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3rd ESS-ILL User Meeting, save the date : from 5 to 7 October 2022, Lund. More information at www.neutrons4europe.com

GENERAL NEWS



Spanish and Italian scientific membership will continue for years to come

Spain has just recently signed an agreement restoring its long partnership with the ILL as a Scientific Member, and a new agreement has also been reached with long-standing Member Italy. This is important not only for budgetary reasons, but also because Spanish and Italian researchers are a crucial and vibrant part of the ILL science programme, delivering very impactful science every year. More information on [Spanish](#) and [Italian](#) use of the ILL.



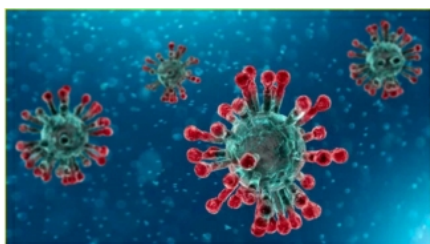
Update on the ILL20-23 Programme and the 2021-2022 long shutdown work

The ILL20-23 programme is the ILL's most important maintenance and upgrade programme, involving several long shutdowns. The objectives for the current and longest shutdown, spanning most of 2022, include the renewal of the H1-H2 beam tube, the delivery of a number of major Endurance guide and instrument projects, and the replacement of essential Equipment.

The replacement of the reactor chimney - which not only accommodates the fuel element in the core but also channels its cooling - is one of the most important milestones in the schedule. A huge amount of work has been done in the guide halls, and the carter pink housing and in-pile guides have been dismantled to make way for the new H1-H2 beamtube. The leaktightness of the reactor containment has also recently been successfully tested.

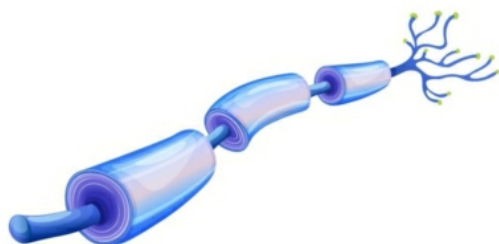
We are now three months into the shutdown and the ILL20-23 programme is on track and on budget a tremendous result, and a testimony to the careful planning, excellent collaboration between the different services involved, and huge commitment of all the ILL staff. [Read More](#)

HIGHLIGHTS AND SCIENCE NEWS



The strikingly different roles of SARS-CoV-2 fusion peptides uncovered

A team of scientists has recently managed to recreate important elements of the membrane fusion mechanism which is critical to the SARS-CoV-2 coronavirus, by simplifying the system down to its core elements and rendering these amenable to experimental analysis by neutron scattering. Neutrons are well suited for the study of protein-membrane interactions under physiological conditions, since they allow structural and dynamics characterisation at room temperature. The results revealed the strikingly different functions encoded in the viral spike fusion domain which could provide a calcium-dependent cell-entry mechanism for SARS-CoV-2. Calcium, for example, pushes the protein's N-terminal to harpoon through the host membrane; removing the calcium re-orientates the protein so that it can bridge and dehydrate lipid membranes, facilitating their fusion. [Read more](#)



Metabolically-incorporated deuterium in myelin, localised by neutron diffraction

Myelin is a natural and dynamic multilamellar membrane structure that continues to be of significant biological and neurological interest. Its biosynthesis and assembly are particularly interesting in its phases of normal formation and renewal and of pathological breakdown. A recent study using small-angle neutron diffraction at the ILL's D16 instrument was performed by US and ILL scientists. In addition to helping to develop a comprehensive understanding of the de novo synthesis and turnover of specific lipids in (ab)normal myelin, the results suggest that the technique can be applied to myelin's proteins, and, more broadly, to the molecular constituents of other biological tissues. [Read more](#)



Exploring salty water structure to understand carbon sequestration in deep aquifers

Salty water can act as a large carbon sink, sequestering carbon dioxide in deep saline aquifers with high pressures and temperatures. However, the fate of the gas depends on the structure of the salty water and how the two substances interact. Neutron diffraction - combined with



molecular dynamics simulations – has recently provided a comprehensive account of the structural and dynamical response of a concentrated solution of NaCl in water to extremes of temperature and pressure. The results show that the method of neutron diffraction with isotope substitution can now be used to give site-specific information on ion solvation in aqueous solutions under conditions that extend into the gigapascal pressure regime. [Read more](#)

[MORE HIGHLIGHTS HERE !](#)

[A SELECTION OF RECENT ILL PUBLICATIONS](#)

NEWS FOR USERS



BNC offers neutrons to LENS facilities users

Many neutron users in Europe have been observing with increasing concern the shutdown of smaller neutron facilities, the Covid-19 pandemic-related difficulties, and recently, the scheduled or unforeseen unavailability of neutrons at several facilities. The Budapest Neutron Centre – BNC – has generously offered to provide beamtime in 2022 for urgent experiments from other facilities if they have had to be postponed because of a recent or future shutdown. This offer concerns proposals which have been positively reviewed at any of the [LENS member facilities](#) but which have not yet been scheduled for any reason and are technically feasible at least partly at BNC.

Proposal rounds

The ILL user programme will be **back in full swing in 2023**, with three cycles scheduled before the summer break.

The experiments to be scheduled during the first semester of 2023 will be selected during the **panel meetings on 7-8 November 2022**, and applications should be submitted before 7 September 2022 (midnight central European time).

With the upgrade programme well underway, we are aiming to provide a **small amount of beamtime to users at the end of 2022** for selected instruments. Applications for this eventual beamtime will be possible in the UserClub all year round before the September call deadline. Unsuccessful proposals will be transferred to the proposal evaluation in November.

More information will be provided via the usual channels in due course, and will be available on the [ILL web site](#).

[The ILL wishes you all a healthy and prosperous 2022](#)

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