



Institut NEEL

Rapport Hcéres

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HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

HCERES report on research unit:

Institut Néel

Under the supervision of
the following institutions
and research bodies:

Université Joseph Fourier – Grenoble – UJF

Centre National de la Recherche Scientifique – CNRS

Grenoble INP

HCERES

High Council for the Evaluation of Research
and Higher Education

Research units

In the name of HCERES,¹

Didier HOUSSIN, president

In the name of the experts committee,²

Jean-Marc BERROIR, chairman of the
committee

Under the decree No.2014-1365 dated 14 november 2014,

¹ The president of HCERES "countersigns the evaluation reports set up by the experts committees and signed by their chairman." (Article 8, paragraph 5)

² The evaluation reports "are signed by the chairman of the expert committee". (Article 11, paragraph 2)

Evaluation report

This report is the result of the evaluation by the experts committee, the composition of which is specified below.

The assessments contained herein are the expression of an independent and collegial deliberation of the committee.

| | |
|--|-------------------|
| Unit name: | Institut Néel |
| Unit acronym: | |
| Label requested: | UPR |
| Present no.: | 2940 |
| Name of Director (2014-2015): | Mr Alain SCHUHL |
| Name of Project Leader (2016-2020): | Mr Hervé COURTOIS |

Expert committee members

| | |
|----------|---|
| Chair: | Mr Jean-Marc BERROIR, École Normale Supérieure de Paris |
| Experts: | Mr Jacek ARABSKI, Université de Strasbourg |
| | Mr Alberto BRAMATI, Université Pierre et Marie Curie |
| | Mrs Maria CHAMARRO, Université Pierre et Marie Curie |
| | Mr Bernard DECONIHOUT, Université de Rouen |
| | Mr Christophe DELERUE, Institut Supérieur de l'Électronique et du Numérique |
| | Mr Christian ENSS, Universität Heidelberg, Kirchhoff-Institut für Physik, Germany |
| | Mr Gwendal FEVE, Université Pierre et Marie Curie |
| | Mr François GALLET, Université Paris - Diderot |
| | Mr Bernard GIL, Université de Montpellier |
| | Mr Karol HRICOVINI, Université de Cergy-Pontoise (représentant du CNU) |
| | Mr Stéphane JOBIC, Université de Nantes |

Mrs Agnès MAITRE, Université Pierre et Marie Curie

Mr Frédéric MILA, École Polytechnique Fédérale de Lausanne, Switzerland

Mr Frédéric N'GUYEN VAN DAU, CNRS / Thalès, Palaiseau

Mr Xavier OBRADORS, Consejo Superior de Investigaciones Científicas (CSIC), Spain

Mr Sylvain RAVY, Université Paris - Saclay

Mr Dimitri RODITCHEV, École Supérieure de Physique et de Chimie Industrielles de la ville de Paris

Scientific delegate representing the HCERES:

Mr Serge BOUFFARD

Representatives of the unit's supervising institutions and bodies:

Mr Didier BOUVARD, Grenoble INP

Mr Johann COLLOT (directeur de l'École Doctorale n°47 Physique)

Mr Giancarlo FAINI, CNRS - Institut de Physique

Mr Niels KELLER, CNRS - Institut de Physique

Mr Yassine LACKNECH, Université Joseph Fourier

Mr Gérard MEUNIER (directeur-adjoint de l'École Doctorale n°220 EEATS)

1 • Introduction

History and geographical location of the unit

Institut Néel is a fundamental research laboratory in condensed matter physics located in the Polygone Scientifique of Grenoble. It has been founded in 2007 through the fusion of four laboratories (Centre for Research on Very Low Temperatures, Laboratory for the Study of Electronic Properties of Solids, the Crystallography Laboratory and Louis Néel Laboratory), and a few teams coming from other laboratories.

The laboratory is organized in three strongly interacting scientific departments, each of them involving research teams and technological groups:

- the NANO Department (NANO) is dedicated to nanoscience, meaning physical properties of nanoscale objects and their implementation for applications in energy, information, technology and biology;
- the Condensed Matter - Low Temperatures department (MCBT) is focused on research of new states in condensed matter, new phases of helium isotopes and development of original instrumentation, in particular for the benefit of other scientific fields such as astronomy, fluid mechanics, or biophysics;
- the Condensed Matter Materials and Functions Department (MCMF) develops crystallographic or spectroscopic studies, design and elaboration of functional materials for energy, spintronics, catalysis, magnetism, optics, superconductivity and biophysics.

Management team

- Mr Alain SCHUHL, director;
- Mr Hervé COURTOIS, deputy director and director of the NANO department;
- Mr Pierre-Étienne WOLF, deputy director and director of the MCBT department;
- Mr Alain IBANEZ, deputy director and director of the MCMF department;
- Mr Philippe GANDIT, deputy director and technical director.

HCERES nomenclature

ST2 Physique

Unit workforce

| Unit workforce | Number as at 30/06/2014 | Number as at 01/01/2016 |
|--|-------------------------|-------------------------|
| N1: Permanent professors and similar positions | 48 | 47 |
| N2: Permanent researchers from Institutions and similar positions | 110 | 108 |
| N3: Other permanent staff (without research duties) | 122 | 119 |
| N4: Other professors (Emeritus Professor, on-contract Professor, etc.) | 1 | |
| N5: Other researchers (Emeritus Research Director, Postdoctoral students, visitors, etc.) | 60 | 51 |
| N6: Other contractual staff (without research duties) | 4 | 2 |
| TOTAL N1 to N6 | 345 | 327 |

| Unit workforce | Number as at 30/06/2014 | Number as at 01/01/2016 |
|---|-------------------------|-------------------------|
| Doctoral students | 96 | |
| Theses defended | 146 | |
| Postdoctoral students having spent at least 12 months in the unit | | |
| Number of Research Supervisor Qualifications (HDR) taken | 26 | |
| Qualified research supervisors (with an HDR) or similar positions | 109 | 108 |

2 • Overall assessment of the unit

Global assessment of the unit

The Néel Institute is the largest French laboratory in the field of condensed matter physics. Its scientific production is outstanding and its national and international reputation is very high.

Founded in 2007 by the merger of several laboratories, the institute has gradually developed an efficient and collegial organization, thanks in particular to the quality and dynamism of its management. It now presents a very unique synergy between experimentalists, theoreticians and technological services which allows for the development of original and innovative projects at the forefront of the domain.

The Néel Institute benefits from the particularly fertile scientific environment of Grenoble and of the Rhône-Alpes region while contributing to it in a remarkable way. It has developed many local, national, international or industrial partnerships and has a strong societal impact, with in particular a large effort concerning technology transfer and dissemination of the scientific culture.

The involvement of the Néel Institute in scientific training is important at all levels, especially at the PhD level.

For all the above reasons, the Néel Institute attracts very promising young researchers, which portends a bright future for the laboratory.

Strengths and opportunities in relation to the context

- scientific excellence:
 - outstanding production and visibility of the research teams;
 - strong links between theoreticians and experimentalists;
 - exceptional technical expertise and know-how;
 - high national and international visibility;
 - number and quality of the local, national and international academic and industrial partnerships;
 - high attractiveness for PhD students, post-docs, visitors and young talented researchers;
- exceptional scientific environment:
 - location in the very fertile “Polygone scientifique” of Grenoble (CEA, LNCMI, ESRF, ILL, LabEx Lanef, Nanoscience foundation, GIANT project...);
 - long standing links with the University Joseph Fourier and Grenoble INP. The merging of these institutions into the Université of Grenoble Alpes may simplify research management and enhance visibility of research;
 - new building dedicated to nanosciences with outstanding performances;
- large societal impact:
 - priority given to innovation and technology transfer;
 - strong implication in the dissemination of science;
- organisation and life:
 - proactive leadership;
 - efficient structure with three levels of management (laboratory, departments and teams);
 - collegial internal organisation;
 - quality of the scientific animation;
 - sharing of financial resources.

Weaknesses and threats related to the context

- significant disparity between the departments in the evolution of their size and in their ability to attract PhD students or postdocs;
- critical size of some research activities;
- difficulties for some young researchers to realize the project for which they have been hired;
- obsolescence of some vital scientific equipments and difficulty to find fundings to replace them;
- evolution of the funding of research. The part of recurrent funding is declining quickly as well as the ANR success rate for a fundamental physics laboratory as the Néel Institute (9 projects funded in 2014 against about 18 in previous years). It results in :
 - difficulties to conduct a scientific policy, to develop new activities or to welcome young researchers;
 - individualization of research projects;
 - increasing complexity of the financial management;
 - dramatic increase of non-creative tasks for researchers;
- lack of career prospects in particular for assistant professors and technical staff;
- insufficient involvement of the staff of the institute beyond the board of directors in the development of the Grenoble Alpes University.

Recommendations

The main recommendation is to continue in this way, by maintaining the unique synergy which exists in the Néel Institute between fundamental research at the highest level and innovative experimental developments.

It should be ensured that the undertaken reorganization to rebalance the three departments leads to the development of new collaborations between teams or poles without weakening the existing ones.

The size of some research activities is becoming subcritical, mainly due to retirements. This problem has to be tackled, either by reinforcing these activities or by reorganizing the different teams. One should keep in mind that a strong richness of the Néel Institute comes from the balanced coexistence of nanophysics activities and more traditional condensed matter ones. This equilibrium has to be maintained because it is potentially a source of very fruitful collaborations.

A particular attention must be paid to the welcoming of the new researchers who regularly join the lab. This is especially true for the young researchers, who represent the future of the institute. They should be given the proper conditions to develop the project for which they have been hired.

During the evaluation period, the Néel Institute young researchers have been very successful in the ERC Starting grant program. Surprisingly, despite their very high level, the Néel senior scientists did not apply for the Advanced grant program. Such applications (as well as applications to the recent Consolidator grant programs) should be encouraged since they play a very important role in terms of structuring and funding of the research.

Significant efforts have been made concerning technology transfer and valorization. These efforts must be continued in order to best exploit the huge potential of the Néel Institute in this domain.

Researchers and technical staff must be concerned by the development of University Grenoble Alpes which is potentially very important for the Néel Institute. Actions to involve all the staff in this project should be carried out.