CERN Bulletin

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LS2 REPORT: RENOVATION OF THE ELECTRICAL INFRASTRUCTURE

Major renovation work is under way across the entirety of CERN's electrical network to modernise certain key facilities

The BE1 input station in Prévessin is currently undergoing maintenance and consolidation work (Image: CERN)

You arrive at your office, switch on the lights and pick up the phone, while your computer hums into life. Without electricity, the scenario is slightly different... CERN's electrical network is so reliable that we forget what's going on behind the scenes.

The Laboratory's electrical infrastructure – which plays an essential role in the excellent performance of our experiments and accelerators, and of all CERN facilities – is anything but trivial. In its nominal configuration, it comprises two substations (BE1 and BE2) with an input voltage of 400 kilovolts (kV), supplied by the French electrical grid. Downstream, these are connected to another substation that lowers the voltage to 66 kV. Part of this network supplies facilities several kilometres away (notably in the LHC), while the other undergoes a further conversion to 18 kV in order to supply the nearby Meyrin and Prévessin sites, as well as the SPS. To provide redundancy, CERN's electrical infrastructure is also connected to the Swiss grid, ensuring that a reduced power supply continues in the event of a problem with the French grid or CERN's internal network.

(Continued on page 2)

A WORD FROM ECKHARD ELSEN

THIRTY YEARS OF LEP'S Z0 LINE SHAPE

Thirty years ago this week, the four experiments at CERN's LEP collider published the first of their famous results: the Z0 line shape, which told us that there are three, and only three, families of fundamental particles in nature. For most of us, it's hard to imagine a time before the Standard Model – not surprisingly, since the theory that underpins particle physics is already into its 50s.

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A WORD FROM ECKHARD ELSEN

THIRTY YEARS OF LEP'S Z0 LINE SHAPE

Yet for those of us old enough to remember, the 1960s was a time of painstaking theoretical work, culminating in the emergence of the Standard Model in the 70s, and paving the way for the ambitious project to build a 27-kilometre-circumference electron–positron collider at CERN. The Large Electron Positron collider (LEP) duly switched on in 1989, and it was not long before it established itself as the machine that would put the theory developed through the 60s and 70s to the test, making the 1990s the decade that put the Standard Model on unassailably solid experimental foundations.

Despite its great size and complexity, the start-up of LEP went with metronomic precision. First beams circulated on 14 July, the first collisions were recorded on 13 August and, on 13 October, 30 years ago this week, the first of LEP's big results was published: unassumingly known as the Z0 line shape, it changed our view of the universe.

When LEP switched on, the number of families of particles was unknown. Theory told us that there had to be at least three, but set no upper bound. We already knew about three families, and only two members of those families remained to be discovered: the top quark and the tau neutrino, which made their first appearances at Fermilab in 1995 and 2000 respectively. But would there be more? The LEP experiments had the means to find out by measuring the production and decay of Z particles, the neutral carriers of the weak interaction.

Z particles decay into pairs of quarks or leptons, all of which can be measured by the detectors, with the exception of the very light neutrinos, which escape unseen. Since each family of particles counts a neutrino as a member, the prediction for what LEP would see was different for two, three, four or more families. The Z0 line shape is the peak in the distribution of particles produced in collisions as the collision energy scans through the Z production energy. Rather than being a sharp peak, it is a distribution around the mass of the Z0 particle, influenced by the experimental resolution and, more importantly, the lifetime of the Z0: the more ways the Z0 can decay, the shorter its lifetime and the larger the width of the peak. This is a direct manifestation of the famous Heisenberg uncertainty principle.

By October 1989, it was clear that the LEP data corresponded with the prediction for three families of particles. To be precise, the LEP experiments gave the number of light neutrinos to be 2.9840, plus or minus 0.0082. Such precision for the number three may seem pedantic, but it still has important consequences today. At the time LEP began, transitions between quarks, known as mixing, were well established, but neutrino mixing was not. Now we have a much better understanding of neutrino mixing, but the LEP measurement remains a very important constraint on the precise form that mixing takes.

As with many discoveries, a question answered is a new question opened. We now know that there are three families, the minimum required by theory and no more, but we do not yet know why. This was an important milestone in physics, and part of a long tradition in neutrino research, which really took off after this measurement. Today, 30 years on, with the LHC in the former LEP tunnel, and as we prepare for a new and exciting era in neutrino physics with our partners in the US and Japan, it's timely to reflect on the significance of those early days at LEP.

Read also the articles on the public website (https://home.cern/news/news/physics/celebrating-leps-physics-legacy) and in the last issue of the CERN Courier (https://cerncourier.com/a/leps-electroweak-leap/).

Eckhard Elsen
Director for Research and Computing

LS2 REPORT: RENOVATION OF THE ELECTRICAL INFRASTRUCTURE

The switchover to the Swiss grid happens automatically thanks to an “auto-transfer” system.

During LS2, due to the major renovation and maintenance work under way, CERN's electrical network is working somewhat differently. “At the beginning of July, the BE1 input station was disconnected. We are now consolidating its protection system because, since this station dates from the 1970s, some of its equipment had reached the end of its life,” says Davide Bozzini, technical coordinator in the Electrical Engineering (EN-EL) group. During the course of the work, which should finish some time in November, the BE2 substation is therefore supplying the entire Laboratory alone.

In mid-September, Meyrin's main substation, ME9, which has supplied the site with 18 kV since the 1960s, was “unplugged”. It is being completely renovated and should come back into operation at the end of April

2020. In parallel, the auto-transfer system will also be entirely renovated. While these two renovations are taking place, the connection to the Swiss grid has also had to be suspended. This enables the EN-EL group to carry out important work on the ME9 substation, but also deprives CERN's general network of one of its sources, which could, in rare cases, lead to temporary power cuts*.

Major work is also under way on the SPS, where five of the seven 18 kV substations located at the seven SPS surface points are being renovated. Work on four of them required new buildings to be constructed, which meant that the EN-EL group could start work before LS2 began, while the accelerator was still running.

The EN-EL group is also working on the LHC Injectors Upgrade (LIU) project. “Our LIU activities are very varied, just like the needs of our clients,” says Davide Bozzini. “In the PS Booster and the PS, for example, we have replaced several electrical boards and low-voltage switch boxes dating from the 1970s, as well as the lighting systems, which were antiquated and have now been replaced with new radiation-resistant lights. The latter were developed by the EN-EL group in collaboration with manufacturers.”

Many other activities, notably maintenance, are also under way in preparation for future runs: maintenance of several hundred transformers and circuit breakers, replacement of the batteries of critical supply systems in the LHC, updating of network status control systems, etc. Currently, more than 200 people (personnel from CERN and from external companies) are working on the consolidation, maintenance and operation of CERN's electrical infrastructure, on which depend all the activities carried out at the Laboratory.

**You will be informed should a power cut occur.*

CERN's newest and biggest power transformer, for the new BE2 electrical substation, was installed in September 2018 to reinforce CERN's electrical network (Image: CERN)

Anaïs Schaeffer

MOVING OUT OF ACADEMIA TO ENTREPRENEURSHIP

Six CERN alumni who started their own companies share experience and information on how to move to entrepreneurship

The panel at the event (Image: CERN)

The fourth event in the “Moving out of Academia to...” series took place on 11 October at CERN and this time focused on entrepreneurship. With many CERN alumni choosing to follow this path, the CERN Alumni Relations team collaborated with the CERN Knowledge Transfer team and invited alumni entrepreneurs to share the experience of their transition from academia to entrepreneurship. The panel consisted of six CERN alumni who are currently running their own successful companies. After short presentations, the panellists interacted candidly and openly with the audience, recounting their journeys and the ups and downs. All remarked that they would do it again without a second of hesitation! The recording of the seminar is available (*https://indico.cern.ch/event/847989/timetable/*) on the event page.

To reach audiences who did not have the opportunity to be present, CERN followed up with a LinkedIn Live that has been viewed more than 12 000 times (*https://www.linkedin.com/video/live/urn:li:ugcPost:6588414643784556544/*).

Orestis Galanis

CROATIA BECOMES AN ASSOCIATE MEMBER OF CERN

CERN welcomes the Republic of Croatia as an Associate Member State

Visit by Her Excellency Ms Vesna Batistic Kos Ambassador Extraordinary and Plenipotentiary Permanent Representative of Croatia to the United Nations Office and other international organisations in Geneva accompanied by Ms Ines Sprem Scigliano Second Secretary on the occasion of the notification of the Associate Membership to CERN (Image: CERN)

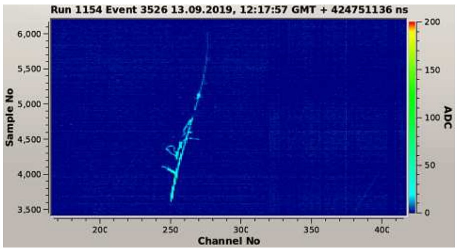
Today, CERN welcomes the Republic of Croatia as an Associate Member State, following receipt of official notification that Croatia has completed its internal approval procedures in respect of the Agreement, signed on 28 February 2019, granting that status to the country.

Scientists and researchers from Croatia have contributed to many experiments at CERN for almost four decades. A Cooperation Agreement concluded between CERN and Croatia in 2001 increased the country's participation in CERN's research and educational programmes. Croatia applied for Associate Membership in May 2014.

As an Associate Member State, Croatia will have a seat in the CERN Council and be entitled to attend meetings of the Finance Committee and the Scientific Policy Committee. Nationals of Croatia will be eligible to apply for limited-duration positions as staff members and fellows. Firms offering goods and services originating from Croatia will be entitled to bid for CERN contracts, opening up opportunities for industrial collaboration in advanced technologies.

TESTS START AT CERN FOR LARGE-SCALE PROTOTYPE OF NEW TECHNOLOGY TO DETECT NEUTRINOS

The second ProtoDUNE detector at CERN saw its first particle tracks in August



A track made by a cosmic-ray muon, observed in the dual-phase ProtoDUNE detector. The ionisation released by the muon track in liquid argon and by the correlated electromagnetic activity can be seen (Image: ProtoDUNE)

Scientists working at CERN have started tests of a prototype for a new neutrino detector, using novel and very promising technology called “dual phase”. If successful, this technology will be used at a much larger scale for the international Deep Underground Neutrino Experiment (DUNE), hosted at Fermilab in the US.

Scientists began operating the dual-phase ProtoDUNE detector at CERN at the end of August, and have observed the first particle tracks. The detector is a cube about six metres long in each direction – the size of a three-storey house – and is filled with 800 tonnes of argon.

The new technology would be used in addition to so-called single-phase detectors that have been successfully operated for many years. “The single-phase technology is a proven method that will be used to build the first module for the DUNE detector,” said DUNE co-spokesperson Ed Blucher of the University of Chicago. “The dual-phase technology provides a second method that has great potential to add to the DUNE detector's capabilities.” Indeed, the dual-phase technology may be game-changing: it would significantly amplify the faint signals that particles create when moving through the detector.

The single-phase ProtoDUNE, which began taking data at CERN in September 2018, is filled entirely with liquid argon. Sensors submerged in the liquid record the faint signals generated when a neutrino smashes into an argon atom. The dual-phase version uses liquid argon as the target material and a layer of gaseous argon above the liquid to amplify faint particle signals before they arrive at sensors located at the top of the detector, inside the argon gas. The dual-phase set-up could yield stronger signals and would enable scientists to look for lower-energy neutrino interactions.

The innovative data-collection electronics, each with a surface area of nine square metres, are individually suspended a few millimetres above the liquid level. They sit in the gas layer near the top of the detector, which has special chimneys that open from the outside. This offers the advantage that the electronics can be accessed even when most of the detector is filled with liquid argon at a temperature below -184 ℃.

The dual-phase detector features a single active volume with no detector components in the middle of the liquid argon and a reduced number of readout elements at the top. This reduces “dead space” within the detector volume and offers the neutrinos a larger target.

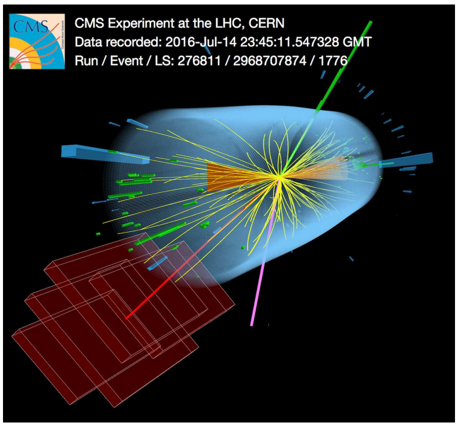
The single- and dual-phase prototypes at CERN are small components of the detector that the DUNE collaboration plans to build in the United States over the next decade: a DUNE detector module will house the equivalent of twenty ProtoDUNEs and operate at up to 600 000 volts.

DUNE plans to build four full-size detector modules based on argon technology. These will be located around 1.5 km underground, at the Sanford Underground Research Facility in South Dakota. Scientists will use them to understand whether neutrinos could be the reason that matter dominates over antimatter in our universe.

The outcomes of the test at CERN will help with deciding how many modules will feature the single-phase technology and how many will use the dual-phase technology.

RUN TOP QUARK RUN

The CMS collaboration has measured for the first time the variation, or "running", of the top-quark mass



A candidate event for a top quark–antiquark pair recorded by the CMS detector. Such an event is expected to produce an electron (green), a muon (red) of opposite charge, two high-energy "jets" of particles (orange) and a large amount of missing energy (purple) (Image: CMS/CERN)

Dive into the subatomic world, into the heart of protons or neutrons, and you'll find elementary particles known as quarks. Measuring the mass of these quarks can be challenging, but new results from the CMS collaboration reveal for the first time how the mass of the top quark – the heaviest of six types of quarks – varies depending on the energy scale used to measure the particle.

The theory of quantum chromodynamics, a component of the Standard Model, predicts this energy-scale variation, known as running, for the masses of all quarks and for the strong force acting between them. Observing the running masses of quarks can therefore provide a way of testing quantum chromodynamics and the Standard Model.

Experiments at CERN and other laboratories have already measured the running masses of the bottom and charm quarks, the second and third heaviest quarks, and the results were in agreement with quantum chromodynamics. Now, the CMS collaboration has used data from high-energy proton–proton collisions at the Large Hadron Collider to chase out the running mass of the top quark.

The CMS physicists looked for how often pairs of particles comprising a top quark and its antimatter counterpart were produced in the collisions. They did this measurement at three different energy scales, between about 400 GeV and 1 TeV, and then compared the results with theoretical predictions of the top quark–antiquark production rate. From this comparison, they obtained the top-quark mass at those three energy scales.

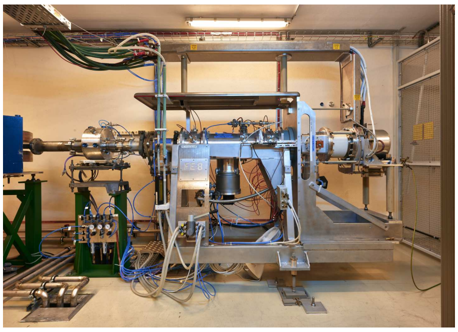
The result? The top-quark mass does seem to run as predicted by quantum chromodynamics – that is, it decreases with increasing energy scale. However, the result is based on only three experimental data points. More data points, as well as improved theoretical predictions, should be able to tell with more precision whether that's indeed the case.

Find out more on the CMS website (*https://cms.cern/news/watching-top-quark-mass-run*).

Ana Lopes

ISOLDE'S NEW OFFLINE 2 SOURCE NEARS COMPLETION

The final touches are being put to the new test facility to ready it for operation



Offline 2 in its enclosure at CERN's Meyrin site (Image: Julien Ordan)

During the ongoing second long shutdown of CERN's accelerator complex (LS2), ISOLDE is upgrading its target test facilities. The so-called Offline 1 will be supported by the brand new Offline 2 facility in the coming months.

ISOLDE, which stands for Isotope Separator On-Line Device, is CERN's longest-running experiment facility, having been first switched on in 1967. It specialises in producing radioactive isotopes of elements, allowing scientists to study exotic nuclei that would rarely, if ever, occur naturally in the universe.

"It works by firing a 1.4-GeV proton beam from the Proton Synchrotron Booster into specially prepared targets," explains Stuart Warren (EN/STI), who worked on ISOLDE for three years. "The elements in these targets undergo physico-chemical processes resulting in the production of specific radioactive isotopes." Once produced, the neutral atoms are ionised so they can be accelerated by electric fields and transported for study. Powerful magnets bend the beam in transport, separating the different isotopes based on their masses, while electrostatic quadrupoles focus the particle beam for delivery into ISOLDE's various experiment set-ups.

"To make new isotopes, we have to test different targets," continues Warren, "but we cannot do this in the 'online' part of ISOLDE, as it is in high demand for research-data collection throughout the year." In addition, the "online" facility is highly irradiated from the proton beams and the nuclear reactions, limiting the time that scientists can spend in its vicinity. ISOLDE has therefore had an "offline" facility that allows scientists to test not only new targets for their suitability, but also the parameters needed to extract the best quality of radioactive-isotope beams. The target in the offline part is heated by a 1000-A supply, which causes the atoms to evaporate and diffuse from the target, after which they are ionised and sent through the beam lines.

Recently, increasing demands on the original offline facility, now called “Offline 1”, led to the decision to build a second one to complement it. “I have spent the last three years designing and building 'Offline 2' with my colleagues Tim Giles, Carlos Muñoz Pequeño and Annie Ringvall-Moberg,” beams Warren.

Offline 2 is located next door to Offline 1 and is enclosed in a Faraday cage covering 40 square metres. It is designed to be as similar to the online facility as possible. For example, its radiofrequency quadrupole cooler and buncher (RFQcb) is a replica of the one used in ISOLDE proper. Warren and company have also put in place systems to conduct automatic tests of new targets and record data over large durations. With Offline 1, this needs to be done manually, resulting in a limited number of datasets being available.

Next week, Offline 2 will begin its six-month commissioning phase, which will include the installation of a dedicated laser bench and other tools. When proton beams return after LS2, Offline 2 will work in parallel with Offline 1 to cater to the needs of target and ion-source development in order to sustain ISOLDE's comprehensive physics programme.

More photos of Offline 2 on CDS (*https://cds.cern.ch/record/2690229*)

Achintya Rao

COMPUTER SECURITY: WHAT DO APARTMENTS AND COMPUTERS HAVE IN COMMON?

For the protection of your digital assets, photos, films, documents, banking access, social media, etc., make sure that you apply cyber-security best practices

Assume that you have just bought an apartment. Ground floor with a small garden. Top location. Near a lovely park. Tram stop not too far away. Quiet, but still in reach of supermarkets and restaurants. Perfect, if it wasn't for the daily and nightly flow of people around your building. Most of them seem nice, but some of them look nasty or even malicious.

So, you have properly equipped your entrance door with a modern lock and dimple keys; protected it additionally with a crossbar and installed a reinforced frame with multiple deadbolts. Your windows and terrace doors are also all reinforced and secured by locks so that nobody from the outside can easily open them, even if they are tilted. Automatic blinds roll down during the night for further protection. Inside your apartment, all your really important belongings are locked away in a small safe attached to the wall in your wardrobe: jewellery, watches, passports, banking codes and some important family documents. And you consulted a local security company who installed some motion sensors and external cameras to monitor abnormal activities when you are not at home. Of course, all that costs money and time to implement, but you feel secure now, properly protected and safe, since, at home, you are the number one person responsible for security. Your household insurance and the local police might help you and provide some valuable advice, but it is up to you to protect yourself and your family.

Enter your laptop. Smartphone. Tablet. PC. eBook Reader. Smart TV. Livebox. Stereo. Playstation. Wii. Internet-connected thingy. Just as within the privacy of your four walls and the valuables you have at home, such digital devices contain lots of information about your private life and that of your family. With some devices, you are even living in tight symbiosis. But have you consciously thought of protecting your devices as thoroughly as your apartment? Deploying all the necessary dedication, money and time?

For the protection of your digital assets, photos, films, documents, banking access, social media, etc., make sure that you apply cyber-security best practices: have all your connected devices configured so that they update themselves regularly. Note that the less “computer-like” your device is, the harder that will be to do (and you might decide to accept the risk of not patching such devices or just not put them online). Make sure that the entry point in your home network (usually your wireless access point, a “Livebox” or similar) is kept up-to-date and configured in a manner that any connection initiated from the outside is blocked. In fact, that should be the default setting. Only deliberately open incoming connections if you have a good understanding of what you are doing. Educate your family. Tell your kids and partner to watch out when browsing the web. Not everything is what it seems, and one wrong click can compromise your home network and all your digital assets. Once more, you are the number one person responsible for the security of your home devices. It is in your personal interest to keep them secured. The Microsofts, Apples, Googles and Swisscoms of this world might help you with that, but still it is up to you to protect you and your family.

But what about at CERN? Internet-wise, CERN is also in a dubious neighbourhood. Computer attacks against the Organization are happening all the time. Phishing. Ransomware. CEO-fraud. Brute-forcing. Defacements. Abuse. Attackers try hard to succeed. CERN's reputation and its flawless operation of accelerators, experiments and computing services is at risk.

So it is in all of our interests to protect the Organization. Just like at home, at CERN you are the person primarily responsible for the cyber-security of your digital assets. It is you in the first instance who is supposed to apply the same cyber-security measures you deploy at home to all the devices registered to you at CERN. Your laptop. Smartphone. Tablet. PC. Server. Virtual machine. Container. Website. Database. Control system. Software. Computing account. Keep them up-to-date. Tightly control any remote, virtual or physical access to them. Have monitoring capabilities in place. Provide additional protective measures if the device is just weak and not really secure. The CERN Computer Security Team can help you with that. Training. Auditing. Consulting. We also provide additional monitoring, detection and protective means. And in the event of damage, we do incident response and close-out. Whatever cybersecurity issue you have, just drop us a line: Computer.Security@cern.ch. We are here to make your professional life more cybersecure.

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Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report. For further information, questions or help, check our website or contact us at Computer.Security@cern.ch.

The Computer Security Team

Official communications

REMINDER CONCERNING THE ROAD TRAFFIC RULES APPLICABLE ON THE CERN SITE

You are reminded that Swiss and French road traffic rules apply on the CERN site, the former on parts of the site located on Swiss territory and the latter on parts of the site located on French territory, including the French part of the Meryin site. However, for logistical reasons and consistency, road signs follow Swiss standards on all parts of the Meyrin site.

You are also reminded that daytime running lights must be switched on on the Swiss part of the CERN site and are highly recommended to be used on the French part as well.

SUBSCRIPTION CHANGES FOR CERN MOBILE PHONES ON 26 NOVEMBER 2019

To reduce costs for data access, especially in the Pays de Gex, and to support e-SIMs so smartphone users whose device is compatible with e-SIM can use a single phone both professionally (with an e-SIM card provided by CERN) and privately (with your own SIM card from your personal mobile phone subscription), mobile telephony subscriptions will change as from 26November.

There will be a brief outage at the time your profile is migrated. If your telephone blocks, you should restart it.

Following the change, users with an appropriate phone will also be able to use VoLTE (Voice over LTE) which should improve connectivity in France, and, if there is no mobile phone network connection, to make voice calls over a Wi-Fi connection at CERN or in Switzerland.

The new subscription options are shown below. Users with a “Full” subscription will be migrated to the Standard subscription. Other users will be migrated to the Restricted subscription.

Subscription	From Switzerland and tunnels	From
Standard (20 CHF)	- Voice included to Switzerland & neighbours - Voice to other countries charged - Data included	- Voic
Restricted (10 CHF)	- Voice included to Switzerland & +33450 - Voice to other numbers blocked - Data included	**Conn**

IMPORTANT NOTE: Voice calls to numbers outside Switzerland and neighbouring countries will be much more expensive than today. It is highly recommended to use CERN landlines when calling abroad or to use data calls with a softphone solution such as Skype for Business (and the soon-to-be-introduced CERN Phone App) that enables you to use your landline number on your mobile phone.

For further details, please see the following webpage (*https://mobile-update.web.cern.ch*) (login required).

Announcements

“SCIENCE MEETS FICTION” CONFERENCE

A conference in collaboration with Arts at CERN will take place on Wednesday 30 October from 2.00 p.m. to 6.30 p.m. at the HEAD in Geneva

(Image: CERN)

Does science need fiction? Does fiction still need science? What kind of fictional spaces, and fictional scenarios emerge when scientists and artists collaborate? From bio-design to particle physics, this conference, in collaboration with Arts at CERN, will focus on the mutual influences between science and fiction.

Wednesday 30 October
From 2.00 p.m. to 6.30 p.m.
CUBE, HEAD, Building H
Free entrance

For more information, please visit this website (*https://www.hesge.ch/head/en/event/2019/science-meets-fiction-conference-collaboration-arts-cern*) or the Facebook event.

FLU: PROTECT YOURSELF AND OTHERS

The World Health Organization (WHO) maintains that influenza vaccinations are effective and safe. “Worldwide, these annual epidemics are estimated to result in about 5 million cases of severe illness and around 290 000 to 650 000 deaths.”

By choosing to get vaccinated, you are protecting not only yourself, but also your family, friends and colleagues as well as people who are vulnerable and at risk.

How to get vaccinated at CERN?

From now until the end of the vaccination period, all people working at CERN can come and collect a prescription for an influenza vaccine from CERN's medical service, building 57.

Once you have bought the vaccine, CERN's medical service will welcome you in order to administer it.

Please ensure that the vaccine is kept cool in the fridge if you cannot come immediately!

Friday 8th November 2019 is the Swiss national flu vaccination day.

To mark this event, CERN's Medical Service will exceptionally be open the whole day from 8am to 5.30pm in order to vaccinate you against influenza.

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For more information regarding influenza:

- <i> WHO </i>
- *OFSP*
- *Santé Publique France*

CERN Medical Service

ENTRANCE A: CONTRAFLOW SYSTEM IN PLACE FROM 21 TO 24 OCTOBER

Please note that, due to roadworks, only one lane will be open to traffic at Entrance A from Monday 21 to Thursday 24 October 2019 during the usual opening hours (7.00 a.m. to 7.00 p.m.). A contraflow system will therefore be in operation to regulate traffic entering and exiting the site, and this may cause delays.

Thank you for your understanding.

The SMB department

SECURE PRINT: HOW TO ENSURE PRINT CONFIDENTIALITY AND REDUCE PAPER WASTE

Secure printing is when you send your file to the printer (print job) with a pincode chosen by you. Your print job will not be printed until you put in this pincode at the machine

Secure printing is when you send your file to the printer (print job) with a pincode chosen by you. Your print job will not be printed until you put in this pincode at the machine.

Have you ever run to the printer to fetch confidential prints because you did not want anyone else to take them by mistake? Have you noticed lots of papers next to the printer that have never been collected?
Or maybe you printed something only to realise immediately that it wasn't correct, meaning you will have to throw those pages away and print again?

Secure print aims to reply to all these points by:

- **ensuring confidentiality:** no one can walk off with your printout;
- **eliminating forgotten printouts:** if you do not release your print job within 12 hours, it is automatically deleted (please note this is 4 hours on some smaller models);
- **reducing paper waste:** as there is a delay between when you send and when you release your print job at the machine, you can delete incorrect jobs before printing them.

In this way, we only print what we really need, resulting in less waste.

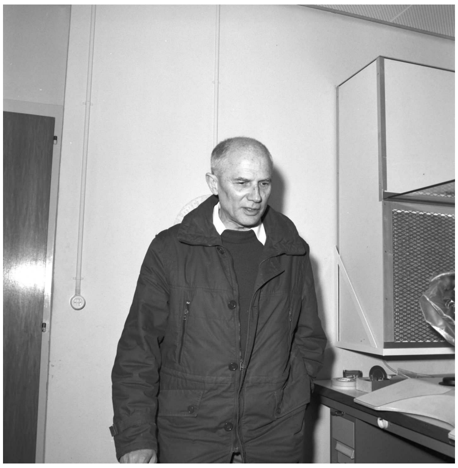
In addition, you can set secure print by default for all your printing so it is even easier to use. To find out how, please find instructions and links to short video tutorials for Mac and PC, in both English and French, here (*https://cern.service-now.com/service-portal/topic.do?topic=SecurePrint*). Using secure printing in Linux will be documented in a future announcement.

Please help us spread the word about this function: by mentioning it to your colleagues and asking them to use secure print. **Let's work together to reduce paper waste at CERN – thank you!**

Obituaries

GIOVANNI MURATORI (1924–2019)

Remembering a superb engineer



Giovanni Muratori's initial analyses of technical problems were invariably correct (Image: Family photograph)

Giovanni Muratori received a double degree in naval and mechanical engineering at the University of Genoa in 1949, after which he worked at ENI-AGIP on the construction of instruments for oil exploration. He started at CERN in August 1959 in the PS division, where he worked on the heavy-liquid bubble chamber designed to study neutrino physics. He oversaw the design of the cameras – not an easy task in view of the strong magnetic field that precluded the use of electric motors – and, after some initial setbacks, the chamber was ready for data-taking in early 1961. When the event rate was found to be insufficient, a crash programme was set in motion to improve the beam (using van der Meer's magnetic horn) and to increase the total mass of detectors (by adding spark chambers downstream). Giovanni embarked on the design of the mechanics and optics of these spark chambers, which became operational in 1963.

At the end of 1961 he was transferred to the Nuclear Physics division and, in April 1966, was appointed leader of the Technical Assistance group, which was involved in the design and construction of optical and mechanical equipment. The group developed and constructed a wide variety of detectors and associated equipment, including the R-108 experiment at the ISR, where they built a set of novel cylindrical drift chambers allowing track positions along the wire to be measured using the difference in the arrival times of the signal at the ends of each wire. For NA31 the group built drift chambers installed in a helium-filled tank, as well as a lightweight Kevlar window separating the helium from a vacuum tank.

Early on, the group designed and constructed an automatic machine for winding large wire spark chambers and soon became specialised in the construction of arrays for the new multiwire proportional chambers. Led by Giovanni, the group developed equipment and facilities for Cherenkov detectors, including a dry lab for handling lithium foil and methods of producing precision glass spherical mirrors coated with highly reflecting aluminium coatings. Mirrors made using these techniques were later used in the RICH detector at LEP's DELPHI experiment.

Towards the end of his CERN career, he worked on the initial designs of the TPC detector for another LEP detector, ALEPH. He also started a collaboration with a group searching for the existence of a “fifth force” and designed and built a rotor that generated a dynamic gravitational field at around 450 Hz, which was used in the first absolute calibration of the gravitational wave detector EXPLORER at CERN.

Giovanni remained at CERN for several years after his retirement in 1986, during which time he worked on several problems, including the initial design of a prototype liquid argon chamber for use in underground experiments at Gran Sasso. He was a superb engineer. His work was highly appreciated and his opinions respected. He participated actively in the design of equipment with innovative and ingenious ideas. He also loved solving machining and manufacturing problems, whether on a large or a Swiss-watch scale. With his common-sense attitude and his warm and generous spirit, his advice was often sought on personal matters. Giovanni will be remembered with respect and affection by his numerous friends and colleagues.

His beloved wife Suzanne predeceased him in May 2018. We extend our heartfelt condolences and sympathy to their son, Bruno, and to Fiona, Giovanni and Hugo.

His friends and colleagues

JEAN-JACQUES CLOYE (1944–2019)

(Image: CERN)

It was with deep sadness that we learned of the death of Mr Jean-Jacques Cloye on 18 September 2019.

Jean-Jacques was retired from CERN, where he had worked for many years in the Accelerator Control Group. Heavily involved in the front-line operational facilities of the accelerators, he was always passionate about his work and fully committed to CERN's mission.

The quality of his work, his smile, his friendliness and his openness towards his many colleagues will live on in our memories.

CERN offers its sincerest condolences to all his family.

The BE/CO Group