# ILL newsletter

NEUTRONS FOR SOCIETY

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## REACTOR RESTART

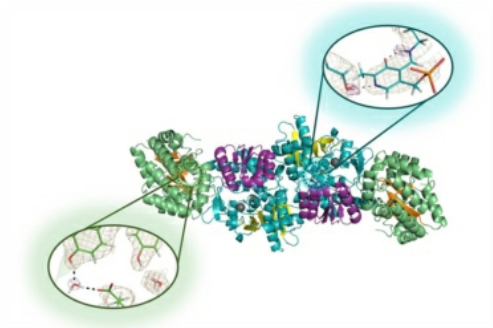
### ILL reactor ON and ready for great science!

THE FIRST 2024 REACTOR CYCLE AT ILL STARTED ON FEBRUARY 27TH. IT WILL GO ON FOR 49 DAYS, UNTIL APRIL 16TH, AT A POWER OF 54.7MW.

This is in fact cycle number 195, and the continued and very successful operation of the world's brightest, continuous neutron source for scientific research is only possible thanks to the highly skilled and dedicated reactor team at ILL.

During this cycle, ILL will welcome more than 500 users who will conduct several hundred experiments (275 proposals scheduled for a total of 329 measurements) in a range of societally relevant areas including environment, energy, health and ICT, covering a range of scientific fields like nuclear, particle and condensed matter physics, chemistry, biology, materials science, engineering and more.

## HIGHLIGHTS AND SCIENCE NEWS



### Neutrons, space-grown crystals, and enzymes

An article recently published in Cell Reports Physical Science reveals how researchers have for the first time directly visualised the positions of hydrogen atoms within an enzyme that plays an important role in the metabolism of many microorganisms. Neutron diffraction measurements at ILL of protein crystals grown under microgravity conditions at the International Space Station (ISS) were key ingredients in this work. Unlike X-rays, which interact with the electrons around the nuclei, neutrons interact directly with the nuclei itself. This means that hydrogen (and its heavier isotope deuterium) scatter neutrons with similar strength to the other common elements of a protein, making them an ideal tool for probing the positions of hydrogen atoms in biological macromolecules. With neutrons, however, the challenge is that we need large crystals that are well-ordered. This is where microgravity and the ISS come in. Read more.

### ILL's Science Strategy for the coming decade

With the creation of the Science Strategy Working Group, the process of developing the ILL's Science Strategy for the coming decade has begun. The Working Group had its first meeting on 7/8 March on site in Grenoble, with the aim of defining the research areas on which the group's discussions will focus and setting up a working structure. Two other meetings are planned, on 17/18 April and 17/18 June 2024. The Working Group comprises 14 ILL scientists, 12 external scientists and a chairperson also from outside the ILL. The external members of the Working Group, who come from both academia and industry, were selected based on the recommendations of the Scientific Council. Their fields of expertise cover the whole spectrum of scientific and technical research areas that can be addressed using neutrons, many of which are closely linked to current societal challenges. The ILL members of the Working Group were selected from volunteers among ILL scientists. The Working Group is chaired by Robert Feidenhans'l of the European X-Ray Free-Electron Laser Facility (European XFEL) in Hamburg. For the full list of members, click here.

### A neutron kick towards a clean energy future

The global need for transitioning to a sustainable and clean energy future has brought hydrogen to the forefront as a promising clean energy carrier. Efficient and safe storage is a key challenge and hydrogen storage on activated carbons is a promising alternative. Investigating the fundamental interactions between hydrogen and nanoporous carbon at the atomic level can give vital contributions to enhance the storage efficacy of these materials. Neutron scattering is sensitive to hydrogen, thus opening the possibility for many different insights. This paper reports on a SANS (Small Angle Neutron Scattering) study using ILL's

D16 highly versatile neutron diffractometer to investigate hydrogen and deuterium adsorption in nanoporous activated carbon cloth as a function of (micro)pore-size. These findings contribute to better understanding the processes and affect the design of materials for efficient hydrogen storage devices working at realistic cryogenic conditions and low pressures. Read more.


### NEPHEWS first meeting hold at SOLARIS

The NEPHEWS partners met last week at the SOLARIS Centre in Krakow, Poland, for the kick-off meeting. The main goal of this EU-funded project is to provide scientists from all over the world with access to major research infrastructures in Europe. NEPHEWS (NEutrons and PHotons Elevating Worldwide Science) involves the cooperation between 21 synchrotron, free electron laser and neutron research infrastructures, led by the SOLARIS synchrotron. The project will run for three years and focus on new and non-expert users, especially from Widening countries, Ukraine and Africa. The agenda of the kick-off meeting included the presentation of the action plan, project structure, communication and outreach plan, and much more.


**International Summer Programme on Neutron and X-Ray Science for undergraduate students**

The ILL/ESRF International Student Summer Programme on X-Ray and Neutron Science is aimed at undergraduate students. It will consist of a 4-week experimental project embedded in a research group of ILL or ESRF, together with a series of introductory lectures on the principles and applications of X-ray and neutron science (magnetism, materials science, soft matter, structural biology, imaging, etc.).

**Application deadline: April 8th**.

More information.

MORE HIGHLIGHTS HERE !

**Previous issues of the ILL newsletter**

www.ill.eu
communication@ill.eu