



GENERAL INFOS



Director's note

On 9 July we ended the second ILL reactor cycle of 2024. This marks the conclusion of the first half of the year, in which we have been focusing on delivering our user programme. In total we had 1372 users from 40 countries visiting the ILL to perform 1094 experiments, making full use of the reactor availability, which was of 98%. In the second half of the year we shift our focus to maintenance and investing in the continued safe and reliable operation of the reactor and instrument systems. We are now in a nine-month shutdown, with a series of construction works being performed in the reactor building, including upgrades to the polar crane on level D and installation of a sprinkler system on level C. The restart will be in early April 2025, marking our long-term return to running three cycles each year.

In 2024 we celebrate the completion of the Endurance upgrade programme. With 43 instruments in user operation in 2025 (including 10 CRGs) plus 9 test instruments, ILL is at its highest performance level ever. We continue to consolidate our position as a world leader in neutron sciences, contributing to shaping the European neutron landscape in a collaborative and complementary way. A general assembly was held at ILL on 2 July where information relevant for both staff and users was shared. You can find the highlights in this newsletter.

I wish you all a relaxing summer and a productive 'rentrée'. I look forward to seeing you soon again at the ILL, at one of the scientific workshops taking place over the coming months, at the ILL/ESS user meeting in Grenoble in December, and back on the ILL instruments in the spring.



Scientific Member agreements & meeting

On 28 June, the ILL Steering Committee meeting took place near Juelich in Germany. It was preceded by a meeting with the 10 scientific members who have signed or are in the process of signing new five to ten year contracts with the ILL. Together these contracts amount to a contribution of between 20 and 21% to the ILL, compared to 19% for the period 2019 - 2023. This positive development was celebrated with our partners after the meeting. The outlier is Belgium whose membership is now suspended. The Science Strategy Working Group is on track to deliver recommendations to the ILL management in July: Key areas of scientific and societal impact and mechanisms for the ILL to address these areas. These recommendations will be used as the basis for the ILL Science Strategy and will be presented at the meeting of the Scientific Council in October. [More info](#)

Photo: Signature of the agreement renewing Switzerland's Scientific Membership at the ILL.



Celebrating Endurance

In 2024 we are celebrating the completion of the Endurance upgrade programme – with the ILL staff in June, and with our users in the upcoming December ILL+ESS user meeting. An official Endurance celebration will be held on 27 November at ILL, on the occasion of the Steering Committee. The technical achievements of Endurance are impressive. H15, designed and engineered at the ILL, the most complex neutron guide system ever realized. Installation finished in February 2024 and is now delivering neutrons to instruments D007, D11+, SAM and SHARPER. Simulations of neutron transport and guide optics played a crucial role, revealing routes to optimization otherwise hidden by complexity. There are new instruments (DALI, FIPPS, NEXT, MOTO, XtremeD, SAM, SuperSUN), rebuilt instruments (PANTHER, SHARPER, D10+, D11+, D16) and instruments dedicated to neutron technology R&D (CT2 for detector R&D and T3 for neutron

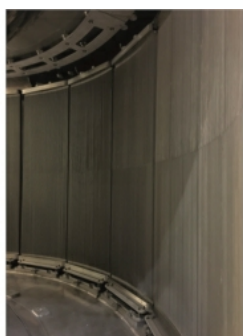
optics). Smaller projects are still to be completed, for example the in-house designed and fabricated MWPC trench detector being installed in D20 or the MARMOT multi-channel energy analyser with bent Si crystals, with first neutrons foreseen in 2025. As for Endurance's impact on science we have: count rate increases by about a factor of 10 (4 to 25); background reduction; extended q ranges; new sample environments; new data treatment software; and more. Highlights of science with Endurance can be found in the recent news in the ILL [website](#).



Radioisotope production at the ILL for cancer treatment

The ILL and Curium Pharma, a world leader in nuclear medicine, signed a long-term partnership for the production of lutetium-177 (Lu-177) at ILL's high-flux reactor. This new partnership will add additional security of supply while bringing a high-flux reactor within the Curium irradiation landscape. Also the Swiss company NOVARTIS announced the desire to establish a partnership with the ILL as part of its plan to create a production unit intended to supply the French market with the first radioligand therapy (RLT) drug for the treatment of metastatic prostate cancer, an investment close to 30 million euros in France. The production at ILL of radioisotopes for medical use has recently known a significant expansion, following the approval in 2022 of Lu-177 based therapies. During reactor cycles, ILL is providing treatment to thousands of prostate cancer patients per week. This is a win-win situation which strengthens the ILL without compromising the neutron

scattering programme – the scientific program will actually benefit from the increase in revenues brought by isotope production. There is currently a feasibility study for the expansion and professionalization of radioisotope productions (made possible by the far-sightedness of the engineers who built the reactor). The ILL is also involved in preclinical and clinical research in the framework of the EU-funded project PRISMAP, supplying researchers with a variety of novel radionuclides that are not available commercially.



Agreement for the manufacturing by the ILL of the detector for the CSPEC instrument at ESS

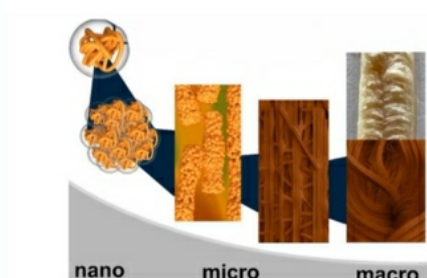
Following the collaboration agreement signed at the beginning of the year between the ILL and the ESS for the supply of a TYREX station for the production of polarized Helium-3, a new agreement was signed on July 9 for the manufacturing by the ILL of the CSPEC detector, as well as for training of ESS personnel. Identical in design to those of IN5 and PANTHER, this Helium-3 detector will be made up of 12 Multitube modules, plus a spare module, each comprising 32 tubes 3.5 m long. Each module will be tested and manufactured at the ILL, then filled at the ESS with the detection gas before installation on the instrument. Helium-3, a rare and expensive gas whose availability on the market has been questioned for many years, is now available again. This makes helium-3 detectors (considered to be the most effective and efficient in terms of signal-to-noise ratio) accessible to neutron facilities. The ILL holds a leading position in this field and wishes to support the other neutron centers in Europe, in particular the members of the LENS organization (Ligue for European Neutron Sources).



Scientific Council of the CEA visit the ILL

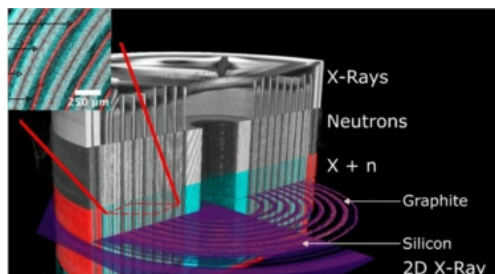
On 29 and 30 May 2024, the CEA organised a meeting of its Scientific Council in Grenoble on the theme of neutron scattering, under the chairmanship of the High Commissioner for Atomic Energy, Vincent Berger. On this occasion, an overview of neutron scattering at national, European and international level was presented, covering the different types of sources (reactors, spallation sources and compact sources), user communities, as well as applications for nuclear power, for the digital transition and for new energy technologies (NET) with a particular focus on batteries and fuel cells. These presentations showed the key position of the ILL in these areas. The future neutron landscape and the current and future contributions of the CEA were at the heart of the discussions. The Scientific Council visited the ILL on May 29, in particular the CRG instruments operated by the CEA. The visit was very much appreciated by all the members of the CEA Scientific Council.

SCIENCE NEWS



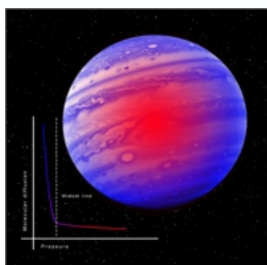
Plant-based meat analogues: using neutrons to peek into the black box

A study recently published in the scientific journal Food Hydrocolloids uses neutron scattering to shed light on texturisation - the black box for plant-based meat analogues - through in-situ real-time observations of the process. The challenge is increasingly relevant for the food industry as consumer concerns about sustainability, health and animal welfare rise. This study is part of the PhD project of Tong Guan in the framework of InnovaXN, an EU-funded doctoral training programme in which 40 PhD students tackle a variety of subjects driven by industrial challenges and exploiting the advanced characterisation techniques of the large-scale European facilities. [Read more](#)
[See video](#)



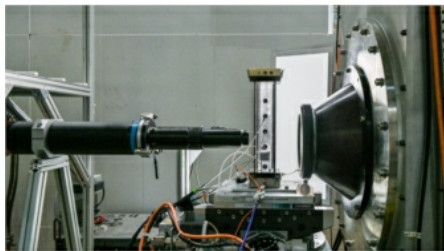
Looking inside battery cells: The power of combining different views

By combining advanced x-ray and neutron imaging techniques, a scientific team involving the ILL, the ESRF and the CEA-Irig has determined the origin of defects appearing in Li-ion batteries. This study, a good illustration of the success of the Grenoble Battery Hub, provides manufacturers with new information which should enable them to improve their manufacturing processes. (Publication in the journal Energy and Environmental Science). [Read more](#)



Unlocking the secrets of supercritical fluids

Proteins perform a vast range of functions in living organisms. They are known to be dynamical entities, moving and changing shape in ways that are crucial to their function. Protein dynamics have been previously investigated at various timescales. Nanosecond and picosecond dynamics have been assigned to local motion, while slower dynamics have been attributed to larger conformational changes. The goal of this study was to complete the mapping of the dynamics of the well-known protein Hsp90 by studying the 5-500 ns timescale using a combination of state-of-the-art complementary techniques, and to take the first steps towards understanding how this timescale relates to the slower dynamics known to drive the protein's function. [Read more](#)



Review article - Liquid Foams: New Insights and Perspectives from Neutron and Synchrotron Scattering Experiments

Small-angle scattering experiments for liquid foam characterisation have been experiencing renewed interest in recent years, with novel developments in both measuring cells and analysis formalism. There is work to do in making sure that the foam research and innovation community, and in particular industrial partners, make full use of the new tools available. In a newly published review, Leonardo Chiappisi (ILL) highlights recent advances in the field, discusses possibilities opened up by the SANS foam cell coupled with conductivity measurements and macrophotography developed within the ILL/ESRF Partnership for Soft Condensed Matter (PSCM), and identifies open challenges that could be addressed using neutron and synchrotron radiation. [Read more](#)



Protein biopharmaceuticals: understanding the processes to take applications further

A recently published study uses neutron and X-ray scattering to deepen our understanding of freeze-drying protein stabilisation processes, widely used in biopharmaceutical applications. The results obtained for a protein relevant for pharmaceutical applications are in stark contrast with those previously obtained for lysozyme, widely used as a model protein. This highlights the importance of protein selection in such studies. [Read more](#)

AWARDS



IUF Research Chair awarded to Alessandro Tengattini

ILL researcher and UGA associate professor, Alessandro Tengattini has just been awarded a research chair at Institut Universitaire de France (IUF). He will develop a five-year research project exploiting the combined neutrons and X-ray imaging capabilities of the NeXT instrument at the ILL in a series of applications on environment and sustainability studies. Specific topics will be addressed, all of them open issues proposed by the UN's Intergovernmental Panel on Climate Change (IPCC): carbon dioxide storage in geological systems; bio-sourced construction materials; carbon-neutral concrete. [Read more](#)



ERC advanced grant to Don Martin

Don Martin has been awarded a European Research Council (ERC) Advanced Grant. Don Martin is a Professor in the Faculty of Pharmacy at the University Grenoble Alpes (UGA) and a well-known and valued collaborator at the ILL - since 2010, he successfully submitted more than 20 experimental proposals and supervised two of our former PhD students. Don Martin's work aims to redefine bioengineering through fundamental research into the assembly of intelligent nanostructured systems of artificial cells combining proteins, biomolecules and lipids with synthetic materials. The prestigious European award, which will provide the 'Energion' project with €2.9 million over five years, will further support his ground breaking research and we're looking forward to seeing his advances in the field as Don will continue his neutron studies on a protein he has

already studied in our facilities. [Read more](#)



Two best presentation award for Erik Lübke

Erik Lübke, PhD student InnovaXN, recently received two awards: the best oral presentation award at the International Operando Battery Days in Grenoble (<https://obat.sciencesconf.org/>) together with Corentin Renais (LEPMI Laboratory Grenoble); and the Elsevier Best Student Talk Awards (one of three) at the International Conference on Tomography of Materials and Structures 2024 (ICTMS, <https://tomography2024.com/>) in Cape Town, South Africa.

EVENTS



PSB Spotlight on Neutrons in Biology

The PSB spotlight on "Neutrons in Biology" took place on 29 June 2024, gathering more than 50 participants from the four institutes of the EPN campus (European Photon and Neutron campus) in Grenoble. During the morning, the participants gathered at the IBS seminar room to attend comprehensive set of lectures on the use of neutrons in life sciences. Following a general introduction of the ILL by Andrew Wildes, several lectures covered the four major neutron scattering techniques applied to molecular biology systems: small angle neutron scattering (SANS), crystallography, reflectometry and spectroscopy (QENS and IENS). The lectures were given by ILL scientists and instrument responsables: Anne Martel (D22), Matthew Blakeley (LADI/DALI), Nicolò Paracini (FIGARO), Daniela Russo

and Francesca Natali (IN13), Tilo Seydel (IN16B), and Orsolya Czakkel (IN11/IN15). Completing the morning program there were two lectures on the main support facilities for biology experiments, covering biodegradation (by Juliette Devos, D-lab) and the laboratories of the PSCM (Partnership for Soft Condensed Matter) by its coordinator Leonardo Chiappisi. A 90-minute visit of the ILL neutron guide halls was organized in the afternoon, focusing on the instruments IN13, LADI, FIGARO IN15 and D22. The 15 participants who followed the visit had the opportunity to discuss with the several instrument scientists and to ask numerous questions.



International Operando Battery Days (OBATT'24) in Grenoble

Over 100 scientists and industry experts gathered in Grenoble on June 13 for the International Operando Battery Days (OBATT'24). The event focused on exploring new ways to analyse battery materials using cutting-edge tools and methods, both in-lab and at Large Scale Facilities such as the ILL and ESRF. These tools will help us understand how battery materials behave during real-world use, ultimately leading to better battery performance and more sustainable devices. In this global effort, neutrons can provide invaluable information. [Read more](#)



BATTERY 2030+ annual conference in Grenoble

The Battery 2030+ annual conference, which took place in Grenoble 28-29 May, attracted more than 300 scientists from Europe and beyond, actively involved in pushing the frontiers of design and materials for current and future generations of electrochemical storage devices, with particular emphasis on renewable, eco-friendly batteries. Highlights included an overview of the EU project Battery Interface Genome – Materials Acceleration Platform (BIG-MAP), where ILL was involved in several pioneering research topics, such as the establishment of a multi-modal, multi-site battery characterisation platform and openware applications for autonomous analysis of spectroscopic data. Also, the importance of correlated methodologies was underlined with reference to the Battery Characterisation Hub,

co-founded by the CEA, ILL and ESRF. Bettina Schwaighofer represented the ILL on the EU project 'ReMade@ARI' stand, which received many inquiries on how European research facilities can assist academic and industry R&D actors to explore the increasing and crucial use of recyclable, locally resourced battery materials in the context of the EU Green Deal.

[MORE HIGHLIGHTS & NEWS HERE !](#)

USER PROGRAMME

The 2025 reactor cycle calendar can be found [here](#). The first cycle is scheduled to start on 2 April.

Next proposal deadline: 16 September 2024 (midnight central European time).

Proposals must be submitted via the [ILL User Club](#), once you have logged in with your personal username and password. [Detailed information](#).

If you are submitting a proposal for the first time please consult our [New User page](#).

Easy Access requests for short measurements and **DDT requests** for full experiments to be performed as soon as possible can be submitted at any time.

Follow instructions [here](#).

New and upgraded instruments now available

- The CRG instrument SAM is now available as the fourth SANS instrument at the ILL.

-The newly upgraded D11+ and SHARPER (CRG), and also PANTHER, are now back in operation.

Full infos [here](#)

Panel meetings: 13-14 November 2024 (Wednesday, Thursday)

Scheduling period: From April 2025

Next deadline: 15 February 2025



ILL ESS USER MEETING 2024

10 - 11 DECEMBER

GRENOBLE, FRANCE

[Early bird registration until 14 October - Registration deadline 9 November](#)

The User-Office is available from Monday - Friday 8am - 4.30pm on the first floor of the new ILL50 building.
You can also use the telephone available near to the ILL50 reception to call your Local Contact, or the User Office in case of problems

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