LPTENS - Laboratoire de physique théorique 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 Théorique de l'ENS

LPTENS

Under the supervision of the following institutions and research bodies:

Ecole Normale Supérieure de Paris

Centre National de la Recherche Scientifique

Université Paris 6 - Pierre et Marie Curie

November 2012

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

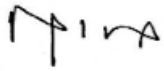
Research Units Department

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 (and, when necessary, for these units' in-house teams).
This score (A+, A, B, C) concerned each of the six criteria defined by the AERES.
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 received the following grades:

- Grading table of the unit: Laboratoire de physique théorique de l'ENS

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

Evaluation report

Unit name:	Laboratoire de Physique Théorique de l'ENS
Unit acronym:	LPTENS
Label requested:	UMR
Present no.:	UMR 8549
Name of Director (2012-2013):	Mr Costas KOUNNAS
Name of Project Leader (2014-2018):	Mr Constantin BACHAS

Expert committee members

Chair:

Mr Giorgio PARISI, Roma University, Italy

Experts:

Mr Lars BRINK, Chalmers University, Sweden

Mr John CHALKER, Oxford University, UK

MrJean-Michel MAILLET, ENS Lyon

Mr André NEVEU, Université Montpellier 2

Mr Henning SAMTLEBEN, ENS Lyon

Scientific delegate representing the AERES:

Mr Marc DRILLON

Representative(s) of the unit's supervising institutions and bodies:

Mr Yves GULDNER and Mr Yves LAZLO, ENS Paris

Mr Reynald PAIN, UPMC

Mr Barend VAN TIGGELEN, CNRS INP

1 • Introduction

The laboratory was founded in 1974 when a group of theoretical physics (particle physics), under the leadership of Mr Philippe Mayer, moved from the University of Orsay to the Ecole Normale Supérieure, 24 rue Lhomond Paris, where it is located now. At the beginning the only subject studied was theoretical particle physics, but gradually its scope included other areas of theoretical physics.

It is today organised in two teams whose researchs are dedicated to the fundamental Interactions in High Energy Physics and to the development of tools of statistical physics and its multidisciplinary applications.

Management team

Mr Costas KOUNNAS, Mr Constantin BACHAS and Mr Denis BERNARD

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	5	5	5
N2: Permanent researchers from Institutions and similar positions	15	15	15
N3: Other permanent staff (without research duties)	2	3	0
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	1	1	0
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	13	15	0
N6: Other contractual staff (without research duties)	0	0	0
TOTAL N1 to N6	**36**	**39**	**20**

Percentage of producers	***95.2 %***

Unit workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	13	15
Theses defended	16	6
Postdoctoral students having spent at least 12 months in the unit*	17	18
Number of Research Supervisor Qualifications (HDR) taken	3	3
Qualified research supervisors (with an HDR) or similar positions	18	24

2 • Assessment of the unit

Strengths and opportunities

The research of the whole laboratory (and of both teams 1 and 2) is excellent. Each team has obtained extremely interesting results with more than 200 papers that were published in high quality journals. The variety of arguments treated is amazing and in spite of this diversification the laboratory still keeps a scientific unity; the boundary between the two teams is not very sharp: four members share their time between the two teams: there are many common initiatives and also less formalized collaborations.

Each member of the lab strongly profits from the presence of scientists from the other team; also the emeriti and the retired members, who participate in the daily life of the lab, share their exceptional scientific experience with younger members.

The laboratory has an extremely high reputation at the international level and it is at the forefront of the worldwide scientific research. Its excellence has been recognized also by two Dirac Medals and by two ERC grants. The laboratory is one of the three components of the FRIF (Research Federation for Fundamental Interactions) LABEX. The laboratory has also much collaboration with first class institutions.

Teaching is also a very important activity in this laboratory that has a strong reputation, as can be seen by the international doctorate school done in collaboration with Amsterdam University, Université Libre de Brussels and the Solvay Institute.

The laboratory is strongly involved in outreach activities and the senior members spend a lot of time in many different scientific panels around the world (e.g. a member of the lab is Vice President of the Greek National Council for Research and Technology - ESET).

The scientific report and the project have a very high quality. Both the scientific points and the hiring strategy are exposed in a lucid way and they are in line with the high quality tradition of the laboratory.

Weaknesses and threats

The departures of some excellent members of the lab (in the recent past or in the future horizon of a few years, some due to retirements, other due to moving to other places) are a threat to its excellence. A carefully prepared plan has been implemented in the past years and has been crucial for maintaining the lab's very high standards.

We feel that there have been some difficulties in the sharing of information at various levels. The laboratory does not have a bona fide conseil de laboratoire and the assembly of all the members takes the decisions. This organization of the ruling bodies may work well for a small lab, but some extra care is needed to avoid possible malfunctioning.

Office space is overcrowded: this laboratory should have enough space to maintain and expand (when it is made possible by external grants) its excellent activities. One should also avoid obliging postdocs and seniors to share offices. Space is also important for planning the acquisition of computer clusters that are playing an increasing role in research.

We are alarmed by the present shortage of administrative support. Only one secretary cannot provide a reasonable assistance to 50 peoples, in spite of her splendid efforts. The complete absence of technical support for a complex network of computers (more than 70 units) leads to a strong deterioration of the functionality of the system that can only be temporary alleviated by the help of one researcher.

Recommendations

The committee strongly recommends that the Ecole Normale Supérieure, the University of Paris 6 and the CNRS continue their institutional support to this extremely successful laboratory.

The fluid division of the laboratory in two teams and the breadth of the subjects studied are important characteristics of the laboratory that should be supported and maintained as stated in the project presented by the future director.

The committee recommends continuing the good hiring procedures of the past, and it agrees with the hiring priorities of the laboratory: at short term, it should recruit a senior researcher in quantum condensed matter (in a broad sense) and in the long run it should start the appropriate strategy for finding the optimal replacement for people that are retiring in the field of phenomenology of high energy physics and of string theory.

In order to improve the decision process, we advise to select a member of the laboratory: such a person, in close contact with the director of the Laboratory and with the directors of the teams, should organize the plenary meetings and should prepare written agendas for these meetings together with the director. Moreover, we recommend the formation of ad hoc panels to follow in depths particularly delicate problems. An effort should be done to increment the participation of the lab's members to the collective life of the department of physics.

It would be important to have three years (or two years with a possible extension to the third year) fellowship for postdocs in order to be competitive with other high standard scientific institutions.

We recommend that very strong efforts should be done to increase the teaching time of the students: a minimal goal is to give to each student the opportunity of having a teaching experience.

We expect that planned renovation works will solve the space problems and that it will be possible to reach a wide consensus on the use of the new space that, when possible, should be allocated in a flexible way. We also expect that at the end there will be some common meeting place for scientific discussions within the laboratory and within the department. Such discussions are an essential part of the way that research in theoretical physics is done, and provision of appropriate discussion space is particularly important since all, except the most senior members of the laboratory, are obliged to share their offices.

All possible efforts should be done do add a second secretary as soon as possible, the present situation being unbearable. We also recommend that a small part of the ERC grants should be used to hire a scientific assistant on a temporary basis.

Finally, we recommend that support for the computers be arranged with the highest priority, possibly at the department level: also this task is very urgent since the computer network is deteriorating in a fast way.

3 • Detailed assessments

Assessment of scientific quality and outputs

The laboratory was started in 1974. The young members of the group then were pioneers in quantum field theory, weak interaction theory, string theory, supergravity theories, supersymmetric field theories and conformal theories. Several of the key discoveries in those fields were done by members of the laboratory. Since then they have continued to excel in these more formal aspects of theoretical physics extending it also into wider aspects of statistical physics, being a cornerstone in the world for this kind of scientific activity. By careful recruiting over the years the laboratory has been able to keep this position. The scientific quality is still outstanding and the laboratory has been able to stay within a broad scope but a well-defined area including conformal field theory and quantum field theory remains as common denominators for most of its members. This gives an almost unique strength to their endeavor. The output during the last six years has been some 400 published papers, many of them from collaborations within the lab but also with leading persons from other groups around the world. The quality of the papers is quite high and the papers are very well cited.

Assessment of the unit's academic reputation and appeal

The academic reputation goes back all the way to the 1970's and has been kept at a top level ever since. The rejuvenation that has been done over the years has been successful to defend the high reputation. The recent success with several important prizes and with two new ERC grants has only strengthened this picture. LPTENS is (as said above) one of the key labs in the world for this kind of activity and its reputation is on par with the leading American institutions in this field of science.

The appeal is extraordinary for at least two reasons: firstly, for its high reputation and secondly for being in central Paris in proximity of so many other interesting physics group.

The laboratory is involved in a large number of national and international programmes, supported by ANR, EC and ERC grants. All members of the lab, including the more junior ones, have impressive international visibility. This has been recognised by award of a series of prizes and distinctions, including the Dirac Medal, the Prix Paul Langevin, three "prime d'excellence scientifique", and two nominations to membership of the IUF. Researchers in the laboratory make a significant contribution as members of national and international scientific committees, including editorial boards and the steering committees of major conferences. They are also in high demand as lecturers at advanced international schools and workshops. Being admitted to do research in LPTENS is a highly competitive process and former postdocs from the team have been very successful in winning permanent academic positions, while most PhD students graduating from the lab have progressed to prestigious postdoctoral positions.

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

The scientific field of the laboratory is more formal theoretical physics where one is searching for solutions to the deep questions about Nature, if one can find an underlying theory for all the basic interactions but also to explain many of the phenomena around us. These are queries that are fundamental for many thinking people outside science. The members of the group give public lectures, they write popular scientific articles, and they are often asked by media to explain new discoveries or to comment on scientific discussions. In this way, they have excellent contacts with the cultural environment and are a very important part of the French cultural landscape. Since the research is curiosity-driven, there are no direct economic or social benefits from it. On the other hand our whole society is based on physical discoveries in the last century that were curiosity-driven to start with. It is very important for France to be a leading nation in this kind of front-line research and the lab is a spearhead for this.

Assessment of the unit's organisation and life

The laboratory is organized in two groups (Equipes). "Equipe 1" is mainly working in fundamental particle physics and "Equipe 2" in statistical physics extending into studies of biological systems. However, to a large extent, this is an administrative division. The common themes of quantum field theory and conformal theory is present in most of the work performed in the lab and the two groups collaborate extensively over the (essentially non-existing) group border. They have common colloquia and seminars and they share most of the duties. The Committee has not been able to find any cleft between the two teams. On the contrary, the Committee is impressed with the unity among the members of the laboratory. The laboratory has been very successful to attract very good graduate students and post-doctoral fellows which for many a theory group are the life and soul.

Also for this lab, they constitute an important part of the life of the lab; the Committee found that they are quite happy with the scientific life of the LPTENS.

There are two obstacles that risk limiting the ultimate success of the lab. The first one is the localities where even senior researchers must share offices and the younger members often have to huddle in large numbers in the few offices available for them. The Committee takes it for granted that ENS will solve this problem after the renovation. The other is the lack of administrative and engineering personnel, where the lab has struggled to get back one secretary after the leave of one of the two secretaries. The success with ERC grants also shows the need for adequate secretarial help. There is no personnel to run the advanced computer system needed for the research performed in the lab. This has been done by one of the researchers, which is a huge waste of resources and also affects the life of the particular researcher and the whole lab.

Assessment of the unit's involvement in training through research

Almost all members of the lab are involved as PhD or post-doc supervisors and the number of PhD students has significantly increased since the last evaluation report.

The lab has been remarkably successful in attracting young researchers at the graduate and post-graduate level. The number of applicants to the post-doctoral positions is usually between 300 and 400, which is also typical for the leading American universities.

The level of the post-docs which accept to come here is also the same as the ones in Princeton, Harvard, Caltech and Stanford. Even though most of the researchers have positions within CNRS and hence have fewer possibilities to get in touch with undergraduate students, the involvement by the lab in master programs ensures that students learn of the lab and the graduate students that get accepted at ENS are usually excellent. The graduate students get three years to finish their degree, which is very short on an international scale where at least four years is standard, but the Committee did not hear any complaints about it. Indeed the dissertations during the last five years have been of very high class. The only fly in the ointment is that the students often do not get enough chances to teach. It is often necessary to have teaching experience in order to get teaching positions after graduation. This is an issue that ENS should address.

It should also be mentioned that the lab is engaged into a doctoral school for beginning graduate students with Amsterdam and Brussels, with three weeks of heavy teaching in each place in the autumn when the students have just arrived. This has been a great success for which other groups in Europe are very interested to join.

Assessment of the five-year plan and strategy

The Committee is very impressed with the five-year plan. It is very well measured and balanced. On the one hand, the lab intends to continue to tread the paths it has done so successfully over all years but also to broaden into new lanes that are opening.

With the success of CERN with its new accelerator LHC, it is natural for the lab to be an active part of the attempts to understand the new data coming. Especially the supersymmetric Standard Model was born in the lab and efforts to understand it and its validity will be important for the lab. However, the lab will not unilaterally work on such problems, since it is too small and since it mostly has a more theoretical orientation which it must continue to follow. The work in Superstring Theory and its consequences for particle physics as well as gravity and cosmology will continue with unfailing strength. Here, it is important that the lab prepares well in advance for the departure of some of the key members through retirement or other ways and the five-year plan address this question adequately.

The Committee approves the plan of the laboratory to continue its excellent research in statistical mechanics in the fields where it has been mostly successful: the interface of statistical physics with probability and geometry, the theory of disordered systems and the study of various aspects of quantum systems, also in connection with the experiments at LKBENS.

The Committee expects the activities in statistical physics going into biological systems to be also thriving, and the five-year plan is very well adapted for major steps forward into these fields, which will expand, in the coming years. In many cases a very large amount of data is available and it is natural to use statistical mechanics tools as in the case of analysis of the genome data. The project plans to arrive at a deep new understanding of many problems in this field: a very interesting effort is the attempt to arrive to quantitative predictions in immunology.

4 • Team-by-team analysis

Team 1 : Fundamental Interactions

Name of team leader: Mr Constantin BACHAS

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	3	3	3
N2: Permanent EPST or EPIC researchers and similar positions	9	9	9
N3: Other permanent staff (without research duties)	0	0	0
N4: Other professors (PREM, ECC, etc.)	0	0	0
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	8	8	0
N6: Other contractual staff (without research duties)	0	0	0
TOTAL N1 to N6	**20**	**20**	**12**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	5	6
Theses defended	11	4
Postdoctoral students having spent at least 12 months in the unit	11	11
Number of Research Supervisor Qualifications (HDR) taken	2	2
Qualified research supervisors (with an HDR) or similar positions	10	12

• Detailed assessments

Assessment of scientific quality and outputs

As detailed above, team A has a long-standing record of excellence and continues to pursue research at the highest international level and with significant impact in collaboration with leading research groups around the world. The research activities cover a large range of subjects in fundamental particle physics, modern quantum field theory and string theory. The recent hires of two 'enseignants-chercheurs' and one junior CNRS researcher in particle physics and string theory have sensibly complemented the team's expertise in view of string theory applications and closer ties with collider phenomenology.

Research highlights of team 1 include

- Integrability and N=4 super Yang-Mills (SYM) theory: the team has accomplished a major break through in putting forward and solving the "Y-system" for the spectrum of anomalous dimensions of all operators and at any value of the 't Hooft coupling constant in four-dimensional SYM theory and the three-dimensional ABJM theory. These results have taken the entire field to a new level and are at the center of a new European research network in which the team is a key member.
- String theory and cosmology: the team has played an important role in the development of the field and continues to make important contributions in international collaborations. Team members have studied the cosmological implications of string theory and discovered generic attractor and bouncing solutions to the back-reacted evolution equations. Substantial work has been done in the construction of string vacua and orbifold models.
- Conformal field theories: the team has made considerable progress in generalizing two-dimensional methods to three and four-dimensional conformal field theories. Among the results are bounds on the scaling dimensions of various operators using the conformal bootstrap equations and first steps towards a solution of the 3D Ising model.
- Applications of AdS/CFT dualities: members of the team have played a key role in developing the applications of holographic dualities to condensed matter and other strongly-coupled systems. This has become a highly active area of research that brings together high-energy and condensed-matter physicists. Related results have been obtained in the supergravity description of three-dimensional strongly coupled CFTs.
- Particle phenomenology in close connection with experiments and experimentalists remains very active, exploring mechanisms for dark matter and which precision tests in accelerator experiments could tell us about various possible extensions of the Standard Model, e.g the supersymmetric one.

Other research highlights include results in general relativity, as well as foundational work on the mathematical structures of string theory, supergravity and supersymmetric field theories.

This work has resulted in about 200 publications in high-quality journals during the period under review.

In summary, the work of the team 1 of the LPTENS has continued to be world-leading and highly innovative, important, instructional, influential and interactive. One should also emphasize the remarkable quality of the hiring of junior members.

Assessment of the unit's academic reputation and appeal

See the statement in section 3.

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

See the statement in section 3.

Assessment of the unit's organisation and life

The working atmosphere is certainly highly motivating and competitive with seminars and journal clubs and several collaborations going on both with team 2 and also with researchers in other laboratories of the Department of Physics at ENS. However, the remarks concerning the relationship between the LPT and the Department of Physics of ENS (see section 3) also apply.

Assessment of the unit's involvement in training through research

The general involvement in training through research via PhD students and postdoctoral researchers has been described in the common section 3 above. Members of team 1 are strongly involved in the organization and lecturing in the by now well-known Amsterdam-Brussels-Paris doctoral school on quantum field theory, strings and gravity which has been established as a yearly event for starting PhD students.

The team traditionally coordinates the highly reputed second-year program in Theoretical Physics of the Master's program « Concepts fondamentaux de la physique » which unites top level students from Ecole Normale, Ecole Polytechnique, and the universities Paris 6, 7 and 11. Several team members regularly teach in this Master's program as well as in the graduate program of the « Ecole doctorale ».

There are currently 7 PhD students and 3 post-docs, and more to come (associated to ANR and ERC grants in particular), while a further 13 PhD students and 10 post-docs have been members of the team during the period under review.

Assessment of the five-year plan and strategy

The work in Superstring Theory and its consequences for particle physics as well as gravity and cosmology will continue with unfailing strength. Here, it is important that the lab prepares well in advance for the departure of some of the key members through retirement or other ways and the five-year plan addresses this question adequately.

Conclusion

• Strengths and opportunities:

We have nothing particular to add for this team to what we said in section 3.

• Weaknesses and threats:

We have nothing particular to add for this team to what we said in section 3.

• Recommendations:

We have nothing particular to add for this team to what we said in section 3. We recall however that we recommended that in the long run one should start the appropriate strategy for finding the optimal replacement for people that are retiring in the field of phenomenology of high energy physics and of string theory.

Team 2 : Statistical Physics and Applications

Name of team leader: Mr Denis BERNARD

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	6	6	6
N3: Other permanent staff (without research duties)	0	0	0
N4: Other professors (PREM, ECC, etc.)	1	1	0
N5: Other EPST or EPIC researchers (DREM, Postdoctoral students, visitors, etc.)	5	5	0
N6: Other contractual staff (without research duties)	0	0	0
TOTAL N1 to N6	**14**	**14**	**8**

Team workforce	Number as at 30/06/2012	Number as at 01/01/2014
Doctoral students	8	9
Theses defended	5	2
Postdoctoral students having spent at least 12 months in the unit	6	7
Number of Research Supervisor Qualifications (HDR) taken	1	1
Qualified research supervisors (with an HDR) or similar positions	8	9

• Detailed assessments

Assessment of scientific quality and outputs

The research carried out by the "statistical physics and applications" team at LPTENS over the period 2009-2012 is of excellent scientific quality with a remarkable international impact and visibility. This research activity covers several topics:

- *Random geometry and conformal field theory (CFT)* : the study of the links between the theory of SLE (Schramm-Loewner evolution) and conformal field theory has been strongly pursued; it also stimulated several advances in boundary CFT and non-minimal CFT, considered by members of the team using e.g. boundary loop models or parafermions; the results on the fractal dimensions of critical Potts domain walls in presence of quenched disorder are quite promising at the interface of statistical physics with probability and geometry. Among the highlights are the results on non-rational CFTs with non-compact, supersymmetric or not, targets, together with the ones on logarithmic CFTs and the long-awaited proof of the famous Razumov-Stroganov conjecture in the domain of statistical combinatorics and loops obtained by one of the post-doc of the team.

- *Statistical physics of disordered systems and applications* : recent research on the theory of disordered systems has produced a diverse set of striking results, and continues a long-standing strength of LPTENS. Highlights include: the refinement of the functional renormalisation group to the point that it is a sophisticated theoretical tool, well-tested numerically and with extensive applications to experimental settings; an exact treatment of interfaces in 1+1 dimensions using a subtle combination of replica and Bethe Ansatz methods; deeper understanding of phase transitions and fluctuations in constraint satisfaction problems; and ground-breaking work on the jamming transition in the hard sphere fluid.

- *Quantum systems: out of equilibrium, coherence, disorder* : investigations of quantum systems far from equilibrium or with quenched disorder represent a new and fruitful line of research at LPTENS. Notable parts of this work extend well-established expertise in classical problems to their quantum counterparts, as with the development of cavity methods for disordered bosonic systems, and the study of quantum optimisation problems. Separately, important work on the theory of quantum non-demolition measurements has helped to establish theoretical foundations for experiments on trapped quantum fields, including those at LKBENS.

- *Biological systems: from modeling to computation* : work on biological physics succeeds in being both excellently connected to other leading research groups in the field internationally, and well integrated with other theoretical physics research at LPTENS. A particular strength is the application of ideas and techniques from statistical physics to problems in biology. Highlights of the work include: the development of efficient inverse methods to infer couplings within assemblies of neurons from recordings of their activity; and progress in the understanding of antibody diversity using maximum entropy models.

This work has resulted in about 200 publications in high-quality journals during the period under review, including almost 40 papers in the most selective media of the field, such as Phys. Rev. Lett. and PNAS.

In summary, the work of the team 2 of the LPTENS has continued to be world-leading and highly innovative. The remarkable quality of the hiring of junior members needs to be emphasized.

Assessment of the unit's academic reputation and appeal

See the statement in section 3.

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

See the statement in section 3.

Assessment of the unit's organisation and life

The working atmosphere is certainly highly motivating and competitive with seminars and journal clubs and several collaborations going on both with team 1 and also with researchers in other laboratories of the Department of Physics at ENS. However, the remarks concerning the relationship between the LPT and the Department of Physics of ENS (see secton 3) also apply.

Assessment of the unit's involvement in training through research

The general involvement in training through research via PhD students and postdoctoral researchers has been described in the common section 3 above. There are currently 8 PhD students and two post-docs and more to come (associated to ANR and ERC grants in particular), while a further 11 PhD students and 8 post-docs have been members of the team during the period under review.

Assessment of the five-year plan and strategy

The five year plans of research are at the forefront of the international efforts in the different domains represented. Certainly, the interface between physics and biology is an highlight (ERC starting grant for a junior member only two years after hiring) together with the statistical physics activity at a world-leading level.

Conclusions

• Strengths and opportunities:

We have nothing particular to add for this team to what we said in section 3.

• Weaknesses and threats:

We have nothing particular to add for this team to what we said in section 3.

• Recommendations:

We have nothing particular to add for this team to what we said in section 3.

At short term, a senior researcher should be hired in quantum condensed matter (in a broad sense).

5 • Conduct of the visit

Visit dates:

Start: Monday 12 November 2012, at 09h30

End: Tuesday 13 November 2012 at 17h00

Visit site:

Institution: LPTENS

Address : 24, rue Lhomond, Paris

Specific premises visited: Offices, Library, computer facilities.

Program of visit:

Monday 12 November 2012

09:30 – 10:00	Welcome
10:00 – 10:45	Presentation of LPTENS by the Director, Mr Costas KOUNNAS
11:00 – 11:30	Presentation of the team 1 by Mr Costas BACHAS
11:30 – 12:00	Presentation of the team 2 by Mr Denis BERNARD
12:00 – 12:30	Visit of LPTENS infrastructures
14:30 – 14:50	Short scientific presentation by Mr Vladimir KASAKOV
14:50 – 15:10	Short scientific presentation by Mr Pierre LE DOUSSAL
15:10 – 15:30	Short scientific presentation by Mr Jan TROOST
15:30 – 15:50	Short scientific presentation by Ms Alexandra WALCZAK
16:20 – 17:20	Meeting with students and with Postdocs
17:20 – 18:00	Internal meeting between the AERES committee members

Tuesday 13 November 2012

09:00 – 09:30	Presentation of the computing and administrative facilities by Mr Marc-Thierry JAEKEL and Ms Viviane SEBILLE
09:30 – 10:00	Informal meetings with members of LPTENS
10:15 – 11:00	Meeting with the Director of LPTENS, Mr Costas KOUNNAS
11:00 – 11:45	Meeting with the future Director of LPTENS, Mr Costas BACHAS
11:45 – 12:30	Meeting with the "Tutelles", (ENS, CNRS-INP, PARIS 6)
13:45 – 17:00	Deliberation of the AERES Evaluation Committee

6 • Statistics by field: ST on 10/06/2013

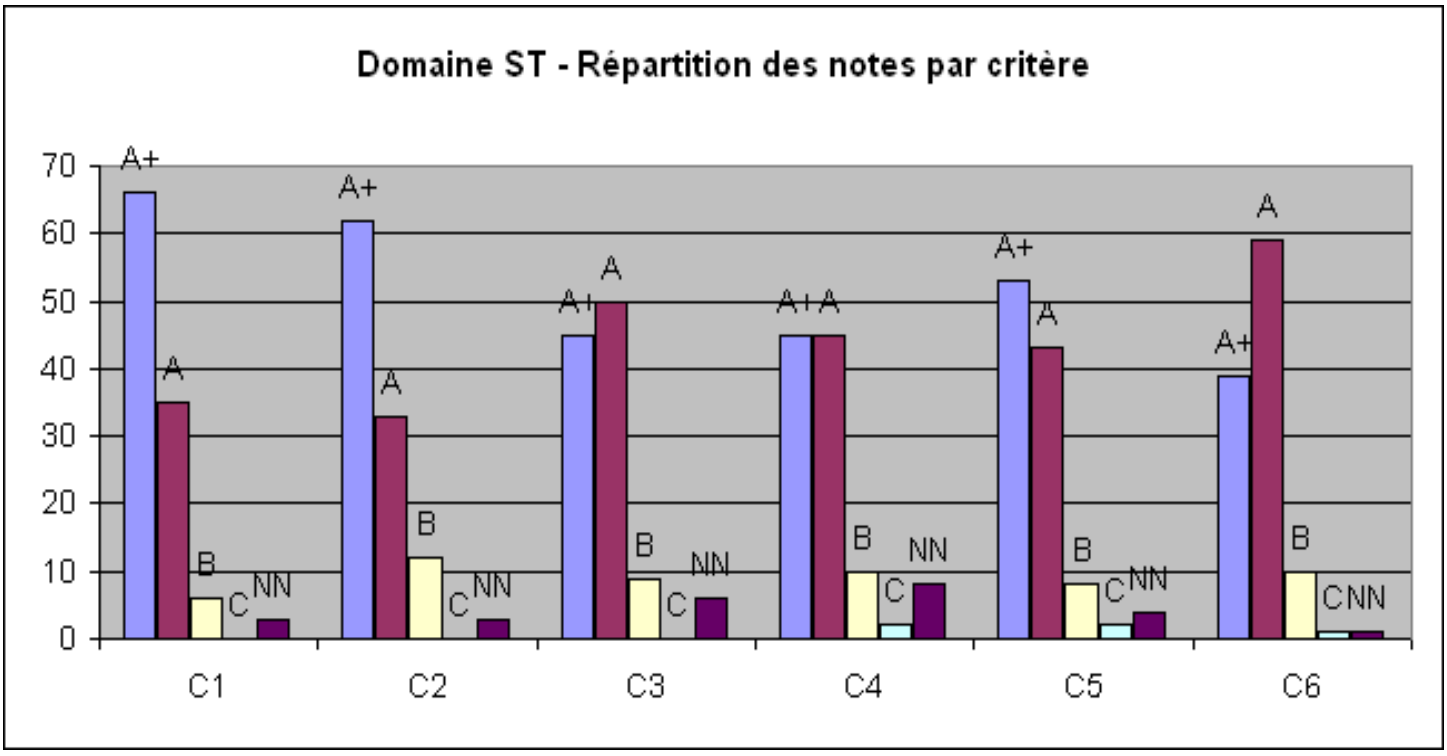
Grades

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

Percentages

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.