Stage 1 - Proposal for a decision

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2013 Evaluation of FCT Research and Development Units

Review process - Stage 1: Final Panel consensus statement

Outcome of Stage 1

Proceeding to Stage 2?

No

Grade

Good

Proposal for funding

Annual Core Funding (€)

10000.00

Individual criteria

Grading Scale for individual criteria:
5 - Excellent (All relevant aspects of the assessment criteria successfully addressed. Any shortcomings are minor)
4 - Very Good (Assessment criteria very well addressed/met, although certain improvements are still possible)
3 - Good (Assessment criteria well addressed/met, although improvements would be necessary)
2 - Fair (Assessment criteria broadly addressed, however there are significant weaknesses)
1 - Poor (Assessment criteria addressed in an inadequate manner, or there are serious inherent weaknesses

A. Productivity and contribution to the National Scientific and Technological System (NSTS)

i.) Research outputs; knowledge and technology transfer activities, when applicable, giving particular importance to the registration and value of patents, models or other relevant innovation indicators;
ii.) Contribution to the accumulation of knowledge and skills of the National Science and Technology System (expected effects and results); contribution to the advanced training of researchers; contribution to the promotion and dissemination of scientific and technological research; dissemination of results and actions to promote scientific culture, as well as participation in activities designed to promote public understanding of science, technology, art and culture; relationship between available past funding and output;
iii.) Degree of multidisciplinarity and of internationalization, when relevant

Score

4

Substantiating Comment

i) The Centre of Physics and Technological Research [CEFITEC] is currently experiencing a phase transition (i.e. a re-organization). Their main R&D areas involve Surface Science and Technology, Photoionization and Mass Spectroscopy and Applied Plasma Physics and Thin Film Technology. The unit has experienced a burst of productivity in the last two years (2012-2013), resulting in a good publication record. This includes a number of publications in high-impact journals (Science, Phys. Rev. Letters Applied Physics Letters etc.). The unit has constructed several prototypes, but transfer of knowledge and the relationship with society/industry are relatively weak, showing only 2 patents during the 2008-2012 period, and no funding from industry contracts. A few

collaborations with industry are listed in the rebuttal document.

ii) The unit has organized a suite of International Workshops and meetings. CEFITEC regularly trains PhD students (8 awarded between 2008-2012) and offers new PhD programs including one in Radiation Biology and Biophysics. CEFITEC managed to attract many bright students at the Masters' level and train them in a high-tech environment that makes them attractive for employers in industry, R&D and academia.
With regard to dissemination, only the agreement established with a hospital center (CHMB), aimed at contributing to knowledge transfer, is mentioned. It is however worth mentioning that the unit has attracted top researchers from all over Europe.

iii) The group is scientifically sound, however the level of internationalization could be improved beyond the present collaborations with European laboratories and with Brazil. The unit participates in ESF/COST actions as well as in a project with CERN. The research performed by CEFITEC appears to be embedded in international networks or bilateral collaborations.

B. Scientific and technological merit of the research team

i.) Scientific productivity and merit of the results of the Unit's research, taking into account the relevance of both current and planned research, as well as the level of internationalization of scientific activities, including publications and citations of published works or other relevant aspects;
ii.) Skills and composition of the research team to adequately execute the proposed program;
iii.) Ability to successfully compete for national and international research grants and contracts, including contracts with companies.

Score

3

Substantiating Comment

The scientific productivity and relevance of the unit has increased over the past two years (2012-2013), thanks to a recent re-organization, which ended up with a better management structure and more focused research. The overall scientific productivity of the center is currently very high, as shown by the number of publications in high-impact journals. It is worth noting that such productivity is not concentrated in a few, outstanding researchers (even though one of the members credits 122 publications in 2012, according to the bibliometrics provided by the institution) but shared by a large fraction of the senior and junior researchers. However, it is observed that only about 50% of the researchers are integrated members and only 8 PhD's were awarded during the previous funding period, which corresponds to only 1 PhD for every 10 researchers or 5 integrated members.

ii) The research performed by the unit is multidisciplinary while a significant fraction of the work is done in collaboration with foreign scientists.

iii) The level of external funding attracted by the Center participants is not very encouraging. The total funding reported is 1,6 M€ out of which ~1 M€ is from the FCT (60~%) while only 68k€ (3,5%) appears to be from non-National sources, like the EU. This is a small amount and a major threat to its sustainability. Surprisingly, no contracts with industry are reported, even though this unit, according to their definition, is 70% applied research.

C. Scientific merit and innovative nature of the strategic programme

i.) Relevance, originality and impact of the proposed strategic programme;
ii.) Contribution of the scientific, technological, artistic or cultural activities of the proposed programme for a smart specialization strategy of the region in which the R&D Unit is incorporated;
iii.) Degree of multidisciplinarity and of internationalization, when relevant.

Score

4

Substantiating Comment

i) The proposed research plan is arranged around 5 main goals: 1) characterization of the physicochemical processes occurring during the interaction of various forms of atomic/ionic projectiles and radiation with molecules and macromolecular structures in gas and condensed phases; 2) the study of nanostructured (and other sort of) surfaces in the framework of several potential scientific and industrial applications; 3) the study of aeronomic molecules and bio related molecular targets in different stages of aggregation aimed at understanding the effect of radiation induced changes; 4) the understanding of how the effects of these phenomena are interconnected; 5) development of new tools for industrial and research applications.

ii) All the different projects that integrate the proposal involve a bottom-up approach, starting from fundamental studies at the atomic/molecular/nanoscale level. Though the different topics are timely, relevant, and with potential impact for society, this should've been emphasized more in the proposal.

iii) The research team is multidisciplinary and encompasses a suite of different research interests, in areas such as thin film production, optical materials, radiotherapy, medical diagnostics, detector technology, micro-flow metrology, gauge calibrations, or solar-based laser systems. Part of the program requires participation of large international collaborations at large-scale facilities e.g. CERN, synchrotrons and free-electron lasers. The researchers have the necessary contacts to guarantee access to these facilities. The proposal, however, fails short in explaining how and why the synergies from the multiple fields of expertise involved would be combined to solve a specific problem. This is exactly why it appears very surprising that the amount of external (non-national) funding was so low in the previous funding period.

D. Feasibility of the work plan and reasonability of the requested budget

i.) Organisation of the programme in terms of the proposed objectives and resources (budget, duration, infrastructures); organisation and work environment, with special focus on the adequacy of the research team's critical mass to perform the proposed objectives and on the management of resources directed to research activities, which includes supervision of postgraduate students and post-doctoral involvement in R&D activities;
ii.) Adequacy of proposed budget to accomplish the proposed strategic programme;
iii.) Institutional resources (technical, scientific, organisational and managerial) of the participating entities. The commitment of the host institution in providing the manpower and material resources to implement the proposed programme is especially valued.

Score

3

Substantiating Comment

i) The proposal is arranged in terms of five thematic lines, each with a list of objectives and sub-tasks. Though each sub-task appears to have the required critical mass, work packages and milestones are missing. A table or graph describing the time frame for finalizing the different sub-tasks (i.e. a Gantt diagram) is also missing.

ii) The requested budget is nearly double compared to that of the previous period even though local infrastructures are already available.

iii) The unit has managed to acquire a substantial research infrastructure, however it seems that exploitation both this infrastructure and the accumulated know-how is limited in particular with direct impact in the local and surrounding community. For a research unit that claims to be 70% applied, reporting only 2 patents and no spin-out companies during the past funding period does not help justify the increase in the requested budget for the new funding period.

Additional questions

1. Laboratory intensity level

Do you agree with the laboratory intensity level suggested in the application?

Yes

If you recommend a different level, please substantiate

2. Suggested basic and applied research/experimental development share

Do you agree with the suggested basic and applied research/experimental development share suggested in the application?

No

If no, please indicate your recommended basic/applied research share

Indicated in % as XX/xx, with basic share always in first position, i.e. 60/40 = 60 basic research and 40 applied research

50/50

If you recommend a different basic/applied research share, please substantiate

Based on the performance of the previous reporting period especially with regards to patents and generation or active participation in SME's/spin-offs, it seems that a 70% applied research is not justified. The unit has the know-how, but it appears that the application of this know-how is still mostly towards further laboratory development, prototyping i.e., basic research, so the recommendation of 50/50 best describes the unit.

Comments

Overall Comment

The Centre of Physics and Technological Research [CEFITEC] is an active research unit particularly interested in research in Surface Science and Technology, Photoionization and Mass Spectroscopy and Applied Plasma Physics and Thin Film Technology. The proposal is aimed at optimizing and exploiting nanoscale processes at different stages and phases of complexity as well as at developing unique technological capabilities.

Among the best qualities and aspects of the unit and of the present proposal, the Panel selects:
- The research plan is multidiscipinary and involves a significant level of internationalization.
- The unit has experienced a burst of productivity in the last two years (2012-2013), resulting in a good publication record.
- The unit is formed by highly skilled scientists with international reputation.
- The proposers have proved their ability to get funding from external sources.
- The planned research has a high potential impact.

Among the aspects that need to be improved:
- The unit is relative small, specially to undertake seven thematic research lines with success.
- Very limited level of funding from EU or other non-national agencies.
- Very limited interaction with industry (no contracts).
- A large percentage of the researchers do not qualify for IM status.
- The numbers of young people being trained (PhD's per researcher) appears very low.

Thus in conclusion whilst CEFITEC is producing good work it was not as strong as other Centres reviewed by the panel and therefore in a highly competitive process was not recommended for the next stage of review.

Questions and comments

To be raised by the Panel to the Research Unit if the latter proceeds to the second stage of the evaluation (on site visits by Panel)