Appendix V
To the Instructions for the Teams of experts-evaluators

FINAL RAPORT

I	**The Name of the Institution to be evaluated**	**National Institute for Laser, Plasma and Radiation Physics**
II	**Evaluation Period**	2007-2011
III	**Members of the Team**	
	1st Evaluator information	
A	**Name, Surname**	Marta Castillejo
B	**Affiliation**	Instituto de Química Física Rocasolano, Spanish National Research Council (CSIC)
	2nd Evaluator information	
A	**Name, Surname**	Mirel Birlan
B	**Affiliation**	Institute de Mecanique Celeste et de Calculs des Ephemerides, CNRS UMR 8028, Observatoire de Paris
	3rd Evaluator information	
A	**Name, Surname**	Gilles Cheriaux
B	**Affiliation**	Laboratoire d'Optique Appliquée, CNRS
	4th Evaluator information	
A	**Name, Surname**	Mihai Datcu
B	**Affiliation**	German Aerospace Center DLR
	5th evaluator information	
A	**Name, Surname**	Cristian Focsa
B	**Affiliation**	Laboratoire de Physique des Lasers, Atomes et Molécules Université Lille 1 Sciences et Technologies

Conclusions and recommendations

1. INFLPR has made outstanding national and international contributions to scientific and technological areas in its fields of activity. The Institute has done this through its basic and applied research performed over the last almost three decades through promoting continuously the research areas within the professional community. The Institute has established an international reputation.

2. The wealth of the Institute are its Human Resources, a highly motivated team of scientists and professionals, perpetuating, growing and expanding the knowledge and know-how and enthusiastically securing continuity and progress.

3. The technological level, i.e. the high number top level scientific apparatus, instrumentation and technologies, indicates the Institute commitment to keep a leading edge updated infrastructure level, thus fostering cross-fertilization and offering high quality services to the members of the Institute and to others within the national scientific and technological community.

4. A particularly important role in the success of the Institute activities is its management concepts and administrative organization. Project oriented activities, assure motivation and high performance of employees. The staff is evaluated on a yearly basis indicating a good follow-up of performance improvement. The operational structures seem to be effective and timely in terms of administrative efficiency.

5. The Institute is well aware of the advantages, in terms of bringing new directions and ideas, of enrolling young researchers, especially those trained in highly reputed foreign laboratories. In that respect, the policies stated in the Human Resource Management Plan seem to be aligned to this challenge.

6. There is enough critical mass in the areas of development but an effort is needed in order to overcome excessive fragmentation and in some cases, duplication of efforts. Merging of teams to reflect a structure coherent with the strategic objectives and directions would critically improve the distribution of human resources.

7. Regarding CETAL, the preparation of human resources and stakeholders and the compulsory preparatory phase has to be launched as soon as possible. For such a facility, a proposal selection committee should be established involving international experts. A solution for the coordination at national level could be the creation of a center of excellence in the field.

8. Regarding ISS, from the organigram of the Institute and from the nature and type of activities, results that ISS has particular fields and structure. It contributes to the elaboration of the national space programs, consolidating and implementing the scientific/technologic competencies in accord with the strategic national objectives for the participation in ESA. Thus it may be appropriate that ISS becomes a standalone institute.

9. The Institute has more potential for university involvement as for instance to promote and establish areas such as astrophysics or space sciences, in the form of university courses, MS, or doctoral schools. It is also encouraged to increase the number of interdisciplinary, jointly directed doctoral theses.

10. Technology transfer, spin-off and supporting start-up activities would be beneficial at national level and these initiatives are strongly encouraged.

11. Evaluation Panel recommends to award the Institute the grade A+

Justification of the mark awarded, for each of the 5 criteria, highlighting strengths and weaknesses, in accordance with the minutes/report of the visit

1. The quality of R&D activities and their results..... 4.2

The Institute has a high scientific profile at national level (leader in the fields of competence) and is well known internationally. The numbers related to publications are considered somewhat moderate in terms of productivity and impact. Submissions to high impact factor journals are desirable. The transfer of knowledge is rather low (33 national patents) considering the number of researchers and the applied character of many research lines. Some of the teams display a very competitive profile in terms of scientific outcome, training activities, projects and international collaborations. The Space Science Institute displays a quite uniform high scientific profile.

The Institute is able to attract funding from a broad variety of sources at national level, in bilateral and EU programs. Regarding the later, the growth has been remarkable in the last years and demonstrates the commitment to work at the level of European standards. The number of projects per year is good. However the funding situation among the teams is quite heterogeneous.

The transfer of knowledge at international level is considered rather low although the research lines at the Institute hold a high potential for technology transfer. A positive aspect is the variety of the initiatives that regard joint proposals, supply of services and data or strategic studies. It is worth mentioning the start-up of the CETAL program which opens up interesting possibilities of technology transfer to the productive sector in the field of photonics.

The international visibility (through participation in European networks and consortia) comes in great extent from some of the Institute's scientists who lead very productive lines.

2. Human resources Quality 4.7

A high percentage of the personnel is below 45 years old. This is very positive in terms of the projection of the Institute and its involvement in competitive EU programs and related initiatives, such as ELI, -NP, ITER, ESA-PECS, CETAL, etc. In this age fringe, the gender distribution is quite equilibrated and inverts the tendency, of the older personnel. On average there are 3.5 staff researchers per PhD student. It is noticed however that the distribution of Ph.D. students is not uniform among the teams; four teams have more than 5 PhD students while 21 have 2 PhD students or less. These numbers indicate a moderate effort on attracting young scientists through research. A very positive aspect is the capability of some research teams to send their PhD students to well-reputed foreign laboratories and to attract them back to the Institute. In general all personnel display a high level of motivation. The panel also noticed a very good level of English language for permanent staff as well as for PhD students.

The ratio of R&D staff/administrative staff is around 3.7. This is considered an adequate indicator of a human resources policy matching the objectives of the institution.

3. Quality infrastructure and its rate of exploitation.....4.3

The high number of recently acquired scientific apparatus (last 4-5 years) indicates the Institute commitment to keep a good, updated infrastructure level. Horizontal approach initiatives creating laboratories that could serve a wide range of research lines (ISOTEST team, CETAL Project, etc.) are very positive in order to foster cross-fertilization and to offer high quality services to the members of the Institute and to others within the national scientific community.

Regarding the future infrastructure CETAL, it should be stressed that in order to perform good scientific projects and host high profile collaborations, the local teams have to be furnished with the necessary expertise in the four envisaged domains (intense lasers, hyper intense laser-matter interactions, advanced technologies for laser processing and Photonics). This requires time and preparation of human resources and stakeholders and the compulsory preparatory phase has to be

launched as soon as possible. It is also important to consider that, for a facility of such characteristics, the proposal selection committee should contain international experts. A potential solution for coordination at national level could be the creation of a center of excellence in the field.

Most of the infrastructures are employed by several research projects indicating a good level of exploitation. However many infrastructures seem to be used by a single team, even if these could be of great value to other researchers of the Institute. This point should be improved.

4. Management efficiency and quality of the research environment 4.9

The management structure seems to be well accepted by personnel which is reasonably represented. The managements shows capability to analyze the situation of the Institute with a relevant retrospect.

Staff is evaluated on a yearly basis indicating a good follow-up of performance. Criteria for personnel selection are based on merit and require standards that are more stringent than those applied at national level in the area of Physics; these criteria seem to be accepted by research staff. The lately implemented new rules for administrative procedures seem in accord with professional criteria of efficiency and transparency. For the ISS branch, an external audit procedure has been set, affording increased transparency and operational efficiency. Due to the lately implemented new rules for administrative procedures, the degree of satisfaction of staff and PhD students is high.

The operational structures defined by the management seem to be very performant and timely in terms of administrative efficiency. A specific recommendation regarding technology transfer to the productive sector, would consist in the creation of an office to deal with such matters, including intellectual property rights, market search and support for promotion of scientific results, professional and coordinated broadcast of Institute' own achievements, etc.

The Scientific Council (which has advisory role to the management), is composed of elected representatives from the different teams and discusses the most important aspects of interest for the Institute. However we should mention there is no representation of low level staff or PhD students. The website provides to all the staff information on the decisions of the Institute at high level. This way of operating is positive but the website could be improved regarding the description and activities of the different teams.

5. Quality and credibility of the institutional development plan.....4.5

The Institute has defined five strategic objectives which fit very well with the areas of optimal level of scientific performance and highest international projection. The incorporation to these mainstream lines of researchers working in marginal or neighboring areas is a challenge for the Institute's management. As mentioned, horizontal initiatives, such as CETAL project, are good instruments for encouraging the birth of new R&D directions. Although emergence of new ideas should always be promoted, the Institute is in dear need of focusing and concentration of efforts along few well defined strategic lines. The management team is fully in that direction. The Institute is well aware of the advantages of enrolling young researchers, especially those trained in highly reputed foreign laboratories. Specific schemes for a selective, competitive recruitment based on merit should be implemented. Strategies for increasing the number of PhD supervisors should be designed.

Support for enrolment in the ELI-NP initiative is a good strategic decision that will have a beneficial impact in most of the research lines of the Institute. Those lines could greatly profit of this important connection, if clear priorities are defined within the respective areas. It is also a good strategy to continue the partnership with Institutions where past collaborations have been fruitful and strengthen the participation in EU projects and consortia. This requires specific measures of support to researchers applying for those sources of funding.

From the organization chart and also from the analysis of the nature and type of activities it results that ISS has particular fields of activities and thematic. ISS is fulfilling the implementation of the strategic national objectives for the participation in ESA. The nature of the activities in ISS is typically based

on the ESA rules, in all respects, design, implementation, documentation, testing, and validation, financial and administrative procedures. Thus it may be appropriate that ISS becomes a standalone institute.

Teams evaluation

Team E1. Laser Interferometry and Applications Group Team Leader: Dr. Dan Apostol

This team has an expertise in basic research and applications of coherent optics and its related (consecutive) fields, such as interferometry, holography, digital speckle pattern interferometry and diffractive optics.

The team is involved in several national an international projects; there is a good dynamics inside the team and the exchanges with laboratories in the same field of research. Team E1 is involved in research projects with laboratories in Italy, Spain, Germany, Russia

Team composition:
This team seems to be composed by at least 11 researchers (the number is not mentioned in the team description material). A real policy of hiring young persons has been caried out in the last five years.

Scientific results
Researchers of this team produce high level science; this science is periodically published into international and national reviews, proceedings and congresses.

PhD and scientific training:
Two PhD thesis were defended inside this team,while three other PhD thesis are now under preparation.

Weakness:
The scientific production presented in various journals contain allmost all of the team members leaded by Dr Apostol; however it is strongly suggested that the team takes into consideration publications which present results obtained in joint projects with international partners

Team E2. Photonic Processing of Advanced Materials (PPAM)
Team Leader: Dr. Maria Dinescu

The team scientific expertise is the laser processing of advanced materials in terms of thin films growth by pulsed laser deposition, surface treatment and patterning by laser irradiation, laser processing of polymers, proteins and cells.

The team is involved in several national and international projects; there is a good dynamics inside the team and the exchanges with laboratories having the same field of research. Team E2 is involved in research projects with high-level laboratories in Europe. We notice the perennial presence of researchers inside FP5-7 programs which is a strong evidence of their international recognition.

The group had a remarkable dynamics in terms of technical investment in cutting-edge technology (more than 1.5 M€), and owns now several facilities that are unique in Romania.

Team composition:
E2 is composed of 21 researchers, among them 9 are young researchers which could be seen as a real preoccupation of renewal inside this team and research topics. The extensive mobility does not affect the team composition.

Scientific results
Researchers of this team produce high-level science, with excellent quantitative and qualitative output in terms of publications (131 papers during the evaluated period). The group leader is member of the Steering Committees of several most important international conferences in this field (COLA, EMRS etc.) and chaired some editions of these conferences. Group members won prizes in important international conferences.

Technology transfer
Constant relationship with private partners; 3 patents over the period.

PhD and scientific training:
Nine PhD theses were defended by the E2 members; the E2 report suggests that some of these theses were developed in collaboration with universities from abroad (Austria, Italy, Greece, Switzerland).

Recommendations: We strongly encourage this group to study the opportunity of new research directions on the future CETAL facility and to strengthen the internal collaborations with other groups working on the same subjects (e.g. E4, E29, E30), either for common scientific issues or for shared use of available characterization facilities. This group has many assets for successful technological transfer; we recommend increased activity in this direction (possible creation of start-ups etc.).

Team E3. Quantum Dots, Nanopowders and Thin Films Team Leader: Dr. Constantin Grigoriu

E3 team has experience in laser deposition of thin films, in the domain of producing nanoparticles and quantum dots of various materials, and in microprocessing for various applications. E3 team seems to have good potential for technological transfer to entrepreneurial/industrial production although not fully exploited yet.

The team includes 8 persons (information on the website). The 3 PhD thesis defended during the last 5 years demosnstrate the commitment to training of young scientists. However at present, only one PhD student is working in the group. The group mantains several bilateral agreements which speaks well of their desire to work at international level.

The scientific outcome is steady over the last years. Funding is provided by only one relatively modest project.

The team could exploit further the expertise of other teams in the Institute working in thin films and nanomaterials and also in the development of dye sensitized solar cells.

Team E4. The Laser-Surface-Plasma Interactions Laboratory
Team Leader: Prof. Dr. Ion N. Mihailescu

This team has a well-established expertise in the field of laser-surface interactions, laser materials processing, laser generated plasmas and applications in medicine, biology, or sensing. The current research is focused on biocompatible film deposition, nanostructured films for gas and bio-sensing, new thin films for spintronics, laser transfer of fragile complex molecules, polymers or living cells.

The group is composed of 22 members with multiple expertise, which insures the critical mass needed for high-level scientific research in this experimental field. The age composition is well balanced, with 15 persons below 40 years. Extensive mobility is noticed, without affecting the team composition. The quite significant incoming mobility is highly appreciated. This group gained a position of "reference center" in the region (visit of the laboratory by colleagues from Serbia, Greece, Ukraine, Croatia).

Scientific output
Excellent quantitative and qualitative publication rate (average of 34 papers/year, some of them in high-impact factor journals as J. Appl. Phys., Appl. Phys. Lett. etc.). Most of the papers are published in collaboration with international partners. Periodicity in publication; the articles are in collaboration with the partners. The group leader has excellent international visibility (member of Steering Committees of several important conferences).

PhD and scientific training
Excellent score: 8 students supervised by Prof Mihailescu defended their PhD theses after 2007, one in *cotutelle* with French partnership. Ten young scientists trained in European labs. Long-term collaboration with foreign partners (Marseille, France). Training of French young students inside the laboratory.

Technology transfer
Sustained collaboration (several national and European projects) with two Romanian companies. The patents are not mentioned in the self-evaluation report, two could be identified from the list provided by the laboratory.

Recommendations: We strongly encourage increased technology transfer and entrepreneurial activities (creation of start-ups etc.). The opportunity offered by CETAL for innovative research directions should be addressed. From a "logistic" point of view, the team clearly needs to extend the space currently dedicated to experimental set-ups.

Team E5. Laser spectroscopy
Team Leader: Prof. Dr. MIHAIL LUCIAN PASCU

E5 team has expertise in tunable lasers, dynamics of semiconductor lasers, laser biomolecular spectroscopy and laser optofluidics. The current research follows these directions. It is not clear how the work on the semiconductor laser dynamics is linked with the other projects developed by the group, which are mainly in the field of laser applications for biology and medicine. The group has a good level of up-to-date scientific equipment.

Team composition:
10 members; 5 young persons were hired in the group, among them one person who defended the PhD thesis in US was hired. This renewal is a very good point.

Scientific results
Extensive international collaborations highlighted in the ISI publications (20 papers on the period 2007 – 2011, some of them in journals with good impact factor). Significant number of invited conferences (30). Three book chapters.
The presence of E5 researchers in key positions (steering committees, chairman, editorial boards) in the frame of networks and professional associations is strongly appreciated.

PhD and scientific training:
One PhD thesis defended, two ready to be defended, three ongoing. Training in several European countries; participation at 16 summer schools.

Technology transfer
Some patents are mentioned in the self-evaluation report, but could be found in the list provided by the Institute. No entrepreneurial initiative is reported.

Recommendations
We recommend to focus on the main projects (laser applications in biology and medicine), where the group can gain international visibility and leadership. The "semiconductor laser dynamics" project seems to be completely separated from the main direction, and had quite low scientific output (two papers in a low-impact Romanian journal). Increased preoccupation for technology transfer and entrepreneurial activities is recommended.

Team E6 Nonlinear and Information Optics Group Team Leader: Academician Prof. Dr. Valentin I. Vlad

Topics of E6 are at the level of cutting edge research: nonlinear nanophotonics for information technologies at molecular level: optical nonlinearities in quantum dots, in "nano-patterning" and "nano-imaging" (AFM, SNOM); optical nonlinearities in metamaterials with sub-wavelength periodic and random structures, characterization and applications of enhanced and ultra-fast (fs) nonlinearities, soliton photonics and laser wave interactions in nonlinear optical materials (wave mixing, stimulated scattering, optical phase conjugation); properties of quantum systems in micro- and nano-cavities; Micro-processing with excimer UV lasers, development of laser equipments; Quantum cryptography for secure communications.

Team composition:
8 members (1PhD student)

Scientific results
This team has a high level a competence in non linear optics and is using this for application in nanostrucutre encription among others. They have published in different journals and have given oral presentations in international conferences.
In the future this team will pursue its activities in this field but with the possibilities of the new laser systems (CETAL), will open up the possibility to investigate non linear optical processes at high intensity.
The team has collaboration with european laboratories.

PhD and scientific training:
Currently 1 PhD student. Professor Vlad is giving Lectures of the Doctoral School, Faculty of Physics, University of Bucharest "Optical Nonlinearities in Nanostructures"; E6 was co-organizer of some international student workshops in Romania.
During the 2007-2011 period, 2 PhD students defended the thesis.

Analysis:
This team presents good results with a number of publications in equilibrium with the number of staff. This group has a vast area of topics and the size of the team is maybe too small to be able to investigate deeply all the envisaged topics.

Team E7 Solid-State Lasers Laboratory Team leader: Dr. Razvan Dabu.

This team is leading the field of ultrashort pulsed lasers development in the Institute and in also in Romania. The team also investigates on the development of a high power femtosecond laser facility (CETAL), material processing and characterization at micro- and nanoscale using nonlinear absorption induced by ultrashort laser pulses, high-power ultrashort laser pulses studies (multiple femtosecond pulses generation, coherent beam combination), X-ray laser development, modeling of stationary systems and interactions between very intense electromagnetic fields and electrons or atoms, modeling and design of advanced diode-pumped solid-state lasers.

Team composition:
17 persons (15 researchers) among them 6 are young (2are PhD graduate)

Scientific results
Periodic publications; E7 involved in 1 international and 5 national projects. Cooperations with teams from UK, Japan, Germany and France.

PhD and scientific training:
2 PhD graduated during 2007-2011

Analysis:
This team is changing its field of factivity since few years ago. They will be in charge of the operation of the TW laser of the Institute as well as the responsability of the laser part of the ELI NP program.
Their activities in laser intense development is targeting an important activity for future ultra-intense systems with coherent beam addition.
The team has also joined research activity in Laserlab which provides good contact with european partners.
This group has a proactive activity in the field and is trying to develop collaboration with referenced institutions on intense lasers to allow them to rapidly acquire new competences.

Team E8. ISOTEST- Team leader: Dr. G. Nemes.

E8 is organized around the project ISOTEST (new team, without history before 2010). Its main objective is to develop a facility for laser induced damage diagnosis of optical components according to ISO standards.

Team composition:
8 members

Scientific results
The team has fully constructed a platform that measures under the ISO conditions the laser induced damage threshold by nanosecond laser. The platform is certified for the ISO standard and currently working offering services and certification for companies. Future plans concern the extension of the platform to short pulse duration lasers.
A link with team E26 would be relevant and highly beneficial.

PhD and scientific training:
Two researchers have started their PhD thesis.

Anaysis:
It is clear that the project is very interestig for implementing the ISO rules, thus creating a Romanian basis into this field. Extending the capabilities to high power lasers will be extremely useful for CETAI. This team seems to be formed by well trained personnel and work is progressing.
This area of work will not be favorable to publications but is of high importance for the Hnstitute. Also this team can play a role in the near future as the number of intense femtosecond lasers at the Institute and the demand for beam time are increasing.

Team E9. Optics and Lasers in Life Sciences, Environment and Manufacturing - Team Leader: Dr. Ing. Dan C. Dumitras.

E9 domain deals with CO2 laser-based spectroscopies , Laser Photoacoustic Spectroscopy and Diffuse Optical Tomography with applications mainly in the medical domain. The team has a great degree of expertise in these techniques.

The Team is composed of 8 researchers, scientists and engineers, with high ratio of young researchers. The group website indicates 12 persons. A good number of PhD thesis are in preparation indicating a committment to training. The profile is inter-disciplinary with a high component of applicative/interdisciplinary science organized around several projects which have allowed a good funding level. Some of the equipment in the laboratory could be renovated using the generous funding. The team has been involved in ELI –preparatory phase and includes funding from this source. The research lines of the teams are not celarly aligned with this source of funding.

Given the funding and the number of people, the group produces a modest number of publications and has multiple collaborations both national and abroad (Nederlands, Russia, USA, Sweden). The team leader has been organizer of international meetings in Romania.

To increase visibility the group website could be regurlarly updated and made to work on Internet Explorer. Renovation of some old equipment is recommended funding permitting.

Team E10. Thin Films Advanced Technologies Team Leader: Dr. Eng. Victor Rares MEDIANU

E10 research work has been focused in the design of thin film nanostructures for achieving development of technological procedures for RF magnetron sputtering applied in the field of photo-voltaic / CuInGaSe2 solar cells, and in ITO and ZnO thin film nanostructures for photonic devices.

Team composition:
8 persons, 1 PhD students

Scientific results:
16 ISI papers between 2007 and 2011;

PhD and scientific training:
1PhD was defended and 1PhD thesis is in progress.

Analysis:
This team has developed a very interesting technological know-how for solar-cell fabrication. The potential at technological is high, but yet undervalorized in industrial products. The team plans to expand in this direction.
The teams appears to be well organized with a good amount of publications. The name of this team does not reflect its activity.

Team E11. Laboratory of Laser Photochemistry (LLP). Team Leader Dr. Ion Morjan

Team E11 has expertise in synthesis of a wide range of nanomaterials, including composites, prepared by laser pyrolysis from gas-phase reactants. It has a well defined strategy to achieve tailored properties of nanomaterials by controlling the preparation method and through access to sufficient analytical tools for their characterization (in-house or external XRD, IR, Raman, TEM, SEM).

The team includes a high number of young researchers, 4 of them been PhD students, and has a good training trajectory. It has a good implication in national and international projects (FP6-FP7, bilateral with Italy) and a reasonable and consistent production of ISI papers. The pooibilities for technology transfer are high, although it seems, not yet suffciently exploited.

For improving visibility the website could be updated. Also some of the laboratory equipment could be renovated if funding allows it.

Team E12. Atomic Processes in Laser Field. Atomic and Ionic Spectroscopy of the Laboratory and Astrophysical Plasmas. Team Leader: Dr. Viorica Stancalie.

E12 topics are related to physics of the atomic and molecular processes in the presence/ absence of laser field and devoted to astrophysics. This upstream research in laboratory is necessary for spectral identification of astrophysics plasma.

E12 contributes to a large database of atomic lines and is involved in the conception of web-distributed applications related to this database.

Team composition:
7 members

Scientific results:
15 ISI articles; various international (+ ITER reactor) and national collaborations. Collaboration are shown by joint articles.

PhD and scientific training:
1MscD

It is not clear if this group should belong to INFLPR or ISS.
It is suggested to start publishing into review oriented to astrophysics (Astronomy & Astrophysics, Astrophysical J, Astronomical J., etc.) in order to increase the visibility of this team in the field of astrophysics.

Team E13. Solid-State Quantum Electronics - Team Leader: Dr. Serban Georgescu

E13 investigates active materials and the emission processes for coherent (lasers) and incoherent (phosphors, radiation convertors, etc) photonic sources, based on solid state inorganic media (single crystals, transparent ceramics, nano and polycrystalline phosphors) doped with transitional elements ions (3d, rare earths). The main objective is identification and characterization of new materials and processes and optimization of traditional systems to extend/improve the characteristics of these photon sources: emission wavelength range, efficiency, temporal regime, scaling of functional parameters.
This team is also investigating diode-pumping of these materials for different applications.

Team composition:
19 researchers (at least 4 young researchers) 23 persons in total.

Scientific results
73 ISI articles (two peaks in 2008 and 2010). Various international bilateral collaborations (Japan, France, Bulgaria, Germany). Interdisciplinary science (application in medicine- new luminiscent markers). Huge expertise and capacity of signing articles as first author.
Very interesting website.

PhD and scientific training:
4 PhD thesis.

Analysis:
The scientific output and the level of international collaborations is good. The team has invested in new advanced experimental systems and has set up a high level laboratory that includes material fabrication and laser sources. The potential for developping new materials and to use them as laser media is high. An example is the design of a laser system to act as a spark for car system ignition. This opens many possibilities for collaborating with industrial partners and demonstrates the interest and capabilities for technology transfer which should be fully exploited.

Team E14. Multi - Functional organo- inorganic luminescent materials Team Leader: Dr. Carmen Tiseanu

E14 works on structural and electronic properties of broad range of organic and/or inorganic materials doped with lanthanides, namely micro and mesoporous materials, coordination polymers and nanocrystals. The team is composed of only one member with strong expertise in the field (possibility of increasing by 1.5 persons thanks to a newly approved IDEI contract –period 2011-2014). The past scientific production is good (19 articles) and mostly in collaboration with foreign researchers. The

This researcher has proven the ability to work into a team and could easily be integrated into a larger group within the same field in the Institute. This would improve the accessibility to a wider range of resources, a more fruitful exchange of expertise and to the increase of visibility of activities.

Team E15 Plasma Surface Engineering

The team is active in plasma physics in synergy with material science and physical metallurgy, the main areas of activity are: deposition techniques for the Combined Magnetron Sputtering and Ion Implantation (CMSII), tungsten coating technology of carbon based materials for the first wall in nuclear fusion devices, combined laser alloying and plasma nitriding treatment for service lifetime increase of the forging dies, Tokamak neutron diagnostics based on the superheated fluid detectors (SHFD's).

The team is mastering the coating and deposition technology, they are innovative and got international recognition. Have succesful European collaborations as the FP7-EURATOM project.

The publication record is on the avarage line of the Institute.

The structure and infrasttructure of the team reflects the application/technology oriented activity. The team has capacities and potential for further spin-off and broadening the applications.

Team E16 Plasma Chemistry and Advanced Functional Materials Team Leader: Dr. Nicolae Bogdan Mandache.

This is a modest size team with a clear profile mainly oriented towards the development and use of pulsed electron beam source for the growth of thin films. Tighter collaborations with other teams of the Institute, working in the domain of thin film fabrication using other methods, would result in interesting synergies and a better use of human and material resources.

The team has a good trajectory of international cooperating which continues to be presently exploited and a good yield of scientific publications.

The team website does not function which implies lack of opportunities for visibility.

Team E17 Microtomography and Image Processing

The team is active in design and implemenation of: X-ray submicron resolution computer tomograph, combined X-ray microbeam transmission/fluorescence system for 3D morphology characterization and composition mapping, image reconstruction and processing for fusion plasma diagnosisand, and application for combined X-ray microbeam transmission/fluorescence system for 3D morphology characterization and composition mapping, Microtomography on superconductor materials: bulk, wires and cables.

The team is focussing on the fabrication of X-ray based systems for imaging and inspection, it is technology oriented, innovative and has obtained international recognition. Succesful European collaborations are established with research institutions in Germany, France, Italy, Greece, Spain, and also with Japan. Specific to the team are the industrial collaborations with partners mainly in Germany and Japan.

The publication record is on the average line of the Institute.

The structure and infrasttructure of the team reflects the application/technology oriented activity. The team has capacities and potential for further spin-off and broadening the applications.

Team E18 . Atomic Particle Trapping and Frequency Standards Group
Team Leader: Dr. Ovidiu Stoican

E18 has an expertise on ion trapping physics, magneto-optical traps, plasma physics and processes, analog and digital electronic design (including RF and low microwave range), metrology of time and frequency, programming and numerical simulation languages. The group presented a self-evaluation report which is quite confusing, it is not clear how the current research dynamics will be continued/extended in future directions. We had only a very short visit in this group, the only issue addressed was the demonstration of particle trapping in a quadrupole. The report claims the intention to use the CETAL/ELI facilities, but the concrete research program is not detailed.

Team composition:
5 persons (4 researchers + 1 auxiliary)

Scientific results
Several ISI papers, team involved in COST programs. National: several projects funded, involvement in ELI preparatory phase.

PhD and scientific training:
1 PhD student in the group.

Technology transfer and entrepreneurial initiative:
The team presents applications regarding entrepreneurial activity for national funding. This strategy should be revised.

Weaknesses/Recommendations:
The research projects are quite dispersed (from trapping to development of atmospheric plasma sources, to interactions with intense laser fields). This strategy is not productive. The group does not seem to have the critical mass to develop all the proposed research directions. We strongly recommend fusion with other groups developing close-related research, e.g. E27 or E28, and refocus the projects to adapt to the available human resources.

Team E19. Plasma Theory Group - Team Leader: Dr. F. Spineanu

E19 is involved in the elaboration of phenomenological explanations, analytical models and numerical instruments adequate to analyze available experimental data in plasma physics (thermonuclear fusion research in Tokamak geometry).

Team composition:
3 persons

Scientific results
The team produces high quality science in high impact international journals in topics related with Tokamac and astronomy (Geophys. and Astrophys Fluid Dynamics). Publications do not reflect collaborative projects with foreign partners.
Strong and successful collaborations with partners from France, Italy, Belgium: it has good representation inside the Euratom Steering committee and is involved in the European ITER Agency.

This is small group but of high scientific profile. It could lead the regrouping of the 3 theoretical plasma groups of the Institute E20 and E22) which would greatly enhance the critical mass and visibility of this line of activity.

Team E20. Mathematical Modelling for Fusion Plasma Group - Team Leader: Dr. Calin-Vlad Atanasiu.

E20 has expertise on MHD interpretation and control of helical perturbations in tokamaks, with Resistive wall modes (RWMs) stabilization and Construction of ITER tokamak pertinent equilibria with flow of arbitrary direction as main tasks.

Team composition:
3 researchers.

Scientific results
6 articles (amog them 2 concern astronomy topics – Euronear articles); Dr Atanasiu si co-author of the rest.
Involvment into ITER ans EURATOM

PhD and scientific training:
1PhD student starts its thesis in 2011

Weakness:
Small team: composed E18+E19? have not found webpage.

Team E21. Generation of repetitive electromagnetic pulses of high voltage and high power; applications in plasma physics - Team leader Dr. N. Georgescu

E21 is formed by only one researcher with a 10 yrs expertise in the production and use of cold atmospheric plasmas, obtained by using high voltage pulses.
The funding and scientific production are low. There is no record of training young scientists. It is suggested that this researcher joins in some other Institute's team within the same field of research.

Team E22. Theoretical Modeling of Fusion Plasmas

The researcher, I.G. Miron is active in theoretical modeling of the plasma instabilities behavior, error fields penetration phenomenon and neoclassical toroidal viscosity (NTV) non- resonant magnetic braking effects in tokamak plasmas.

This resarcher works in isolation and incorporating in another team has to be considerated. There is no evidence of impact publications nor of collaborations.

Team E23. Plasma and Laser Accelerators Team Leader: Dr. Catalin Ticos

E23 has been created recently in 2011 and deals with experimental and theoretical physics with electrons beams produced by linear accelerators. The main objective of this team is to evolve from the the use of linac accelerators to the CETAL laser for generating electrons beams.

Team composition:
3 scientist + 3 young researchers.

Analysis:
The project of this team is strongly linked to the achievement of CETAL. This field of research will be quite different from the present one but their expertise in electrons beam can be very relevant.

Team E24 Electron beam and microwaves applications for environment, biomedicine and new materials

Experimental research activity of E24 is the use of electron beams obtained from linear accelerators and the application of irradiation techniques to materials processing, environmental protection, biomedicine and food preservation. The group is in charge of the ALIN-10 and ALID-7 accelerators maintenance and operation. It was also heavily involved in the preparatory phases of CETAL and ELI facilities (dosimetry calculations etc.). The group has benefited of significant financial support in the frame of several national projects. The developed research has clear interdisciplinary and applicative features.

Team composition:
10 persons (6 scientists + 4 auxiliary). No information on age evolution or human resources strategy is given.

Scientific results
No information is provided on published papers, participation in international conferences, etc.

PhD and scientific training:
No data available.

Technology transfer
No data in the report and 4 patents identified in the list provided by the Institute.

Weaknesses/Recommendations:

The self-evaluation report is incomplete, important indicators are missing. It is not clear who is the group leader: C. Ticos, D. Ighiceanu? We strongly recommend regrouping with E23 and E25. Although there is a great applicative potential, there is no interest for patents or entrepreneurial activity.

Team E25. Electron Beam Applications Team
Leader: Dr. Monica R. Nemţanu

Team studies the accelerated electrons interaction with complex materials and biological structures; the development of an electron-optic system DYADIN for non-destructive characterization of intense electron sources of low energy; thermal effects in radiation-matter interaction. Young team (founded in 2008). Group leader defended her PhD thesis in 2009. Experiments on the ALIN-10 and ALID-7 beam lines.

Team composition:
5 members (4 researchers + 1 auxiliary). One of the four researchers is retired.

Scientific results
22 ISI papers published by the members between 2007 and 2011. Editors of one book (published in India). Involvement in national and international collaboration (Turkey, Brazil)

PhD and scientific training:
3PhD defended inside the team.
Interest in forming new MSc students.
Team members attended several training courses in Romania and abroad.

Technology transfer
Application for two patents in 2010 and 2011. No entrepreneurial initiative is reported.

Weaknesses/Recommendations
This is a very young team which does not seem to have the critical mass. We strongly recommend regrouping with teams E23 and E24. The development of the DYADIN system does not fit with the other projects of the group. Although the applicative potential of the research developed is evident, there is no collaboration with private/industrial partners. The group applied for two patents, but no entrepreneurial activity is envisaged.

Team E26. Laser Metrology and Standardization Laboratory Team Leader: Dr. Dan Sporea.

E26 established to run research programs and develop methods/ procedures related to laser metrology, optical fiber metrology as well as metrology using laser radiation.
They obtained National accreditation as the first laser metrology laboratory in the field of lasers and optical fiber systems.

This team is also pursuing activity in training and education (supervized by the Center for Science Education and Training) for childrens.

Team composition:
6 people with 3 scientists.

Scientific results
4 articles for 2007-2011.
Key-importance into the CETAL project. Involvment in Euromet. Leader of romanian contribution for COST Action TD1001 "Novel and Reliable Optical Fiber Sensor Systems for Future Security and Safety Applications".

PhD and scientific training:
1 PhD thesis defended, 1 MSc defense

Analysis:
This team could create link with team E8. The number of publicaitons is low but this can be attributed to the nature of topics which is finally service for external partners.

Team E27. Plasma Processes for Materials and Surfaces Team leader- Gheorghe Dinescu

E27 deals with the development of new, innovative atmospheric pressure, cold (nonthermal) plasma jet sources for applications in nanotechnology, biomedicine, environment, fusion technology. This is one of the best teams of the Institute: it has a clearly focused line, very good scientific production (many with international common authorship), a very important international presence and a remarkable team dynamics. The team is committed to train young researchers, expose them to the international community in the field and has been able to incorporate some of them back to the group. The average age is low (< 37 yrs) which gives a good perspective for future group activities and projects.
The team could explore the possibility of developing plasma jets for analytical applications. Also it is suggested that the team coordinates at Insitute level a platform for stronger collaborations with other teams in the same and related fields.

Team E28. Pulsed Transient Plasma
Team leader: Mihai Ganciu-Petcu

This group has enormous scientific and technological expertise in plasma physics, valorized inside several national and international projects. The main research topics are: fundamental and applications of low pressure pulsed (ns) plasmas in various geometries, micro-modulation of RF plasma, synthesis of interfacial layers for increased adherence. The group has a very innovative approach on these subjects, as it is proved by sustained collaboration with industry (Romanian and international companies), high number of patents (international), involvement in a start-up etc.

The self-evaluation report presents only the scientific achievements. No data are available on group structure, human resources strategy, young researchers training, research prospective for the next period. Some of these points have been clarified during the visit.

Team composition:
4 researchers + 1 technician
The average age of the group seems to be quite high. There is no displayed preoccupation for renewal of the group.

Scientific results
Important scientific activity, multiple collaborations, excellent international visibility.
23 papers over the evaluated period (data from Scopus), some papers in high-impact journals.

PhD and scientific training:
No information.

Technology transfer and entrepreneurial activity
This is the field of excellence of the group: 8 international patents, one start-up, clear orientation for technology transfer.

Weaknesses/Recommendations:
Incomplete self-evaluation report, no webpage found. Stronger interaction with other groups from the Institute (E27, E18) could be advantageous.

Team E29. Plasma Coatings
Team Leader: Dr. Cristina Surdu-Bob

This is a dynamic young team established in 2008. The group has interdisciplinary expertise in plasma diagnostics, deposition of thin films, the synthesis of medical implants and in vivo and in vitro experimental work. The conducted research focuses on these topics.

Team composition:
5 researchers. Very positive group dynamics (three recruitments during the last years). Two of the group members are doctors in medicine.

Scientific results
16 ISI papers between 2007 and 2009
Collaboration with Germany.

PhD and scientific training:
3 PhD thesis defended, 1 PhD in preparation

Technology transfer:
Clear orientation towards technology transfer and entrepreneurial activities. Very important collaborations with industry (Romanian and foreign companies) and medicine (hospitals). Three patents.

Weaknesses/Recommendations
Although the human resources evolution was very positive during the last years, the group is in a critical phase of acquiring critical mass. We recommend increased collaboration/integration with other groups from the Institute for, e.g. common use of characterization instruments or identification of new possible approaches/applications.

Team E30. Elementary Processes in Plasma and Applications
Team Leader: Dr. Cristian P. LUNGU

E30 has extensive expertise in thin film deposition by the TVA method. Some scientific achievements are displayed in the report, pointing out the main research directions currently followed by the group: synthesis of granular type magnetoresitive materials, nanostructured Re–Cr–Ni multiple component film, coating of tiles for the preparation of the ITER project etc. Good scientific collaboration is developed with France, Germany, Slovenia, Sweden, UK, Finland. Important involvement in the EURATOM project.

Team composition:
10 persons (6 scientists + 4 auxiliary).

Scientific results
No data are available on publications in the self-evaluation report. About 70 papers according to Scopus, but many of them in low impact-factor Romanian journals.
No data on involvement in international conferences steering committees, editorial boards etc.

PhD and scientific training:
3 PhD theses defended.

Technology transfer and entrepreneurial activity
Nothing is mentioned in the self-evaluation report. Five patents found in the list provided by the Institute. No entrepreneurial activity.

Weaknesses/Recommendations
The group should increase the collaboration with groups from INFLPR for optimization (speed-up) of the deposited films characterization. Some of these characterizations are currently done abroad, while all the necessary equipment exists in INFLPR. The applied potential of this research is great and should encourage entrepreneurial initiative.

Team E31. STARDOOR Team Leader : Dr. A. Scarisoreanu

Principal scientific objective: metrology and education. Expertise in dosimetry. Founded in 2006.

Assure traceability for PTB which is recognized by BIPM, accreditation by RENAR –Romania. The only RENAR accredited facility in Romania for dosimetry in the field of high energy ionizing radiation. The team has an important role in implementing rules and procedures for radiation protection inside the future CETAL and ELI projects.

Team composition:
11 persons (7 scientists + 4 auxiliary).

Scientific results
At least 15 ISI articles.

PhD and scientific training:
1 PhD thesis defended, 2 PhD thesis started.

Weakness:
The distribution of time and human resources among the different activities (metrology, fundamental science, education should be clarified and rationalized according to well defined objectives.

Team E32. Theoretical Physics and Astrophysics Group Team leader: Dr. Cecil Pompiliu Grunfeld

E32 is dealing with atomic and molecular processes, kinetic theory of complex systems, exactly solvable models and space-time structures and symmetries in General Relativity. There are three human nuclei of study around these three themes. Transversality of some of them with E34 (theory and observations around a project based on Pierre Auger observations).

Team composition:
13 researchers, an average of 40 yrs inside the team.

Scientific results
58 ISI papers (+ books and chapters)
Collaboration with France, Turkey, Japan, USA.

PhD and scientific training:
6 PhD defended inside the team.

The team benefits of the computational infrastructure of ISS for their numerical modeling. This team is dynamic and young. During the visit it was appreciate the mobility and versatility of people in doing fundamental (cosmology, astrophysics, relativity) science. This is emphasized by the large number of national contracts and individual grants. The team increases in the last five years, some of the members were hired after the PhD defense (few of them were comming to ISS from abroad).

Team E33. Cosmology and Astroparticle Physics Group

The team is active in understanding of dark sector of the universe, present and future space missions and ground-based experiments, observing strategies of the future European space missions dedicated to probe the dark energy, neutrino astronomy and "multi-messenger astronomy", very high-energy gamma-rays of cosmic origin, Ultra High Energy Cosmic Rays, public dissemination of knowledge and to educational actions.

The team has high dynamic and collaborative synergy, with strong theoretical research continued in ESA projects and applications and interesting approach for education.

The article publication publication record is slightly under the Institute average, but compensated by contributions to books.

The team is active international level, including participation in the coordination boards of large scale European and international projects. The potential in education, including University level may be further enhanced.

Team E34. High Energy Astrophysics and Advanced Technologies. Team Leader Dr Sorin Zgura

HEAT Group is focused on relativistic heavy ion physics, reactions with relativistic radioactive beams, hadronic physics, nuclear astrophysics, astroparticle physics, computational physics and high performance computing.
The performances are related to big programs of observations and experiments developped in Europe and also around the World.
Researchers in thsi team are manipulated huge quantity of data and manage an important grid of calculus for various experiments (for instance ALICE experiment uses the capacity of 2000CPUs and generates a traffic of 600Gb each six months) which operates into the experiments network.

Team composition:
25 researchers (globally the piramid of ages and the balance men/women favorizes young researchers and the equilibrium between sexes).

Scientific results
20 articles ISI; collaboration CERN/ALICE. Reactions with Relativistic Radioactive Beams:Germany, Becquerel/Russia, World LLHC Computer Grid/CERN Switzerland, Pierre Auger Observatory – France. 3 international projects and 17 national projects. Currently four national projects (including 2 projects of young researchers) are running.

For the future, the transverse activity with E22 concerning Pierre Auger experiment is appreciated.

PhD and scientific training:
Not precised in the repot, it is written that several members defended PhD.

Suggestion to publish results also in astronomical reviews, thus incerasing the visibility of ISS (the HEAT team) inside the astronomical community.

Team E35. Space Plasma and Magnetometry Group - Team Leader: Octav MARGHITU

E35 has expertise in fluxgate magnetometers; processing and interpretation of magnetic field data; Astronomy collaborations around ESAs Cluster and Venus Express missions and Nasa's Themis and Fast missions.
Themes: Solar-terrestrial interactions(magnetospheric physics and the coupling of the magnetosphere with the solar wind and the ionosphere–thermosphere); Fundamental processes in collisionless plasmas, including shocks, reconnection, turbulence, parallel electric fields, MHD and kinetic waves, instabilities in relationship to astrophysical and laboratory plasmas; disturbances in geospace and connections to the Earth, for example space weather or electromagnetic phenomena associated with earthquakes; hardware development and software tools, including particle and magnetic field sensors, in-flight calibration, advanced data analysis and numerical simulation techniques.

Team composition:
12 persons (11 researchers + 1 auxiliary); this is a very young and dynamic team.

Scientific results
65 ISI papers; National (IFIN-HH, Bucharest, Galati, Iassy) collaborations and international collaborations(Belgium, Canada, Finland, France, Germany, UK, Sweden, USA).
Very positive activity.

PhD and scientific training:
5 PhD thesis defended or under way. International exchanges and trainings; Erasmus involvment (they received students or they propose students for foreign institutes).

Suggestions: - increase the international collaborations with space missions projects as a full member in the consortia and core-members of future programs. Renew with expertise of technical devices (magnetometers) for space science.

Team E36 Application of Space and COmmunication Technologies in the Social Benefit – ASCOT

The team is active in telemedicine, in-field, mobile, portable-by-foot, human security and safety, environment survey and prediction, human performance assessment, and training, engineering and applied physics technological research and solutions, remote sesning analysis of image time series.

The team has very good theoretical background and works in the ESA style, developing high TRL technologies in relative short time. The ESA technology development cycles are followed in all aspects: design, documentation, implementation, test and validation, TRL tracing, working with stakeholders and users, financial/administrative aspects.

The topics of the team are "niche" in the today technology and market, thus potential for further development.

The publication record is very good.

The team has international recognition and particularly at ESA level.

Team E37 Gravitation and nanosatellites research team

The team is active in development of applicative small satellite missions for scientific measurements and earth observation objectives. Team is very dynamic, and has ay once academic and technology flavours.

The team followd a coherent startegy carrying a series of projects on focused thematic and objectives: GOLIAT (the development of the first Romanian nanosatellite), PLURIBUS (identical nanosatellites for formation flying missions), FORMUAV (autonomous UAVs for formation flying missions), VECSS (telemetry and data module on board a privately financed Romanian rocket), COMPOSAT (individual subsystems for nanosatellites), MARKS (coordination system for space activities using advanced research and knowledge management), TERASCAN (research on the emission, modulation, scaning and detection of THz electromagnetic waves; experimental model for a detection and imaging instalation of objects for security purposes).

The team gained national and international recognition by designing, launching and opearting the first Romanian satellite GOLIAT.

The team has interdisciplinary activities, and follows the ESA technology development standards. The GOLIAT reached the TRL 8, being operated in space.

The knowledge gathered during the GOLIAT project created a the backbone for further technology activities with ESA, and is base of a "national school".

Publication record is good and impact is very high while the satellite is in orbit.

Overall technical considerations, observations, conclusions:

During the visit, the evaluation panel raised a serious concern about safety issues. We noticed (among others) the use of class IV lasers without laser goggles (even in demonstration during our visit), the use of unprotected high-voltage wires and electrodes, the use of liquid nitrogen without any oxygen-level sensor in the room, the use of (non-attached) gas cylinders placed directly in the experiment room. The management should make sustained efforts in order to bring the safety level in the Institute at the European standards.

Proposed Certification level: A+

Nr. crt.	Name, Surname	Signature
Evaluation TEAM		
1	Marta Castillejo	
2	Mirel Birlan	
3	Gilles Cheriaux	
4	Mihai Datcu	
5	Cristian Focsa	
Observers		
1	Coordinating Authority	
2	CCCDI Representative	
3	ANCS Representative	

Date: 07th May 2012

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