THE EUROPEAN NEUTRON SOURCE

NEUTRONS FOR SOCIETY

ILLnewsletter

May 2023

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REACTOR RESTART

Reactor operation & scientific programme

We are pleased to announce that the second cycle of the reactor this year is successfully up and running. 2023 is indeed a pivotal year for the ILL following the long shutdown in 2022. The scientific programme is in full flow with many users now back at ILL performing exciting experiments on our upgraded, state-of-the-art instruments and scientific services.

Photo: S. Monfront

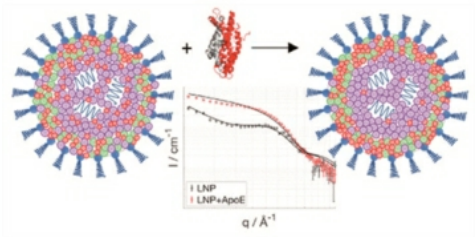
GENERAL NEWS

Ken Andersen will be ILL's next Director

The ILL is very happy to welcome back Ken, who knows us very well, having completed his PhD in physics at our Institute, before becoming an instrument scientist (D7) and then heading one of the advanced technology departments at the ILL, the Neutron Optics department. Ken Andersen is currently the Associate Laboratory Director for Neutron Sciences at Oak Ridge National Laboratory, where he oversees the operation and management of two neutron facilities: the Spallation Neutron Source (SNS) and the High Flux Isotope Reactor. At ILL, Ken will replace Paul Langan, who recently returned to Oak Ridge National Laboratory as associate laboratory director for Biological and Environmental Systems Science. Until Ken takes up his duties on 16 October 2023, the interim Director of ILL is Jérôme Estrade.

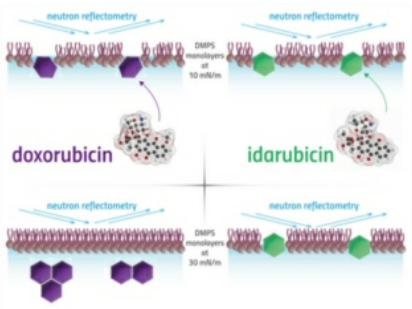
Photo: ORNL

HIGHLIGHTS AND SCIENCE NEWS



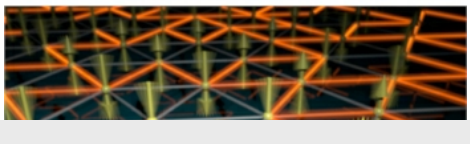
Neutron scattering and selective deuteration reveal the structure of mRNA-containing lipid nanoparticles

Decades of research into messenger RNA (mRNA) and lipid nanoparticles (LNPs) as delivery vehicles laid the foundation for the rapid development of mRNA-LNP-based SARS-CoV-2 vaccines by Moderna and Pfizer/BioNTech. Authorised in 2020, they were the first mRNA vaccines to reach the market for any indication and have now been used worldwide. Further investigation, however, is required in order to optimise the disruptive potential of this new and innovative technology. The structure and composition of mRNA-containing LNPs, in addition to the effects induced by the serum protein apolipoprotein E (ApoE), were recently revealed by combining the powerful techniques of neutron scattering and selective deuteration. Read more



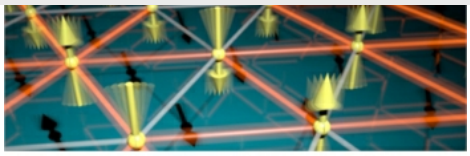
Neutron reflectometry provides new insights on anticancer drugs

Naturally occurring plant cellulose, our most abundant renewable resource, consists of fibers of long polymer chains that are tightly packed in parallel arrays in either of two crystal phases collectively referred to as cellulose I. During mercerisation, a process that involves treatment with sodium hydroxide, cellulose goes through a conversion to another crystal form called cellulose II, within which every other chain has remarkably changed direction. In order to understand how this change of cellulose chain direction is possible, a neutron diffraction experiment with deuterium labelling was performed at the ILL. It showed that during mercerisation of bacterial cellulose, chains fold back on themselves in a zigzag pattern to form crystalline anti-parallel domains. This result provides a molecular level understanding of one of the most widely used industrial processes for improving cellulosic materials. Read more



A new 'spin liquid' shows its potential

Studies of materials with unusual magnetic characteristics have intrigued physicists and electronic engineers for decades. They not only provide valuable theoretical insights into the often complex quantum behaviour of electrons in solids and liquids, they also offer huge potential as the basis for the next generation of devices for information processing and storage.

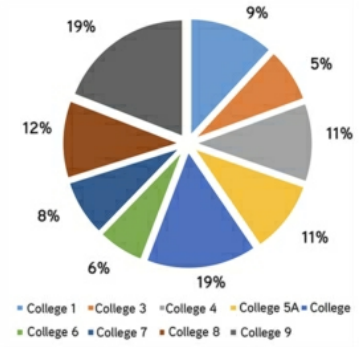


A rare-earth oxide with liquid-like magnetic behaviour could be the key to a future generation of quantum electronic devices. Read more

MORE HIGHLIGHTS HERE !

A SELECTION OF RECENT ILL PUBLICATIONS

NEWS FOR USERS



376 proposals were accepted out of the 614 submitted by the latest deadline. They will be scheduled after the summer break.
The next proposal deadline will be 15 September 2023. Accepted proposals will be scheduled during the first semester in 2024.
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**.** See the instructions here.
The reactor operating schedule for 2023 is available on the ILL website.
The figure shows the number of accepted proposals by college.

Important information for users coming to the ILL

You will now be able to access to the ILL main building and experimental halls after your site entrance badge has been programmed to allow access to the ZAC (controlled access zone: *zone à accès contrôlé*) on the ground floor reception in the new ILL50 building. Your dosimeter will also be distributed at this stage.
The reception at the ZAC entrance is open Monday to Saturday from 7am until 7pm, but closed on Sundays and public holidays.
It will still be possible to enter the site at night and on Sundays and access the Guesthouse, for example, but not to enter the ZAC.

New rules for access to radiation protection areas

To comply with French regulations regarding the protection of workers against the risks of ionising radiation, the ILL must implement new rules for users working in controlled areas.
These rules are being applied from the first reactor cycle of 2023. Users coming for an experiment and working in the ILL's experimental areas should now comply with these new rules.
Read all the necessary information here.

Previous issues of the ILL newsletter

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