agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

AERES report on the research unit :

Laboratoire Léon Brillouin

From the

CEA

CNRS

May 2011

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Le Président de l'AERES

Didier Houssin

Section des unités de recherche

Le Directeur

Pierre Glorieux

May 2011

Research Unit

Name of the resarch unit: Laboratoire Léon Brillouin

Requested label: UMR

N° in the case of renewal: UMR12

Name of the director: Mrs Christiane ALBA-SIMIONESCO

Members of the review committee

Committee chairman:

Mr Thomas BRÜCKEL Forschungszentrum Jülich GmbH, Germany

Other committee members:

Mr Serge BOUFFARD, CIMAP, France

Mr Bernard CABANE, PMMH ESPCI, France

Mr Stefan EGELHAAF, Heinrich Heine Universität Düsseldorf, Germany

Mr François GUILLAUME, Université de Bordeaux, France

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Mrs Anne-Marie CAZABAT

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Mr Christian ROLANDO, DAS CNRS/INC

Report

1. Introduction

- Date and execution of the visit

The committee for the AERES evaluation of the Laboratoire Léon Brillouin (UMR12 CEA-CNRS) met in Saclay on 16 and 17 May 2011, after having received a detailed written report in three parts some weeks prior to the meeting. Unfortunately, one of the invited committee members, M. Bernard CHEVALIER from ICMCB Bordeaux, was not able to attend the meeting and therefore could not contribute to the present report.

On the first day, after an initial closed session of the committee, the director of LLB, Mme Christiane Alba-Simionesco, gave a detailed presentation on the organization of the laboratory, of its missions, personnel, budget, etc. Then the three main lines of research - axis 1: "Strongly Correlated Quantum Materials and Magnetism", axis 2: "Materials and Nanoscience" and axis 3: "Soft Matter and Biophysics" were introduced each in one overview presentation by the respective coordinator and two highlight talks by senior scientists[1], followed by a poster session. Ample time was foreseen for discussions with management and key scientists during the presentation sessions and with some of the younger scientists during the poster presentation, which was greatly appreciated by the entire committee. Before a closed session to review the first day, the committee had the opportunity to visit the facility in order to obtain a direct impression of the instrumentation.

The second day started with an overview by M. Alain Menelle of the service and user program at LLB as well as its quantitative research output, followed by a presentation of the CAP2010 and CAP2015 instrumentation programs by M. Arsen Goukassov. In open discussions with the council of the laboratory and the three groups of personnel – students, technicians and scientists - the committee members were able to convince themselves of the high motivation of the staff. The committee also became aware of some of the less favorable constraints on the operation of this large scale facility, such as restricted access for non EU personnel and visitors during weekends, small number of technical staff and limited ability to hire thesis students. Correspondingly, some concerns were expressed by the committee in the meeting with CEA and CNRS representatives, where the committee was assured of the high importance and appreciation these agencies attribute to LLB and of their commitment to the future of the laboratory despite the present difficult funding situation.

The well organized information sessions, together with the written reports, allowed the committee to obtain a very clear view not only of the original research done by LLB staff scientists and its users, but also of the organization of the user service, and of the innovative instrumentation projects. In the final closed session the committee defined specific evaluation criteria adapted to such a large scale facility with open user access, worked out some general recommendations and performed an initial SWOT analysis. The present report was then elaborated by e-mail correspondence in the course of three weeks after the meeting.

- History and geographical localization of the research unit, and brief presentation of its field and scientific activities

The Laboratoire Léon Brillouin is located within the "Centre CEA de Saclay" and profits from the exceptional scientific environment provided by the "plateau de Saclay", which includes the synchotron radiation source SOLEIL and renowned Universities. LLB constructs and operates instruments for research with neutrons around Orphée, a 14 MW reactor operated by the CEA since 1980. As a national large scale facility, its mission is threefold:

(1) Deliver neutrons to the French and international scientific communities for experiments that are selected by an external committee. This target includes user service and instrument development[1].

(2) Lead the scientific community and the industry of France in the field of neutron scattering. Open up new possibilities and applications of neutrons to tackle topical scientific and technological problems. Broaden the use of neutron scattering and popularize the technique. This target includes training and education of potential users.

(3) Carry out original research in the general area of neutron scattering. In house research at LLB is now structured along the three axes mentioned above.

- Management team

The management team consists of the Director and Deputy Director appointed by the Steering Committee, where the head belongs to one of the two institutions CEA or CNRS and the deputy head to the other. At present, the Director of the LLB is Mme Christiane ALBA-SIMIONESCO, CNRS, the Deputy Director is M. Jean-Paul VISTICOT, CEA. The management team is supported by the administrative group and the leaders of six scientific and four technical groups.

- Staff members (on the basis of the application file submitted to the AERES)

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	1	-
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	41	38
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	27	17
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	41	39
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	1	
N6: Number of Ph.D. students (Form 2.8 of the application file)	13	
N7: Number of staff members with a HDR or a similar grade	29	25

2 • Overall appreciation on the research unit

- Summary

LLB strongly pursues the major missions of a national large scale user facility:

1- to excel in its own research,

2- to provide service to a wider user community,

3- to continuously improve instrumentation through method development and instrument renewal and

4- to broaden the user community by providing training and education.

[1] Presenters were : - for axis 1 : J-M Mignot (coordinator), Y. Sidis, I. Mirebeau ; - for axis 2 : F. Ott (coordinator), M-H Mathon, A. Bataille ; - for axis 3 : F. Boué (coordinator), J. Jestin, S. Longeville

The excellent scientific output of LLB and its remarkable impact in the wider French and international user community underpins the importance of reseach with neutrons in addressing the "Grand Challenges" of modern society and provides an essential cornerstone for the European leadership in this field of science. However, without appropriate funding for a substantial instrument renewal and upgrade program - as proposed by the program CAP2015 - and a continuous renewal of the staff, this success story is not sustainable in the long term.

- Strengths

- Neutron scattering provides unique and unrivaled information on "where the atoms are and how they move" in condensed matter systems. It is thus indispensible for our modern understanding of matter based on a microscopic, truly atomistic approach. Since materials are the basis for all applications, research with neutrons contributes in a decisive way to the Grand Challenges of modern industrial societies, such as energy supply and storage, health, environment, transport and information technology.
- Research with neutrons is a field, where Europe is traditionally strong and still the world leader despite the advent of the new generation pulsed MW spallation sources in the US and Japan.
- Apart from the world leading joint European center, the Institut Laue Langevin (ILL) in Grenoble, there are only five major national neutron centers with sources in Europe: LLB / Saclay in France, ISIS / RAL in Great Britain, BER II / HZB and FRM II / Garching in Germany and finally SINQ / PSI in Switzerland. LLB with its medium flux reactor Orphée, the cold, thermal and hot sources and a broad instrument suite is a key component of the European neutron roadmap.
- As detailed in the reports on axis 1, 2 and 3, LLB sustains an international highly competitive research program with outstanding scientific output and international excellence within its research profile.
- LLB features enthusiastic and creative scientific and highly skilled technical staff.
- LLB fulfills its mission to build up a scientific community by strong involvement in training and education programs such as "FANS du LLB", "HERCULES" or participation in the organization of national and international workshops (e.g. "Journées de la Neutronique").
- The neutron source, the reactor ORPHÉE has just recently passed a general safety inspection by the "Group Permanent" and stable and reliable operation can be expected for at least 10 years to come, provided there is a positive outcome of the 2012 stress test imposed on all nuclear installations in France after the Fukushima accident.
- The laboratory enjoys strong connections with the European Neutron Scattering community through the NMI3 collaborative network, where it co-ordinates two Joint Research Initiatives.
- Positive and supportive views were jointly expressed by representatives of CEA and CNRS during the visit of the committee.

- Weaknesses

- The LLB lacks the necessary political clout to transport the above positive messages to funding agencies; its staff is very visible in the scientific community, but less so in science policy.
- LLB has very small central service groups, in particular in the field of electronics and software, which hampers the development of standardized instrument control and analysis software.
- Due to CEA regulations for the Saclay site, there exist severe access restrictions for non-EU visitors, but also for LLB's own non-EU thesis students – limitations that are not compatible with the functioning requirements of an open user facility.
- The web based user information, proposal and reporting system is not up-to-date.
- The number of Ph.D. students and postdocs is very limited due to lack of budget and involvement of universities at LLB
- While communication within some of the scientific groups is excellent, other group managers do not fully assume their management responsibility.
- The strong research program in soft matter suffers from a lack of a deuteration facility – a specific requirement for research with neutrons

- Opportunities

- The instrument upgrade program CAP 2015 is a huge opportunity for LLB to offer more state-of-the-art instruments to the user community and open new research areas.
- New opportunities arise through the collaboration with SOLEIL and the European Spallation Source (ESS), and through the Swedish-French co-operation agreement.
- Industrial research could be strengthened through a more proactive approach.
- LLB could strongly profit from the reorganization of science on the Saclay campus through local collaborations.
- By building stronger links to Universities – in particular local ones - LLB could possibly attract more thesis students and broaden the user community.
- Organization of scientific life at LLB along the three axes, animated by senior scientists as coordinators, will increase the scientific dialog within LLB and encourage carrying out longer term research programs.

LLB could reach out to the life science community and establish strong links to national research in biology.

- Threats

- The instrument upgrade- and renewal program CAP2015 is essential for LLB to stay competitive in the field of research with neutrons, considering the enormous dynamism observed world-wide (completion of SNS, JPARC, ANSTO, new guide hall at NIST, refurbishment of guides and instrument upgrade at BER II, Millennium program of ILL, second target station at ISIS, JCNS involvement in the scientific exploitation of FRM II, ESS, etc.). A loss of the CAP2015 program would become a serious threat to LLB. Funding urgently needs to be secured to ensure a successful long term sustainable operation of LLB as a national large scale user facility.
- Considering the service aspect of a large scale user facility, staffing needs to be maintained at a minimal level of 5 persons per instrument (in comparable facilities world wide this number is closer to 6 or 7). LLB does not even reach these values at present and imminent retirement of key scientists or technical staff then represents a serious threat to the user program. A proactive approach for recruitment therefore has to be developed and supported by CNRS and CEA.

- Recommendations

- Highest priority should be given to the replacement of retiring staff and recruitment, aiming at a healthy staff level of not less than 5 persons per instrument.
- Of highest priority is the realization of the instrument upgrade and renewal program CAP 2015, in particular the realization of the PA20 small angle instrument as a high throughput machine and the time-of-flight spectrometer Fa#, which serves both the soft matter and the hard condensed matter communities.
- CNRS should acknowledge the involvement of LLB staff in service for the user community by providing an appropriate heading in the individual reports as it is done e.g. for research administration and teaching.
- CEA should consider improving access to LLB for foreigners.
- LLB should strive to realize the opportunities listed above.

A1: Number of permanent researchers with teaching duties (recorded in N1) who are active in research	
A2: Number of permanent researchers without teaching duties (recorded in N2) who are active in research	37
A3: Ratio of members who are active in research among staff members [(A1 + A2)/(N1 + N2)]	97%
A4: Number of HDR granted during the past 4 years (Form 2.10 of the application file)	7
A5: Number of PhD granted during the past 4 years (Form 2.9 of the application file)	14

3 • Specific comments

• Appreciation of user service along the criteria

- With 21 neutron scattering instruments in user operation, the three types of moderators (cold, thermal and hot) and instrument types ranging from diffractometers (liquids, powder, single crystal, texture/strain) via small angle scattering and reflectometers to medium and high resolution spectrometers (triple axis, time-of-flight, resonance spin echo), LLB features a fairly complete instrument suite.
- As witnessed by the scientific output, instruments at LLB are quite productive and some of them – such as the diffractometers on the hot source – are rather unique. However, given the world wide effort in neutron instrumentation, the realization of the instrument renewal program CAP2015 is urgently required for LLB to stay internationally competitive.
- Concerning the reliability of source and instruments, no hard numbers were presented to the committee. About 15% of experiments are being repeated as they encountered technical or scientific problems; however, the fraction of real downtime has not been quantified. While the Orphée reactor has the reputation of a very reliable neutron source (180 operation days at 14 MW per year are guaranteed), the ageing instrument suite suggests certain downtimes for instruments and sample environment. The committee recommends the establishment of a risk management system, which tracks failures and initiates regular component renewals.
- LLB has a good sample environment suite, especially for hard matter studies at low temperature, magnetic fields and high pressures. A highlight in this respect is the high pressure capability developed by the late Igor Goncharenko. Platforms and laboratories exist for Biology, Chemistry, Cryogenics and High Pressure. An additional deuteration laboratory is recommended as it would give LLB a definite edge compared to other neutron scattering centers.
- User access and service meet the highest international standards. The experiment selection is done by independent committees of international experts. No beam time is reserved for in-house research and LLB scientists must go through the same evaluation procedure, on the basis of written proposals, as external users. The distribution of proposals over scientific domains is quite healthy with a certain focus on Hard Matter and Magnetism (2008-2010 numbers: 41% Magnetism, 22% Materials Science, 17% Chemical Physics, 12% Structure, 8% Biology). The share of 23% beamtime allocation for EU countries and about 10% for Non-EU shows the international attractiveness of the facility and compares well with similar facilities world wide. About 500 users visit LLB each year, which compares favorable to similar facilities. The fraction of new users is with around 20% quite remarkable.

• Outreach

- LLB is very active in user education and training. The high priority given to this item is evidenced by a new group established within the laboratory dedicated to these activities. Besides its own Ph.D. program, LLB organizes neutron schools, e.g. “FANS du LLB” or participates in the “HERCULES” training sessions together with ILL, ESRF and SOLEIL. New activities are being discussed for the future such as virtual training sessions. LLB reaches out to the general public by offering guided tours of the facility. In 2008 to 2011, LLB sponsored around 20 workshops and summer schools. The committee recommends that LLB presents and discusses its instrument renewal program CAP2015 with the French user community during a special session of one of the national workshops.

• Appreciation of method- and instrument development

- The programs CAP2010 and CAP2015 provide a clear roadmap and project structure for instrument renewal, which will bring new energy to the facility and are vital for securing its survival on the long term. However, the limited resources lead to targeted actions and often involve projects with the highest possible return within the budget constraints. The committee recommends the implementation of a separate budget line for the instrument upgrade program by CNRS and CEA. A highlight in the development of sample environment at LLB is the high pressure facility, where LLB holds the world record for neutron scattering. The laboratory enjoys strong connections with the European Neutron Scattering community through the NMI3 collaborative network, where it co-ordinates two Joint Research Initiatives. In addition new opportunities arise through the collaboration with SOLEIL and ESS and through the Swedish-French co-operation agreement.

- Appreciation on the results

- LLB has an impressive publication output and ranks third world wide among the neutron facilities with about 200 peer-reviewed papers per year. The high quality is documented by the fact that about 10 to 15% of the publications appear in so called highly ranked journals.
- The participation in formalized European collaborations (e.g. NMI3, ESS-PP), national and regional programs (e.g. ANR, RTRA) and industrial contracts is quite appropriate for a facility of the size of LLB.
- Appreciation on the impact, the attractiveness of the research unit and of the quality of its links with international, national and local partners
- LLB scientists are well recognized in the community as documented by the large number of invited talks (128 for the years 2008 to 2010) and by the participation in scientific committees (e.g. scientific council of ILL, ESS, selection committees of FRM II, ESRF, NIST etc.).
- External funding of LLB amounts to about 25% of the total budget. This number, which can be improved in the future, documents the attractiveness of LLB for various national and international research networks.

- Appreciation on the management and life of the research unit

- With CAP2010 and CAP2015, LLB has established a clear roadmap and project structure for instrument renewal.
- The rather recent organization of research along three axes provides an opportunity for a coherent animation of scientific life within the LLB and the elaboration of a long term scientific strategy.
- A risk management system for the instruments and auxiliary equipment is lacking.

- Appreciation on the scientific strategy and the project

- Within each of the three axes, long term scientific projects have been formulated, see corresponding sections in the following chapters.

4 • Appreciation team by team and/or project by project projet

Axis 1 – Strongly Correlated Quantum Materials and Magnetism

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)		-
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	15	15
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	7	3
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)		
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)		
N6: Number of Ph.D. students (Form 2.8 of the application file)	2	
N7: Number of staff members with a HDR or a similar grade	11	11

- Appreciation on the results

Axis 1 is devoted to "Strongly Correlated Quantum Materials and Magnetism". It is animated by J M Mignot and gathers 19 staff members, 7 Ph.D. students and 4 post-docs (2011 numbers). The research made within this axis is highly visible, and mostly at the best international level. Some researchers are clearly leaders in their field: they greatly contribute to the well-known reputation of LLB. With almost 150 publications in peer-reviewed journals, including strong Impact Factor ones (Nature, Science, Nature Physics, Physical Review Letters …), research done by LLB staff of Axis 1 meets the best international standards. This research is mainly done by means of three neutron-scattering techniques: inelastic scattering on triple-axis spectrometers, single-crystal diffraction and powder diffraction. Subjects coveredby this research are connected to the topical major topics in solid state physics: unconventional superconductivity, orbital ordering, quantum magnetism, multiferroicity, etc.

Results on high Tc superconductors are among the most visible ones coming out from LLB. Polarized neutron diffraction on different underdoped cuprates gives strong indications that a magnetic phase which breaks time-reversal symmetry but preserves the lattice translation invariance occurs below a certain temperature, and strongly supports C. Varma's proposition of spontaneous circulating currents at the scale of the unit cell. The corresponding phase seems to be in competition with the superconducting order. Recent inelastic scattering experiments at very low doping reveal that a new quasi-1D electronic phase, liquid-crystal like, may develop below 150 K. On the theory side, convincing calculations have been made along the spin resonance mode scenario of superconductivity, which can explain many experimental features observed in cuprates in tunneling, ARPES, etc. measurements. Recently discovered pnictide superconductors have been studied: the magnetic excitations could be the glue for pairing in these compounds.

Geometrical magnetic frustration in pyrochlore lattice has been extensively studied with great success at LLB. By changing the rare earth R in $R_2Ti_2O_7$ systems, different exotic magnetic phases such as spin liquids and spin ice develop at low temperature, with intriguing excitations like monopoles. By applying a magnetic field or pressure, one can change the magnetic ground state in these systems. LLB researchers are worldwide experts in this complex and subtle physics where small perturbations can generate huge changes in the behavior of these frustrated systems.

Compounds based on manganese oxides have been studied at LLB. Some of them display a multiferroic behavior where magnetism and ferroelectricity are coupled. In hexagonal $RMnO_3$ (R stands for different rare earth atoms), a giant magnetoelastic coupling has been evidenced by neutron diffraction and inelastic neutron scattering experiments,

together with a strong correlation between atomic position of the given rare earth and the type of magnetic order observed. On the other hand, a hybrid dispersive wave corresponding to new excitations (called electromagnons) has been successfully discovered through inelastic scattering experiments. On colossal magnetoresistance compounds like La_{1-x} (Sr or Ba)$_x MnO_3$, recent studies focused on the x=1/8 doping, and showed that quantized spin waves in ferromagnetic clusters in the matrix can explain the observed insulating behavior.

4f electron systems provide a rich variety of behaviors and phases, which have been studied at LLB. Besides the well-known heavy fermions metallic compounds, new systems like skutterudites and hexaborides have attracted attention, since multipole orders can develop because of the strong coupling between spin and orbital degrees of freedom. A series of compounds with different ground state multiplets (corresponding to different rare earth elements) have been studied successfully.

A combination of neutron scattering experiments and simulations provides evidence of "blue magnetic phase" in MnSi, analogous to the blue phase of chiral liquid crystal.

Axis 1 also leads to research-driven method development, which then provides access to new types of information for general users. A highlight in this respect is the development of polarized neutron diffraction techniques to access local anisotropic susceptibility tensors.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

- With 18 invited contributions to international Conferences in 3 years, the research activities of Axis 1 are highly visible and meet the best international standards.
- Axis 1 is led by high level scientists, some from outside France, with an excellent international reputation. A certain difficulty exists for all LLB in the recruitment of thesis students, which could possibly be overcome with more formalized links to universities. Additional funds from the French ANR and the local RTRA "Triangle de la physique" show that the research at LLB is a well recognized activity.
- Long term partnerships with foreign groups (providing samples or doing neutron scattering experiments) have been built. These collaborations are solid, with high level partners, and involve all the continents.

- Appreciation on the scientific strategy and the project :

Projects of Axis 1 are on-line with their recent research. LLB staff proposes a detailed list of experiments they are willing to do in the near future. It is clear that their projects are carefully thought through. In the longer term, they want to investigate artificially structured magnetic materials, in particular to study magnetic excitations in such confined geometries. New development of the spectrometers will be made (cf instrumentation part).

- Conclusion :

  – Summary

This short summary of the research activities shows the broad variety of domains covered within Axis 1. The clever combination of the three experimental techniques reported above enables to describe in great detail the magnetic behavior of complex systems. Results on high Tc cuprates are the most widely known, and there is no doubt that this research will stay at the international leading edge. The work on magnetic frustrated systems is original and at the best international level: it is also a strength in LLB's research.

Recent focus put on ferroelectric compounds is really interesting and challenging: coupling with work made on thin films (Axis 2) must be encouraged. Long term research on different magnetic systems like CMR manganites, 4f heavy fermions and Kondo like systems or exotic magnets needs obviously neutron scattering experiments. LLB's output in these domains is very good.

– Strengths and opportunities

- High quality research, often at the best international level
- Leader in some topics like HTc cuprates or frustrated systems
- Good reactivity when new interesting materials appear (like pnictides for instance)
- Partially very good equipment to perform their experiments
- Very good connections with teams providing samples.

– Weaknesses and threats

- Some instruments used by the group are ageing and urgently need an upgrade
- A complementary TOF spectrometer for overview studies of excitations in single crystals is lacking. The project Fa# would fill this gap but its realization requires additional funds besides the LLB budget (see instrumentation part).
- Challenging experiments with extreme sample environment (high pressure, high field, low temperature) depend on a small group of experienced people

– Recommendations

- The instrument upgrade program should be vigorously pursued and appropriate staffing for the service groups has to be ensured

Axis 2 – Materials and Nanosciences - Fundamental Studies and Applications

• Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	1	-
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	17	17
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	9	6
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)		
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)		
N6: Number of Ph.D. students (Form 2.8 of the application file)	6	
N7: Number of staff members with a HDR or a similar grade	11	9

• Appreciation on the results

This axis covers research in materials science in a very broad sense, from nano-objects to glass formers and liquids. This research encompasses fundamental research and applications and exploits a very wide range of experimental facilities available at LLB, including small angle neutron scattering, single crystal diffraction and incoherent quasielastic neutron scattering. The quality and impact of the fundamental research undertaken in this axis can, for example, be illustrated by the study of the electric-field-induced spin flop in $BiFeO_3$ single crystals with the first proof of a magneto-electric coupling (published in Phys Rev Lett with already 82 citations in 2 years). Research in collaboration with industrial companies undertaken in this axis is also a strength of the team. Indeed several excellent projects have been performed that exploit the unique properties of neutrons, for the characterization of

heterogeneities, precipitation processes and ageing under irradiation, all phenomena which are important for understanding mechanical properties and processing of metallurgical composites or alloys of nuclear interest. This activity must definitively be encouraged.

The quality of the scientific production is excellent with more than 150 papers published in international journals of high impact factor (some published in the top journals in physics and physical-chemistry) and a large number of communications at international meetings. Unfortunately the number of thesis defended within this axis is small; LLB being not well integrated within the local educational programmes.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The reputation of the staff members is high with 21 invited communications in international conferences during the last 2 years. In addition, the researchers in this axis are capable of obtaining substantial financial support from the local (C'nano, RTRA) and national (ANR) agencies. Several contracts and Ph.D. grants with major international companies have been obtained as well as patent applications. The committee has also noticed the strong interactions with the other CEA Divisions, in particular with the Nuclear Energy Division for nuclear materials.

As expected for a large facility such as LLB, the scientific collaborations involve a large number of laboratories, with a fair distribution between national (77) and international (54) teams. All in all, the impact of the research in this axis is high and the skills of its members are well recognized both at the national and international levels. The research activity in this axis has clear concrete results with socio-economic partnerships.

- Appreciation on the scientific strategy and the project

The scope of axis 2 should be better emphasized to gain visibility. Several topics are common with the two other axes (for example "Multiferroic materials" with axis 1 and "Polymer reinforcement by nanoparticles" with axis 3) pointing at a weakness concerning a common strategy. Certainly axis 2 is more concerned with materials that are potentially interesting for applications being involved directly with industrials companies in applied research (metallurgy for example). The total number of young researchers (Ph.D. and post-docs) is quite low compared to the number of permanent staff. However the members of the team have made efforts for recruiting Ph.D. students in co-direction and post-docs funded by ANR or CEA and this should be also encouraged.

The projects are continuation of the lines of research described for the last four years, but with some modifications, which are well justified. Very interesting new methodological developments are planned to reconstruct the magnetic structure of a nano-object or to exploit the new in-house 2D high resolution detector Barotron to characterize and study intermolecular interactions in anisotropic fluids.

- Conclusion:

  – Summary

In summary the research within axis 2 encompasses fundamental studies and applications in a quite wide range of systems. The scientific production is excellent and at the frontline of international research. The impact of this research at all levels is high, the team members being well recognized internationnally for their competence. This basic research often leads to applied research collaborations which are implemented through contracts with industrial compagnies. However the scope and coherence of axis 2 should be better emphasized to gain visibility.

  – Strengths and opportunities

Researchers in axis 2 exploit and develop highly sophisticated neutron scattering methods for studying materials and specifically heterogeneous systems. A major strength of this activity is in its strategy towards integrating applied aspects in its research. Partnerships with major companies already exist and the development of the campus at Saclay could certainly be an opportunuity to reinforce the activity of axis 2 within the socio-economic context.

On the instrumentation side, the SANS is a very powerful tool, recognized and increasingly applied in metallurgical studies. The development of a new diffractometer Super 6T1 for measuring the texture and the stress will be a great asset for this team

– Weaknesses and threats

Because LLB is a large facility the "Materials and Nanosciences" axis is involved in the study of many different systems. In addition these studies are sometimes also undertaken in the other axes at LLB. It is therefore difficult to find a common goal and a visibility in the scientific strategy. A major risk is related to the small number of Ph.D. students and post-docs together with planed retirements of staff members. The understaffing of axis 2 is a common problem in all the LLB activities.

– Recommendations

The research quality in axis 2 is already very high but the visibility of the axis should be improved by defining clear common targets that embrace and mobilize all the team members. While certain links to the other axes are natural, axis 2 could increase its visibility by focussing on its specificity: projects where both fundamental and applied aspects are present. Thus, the effort towards applications must be maintained to attract new industrial partners.

Axis 3 – Soft Matter and Biophysics

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)		-
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	13	13
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	13	8
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	1	1
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)		
N6: Number of Ph.D. students (Form 2.8 of the application file)	8	
N7: Number of staff members with a HDR or a similar grade	8	7

- Appreciation on the results

The research in soft matter at LLB has been at the frontline of international research since the milestone experiments on the conformations of macromolecules. It exploits the possibilities offered by neutron scattering for multicomponent systems through the use of contrast matching. This is timely, since multicomponent systems are now attracting increasing attention in the soft matter community. The committee has appreciated the presentation of recent success stories on hard-soft composites (mineral particles dispersed in a polymer matrix), which have relevance to fundamental questions (what is the extent of connectivity in composite materials) but also to applications (reinforcement of elastomers for car tires and for silicone sealants). The story is not finished, and much work remains to be done to have a real impact of our understanding of the effect of dispersed particles on the mechanical properties of the matrix.

The committee also appreciated other success stories such as the nanoparticle surface assembly through the clever use of polymer dewetting from the surface. This work was reported in an impressive set of publications. Capillary shaping of solutes is a very active field at present, and a continued involvement of LLB with leading groups in this area would be a great opportunity.

A further project investigated the so-called 'corset effect' which is concerned with the dynamics of polymers in confinement. This is an extremely careful and very interesting study which follows the tradition of LLB. It yielded very

important results as well as an unexpected by-product: an improvement of battery design, possibly with a very significant technological impact.

Another highly innovative work was the synthesis of nanoparticles with an optical signature (localized surface plasmon resonance) that can be tailored through grafted macromolecules. This work resulted from collaboration with another group from CEA, a group at the University of Lyon and one in Helsinki. Similarly, there have been many other very successful projects, such as the synthesis of nanocomposites for biology, and the studies of self-assembled systems made of peptides or block copolymers.

Thus, it appears that LLB has built a very strong competence in the design and characterization of assemblies of nanoparticles and polymers, giving access to the structure-function relationship of these materials. The researchers are also well-connected with the scientific community and can profit from very fruitful and productive collaborations (see also below). The quality and quantity of the scientific output, i.e. publications and communications, is very high. There would be mutual benefits if these research efforts were integrated within a strategy of LLB teams working in soft matter.

Finally, there is a remarkable activity in Biophysics, centered on the interaction of proteins with their environment, including the study of protein hydration and its relation with water structure and dynamics. These studies contribute to our understanding of the behavior of biomolecules in crowded environments as they exist, e.g., in living cells. It is clear that this work is of the highest quality and at the frontline of international research.

Overall, this is an excellent set of scientific results.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The committee found that the teams that compose Axis 3 are excellent and highly regarded internationally. This appreciation is supported by the existence of collaborations with some of the best soft matter groups abroad, and it is consistent with the substantial number of invitations to international conferences and symposia for permanent researchers of Axis 3. LLB teams of Axis 3 do take part in international and national scientific networks, but they do not have a central position in these networks.

Also, the research is not sufficiently strongly linked to teams that work downstream on concrete applications (links to industry are weak)

LLB has recruited excellent postdocs and Ph.D. students. However, the ability to recruit a sufficient number of post-docs and students is limited by the lack of funding, and this is a weak point that needs urgent action. The LLB groups are not very successful at attracting competitive funding, to a large extent because funding agencies assume that they enjoy full financial support by CEA and CNRS. The committee sees as a serious problem the fact that CEA and CNRS claim to fully fund LLB, but in reality provide budgets that amount to serious underfunding.

It is very surprising that, with so many collaborations with outside groups belonging to CNRS and/or universities, LLB Axis 3 researchers are not associated to the grants those outside teams might get.

- Appreciation on the scientific strategy and the project

The current projects address major issues in soft matter and in biophysics. They take advantage of the unique capabilities of LLB, and focus on routes that other laboratories in France could not take. There are, however, two weak points in the organization of this research effort and in the quality of partnerships. One weak point is the apparent lack of integration of the sub-teams within axis 3: the committee has not seen sufficient evidence of efforts aimed at making these different projects converge at some point in the future. It is not clear whether some of those projects will enjoy stronger support within Axis 3 (soft matter) or within Axis 2 (materials). In any case, it is necessary to re-examine periodically which associations of researchers provide them with the best scientific interactions.

The committee was concerned with the lack of strong vertical partnerships with other teams outside LLB: the LLB researchers are involved in many national and international collaborations, but the committee has not seen evidence of a strong integration with teams involved in research upstream (selection and definition of the materials science problem) or downstream (evaluation and application of the consequences of the discoveries made by LLB). To some extent, this looks like a “make your own sample, publish and forget” policy. This might be due to the fact that the LLB also operates as a user facility and is thus partially user-driven. Furthermore, the directorate is appointed for

a limited time and the funds and positions are not committed and secured on a long-term basis. Nevertheless, it would be nice to see some collective brain storming on questions such as “where do we want to go in materials science and what do we want to get out of it” or “what are the central issues that we can solve in biophysics and what will be the impact on our colleagues in biology”.

- Conclusion :

  – Summary

The research in Axis 3 has produced a brilliant set of results and publications on very diverse systems, including soft-hard composites, nanoparticle assemblies, self-assembled surfactant or block copolymer structures, protein-polyelectrolyte complexes and proteins surrounded by repelling macromolecules.

There is a risk that this research will be spread too thin, on too many systems, and miss opportunities of convergence between different projects within LLB. There is also the opposite risk, that this research will remain mainly a LLB affair, at the expense of vertical integration with other French or foreign teams that perform related research upstream or downstream from Axis 3 research.

  – Strengths and opportunities

The research groups in axis 3 combine competences and techniques that are rarely found elsewhere: they can synthesize composite materials at the nanoscale, characterize their structure with different contrasts that enhance different components within the material, and they have demonstrated that they can go all the way to the structure-function relation of the material. The planned SANS upgrade, the planned TOF and upgraded Spin Echo spectrometer, enhance these opportunities as they address the needs of the soft matter community.

  – Weaknesses and threats

For the soft matter groups, there is a risk of dispersion on the study of too many materials. This is inherent to the fields of materials science, colloids and self-assembly. For the biophysics group, there is a risk of isolation from the teams who perform the best research in structural biology and in biophysics. These risks would be greatly enhanced by a reduction in number of staff members due to retirements or departures for other laboratories.

  – Recommendations

The teams of Axis 3 have the potential of becoming a « National center for the study of nanocomposites ». This would require actions in 5 directions:

- (i) A better integration of the teams within Axis 3 and the demonstration that they can make their efforts converge on joint topics of common interest.
- (ii) Stronger links with other research groups that perform research upstream or downstream from the research performed at LLB (vertical integration).
- (iii) A large increase of external funding through “systematic responses” to ANR calls, European projects and other project-based funding.
- (iv) A substantial increase in the number of students and post-doctoral researchers and some long-term commitment securing the corresponding positions as well as staff positions.
- (v) Attracting long term (2 - 5 years) visitors that have a unique competence in the fields of research that are central to Axis 3.

Title of the team : Instrumentation activities

- Staff members

	Past	Future
N1: ~~Number of researchers with teaching duties (Form 2.1 of the application file)~~		-
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	1	1
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	0	0
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	5	4
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	0	
N6: ~~Number of Ph.D. students (Form 2.8 of the application file)~~		
N7: ~~Number of staff members with a HDR or a similar grade~~		

- Appreciation on the Instrumentation activities

Since its creation in the early 1980's the Laboratoire Léon Brillouin enjoys an excellent reputation in the field of neutron scattering based on an outstanding scientific output. Science has been the focus of this CEA-CNRS facility also because CNRS does not reward activities related to instrumental and methodological developments.

This lack of incentive for scientists to engage in instrumentation in conjunction with the obvious low level of funding and human resources has led to a certain stagnancy in the instrumental development at the LLB, over a period where impressive and continuous gains in neutron flux and experimental capabilities have been achieved at other facilities.

The original instrument suite of the LLB matched the needs of magnetism and polymer research as it included, besides the diffractometers, 5 triple axis spectrometers (TAS) and 4 small angle scattering (SANS) instruments. These instruments led to the high scientific output acknowledged in this report. However, over the years the instruments were not renewed and most of them are no longer up to date. In the mean time a TAS and a SANS were turned down and the remaining SANS are not really competitive. The upgrade and renovation of the aging instrumentation is therefore of crucial importance for the LLB to keep its position in the "world league" of neutron centers.

The LLB did not have an instrumentation program before 2005. In these years the instrumentation activities were mainly focussed on specific fields such as diffraction under high pressure, where the laboratory holds the world record, or neutron optics and reflectometry. In the latter the laboratory has a long tradition of innovation and its international visibility is acknowledged by the fact that Frédéric Ott co-ordinates the Neutron Optics Joint Research Activity (JRA) within the EU FP7 - NMI3 from 2009 to 2011.

The situation has changed with the introduction in 2005 of the instrumentation program CAP2010, and of CAP2015 in 2008. In the process of defining these programs the instruments were assessed and the needs were defined also with the user scientific community resulting to the financial support of the CAP2010 projects 6T2 by the Rennes Metropole and 3T2 by the Aquitaine Region. A clear project structure and progress monitoring have been established, which take into account the budget and manpower constraints. The resulting instrumentation programs give a development impetus and define the medium term strategy of the facility.

The Instrumentation activities, however, suffer from the low budget, as they are financed from the running (normal) budget without any additional funds. In most cases existing instruments are refurbished and upgraded on the basis of a very low budget. Partially, priorities for instrument upgrades have been set by the very limited resources available and not by scientific arguments only. Nevertheless, the gains in neutron intensity and functionality are impressive. Examples from CAP2010 are the Very Intense Polarized Neutron Diffractometer (VIP), or Super 6T2, two

very competitive instruments adapted to the needs of Axis 1. CAP2010 and CAP2015 include an ambitious project, the multi-angle option of the Resonance Spin Echo instrument MUSES, for high resolution dynamical studies in biology and soft matter within Axis 3.

Building completely new instruments from scratch requires more resources and for this reason the number of these projects is limited. CAP2010 included the very Small Angle Scattering instrument (SANS) TPA, which is now at the end of the commissioning phase. CAP2015 bears more ambitious projects such as PA20, a new high throughput SANS. This is a most important project, which will rejuvenate the aging SANS instrument suite. Another important project is Fa#, a state-of-the-art Time-Of-Flight spectrometer. Both projects are essential for LLB to remain competitive with other neutron centres. They are large projects, which will address the needs of both the hard matter and soft matter communities. However, the costs exceed the financial capabilities of the LLB and Fa# cannot be realized without additional funds.

- Appreciation on the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

Both CAP2010 and CAP2015 started with an assessment of the instrumentation park and a consideration of the needs of the user community. These processes intensified links at the national and international levels.

Through the instrumentation programs the LLB has increased its activities in the field of neutron instrumentation, which has led to a stronger international presence and higher visibility within the neutron community. The traditionally strong connections with some neutron centres, like the ILL in Grenoble, are now complemented by new contacts with the synchrotron source SOLEIL or the European Spallation Source (ESS) in Lund. In this context the recently signed French-Swedish co-operation agreement is a big opportunity for the laboratory.

In spite of the limited resources, the LLB made a remarkable effort in the field of instrumentation and has obtained appreciable results during the last years. However, the large majority of the scientists actively involved in the field of instrumentation are CEA employees. Due to the low rating of these activities by the CNRS, CNRS scientists often refrain from getting actively involved into instrumentation projects. For young scientists having an instrumentation project to get a permanent position at CNRS turns out to be very difficult.

The LLB plays an important role within most of the JRAs of the EU FP7 - NMI3. In addition, A. Brulet will co-ordinate the new SoftBioMaterials JRA from 2012 to 2015 and as mentioned above F. Ott co-ordinates the Neutron Optics JRA from 2009 to 2011.

- Appreciation on the scientific strategy and the project

Both CAP2010 and CAP2015 are of crucial importance for the existence of the LLB. They maintain its national and international visibility and the high level and competitiveness of the scientific output. These programs reflect the medium and long-term strategy of the laboratory and ensure its future.

The results obtained so far are impressive, and this should be attributed to a targeted allocation of resources, the originality of the approach and the efficient management of the projects.

- Conclusion:

  – Summary

The committee acknowledges the high quality of CAP2010 and CAP2015, which bring a new energy to the facility and are vital for securing its survival on the long term. Through these programs the LLB has conceived a medium term strategy with a series of successful instrumental projects. However, the limited resources lead to targeted actions and often involve projects with the highest possible return within the budget constraints.

  – Strengths and opportunities

The laboratory enjoys strong connections with the European Neutron Scattering community through the NMI3 collaborative network, where it co-ordinates two Joint Research Initiatives. In addition new opportunities arise through the collaboration with SOLEIL and ESS and through the Swedish-French co-operation agreement.

The enthusiastic and creative scientific and highly skilled technical staff of LLB is a key component in the implementation and success of CAP2015. This program will greatly improve the capabilities of the laboratory and will secure its future.

– Weaknesses and threats

The Instrument development program CAP2015 requires additional funds, which cannot be found without strong lobbying and some political pressure pushing the value of neutrons in national scientific objectives.

The anticipated retirement of some of the scientific and technical staff may threaten the realization of these plans.

There is a misbalance between the situation of CNRS scientists on one side, who are mainly judged by their organization for doing science, and CEA scientists on the other side, who are also involved in instrumentation and user service projects.

– Recommendations

Both funding agencies, CEA and CNRS, should put the highest priority on the replacement of retiring staff and on the funding of CAP2015, which should be secured and committed on the long term as soon as possible. The realization of this instrument renewal program is vital for the LLB. Particular weight should be put on the realization of the high throughput small angle instrument PA20. Funding should also be found for the planned Time-of-Flight Fa#, which will serve soft matter as well as hard condensed matter communities.

The committee recommends that CNRS finds ways to acknowledge in an appropriate way the involvement of LLB staff in instrumentation projects. This may be done by including appropriate headings in individual reports as is done for research administration and teaching.

Title of the team : Service activities

- Staff members

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	1	0
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	38	36
N3: Number of other researchers including postdoctoral fellows (Forms 2.2, 2.4 and 2.7 of the application file)	27	17
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	17	14
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	1	
~~N6: Number of Ph.D. students (Form 2.8 of the application file)~~		
N7: Number of staff members with a HDR or a similar grade	26	23

- Appreciation of the user service

The LLB is a large scale facility that is recognized in the French roadmap for neutron scattering. With its long experience, this French infrastructure offers high quality access to a large and competitive suite of neutron instruments for the benefit of the national and international scientific communities. This service activity, which is the main mission of LLB, includes the construction and operation of the instrument suite around the 14 MW ORPHEE

reactor, the welcome and the assistance of guest scientists before, during and after their beam time, and the promotion of neutron scattering and training in the different techniques.

The committee has recognized the quality of the user service, in spite of the obvious understaffing and underfunding of the facility. The committee is convinced that such a high level could not have been reached if LLB researchers did not also perform high level research (see above) while maintaining strong connections with a well trained and strongly committed scientific community. Thus, all activities of the laboratory are closely intertwined and can hardly be assessed independently.

The beam time is allocated after an evaluation of the proposals by a Selection Committee which meets twice a year. This committee is composed of 31 members (half from abroad) and is organized in five subsections. The distribution between the themes is as follows: 41% for magnetism and superconductivity, 21% for the material sciences, 17% for physical chemistry, 12% for structure determination and 8% for biology. Around 80% of the proposals are accepted with some reduction of the beam time (66%). The different experiments thus cover all relevant areas of science. However, only a few experiments are dedicated to industrial applications and the corresponding funding is very low.

An important specific feature of the LLB is that there is no special treatment for the in-house experiments. All projects of LLB members are submitted to the same evaluation as external proposals. This must surely contribute to the high quality of the LLB research.

Despite variations of the number of days available annually for neutron experiments, the demand remains strong at around 500 proposals per year. There has been continuous growth since 2004, which is probably a result of increased commitment by the LLB staff. There has been particularly strong demand for SANS, triple axis and structure powder diffractometers.

62% of beam time is allocated to the French community, which is typical for a national center, especially since in-house experiments are included in this fraction. Of the remainder 20% have a spokesperson from LLB and 10% are in close collaboration with the LLB, which means that of the beam time dedicated to outside users, approximately half is allocated for French scientists and half to the international community (mainly European countries). This appears to be a very healthy distribution of the beam time. The European experiments are supported by the European access program NMI3 and the LLB is recognized as a large facility by the European Union.

There have been a high number of new users (around 20 % of the authors of recent experimental proposals have never participated to a previous experiment) and this is a very positive sign of the interest of the user community. The communication activities and specific training (HERCULES Schools and FANS of LLB) play an important role in this success.

Every year, the LLB provides about 180 days of neutron beam time (reactor operation) on 21 instruments, which is similar to the average of other major facilities. During reactor operation, the rate of use of the instruments is very high at more than 80% for 14 of them and around 60% for the others. This availability rate is remarkable considering the low number of scientific and technical staff involved in this activity: 0.03 permanent staff per operating day and instrument (compared to 0.07 at ILL and ISIS, 0.06 at SINQ).

Moreover, it is important to note that the logistics of the user service must take into account the constraints of working in a nuclear facility and in a CEA center.

- Appreciation of the impact, the attractiveness of the team and of the quality of its links with international, national and local partners

The LLB compares very well with other neutron facilities, especially when one takes into account the material and human resources. For example, regarding the number of publications per year, the LLB is ranked third among the worldwide neutron centers. This position is further improved if it is normalized either by the number of instruments or by the number of permanent employees. If we consider only the top 10% most cited papers in physics, LLB remains in 4th place. The attractiveness of the facility is reinforced by the organization of several workshops, schools and international conferences.

In conclusion, the service activity of LLB reaches quantitatively and qualitatively the level of major neutron facilities.

- Conclusion:

  - Summary

The service activity of LLB is a long tradition, which has been maintained at a high level of quality by the staff. Several indicators such as the increase in the number of proposals, the turnover of the community, the number of publications, the availability of instruments… demonstrate the effectiveness of this activity.

  - Strengths and opportunities

The staff enthusiasm associated with the creativity of researchers and the skills of the technical staff are strong assets for the future of the facility.

The quantitative and qualitative levels of publications compared to others facilities and the excellence of the scientific output bring a good visibility to these activities.

LLB is very active in the life of the neutron user community through actions such as schools (HERCULES) and training for new users (Fans of LLB). This last action is essential for the renewal of the community.

The reliability of the reactor has been assessed and the functioning guaranteed for the next ten years (assuming the reactor will successfully pass the stress test put into effect after the Fukushima disaster).

The NMI3 collaborative network, which will complete in January 2013, offers unique opportunities for accessing the facility in particular for European researchers.

  - Weaknesses and threats

The major weakness of the user service comes from the obvious understaffing and underfunding of the facility. Understaffing affects not only the scientists, who act as scientific local contacts, but also the technical staff affected to the instruments and to the central services (electronics, software, sample environment…).

There exists no up-to date web-based system for handling visitor invitations comparable to e.g. the "visitor club" at ILL. As way of example, receiving an invitation from the user office for scientists from abroad can be a tedious procedure.

The access limitations due to CEA regulations also create strong constraints in the organization of the user activities in a facility, which runs over night and week-end.

  - Recommendations

The committee has recognized the high quality of scientific and technical activities for the benefit of users and the strong involvement of LLB personnel to serve the scientific community. In order to keep this high quality level, it is important to upgrade the instruments as it is planned in the CAP 2015 project and at the same time preserve the funding for the running costs.

LLB is encouraged to work closely together with the other European neutron centers in the NMI3 framework to establish an up-to-date web based system for handling of proposals, visitor invitations, reporting etc.

The CEA and CNRS must allow LLB to perform its tasks under the appropriate conditions. For this, an increase in technical staff seems necessary and the number of researchers should be at least maintained constant, despite the several retirements expected in the next few years.

Last but not least, some flexibility in the access of the laboratory within the CEA campus would be beneficial in promoting the laboratory and the use of neutrons. This would open up the scientific life and would facilitate the local contact task of the LLB scientists during the experiments.

Notation

Cette unité n'a pas fait l'objet d'une notation.

Direction des sciences de la matière

énergie atomique • énergies alternatives

Monsieur Pierre Glorieux
Directeur de la section des Unités de recherche

AERES
20 rue Vivienne
75002 Paris

Saclay, le 31 Août 2011

N/Ref: DSM/DIR/2011-0825/PRC/CPe

Objet: Observations de la Direction des Sciences de la Matière du CEA et de l'Institut de Physique du CNRS sur le rapport d'évaluation du Laboratoire Léon Brillouin (LLB)

Monsieur le Directeur,

Vous m'avez transmis le rapport préliminaire d'évaluation du Laboratoire Léon Brillouin (LLB). Je tiens tout d'abord à remercier l'AERES, au nom des deux tutelles du LLB, le CEA et le CNRS, d'avoir accepté d'évaluer cette unité hors vague, ce qui nous permet de faire un bilan à mi-parcours de la mise en place de la politique de la nouvelle direction. Cette évaluation revêt également un autre caractère exceptionnel, puisqu'elle correspond à la première évaluation par l'AERES d'une Très Grande Installation de Recherche.

J'associe également les remerciements des tutelles à ceux que la Direction et les personnels du LLB tiennent à adresser aux membres du Comité d'évaluation pour l'ensemble du travail réalisé et pour la qualité des échanges qui ont eu lieu lors de la visite.

Nous prenons bonne note des recommandations du Comité et vous assurons que la plus grande attention sera portée à la mise en œuvre des actions permettant de les suivre. Dans le contexte budgétaire actuellement difficile pour les TGIR, les appréciations très positives et l'analyse du Comité constitueront un outil précieux pour soutenir les projets du laboratoire.

Je vous prie de croire, Monsieur le Directeur, à l'expression de toute ma considération.

Yves Caristan
Directeur des Sciences de la Matière

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