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ΤΗΣ ΠΟΙΟΤΗΤΑΣ  
ΣΤΗΝ ΑΝΩΤΑΤΗ ΕΚΠΑΙΔΕΥΣΗ

HELLENIC REPUBLIC

**H.Q.A.**

HELLENIC QUALITY ASSURANCE AND  
ACCREDITATION AGENCY

## EXTERNAL EVALUATION REPORT

DEPARTMENT OF PHYSICS

NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS

OCTOBER 2013



### **External Evaluation Committee**

The Committee responsible for the External Evaluation of the Department of Physics of the National and Kapodistrian University of Athens consisted of the following five (5) expert evaluators, drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005:

1. Prof. Christos Flytzanis, École Normale Supérieure, CNRS, France (Coordinator)
2. Prof. Costas Kounnas, École Normale Supérieure, CNRS, France
3. Prof. Grégoire Nicolis, Université Libre de Bruxelles, Belgium
4. Prof. Panos Razis, University of Cyprus, Cyprus
5. Prof. Yiannis Vardaxoglou, Loughborough University, United Kingdom

*The structure of the “Format” proposed for the External Evaluation Report is dictated by the requirements of Law 3374/2005 and corresponds generally to the structure of the Internal Evaluation Report submitted by the Department.*

*The length of text in each box is free. Moreover, the various questions may not be answered separately; they only provide a general idea about specific matters that should be addressed by the Committee when formulating its comments.*

### **Introduction**

- The External Evaluation Committee (hereafter referred to as the “Committee”) met in Athens between the 7<sup>th</sup> and 12<sup>th</sup> of October, 2013, to carry out the Evaluation of the Department of Physics (hereafter referred to as the “Department”) of the National and Kapodistrian University of Athens. It was unfortunate that the Committee was unable to visit the premises of the Department due to unforeseen circumstances (lack of access due to students’ occupation of the Department’s premises) which were beyond the control of both the Committee and the Department itself.
- In the morning of October 7<sup>th</sup> the Committee first attended an introductory presentation in the HQAA offices, providing general guidelines for the evaluation procedure. This was followed by an introductory meeting at the Divani Palace Acropolis hotel and a series of 3 presentations by the Chairman of the Department, Professor G. Tombras, the Chairman of the Internal Evaluation Committee, Professor E. Floratos and the Vice Coordinator of the Physics Laboratories and Graduate Studies Committee, Professor A. Karabarbounis. A number of questions were asked by the members of the Committee for further clarification on various aspects of their presentations.
- In addition, the Vice-Rector for Academic Affairs, Professor A. Doukoudakis, provided some remarks on the legislative framework and highlighted some current concerns regarding the organisational processes of the University.
- During the above presentations the Committee was provided with factual data of the Departmental activities and statistical elements concerning the undergraduate and graduate programs and data on educational and research matters, student performance statistics, age profile of the academic staff, future plans and other relevant information.
- More specifically, the Chairman of the Department described the Departmental structure, the number of academic, research, technical and administrative staff of the Department Sectors, the student intake and load at both undergraduate and postgraduate levels, as well as the number of courses offered at these levels.
- The Internal Evaluation Committee Chairman presented in detail the findings of the internal evaluation process for the period 2005-2010, as well as those for the 2010-2011 academic year.
- On Tuesday, October 8<sup>th</sup>, the Directors of the 5 Sectors of the Department, namely:
  1. Solid State Physics (Prof. N. Stephanou)
  2. Nuclear and Particle Physics (Prof. C. Kourkoumelis)
  3. Astrophysics, Astronomy and Mechanics (Prof. M. Tsamparlis)
  4. Environmental Physics and Meteorology (Prof. C. Helmis)
  5. Electronics, Computing, Telecommunications and Automation (Prof. I. Tsiggelis)

gave a detailed account on their respective Sectors, including manpower, teaching courses offered and load, research group activities and programs, funding, national and international collaborations, scientific publications and citations, dissemination and outreach and services provided to the public and private sectors.

In the absence of direct interaction with undergraduate, master and PhD students, the Chairman provided information on student welfare, lodging, subsistence and other facilities, textbooks provided, medical care, access to the Library and internet. He also described the students' attendance to classes and the examination system.

Likewise, with regards to the technical and administrative personnel, including the Department's secretariat and the provision of information technology services, the Committee was unable to make contact, due to the exceptional circumstances described above. However, the Committee was provided with some basic information (number of employees per Sector, status and current concerns on their employment).

Finally, closed sessions took place, from the afternoon of October 8<sup>th</sup> until October 11<sup>th</sup>, for the Committee members to consider all the information collected, to evaluate the Department and to write the External Evaluation Report.

For the evaluation, the members of the Committee received and took into consideration the following electronic documents provided by HQAA:

1. The Internal Evaluation Report, including the tables and annexes concerning the personnel and course programs and information on research programs, publications and citations for the period 2005-2011.
2. Undergraduate and graduate studies curricula.
3. Presentations provided by the Heads of the Department's Sectors, the Chairman of the Department, the Chairman of the Internal Evaluation Committee and the Vice Coordinator of the Laboratories and Graduate Studies.
4. Brief CVs of the academic staff.

## **A. Curriculum and Teaching**

### **A1.1 Curriculum: Undergraduate level**

#### **APPROACH**

The undergraduate physics curriculum is based on 4 years of study. The Bologna Process is adopted as far as credit accumulation is concerned, but other key aspects have not yet been implemented. The core undergraduate physics curriculum follows current international standards, maintaining at the same time the long term experience and traditions of the Department.

More specifically, the undergraduate physics curriculum consists of:

1. 35 theoretical courses, out of which 25 are mandatory for all students, 1 elective core course, 6 courses are in the orientation area selected by the student and 3 additional are elective courses. There are as many as 48 elective courses offered associated to the following orientation areas:
  - Solid State Physics and Materials Science
  - Nuclear and Elementary Particle Physics
  - Astrophysics, Astronomy and Mechanics
  - Environmental Physics and Meteorology
  - Electronics, Computing, Telecommunications, Automation
  - Education
  - General Cycle
2. 7 physics laboratory courses (4 in the area of general physics, 2 core laboratory courses selected by the student and 1 laboratory course in the orientation area selected by the student)
3. A Diploma Thesis offered as a mandatory course, covering 2 semesters

The minimum total number of ECTS units is 240 in accordance to the Bologna process.

In order to get a feedback on the program of study attended by the students enrolled, the Department devised a teaching evaluation procedure based on a specialized questionnaire filled by the students at the end of each semester, as a mechanism to further improve the quality of teaching.

The Committee considers that the core physics and mathematics curriculum is of high quality. However, it finds that the scope of having 7 different specialization orientations, already at this level, and an associated high number of elective courses is excessive. Although the Committee recognizes that this may offer concrete professional scope, it nevertheless considers it confusing to the students, partially preventing them from acquiring a broader view of physics.

The undergraduate teaching laboratories are numerous and seem to cover the standard needs of an undergraduate program, even though the Committee has not had the

opportunity to visit the associated infrastructure.

Furthermore, the Committee notices an unacceptably long study period (average of 6.5 years to complete the degree).

The Committee was informed that the student attendance is low, at the beginning of the courses 40-55% and afterwards dropping sometimes down to 10-15%. Drastic measures have to be undertaken by the Department to change this situation as it is reflected in the accumulation of unreasonably high number of “inactive” students (only about 1200 out of 3500 enrolled students are considered to follow the classes normally). It is anti-pedagogical and disincentive to the regular students. Concerning this point, the Committee is well aware that this unacceptable situation is rather common across the Greek university system.

### ***APPLICATION AND RESULTS***

Overall, the physics undergraduate curriculum is well structured (introductory, core and specialization courses). The course content is of high quality but the number of courses is still high. A further reduction of courses is needed, some reduction of the core courses and especially a greater reduction of the elective courses. The reduction process must be accompanied by consequent improvement in cohesion and depth. The resulting structure will improve the quality and content of the program.

The undergraduate teaching laboratories seem to function adequately; however, from the pictures presented to the Committee the space allocated appears to be limited. The Committee recommends that measures should be taken for regular refurbishment and maintenance of the equipment. In addition, there is a serious lack of specialized technicians for the purpose. The present situation, with primarily unpaid graduate students covering the needs in the educational laboratories, is not acceptable.

The Committee considers that the present structure of the orientations offered in the study program is divisive for historic reasons and it does not reflect the current educational trends and training needs.

### ***IMPROVEMENT***

The Committee suggests that the number of core courses should be further reduced, mainly by suitable regrouping (eg. Mechanics 1 and 2), combined with an associate enhancement of the laboratory sessions and coursework.

The number of elective courses per year should be significantly reduced (for instance some courses could be offered every 2 years). The number of elective courses chosen by the students should not exceed 4 courses per specialty out of approximately 24 offered in any one year. It is also suggested that excessive fluctuations of the number of students in any course should be avoided, with no less than 5 enrolled students per course.

The Committee considers that priority should be given to specialized technical personnel in order to guarantee the quality and continuous functioning of the experimental courses, due to large number of students sharing the experimental set-up. A solution can be provided regarding this issue by retraining existing personnel or granting teaching assistantships to graduate students (preferentially PhD students).

It is common international experience that a student can be enrolled only in a certain number of courses at the beginning of each semester. The student is then obliged to attend the course, to participate in homework or class work (laboratories), to attend the mid-term examinations, etc. After fulfillment of all these requirements, the student can then participate in the final examination, irrespective of whether it is the first time or after multiple attempts. The Committee realizes the difficulty of implementing this procedure, given the current pool of “students under degree”, but this should be seriously considered by the Department in the future re-organization and re-structuring of the universities.

## ***A. Curriculum and Teaching***

### ***A1.2 Curriculum: Master and Doctoral level***

#### ***APPROACH***

The Department offers a graduate program in basic Physics and a program in Applied Physics. The former comprises 3 specialization areas: **Physics of Condensed Matter; Nuclear and Elementary Particle Physics; Astrophysics, Astronomy and Mechanics**. The second program comprises 4 specializations areas: **Environmental Physics; Electronics and Radioelectrology; Electronics and Automation** (offered jointly with the Informatics and Telecommunications Department).

In addition, the Department of Physics participates in a number of other graduate programs at the master level (**Theoretical Informatics and Modeling, Oceanography, Medical Physics and Radiology, Microelectronics**), in collaboration with other University departments and schools, the Democritus National Research Center, the National Technical University of Athens, the National Center of Sea Research, the University of Crete, the Aristotelian University of Thessaloniki, and the University of Ioannina.

All the above master courses are credited in ECTS credit units, according to the Bologna Process, for a total of 90 units. Each program spans four semesters, including one semester for the thesis and is operated under the responsibility of a Sector of the Department, which handles the students' admissions.

There are practically no scholarships available to support graduate students studying under master and doctoral programs except those funded by the national IKY Foundation and from various European/national programs.

The master programs are planned according to the research interests of the individual laboratories as well as the didactic orientation of the Department. Generally, the study programs are of good quality, comparable to the level of master programs offered by other universities worldwide. Several of the topics are of applied nature, serving the needs of the general society by providing technological knowledge and methods for solving several current problems of interest.

There is an advising committee to annually review the progress of each master and doctoral student. A significant number of the students graduating from the Department with the *Πτυχίον* enter the master and doctoral programs. The total number of master students accepted per year by the Department is approximately 70. The number of students currently working for their PhD is 143. The mean duration of the master studies is 3 years and for the PhD 4.5-5.0 years.

There are a very large number of courses offered. A master's student must follow a number of compulsory core courses as well as electives courses, depending on the specialization area (15 courses in 3 semesters or 12 courses plus a master thesis dissertation).



### ***APPLICATION AND RESULTS***

The Committee discussed the graduate program (master and PhD) with the Chairman of the Department, the Chairman of the Internal Evaluation Committee and the Sector Heads. It notices that in the fundamental physics graduate program the presence of theoretical physics related topics is not evident in all 3 orientations.

It became evident that there is no institutional financial support for master and PhD students apart from bespoke research programs. The need for a national scholarship system was emphasized. Due to this absence of financial support, most students seek outside work, effectively becoming part-time students, thus lengthening the duration of their studies. National scholarships for graduate students are formally established in most developed countries in the world.

### ***IMPROVEMENT***

The Committee recommends the adoption of a number of core courses, common to all 3 orientations of the basic physics program, covering basic theoretical and experimental physics tools, such as mathematical physics, statistical physics and experimental methods.

A major problem in the graduate programs is the lack of national scholarships to support the students while attending the programs offered by the Department. A structured national scholarship program should be realized as quickly as possible.

The implementation of remunerated teaching and/or research assistantships would serve the dual purpose of providing financial support to graduate students during their studies and of providing scientific assistance for the presently under-staffed laboratories that in some cases lack the required technical support.

Another measure that will improve the situation would be to establish start-up funds for new faculty members in physics. Such funds are available to new faculty at major universities in the US and Europe. The Department would not be able to achieve its goals if the current situation without start-up funding continues.

## **A2.1 Teaching Undergraduate**

### ***APPROACH***

The teaching methodology adopted by the Department appears to be the same as that established internationally. It is based on a series of lectures, complemented by problem-solving sessions. In the case of physics laboratory courses, all students in a session perform on a rotational basis the required experiments, except from some introductory laboratory exercises where all simultaneously are trained in common experimental tools and skills; From a pedagogical point of view the rotational system presents a disadvantage, although from the financial point of view it minimizes the cost of acquiring the necessary infrastructure.

The Committee was informed that the educational material of the courses is posted on the Web pages of the Department and is suitably accessed by the students and faculty members via a security code.

All courses offered by the Department and the University are well supported, as far as the bibliography is concerned, where each student receives for free one of the textbooks proposed by the Department out of a list of possible books in a catalogue. Most of the textbooks existing in the international bibliography, and in their translated versions, are used in the courses offered by the Department and it seems they can be found also in the Library, but not in multiple copies.

The teaching staff-to-active students' ratio is approximately 1:15, given that there are 80 staff members for 1200 regular active students out of a total number of 3500 students. The teaching staff-to-active student ratio is close to international standards (1:10). However, in the near future, this number will deteriorate because of no replacement of the faculty retired.

The Committee did not have the possibility to visit in situ the teaching laboratory facilities of the Department and therefore cannot formulate any opinion on this subject. According to the information received they seem to meet the present needs of the Department. However, considering the large number of student sessions in the laboratories, sufficient technical assistance was envisaged.

With respect to the student evaluation, the Department utilizes a combination of mid-term examinations, problem solving questions, written examinations and practical exercises (in laboratory courses) for its offered courses. However, the Department does not carry out the system of "*Advisor Professor per student*", who continuously monitors the progress of his/her students throughout their studies.

### ***IMPLEMENTATION***

The academic staff of the Department is currently composed of 85 faculty members; i.e., 24

Professors, 27 Associate Professors, 31 Assistant Professors and 3 Lecturers. The Department has 9 technical staff members (ΕΤΕΠ), 3 technical/teaching staff members (ΕΕΔΙΠ) and 7 secretaries located in the 5 Departmental Sectors. In addition, there are 24 administrative/teaching staff members (ΙΔΑΧ). (source: official Webpages of the Physics Department)

With the exception of the number of technicians, which is very limited and apparently inadequate to serve the needs, the Department staff is sufficient to realize its educational program, both at the undergraduate and graduate levels. However, the fact that each laboratory course has to be subdivided into several groups (of about 10-15 students each) presents an insurmountable task considering the current number of technical staff.

Due to the ongoing inaccessibility of the laboratories of the Department, the Committee cannot comment on the overall infrastructure, room-space availability and accompanying teaching material.

The textbooks provided for each course as well as the laboratory notes represent good introductory material to successfully overcome the difficulties of the required subject topics. In addition, the Committee was informed that there exists remote access (via Internet) to the content of the courses offered.

A positive aspect of the undergraduate program that should be underlined is the possibility offered for the students to participate in the European exchange program Erasmus, allowing them to gain experience within the European Area of Higher Education.

The Department has introduced the collection of data for the evaluation of the teaching personnel (questionnaire), which enables the academic staff to draw useful conclusions about their overall performance.

### ***RESULTS***

The intake of the Department is approximately 250 students per year. It is expected that following the request from the Department, this number will be reduced in future years. According to the statistics provided by the Department, the total number of undergraduate students currently enrolled is about 3500, but only 1200 (~30%) of them are 'active' students. A significant number of about 2300 (~70%) are "inactive students" («αίωνιοι φοιτητές»).

The number of students graduating per year is on the average about 120, which corresponds to about 50% of the entering students every year, but only to about 3.3% of all the enrolled students and to about 10% of the currently-active student body.

There is an uneconomical and unnecessary extension of the studies, which presently lies above the 4 years. For instance, the average duration of undergraduate studies is 6.5 years, and only a small fraction of the enrolled students succeed to graduate within 4 years.

### ***IMPROVEMENTS***

With respect to the guidance of students by the faculty members, each student should have an “Academic Advisor/Tutor” during his/her studies.

Every effort should be made so that sufficient funds are secured by the Department for the maintenance of teaching and research equipment.

A necessity exists for hiring more technicians. Taking into account the current economic crisis, an alternative solution for lab supervision would be to offer a sufficient number of teaching assistantships to students doing their graduate studies.

The faculty members are giving appropriate weight to the promotion of physics to the local society and in particular to the younger generation. One excellent measure they use is to regularly receive groups of secondary school students and demonstrate to them various physics experiments. In view of this activity, the Committee encourages the faculty members and the University at large to take more actions towards advertising the Department’s educational programs.

The Committee also believes that the number of students enrolled in the Department has to be drastically reduced, in order to maintain the good quality of the program. Like all other universities in Greece, every effort should be made to complement the existing national entrance examination system with the proper measures to attract only students wanting to study the particular fields.

## ***A2.2 Teaching Master and Doctoral studies***

### ***APPROACH***

The Department of Physics offers organized and structured graduate studies within a wide-ranging field for basic and applied physics. The master's graduate program comprises of lecture courses and a research thesis. Some master programs in applied physics do not require a thesis. For the enrollment to the PhD program the award of a master degree is a prerequisite.

The selection of students follows agreed procedures that include an application letter, the candidate's curriculum vitae, a statement of interests and possibly an interview. Acceptance of the candidate students is done after approval by the General Assembly of the Department.

Following the completion of the lecture series, the students select their research supervisor and are integrated within a specific research group. The topic of their PhD thesis as well as the student's annual progress is monitored by a 3-member Coordinating Committee.

Graduate students enjoy similar arrangements as undergraduate students concerning every aspect of their studies and student welfare.

### ***IMPLEMENTATION***

For each master course there are written examinations as is described in the bulletin for graduate studies. The bulletin describes rules to be followed and the content of the course. Most of the material is available on the Internet.

For the doctoral program there is a committee, consisting of 3 faculty members, who follow closely the progress of the candidate and the selection of the topic for his/her thesis. After the completion of the work for the doctoral thesis, the students defend their PhD thesis in an open seminar, in front of a seven-member examination committee, during which an oral examination of the methodology followed and the outcome of their research takes place. The doctoral theses are expected to lead to original publication(s) in international refereed journal(s).

### ***RESULTS***

The students who complete their graduate programs within the normal study period (average 3 years for the master degree and 4.5 years for the PhD degree) are generally well-trained and with the potential for further evolution in academic and/or technology careers.

Graduates of the Physics Department have secured permanent positions at universities, research centers and the private sector in Greece and abroad. The Department graduated 18 PhDs and 69 MScs during the period 2009-2010.

***IMPROVEMENT***

As emphasized throughout this Report, it is necessary to secure scholarships for all graduate students at the master and PhD levels. This can be realized through the establishment of teaching/research scholarships and through the submission of applications in national and European funding agencies.

The Committee recommends that the graduate experimental laboratories should obtain additional technical support.

## **B. Research**

### ***APPROACH***

The Department strives for excellence in research, by concentrating in a wide number of selected state of the art themes within the 5 Departmental Sectors comprising:

1. Solid State Physics (20 staff members)
2. Nuclear and Particle Physics (23 staff members)
3. Astrophysics, Astronomy and Mechanics (16 staff members)
4. Environmental Physics - Meteorology (13 staff members)
5. Electronics, Computing, Telecommunications, Automation (13 staff members)

The Physics Department promotes research by essentially appointing Greek scientists with extensive experience at outside international institutions of high calibre. The research level is high, indicated by the large number of publications per faculty member in internationally recognized peer-reviewed journals (about 2.5-3.5 publications/staff member/year for the time period 2005-2010). This is also reflected in the ability of the Department to attract competitive grants from European and other research funding agencies.

The Committee was informed that there exist a healthy number of graduate students, of whom only a very small number are funded, mostly due to the lack of national financial support. The research in the Department is supported by about 200 Masters students and 143 doctoral students.

The number of postdoctoral fellows is very minimal, financed from grants from national and European funding agencies. Considering the important role that postdoctoral fellows play in research, this could be damaging in the medium to long term research planning, succession and reinvigoration.

The Committee considers that the number of technical staff in the laboratories is clearly inadequate and this matter must be urgently addressed. Due to the lack of new positions, the necessary support could be provided by either restructuring or redistributing and retraining the available manpower within the University and/or introducing teaching/research assistantships of graduate students.

### ***IMPLEMENTATION***

In the past 5 year period, 2005-2010, the Department has been very successful in securing research funds from several competitive external grants from public and private sectors. For the period 2005-2010 the total research budget coming from the Department's academic staff through various grants was of the order of 12.6 M€.

In the last 2 years there is a significant increase in the number of good quality publications and citations, to a large extent due to the active involvement of the Department in large scale international collaborations.

From the Department's official data made available to the Committee, the following numbers are obtained:

1. The members of the Department published about 1250 articles in refereed journals in the period 2005-2010, corresponding to an average value of about 2.5 articles per year and per faculty member. For the last academic year (2010-2011), the corresponding number is 292 articles in refereed journals and 3.5 articles per year and per faculty member. These numbers are considered to be very good.
2. The total number of citations is approximately 30000 for the period 2005-2010. This corresponds to about 60 citations per member per year.
3. These figures are considered to be good in relation to other physics departments in Greece.

Most of the research programs of the Physics Department are conducted with significant collaboration with major universities and research institutes in Greece and abroad.

### **RESULTS**

The Committee was unable to establish a coherent strategic plan on the Department's goals and aspirations with regards to the appointment policy, succession planning and infusion of new research directions. This is expected to create serious problems for the future of the Department, considering that a significant number of staff members will retire in the near future and will only be replaced by a very limited number of new appointments.

The scientific output of the Solid State Physics Sector is considerable. The Committee finds that its activities are somewhat dispersed on too many topics, thus lacking a coherent visibility. For instance the activity of the *Ινστιτούτο Στερεού Φλοιού της Γης* seems quite disconnected to the mainstream of the sector and more appropriate to a Department of Geology or related. On the other hand the Committee notes and encourages the desire of the Sector to develop activities in the soft condensed matter physics area and further recommends strengthening activities in materials with highly correlated components research.

The Nuclear and Particle Physics Sector produces highly visible research outcomes in key areas, both in theory and experiment, with significant contributions to forefront high-energy physics experiments. In view of the retirement of some members of this Sector, provisions should be made to maintain its international status.

In the Sector covering the scientific areas of Astrophysics, Astronomy and Mechanics, there seems to be a significant overlap in the research interests and outcome of the corresponding faculty members. The Committee recognizes the importance of this Sector in the training of physics students at both the undergraduate and graduate levels and appreciates the contribution of its members in this respect. With regards to research, the Committee encourages to exploit the significant overlap of interests with the other two basic physics Sectors.



The Sector of Environmental Physics and Meteorology highlights the importance of physics in industry, economy and everyday life. In doing so, it promotes the profession as an established societal need. It contributes to the professional integration of physicists. The research conducted by this Sector is more service oriented and attracts significant funding from public and private organizations. This is in particular reflected in the large number of scientific collaborators attached in this Sector.

The Electronics, Computing, Telecommunications and Automation Sector allows the Physics Department to maintain a strong interface with these important areas of applied physics and engineering. As such, it provides know-how to the other Sectors; it is involved in joint research projects and conducts a strong research program of its own. It also contributes significantly to the teaching and training activities of the Department.

### ***IMPROVEMENT***

- The Committee identified as a serious concern the uneven distribution of resources within certain Sectors and concomitantly a lack of coherence in their research policy.
- The Department, in developing a new strategic plan, should take into strong consideration the imminent departure of a significant number of staff members in the next 2-3 years and the limited amount of replacements/new appointments. In this respect, the Department should take advantage of the possible availability of its Emeritus members and integrate them into its research and training activities.
- With respect to the different Sectors the following measures are recommended:

The Committee encourages the desire of the Solid State Physics Sector to develop activities in the soft condensed matter physics area and further recommends to strengthen activities in materials with highly correlated components research.

In view of the retirement of some members within the Nuclear and Particle Physics Sector, provisions should be made to maintain its recognised international status.

With regards to the Astrophysics, Astronomy and Mechanics Sector, the Committee encourages to exploit the significant overlap of interests with the other two basic physics Sectors.

It is also recommended that long-standing activities in the area of Non-Linear Dynamics, in the general sense, currently scattered across several Sectors of the Department, be reorganised in a more coherent and visible way.

The Committee suggests that in respect to the important role and the size of the Department within the Greek scientific community, and in order to complete the spectrum of research activities in Physics, the introduction of modern atomic, molecular and optical physics, in particular laser physics, should be undertaken.

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<b>C. All Other Services</b>
<b><i>APPROACH</i></b>
<p>In view of the unfortunate situation with the occupation of the University premises, the Committee could not get a picture of the Physics Department's infrastructure facilities (offices, teaching rooms, laboratories, workshops, administrative services, library, computer center, subsistence and lodging facilities, recreation facilities etc.).</p> <ul style="list-style-type: none"> <li>• The secretariat and technical staff are attributed per Sector. This way to attribute human resources may face serious management problems across the Department in view of the announced future staff reductions.</li> <li>• The student access to the Web pages subscription, grading by professors on the Web and the recent introduction of the management of electronic book distribution).</li> <li>• The technical support (6 persons) for teaching and supervising at the laboratories is evidently insufficient to cover the needs of the curriculum.</li> </ul>
<b><i>IMPLEMENTATION AND RESULTS</i></b>
<ol style="list-style-type: none"> <li>1. The administrative infrastructure is adequately organized in the Department.</li> <li>2. Students can access the library information remotely.</li> <li>3. There is a pronounced inadequacy of the number of the technical personnel in the Department.</li> </ol>
<b><i>IMPROVEMENTS</i></b>
<ul style="list-style-type: none"> <li>• One of the Department's priorities should be the recruitment of new technical personnel.</li> <li>• All secretarial personnel should undergo thorough professional training on a regular basis.</li> </ul>

### ***D. Strategic planning, perspectives for improvement and potential inhibiting factors***

- Short, medium and long-term goals:

1. The curriculum is well organized structurally. The Committee considers that the number of elective undergraduate courses (48) is large and efforts should be made to reduce their number offered every year to roughly half, by combining similar thematic topics.
2. The present technical personnel is clearly insufficient to cover the needs of the Department and especially those of the laboratories with a large number of students. Under the current circumstances this insufficiency could be addressed through, for example, the introduction of a teaching/research assistantship program for graduate students.
3. It is advised that a careful planning of the outreach and a better link with the local schools and the wider community should be strongly promoted.
4. It is important that the Department maintains its continuous efforts to produce world-class research. This would require the gradual renewal of the research staff and the research laboratories, resulting in the introduction of state-of-the-art infrastructure and facilities.
5. The age profile of the Department shows that a large number of the academic staff will reach the age of retirement within the next couple of years. The Department will be faced with a difficult situation and has to establish a contingency plan.

The following inhibiting factors hold for all Greek universities:

- (a) The universities are restrained by the Law, which does not permit them to distribute some allocated funds and positions according to their needs. They do not have sufficient self-governance to redirect funds and positions according to their strategic planning. Each university should be given a budget and be allowed to set its priorities.
- (b) The Committee is seriously concerned by the student occupations (**Καταλήψεις**), with a high frequency of occurrence and with the resulting destructive fall-out and repercussions in the study and research activity of the Department. In particular, the Committee observes that this phenomenon contributes to the lengthening of the studies and to delaying the conferment of degrees. This situation is unacceptable as it also hinders the academic staff to carry out their research and to access their offices and laboratories.
- (c) More effort should be made by the relevant State authorities to ensure the continuity and non-interruption of the functioning of the University throughout the academic year. This seems to be a general problem in Greece.
- (d) Like in most other universities in Greece there continues to be a relatively high percentage of students admitted to the Department through the national examination system without the students necessarily wanting to become physicists. This problem holds for almost all scientific fields and has to be seriously addressed by the State, in close collaboration with the universities.

## ***E. Conclusions:***

Conclusions of the External Evaluation Committee and recommendations:

Most of the research in the Department is of high international standing.

- In its long history the Department has played an important role within the Hellenic scientific community and developed strong connections with major international institutions.
- Many of the faculty members of the Department are established actors of the international scientific community in their areas of expertise.
- The Department provides excellent training in Physics. Many of its graduates have pursued or are currently pursuing careers in several established universities and research centers within and outside the country.
- The Committee noted scientific exchanges with other research institutes in the Athens area.
- The deficiencies in undergraduate and graduate studies are attributed more to the general institutional structure of the Greek universities and the peculiarities of the admission system.
- The Committee strongly recommends that a revision of the students' course load should be made along the lines proposed in part A of this Report. This should allow them to make a better informed choice of their specialization area and their future professional development.

The Committee strongly believes in the necessity to implement a minimal acceptable system of scholarships for graduate students, both at the Masters and at the PhD level. This can be realized through the implementation of teaching/ research scholarships and through the submission of applications for European and/or national research funding.

The Committee recommends that all laboratories require the continuing support of technical personnel. Graduate students with an appropriate teaching and/or research assistantships would successfully support the laboratories and help in the realization of the teaching/research programs.

The Department should develop a clear and coherent strategic plan within the framework of the higher education national legislation and follow a recruitment policy for new faculty members.

The number of undergraduate students entering the first year in the Department is about 250, while the current total number of "active" students is about 1200. The Committee was informed that the vast majority of them and particularly those "under degree", do not attend the courses offered and they cannot be considered as active students (they simply attend only the examination periods). The Committee believes that the number of students entering in the Department has to be drastically reduced to no more than 150 students per year, in order to achieve a much better functionality and quality of studies offered.

Students should be continuously evaluated for each course and should be enrolled in only a certain number of courses at the beginning of each semester. They can then participate in the final examination under pre-specified evaluation criteria. The Committee strongly advises establishing an academic/personal tutoring system, where each faculty member is assigned a small number of students to continuously monitor their study progress. This should be included in the teaching load of the faculty staff.

It is also advised, where possible, that emeritus professors are involved in teaching and research activities.

The scientific work of the Department is severely obstructed by several factors that occur in general in all Greek universities:

- The lack of the timely renewal of academic staff and the delay in completing the appointment process.
- The heavy administrative burden and bureaucracy involved in the Department processes, such as recruitment and budget allocation.
- Financing of participation in conferences/workshops/schools outside of Greece and within Greece is practically non-existent.
- Start-up funds and matching funds for new academic staff are non-existent.
- Delay in the approval and roll-out of the research programs supporting both students and academic staff.
- There is no structural position of postdoctoral fellowships.

#### **NOTE**

The Committee's work during this evaluation was hindered by an occupation of the University premises by students, forcing the Committee to rearrange its evaluation program in a nearby hotel. The Committee appreciates the firm commitment of the HQAA authorities to maintain the present evaluation schedule.

The Members of the Committee

**NATIONAL & KAPODISTRIAN UNIVERSITY  
OF ATHENS**

**DEPARTMENT OF PHYSICS**

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