THE EUROPEAN NEUTRON SOURCE

# ILLnewsletter

May 2021

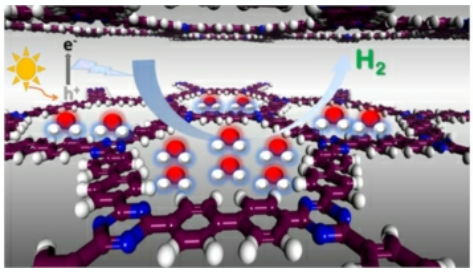
Consult our web site and follow us on Twitter !

The second cycle of 2021 has started – 64 days of neutrons until Bastille day!

## HIGHLIGHTS AND SCIENCE NEWS

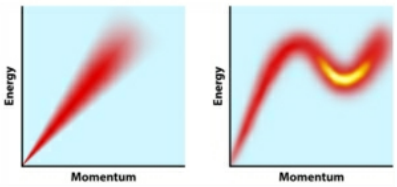
### Helping scientists better understand the methane-rich outer planets

An international team, including ILL scientists, have used neutron scattering to study the behaviour of dense supercritical methane. Their results could help to better model the interiors of the methane-rich outer planets of our solar system. Methane is one of the most abundant molecules in the Universe and there's no doubt it is a major component in our solar system, especially on planets further out from the Sun than Mars. With data at hand coming from the most recent space missions, scientists are modelling the interiors of those planetary bodies, and our study provides new insight. Read more




### Using neutrons to explore the secrets of greener hydrogen fuel production

Hydrogen fuel is seen as the zero-carbon fuel of the future. It has the potential to be stored easily, and when it's consumed in a fuel cell, such as with car engines, it produces only water and heat as a waste product. Hydrogen fuel can be generated by splitting water. It is cleaner to split hydrogen from water using the energy from sunlight, rather than fossil fuels. This uses photocatalysts to speed up the reaction, with the most common being inorganic semiconductors. However, scientists are now also investigating organic porous polymer photocatalysts. Neutrons are an excellent probe when probing organic materials made of light atoms such as hydrogen, as shown by a recent study. Read more




### Excitations in the Ultimate Quantum Fluid

At low temperatures, helium is the ultimate quantum fluid, or "superfluid," exhibiting behaviours that are dominated by quantum-mechanical fluctuations. These fluctuations give rise to a menagerie of effects which can be both entertaining (a cup of liquid helium can empty itself) and potentially problematic ("superleaks" can compromise low-temperature experiments). Understanding and predicting such behaviours has been an active line of research since they were first observed in the 1930s. Researchers have measured superfluid helium's full dispersion spectrum, explaining discrepancies in previous studies and constraining theories of superfluidity. Read more

MORE HIGHLIGHTS HERE !

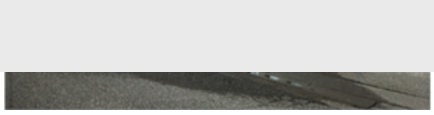
**THE 2020 ANNUAL REPORT HAS BEEN PUBLISHED**

A SELECTION OF RECENT ILL PUBLICATIONS

## NEWS FOR USERS

### Reinforced security procedures to access the ILL facilities

Now highly visible, the fence around the new controlled access zone (ZAC) is almost complete. It will be brought into service by the end of July, with new entry points.
The ZAC is intended to increase security from unwanted intrusion. Most of the ILL's main buildings will be inside the zone, notable exceptions being the Science Building and ILL 1. Access to the ZAC will be possible with a badge programmed for the duration of your stay, in a way very similar to what exists today.
In due course, access to the reactor building will be more restrictive with airport-like controls. Longer times are already required for authorisation to enter this zone (probably 72 hours at least) so please anticipate this. We have also created offices for instruments in the reactor building in the new reception building of the ZAC (ILL50 - photo opposite) , which will provide a



more comfortable working environment for visiting scientists and benefit from the now familiar, remote access capability.

**Important information for users being able to come on site**

The current reactor cycle (64 days from 11/05 to 14/07) has been planned on the assumption that most users will not be able to come to the ILL. Those users who can come to the ILL for their experiments must carefully read and follow the working procedures and practical issues for visitors on site. We will be continuing our trials of new software tools for remote instrument control and data treatment during this cycle.

**Keep an eye on your experiment from home!**

If you are unable to come on site for your experiment, watch this short video to see how Remote Access can help you analyse your experimental data and control your instrument during the experiment remotely https://www.youtube.com/watch?v=EAVgbQXRIdo&feature=youtu.be

**Previous issues of the ILL newsletter**

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