



# ILL news letter

SEPTEMBER 2022

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## GENERAL NEWS



### The ILL prepares for the future

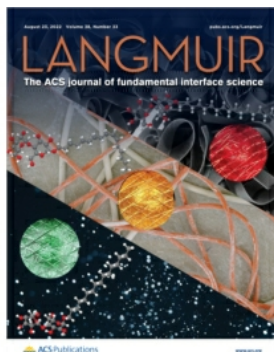
In 2023, a two-decade campaign of improvements to the ILL reactor and instruments will be complete, positioning researchers to carry out wholly new types of experiments. A meeting of the ILL's post-2023 "Strategy Working Group" was hosted by his Excellency the German Ambassador to France in Paris on 12 and 13 September. The ILL Associates established the working group earlier this year to provide advice on developing a strategy to make the best possible scientific use of the ILL within the scope of the 6th Protocol (which extends the original Intergovernmental Convention to the period 2024 to 2033).

The meeting included representatives from the Scientific Council, the Scientific Members, the user community, other European neutron sources, and the Associates and ministries. In the centre of the photo, the Ambassador Hans-Dieter Lucas, who gave a welcome speech to open the workshop.

### Call for PhD projects

The deadline for submitting a proposal for a PhD project is **midnight on Friday, 21 October 2022**. PhD project proposals which satisfy the criteria for accomplishing the in-house academic mission of the ILL's PhD programme compete against each other via a peer-reviewed selection process. Project selection is a two-stage procedure involving an evaluation by in-house review panels and a decision by the ILL Directors. Proposers of projects which are short-listed will be notified around mid-January 2023. Final selection should take place around mid-February 2023, when the ILL supervisors of the short-listed projects will be invited to make a short presentation of their projects. Scientific excellence is the main selection criterion, although other criteria also play a role in the selection of PhD projects. You can find more information on the call for PhD projects on this [website](#).

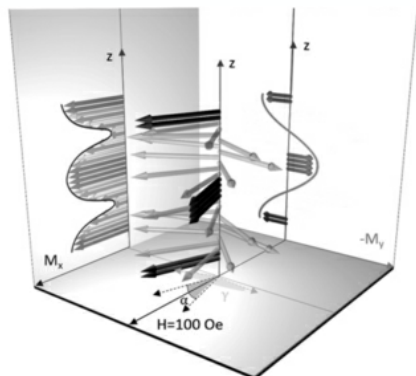
## HIGHLIGHTS AND SCIENCE NEWS



### Topological dynamics of micelles formed by geometrically varied surfactants

The molecular structure of compositionally identical sugar-based surfactants strongly influences the segmental and network dynamics of the micelles formed, which in turn are closely related to the rheology of the system. A recent neutron spin-echo experiment at the ILL showed that the segmental dynamics can be modelled as a one-dimensional array of segments where the dynamics increase with inefficient monomer packing. The network dynamics as characterised by dynamic light scattering show different relaxation modes that can be associated with the micelle structure. Hindered dynamics are observed for arrested networks of worm-like micelles, connected to their shear-thinning rheology, while nonentangled diffusing rods relate to Newtonian rheological behaviour. While the design of novel surfactants with controlled properties poses a challenge for synthetic chemistry, the experiment demonstrates how simple variations in the monomer structure can significantly influence the behaviour of surfactants. The resulting article appeared on the cover page of Langmuir.

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### Emergent magnetic fan structures in manganite homojunction arrays

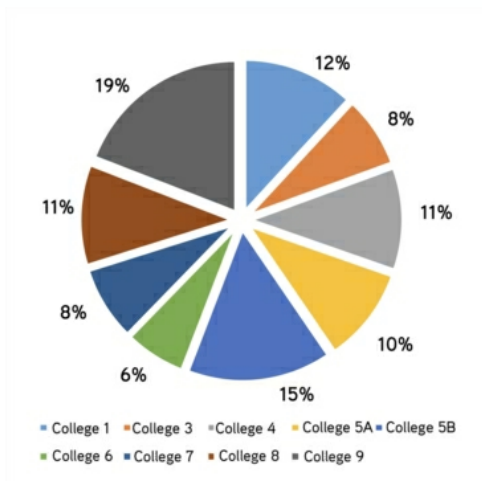
Devices with tunable magnetic noncollinearity are important components of superconducting electronics and spintronics, but they typically require the epitaxial integration of several complex materials. Spin-polarized neutron reflectometry (PNR) measurements on  $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$  homojunction arrays with modulated Sr concentration have led to the discovery of magnetic fan structures with highly noncollinear alignment of Mn spins and an emergent periodicity twice as large as the array's unit cell. The neutron data (on the angle-dispersive neutron reflectometer NREX in Garching, and Super-ADAM at the ILL) show that these magnetic superstructures can be fully long-range ordered, despite the gradual modulation of the doping level created by charge transfer and chemical intermixing. The degree of noncollinearity can be effectively adjusted by low magnetic fields. Notwithstanding their chemical and structural simplicity, oxide homojunctions thus show considerable promise as a platform for tunable complex magnetism and as a powerful design element of spintronic devices.

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### Autumn 2022 proposal round

We received a total of 623 proposals via the standard submission procedure on 7 September.

The subcommittees of the Scientific Council will meet at the ILL on 7 and 8 November to assess them.

The accepted proposals will be scheduled during the first half of 2023.

### Long reactor shutdown and reactor restart

During the long H1-H2 shutdown, which started in October 2021, we have been carrying out work to upgrade existing instruments and build new ones, as well as to improve the sustainability, safety and security of the reactor. We look forward to welcoming our users back to the ILL in 2023 and providing them access to improved scientific capabilities at a safe and reliable reactor.

We plan to deliver 3 cycles of operation in 2023, to be delivered by August. The exact restart date and Schedule will be announced soon.

### News from the ILL Deuteration Facility, D-Lab

After 20 years as the head of the ILL Deuteration Laboratory, Dr. Michael Haertlein retired at the end of June 2022. The D-Lab team is continuing its activities with the same enthusiasm and dedication. Martine Moulin, Valérie Laux and Juliette Devos remain available to discuss, collaborate and provide expertise for your projects which require the deuteration of biological samples.

The Deuteration Laboratory (D-Lab) is run as a user platform. It allows users in the area of life sciences and structural biology to seek tailor-made deuterated biomolecules in support of neutron scattering, protein crystallography, dynamics and reflectometry. Access to the platform is by a rapid electronic peer-review system. D-Lab applications can be submitted at any time during the year and are independent from ILL beamtime proposal submission. The acceptance of a D-Lab proposal does not imply automatic allocation of beamtime and vice versa. Users are invited to contact the D-Lab team (mailto:dlab-proposals@ill.fr) before submitting proposals to discuss their scientific projects and technical feasibility. Once completed, proposals should be returned as an electronic attachment to the ILL User Office. [Read more](#)

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