LPS - Laboratoire de physique statistique de l'ENS

Rapport Hcéres

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

Department for the evaluation of research units

AERES report on unit:

Laboratoire de Physique Statistique

LPS

Under the supervision of the following institutions and research bodies:

École Normale Supérieure

Université Paris 6 - Pierre et Marie Curie

Université Paris 7 - Denis Diderot

Centre national de la recherche scientifique

November 2012

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

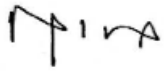
Research Units Department

President of AERES

Didier Houssin

Research Units Department

Department Head



Pierre Glaudes

The president of AERES "signs[...], the evaluation reports, [...]countersigned for each evaluation department by the relevant head of department (Article 9, paragraph 3, of french decree n°2006-1334 dated 3 november 2006, revised).

Grading

Once the visits for the 2012-2013 evaluation campaign had been completed, the chairpersons of the expert committees, who met per disciplinary group, proceeded to attribute a score to the research units in their group.

This score (A+, A, B, C) concerned each of the six criteria defined by the AERES and was given along with an overall assessment. NN (not-scored) attached to a criteria indicate that this one was not applicable to the particular case of this research unit or this team.

Criterion 1 - C1 : Scientific outputs and quality ;
Criterion 2 - C2 : Academic reputation and appeal ;
Criterion 3 - C3 : Interactions with the social, economic and cultural environment ;
Criterion 4 - C4 : Organisation and life of the institution (or of the team) ;
Criterion 5 - C5 : Involvement in training through research ;
Criterion 6 - C6 : Strategy and five-year plan.

With respect to this score, the research unit concerned by this report and its in-house teams received the following grades:

- Grading table of the unit: Laboratoire de Physique Statistique

C1	C2	C3	C4	C5	C6
A+	A+	A	A	A+	A

- Grading table of the team: Mouillage et Nucleation

C1	C2	C3	C4	C5	C6
A+	A+	A+	NN	A	B

- Grading table of the team: Theorie de la Matiére Condensee

C1	C2	C3	C4	C5	C6
A+	A+	B	NN	A+	A

- Grading table of the team: Reseaux Complexes et Systemes Cognitifs

C1	C2	C3	C4	C5	C6
A+	A+	A	A	A+	A+

- Grading table of the team: Physique des Biomolecules

C1	C2	C3	C4	C5	C6
A+	A+	A+	A+	A+	A+

- Grading table of the team: Surfaces Moleculaires Organisees/Molecular Byophysics

C1	C2	C3	C4	C5	C6
A+	A	B	A+	A+	A+

- Grading table of the team: Theorie Non Lineaire des Instabilites

C1	C2	C3	C4	C5	C6
A+	A+	B	NN	A+	A

- Grading table of the team: Morphogene et Phenomenes Multi-Echelles

C1	C2	C3	C4	C5	C6
A+	A	B	NN	A	B

- Grading table of the team: Physique Non Lineaire

C1	C2	C3	C4	C5	C6
A+	A+	B	A+	A	A+

- Grading table of the team: Physique Statistique Hors-Equilibre

C1	C2	C3	C4	C5	C6
A+	A+	B	NN	A	A+

Evaluation report

Unit name:	Laboratoire de Physique Statistique
Unit acronym:	LPS
Label requested:	UMR
Present no.:	UMR 8550
Name of Director (2012-2013):	Mr Eric PEREZ
Name of Project Leader (2014-2018):	Mr Jorge KURCHAN

Expert committee members

Chair:	Mr Jean Louis BARRAT, Laboratoire Interdisciplinaire de Physique, Grenoble (représentant du CNU)
Experts :	Mr Georges BATROUNI, Institut Non-Linéaire de Nice
	Mr Pascal DAMMAN, Laboratoire Interfaces & Fluides Complexes, Mons, Belgique
	Mr Thierry DAUXOIS, École Normale Supérieure, Lyon (représentant du CoNRS)
	Mr Georg MARET, Université de Kontanz, Allemagne
	Ms Laurence SALOME, Institute of Pharmacology and Structural Biology, Toulouse
	Mr Riccardo ZECCHINA, Department of Applied Science and Technology, Politecnico di Torino, Italie

Scientific delegate representing the AERES:

Mr Serge BOUFFARD

Representatives of the unit's supervising institutions and bodies:

Ms Laure BONNAUd (Université Paris Diderot)

Mr Andrea GAUZZI (Université Pierre et Marie Curie)

Mr Yves GULDNER (ENS)

Mr Yves LASZLO (ENS)

Mr Bertrand MEYER (Université Pierre et Marie Curie)

Mr Jean-François PINTON (CNRS)

Mr Bart VAN TIGGELEN (CNRS)

1 • Introduction

History and geographical location of the unit

The statistical physics laboratory (LPS) is a strongly interdisciplinary, medium size research unit. It was created 25 years ago with an original balance between "light" experimental physics and theoretical physics activities. The research directions have evolved regularly over the years. Today the three main research lines are fundamental statistical physics, non linear physics and biophysics.

The laboratory is located in the building of the ENS physics department. It is supported by ENS (for office and laboratory space, funding, technical support from the department and several professor and lecturer positions), by CNRS (for a majority of the research positions, most of the technical staff and funding), Université Pierre et Marie Curie (which provides about 50% of the university positions and some funding) and by Université Paris Diderot (20% of the university positions).

Management team

The laboratory is directed by Mr Eric PEREZ (CNRS) since 2006.

AERES nomenclature:

ST2

Unit workforce

Unit workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**13**	**14**	**13**
N2: Permanent researchers from Institutions and similar positions	**19**	**17**	**17**
N3: Other permanent staff (without research duties)	**1**		
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	**1**		
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	**5**	**1**	**1**
N6: Other contractual staff (without research duties)	**13**	**5**	
TOTAL N1 to N6	**52**	**37**	**31**

Percentage of producers	***96,9%***

Unit workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**14**	
Theses defended	**34**	
Postdoctoral students having spent at least 12 months in the unit*	**23**	
Number of Research Supervisor Qualifications (HDR) taken	**4**	
Qualified research supervisors (with an HDR) or similar positions	**23**	

2 • Assessment of the unit

Strengths and opportunities

The laboratory has an excellent track record of developing the application of statistical physics in a very broad variety of fields, with a nice balance between experiment, theory and computation. The scientific production is excellent, and many senior members enjoy a remarkable recognition at the international level. The laboratory has also shown its ability to evolve and develop new research directions, as illustrated by the spectacular development of experimental and theoretical biophysics in the last decade. The laboratory has excellent collaborations, interdisciplinary as well as within the physics department of ENS. It is funded at a very good level (directly from partner institutions and through many competitive research grants) and benefits from a constant flux of very good graduate students.

Weaknesses and threats

At present, the scientific policy of the laboratory tends to be determined at the level of very small teams, some of which lack scientific cohesion. The laboratory could act more collectively to define its scientific strategy.

The laboratory has lost several very good teams or scientists in the last five years, dominantly in its experimental component. An important element of context is the development in the past decade of several very successful laboratories (some of them being in part “offsprings” of LPS) in the neighbouring universities or schools, in fields that are closely related to those of LPS. This, in combination with severe laboratory space problems, raises the issue of the attractiveness of the laboratory.

Recommendations

The committee recommends that the laboratory compensates the loss of several experimental teams and anticipates coming retirements by attracting a new experimental team in the fields of soft matter or experimental statistical physics. The space vacated by previous departures should be preserved for this purpose. The laboratory members are encouraged to take advantage of the opportunities offered by the developments of the new Labex associated with the ENS physics department.

3 • Detailed assessments

Assessment of scientific quality and outputs

The activities of LPS cover a remarkably broad scientific scope, ranging from experimental biophysics to mathematical aspects of statistical mechanics. In all the fields covered, the teams of the laboratory have made major contributions during the last four years. The scientific production is excellent and numerous (413 publications in peer review journal). It includes a large number of high impact publications, that result from the development of highly innovative research in experiment, computation and theory. The activity is truly interdisciplinary, with, within the last ten years, a very strong and successful development of the interface with biology and medicine. High level publications can be found of course in physics journals, but also in mathematics, biology, cognitive sciences, geosciences... The interactions are strong and fruitful between teams from other disciplines, but also within the local environment of the physics department with theoretical, condensed matter and atomic physics laboratories.

Assessment of the unit's academic reputation and appeal

Many senior researchers of the laboratory have a very high international visibility, as can be judged from a number of indicators: scientific prizes, membership of national academy of science, editorial board memberships. Laboratory members have also been successful in highly competitive international calls (e.g. ERC, HFSP). The number and the quality of invited conferences are excellent, and a large fraction of the permanent researchers are concerned by such invitations. This very high reputation and international visibility of the LPS members should allow them to attract more postdocs funded by external sources such as Marie Curie or Humboldt fellowships, and more visitors on ENS invited professor positions.

In the last five years, the laboratory has been able to attract several young researchers on junior CNRS or university positions. In contrast, a number of confirmed young researchers, with a strong scientific leadership profile, have left LPS to take professor positions in other universities in France and abroad. Such moves are a measure of the general success of the type of research developed within LPS. However, their concomitance results in a less uniform age distribution of the research staff. It also turns out, that the corresponding activities were largely experimental in nature. While no single cause can be identified, it is clear that laboratory space and office space issues (both in terms of quantity and quality) are critical, and that the present scarcity of these resources is detrimental to the overall attractiveness of the laboratory.

Assessment of the unit's interaction with the social, economic and cultural environment

The activity of the different teams is fairly heterogeneous in this respect, as can be easily understood from the large diversity of the research topics. While several excellent initiatives will be noted in the team by team analysis below, clearly the laboratory as a whole does not appear to consider public outreach or valorisation of research results as strong priorities. While it may be difficult to improve this at the level of a relatively small research unit, it seems that the physics department would be the appropriate structure to coordinate and support more initiatives in these directions.

Assessment of the unit's organisation and life

The general organisation pattern is typical for such a medium size research unit, with a laboratory council that represents the different research teams and is consulted by the director on scientific policy issues or on practical aspects of the laboratory life. In particular, an internal call for proposals allows the teams to initiate projects without specific external funding. Other important aspects that are discussed within the laboratory council are the definition of recruitment priorities, and issues related to laboratory space and infrastructure.

Although several activities (seminars, lab's “retreat”) are organized at the level of the laboratory, it appears that most of the scientific life takes place at the level of relatively small teams (typically three permanent researchers), and that much of the scientific policy is also defined at that level. In some cases this organisation in teams seems to be the result of a complex history, rather than to correspond to a scientific reality. Therefore the committee suggests that the definition of a scientific policy at a more coarse grained level would be profitable to the entire laboratory.

The laboratory benefits from support from the department for several technical aspects (in particular computers and computing facilities). It also has its own technical staff for administration and finance, electronics, and a workshop that takes care of most of the needs in terms of mechanical conceptions and realisations. These services are important to the cohesion of the laboratory, and the committee appreciated the importance of maintaining the proximity between the research teams and shared technical services. In view of the important expansion of biophysics activity, a special mention is made of the "biology for physics" platform, which is hosted by the biology department and currently staffed by a single CNRS engineer. A reinforcement of this platform, perhaps at the level of the ENS departments, is highly desirable.

It was already mentioned above that laboratory space issues are critical, even more so in view of the important remodelling of the physics department building scheduled for the 2013-2015 period. It appears very important that the laboratory members are kept informed in "real time" and in the most transparent and accurate way of the manner in which this renovation project will affect the functioning of the experimental laboratories and technical services.

Assessment of the unit's involvement in training through research

The implication of the laboratory members in graduate training is excellent. The number of PhD students (about one student for two researchers on average) is reasonable for a fundamental physics laboratory, and guarantees a good quality of the training. The PhD students belongs mainly (62%) to the "École Doctorale" ED 107 (Physique de la Région Parisienne) but also for 22% to ED 389 (La Physique de la Particule à la Matière Condensée), 4% to ED 223 (La logique du vivant), 4% to ED 474 (Frontières du Vivant), 4% to ED 518 (Matière Condensée et Interfaces) and 2% to ED 381 (Constituants élementaires et systèmes complexes). Most former graduate students of LPS find postdoctoral positions in excellent groups at the international level. The origin of the students is diverse, and illustrates the appeal of the scientific themes of the laboratory, also at an interdisciplinary level. The LPS students have been active in initiating interactions within the physics department (student and postdoc seminar).

Another very positive aspect is the strong implication of senior researchers in organisation of graduate studies at various levels: graduate school, masters degrees, ENS physics department to cite only the most visible responsibilities.

Assessment of the five-year plan and strategy

The committee has appreciated the overall quality of the numerous scientific projects presented by the different teams, which are commented in the team by team assessment below. Concerning general issues relating to the scientific policy of the laboratory, it appears that the present and future direction have well identified key aspects that are essential to preserve the originality and excellence of the LPS. In particular, the committee agrees that there is a very clear need to fill the gap (in terms of scientific activities and of age distribution) left by the recent departures of several experimental groups or researchers, and to anticipate the retirement of several scientific leaders within this decade. The current ideas to bring in an experimental team in the broad field of soft matter or experimental statistical physics, and to complement the theory activity by bringing in theoretician(s) with a broad range of interests in statistical physics, go into the right direction.

The committee has also appreciated the difficulty of building a scientific policy based on positions opened in partner universities, in a context of competition between several excellent laboratories working on closely related topics. It is therefore very important that the laboratory takes advantage of the commitment clearly expressed by the two main partners (ENS and CNRS) to support the installation of new team(s). The requirements of excellence and originality with respect to the broad scientific environment are of course challenging, but consistent with the track record of the laboratory.

The availability of laboratory space is obviously a critical issue for the development of a new experimental activity. The committee strongly encourages the idea that a significant part of the space that has been vacated recently must be preserved for the installation of new experimental teams on a relatively short time scale, a priority for the laboratory.

More generally, it seems that the perspective of the renovation project has led many teams to adopt a "wait and see" attitude with respect to possible developments of the laboratory. The committee would like to encourage the researchers to project themselves beyond this three year period, and to take advantage of the many exciting opportunities that are offered by the new structures within the physics department: in particular, attracting new groups on the junior research grants funded by the Physics Labex could be a way of strengthening the laboratory in the long term. A substantial surface of new laboratory space will be available within the physics department after the renovation project is completed, and attributed on a competitive basis to the projects of the different disciplines. Clearly the LPS can find here the potential for a further development of its activities within a five year perspective.

Overall, the committee believes the LPS has a very strong potential to continue developing research at the frontiers of statistical physics. If the laboratory acts in a collective way along the lines that have been proposed by the present and future direction, there is no doubt that it will remain a leading scientific center in this field.

4 • Team-by-team analysis

Team 1 : MOUILLAGE ET NUCLEATION

Name of team leader: Mr Etienne ROLLEY

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**2**	**2**	**2**
N2: Permanent EPST or EPIC researchers and similar positions	**1**	**1**	**1**
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)			
N6: Other contractual staff (without research duties)	**1**		
TOTAL N1 to N6	**4**	**3**	**3**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**1**	
Theses defended	**2**	
Postdoctoral students having spent at least 12 months in the unit	**2**	
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions	**2**	**2**

• Detailed assessments

Assessment of scientific quality and outputs

The most remarkable recent scientific achievement of this team was the discovery of superplasticity in very clean crystals of 4He at very low temperatures. This phenomenon is attributed to the frictionless gliding of dislocations along certain crystallogaphic planes. This unexpected process seems to explain the heavily disputed rotation anomaly of solid 4He and could possibly settle the issue of supersolidity. This is a world leading contribution to the physics of quantum crystals. The exceptional quality of this work is documented by several prestigious awards to the group leader, his call as a member of the French Academy of Science, one ERC advanced grant and 2 ANR grants, as well as an impressive series of publications in high level journals (Nature, Nature Physics, Phys.Rev.Lett...) and many invitations to international conferences.

Excellent work has also been done on the phase diagram and cavitation of water under negative pressure by sophisticated Brillouin scattering experiments under acoustic modulation.

Substantial work has been carried out on wetting of disordered solid substrates. It has primarily focused on wetting of cesium surfaces by liquid hydrogen at cryogenic temperatures, with some additional room temperature studies about the influence of roughness with silicon wafers decorated with silanized patches. In both cases the control of disorder on submicrometer scales is difficult and renders delicate an in depth analysis of the data.

Assessment of the unit's academic reputation and appeal

The senior leader of the He activity has very high international visibility and excellent scientific reputation well beyond his own field. This is seen by the fact that he shares responsibilities in many international committees and boards, in particular, as chairman and member of the PE3 committee (solid state physics) of the European Research Council. The other members of this team have not reached the same international visibility.

Assessment of the unit's interaction with the social, economic and cultural environment

Here again, the leader of the He activity has shown outstanding performance and engagement. He is author of several books and articles "grand public", partly on scientific issues well beyond his own research and of general interest and close to `burning issues' (such as climate and energy resources). He has also given public lectures and radio interviews. All together, his performance on these issues is unsurpassed at LPS.

Assessment of the unit's organisation and life:

Not much is known about the connectivity within this team, the report does not give any useful information. Since the move of one junior scientist to Lyon in 2010, the activities of the different seniors seem to be quite separate and uncorrelated, both thematically and also visible from the lack of coautherships (with one exception, ref.19) on the reported publications.

Assessment of the unit's involvement in training through research

This group has had 3 PhD students, and has a good involvement in teaching activities within the physics department.

Assessment of the five-year plan and strategy

The cryogenic experiments on dynamics of wetting of liquid hydrogen at cesium surfaces suffer from poor control of surface roughness. It is planned to switch to gold surfaces coated with self assembled monolayers in order to get better control of the surface properties. Particular focus is on measurements of microscopic cut off length as function of disorder. The wetting/dewetting hysteresis of the hydrogen/cesium system will be further studied. All this is a logical continuation of the previous work. A new and equally interesting study is devoted to a better understanding of the recently observed phenomenon of elastic deformation of porous materials when wetted by the penetrating liquid and the interplay between wettability, kinetics and deformation.

The activity on He will continue with three very interesting topics: a) acoustic damping measurements to quantify the dislocation densities in He crystals, b) study the elasticity of solid He confined in porous matrices such as Vycor and c) dc-superflow of mass through solid He. Unfortunately, this beautiful activity will gradually slow down due to the retirement of the lead scientist. The transfer of low temperature know-how to the neighbouring solid state physics laboratory is anticipated.

Conclusion:

- Strengths and opportunities:

The team has obtained outstanding scientific results on solid ^{4}He. Its international visibility in the field of quantum fluids and solids and beyond, as well as its public outreach and engagement on issues of general public interest, are equally outstanding.

- Weaknesses and threats:

Loss of leadership in the physics of Helium, part due to the retirement of the leader.

- Recommandations:

The interruption of the low temperature physics activity, and the focus on subjects such as wetting and porous media, constitutes a major evolution for the group, which could lead during the next mandate to a redefinition of its position and interactions within the LPS.

Team 2 : THEORIE DE LA MATIERE CONDENSEE

Name of team leader: Mr Xavier LEYRONAS

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**2**	**2**	**2**
N2: Permanent EPST or EPIC researchers and similar positions	**2**	**2**	**2**
N3: Autres personnels titulaires (n'ayant pas d'obligation de recherche)			
N4: Autres enseignants-chercheurs (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)			
N6: Other contractual staff (without research duties)			
TOTAL N1 à N6	**4**	**4**	**4**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**1**	
Theses defended	**5**	
Postdoctoral students having spent at least 12 months in the unit		
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions:	**4**	**3**

• Detailed assessments

Assessment of scientific quality and outputs

This is a theory group of four permanent members and two current doctoral students. They have three main lines of research: Statistical physics and numerical simulation algorithms, condensed matter physics and lattice Boltzmann simulations. In the evaluation period 2007-2012 they published more than forty papers in top international journals such as PRA, PRB, PRE and PRL, containing many truly remarkable results. To mention just two examples: a new very efficient Monte Carlo algorithm which permitted the simulation of large systems of hard disks in two dimensions to understand better the nature of the phase transition and the nature of the phases; detailed calculations of the pairing properties of ultra-cold fermionic atoms as the a function of the polarization of the system (excellent agreement with experiments). They have given a total of fourteen invited talks. The quality of the work is excellent especially in the first two research lines mentioned above.

Assessment of the unit's academic reputation and appeal

The conference invitations and the quality of the publications testify to an internationally visible group with an excellent reputation. A review of their citation rates and h-indices confirms this. One also remarks several intra-group collaborations and publications; several collaborations with other laboratories at ENS and in particular several collaborations between the theorists of this group and experimentalists at LKB and many other national and international collaborations. A member of this group is a senior professor at the IUF.

Assessment of the unit's interaction with the social, economic and cultural environment

As for their interaction with the social, economic and cultural environment, a member of the team belongs to the Scientific Council of Paris Township which, among other tasks, attributes research grants. The members of this group have excellent and highly fruitful collaborations with members of other laboratories at the ENS such as LPT and LKB.

Assessment of the unit's organisation and life

This is a very small group with a sub-critical mass for meaningful communal life.

Assessment of the unit's involvement in training through research

Over the evaluation period, this group has had five PhD students two of whom are current. In addition, this group is strongly involved in two particularly important and demanding tasks: (a) direction of "École Doctorale de Physique de la Région Parisienne" and (b) direction of the Department of Physics of the ENS. The department of Physics (Federation de Recherche FR684) has launched several initiatives to attract PhD students and also Post-Doctoral fellows to the ENS. Another important task within this team is the responsibility for the physics teaching assistants (moniteurs) at UPMC.

Assessment of the five-year plan and strategy

The plan for the coming five-year period is to use the expertise and theoretical and numerical innovations of the past four years to make new contributions in the fields of ultra-cold atoms and classical and quantum phase transitions in two dimensions. Both theoretical and numerical methods will be used. Many of the proposed projects are extensions of current ones and are motivated by very interesting experimental results which need to be better understood. As in the previous years, there will fruitful interaction with the experimental groups at ENS. All indications are that these goals are attainable.

Conclusion:

- Strengths and opportunities:

The strengths of this team come from the very high quality of its research, the excellence of its results that have been published in the best journals. One could also notice the strong experimental relevance and the close collaborations with researchers in other ENS laboratories. The strong involvement in teaching activities and the administration of teaching structures provide many opportunities.

- Weaknesses and threats:

One member has retired and another has reached retirement age, leaving only two members in the group. There does not appear to be a clear plan for the future of the group. A large part of the future project in quantum gases will rest on the activity of one emeritus professor. The group does not seem to have attracted much external funding.

- Recommandations:

The position of LPS with regards to this group needs to be clarified.

Team 3 : RESEAUX COMPLEXES ET SYSTEMES COGNITIFS

Name of team leader: Mr Jean-Pierre NADAL

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions			
N2: Permanent EPST or EPIC researchers and similar positions	**6**	**5**	**5**
N3: Autres personnels titulaires (n'ayant pas d'obligation de recherche)			
N4: Autres enseignants-chercheurs (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	**1**	**1**	**1**
N6: Other contractual staff (without research duties)			
TOTAL N1 à N6	**7**	**6**	**6**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**1**	
Theses defended	**4**	
Postdoctoral students having spent at least 12 months in the unit	**1**	
Number of Research Supervisor Qualifications (HDR) taken	**1**	
Qualified research supervisors (with an HDR) or similar positions:	**5**	**4**

• Detailed assessments

Assessment of scientific quality and outputs

The team is composed of several sub-units which work on different problems at the interface between statistical physics, molecular biology, neuroscience and socio-economics systems. Overall the team counts seven permanent members, with several Post-docs and PhD students. The scientific production is of very good level (64 publications on main journals plus book chapters and proceedings). The research activity can be divided in five main sectors:

1) New tools for statistical physics and data analysis.

This is a very important area which finds applications in many fields characterized by availability of large scale data sets (from computational biology and neuroscience, to social sciences). Members of the team have contributed with several pioneering papers.

2) Instabilities: Propagation of fractures.

This is a traditional subject of interest in statistical physics (and of the LPS in particular), in which the team has contributed with new relevant technical results.

3) Molecular biophysics

This is a broad field of research in which the LPS researchers together with their collaborators have provided a number of exceptionally interesting results in the following contexts: Reconstruction of DNA sequence from unzipping data, extracting specific regulatory motifs from sequenced genomes, determining functional gene network architectures, analysis of sequence data from the immune system, non-genetic individuality of the motor of E. coli, bacterial Chemotaxis, analysis and algorithms related to Infotaxis.

4) Neuroscience and Cognition.

As the previous case, this sector comprises a broad range of extremely timely topics. Some of the results obtained by the group members have had a great impact and have vitalized the interest of the scientific community. The list of topics is impressive: Static and dynamical inference in neural networks, cerebellum and oscillations, dynamics of synaptic domains, computation by single neurons and circuits of neurons in the retina, coding of information by populations of neurons: impact of correlations. population coding of categories...

5) Collective behaviors in biological and social systems.

This is the most interdisciplinary research activity with a list of topics ranging from biological systems (inference of interactions between species in a closed ecosystem, public good usage in bacterial colonies, collective cell motion, starling flocks) to social systems (choice under social influence, urban social dynamics, sustainable development). These works are of excellent quality, containing very stimulating and seminal applications of statistical physics.

Assessment of the unit's academic reputation and appeal

In spite of the relatively young age of many of the members of the group, the scientific quality of the team is renowned worldwide, as witnessed by the prestigious international collaborations in the US (Princeton, Harvard, Rockefeller U., Chicago), in Israel (Technion) and in Italy (Roma).

Important collaborations are active with other French laboratories, at the ENS (Theoretical Physics Lab., Biology Dept., Cognitive Sciences Dept.), Paris-5, Paris-2, the EHESS, the Pasteur and Curie Institutes.

The group members have organized many conferences and have been invited speakers to numerous workshops, conferences and seminars. Some group members been honoured with scientific awards. The number of grants is high.

The group members have been active in the organization of conferences at various levels (including popularization of science) and have organized (also with members of other groups) the LPS seminars. One is a member of the Comité National du CNRS (commission 02 and CID 44) and another is deputy director of Centre d'Analyse et de Mathématique Sociales (CAMS, UMR 8557 CNRS EHESS).

Assessment of the unit's organisation and life

The team life is active and many members of the group, and their students, have contributed to the cultural life of the ENS physics department, with good connections to other departments (especially biology).

The interactions among members take place in shared lectures and collaborations with other LPS members are currently active. A Journal Club is organized every two weeks (open to other ENS members).

Assessment of the unit's involvement in training through research

Several team members have created and are strongly involved in teaching various high-level courses, and in the responsibility of the Master in cognitive sciences, "Cogmaster" (ENS, EHESS, Paris Descartes). The team members have supervised three PhD finished recently and two other just started.

Assessment of the five-year plan and strategy

A large number of different projects are proposed for the next five years. Some projects are the natural evolution of the past research, others are more innovative and in close contact with experimental data.

These projects touch very relevant and timely topics (quantitative biophysics, neuroscience, collective behaviors in biological and social systems), most of them characterized by the elaboration of "big data" (e.g. new sequencing data) and have the potential of leading to great impact on basic theoretical and applied open problems. The majority of the projects will take place in collaboration with other ENS groups and external researchers.

Overall the projects are interesting and will certainly attract the attention beyond the statistical physics community. However their number (19) is certainly too large for a team of five researchers (plus possible emeritus) and focusing on those that seem more promising would seem a good strategy for the team.

Conclusion

- Strengths and opportunities:

The team has a very high level in statistical physics, and has a demonstrated ability to contribute significantly to many different aspects of complex systems.

- Weaknesses and threats:

The general theme of complex systems is obviously a very exciting one, with many new possibilities offered to apply the concepts of statistical physics. However, the danger of having a dispersed activity with limited impact on the fields of application should not be underestimated.

- Recommandations :

This team should focus on a smaller number of projects.

Team 4 : PHYSIQUE DES BIOMOLECULES

Name of team leader: Mr David BENSIMON / Mr Vincent CROQUETTE

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**2**	**2**	**2**
N2: Permanent EPST or EPIC researchers and similar positions	**2**	**2**	**2**
N3: Other permanent staff (without research duties)	**1**		
N4: Autres enseignants-chercheurs (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	**2**		
N6: Other contractual staff (without research duties)	**5**		
TOTAL N1 à N6	**12**	**4**	**4**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**2**	
Theses defended	**5**	
Postdoctoral students having spent at least 12 months in the unit	**5**	
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions:	**3**	**3**

• Detailed assessments

Assessment of scientific quality and outputs

The group performs a "top level" research in single molecule biophysics and has an impressive production in the most highly ranked journals (Science, Nature Methods, PNAS, EMBO J., Nucl. Acids Res.). After their pioneering development of single DNA molecule manipulation technique and the subsequent unraveling of the mechanism of action of DNA machineries in the past, this period is marked by the invention of an original single molecule sequencing method and the in vivo probing of the DNA replication machinery with a single molecule resolution.

More recent research activities addressing biological questions at larger length scale, the developmental process using photocontrolled perturbation and the interactions within a microbial population, begin to produce interesting results or gave rise to the development of new instrumental tools.

Assessment of the unit's academic reputation and appeal

The group is recognized worldwide for their indisputably outstanding research at the forefront of single DNA biophysics.

Assessment of the unit's interaction with the social, economic and cultural environment

Three patents have been filed consecutive to their invention of a method allowing the extremely precise localization of a particular sequence on a DNA molecule. The co-inventors are furthermore involved in the creation of a second start-up PICO SEQ for their exploitation.

Assessment of the unit's organisation and life

Each permanent researcher is responsible for a different length scale research topic nevertheless strong interactions exist between them. The atmosphere is also favourable to a good communication with and between the students and visitors.

Assessment of the unit's involvement in training through research

Apart from their contribution to Master degrees and the teaching responsibilities of two members of the group, the involvement in training is quite important with 8 PhD thesis that were accomplished during the period.

Assessment of the five-year plan and strategy

While the research projects have different stages of maturity, the plan for the next five-years is definitely oriented towards progress for each of them resting on the achievements made recently.

The main and leading activity on single DNA in vitro manipulation will continue. The obtention of an ERC grant in 2011 will permit further technical developments and to push at an increasing level of complexity the in-vitro investigations of replication and repair mechanisms.

The objectives of the "super resolution" in-vivo exploration of DNA machineries will be to tackle questions of biological relevance.

After the development of sophisticated tools for the emerging topics of the group dedicated to larger length scales issues, the experimental work will start. Comparison with numerical simulations will be used to validate comprehensive models of the investigated questions about development and morphogenesis. In particular, the projects concerning the perturbation and monitoring at the single cell level during embryo development, are quite interesting and should give rise to important results. They will however have to compare with similar projects developed in other research labs in France.

Interestingly, all research activities benefit from collaborations with specialists of the considered domain.

Conclusion

● Strengths and opportunities:

The group has an international leadership position in single DNA molecule biophysics.

● Weaknesses and threats:

The renovation of the Physics department building will probably perturb the progress of the experiments. However they should benefit from better housing conditions after moving to other rooms in the laboratory. Considering the national and international competition in development and morphogenesis studies, it will be an ambitious challenge for the group to produce original and notable contributions in this field.

● Recommandations:

Overall the group maintains a great dynamics and should continue to produce outstanding contributions in the next five-years.

Team 5 : SURFACES MOLECULAIRES ORGANISEES/MOLECULAR BYOPHYSICS

Name of team leader: Mr Frédéric PINCET

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**1**	**1**	**1**
N2: Permanent EPST or EPIC researchers and similar positions	**3**	**3**	**3**
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)			
N6: Other contractual staff (without research duties)	**5**	**3**	
TOTAL N1 à N6	**9**	**7**	**4**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**3**	
Theses defended	**4**	
Postdoctoral students having spent at least 12 months in the unit	**7**	
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions:	**3**	**3**

• Detailed assessments

Assessment of scientific quality and outputs

The work of the group, focused on the study of complex protein machineries involved in membrane rearrangements or regulation events, is highly original and of excellent quality. Very important aspects of the cellular life are investigated, e.g. oocyte-sperm interactions and membrane fusion for neurotransmitter release. It relies on several original home-built devices. Important breakthroughs have led to an impressive number of publications in top-level journals in particular about the energetics and dynamics of SNARE complex responsible of membrane fusion (e.g. Science, Nature structural and molecular biology and PNAS).

For example, a detailed study about the number of SNAREs required to I) perform adhesion of membrane, II) open transient pores and III) keep the pore opened, was achieved in a particularly clever way with the help of fluorescence microscopy and nanodisks of cellular membrane generated and stabilized with another protein complex. This work gives a very accurate view of the global mechanisms used by cells to open pores.

Assessment of the unit's academic reputation and appeal

At first sight, the number of invited conferences found in the report is moderate. This point should be however softened considering the major achievements in Biophysics published in 2011 and 2012 by the team. Indeed the relevance of these works to the broad biophysics community will probably generate invited conferences in a near future. The group also demonstrates an undeniable ability to raise funds (ANR, Europe, CNRS) providing a good level of financial support.

For their studies of membrane fusion, the team developed (and continues to develop) original set-ups combining fluorescence microscopy and micro-manipulation. Interestingly, the group disseminates these new tools and knowledge by having visiting scientists from other biophysics groups.

The team leaders built up a network of collaborators including very strong international groups in biology and medicine.

Assessment of the unit's interaction with the social, economic and cultural environment

See general appreciation on the laboratory.

Assessment of the unit's organisation and life

The team is extremely dynamic with a special emphasis on training of and interactions between PhD students. During the visit of the research group, it was clear that group meeting are regularly organized as well as informal discussions between permanent researchers, post-docs and PhD students.

Assessment of the unit's involvement in training through research

During the assessment period, the team leaders were strongly involved in training of students, three PhD theses were defended. In addition, three PhD theses are in progress.

Assessment of the five-year plan and strategy

The research themes are clearly identified in the project. They are natural prolongations of previous research projects of the group and are usually associated to on-going PhD theses. There are several projects devoted to a better understanding of the membrane fusion process (the assembly of the SNARE complex and the opening of a fusion pore). One project is focused on several aspects of gamete interactions.

Finally, there is a project about the mechanism of assembly of efflux pumps aiming at paving the way to the development of novel approaches in the fight against antibiotic resistance.

Conclusion

● Strengths and opportunities:

The team participates in breakthroughs in biophysics that have led to an impressive number of publications in top-level journals. For their studies, the team acquired specific technical knowledges by developing original experimental set-ups combining optical microscopy, immuno-labeling and micro-manipulation.

● Weaknesses and threats:

The implication of the researchers in cultural, economical and social life should be improved. The research themes of the group being of interest for health care, they offer opportunities of a large popularization of the achievements of the group.

● Recommandations:

The committee recommends to find a new name that would better account for the research activities of the team, and to improve the communications, for instance in what concerns the website of the team (several pages are outdated or empty).

Team 6 : THEORIE NON LINEAIRE DES INSTABILITES

Name of team leader: Ms Martine BEN AMAR

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**2**	**2**	**2**
N2: Permanent EPST or EPIC researchers and similar positions	**1**	**1**	**1**
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)	**1**		
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)			
N6: Other contractual staff (without research duties)	**1**	**1**	
TOTAL N1 à N6	**5**	**4**	**3**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**2**	
Theses defended	**9**	
Postdoctoral students having spent at least 12 months in the unit	**3**	
Number of Research Supervisor Qualifications (HDR) taken	**1**	
Qualified research supervisors (with an HDR) or similar positions:	**3**	**2**

• Detailed assessments

Assessment of scientific quality and outputs

The committee has appreciated the high quality of the research developed by this group in several disconnected directions. One might in particular mention the study of instabilities explaining theoretically the morphogenesis. Very interesting results have been derived in the context of tumor growth or more recently for the morphogenesis of flowers. Very interestingly, these scientific developments which were originally purely fundamental have now reached the maturity to be applied to real medical problems. Studies of the evaporation of completely wetting liquids and of nematic films deposited on glycerol or water were also developed within the team.

Mastering modern massively parallel programme, very interesting results in computational hydrodynamical turbulence and MHD turbulence were also derived in this team. They allow one to tackle the problem of finite time singularities and of magnetic reconnection in MHD. The superfluid dynamics with a truncated Gross-Pitaeveskii equation leads also to results at the international level.

Assessment of the unit's academic reputation and appeal

Excellent international reputation and visibility of the leaders of the team, with many international collaborations, invitations and students.

Assessment of the unit's interaction with the social, economic and cultural environment

See the general appreciation on the laboratory. We note that a member of the team belongs to the National Committee for Scientific Research.

Assessment of the unit's organisation and life

The scientific coherence and connectivity within this team appear to be relatively weak.

Assessment of the unit's involvement in training through research

During the assessment period, the team leader had an exceptional commitment in the organization of two masters. The number and quality of PhD students trained during the period within this team are very high.

Assessment of the five-year plan and strategy

The strategy seems basically to pursue the ongoing research. There is no discussion of increasing the links between the different members of the team which might be appropriate, in particular for the integration of the younger researcher.

Conclusion

- Strengths and opportunities:

The very high scientific reputation of different members is clear and promising for the development of innovative research in the domain of nonlinear instabilities. The very tight and unusual links by one of the team member with the medical community has to be pursued since it is a very appealing development.

- Weaknesses and threats:

The rationale for the too few interactions between the MHD activities and the (corresponding) experiments in the nonlinear physics team (8) is not clear from the outside.

- Recommandations:

The collective dynamics within this group and with other teams could be improved significantly, for example concerning the activities on morphogenenis and dynamo.

Team 7 : MORPHOGENE ET PHENOMENES MULTI-ECHELLES

Name of team leader: Mr Mokhtar ADDA-BÉDIA

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**1**	**1**	**1**
N2: Permanent EPST or EPIC researchers and similar positions	**2**	**2**	**2**
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	**1**		
N6: Other contractual staff (without research duties)			
TOTAL N1 à N6	**4**	**3**	**3**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**0**	
Theses defended	**5**	
Postdoctoral students having spent at least 12 months in the unit	**3**	
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions:	**1**	**1**

• Detailed assessments

Assessment of scientific quality and outputs

The broad range of research achieved by this group, leaded by two young researchers with excellent track record, was very original and successful. Combining their expertise in statistical physics, applied mathematics, mechanics and non-linear phenomena, they studied the morphogenesis in various systems, including material of biological interests. Experiments and theoretical approaches were nicely combined in their work on confined systems of low dimensionality. The research projects can be rationalized into several topics: statistics of crumpling, tearing and fracture dynamics in soft matter, compaction of flexible objects (i.e. folding of confined rods and crumpling/ wrinkling/folding of constrained sheets).

For example, the works about growth and dynamics of a "ruck in a rug", the compression of thin sheets glued on a foam (coll. MIT) and the understanding of macroscopic delamination (coll. ESPCI) perfectly demonstrate the power of this approach, well designed experiments explained by scaling law theoretical models. More recently, they have been involved in a very important contribution to the understanding of wrinkling. A new formalism based on "near threshold" and "far from threshold" regimes was proposed that appears to be very efficient to describe the various states of confined sheets (coll. B. Davidovitch U-Mass, E. Cerda, U-Santiago).

Assessment of the unit's academic reputation and appeal

This group was extremely self-consistent and very productive, specially regarding publication. Even if other well-established groups within the LPS have a higher visibility, this group created in 2006 starts now to be recognized as a major contributor to the field. The team leaders gave several invited talks in national and international workshops and conferences.

Appréciation sur l'interaction avec l'environnement social, économique et culturel

See general appreciation for the laboratory. The team leader was a member of the SFP committee and is now member of the National Committee for Scientific Research.

Assessment of the unit's organisation and life

It is very difficult to assess the life and organization for this team. Initially this group was organized around two young permanent researchers. One of the leader left, and two newcomers arrived, the team has been deeply modified and will need some time to accommodate this new situation.

Assessment of the unit's involvement in training through research

During the assessment period, the team leaders were strongly involved in training of students, four PhD theses were defended (Boué 2008, Corson 2008, Bayart 2010 and Chopin 2010). Surprisingly, no new PhD theses are in progress according to the report.

Assessment of the five-year plan and strategy

The five years project describes a prolongation of the work previously performed by the remaining team leader (with an emphasis on experimental studies). Several questions however remain, especially about the implication of the new permanent researchers that recently joined the group. Would they be involved in the same projects on packing of low dimensional systems? Or would they develop their own activities? There is no indication in the project.

Conclusion

- Strengths and opportunities:

The group was successfully involved in a broad range of research projects in mechanics with a original approach combining theory and experiments. These original projects led to several publications in high impact journals (PRL, PNAS) and enabled the group to attract several PhD students during the assessment period.

- Weaknesses and threats:

For unclear reasons, there is no PhD in progress. Is it related to a decrease of attractiveness for graduated students or a recent lack of research grant? The training of PhD students is obviously an important aspect of the life in a research laboratory. The departure of one of the founding members in 2010 was obviously an important loss for the team.

- Recommandations:

With its specific location, the group should create or reinforce collaborations with nearby research groups working in related fields (e.g., ESPCI, Institut d'Alembert, UPMC or U-P7).

Team 8 : PHYSIQUE NON LINEAIRE

Name of team leader: Mr Stephan FAUVE

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**1**	**2**	
N2: Permanent EPST or EPIC researchers and similar positions	**2**	**2**	
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	**1**		
N6: Other contractual staff (without research duties)	**1**	**1**	
TOTAL N1 à N6	**5**	**5**	

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	**2**	
Theses defended	**4**	
Postdoctoral students having spent at least 12 months in the unit	**2**	
Number of Research Supervisor Qualifications (HDR) taken	**1**	
Qualified research supervisors (with an HDR) or similar positions:	**2**	

• Detailed assessments

Assessment of scientific quality and outputs

This group is involved in the experimental reproduction of the dynamo effect, a remarkable achievement after a long period of preparation. Careful studies were performed during the period being reported on. Connections with geophysicists have led to very nice and original results. As an example, one might mention a simple dynamical system reproducing some features of the Earth's dynamo problem including reversals and localization of the magnetic field and the intriguing connection with plate tectonics. More generally, they were interested in several aspects of hydrodynamics and MHD turbulence. An intense activity has also focused on wave turbulence in fluid or elastic plates. Experiments, numerical simulations, theoretical study of simple or realistic models, the approaches were numerous and successful.

Assessment of the unit's academic reputation and appeal

This group which tackles with great success difficult questions at the interface between physics and geophysics, has a very high international reputation demonstrated by the numerous invited conferences and the strong academic appeal for young and talented PhD students. They are involved in strong collaborations with IPG, CEA and ENS-Lyon.

Assessment of the unit's interaction with the social, economic and cultural environment

See the general comment on the laboratory.

Assessment of the unit's organisation and life

This group seems to have a real communal life. Different directions of research are pursued usually by more than one permanent member and lively interactions between the team members seem to be present.

Assessment of the unit's involvement in training through research

The team has attracted several talented PhD students who were able to accomplish very appealing work. Several team members give lectures at the master level, and numerous master students are hosted by the team, especially for short time internships during their studies.

Assessment of the five-year plan and strategy

The proposed future project presents four different new experiments which seem highly interesting: Proposition of a new configuration for the dynamo effect, an interesting analogue of a Keplerian supersonic flow, new electromagnetic pump, an experiment to reproduce the quasi-biennal-oscillation. This nice combination of experiments builds on expertise acquired over the past few years to develop new ideas to tackle the interesting problems just mentioned. The record of accomplishments of this group holds every promise that these goals can be achieved.

Conclusion

- Strengths and opportunities:

The activity of this group and the experiments proposed for the next five years are built on the cutting edge expertise of this group in hydrodynamics and MHD.

- Weaknesses and threats:

It would be appropriate to group in this team all numerical work dedicated to the dynamo effect within the laboratory. The choice to recruit recently mostly theoreticians might be a difficulty in the future to tackle all experiments presented in the project. The involvement of some of the members in an experimental project is unclear.

- Recommandations:

The team should perhaps reconsider the list of projects according to the actual strength of the team on the experimental side, and be attentive to the integration of theoreticians in a project that is dominantly experimental.

Team 9 : PHYSIQUE STATISTIQUE HORS-EQUILIBRE

Name of team leader: Mr Eric BRUNET

Workforce

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014	2014-2018 Number of project producers
N1: Permanent professors and similar positions	**2**	**2**	
N2: Permanent EPST or EPIC researchers and similar positions			
N3: Other permanent staff (without research duties)			
N4: Other professors (PREM, ECC, etc.)			
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)			
N6: Other contractual staff (without research duties)			
TOTAL N1 à N6	**2**	**2**	

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students		
Theses defended	**2**	
Postdoctoral students having spent at least 12 months in the unit		
Number of Research Supervisor Qualifications (HDR) taken		
Qualified research supervisors (with an HDR) or similar positions:	1	

• Detailed assessments

Assessment of scientific quality and outputs

The research activity of the team has been focused on three main sectors: (1) Non-equilibrium systems, (2) Noisy traveling waves, evolution with selection and the branching Brownian motion and (3) Disordered systems in one dimension.

An impressive number of important results have been obtained in sector (1), ranging from the calculation of the entropy in non-equilibrium systems and fluctuations in currents to the study of correlations in non-equilibrium steady states. These are results at the frontier of statistical physics, of both mathematical and physical relevance, and they will be reference works for the whole community of statistical physics.

Sector (2) is more interdisciplinary. The main results have shown how the logarithmic corrections (in the intensity of noise) to the velocity of noisy travelling waves have an analogue in models of evolution with selection.

Other results concern the connection between selection and branching Brownian motions. Extensions of these works have become the subject of new studies in the applied probability community and have led to new results concerning the speed of adaptation under different selection mechanisms.

Sector (3) represents the natural continuation of traditional interests in disordered systems. Very interesting works on roughening and on mathematical aspects of depinning models have been derived.

The group has published 29 papers in main journals, with numerous invited talks.

Assessment of the unit's academic reputation and appeal

The scientific reputation of the group is exceptional, as attested by the award of the Boltzmann medal in 2010. The outputs play a reference role for the whole international community of statistical mechanics and of applied probability.

Assessment of the unit's interaction with the social, economic and cultural environment

See the general comment on the laboratory.

Assessment of the unit's organisation and life

The team has only two members with a long record of previous collaborations.

Assessment of the unit's involvement in training through research

One PhD student is presently integrated, and two PhD students have concluded recently. Both members have had a teaching activity at the graduate level at UPMC and at ENS.

Assessment of the five-year plan and strategy

The five-year research strategy for the group was not detailed in the written document. It appears to be the natural continuation of the problems on which the group has been working recently, with obviously good prospects for new interesting results.

Conclusion

- Strengths and opportunities:

The team enjoys an excellent international recognition. It has developed interesting collaborations with the applied probability community in UPMC.

- Weaknesses and threats:

The team seems quite isolated within the LPS, and even within the Physics department.

- Recommandations:

This is a very small team which could certainly attract a researcher. Stronger interactions with the complex network or condensed matter theory teams would be beneficial to all.

5 • Conduct of the visit

Visit dates:

Start:	Thursday, November 8th, 2012, at 8:30 am
End:	Friday, Novenber 9th, 2012, at 4:30 pm

Visit site:	LPS laboratory
Institution:	ENS
Address:	24 rue Lhomond, Paris 75005

Schedule of the visit:

Thursday, November 8th

8h30	welcome
9h00	Closed session of the Committee
9h15	Presentation of the activity report - Director
10h00	Scientific highlight 1 - S. BALIBAR
10h20	Scientific highlight 2 - X. LEYRONAS
10h40	break
11h00	Scientific highlight 3 - V
11h20	Scientific highlight 4 - M. BEN AMAR
11h40	Scientific highlight 5 - F. PINCET
12h00	Scientific highlight 6 - N. DESPRAT/MORA
12h20	Scientific highlight 7 - S. COCCO
12h40	lunch
13h35	Visit of the teams
16h35	break
16h50	Meeting with the permanent staff
17h20	Meeting with the engineers and the technicians
17h40	Meeting with the PhDs and the postdoctorals
18h20	Presentation and discussion about the Physics Department (FR 684)
19h20	Closed session of the Committee

Friday, November 9th

9h00	Meeting with the authorities
10h30	pause
10h45	presentation of the project
11h45	Discussion with the Director and the project leader
12h30	Closed session of the Committee
16h00	end

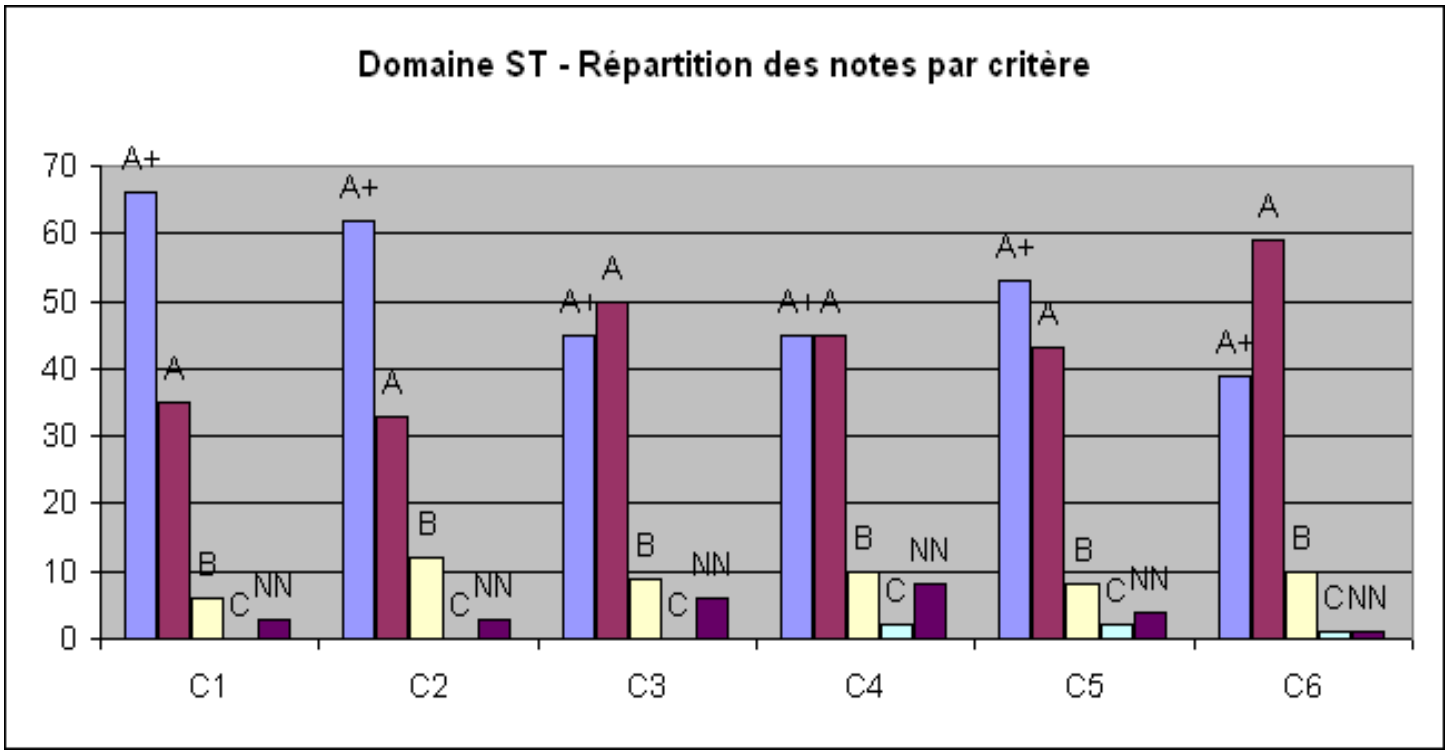
6 • Statistics

Grading tables and percentage per field

Critères	C1 Qualité scientifique et production	C2 Rayonnement et attractivité académiques	C3 Relations avec l'environnement social, économique et culturel	C4 Organisation et vie de l'entité	C5 Implication dans la formation par la recherche	C6 Stratégie et projet à cinq ans
A+	66	62	45	45	53	39
A	35	33	50	45	43	59
B	6	12	9	10	8	10
C	0	0	0	2	2	1
Non Noté	3	3	6	8	4	1

Critères	C1 Qualité scientifique et production	C2 Rayonnement et attractivité académiques	C3 Relations avec l'environnement social, économique et culturel	C4 Organisation et vie de l'entité	C5 Implication dans la formation par la recherche	C6 Stratégie et projet à cinq ans
A+	60%	56%	41%	41%	48%	35%
A	32%	30%	45%	41%	39%	54%
B	5%	11%	8%	9%	7%	9%
C	0%	0%	0%	2%	2%	1%
Non Noté	3%	3%	5%	7%	4%	1%

Histogram



7 • Supervising bodies' general comments

Despite the AERES' requests, it had not received any comments by the time this evaluation was published.