

DISCUSSING FUTURE COLLIDERS AT FCC WEEK 2018

Some 500 scientists from 147 institutes met in Amsterdam for the 2018 Future Circular Collider (FCC) week from 9 to 13 April



Sijbrand de Jong, President of the CERN Council, at the 2018 FCC week in Amsterdam.

From 9 to 13 April, some 500 scientists from 147 institutes met in Amsterdam for the 2018 Future Circular Collider (FCC) week. This fourth annual meeting of the FCC collaboration offered a vibrant space to discuss the latest research results and present technological breakthroughs that could pave the way for a new large-scale research infrastructure.

Both LEP and the LHC were massive endeavours spanning more than 20 years each, from conception to commissioning. This is why it is timely to advance with the design of the next-generation of circular colliders, which could begin operation af-

ter the completion of the HL-LHC research programme.

Open questions in modern physics, such as the nature of dark matter and the observed matter-antimatter asymmetry, along with the need to study the Higgs boson in detail, call for particle accelerators at the energy and intensity frontier. The combination of accelerators envisioned by the FCC study, through their synergies and complementarities, offer an extraordinary tool for further exploration of these questions.

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DISCUSSING FUTURE COLLIDERS AT FCC WEEK 2018

The different options being considered by the FCC study captivate particle physicists and challenge accelerator engineers, with unprecedented opportunities for physics discoveries and technological breakthroughs.

"Historically, accelerators have been our most powerful tools for exploration in particle physics and I believe they will continue to play a crucial role in the future. They will be part of a compelling and diverse scientific programme together with other, complementary approaches," said Fabiola Gianotti, CERN's Director General, during the FCC week opening session. She added: *"I cannot see a more natural and better place than CERN to host future circular colliders of the complexity of the FCC, given CERN's demonstrated expertise in building and operating high-energy accelerators, the existing powerful accelerator complex, and the available infrastructure that we continue to upgrade."*

An intense week of meetings and discussions looked at performance-optimised machine designs, detector concepts and future R&D lines to meet the physics targets along with studies on the infrastructure and civil-engineering requirements. More than 285 presentations and 80 posters covered current progress as well as new concepts. Parallel sessions summarised R&D efforts on topics including superconducting materials and high-field magnets, high-efficiency klystrons, superconducting RF cavities, as well as beam-monitoring systems, energy-efficient cryogenics and vacuum systems.

The FCC study offers opportunities to train the next generation of scientists, engineers and innovators who will further develop accelerator technologies that could find many applications outside particle physics. The FCC innovation awards acknowledged the high-quality work of young researchers, which is key for the realisation of this

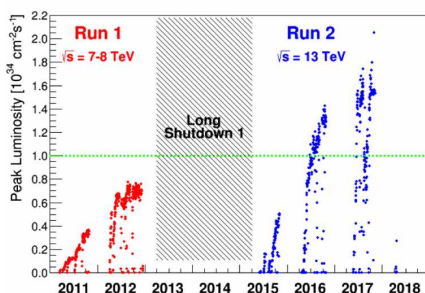
project. *"One of the main goals of the FCC collaboration is to help young, talented and motivated colleagues to develop into successful scientists, by presenting networking opportunities and exposing them to new views and perceptions. The high number of young people participating in the FCC week is testimony to the attractiveness of the ongoing research and is key for the success of this project,"* says Michael Benedikt, FCC study leader.

The worldwide interest in the FCC study was reflected in the number and diversity of attendees at this year's meeting, with participants from research centres, universities and industrial partners in 30 countries. The FCC collaboration is now gearing up for the preparation of its conceptual design report, set to be published by the end of 2018 in time for the upcoming update of the European Strategy for Particle Physics.

Panagiotis Charitos

LHC REPORT: COLLISIONS AND SPRING CLEANING AT THE LHC

On 28 April 2018, 13 days ahead of schedule, the operators of the LHC successfully injected 1200 bunches of protons into the machine and collided them



The peak luminosity of each fill as a function of the date. A few points have now been plotted for 2018, indicating the first steps of the intensity ramp-up phase. The green line indicates the LHC design luminosity.

On 28 April 2018, 13 days ahead of schedule, the operators of the LHC successfully injected 1200 bunches of protons into the machine and collided them. This formally marks the beginning of the LHC's 2018 physics season.

An important milestone was achieved on Tuesday, 17 April, when, for the first time

in 2018, stable beams were declared and the experiments started to take data, although only at very low luminosity levels, and with only three bunches per beam. The LHC has now entered the period during which the final beam commissioning steps will be interleaved with stable beams for the experiments, with a stepwise increase of the number of bunches in each beam until the maximum number of 2556 bunches per beam is reached.

The scrubbing run is another key step in the beam commissioning process, preparing the machine to perform well with a large number of bunches. The scrubbing process "cleans" the surface of the vacuum chamber of "loose" electrons. Loose electrons can detach and then build-up as a cloud in the vacuum chamber, affecting the beam's stability and quality. The duration of the scrubbing run depends on the type of work that took place during the YETS. This time, the machine was neither extensively opened, nor warmed up to room tempera-

ture. The one new component that required extra attention was an injection kicker module that was exchanged during the YETS. Therefore, only one day of scrubbing – performed on Monday, 23 April – was required to establish the conditions necessary for running with 2556 bunches per beam and to condition the injection kicker module. The machine was successfully filled with 2820 bunches and the beam was maintained for several hours at a low (injection) energy (450 GeV).

A large number of measurements were made during the scrubbing run to monitor the effectiveness of the cleaning and to decide when to stop. Against expectations, some activity was observed in the interconnection of 16L2, where, in 2017, some gas condensate caused regular beam losses. This problem could be circumvented by filling the LHC with a different bunch pattern. It is still early days to be able to draw conclusions and so more measurements, with an increased number of bunches at higher

energies and in stable beams, will be required to understand the extent and possible consequences of the observed activity.

At present, the intensity ramp up is at the level of around 600 bunches per ring, roughly 25% of the total number of bunches, but also about six days ahead of

schedule. The threshold of 1200 bunches, which is considered significant in terms of data taking, was expected to be reached around 11 May, but it was already reached on 28 April.

A revised 2018 LHC schedule, which takes into account the faster than anticipated

commissioning, has been approved and published, providing 131 days of physics with 25 ns proton beams, 17 days of special runs with protons, usually at a lower luminosity production rate, and 24 days of lead-lead collisions at the end of the year.

Rende Steerenberg

CERN TAKES TO THE SADDLE

CERN doesn't just accelerate particles... it also accelerates people!



Bike to work, 2013 edition (Image: CERN)

Bike to Work is an annual challenge that takes place during the month of June and is aimed at encouraging cycling as a mode of transport. The rules for taking part are simple: during June, at least half of your journeys to and from CERN must be by bike. You and three teammates regularly note down the distance travelled by bike in your personal calendars within the Bike to Work application. If you live too far away, don't be put off, as it's possible to combine cycling with another mode of transport, or even with walking, provided that you fulfil certain conditions.

bike repair stations and new showers to encourage the use of environmentally friendly modes of transport.

"Even though registration has been open just a few days, more than 20 teams have already signed up. People who are interested in taking part but don't yet have a team can register individually, then join an incomplete team later," says Jens Vigen, CERN's Bike to Work coordinator. So why not take the opportunity to meet new people and share your passion for cycling?

CERN doesn't just accelerate particles... it also accelerates people! For six years, its ever-growing community of cyclists has participated in the biggest event promoting cycling in Switzerland: Bike to Work. 831 members of the personnel took part last year and the goal for 2018 is to encourage at least 1000 to come to work using pedal power.

Aside from the fact that cycling is a sustainable mode of transport, it's also a great lifestyle choice. You don't need us to remind you of the health benefits. Cycling also gives you more freedom to get around, particularly by helping you to avoid stressful traffic jams... This year, people at CERN have even more reasons to get their bikes out, as the SMB department has installed

Sign your team up here:
https://www.biketowork.ch/fr/participation/Team_anmelden

Or join an incomplete team here:
https://espace.cern.ch/bike2CERN/Pages/official_team.aspx

Cristina Agrigoroae

CALL FOR INPUT TO THE EUROPEAN STRATEGY UPDATE

The European Strategy for Particle Physics, which is due to be updated by May 2020, will guide the direction of the field to the mid-2020s and beyond

The European Strategy for Particle Physics, which is due to be updated by May 2020, will guide the direction of the field to the mid-2020s and beyond. To inform this vital process, the secretariat of the European Strategy Group (ESG) is calling upon the particle-physics community across universities, laboratories and national institutes to submit written input by 18 December 2018.

The update of the European Strategy got under way in September when the CERN Council established a strategy secretariat. Chaired by Halina Abramowicz, the secretariat includes Keith Ellis (the Chair of CERN's Scientific Policy Committee), Jorgen D'Hondt (the current ECFA Chair) and Lenny Rivkin (the Chair of the European Laboratory Directors group).

The ESG secretariat, which has been assigned the task of organising the update

process, proposes broadly following the steps of the previous two strategy processes, concluded in 2006 and 2013. An open symposium, which on the two previous occasions took place in Orsay (France) and Kraków (Poland), will take place in May 2019, during which the community will be invited to debate scientific input into the Strategy update. With the event expected to attract around 500 participants, the secretariat proposes holding it over a period of four days.

To prepare for the open symposium, the location of which is expected to be decided by the summer, the ESG will be calling for written contributions towards the end of the year. Input should be submitted via a portal on the Strategy update website, which will be available from the beginning of October, once the update has been formally launched by the CERN Council. The link will appear on the CERN Council's web pages and will be widely communicated closer to the time.

A "briefing book" based on the discussions will then be prepared by a Physics Preparatory Group and submitted to the ESG for consideration during a five-day-long drafting session in the second half of January 2020. A special ECFA session on 14 July 2019, during the European Physical Society conference on high-energy physics in Ghent, Belgium, will

provide another important opportunity for the community to feed into the ESG's drafting session.

Global perspective

The European Strategy update will take into account the worldwide particle-physics landscape and developments in related fields, and was initiated to coordinate activities across a large, international and fast-moving community.

Understanding the properties of the Higgs boson (which was discovered at CERN just before the previous Strategy update) will remain a key focus of analysis at the LHC and future colliders, as will precision measurements of other Standard Model (SM) parameters and searches for new physics beyond the SM.

Neutrino physics is another key area of interest, with much experimental activity having taken place since the last update. A Physics Beyond Colliders programme has also been established by CERN to explore projects complementary to high-energy colliders. The European astroparticle and nuclear-physics communities, meanwhile, recently launched their own strategies, which will also feed into the ESG update.

"After the discovery of the Higgs boson, the field is presented with a number of challenges and opportunities," says Abramowicz. "Guided by the input from the community, the European Strategy will determine which of these opportunities will be pursued."

HACKING SOLUTIONS TO MEDTECH CHALLENGES

The very first CERN Medical Technology Hackathon – MedTech:Hack – was held at IdeaSquare from 6 to 9 April

Out of 25 applications from 14 different countries, five teams of students and young professionals were selected to come to CERN to solve challenges in the medical field. The challenges were set by healthcare organisations and industry partners and the teams were given access to relevant CERN technologies in order to solve them.

Why is a hackathon organised by CERN focusing on MedTech? Early activities at CERN relating to medical applications date back to the 1970s.. In light of the significant growth in these activities, in 2017, CERN published a formal medical applications strategy (approved by the Council in June that year). The MedTech:Hack was initiated by the Knowledge Transfer group's Medical Applications section and its Entrepreneurship team together, to explore new ways of developing viable applications in the field.

The challenges of the hackathon were set by the Hôpitaux Universitaires de Genève (HUG), the Global Humanitarian Lab, RadiaBeam Technologies and G-

ray. Moreover, to complement the technical know-how provided by CERN, the MedTech:Hack was organised in close collaboration with: HUG, providing access to medical doctors' expertise; the Global Humanitarian Lab, offering a close link to several humanitarian organisations; Impact HUB, supporting the teams in business model development; The Port, which has extensive expertise in hackathons and also shared their methodology; and the Geneva Health Forum, providing an opportunity to present the results to the global health community. Finally, MassChallenge Switzerland partnered with MedTech:Hack to support a selected team on their way to becoming a start-up.

After three days of intense work and remarkable progress with the help of mentors from industry and technical experts from CERN, the AwardFEST took place on 9 April. The jury had a tough job selecting a winner and ended up choosing two of the teams.

Team 2.7 from Tanzania worked on the Global Humanitarian Lab's challenge, on

mobile health, finding a solution for people in rural areas to get better access to vital healthcare. The solution they came up with was Box.e, a portable device with several sensors to measure the vital signs of patients, using CERN's C2MON technology to store and monitor data.

Team Radioactive_boys from Germany worked on HUG's challenge on screening radiopharmaceuticals in a much faster and more efficient way. Their solution, Bioscan, is a modular hybrid scanner for the measurement of radioactivity. It is fast and boasts high spatial and temporal resolution using CERN's GEMPix detector.

Both winning teams were rewarded with a stay at CERN to continue developing their projects. In addition, Team 2.7 got the opportunity to present their project at the opening ceremony of the Geneva Health Forum, while Team Radioactive_boys won a spot in the second round of judging at MassChallenge Switzerland.

Ranveig Strom & Rita Ferreira

CRABS SETTLED IN THE TUNNEL

After several years of preparatory work, the first crab cavity prototypes have been installed in the SPS tunnel and are ready for testing



CERN scientist, Giovanna Vandoni, coordinated the recent installation of crab cavities. (Image: Julien Orban/CERN)

The High-Luminosity LHC (HL-LHC) project aims at increasing the number of collisions in the LHC and consequently improving the precision of the experiments' analyses. For several years, engineers, technicians and operators have been devising, designing and building the components, some of which are completely novel. Among these innovative components are the "crab cavities", which will rotate bunches of the beams to increase the overlap between them and therefore the probability of collisions in-

side the experiments. CERN scientist, Giovanna Vandoni, has coordinated the recent installation of the cryomodule containing the first two prototype cavities in the Super Proton Synchrotron (SPS), where they will be tested this year. Here (<https://home.web.cern.ch/about/updates/2018/04/crabs-settled-tunnel>) 's the story so far in pictures.

Giovanna Vandoni

COMPUTER SECURITY: A FREE CLICK FOR YOUR AWARENESS

After our Bulletin article entitled "Curiosity clicks the link" at the end of February, our annual "clicking campaign" followed on one month later

After our *Bulletin* article entitled "Curiosity clicks the link" at the end of February, our annual "clicking campaign" followed on one month later. Based on e-mail templates created by students of the University of Rotterdam, using only information they were able to find on CERN's public webpages, 20937 "suspicious" e-mails were sent, to everyone with a CERN e-mail address. Many reported these malicious mails to us immediately, a few detected them as our awareness campaign, and some recipients clicked...

Are you still curious? Learn from examples of "Phishing mails" provided by a "David.Marquinais @ cern.ch"; verify your e-mail address for "CERN Lightweight Account verification" ("support @ cern.com"); check out your account for the "Cern Pensions update" sent by "head.office @ cem.ch"; or answer the "CERN Students & Educators evaluation email" from "outreach @ cem.ch" in order to comment on their new website... Yes, many sender addresses do not make sense. "David Marquinais" as "Head of User Support" and "Fabien Delacroix" as "Head of CERN" do not exist at CERN. Neither do "cern.com", "cem.ch" (which looks like "cern.ch" when displayed in small fonts). CERN only uses "cern.ch" and ".cern" (dotCERN). If you read the corresponding mail bodies, the embedded

links look weird and have no apparent ties with CERN. But this is what the malicious evil-doers (in this case the students from Rotterdam) try to do: to lure you in believing the mail is genuine. To make you click. To fall for it. To fail.

Clicking had no negative consequences... this time. But in reality, with real malicious e-mails, with one click, your computer would have been lost. Infected. Compromised. With one click, the malicious evil-doers might be able to install software on your Windows PC/laptop or Macbook (less likely on Linux systems), which register every keystroke you make in order to figure out passwords to your Facebook account, your Twitter feed, to access CERN or for accessing your bank details. Attackers will enable the webcam and the microphone in order to spy on you. They will download your documents, encrypt them in order to obtain money from you, and if you don't comply make those documents public. Game over.

Luckily it was just a clicking campaign this time, as we would have had a "game over" for 14% of the recipients. 14% clicked on the embedded links. Their compromised Windows PCs/laptops or Macbooks would now pose a threat to the Organization. Compared to previous years, this is a decrease from 18.7% in 2017 (16.5% in

2016). Other industries have reported similar "click rates". But in the end, the number doesn't really count, as the "click rate" scales with the level of sophistication of the e-mail. Targeted and well-engineered e-mails are harder to spot, and the "click rate" would be higher. Also, to be fair, many people informed us immediately after they received a suspicious e-mail. Thanks to them, we would have quickly been able to block any malicious website, URL or e-mail. Thanks to them, we would have been able to warn others. Of course, this time we let it go. But in reality, a quick heads-up send to us at Computer.Security@cern.ch can crucially help to secure CERN and minimise impact.

Hence this awareness campaign, helping you to identify strange e-mails early, be more vigilant, and avoid clicking before you lose your private data. And before you give the malicious evil-doers access to CERN. Just be reasonable. While it is difficult to protect yourself from the more sophisticated and targeted e-mails, protect yourself against the "easy" ones. It is like in the real world. If a stranger offers us, for example, a small bag of white powder and asks us to carry it across the border, we decline and walk away, don't we? It's the same in the digital world: if an e-mail, its sender, its context, the language, the way it is phrased, the embedded links and URLs,

etc. look weird to you, just do not click. Delete it. Or, if in doubt, send it to us for

verification. If it looks malicious, give us a heads-up!

further information, questions or help, check our website or contact us at Computer.Security@cern.ch.

Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report. For

The Computer Security Team

Announcements

CERN'S CAREERS WEBSITE GETS A MAKEOVER

In a competitive employment market, CERN must vie for the attention of the best candidates in engineering, physics, technical and support roles throughout its Member and Associate Member States. It's a tall order and an attractive, clear, intuitive and informative careers website is an essential ingredient in putting CERN on the radar of potential candidates.

Based on extensive user feedback on its existing site, collected in collaboration with PotentialPark (www.potentialpark.com), and with the support and guidance of the CERN web team, the CERN HR Talent Acquisition group has fully reviewed and revamped the existing website to create an all-new, streamlined and, what's more, mobile-friendly experience: <http://careers.cern>.

Due to go live on 2 May, the new website will be accompanied by another major upgrade: that of CERN's e-recruitment (also known as "Applicant Tracking") system, which aims not only to provide a streamlined candidate experience, but also to optimise and improve the efficiency of all recruitment processes at CERN.

James Purvis, head of the HR department, views this change as a positive step forward: "Following the External Review Committee's recommendations to the CERN Management with respect to streamlining administrative software systems, and a subsequent study carried out by Gartner, which was presented at the Enlarged Directorate in December 2017, CERN's ability to adopt 'standard processes' is going to be a critical success fac-

tor in its ability to increase administrative efficiencies".

As with any new tool, there will necessarily be a transition phase. Given the change in interface and the impact on the various processes, the HR-TA teams have developed comprehensive documentation to assist users and are fully trained and prepared to provide the necessary support to make the switchover as seamless as possible.

Find out more at <http://careers.cern>.

CERN. Take part.

HR Department

A COMMUNITY OF PRACTICE FOR PROJECT MANAGEMENT AT CERN

Project management has been around for many years at CERN. New machines and installations are often designed and built using CERN Project Management tools and practices. In 2015, the best practices at CERN were assembled in the OpenSE standard, which has become the standard practice at CERN for project management. With increasing interest in the subject and the high level of expertise available, the standard is being considered for an up-

grade and input from all practitioners is more than welcome.

For this purpose, a community of practice was created in 2017 to capture ideas and proposals on matters relating to project management, but also systems engineering, programme management and associated practices.

Since the start, the community has been growing rapidly and the mailing list now

contains more than 260 members. If you have experience to share or ideas to put forward, please join us every four weeks on Tuesday afternoons from 5.45 p.m. to 6.45 p.m.

To subscribe, go to: <https://e-groups.cern.ch/egroups/EgroupsSubscription.do?groupid=10268571>.

Thijs Wijnands, Pierre Bonnal, James Devine and Erwin Mosselmans

FILM SCREENING: WORLD ECONOMIC FORUM PANEL DISCUSSION



Introduction from
Fabiola Gianotti

Light lunch
sponsored by the
Staff Association

Organised by CERN's
Women in Technology
Community

<https://cern.ch/wit>

WEF Panel Discussion Screening

May 4th, 12:30
Council Chamber

<https://indico.cern.ch/event/723967/>

Justin Trudeau, Orit Gadiesh and Malala Yousafzai.

Friday, 4 May 2018, 12.30 p.m.

Council Chamber (503-1-001)

During this year's World Economic Forum (WEF), which took place from 23 to 26 January in Davos, a panel discussion was dedicated to the topic: "Creating a shared future through education and empowerment".

We will screen this session, which lasts 56 minutes, after an **introduction by Fabiola Gianotti**, who will talk about her participation in the WEF and share her impressions of the panel discussion.

We invite you all to join us afterwards for a discussion and a light lunch outside the Council Chamber.

This event, organised by the Women in Technology (WIT) Community and sponsored by the CERN Staff Association, is relevant to everyone, so please invite your friends and colleagues!

We are looking forward to seeing many of you there.

More information on Indico (<https://indico.cern.ch/event/723967/>) .

The WIT Steering Committee

Don't miss the screening of the WEF panel discussion with Fabiola Gianotti,

23RD INTERNATIONAL CONFERENCE ON COMPUTING IN HEP

23RD INTERNATIONAL CONFERENCE ON COMPUTING IN HIGH ENERGY AND NUCLEAR PHYSICS
CHEP 2018
9-13 July 2018, National Palace of Culture, Sofia, Bulgaria

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Program Committee Chairs

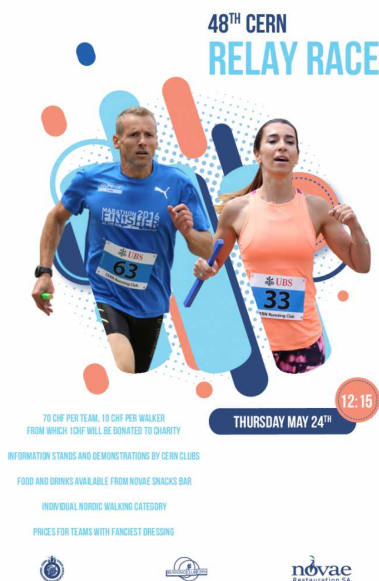
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Main Themes

Online and Offline computing
Distributed computing
Data Handling
Software development
Machine learning and physics analysis
Clouds, virtualization and containers
Networks and facilities

chep2018.org

24 MAY: 2018 CERN RELAY RACE



TAKE PART IN A SURVEY ON OPEN SCIENCE PRACTICES IN HEP

All research papers by CERN-affiliated authors are published as Open Access, but free and open access to the papers is not enough for Open Science. Research data, code and documentation each play a part in increasing the transparency and reusability of research output. How does the HEP community feel about the openness of these “non-traditional” research outputs? What about data- and code-sharing practices and tools? Chip in to build a complete picture of HEP scien-

tists' sharing practices and preferences, and learn what's shaping the landscape of Open Science. Your responses will provide valuable insights for the enhancement of INSPIRE, CERN Open Data and related information services.

All HEP scientists are invited to take part in the survey “High-energy physicists' attitude towards Open Science” ([https://survey.shef.ac.uk/limesurvey/](https://survey.shef.ac.uk/limesurvey/index.php?sid=77428&lang=en)

[index.php?sid=77428&lang=en](https://survey.shef.ac.uk/limesurvey/index.php?sid=77428&lang=en)”), which will accept responses until 18 May.

The survey has been designed by a CERN doctoral student studying Library and Information Science at the iSchool at the University of Sheffield as part of a PhD project. The survey has been approved by the iSchool's Research Ethics Committee. Click here (<https://tinyurl.com/y8rlfztd>) for more information on the project.

INTERNATIONAL CONFERENCE ON BLACK HOLES AS COSMIC BATTERIES

International Conference on Black Holes as Cosmic Batteries: UHECRs and Multimessenger Astronomy

Foz do Iguaçu-Brazil, September 12-15, 2018

The conference Black Holes as Cosmic Batteries, BHCB, is the first international conference on the subject Black Holes and Multimessenger Astronomy to be held in

Brazil. BHCB will take place in the touristic town of Foz do Iguaçu (Brazil) during September 12-15, 2018. It will be hosted by Universidade Federal do Paraná, Setor Palotina (UFPR). The conference will be devoted to the presentation and discussion of hot recent observational, phenomenological, and theoretical developments in the field of high-energy astrophysical phenomena associated to black hole dynamics.

Important dates:

Registration closes: July 15th 2018
Deadline for submission of abstracts: July 15th 2018
Conference begins: September 12th 2018

Additional information and details are available on the website of the event: <http://bhcb2018.com.br>.

The BHCB 2018 Organizing Committee

Obituaries

DANIEL BOUSSARD (1937–2018)



The world of radio-frequency (RF) technology lost an outstanding inventor and leader when Daniel Boussard passed away on 6 January. Daniel made vast contributions to the design of RF systems for accelerating and controlling particle beams. He furthered our understanding in particle-beam dynamics and in the intricacies of controlling high-intensity beams. He was a technical innovator across low- and high-power electronics, right through to the sophisticated RF cavities required in the accelerators.

Daniel started at CERN in the late 1960s, working on the PS machine, but was soon recruited to design the beam control systems for the then new SPS accelerator. He made observations of the microwave signals disrupting the beams, putting forward his famous criterion for avoiding them.

This started a programme that continues at CERN to this day to understand and control parasitic impedances, which drive beam instabilities, and to invent methods to counteract their effect. With increasing intensity in the SPS, formerly unobserved beam instabilities raised their heads. To deal with this, Daniel pioneered the use of new digital electronics, incorporating them in the one-turn feedback system that he invented to subdue the instabilities.

In the SPS, thoughts quickly turned towards using the machine for the P-PBAR project. Here the problem was to understand and control the noise sources inherent in the RF systems, which destroyed the circulating beams. Pinpointing the critical elements and finding solutions increased the lifetime of the beams from minutes to hundreds of hours.

To accelerate leptons in the SPS for the new LEP accelerator required high RF voltages. Daniel dared to consider installing, for the first time, a superconducting cavity into an environment with high-intensity proton beams. While helping to accelerate the leptons to higher LEP injection energies, it was essential to make this cavity “invisible” to the high-intensity proton beams. He solved this by using sophisticated RF feedback techniques, and the SPS subsequently happily “multi-cycled” protons and leptons for the lifetime of LEP. In these areas, Daniel became an acknowledged leader in the world and his ideas are essential to all modern machines.

With his extensive knowledge of superconducting (SC) RF systems, Daniel was

asked to lead the project to install the huge SC RF cavities required for the LEP energy upgrade. While the cavities themselves had to be technically robust, careful design of the electronics to control the voltage and cope with unexpected problems (such as ponderomotive oscillation instabilities) was essential. The experience and understanding gained from SC RF systems in the SPS and in LEP led to their selection for the LHC, and Daniel led the design and implementation of these highly successful accelerating elements.

The tutorials and lectures given by Daniel at CERN accelerator schools on beam loading, RF noise and Schottky diagnostics have become classical references, continuing to serve generations of scientists all over the world. He mastered the art of explaining complex issues in a simple manner.

As a leader, Daniel was kind, fair and highly esteemed, giving clear and carefully thought-out decisions. The remarkable person he was, he took good care of the people entrusted to him and gave honest credit to all those working with him. His natural authority derived from his human qualities and his undoubted technical expertise.

He greatly loved the mountains, going on long hikes both on foot and on skis. It is not surprising, knowing his CERN career, that in his retirement in the south of France Daniel built a guided solar-panel array and became mayor of his village, Valavoire.

His friends and colleagues

Opinions

ENTERPRISE RISK MANAGEMENT – A NEW ELEMENT FOR CERN

CERN has always taken a very proactive approach to managing risk. Risk Management is embedded in the Organization's culture. The successful operation of CERN facilities, and the construction of new projects depend on it. Well-established examples of Risk Management processes include the current consolidation programmes for the Laboratory's infrastructure and accelerators. These were introduced in the year 2000 and take into consideration many factors including CERN's scientific objectives, as well as risk and reputational consequences.

This approach works well on a case-by-case basis, but such a segmented Risk Management approach, organized by domain of expertise, has its limits. It does not help with comparison and consolidation of risk data across CERN. For this reason, and in line with evolving best practices,

the Organization has introduced a new element: Enterprise Risk Management (ERM).

Enterprise Risk Management addresses all types of hazards and provides with an holistic view of the most significant threats for the Organization. Managing risks enterprise-wide gives the Organization the best possible chance of achieving its objectives.

CERN's ERM process has been in place since September 2016, but what does that mean in practice? From the governance's perspective, an Enterprise Risk Management Advisory Committee (ERMAC) has been established to advise the Directorate, and everybody involved, on all matters related to corporate risks.

From a process point of view, in 2017 the Directorate carried out the 1st risk review to identify and assess, together with the support of the ERMAC, the top risks for the Organization. A Risk Owner was appointed for each of them; each risk owner is a member of the Directorate, and has full responsibility for managing the menace. Their role is to identify the Departments involved, and ensure that a deeper analysis is undertaken to enable the risk to be effectively mitigated.

The next step for ERM at CERN is alignment with the operational risk management processes that are well established in the Departments. This will in turn nurture the annual enterprise-level risk review, contributing to CERN's long-term sustainability. To learn more about ERM at CERN, visit the ERM website.

Anne Kerhoas

Ombud's corner

STRESS: A CONTAGIOUS PHENOMENON

"My supervisor is getting angry more and more often: he loses his temper with us, shouts at us and throws things across the room," Dumitru, a CERN fellow, tells me.

CERN is a demanding place to work, particularly during critical periods such as technical stops: all hands are on deck, the tension rises and the expectations are huge. In addition, long-term and large-scale projects often pose strategic challenges that are sources of uncertainty and stress.

Section leaders, who in most cases constitute the first level of supervision, are particularly vital cogs in the Organization's machinery.

"Felix has been a section leader for three years and supervises those he used to work alongside. His section consists of 15 staff (LD and IC), two fellows and a technical student. Felix is also responsible for supervising the work of four technicians from an external firm. Felix does his best to manage this small army while responding

to increasingly demanding requests from users. His group leader trusts him completely, which makes him feel valued, but some days he really feels the weight of the world on his shoulders. However, he doesn't want to show any signs of weakness, so he ploughs on through thick and thin. So when Dumitru comes to him to tell him that he hasn't had time to deal with the stock management, Felix hits the roof. He regrets his behaviour later, but hasn't yet found the time to clear the air with Dumitru."

The problem is that, if we let it, stress can be passed from one person to another. So how can we avoid being caught in its wake?

Obviously we should try to avoid losing our tempers with our colleagues or the teams for which we are responsible. However, if it does happen, there's nothing to stop us acknowledging our mistake once the dust has settled: it's a way of opening a dialogue and reinforcing our credibility.

As team members we can also make a positive contribution. If we see that our su-

pervisor is stressed, we can try and give him or her a bit of space and thus avoid getting caught up in the drama. We can also offer to help our supervisors.

As the Ombud, I regularly see colleagues who tell me about stressful and tense situations. Rarely – in fact almost never – do supervisors come to me when they are stressed and feel like they are losing control. To these people I'd like to say: to err is human, we can't always be at the top of our game, no one is infallible. There are places, like the Ombud's office, where you can discuss this sort of situation openly,

without worrying that it will come back to haunt you. It doesn't mean you're admitting weakness – in fact it's a sign of maturity.

If you find yourself in a stressful situation, talking it over with a person you trust is the first step towards resolving the problem.

If you'd like to comment on any of my articles or suggest a topic that I could write about, please don't hesitate to e-mail me at Ombuds@cern.ch.

Pierre Gildemyn