magnets borrowed from the LHC. In a recent publication, the OSQAR collaboration was able to confirm that no axion signal appears out of the background. In other words: the quest is still on.

small fraction of these axions is converted back into photons that can be easily detected. “The OSQAR principle is rather simple: by shining light from one side of a wall, we expect to find this light on the other side,” explains Siemko.

“With respect to other experiments pursuing the same search, OSQAR can count on the most powerful magnetic field ever used for this kind of experiment,” adds Pierre Pugnât, OSQAR’s spokesperson. “The state-of-the-art LHC dipole magnets – providing 9 T over 14 m long aperture – are used for the photon-axion-photon conversions in a vacuum or using a buffer gas at a specific pressure as an amplification medium. For the first time in 2010, this experiment has been operated with two aligned LHC magnets in the SM18 hall and the results have been recently submitted for publication. This translates into a higher sensitivity and a higher resolution.”

OSQAR is not the only research project looking for axions at CERN; CAST is the other one. “We can say that CAST and OSQAR are complementary: both are looking for axions but from slightly different points of view,” explains Siemko. “While CAST works as a sort of telescope that stares at the Sun, trying to record hypothetical axions produced in its nuclear reactions, OSQAR’s experimental approach consists in producing the axions by itself.”

In addition to looking for axions, the members of the OSQAR collaboration have other challenging plans for their experiment. In the years to come, they will test some predictions of Quantum Electro Dynamics (QED) – the most precise theory developed by physicists so far. “In the 1930s, scientists predicted a very tiny effect at low energy, related to the light-by-light scattering, one of the most fundamental processes in QED,” explains Pierre Pugnât. “Nobody has directly measured this effect before, but OSQAR can reach the sensitivity to measure it for the first time. Indeed, particle physics is not just about high-energies – low energies still need further exploration! And it is quite fascinating to have the possibility to investigate the theories postulated by the fathers of modern physics, trying to prove if they were right or not.”

The search for Dark Matter is proving tough for scientists and the quest is far from over. But OSQAR scientists are confident that if axions exist, as theory seems to indicate, their experiment will be able to find them.

Fabio Capello

Further reading:

OSQAR Webpage:

<https://osqar.web.cern.ch/osqar/index.html>

Introduction:

<http://cdsweb.cern.ch/record/1045979>

Institutes collaborating:

<http://greybook.cern.ch/programmes/experiments/OSQAR.html>

Last results:

<http://arxiv.org/abs/1110.0774>



The OSQAR experiment installed in the SM18 hall. (Photo by F. Capello)

e-EPS News: Highlights from the European Physical Society

DESY and INFN physicists win 2011 Enrico Fermi prize

The 2011 Enrico Fermi prize of the Italian Physical Society (Società Italiana di Fisica, SIF) has been awarded, for work in the field of experimental particle physics, to Dieter Haidt of the DESY Laboratory at Hamburg and to Antonino Pullia of the University of Milano Bicocca and Istituto Nazionale di Fisica Nucleare, “for their fundamental contribution to the discovery of weak neutral currents with the Gargamelle bubble chamber at CERN”.

The Enrico Fermi Prize is awarded yearly to members of the society who especially honour physics by their discoveries. For more information on the prize, please visit the Italian Physical Society website:

http://www.sif.it/SIF/en/portal/activities/fermi_award

Consultation on the future of European Union Research

The outcome of the consultation on European Union research and innovation funding was discussed, at a major conference in Brussels on 10 June. The consultation – which the EPS contributed to – was based on a European Commission Green Paper, which was published on 9 February.

The Green Paper proposed major changes to EU research and innovation funding, in order to increase the scientific and economic impact, to make participation easier and to provide better value for money. For more information, and a summary analysis of the consultation, please visit the European Commission website:

http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=home

Physicists encouraged to consider carbon footprint

Physicists are being encouraged to take a look at the size of their carbon footprint. In the October issue of *Physics World*, University of Oxford astrophysicist Phil Marshall calls on his colleagues worldwide to individually address environmental sustainability.

“Individual physicists can help to solve the energy problem, and not just the ones whose research is in new technologies; we can all contribute by setting the right example,” writes Marshall.

The article came just before the First Joint Workshop on Energy Management for Large Scale Research Infrastructures, which was held in Lund, Sweden from 13 to 14 October. The meeting aimed to identify ways of doing large-scale physics research with a manageable and sustainable carbon-neutral energy supply.

e-EPS News



Security bingo for administrators

Have you ever thought about the security of your service(s) or system(s)? Show us and win one of three marvellous 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 at Computer Security@cern.ch or P.O. Box G19710, by November 14th 2011.

Winners[1] must show us that they follow at least five good practices in a continuous horizontal row, vertical column or diagonal. 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.

My service or system...

...is following a software development life-cycle.	...is patched in an automatic and timely fashion.	...runs a tightened local ingress/egress firewall.	...uses CERN Single-Sign-On (SSO).	...has physical access protections in place.
...runs all processes / services / applications with least privileges.	...has a defined and documented disaster recovery plan.	...is logging remotely all accesses and critical actions.	...is maintained by administrators who followed dedicated security training sessions.	...has no openings in CERN's outer perimeter firewall.
...restricts access to all privileged accounts to a very few people.	...does not use shared folders.	...adheres to the CERN "Security Baselines for Servers".	...has all USB ports disabled.	...has a password protected BIOS, IPMI interface and boot loader.
...is managed by a configuration management system.	...has had all its code & configuration reviewed.	...restricts user access.	...uses very few local accounts.	...has all unnecessary processes and services disabled.
...is running a local intrusion detection system (IDS).	...does not use any default passwords.	...has been successfully scanned by the Computer Security Team.	...tightly controls access to all local data stores.	...has all modems disabled.

Computer Security Team



Share your work, submit your thesis to CDS!

News from the Library

This is the most efficient way of sharing your work within the community - your thesis will certainly find a much greater audience than if you follow the advice of certain dubious publishing companies (see the article "Free access to science... but at what cost?" published in this issue). At the same time, you ensure long-term storage of your file.

All theses qualify, from bachelor to PhD, and any language is accepted. You simply go to CDS and submit your work. If your thesis was written some years ago it is

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If you have any questions or submission problems, please do not hesitate to contact Catherine Cart. If you prefer that we do the submission on your behalf you can simply send the .pdf file of your thesis to the same address - or send a hard copy to her office.

CERN Library



Take note

VISIT OF UK FIRMS AT CERN

24 – 25 NOVEMBER 2011

09h00 to 17h00 Thursday 24 November

09h00 to 17h00 Friday 25 November

Individual interviews will take place in technicians' offices. 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 from the GS Department web pages at the following URL:

<http://gs-dep.web.cern.ch/en/content/Industrial-Exhibitions>

List of Companies:

- AWS Electronics
- Cryogenic
- Hytec Electronics
- Industrial Electronic Wiring
- M G Sanders
- MDC Vacuum
- MM Microwave
- Premier Building and Engineering
- Russel Ductile Castings
- Tadley Engineering
- NDSL

For further information please contact Claudia Bruggmann Furlan GS-IS-LS 73312 or Caroline Laignel GS-DI 73722.



Take note

GENERAL INFORMATION MEETING ON THE EUROPEAN CO-OPERATIVE ASSOCIATION OF INTERNATIONAL CIVIL SERVANTS (AMFIE)

**Monday 28 November 2011 at 12h
(61/1-009 – Pas Perdue, room C)**

Mrs. Janine RIVALS, Vice-Chairwoman of AMFIE's* Board of Directors and Mrs. Hélène ECKERT, coordinator for all international organisations in Switzerland, will make a general presentation on AMFIE's personal financial services and how they may benefit international civil servants. They will also focus on the particular financial challenges faced by expatriate civil servants and on the solutions AMFIE can offer. The presentation will be followed by a question and answer session.

Private consultations – from 11:00 to 12:00 and from 14:00 to 17:30 (61/1-009 and 61/0-006)

Participants who wish to meet AMFIE's representatives for one-to-one private consultations are invited to contact directly Mrs. Janine Rivals (+33/1 45 35 70 79, GSM +33/6 63 58 36 62 or jr@amfie.org) or AMFIE's Secretariat in Luxembourg (+352/42 36 61-1 or amfie@amfie.org). It will be possible to make an appointment on the day itself, after the end of the presentation by choosing amongst the available slots.

There are 3 coordinators or liaison officers at CERN, who can also answer general questions:

Joel LAHAYE, tel 73461

Erwin MOSSELMANS, tel 74125

Nicolas SALOMON, tel 75583

** AMFIE is a cooperative society open exclusively to international civil servants. It is managed by a group of active and retired international civil servants. Created in 1990 as a fully licensed financial institution, it is subject to the laws and regulations which govern the activities of Luxembourg's financial sector.*

The Cooperative offers its members a broad range of financial services and products at little or no cost in the six currencies available to accounts holders (EUR, CHF, GBP, USD, CAD, AUD).

WHAT'S NEW@CERN, EPISODE 2

On Monday 7 November at 4pm in English and 4.20pm in French, watch "What's new@CERN" on webcast.cern.ch. In this second episode: LHC performance, a journey to the particle source and this past month's news.

CERN Video productions

MAINTENANCE OF THE CERN TELEPHONE EXCHANGES

Maintenance work will be carried out on the CERN telephone exchanges between 20h00 and 2h00 on the 16 November.

Fixed-line telephone and audio-conference services may be disrupted during this intervention. Nevertheless, the CCC and the fire brigade will be reachable at any time.

Mobile telephony services (GSM) will not be affected by the maintenance work.

IT/CS



External meeting

**Geneva University
Physics Department**

**24, quai Ernest-Ansermet
CH-1211 Geneva 4**

Monday 14 November 2011

COLLOQUE DE PHYSIQUE
at 17.00 hrs – Stückelberg Auditorium

**Cavity optomechanics: controlling
micro mechanical oscillators with laser
light**

Prof. Tobias Kippenberg
EPFL, Lausanne

Laser light can be used to cool and to control trapped ions, atoms and molecules at the quantum level. This has led to spectacular advances such as the most precise atomic clocks. An outstanding frontier is the control with lasers of nano- and micro-mechanical systems. Recent advances in cavity optomechanics have allowed such elementary control for the first time, enabling mechanical systems to be ground state cooled leading to readout with quantum limited sensitivity and permitting to explore new device concepts resulting from radiation pressure.

*Une verrée en compagnie du conférencier
sera offerte après le colloque.*

Prof. Markus Büttiker



Meeting at CERN

Accelerator and Technical Sector Seminar

at 14:15 - BE Auditorium, bldg. 6
(Meyrin) – please note unusual place

Mechanical stabilization and positioning of CLIC quadrupoles with sub-nanometre resolution

Stef Janssens / EN-MME

To reach the required luminosity at the CLIC interaction point, about 4000 quadrupoles

are needed to obtain a vertical beam size of 1 nm at the interaction point. The mechanical jitter of the quadrupole magnets will result in an emittance growth. An active vibration isolation system is required to reduce vibrations from the ground and from external forces to about 1.5 nm integrated root mean square (r.m.s.) vertical displacement at 1 Hz. A short overview of vibration damping and isolation strategies will be presented as well as a comparison of existing systems. The unprecedented resolution requirements and the instruments enabling these measurements will be discussed. The vibration sources from which the magnets need to be isolated are characterised. The specificity of the requirements for isolation of particle accelerator components resulted in the development of a very stiff stabilization

support at CERN. The active support can also reposition the quadrupole in between beam pulses with nanometre resolution. The conceptual design of the active stabilization and nano-positioning was validated in models and experimentally demonstrated on test benches. The design choices and improvements for the mechanics, the controller and electronics, leading to the results achieved, will be shown. The integration of the stabilisation system with other ground motion mitigation techniques has provided additional input for the stabilisation system. Finally, the status and directions of future development work will be presented.

Organisers:

S. Sgobba (EN), W. Herr (BE), G. de Rijk (TE)



Seminars

TUESDAY 8 NOVEMBER

COMPUTING SEMINAR

11:00 - Council Chamber, Bldg. 503

The Oracle NoSQL Database

C. LAMB / ORACLE

LHC SEMINAR

11:00 - Main Auditorium, Bldg. 500

QCD measurements with the CMS detector

K. KOUSOURIS / CERN

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA

S. DOMOKOS / WEIZMANN INSTITUTE

WEDNESDAY 9 NOVEMBER

TH COSMO COFFEE

11:00 - TH Auditorium, Bldg. 4

Non-Gaussianity in the CMB Anisotropies at Recombination in the Squeezed limit

A. RIOTTO / CERN

TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

TBA

G. ISIDORI

THURSDAY 10 NOVEMBER

COLLIDER CROSS TALK

11:00 - TH Auditorium, Bldg. 4

TBA

G. CHACHAMIS / PAUL SCHERRER INSTITUT

FRIDAY 11 NOVEMBER

POST-INDUCTION DAY TRAINING

09:00 - Bldg. 593, Room 25

Post Induction day training on popular IT and GS services - English session

14:00 - Bldg. 593, Room 25

Post Induction day training on popular IT and GS services - French session

TH INFORMAL LATTICE MEETING

11:00 - TH Auditorium, Bldg. 4

TBA

ETSUKO ITOU / KYOTO UNIVERSITY, YITP

TUESDAY 15 NOVEMBER

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

Deeply Virtual Compton Scattering in the Gauge/Gravity Duality

M. COSTA

WEDNESDAY 16 NOVEMBER

TH THEORETICAL SEMINAR

14:00 - TH Auditorium, Bldg. 4

Boltzmann-like transport theory including quantum coherence

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

ISOLDE SEMINAR

14:30 - Bldg. 26-1-022

ISOLDE Seminar / Nuclear Incompressibility, the Asymmetry Term, and the MEM Effect

UMESH GARG / UNIVERSITY OF NOTRE DAME

THURSDAY 17 NOVEMBER

COLLIDER CROSS TALK

11:00 - TH Auditorium, Bldg. 4

TBA

AMNON HAREL / UNIVERSITY OF ROCHESTER

FRIDAY 18 NOVEMBER

DETECTOR SEMINAR

11:00 - Bldg. 40-Salle Andersson

Development of spark-resistant large-area micromegas detectors for the ATLAS upgrade

J. WOTSCHACK / CERN

JOHN ADAMS LECTURE

16:30 - Main Auditorium, Bldg. 500

LHC - Bold Beginning

M. LAMONT / CERN