NEWSLETTER

Issue 7, June 2017

Dear HEPTech members,

The expression "time flies when you are having fun" is true but it seems to apply also to our professional lives. Time is truly the most valuable commodity since its expenditure is totally outside of our control. Time is spent at a steady and constant pace, and our only control is how we keep busy.

I think it is clear our members are spending their time wisely! It seems just yesterday when the large projects in Szeged and Magurele started , and we can now see them take huge leaps forward and become a reality in the context of European and international science.

Hopefully, we can all attend the event at ESS and explore how to create an innovation framework. I believe we need a better approach that cuts through all of the silos of activity that foster and engage innovation and industry within a research institution. This could be a fantastic first step for a structure that manages innovation across all departments effectively.

It is great to have news of collaborative work between ESS and STFC, and how best practices from CERN are being shared in Greece. It shows how our Network can be impactful if we capture the value of collaborating with one another.

Finally, it is fantastic to hear from ILL and learn more about what they do. I am happy to have them as a very active node and it is great to understand that HEPTech is able to create value for the TTOs with our academia-industry matching events.

We would not want to waste our time.

António de Valladares Pacheco,
HEPTech Coordination Manager

Around the members

ELI Attosecond Light Pulse Source (ELI-ALPS), Szeged, Hungary

Horia Hulubei National Institute of Physics and Nuclear Engineering (IFIN-HH), Romania

European Spallation Source (ESS)

National Technical University of Athens, Greece

In focus: Institute Max LAUE – Paul LANGEVIN (ILL), France

The interview: Jerome Beaucour, Head of mechanics and neutron distribution, Head of Industrial liaison office, ILL

HEPTech upcoming events

Around the members

ELI-ALPS, the European attosecond laser facility is inaugurated

The ELI Attosecond laser research centre was inaugurated on 23rd May 2017, in Szeged, Hungary.

Speaking at the opening ceremony, Prime Minister Viktor Orbán said the centre was the largest scientific investment in Hungary in modern history. "The research centre is not an investment with the purpose of catching up with Europe; it is rather about making Europe catch up with the world," he said. ***(Photo: MTI)***

The facility, part of the European Union's Extreme Light Infrastructure (ELI) project, will make a wide range of ultrashort light sources accessible to the international scientific community. The centre's main areas of research and application are valence and core electron science, 4D imaging, relativistic interactions and biological, medical and industrial applications. The main scientific mission of ELI-ALPS is to enable visualization of ultrafast structural dynamics of matter with the highest resolution in both space and time. Furthermore, the mission aspires to contribute to the development of high-peak-power and high-average power light sources.

As the flagship of the ELI-ALPS' secondary sources, high harmonic generation (HHG) in gas targets will provide EUV attosecond pulses at repetition rates ranging between 1 kHz and 100 kHz, pulse energies ranging from 1 nJ to 1 μJ respectively, and pulse durations of the order of 0.5 fs, enabling detailed investigation through coincidence measurements, imaging techniques, and/or non-linear EUV processes.

ELI is implemented as a distributed research infrastructure with three pillars: ELI-ALPS in Szeged, Hungary, ELI-Nuclear Physics (ELI-NP) in Magurele, Romania, and ELI-Beamlines (ELI-BL) in Dolní Břežany, Czech Republic.

85% of the total funding of 231,4 million Euro for the implementation of ELI-ALPS comes from the European Union's Regional Development Fund (ERDF).

Currently, 263 people are involved in the ELI-ALPS project. This number will increase to 300 by the time the research center is fully operational.

Designed as a user facility, ELI-ALPS will host researchers from all over the world. A first call for experiments will probably be issued by the end of 2017; first experiments would be possible in 2018. The experimental time will be distributed under the auspices of the ELI delivery consortium (ELI-DC) and later by a newly established European Research Infrastructure Consortium (ELI-ERIC). The ELI-ERIC will be supported by member (host and non-host) countries, in a similar scheme to CERN and European XFEL. ***(Photo: MTI)***

Laser in Magurele assembled, first tests successfully on track

The world's most powerful laser, currently under construction in Magurele, just outside Bucharest, has been assembled and has started the first tests, announced Professor Nicolae-Victor Zamfir, director of the Extreme-Light Infrastructure – Nuclear Physics (ELI-NP) project. He estimates that the first laser beam will be obtained next autumn.

"The second stage of implementation has started, a stage in which the various components of the large equipment and experiments are being installed and tested. We are on the final stretch toward completion. All components have been installed and the testing is being done gradually," Zamfir said. ***(Photo: News.ro)***

So far, the tests are looking good and are on schedule, according to the ELI-NP Director. The plan is to obtain the first laser beam next autumn. Initially, it will be of a lower power as it will take some time before maximum parameters of 10 PW are reached. These tests will last for two years. "We hope to be fully operational sometime in the summer of 2019," Zamfir explained.

The laser in Magurele is considered the most powerful in the world, and, in addition, the facility will have the brightest Gamma beam. When it becomes operational, ELI-NP will be the most important scientific research centre in Romania. The facility will help in discovery of radioactive isotopes that may treat cancer, for instance, or in identifying the exact content of radioactive waste barrels without the need to open them, which is extremely difficult to do today. The laser will be also useful in testing materials that are sent in space for long period of time.

The investment is estimated at 310 million euros and is financed by European structural funds.

The project started in January 2013 and the works are so far almost on schedule – with a delay of just a few months – and on budget. A total of 140 persons are working on this project, 120 of whom are Romanian and foreign researchers from all over the world, who came to work on the biggest scientific project in which Romania is involved. In 2019 the centre will have more than 200 researchers and the recruitment process is ongoing.

(The text is based on the interview of Professor Nicolae-Victor Zamfir given to News.ro)

ESS brought together the global particle accelerator community

More than 1,400 scientists, engineers, students and industrial representatives gathered in Copenhagen's Bella Center from 14th to 19th May for the 8th International Particle Accelerator Conference, hosted by the European Spallation Source. A record number of delegates from 40 nations attended a full week of programming.

"The IPAC series is well established as *the* major event bringing together scientists, engineers, students and industrial representatives from around the world," says IPAC '17 Organising Committee Chair Gianluigi Arduini, of CERN, who serves as chair of the European Physical Society's Accelerator Group. "IPAC '17 continues along this tradition while exploring new means of enhancing the outreach of the accelerator community and reinforcing its visibility. The city of Copenhagen and the surrounding region across Denmark and Sweden, with its tradition of dynamism, innovation and collaboration, could not be a more appropriate scenario for this event."

The annual conference has a reputation for a high standard of excellence. At its core is a scientific programme that includes around 100 invited and contributed talks culled from more than 2,000 abstracts submitted by scientists and engineers from all over the world.

The event also included an industry exhibition that featured 115 companies from 16 different nations and opened with a special poster session for students.

The format of the conference facilitated formal and informal interaction between all parties, encouraging the exchange of information and ideas across a broad spectrum of accelerator science and technology. Ninety-seven students were selected for sponsorship grants to attend the conference and participate in the special poster session.

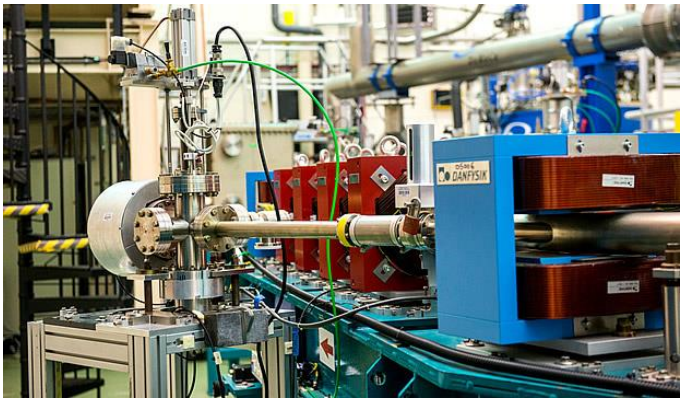
Delegates had an opportunity to cross the bridge to Sweden for guided tours of the ESS construction site.

Read more…

Looking east over the target station and experimental halls work area. Most of the site is visible here, including temporary site offices to the south and many of the facility buildings in progress (Photo: ESS)

UK's Daresbury lab gears up for high-beta cavity series production for ESS

At Daresbury Laboratory, located in Cheshire between Manchester and Liverpool, preparations are underway for the fulfillment of a large portion of the UK's in-kind contribution to the European Spallation Source (ESS): series production and testing of the accelerator's high-beta cavities as well as ongoing work for beam transport and diagnostics modules.



The Science & Technology Facilities Council (STFC) is coordinating production of the cavities through Daresbury, where it will perform acceptance testing, including radio frequency (RF) tests in cryogenic conditions. They will be also responsible for ensuring that the cavities are literally spotless before they are locked away inside cryogenic tanks at France's CEA Saclay laboratory and delivered for installation in Lund.

(Test bench at Daresbury Lab in Cheshire. Photo: ESS)

Much of the work has to be conducted under ISO 4 clean-room conditions at Daresbury to get the best performance out of the cavities when they are put into operation. Daresbury's Accelerator Science and Technology Centre (ASTeC) also provided ESS with new state-of-the-art vacuum test facilities last year.

ESS is organizing its first technology transfer conference

As a green field research facility and one of the largest science and technology infrastructure projects being implemented in Europe today, the European Spallation Source (ESS) offers many innovation opportunities. To leverage the scientific and technological opportunities arising from the design, construction and operation, ESS is currently in the process of establishing an innovation management structure within the ESS organization and implementing specific steps to build internal capacity.

The first ESS TT Conference "Establishing and Maintaining an Innovation Framework" will take place on 11th October 2017, in Lyngby, Denmark. Main partners for the conference organization are the Technical University of Denmark (DTU) and the High-Energy Physics Technology Transfer Network (HEPTech).

The aim of the conference is to achieve a broad and effective exchange of best practice among ESS partner organisations. The conference is organised in the framework of the Horizon 2020 project BrightnESS and will focus on the importance of the establishment and maintenance of an innovation framework and its ecosystem.

The one-day event will be divided into two blocks. Each block will have three speakers with strong knowledge transfer background. The blocks will be finalized by interactive workshops to provide a forum of best practice exchange from similar organisations.

Detailed programme of the conference & Registration

Graduate courses based on CERN-related technology transfer experience are delivered in Greece

Two graduate courses based on CERN-related technology transfer experience have been delivered recently at two Greek universities.

Evangelos Gazis, professor of the National Technical University of Athens and representative of NTUA at HEPTech has been running continuously, since the academic 2012-13, a graduate course *Research Methodology and Transfer Technology from CERN* at the Department of Electrical Engineering, Eastern Macedonia and Thrace Institute of Technology. In this course, the students get information about the research methodology and procedures in particle physics, as well as about the strategy of exploring the innovations offered by CERN in terms of opportunities for knowledge/technology transfer and industrial applications. In addition to the lectures given in Greece, the students visit every year the CERN's infrastructure and have a 2-day workshop with advanced experts of CERN.

In the spring semester of the academic year 2016-17, a new graduate course *International and European Policy for Research and Innovation* was launched at the University of Piraeus, Department of International and European Studies. The lectures are given by Evangelos Gazis, professor of the NTUA and Dr. Christina Kontogoulidou, lecturer of the University of Piraeus (UNIPI). The course is focused on the strategy for marketing of research results stemming from the R&D collaboration with industry in Greece. It also makes an overview of the policy arrangements concerning the intellectual property of the innovations resulting from the scientific collaboration between various interested parties (companies, research centres, universities). The course also studies the existing situation in Greece in terms of the IP-related legal and institutional framework, as well as the potential of industry in technology transfer in the medical applications domain.

In focus

Institute Max LAUE – Paul LANGEVIN (ILL), France

The Institute Laue-Langevin is an international research centre founded on 19 January 1967 with the signing of an agreement between the governments of the French Republic and the Federal Republic of Germany. 50 years later, ILL is at the leading edge of neutron science and technology, providing the world's most intense neutron flux and state-of-the-art instrumentation for the academic and applied research.

The Institute is funded and managed by France, Germany and the United Kingdom, which officially became its third Associate member country in 1974. Each of these three countries contributes around 25% to the annual budget. The remaining funding is provided by 10 Scientific Members (Spain, Switzerland, Austria, Italy, the Czech Republic, Sweden, Belgium, Slovakia, Denmark, and Poland). Thus, ILL caters to more than 90% of the European neutron scattering community.

(Photo: ILL)

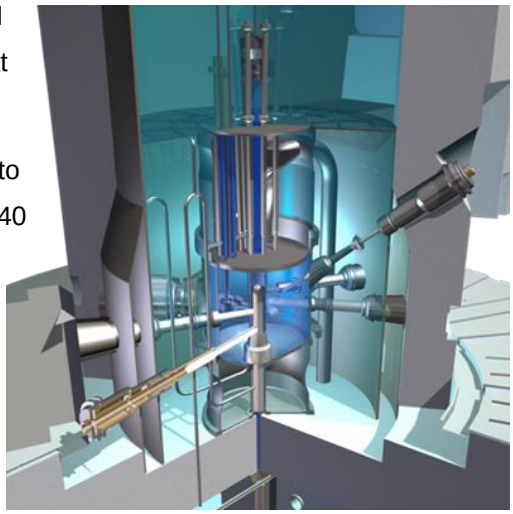
The ILL owes its existence to the bonds of friendship and esteem between Louis Néel (Nobel Laureate) and Heinz Maier-Leibnitz. They were both determined to bring post-war France and Germany together through the creation of a major centre for neutron research.

ILL has the innovative status of a service institute, offering the scientific community the world's leading facilities in neutron science and technology.

Neutrons hold the key to many important questions about the fundamental laws governing our universe. They are also themselves a subject of great scientific interest.

As a service institute, ILL makes its facilities and expertise available to visiting scientists. Every year, about 1400 researchers from over 40 countries visit it. More than 800 experiments selected by a scientific review committee are performed annually.

Research focuses primarily on fundamental science in a variety of fields, including condensed matter physics, chemistry, biology, nuclear physics and materials science. It results in around 650 publications per year.



A neutron source operating 200 days/year, producing 5 x 10^{15} neutrons/sec/cm^2 generated at 58 MW (Photo: ILL)

In addition to academic research, 30% of the ILL's activities are directly linked to applications for various industries, such as automotive industry (lithium batteries, fuel cells for electric cars), aerospace (welded structures, new alloys) and healthcare (radiopharmaceuticals for the diagnosis and treatment of tumours). They also help to meet major societal challenges in many areas, including the environment and energy, health, food, chemistry and materials of the future. Whilst some scientists are working on engine designs, fuels, plastics and household products, others are looking at biological processes at cellular and molecular level. Still others may be elucidating the physics that could contribute to the electronic devices of the future.

ILL is also a unique place in the world to probe the fundamental processes that help to explain how our universe came into being, why it looks the way it does today and how it can sustain life. For example, within an international scientific collaboration, the ILL is hosting the STEREO experiment, which is being used in the search for a light sterile neutrino, currently a hot topic in neutrino physics due to the so-called gallium and reactor anomalies, in which fewer neutrinos than expected have been observed. All of ILL's scientists - chemists, physicists, biologists, crystallographers, specialists in magnetism and nuclear physics - are also experts in neutron research and technology and their combined know-how is made available to the scientific community.

The institute is an exceptional centre of excellence, a fine example of successful co-operation in Europe and a prototype for the European Research Area.

The interview

Jerome Beaucour,

Head of mechanics and neutron distribution,

Head of Industrial liaison office, ILL

What makes ILL so unique in the world?

The fact that ILL still maintains flagship status in the world's neutron facilities half a century after its launch is a clear indication of its uniqueness and prime scientific relevance. As the historical nucleus of the European Photon and Neutron Science Campus in Grenoble, which is visited by some 6000 researchers every year, the spirit of broad international scientific collaboration envisaged by its founders Néel and Leibnitz in the sixties still lives on in Grenoble today!

ILL offers to the scientific community access to the world's brightest neutron beams covering a wide range of energies and to a suite of more than 40 state-of-the-art instruments that are constantly undergoing innovative developments and improvements. It aims to provide new possibilities for both academic and industrial researchers up to 2030 and beyond in the fields of magnetism, materials science, soft matter, biology and particle physics. For instance, due to improvements in neutron transportation and detector technology developed at ILL, there has been a overall 25-fold increase in useful instrument neutron flux in the last ten years. This, coupled with other advances at ILL in fields such as ultracold neutrons, enables us to continuously push back the boundaries of the type of science undertaken at the Institute.

Of course, none of this would have been possible over the last 50 years without the exceptional scientific and technical skills of the ILL's staff and their outstanding sense of service and commitment to hosting thousands of international scientists in Grenoble's remarkable Alpine setting.

Could you give us some examples of successful technology transfer at ILL?

ILL policy focuses primarily on developing technologies to enhance its neutron instrument suite and on making these new technologies accessible to other research facilities and possibly industrial companies that may need them. This is the case for cryogenic systems, advanced mechanics, specific monochromator crystals for optics, and detector technologies. For example, where detectors are concerned, the ILL owns several patents and works with industry to develop the technology for a broader public. In some cases, we transfer technology through license agreement, as was recently the case with a private German company for new technology involving neutron guides made of advanced substrate.

As well as technological developments, the research conducted at ILL can also produce results that are of great interest to a broader public. For example, thanks to its very high flux, the Institute Laue-Langevin has been able to produce samples of 161Tb, an isotope of terbium which potentially has better properties for cancer therapy than existing radiopharmaceutical treatments. Researchers led by the Technical University of Munich and Paul Scherrer Institute (PSI), collaborating with ILL, have confirmed that 161Tb could be produced at ILL in sufficient quantity and quality for therapeutic use, opening up promising perspectives for cancer treatment.

How do you cooperate with CERN and other research organisations/networks?

ILL has a long history of cooperation with CERN within the framework of various scientific collaborations. Few examples: nuclear physics, data policy (access to users), mass of anti-hydrogen measurement (Gbar project), detectors. We are a member of the HEPTech and TTO Circle networks and benefit from the opportunity to share and learn good practice for strengthening technology transfer.

We have taken an active part in several academia-industry matching events such as the AIME on Cryogenics (Grenoble 2015) and AIME on nanotechnology (Darmstadt, 2016). Workshops of this kind are very efficient in forging links between research facilities like the ILL and industrial partners. We have proposed to organize a dedicated AIME on imaging next year at the European Photon and Neutron Campus in Grenoble, in order to demonstrate how useful the 2D and 3D imaging technics developed in research facilities, could be for industry.

HEPTech upcoming events

- Steering Committee, September 6th 2017 at CERN with VideoConference
- European Cryogenics Days 2017 (and the 2nd International Workshop on Cooling Systems for HTS Applications (IWC-HTS)), 13 – 15 September 2017, Karlsruhe, Germany
- Technology Transfer programme within the 2017 IEEE Nuclear Science Symposium and Medical Imaging Conference, 21 October – 28 October 2017, Atlanta, Georgia, USA
- Steering Committee, November 16th 2017 at CERN with VideoConference
- HEPTech Board Meeting, December 4th 2017 at CERN with VideoConference

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