MINISTRY OF EDUCATION AND RELIGIOUS AFFAIRS
GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY
SUPERVISION OF RESEARCH CENTERS DIRECTORATE

Evaluation Report

Domain: PHYSICS

Date: 3-12/2/2014

Institutes

Electronic Structure and Laser (Foundation for Research and Technology)
Nuclear and Particle Physics (National Centre for Scientific Research "Demokritos")
Nuclear and Radiological Sciences, Energy, Technology and Safety (National Centre for Scientific Research "Demokritos")
Advanced Materials, Physicochemical Processes, Nanotechnology & Microsystems (National Centre for Scientific Research "Demokritos")
Theoretical and Physical Chemistry (National Hellenic Research Foundation)
Astronomy, Astrophysics, Space Applications and Remote Sensing (National Observatory of Athens)

EVALUATION COMMITTEE

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Executive Summary

At the start the evaluation panel would like to thank the staff of all the institutes visited for their welcome and the effort they put into this review. The institutes have lived through very uncertain times and in general have responded well although there is an element of pursuing funding rather than concentrating on their core missions. This may become more challenging in the future as European Commission funding changes under Horizon 2020.

This evaluation concentrated on assessing the current health and future plans of physics institutes in Greece only from 2005 to 2012. It is not an assessment of the overall picture of physics in Greece since it does not take into account the role of universities or other bodies. Likewise it does not cover the immediate past year, 2013. While there are historical reasons for having institutes separate from universities the reasons now are less clear except where there is a need for long term commitments, running large research infrastructures, or providing a national service of some kind.

One issue that has made evaluation difficult is that many of the institutes have been merged during the period of evaluation and several have new directors who have only been in post for short periods. The panel took a pragmatic view on how to deal with this but realise that actions have already been undertaken to address some of the issues that are of concern. The panel tried to judge the outputs in relation to the prevailing economic conditions.

The quality of science and ambitions of all institutes has been found to be very good despite the economic problems that affected Greece during the middle of the evaluation period. However there were some themes raised by all institutes:

Strategy

There is a desperate need for a national research policy at a level that will allow the institutes to position themselves strategically for the country.

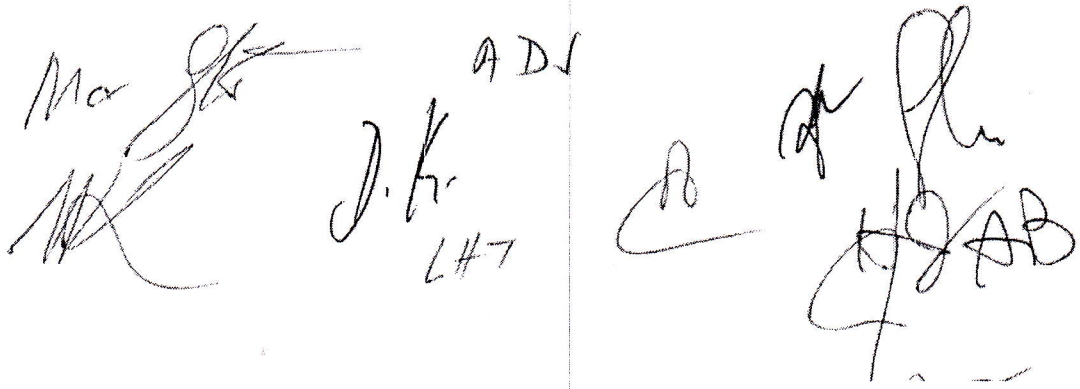
Abrupt variations from year to year in national funding makes any long term planning and investments difficult to manage and can lead to mission drift in order to make up shortfalls.

While some element of competition is desirable, there appears to be many areas of research that are duplicated between institutes and a lack of knowledge of what is being undertaken elsewhere.

There is a clear ambiguity in approach to the links between institutes and universities. Isolating institutes other than for national security reasons is counter-productive and there should be much more encouragement for institutes and universities to work together by interchanging staff, adjunct positions and joint projects.

Funding

The on-going financial crisis has affected the ability of all institutes to focus on undertaking research and a considerable amount of time is taken up chasing other funds.



As national funding towards the institutes has declined, the reliance on gaining grants from the European Commission and other similar bodies has increased and in most cases has allowed the institute to increase its research output and impact.

The ability to attract structural funds that are available has been thwarted by the lack of national matching funds.

Personnel

The virtual embargo on filling posts especially with younger scientists has led to a demographic imbalance with the largest group of personnel over 50 years old. This has short to medium term consequences for all institutes

In addition to the age imbalance, the gender imbalance is marked

There is a lack of technical support staff

Organization

No institute had an international advisory board and the governance structure of all institutes is not in line with international best practice

The bureaucracy imposed by central government is far too heavy and leads to a lack of flexibility in allowing the institutes to react to changing circumstances. It indicates a lack of understanding of the risks involved in undertaking cutting edge research

Facilities

In general the current state of equipment is reasonable to good but the lack of current investment means that this position is not sustainable in the future

Outreach

There is a general lack of understanding of the so called "innovation cycle" allowing optimum exploitation of research outputs

Greek industry, where it exists, is generally unaware of the results of the research undertaken in the institutes.

There now follow some general comments regarding the institutes and the larger conglomerates where applicable.

FORTH – Hellas

The benefits of a close relationship between the University of Crete and FORTH are clearly seen in the large number of professors who do all or part of their research in the institute. The future strategy is to follow the European Commission's Horizon 2020 priorities since it is seen that this will ensure the long term viability of the group. The institute has good linkages with other European research infrastructures such as their membership of CHARISMA, a virtual infrastructure bringing

together researchers in cultural heritage. Also to be noted is the interaction between the local authorities and the institute regarding the future strategy especially of physical infrastructure and the development of an innovation centre. The institute currently has two distinct activities although there is support across activities there is a desire for the Astrophysics group to form a separate institute in due course.

The IESL-FORTH Physics program excels in the areas of electronic structure of matter and atomic condensates, and novel lasers and laser applications. In particular, IESL research in attosecond metrology and in metamaterials and plasmonics is rivalling those of the world-leading institutions, and the Institute is poised to achieve Nobel-level ground-breaking results. The solid state research at IESL comprises physics of III-arsenides and III-nitrides and also metal oxide semiconductors. It focuses both on fundamental research and on device applications. Nanostructures such as metamaterials and atom lasers are important constituents of the program listed below. To date IESL has achieved truly world-leading positions recognized by two highly-prestigious international awards: 2005 Descartes Prize and 2013 James C. McGroddy Prize for New Materials.

The IESL Astrophysics Program is very active and productive in many fields of Galactic, Extragalactic and Theoretical Astrohysics. Their main observational facility is the Skinakas Observatory with its 1.3 m telescope, equipped with a unique and innovative Optical Polarimeter. This was the only fully operational telescope in Greece during this evaluation period. The group performs outstanding outreach activities that involve a substantial participation of the Cretan population.

Demokritos

The reputation and footprint of Demokritos is an ideal starting point for creating a national innovation centre as proposed by the president. The question arises as to what the centre can do as a whole and what should be left to the individual institutes and, indeed, what should be left to individual groups. There are a number of campus wide initiatives and services which should be centrally driven. The first is to develop an outward facing innovation centre with IPR management, financing, marketing expertise available to all. There should also be a coherent approach to marketing the campus to industry, public bodies and to policy makers at all levels. In addition, in line with the key societal themes such as energy, the centre should ensure a coherent research policy is developed between the institutes. Thought should also be given as to centralising the training of management and technical staff. An analysis should be made as to whether other support services could give further efficiencies (e.g. general procurement, finance, human resources, ICT). It is recommended that attention should be made to other international centres with a similar mission to assess what might be best for Demokritos.

The links with universities needs to be strengthened such that university professors and institute staff could hold joint positions. Likewise, there needs to be an assured flow of postgraduate students and postdoctoral fellows working in the institutes to assure new ideas are fostered.

INPP

INPP, the *only* institute in Nuclear, Astroparticle and Particle physics in Greece, with its excellent performance during the years is very well recognized internationally. Techniques developed for fundamental science in Nuclear and Particle physics at INPP have led to important spin-offs in

technological sectors of the economy, including applications of nuclear instruments in commercial developments and in other areas of science. The future plans concern very exciting and top quality programs both in house and at CERN. Particularly important is the **CALIBRA** proposal for the accelerator based research in nuclear science and applications providing excellent opportunities and improving synergies with other institutes of Demokritos. Within CALIBRA the construction of a neutron beam line and the installation of a donated cyclotron for the production of radio-isotopes are very strategic.

INRASTES

INRASTES. The Institute of Nuclear and Radiological Sciences and Technology, Energy and Safety) was established in April 2012 as a result of a successful merger between the former Institute of Nuclear Technology and Radiation Protection and the former Institute of Radioisotopes and Radiodiagnostic Products. INRASTES is organized in four thematic areas/action lines:

. Nuclear Technology

. Radiological Sciences and Technology

. Biodiagnostic Sciences and Technology

. Energy and Environmental Technologies and Safety

The new organizational structure is expected to improve coordination and strengthen the interactions between the research groups resulting in the overall achievement of excellence in the research outcomes. This is in line with the policy of the General Secretariat of Research and Technology and the NCSRD. In this respect, we recognize and applaud the leadership of the director (Dr. A. Stubos) of the Institute's staff to take on the challenge and successfully prepare for the future.

IAMPPNM

IAMPPNM is by far the largest Institute in Greece, with several cutting edge scientific and RTD activities in the fields of nanomaterials, nanotechnology, and processes. It owns unique-in-Greece equipment for this kind of research, including an ISO certified "Nano and MEMS Laboratory". It was created in year 2012 by merger of the three institutes of NCSR Demokritos, IMS (Institute of Materials Science), IPC (Institute of Physical Chemistry) and IMEL (Institute of Microelectronics). It has excellent scientific performance, comparable to and in many cases better than that of similar sized institutes in the EU. Future plans include the **Nano-GR proposal** which aims at accelerating the development of the next generation of products and processes and also rapidly generate prototypes for many knowledge-driven applications. Largely based on existing facilities, the project is sound and should be supported, provided efforts will be put on management, organisational and exploitation issues.

Other Institutes

TPCI

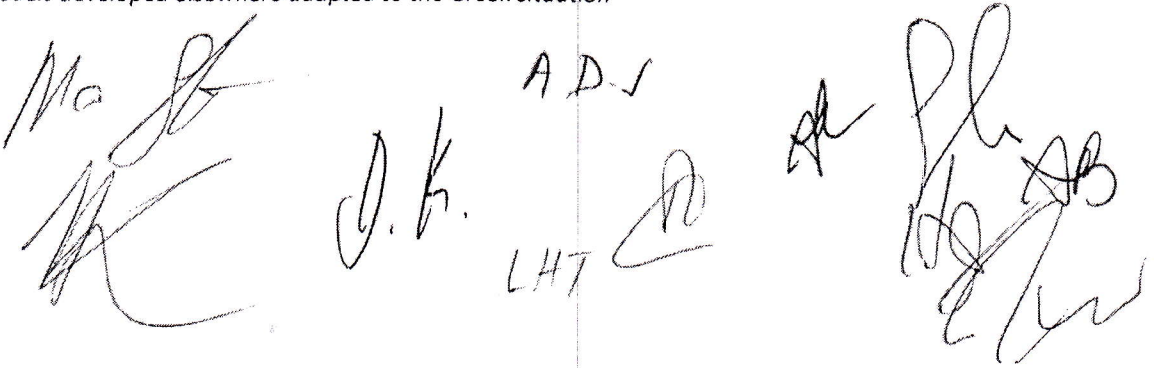
The Theoretical and Physical Chemistry Institute (TPCI) is an excellent example of how world class research can be performed at a small institution by focusing on a limited area of science (physical chemistry at this case), providing sufficient and stable resources for sustained activity, and giving the researchers autonomy to plan scientific agenda. This Institute is unique in systematically integrating theoretical concept to experiments to applications, thus providing high degree of coherence within the program. It has shown excellent performance in research on experimental and computational / theoretical chemistry and physics; structure and properties of matter and light-matter interactions; and exploitation of materials with advanced functionality in applications such as energy conversion and storage, optical and electrochemical sensing, electro-optics and photonics. It has also translated its expertise in spectroscopy to the benefit of Greek industry. The outreach of the Institute to public at large has been good but that can be improved further by exploiting its location in central Athens and broad interest of the public in neighbouring Institute of Historical Research. Finally, we recommend that to facilitate the continuing progress and safe operation of the facilities at TPCI the laboratory and office spaces should be expanded as soon as possible.

IAASARS

IAASARS is the result of the merger of two Institutes: Institute of Astronomy and Astrophysics (IAA) and the Institute of Space Applications and Remote Sensing (SARS). The present institute activities span a broad range: Space and ground based Astronomy and Astrophysics, Remote Sensing, Solar Terrestrial Environment and Space Physics, and Signal Processing and Applications. During the evaluated period several excellence grants for long-term international projects have been won competitively and the prestigious L'Oreal award for women was given to one of the members. The election of the new Director is encouraging for the future of the Institute, notably for his strategic vision for integration. The Helmos Observatory, a now dysfunctional 10Meuro facility, stands an excellent chance under his Directorship. The societal benefit of the Institute is drawing both from the IAA and the SARS components and should be continued and carefully preserved.

Recommendations

- *Urgent steps should be taken to create a national research policy of sufficient detail to allow institutes (and universities) to align their missions and strategies to support the country*
- *Despite the on-going financial crisis, an agreed stable base line funding needs to be committed by the government*
- *Posts for younger staff must be created and supported*
- *Institutes and universities should be encouraged to collaborate more effectively via joint positions, adjunct posts and shared projects*
- *Where there is overlap in missions or where expensive equipment is duplicated some rationalisation is required*
- *A common approach to the exploitation of research outputs is needed using best practice models developed elsewhere adapted to the Greek situation*



- *The governance of all Institutes need addressing to ensure they are more publicly accountable for spending public funds yet allowing more flexibility in the use of such funds. This should be at "arms-length" from central government*
- *Following the previous recommendation the administrative bureaucracy from central government could be reduced allowing more freedom to the institutes to respond to changing scenarios*
- *All institutes should create International advisory bodies to direct institutional strategy*
- *All institutes should consider the new paradigm changes arising from open access to publications, data, citizen cyberscience, Massive Open Online Courses (MOOC)and other new developments under "Science 2.0."*
- *There should be a commitment to a long term national fund for large scale capital equipment which will allow institutes to attract structural funds. This should be used to encourage institutes and universities to work more closely together*
- *Institutes should look to forming associations with key industrial partners such as technology update clubs*
- *Institutes should use professional media placement advisers to better communicate their work to the public and private sectors*
- *There should be no distinction between permanent and other research workers with respect to tax conditions and ability to be principal investigators*

Theoretical and Physical Chemistry Institute
(National Hellenic Research Foundation)

Theoretical and Physical Chemistry Institute

(National Hellenic Research Foundation)

EXECUTIVE SUMMARY

The Theoretical and Physical Chemistry Institute (TPCI) at NHRF represents an outstanding research institution at the forefront of materials science relevant to nano-medicine, environmental monitoring and diagnostics. It is an excellent example of how world class research can be performed at a small institution by focusing on a limited area of science (physical chemistry at this case), providing sufficient and stable resources for sustained activity, and giving the researchers autonomy to plan scientific agenda. This Institute is unique in systematically integrating theoretical concept to experiments to applications, thus providing high degree of coherence within the program. It has shown excellent performance in research on experimental and computational/theoretical chemistry and physics; structure and properties of matter and light-matter interactions; and exploitation of materials with advanced functionality in applications such as energy conversion and storage, optical and electrochemical sensing, electro-optics and photonics. It has also translated its expertise in spectroscopy to the benefit of Greek industry.

For the further enhancement of the stature of TCPI, the Evaluation Committee makes the following specific recommendations:

1. There should be an external, international advisory board to set broad directions for the Institute.
2. More laboratory and office spaces should be provided as soon as possible. Also the building needs maintenance to meet safety standards.
3. The outreach of the Institute to public at large has been good but that can be improved further by exploiting its location in central Athens and broad interest of the public in neighbouring Institute of Historical Research.
4. The competitiveness of the Foundation and the ability to ensure financing should be strengthened not only by the EU and international organizations but also by the State. Base equipment should be provided by public sources so that external projects can be realized.
5. Strengthening the Institutes as sovereign administration - management units is recommended. Use of funding opportunities from the National Strategic Reference Framework for the development, renewal and support of infrastructures is strongly suggested.
6. Academic supervision has to be organized in such a manner that the leading scientists are accepted members of a university faculty (adjunct positions).

1.1 General description of the field

TPCI is a well-integrated institute for the research, development and applications of physical chemistry and chemical physics of materials. It was founded as one of the original institutions within The NHRF, which itself was established as a Legal Entity under Private Law:

Presidential Decree 226/1989 "Organization of the NHRF", according to Law 1514/1985

Its activities are organized in the following three fields:

1. Theoretical & Computational Chemistry and Physics (TCCP)
2. Materials Synthesis & Physical Chemistry (MSPC)
3. Photonics for Nano-applications (PNA)

In addition, the Institute has two laboratories named Applied Spectroscopy Lab and Photonics for Nano-applications Lab, which provide services to both internal and external 'customers'.

The TCCP group is engaged in understanding the nature of materials from a very fundamental point of view with the intent of predicting their structure and properties, which can then be tested and exploited in applications by experimentalists. The key topics of interests of this group include: (a)) Electronic structure & properties of many-atom systems, (b)) Structure, properties and spectra of atoms & light-matter interactions, (c) Statistical mechanics of biopolymers, and (d) Molecular dynamics atomistic modelling of various materials.

The MSPC group, on the one hand, is engaged in the synthesis of new materials with advanced functionality. On the other hand, it is focusing on the physico-chemical understanding of relevant phenomena using spectroscopic techniques. The key topics that are pursued by this group include: (a) Nanostructured amorphous materials, (b) Self-assembled nanostructures and complex nanomaterials, (c) Carbon-based nanostructured materials, and (d) Laser-assisted structuring and functionalization of materials.

The PNA group is interested in the fundamental aspects of how light interacts with matter, and then applying this understanding to nano-structuring of materials for device applications. The key topics of research by this group include: (a) Size-dependent phenomena at the nanoscale, (b) Biophotonics and space science applications, and (c) Optical devices/sensors & information processing.

1.2 State of the art in Greece compared to Europe and the rest of the word

1.2.1 Human Capital

NHRF sustains a very efficient personnel age, ranking structure and lean administration, which promise a very dynamic organization for the training of young scientist. The operative scientific staff (university graduates) constitute 88% of total personnel, and the administrative personnel amounts only to 7%. Thus the organization is highly efficient in terms of the management of human resources. For every permanent staff position another was created, mainly for young scientists. The number of permanent staff members has been reduced by 20% compared to 2006. For the future, care has to be taken that postdoc positions are not affected by permanent positions.

1.2.2 Research Accomplishments

NHRF ranks as the *1st in Greece according to the high quality publications index* (SCImago Journal Rank, SJR) and *in respect to the "Field-normalized citation score"* (National Documentation Centre: "Greek Scientific Publications 1996-2010"; NSI & InCites™-Greece).

Its success is also based on a national-level, unique and outstanding experience and equipment of *Vacuum ultraviolet (VUV) laser* systems and vibrational spectroscopy equipment. TCPI is an excellent example of strategic decisions that a small organization such as this can make, viz. to identify a particular area of potential application, provide sufficient resources for the activity to grow, and give the researchers sufficient freedom for innovation.

Theoretical and Computational Chemistry and Physics (TCCP)

The TCCP is the largest and leading group in Greece with focus on theoretical materials science. It provides expertise in state-of-the-art from multiconfigurational methods as applied to density functional theory (DFT), semi-empirical and atomistic models. Significant increase is noted in international visibility and impact according to co-authorships and citations as high as for institutions in Germany, Japan, China and USA.

The group has reported major achievements in the area of electronic structure of molecular systems, specifically the electronic, structural, and vibrational properties of molecules, clusters and solids. Remarkable results are provided in charge-transfer in carbon nanohybrids, chemical sensors, push-pull chromophores, and chemistry in confined space (– reversible encapsulation).

We further note periodic DFT calculations of structural, mechanical and electronic properties of 2D materials such as graphene under stress and the problem of Truncated Excited Wave Functions tackled by the Variational Principle.

A very important topic is treated in the area of light matter interactions in respect to potential energy surfaces of molecules, absorption and emission spectra, particularly in ultrafast processes: Time-resolved effects of electron correlations are computed to simulate the attosecond time delay in photoemission of electrons from different (sub) shells.

Achievements are also recognized in the area of DNA physics at the nanoscale and Molecular Dynamics (MD) modelling of amorphous materials such as glasses.

Materials Synthesis & Physical Chemistry (MSPC)

The joining of E.I. Kamitsos and G.D. Chryssikos some decades ago, both with background in spectroscopy of glass laid foundation of perhaps the strongest team in the world in this rather narrow area of physical chemistry. Whereas this team has maintained international leadership on this topic over the years, it is particularly impressive how the Institute has built on its strength and diversified in related areas during the reporting period, benefitting from the new discoveries made in the field. Thus the activities of the MSPC have remained on the forefront, limited, if at all, only by the availability of high-cost instrumentation and the number of researchers. Even with limited resources, it has managed to identify research problems which can be investigated with excellent outcome and impact on the field. It is noteworthy that most of the recent activity has been driven by some practical application, and therefore, we expect strong impact of the work both in academia and industry in Europe as well as rest of the world.

The research accomplishments of the MSPC group are best appreciated as building on the existing strength to advancing the state of the current 'hot topics'. Photonics was a booming field of advanced technology several years ago and it underwent a period of low activity due to the over production of optical fibre and economic crisis. It is now returning with renewed enthusiasm for new technological solutions to meet the ever growing demands of communication, health, environment and energy sectors. The MSPC group has been positioning itself in line with these expectations, for example through research on functional glasses with improved strength, optically active glasses for solar applications, new thermally poled glasses for stable, high optical nonlinearity, etc. The group has made significant contributions to the understanding of self-assembly copolymers, and then developing novel ways to manipulate the self-assembly process. The self-assembled, nanostructures prepared in this way are leading the synthesis of a highly useful new class of polymers for flexible electronics and sensors. The use of lasers in structuring and functionalizing the polymers as well as inorganic materials such as for plasmon enhanced solar cells is particularly exciting, as it provides spatial selectivity that is important for certain devices. With the recent award of Nobel prize for the discovery of graphene, there has been tremendous activity of research on carbon-based materials. The MSPC group's focus is on the functionalization of this class of materials, which exploits its previous experience on the functionalization of polymers.

Besides contributions to cutting edge research on specific topics mentioned above, an exceptional outreach effort of TPCI has been to transform its know-how in spectroscopy (near infrared (NIR), attenuated total reflectance (ATR), Raman etc.) and make it available to the benefit of Greek industry and society. The Applied Spectroscopy Laboratory has been proactive in not only solving industrial problems but also training the users in the use of such tools in quality control, process monitoring, etc.

Photonics for nano-applications laboratory (PN)

The Photonics for Nano-applications (PN) laboratory focuses on size dependent phenomena and fundamental processes at the nano-scale. New insight has been gained into the nanodomain behaviour of semiconductive metallic nitrides and electric nano-memories published in a most downloaded paper in Nanoscale Research Letters in 2013.

Outstanding progress in the development of coherent dynamics in nano-rotors led to mechanical nano-amplifiers, which will be the base of the next EU CosmoPhos project in nanomedicine.

A novel technique to generate plasmonic quantum dot nanocomposites on the basis of soft matter organization by structured optical fields and Laser radiation forces could be developed.

Industrial impact is being achieved by the successful development of photonic stress-strain sensors and optical chemosensors based on optical hybrid polymer/silica fibres.

1.2.3 Opportunities and threats in relation to the national regional economy

The Theoretical and Physical Chemistry Institute (NHRF) has got the opportunity to keep a forefront position in the field of materials science relevant to nano-medicine and, environmental monitoring and diagnostics, based on excellent knowledge and experience in the unique vacuum ultraviolet (VUV) laser-matter interaction and VUV and vibrational spectroscopy analytical equipment.

The academic excellence in the subject is top in Greece and very good on the international level, which can be catalysed further with public funding.

NHRF shows a relatively young age structure which provides opportunities for the training of young scientists for positions in industry and academia. Care must be taken that a substantial fraction of the positions remains available to young, non-permanent scientists in order to provide sufficient dynamics and renewal within the system.

The significant increase in international visibility and impact provides excellent expectations for growth and external funding.

There are definitive threats for the success of NHRF:

For example, when there is a lack and/or abrupt variations in national funding, the result would be long-term damage to the performance of TCPI.

Basic equipment has to be provided by public sources so that external projects can be realized.

The finding of excellent scientist from the international market could be hindered when state administrative regulations interfere with the internal institute financial management, recruitment process, etc.

Academic supervision needs to be organized in such a manner that the leading scientists are accepted members of a university faculty (adjunct positions).

1.3 Recommendation and Measures to be taken

The committee congratulates the members of Theoretical and Physical Chemistry Institute of NHRF for their outstanding scientific achievements at the forefront of physical chemistry and materials science relevant to nano-medicine, environmental monitoring and diagnostics, their will to be in line with the EU policy (Horizon 2020) and their active interaction with industry.

- We find that the staff is extremely motivated and dedicated to their mission. A long term national strategy should provide the frame work for their further successful development.
- There should be an external, international advisory board to set broad directions for the Institute.
- More laboratory and office spaces should be provided as soon as possible. Also the building needs maintenance to meet safety standards.
- An enhancement of closer partnerships through program agreements with private and public entities is suggested in order to attract the younger generation, exploiting the interdisciplinary interaction between natural science and historical research, and the invaluable location of TCPI in the downtown area with direct access to other institution of cultural heritage.
- The competitiveness of the Foundation and the ability to ensure financing has to be strengthened not only by the EU and international organizations but also by the State.
- Use of funding opportunities from the National Strategic Reference Framework for the development, renewal and support of infrastructures is strongly suggested.
- Strengthening the Institutes as autonomous administration - management units is recommended.
- Participation of NHRF in the formulation and implementation of large national and European research infrastructures will be of great value.
- Base equipment has to be provided by public sources so that external projects can be realized.
- Enhanced interaction with universities is recommended to support academic education and research training by joining NHRF management with university faculties (similar to "habilitation"), and allowing academic supervision of graduate students. Academic supervision has to be organized in such a manner that the leading scientists are accepted members of a university faculty (adjunct positions, for example).
- Qualification opportunities of young scientists on the pre- and post-doc level must not be affected adversely by the hiring of permanent scientists.
- The finding of excellent scientist from the international market should not be impeded by state administrative regulations interfering with the internal institute financial management.

TABLE 1

How do you evaluate the Institute with respect to	**Grade** TPCI			
1. Leadership	5.0			
2. Mission and goals	5.0			
3. Strategy and policy	5.0			
4. Adequacy of the resources	4.5			
5. Funding policies	5.0			
6. Facilitates	3.5			
7. Academic reputation	5.0			
8. Societal relevance	5.0			
9. Balance of the strengths and weaknesses	5.0			
OVERALL ASSESSMENT	4.8			

REMARKS

1. The leadership of the Institute is excellent and has conveyed confidence in the future.
4. The public funding needs to be stabilized and expanded for the researchers to perform at their best.
6. The laboratory and office spaces need to be expanded significantly. Also the building needs maintenance to meet safety standards.
8. Excellent outlook for the benefit of Greek as well as international community.
9. Despite the fact that the Institute was consolidated from two independent organizations, the newly formed Institute has found excellent balance of strengths and weaknesses.

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247

TABLE 2

How do you evaluate **quality** of the Institute with respect to	Grade				
1.Originality of the approach and ideas	5.0				
2. Significance of the contribution to the field	5.0				
3. Coherence of the Institute[1]	4.5				
4. Prominence of the Institute head	5.0				
5. Prominence of the other research staff	5.0				
6. Quality of scientific publications (scientific impact)	5.0				
7. Quality of other results	5.0				
OVERALL ASSESSMENT OF QUALITY	4.9				

REMARKS

3. The theory and experimental groups appear to collaborate well, but there is potential for strengthening collaboration and interactions.

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TABLE 3

Considering the number of staff, how do you evaluate the **productivity** of the Institute with respect to	Grade				
1. Number of PhD theses	5.0				
2. Number of scientific publications	5.0				
3. Number of professional publications	5.0				
4. Other results	5.0				
5. Distribution of published output within the Institute	5.0				
OVERALL ASSESSMENT OF PRODUCTIVITY	5.0				

REMARKS

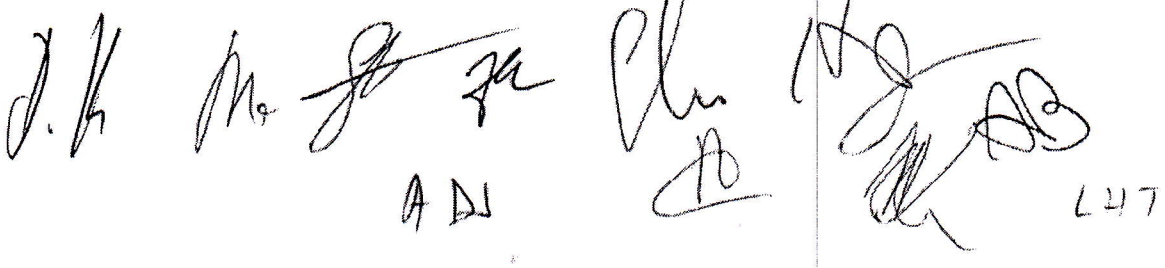

TABLE 4

Considering the objectives of the Institute, how do you evaluate the **relevance of its research activities** with respect to	**Grade**				
1. The advancement of knowledge	5.0				
2. The dissemination of knowledge	4.5				
3. The implementation of knowledge	5.0				
OVERALL ASSESSMENT OF RESEARCH RELEVANCE	4.8				

REMARKS

2. The science-focused Institutes have the potential of expanding public exposure owing to the central location of NHRF and large public interest in the Institute of Historical Research.

TABLE 5

Considering the present status and future developments of staff and facilities, how do you evaluate the long-term **vitality** of the Institute with respect to	**Grade**				
1.Its past scientific performance	5				
2.Its future plans and ideas	5				
3.The staff age and mobility	4.5				
OVERALL ASSESSMENT OF VITALITY	4.8				

REMARKS

1. The existing balance of age appears to be adequate, but recruiting of young researchers must be pursued in the future to improve this balance.

EVALUATION COMMITTEE

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EVALUATION PERIOD 2005-2012

EVALUATION COMMITTEE	CENTER	INSTITUTE	CRITERIA					TOTAL
			OVERALL ASSESMENT (TABLE 1)	OVERALL ASSESSMENT OF QUALITY (TABLE 2)	OVERALL ASSESSMENT OF PRODUCTIVITY (TABLE 3)	OVERALL ASSESSMENT OF RESEARCH RELEVANCE (TABLE 4)	OVERALL ASSESSMENT OF VITALITY (TABLE 5)	
PHYSICS	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Electronic Structure and Laser	5,00	5,00	5,00	5,00	5,00	**5,00**
MATHEMATICS AND COMPUTER SCIENCES II	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Computer Science	5,00	5,00	4,60	5,00	4,83	**4,89**
PHYSICS	NATIONAL HELLENIC RESEARCH FOUNDATION	Theoretical and Physical Chemistry	4,78	4,93	5,00	4,83	4,83	**4,87**
PHYSICS	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	Nuclear and Radiological Sciences, Energy, Technology and Safety	4,70	4,94	4,94	4,93	4,83	**4,87**
PHYSICS	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	Nuclear and Particle Physics	4,89	4,93	4,88	4,83	4,67	**4,84**
LIFE SCIENCES	BIOMEDICAL SCIENCES RESEARCH CENTER "ALEXANDER FLEMING"	Biomedical Sciences "Alexander Fleming"	4,94	4,71	4,75	4,67	5,00	**4,82**
ENGINEERING SCIENCE	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Chemical Engineering Sciences	4,89	4,89	4,72	4,87	4,67	**4,81**
MATHEMATICS AND COMPUTER SCIENCES II	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Applied and Computational Mathematics	4,89	4,71	4,40	4,67	5,00	**4,73**
ENERGY AND ENVIRONMENTAL SCIENCE	HELLENIC CENTER FOR MARINE RESEARCH	Oceanography	4,48	4,47	4,77	4,89	4,83	**4,69**

EVALUATION PERIOD 2005-2012

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			OVERALL ASSESMENT (TABLE 1)	OVERALL ASSESSMENT OF QUALITY (TABLE 2)	OVERALL ASSESSMENT OF PRODUCTIVITY (TABLE 3)	OVERALL ASSESSMENT OF RESEARCH RELEVANCE (TABLE 4)	OVERALL ASSESSMENT OF VITALITY (TABLE 5)	
LIFE SCIENCES	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Molecular Biology and Biotechnology	4,67	4,71	4,75	4,50	4,67	**4,66**
SOCIAL SCIENCES	NATIONAL HELLENIC RESEARCH FOUNDATION	Historical Research	4,00	4,86	5,00	5,00	4,33	**4,64**
PHYSICS	NATIONAL OBSERVATORY OF ATHENS	Astronomy, Astrophysics, Space Applications and Remote Sensing	4,28	4,29	4,80	5,00	4,67	**4,61**
MATHEMATICS AND COMPUTER SCIENCES II	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION, COMMUNICATION AND KNOWLEDGE TECHNOLOGIES	Language and Speech Processing	4,83	4,64	4,30	4,50	4,33	**4,52**
ENERGY AND ENVIRONMENTAL SCIENCE	NATIONAL OBSERVATORY OF ATHENS	Environmental Research and Sustainable Development	4,15	4,14	4,58	5,00	4,67	**4,51**
MATHEMATICS AND COMPUTER SCIENCES I	CENTER FOR RESEARCH AND TECHNOLOGY HELLAS	Information Technologies	4,50	4,36	4,60	4,50	4,50	**4,49**
PHYSICS	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	Advanced Materials, Physicochemical Processes, Nanotechnology and Microsystems	4,50	4,50	4,20	4,67	4,50	**4,47**
SOCIAL SCIENCES	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Mediterranean Studies	4,26	4,37	5,00	4,20	4,53	**4,47**

EVALUATION PERIOD 2005-2012

EVALUATION COMMITTEE	CENTER	INSTITUTE	CRITERIA					TOTAL
			OVERALL ASSESMENT (TABLE 1)	OVERALL ASSESSMENT OF QUALITY (TABLE 2)	OVERALL ASSESSMENT OF PRODUCTIVITY (TABLE 3)	OVERALL ASSESSMENT OF RESEARCH RELEVANCE (TABLE 4)	OVERALL ASSESSMENT OF VITALITY (TABLE 5)	
LIFE SCIENCES	HELLENIC CENTER FOR MARINE RESEARCH	Marine Biology, Biotechnology and Aquaculture	4,72	4,43	3,88	4,50	4,83	**4,47**
MATHEMATICS AND COMPUTER SCIENCES II	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	Informatics and Telecommunications	4,67	4,57	4,50	4,50	4,00	**4,45**
ENGINEERING SCIENCE	CENTER FOR RESEARCH AND TECHNOLOGY HELLAS	Hellenic Institute of Transport	4,56	4,43	4,10	4,23	4,47	**4,36**
ENERGY AND ENVIRONMENTAL SCIENCE	HELLENIC CENTER FOR MARINE RESEARCH	Marine Biological Resources and Island Waters	4,22	4,25	4,70	4,39	4,22	**4,36**
ENGINEERING SCIENCE	CENTER FOR RESEARCH AND TECHNOLOGY HELLAS	Chemical Process and Energy Resources	4,40	4,07	4,22	4,40	4,30	**4,28**
MATHEMATICS AND COMPUTER SCIENCES I	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION, COMMUNICATION AND KNOWLEDGE TECHNOLOGIES	Management of Information Systems	4,33	4,57	4,50	4,33	3,33	**4,21**
MATHEMATICS AND COMPUTER SCIENCES I	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION, COMMUNICATION AND KNOWLEDGE TECHNOLOGIES	Industrial Systems	3,56	4,00	4,50	4,00	4,50	**4,11**