

Benefits of Scientific Membership at the Institut Laue Langevin

ILL in Grenoble, France, has been the world's leading neutron facility for decades, delivering science, innovation and training at an unprecedented level. This excellence and impact are underpinned by the high flux reactor which still delivers to this day the world's most intense, continuous neutron beams, the world's largest, state-of-the-art suite of more than 40 public instruments, a comprehensive range of technical and scientific services and an expert workforce of more than 500 staff with experience accumulated over decades.

Since 2000, the ILL has benefitted from investment of the order of 200 M€ covering mainly the reactor and instrument suite. Over the last decade many reactors have had to undertake safety improvements following the Fukushima accident and ILL is the first reactor in France to have completed its post-Fukushima response. The instrument suite was upgraded initially through the Millennium programme (80 M€ over the period 2000 – 2015) and then most recently with the Endurance programme (60 M€ from 2016 to 2024). These programmes have delivered about 60 innovative infrastructure, instrument and scientific support projects. As a result of this investment ILL is ideally placed to deliver science, innovation and training at the highest level over the next decade for its partners.

The ILL is a European research infrastructure and a member of the EIROforum group of eight leading European research infrastructures (www.eiroforum.org). ILL is owned by France, Germany and the UK (the Associates) with each providing 25% of the annual operating budget, approximately 110 M€. Ten Scientific Members (SMs) collectively provide most of the remaining 25% of budget. Spain, Austria and Switzerland have been members for more than 30 years, while Slovenia is the most recent SM from 2020. The biggest SM is currently Sweden contributing 5.5% of the budget. In September 2021, the Associates signed the 'Sixth Protocol' to operate ILL from January 2024 to December 2033.

The principal return-on-investment of the Associates and SMs is scientific output based on a share of beam time that is commensurate with the level of funding. Scientific proposals are evaluated on excellence and then national beam time allocation is refined to match budget contribution by the Science Director. Beam time allocated in this way is provided free of charge to the experiment team, as well as reasonable travel costs. Based on the suite of 40 instruments and expected annual reactor operation at a level of 170 days, the user programme will have an annual capacity of 5440 instrument days (80% of a total of 6800 instrument days) – 1% of beam time therefore costs 1.1 M€ and delivers 55 days of beam time. It must be noted however that beam time accounting methods for international collaborations (which is based on the composition of collaborative proposal teams and not simply the affiliation of the principal investigator) mean that scientists from a SM typically have access to two-to-three times this amount of beam time i.e. 110-165 days for 1% of budget.

Access to beam time is the most visible benefit of being a SM at ILL and others are detailed below. It should be noted that ILL is the operating hub of neutron scattering in Europe providing a unique opportunity to develop collaborations across the 13 Associate and Member states, as well as the many other countries that benefit from limited access. Neutron facilities and labs in Europe cooperate closely forming a network which has recently been structured through the League of advanced European Neutron Sources (LENS - <https://lens-initiative.org/>). ILL initiated LENS and is clearly at the centre of this network providing strong links to all other facilities.

For more information about ILL, please consult the website <https://www.ill.eu/> and the [general](#) and [impact](#) brochures.

Membership level

The principal mechanism for any country to partner with ILL is therefore through scientific membership at an appropriate level for the national neutron scattering community in terms of its size, expertise and needs.

Membership can be set at any level from 0.3% upwards. Based on the current budget forecast for the next five years, the annual operating budget is 109 507 900 €₂₀₂₃. As an example, the total cost of membership at 0.3% for the period 2029 - 2033, with 2% indexation, would therefore be 1 925 000 € with equal annual contributions defined in the table below.

	2029	2030	2031	2032	2033
Annual financial contribution (€)	385 000	385 000	385 000	385 000	385 000

Accession fee

In addition to the annual fee for 0.3% of membership level, a one-off accession fee, equating to 0.3% of ILL's current capital value and reserves, is to be paid by a new SM as a contribution to past investments. Based on 2026 values, the accession fee is 619 000 €.

Travel costs for scientists

Scientific membership covers travel costs for users to participate in experiments at ILL, typically two scientists per experiment, based on reasonable costs for travel within Europe. For SMs outside Europe, travel is likely to be more expensive than travelling within Europe and, in order to be consistent with the level of financial support offered to European SMs for travel, a budget envelope will be established through negotiation, based on an estimated number of user visits and reasonable travel costs.

Note that working through COVID has enabled a high level of remote access, in particular at ILL. While much scientific collaboration and training requires physical presence at the facility, remote access offers new opportunities for hybrid experiments with core scientific participants on site and potentially many more remote participants, avoiding travel, giving input or benefitting from remote training, while substantially reducing the carbon footprint of the experiment. For a geographically distant SM, remote access offers new and highly useful flexibility.

Additional benefits and opportunities

Additional benefits of being an SM level at ILL include:

- *Representation on the Scientific Council* – a representative from a new SM will be eligible for nomination to the Council in which scientific strategy is discussed.
- *Representation on the scientific subcommittees* – scientists from a new SM will be eligible for nomination to the subcommittees which select the best experiment proposals for beam time.
- *Access to training programmes* – these include placements for Master's students and the ILL PhD programme.
- *Staff placements* - ILL is open to hosting scientists, engineers and technicians from a new SM on long-term detachments that would provide additional capacity and capability at ILL, as well as providing key training in a world-leading, science-focused research facility that would be of major benefit to the SM neutron community. Such placements will be considered to cover overuse of beam time and limited in financial value, based on ILL staff costs, to 15% of the SM contribution.

- *Access to ILL neutron beams for industry* – national SM industry can use ILL facilities for pre-competitive research under the same conditions as academic users and for proprietary research (i.e. paid for beam time)
- *Access to Scientific Partnerships and Hubs* – ILL is a leading player in several key partnerships and hubs for high impact research e.g.
 - The Partnership for Structural Biology - <https://www.psb-grenoble.eu/>
 - The Partnership for Soft Condensed Matter - <https://pscm-grenoble.eu/>
 - A range of new Science Hubs covering batteries, advanced manufacturing, quantum materials, and biology and health as defined in the ILL Science Strategy.
- *Instrument, technical and scientific projects* - While ILL does not have plans for another major programme of projects at the current time, a number of projects are underway and more will be needed to ensure that the best scientific opportunities continue to be made available to the research community. It may be of mutual interest for a new SM and ILL to co-develop such projects.