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## In brief

- The ILL has remodelled the entire H5 guide system. The guide now feeds neutrons to ThALES in the reactor hall and to the instruments in the ILL22 guide hall. The result is optimised transport of useful neutrons to the instruments, limiting background to the minimum possible. The first measurements of neutron flux are very positive, indicating an estimated flux gain of between 25 % and 200 % compared to the previous instruments (more on p. 4).

- The commissioning phase of new three-axis spectrometer ThALES has officially started. The instrument is optimised to study the dynamics of strongly correlated electron systems under extreme conditions (more on p.2).

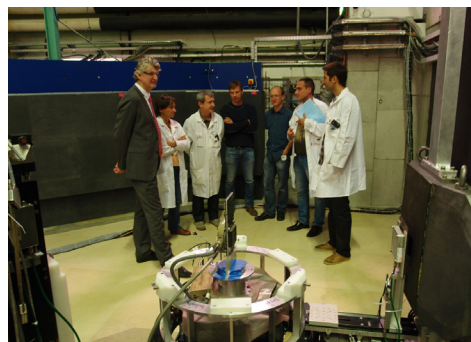
- The new tram B now connects the centre of Grenoble (via the railway station) to the new EPN site entrance - located at 71 avenue des Martyrs (more on p. 10).

## Facility news

### ThALES - Three-Axis Low Energy Spectroscopy

*M. Bohem, P. Steffens, S. Roux and J. Kulda (ILL)  
V. Sechovsky and P. Svoboda (Charles University, Prague)  
J. Saroun (Nuclear Physics Institute, Rez near Prague)*

The ThALES project is a collaboration between the ILL and Charles University (Prague), financed by the Czech Ministry of Science and Education. The official kick-off meeting for the instrument construction phase took place in 2011 with the signature of the Memorandum of Understanding between the two partners. Overall, 3.5 M€ were invested in several ILL member countries (Spain, France, Germany and the Czech Republic). All parts were installed on-site according to the timeline. On 16 October 2014, the commissioning phase of the Millennium project ThALES has officially started with the signature of the Science Director Helmut Schober (see photo). First measurements already confirm the expected gain in flux in the guide and at the sample position and ThALES will be available for the ILL user community for the next proposal round.



ThALES' main field of application is the study of the dynamics of strongly correlated electron systems under extreme conditions. Inelastic neutron scattering (INS) studies using three-axis spectrometers have been indispensable for measuring elementary excitations in crystalline

solids and magnetically ordered systems for decades. In recent years investigations on classically ordered systems yield increasingly to the study of magnetic systems with low dimensionality, quantum fluctuations or magnetic frustration. Although other experimental techniques (NMR, muon spin rotation) can provide valuable information on the same systems, INS remains the method yielding the most complete information on the role of space and time correlations and their interplay in the behavior of condensed matter systems. Moreover, neutrons couple with comparable strength to both the structural and magnetic degrees of freedom and the two scattering components can be quite cleanly separated using polarised neutron techniques.

ThALES is optimised for exploring correlated magnetic systems beyond the experimental possibilities of its predecessor IN14 spectrometer [1-3] in terms of data collection rate and experimental possibilities: it will cover a dynamical range with momentum transfers up to  $2 \text{ \AA}^{-1}$  and energy transfers up to 18 meV. It is expected to reach the highest cold neutron flux on a TAS with enhanced energy resolution. The modified spectrometer shielding can host high field measurements up to 15 T in the complete dynamical range, while the new Heusler monochromator will provide a polarised neutron flux of the order of the old IN14 in its unpolarised mode. The challenge of measuring magnetic excitation in  $\text{mm}^3$ -sized samples has been addressed by combining the virtual source concept with a focusing guide and a Si 111 focusing monochromator.

### References:

- [1] Boehm M., Roux S., Hiess A., Kulda J., *JMMM* **310** (2007), e965-e967.
- [2] Boehm M., Roux S., Hiess A., Kulda J., I. Saroun, *Meas. Sci. Technol* **19** (2008), p.034024.
- [3] Boehm M., Cermak P., Kulda J., Hiess A., Steffens P., Šaroun J., *J. Phys. Soc. Jap.* **82**, Supplement A, SA026 (2013).
- [4] A. Piovano, S. Roux, J. Kulda, *J. Phys. Conf. Series* (2014), *NOP&D-2013 proceedings* (accepted). ■

### A new ILL facility dedicated for industrial applications

*J. Segura-Ruiz, J. Beaucour, R. Cubitt, G. Manzin and B. Giroud (ILL)*

In the framework of the programme “Investissement d’avenir” launched by the French government, the Technological Research Institute (IRT) NanoElec based in Grenoble and led by the CEA, has the main objective of boosting the R&D of the micro/nanoelectronics industry in France. The ILL is the leading partner of one of the main actions of the IRT NanoElec: the characterisation programme, aimed at developing industrial research with Grenoble’s large scale infrastructures, ILL and ESRF. The ILL programme partners are CEA, ESRF, ST Microelectronics, Soitec and Schneider Electric, working together with a total budget of 6.5 M€ from which 2.2 M€ is destined to create an infrastructure to make easier the access of the industrial partners to ILL and ESRF.

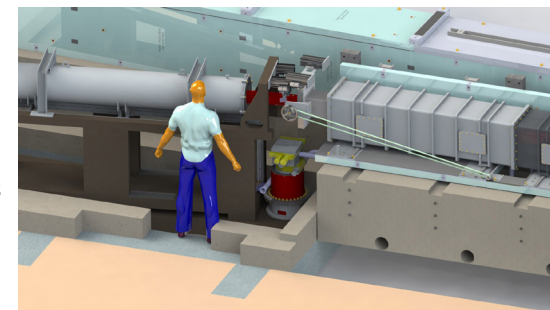
After analysing the microelectronics industry’s needs, the IRT has decided to cover fully the expenses for the equipment of a sample preparation laboratory and the acquisition of an X-ray “bench” (both to be installed in the new Science Building). The X-ray bench will include three techniques: X-Ray reflectivity, grazing incidence diffraction and powder diffraction. This equipment will have two interchangeable X-ray sources with energies of 8 and 22 keV, and a 2D detector with high efficiency at both energies; the instrument is expected to be available for users in February 2015.

A major element of the IRT programme involves the construction of a new instrument at the ILL (named D50), including two of the techniques mostly demanded by the microelectronics industry (neutron reflectivity and irradiation). The instrument D50 is a prototype of the white neutron beam

RAINBOWS type reflectometer foreseen to be constructed as part of the Endurance programme. The RAINBOWS set-up requires a well collimated beam and the use of a refracting prism to analyse the wavelength after reflection [1]. This method will lead to a performance up to 25 times faster than traditional time of flight reflectometers. The second main innovation of this instrument in comparison with standard reflectometers available at the ILL is the use of a CCD/scintillator-based detector. This detector should provide a lateral resolution of around 150 microns and a total detection surface of  $200 \times 200 \text{ mm}^2$ . The instrument is expected to start commissioning by June 2015.

In addition, the IRT will also invest in the ESRF beamline BM05, which will also be used part-time for industrial applications. Apart from the characterisation programme, the ILL is also participating in the IRT’s training programme. In this context, the ILL will offer training sessions to undergraduate students in collaboration with the INP-G.

- [1] R. Cubitt and J. Stahn, *Eur. Phys. J. Plus* **126**, 111 (2011). ■



Final design of the D50 instrument showing from right to left, the beam collimation, sample stage, and detector tube.

# Instrument & technical upgrades

## The H5 guide system – the latest innovative guide system at the ILL

*J. Beaucour, B. Giroud and L. Didier (ILL)*

As part of Millennium Programme the ILL has remodelled the entire **H5 guide system**. H5 feeds neutrons to ThALES in the reactor hall (ILL5) and to the instruments in the ILL22 guide hall. This involved dismantling all the existing guide system as well as all its primary casemates. The new guide and its improved biological shielding was re-installed in an intensive 8-month period of work in 2014.

The design of the new guide system exploits modern guide technologies to the full – high-performance supermirror coatings, multiple guide elements and a new metallic substrate material for the in-pile part. Two lines were followed in the guide design: the creation of a specific guide per



The small-angle scattering instrument D22 in the ILL22 guide hall.

instrument (now made possible with the latest guide technology) and the design of the guide to match the instrument's requirements. The result is optimised transport of useful neutrons to the instruments, limiting background to the minimum possible.

The first measurements of neutron flux are very positive and indicate an estimated flux gain of between 25 % and 200 % compared to the previous instruments.

In parallel to the work on the H5 guide, instruments D16, SuperADAM, D22 and IN15

have been given major upgrades. IN14 has been replaced by **ThALES**, a new three-axis machine unique in the world (see article on p. 2). Two other instruments have been added: **WASP**, the future spin-echo machine, which will replace IN11 in around 2016, and **D50**, a prototype for RAINBOWS selected by the Scientific Council for the Endurance programme and which will provide ILL with an instrument for industrial applications (see article on p. 3). As a result of the H5 project the back scattering spectrometer IN16 has disappeared, to be replaced by **IN16B** in the ILL7 guide hall.

The diffractometer **D16** has been moved 10 metres closer to the reactor, taking up IN16's old position. As it is now on a much more powerful guide it has also been given a few changes, such as improved detector performance and a new elevator for the sample line. The instrument has been up and running for users since mid-November 2014. They are seeing an order of magnitude improvement in flux at the sample!

The CRG reflectometer **SuperADAM** was previously cramped into the space between D16 and cryoEDM; it now enjoys an experimental area nearly three times the size. Improvements were made to its spectrometer, monochromators and detector and it only took a few days of commissioning to make it ready for users in mid-November. The upgrade, together with the effect of the new guide, provided a factor of five gain in flux - SuperADAM will clearly be providing a wealth of new discoveries in the future.

**CryoEDM** has now been dismantled, but a specially optimised guide section (H523) has been installed in the hall for long wavelengths; this has been set aside for future fundamental physics experiments. We have received very serious reports that a number of ferocious physicists are

plotting in the background... is there a new EDM rising from the ashes?

Instrument **D22** is now the proud possessor of a new high-tech collimator system including the TISANE option, and also shielding compatible with white beam requirements. The project started in the summer of 2013 with the removal of the collimation system. The work ended in late November 2014 with the installation of the radiological shielding provided by BARC (India). We have introduced the use of new collimator and diaphragm changers, which will improve

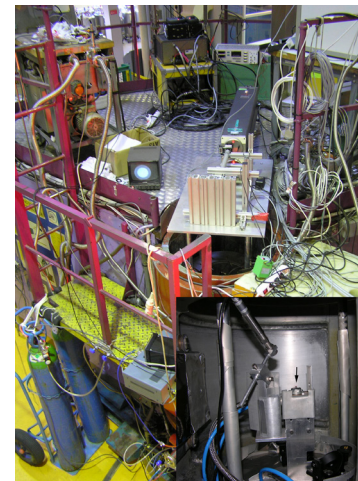
performance and reliability.

On 27 November, D22 received its first neutrons and we were able to validate the shielding devices and confirm the major improvement in flux expected. We can now envisage a white beam on D22 and this should allow for a major rise in flux (estimated at x20) for fast kinetic studies with fewer samples when Q resolution is not required. We are expecting our first users for the first cycle of 2015. ■

## Development of an aerodynamic sample levitator for time-of-flight spectrometers

*L. Hennet, S. Brassamin, D. L. Price (CEMHTI, Orléans), F. Kargl (DLR, Cologne), S. Magazu (University of Messina), H.E. Fischer, J. Kozaily, M.M. Koza, E. Lelièvre-Berna (ILL)*

Quasi-Elastic Neutron Scattering (QENS) is one of the best techniques for probing the structural relaxation of solids and liquids. Time-of-flight QENS in particular is well adapted to the study of atomic diffusion in liquids, in our case, molten calcium-aluminates and aluminosilicates.



**Figure 1:** Levitation set-up on IN6. The inset is a view of the sample area showing the neutron shielding and the levitator (indicated by the arrow).

At very high temperatures, the study of liquids in standard furnaces is often limited by the temperature range; it is also hampered by possible interactions between the molten samples and the container, resulting in sample contamination.

These problems can be overcome by the use of container-less processing techniques. Amongst these, aerodynamic levitation combined with CO<sub>2</sub> laser heating is the best method for studying liquid oxide materials such as glasses and ceramics. As there is no heterogeneous nucleation it also has the major advantage of providing relatively easy access to the undercooled liquid state. However, the devices currently available are limited in terms of the sample size they can safely handle, making QENS experiments difficult. Preliminary tests performed on the three-axis spectrometer IN8 demonstrated the feasibility of such experiments with a 4 mm sample of CaAl<sub>2</sub>O<sub>4</sub> but with poor energy resolution (see the experimental report 6-05-745).

The objective of this Long-Term Proposal (**LTP-6-4**) was to develop levitation apparatus for instrument IN6 (figure 1). IN6 is a time-focusing time-of-flight spectrometer designed for QENS and inelastic neutron scattering at incident neutron wavelengths in the range of 4 to 6 Å. The instrument was well suited to our needs as we had full access to the sample-mounting area.

There are several components in our set-up:

- The levitation device, composed of a convergent-divergent aluminium nozzle on which

the small spherical sample is placed. The nozzle enables the diffusion of a precisely regulated gas flow (Ar + 3.5 or 20% O<sub>2</sub>) below the sample and is fixed on a water-cooled copper block.

- The heating system, consisting of two CO<sub>2</sub> lasers focused on the sample from above and below using an arrangement of flat and focusing mirrors.
- An optical pyrometer for temperature measurement.
- Several video cameras for monitoring the sample during the levitation process.

The first step involved reducing the background from the levitation device in the neutron beam. We installed and optimised the neutron shielding of the metallic parts using cadmium foils. A diaphragm was also installed in front of the sample. We compared the changes in background after each modification.

For levitating the sample we used an aluminium nozzle that allowed between half and 2/3 of the sample to be visible to the beam above the nozzle. In practice however, as aluminium is relatively non-absorbing, almost all the sample is visible to the neutron beam. We optimised the shape of the nozzle to reduce neutron scattering from it, by reducing the amount of aluminium around the levitation cone while keeping a constant thickness of 0.5 mm.

The next step was to evaluate the background scattering from the levitation gas, composed mostly of argon which is quasi-transparent to neutrons. We usually use a mixture of argon with only 3.5% of oxygen, as oxygen scatters neutrons more than Ar. For silica (SiO<sub>2</sub>)-rich samples, however, it was necessary to increase the oxygen content (up to 20%) to avoid oxygen loss from the molten sample, especially during very long measurements. It was then important to know the dependence of the background scattering on the gas composition. We observed an increase in the signal near the elastic line with a rise in oxygen content, an effect that we took into account in the data analysis.

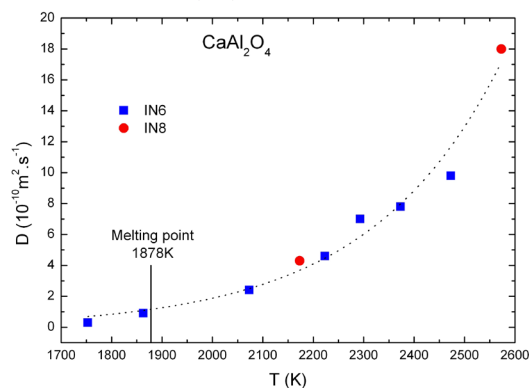
A second laser was added to the set-up, heating the sample from below (i.e. through the levitation

gas outlet in the nozzle) but it was almost impossible to reach the deeply undercooled region with 4 mm samples. The sample would generally crystallise at about 50° C below its melting point. To overcome this problem, we used smaller samples with diameters of less than 3 mm; this was challenging for QENS experiments due to the low counting rates. The first tests showed that runs of 24 h were necessary to obtain a reasonable signal-to-noise ratio (compared to 12 h with a 4 mm sample). The smaller conical nozzle for 3 mm samples also produced lower background from the aluminium.

In order to illustrate the information that can be obtained, figure 2 shows the temperature dependence of the diffusion coefficient of CaAl<sub>2</sub>O<sub>4</sub> obtained by QENS using our levitation setup. Our data agree well with existing data from macroscopic measurements of diffusion. It is worth pointing out that the data obtained previously at IN8 also agree with those from IN6. These results confirm the extreme fragile nature of the glass-former CaAl<sub>2</sub>O<sub>4</sub>.

We completed our study by applying our levitation method to samples with higher melting points as well as to metallic alloys.

For all these developments, we gratefully acknowledge the important technical assistance of Richard Ammer (ILL). ■



**Figure 2:** Temperature dependence of the diffusion coefficient of CaAl<sub>2</sub>O<sub>4</sub>. The red dots are the data obtained at IN8 (experiment report 6-05-745).

## Event & meeting reports

### The very first Science Building clip session 1 July

*R. Cubitt (ILL)*

With the completion of the Science Building we are seeing ILL and ESRF staff sharing a building together for the very first time. The ILL's LSS group and the ESRF Soft Matter group have been deliberately given space to share on the third floor, as have the theory groups on the 4<sup>th</sup> floor.

The idea of the Science Building Clip Session was to give everyone - from the theory groups to the instrument scientists and support staff - the possibility of introducing themselves in just 2 minutes. Everyone felt the meeting had been a great success and a positive sign of the institutes' capacity to work together well. ■



### X-Ray and Neutron Science – International student summer programme 6 July - 2 August

*P. Steffens (ILL) and P. Bruno (ESRF)*



The ILL and the ESRF organised a joint summer programme for undergraduate students this year for the very first time. It was the directors' aim to offer a four-week summer school to member country students interested in familiarising themselves with neutrons or X-rays at an early stage in their studies before having to decide on their speciality for a PhD thesis.

Eighteen participants from ten different countries, selected from a large number of applicants, were invited to spend four weeks on the EPN campus. Experts from the ILL and the ESRF gave a series of introductory courses on X-ray and neutron theory and on the techniques for their production and use. For many of the participants this was their first contact with these techniques.

Over the following weeks each student worked on an experimental project, embedded in one of the research groups at the ILL or ESRF – projects ranging from structural biology to geology or magnetic phase transitions. Many of ILL's PhD students played an active part as supervisors in these projects.

It was an enriching experience for both sides, with appreciative feedback from the participants: “Warm welcome” – “I discovered many new

interesting fields of science” – “motivated me for a PhD” – “friendly and good atmosphere to work” – “I would enjoy doing my thesis at the ILL/ESRF”. Both the organisers and supervisors were astonished by the motivation and efficiency of the students’ work in these fields despite their inexperience, and the very high quality of the presentations made by them all at the end.

The ESRF director Francesco Sette was enthusiastic at the outcome and he impressed on the students their importance, as a new generation of scientists, for our two institutes. It was hard to take leave on the final day, but most of the students were convinced that they would certainly be back on the campus some time in the future. ■

### nEDM2014 workshop “Challenges of the world-wide experimental search for the electric dipole moment of the neutron” 2-6 November, Ascona (Switzerland)

*B. Filippone (CalTech), P. Geltenbort (ILL), M. van der Grinten (RAL), K. Kirch (ETHZ-PSI) and Ph. Schmidt-Wellenburg (PSI)*

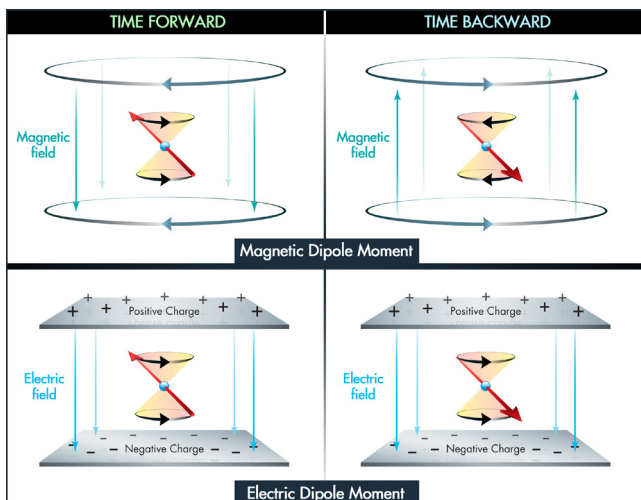
An international workshop on the techniques, methods and instrumentation being used in the search for a neutron electric dipole moment was recently held in Ascona, Switzerland. nEDM2014 was organised in November by the Paul Scherrer Institut (PSI), the ETH of Zurich, the Institut Laue-Langevin (ILL) Grenoble and the Rutherford Appleton Laboratory (RAL).

It was the second workshop of its sort, held in the spirit of the 2012 meeting at the Oak Ridge National Laboratory (Tennessee, USA).

Fundamental particle physics has been using a number of complementary approaches to push back the limits of our understanding of nature. In one approach, physicists apply the highest achievable energies to produce new particles in

“particle colliders”, whilst others aim at the highest possible level of precision, often at much lower energies and with high intensities, to identify small discrepancies in our theoretical predictions - symmetry violations in particular.

The experiments searching for the neutron’s finite electric dipole moment (EDM) are among those with the highest priority in low-energy, precision particle physics. A finite permanent EDM would indicate a violation of the discrete symmetry of time reversal, signalling ‘new physics’ phenomena beyond the electroweak Standard Model of particle physics. The Standard Model has failed to explain the asymmetry of matter



Compared to the interaction of a magnetic moment with the magnetic field, the interaction of a permanent electric dipole moment of an elementary particle with spin with an electric field violates time reversal symmetry. ©graphic artist at LBNL in "Report to NSAC on Implementing the 2007 Long Range Plan (Jan. 2013)".

over antimatter observed in our universe today, asymmetry which could be intimately linked with a symmetry violation manifesting itself in an EDM of a particle with spin.

Searches for a neutron EDM have a long history, dating back to the 1950s. Since then, experiment sensitivities have improved by some six orders of magnitude - without finding a finite EDM but resulting, nevertheless, in the exclusion of many potential particle physics models put forward e.g. to explain known symmetry violations. The most recent and most sensitive result of a neutron EDM search (performed at the ultra-cold neutron source PF2) was published in 2006. The community is working hard on improved sensitivities to push back the present limit and discover a non-zero EDM.

With the new technologies now available at least 7 collaborations around the world are working on improved searches for the neutron EDM. The technical, technological and systematic challenges of these experiments are manifold; they require intense research and development activity and ingenious measurement schemes.

The nEDM2014 workshop focused on vital issues in these new approaches, bringing together experts in the field and students involved in projects across the globe. More than 50 scientists contributed to a fruitful exchange of ideas, discussing technical problems in great detail

and prepared the ground for more experimental collaboration in the future. Many of the current activities are concentrated around key neutron source technologies, cryogenics, materials with very specific properties, high voltages, magnetic shielding and a range of magnetometry techniques.

The community as a whole has been growing over the past few years, attracting highly motivated young researchers. Considerable progress was reported, orally and in posters, on projects in Canada, France, Germany, Japan, Russia, the USA and Switzerland, by scientists from an even larger number of countries. Meetings of this sort generate R&D collaboration, the exchange of know-how and a profusion of new ideas. The participants certainly agreed on this and the need for another technical nEDM workshop in three years’ time. An offer to host the event in 2017 in Canada was made by the Canadian participants and was warmly welcomed. Progress on the neutron EDM will continue to be a hot topic at more general conferences and workshops in the meantime, but it is these more specialised technical workshops, attended by those in daily contact with the issues, which drive the maturing EDM community onward. ■



Happy workshop participants from all over the world helping to overcome possible boundaries between individual groups.

# Announcements for ILL users



## Tram B extended to the EPN science campus

The new tram line to the campus was brought into service at the beginning of September 2014. Tram B now connects the centre of Grenoble (via the railway station) to the new terminus "Grenoble Presqu'île". You must get off at the terminus for the EPN campus. "Grenoble Presqu'île" is between the new "Place de la Résistance" roundabout and the new site

entrance at 71, avenue des Martyrs.

You can buy tram and bus tickets at the Guest House or from the machines at the tram stops.

Please note that you can no longer enter the site via the previous site entrance on rue Jules Horowitz and that the n° 34 bus service between the city centre and the campus no longer exists. ■

## Payment for meals at the on-site restaurant

Your site entrance badge is used to pay for meals at the restaurant and take-away counter. Since mid-2014 none of the badges are pre-charged with money. On arrival, you may charge your badge at the restaurant cash desk. In the evenings and week-ends you can pay with cash or credit card at the till.

You can recover any balance remaining on your badge at the end of your stay at:

- the cash desk in the restaurant entrance on weekday lunchtimes, or

- the till during meal times on evenings and weekends.

If you are being reimbursed by the ILL, any money remaining in your account at the end of your stay will be reimbursed when your claim is processed by the ILL Travel Office.

If you lose your badge, go to the site entrance to request a new one. ■

## Proposal round

The next deadline for proposal submission is **Tuesday, 17 February 2015, midnight (EU time)**.

The web system will **open on 5 January 2015**.

Proposals will be reviewed over March/April and the Subcommittees will meet to assess them on **21-22 April 2015**.

Proposals must be submitted via the Electronic Proposal Submission (EPS) system on our new User Club website (<https://userclub.ill.eu/cvng>); you will have to log in with your username and password. The detailed guidelines for the submission of a proposal at the ILL can be found here: <http://www.ill.eu/users/applying-for-beamtime/electronic-proposal-system/>.

You will receive the full support of the Club team if you have any problems. Please allow sufficient time for any unforeseen computing hitches. If you have any difficulties at all, please contact our web support ([club@ill.eu](mailto:club@ill.eu)). For other queries, contact the User Office ([sco@ill.eu](mailto:sco@ill.eu)). ■

## Instruments available

The following instruments will be available for the next round.

- powder diffractometers: D1B\*, D2B, D20, SALSA
- liquids diffractometer: D4
- polarised neutron diffractometers: D3, D23\*
- single-crystal diffractometers: D9, D10
- large scale structure diffractometers: D19, LADI
- small-angle scattering: D11, D22, D33
- reflectometers: SuperADAM\*, D17, FIGARO
- small momentum-transfer diffractometer: D16
- diffuse-scattering spectrometer: D7
- three-axis spectrometers: IN1-LAGRANGE, IN8, IN12\*, IN20, IN22\*, THALES
- time-of-flight spectrometers: IN4, IN5, IN6, BRISP\*
- backscattering and spin-echo spectrometers: IN11, IN13\*, IN15, IN16B
- nuclear-physics instruments: PN1, PN3
- fundamental-physics instruments: PF1B, PF2, S18\*

\* Instruments marked with an asterisk are CRG instruments, where a smaller amount of beamtime is available than on ILL-funded instruments, but we encourage applications for these.

The list of **operating CRGs** is as follows (status December 2014):

CRG-A: D1B, IN13

CRG-B: BRISP, D23, SuperADAM, IN12, IN22, S18

GRANIT jointly funded with LPSC (UJF, CNRS)

You will find details of the instruments on our web site at

<http://www.ill.eu/instruments-support/instruments-groups/>

## Scheduling period

Those proposals accepted at the next round will be scheduled for the last 2 reactor cycles in 2015.

## College Secretaries

College 1 - Applied metallurgy, instrumentation and techniques: *Anne Stunault*  
 College 2 - Theory: *Marie-Bernadette Lepetit*  
 College 3 - Nuclear and particle physics: *Aurélien Blanc*  
 College 4 - Magnetic excitations: *Gøran Nilsen*  
 College 5A - Crystallography: *Thomas Hansen*  
 College 5B - Magnetism: *Clemens Ritter; Charles Dewhurst (focus group secretary)*  
 College 6 - Structure and dynamics of liquids and glasses: *Viviana Cristiglio*  
 College 7 - Spectroscopy in solid state physics and chemistry: *Mohamed Zbiri*  
 College 8 - Structure and dynamics of biological systems: *Bruno Demé*  
 College 9 - Structure and dynamics of soft-condensed matter: *Orsolya Czakkel, Lionel Porcar (focus group secretary)*.

## Calendar

### Important dates

Subcommittee meetings: **21 -22 April 2015 & 17-18 November 2015**  
 Scientific Council: **23-24 April 2015 & 19-20 November 2015**  
 Next proposal deadline: **15 September 2015**

### Reactor cycles in 2015

Cycle n° 174	from to	16/04/2015 31/05/2015
Cycle n° 175	from to	17/06/2015 06/08/2015
Cycle n° 176	from to	01/09/2015 18/10/2015
Cycle n° 177	from to	05/11/2015 22/12/2015

Provisional dates for future reactor operations can be found at  
<http://www.ill.eu/reactor-environment-safety/high-flux-reactor/cycles/projected-operation/>

### Workshops and schools in the first semester of 2015

- FullProf School, 2-6 March, Grenoble  
<http://www.ill.eu/html/fpschool2015/>
- McStas instrument simulation training, 5-6 March, Grenoble

OUR VERY BEST WISHES FOR THE YEAR AHEAD FROM ALL AT THE ILL



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### Publishing information

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<http://www.ill.eu/quick-links/publications/ill-news/>  
 The next issue will be published in June 2015