

## **The External Evaluation Report of a Doctoral Study Domain**

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### **I. Introduction**

The external evaluation has been performed in a hybrid mode, with remote meetings (for international evaluators) and an on-site visit. For the doctoral studies in Physics the composition of the Experts Committee was:

Prof. Dr. MORARU Luminita (coordinator)

Prof. Silvia Monica Lenzi (international evaluator)

Ms. Bianca-Denisa Cernușcă (PhD student)

The specific activities of the evaluation of the doctoral school were scheduled between 22-26 November 2021 - online meetings with the members of the evaluation commission and meetings with the evaluation commission and the representatives of the university, faculty, doctoral school management, doctoral field coordinator, doctoral students, graduated doctoral students in the field, employers etc. On November 25, the coordinator of the evaluation team during the visit had the opportunity to meet all of the members and personnel involved in the Doctoral School.

### **II. Methods used**

The methods and tools used in the external evaluation process, before and during the evaluation visit include:

- The analysis of the internal evaluation report of the doctoral study domain under review and its Annexes;

- The analysis of documents, data and information available on the IOSUD/Doctoral School(s) website, in electronic format;

- Visiting the buildings included in the institution's property by the coordinator of the Committee

- Online Meeting/discussions with doctoral students in the doctoral study domain under review;

- Online Meeting/Discussions with the graduates of the doctoral study domain under review;

- Online Meeting/Discussions with employers of the graduates in the doctoral study domain under review;

- Online Meeting/Discussions with the school officials of the Doctoral School(s) in which the doctoral study domain under review is operating;



- Online Meeting/Discussions with the doctoral advisors in the doctoral study domain under review;
- Online Meeting/discussions with the representatives of the various structures of the IOSUD/Doctoral School(s)

### **III. Analysis of ARACIS's performance indicators**

#### **Domain A. INSTITUTIONAL CAPACITY**

*\*general description of domain analysis.*

#### **Criterion A.1. The administrative, managerial institutional structures and the financial resources**

*\*general description of the criterion analysis.*

*Standard A.1.1. The institution organizing doctoral studies (IOSUD) has implemented the effective functioning mechanisms provided for in the specific legislation on the organization of doctoral studies.*

*\*general description of the criterion analysis.*

**Performance Indicator A.1.1.1.** *The existence of specific regulations and their application at the level of the Doctoral School of the respective university doctoral study domain:*

*(a) the internal regulations of the Doctoral School:*

The Regulations of the DSP was elaborated in 2012 in agreement with the provisions of the Regulations on the University of Bucharest Doctoral Studies, and was updated several times. The activity of both DSP and ISDS is coordinated by a Council consisting of 7 members: the Director of the Doctoral School, 2 representatives of the tenured doctoral supervisors from the University of Bucharest, 2 external specialists and 2 doctoral students. In the case of ISDS, the two external specialists must be institutionally affiliated at a higher education or research institute from abroad or have been active for at least 10 years at such an institution.

*(b) the Methodology for conducting elections for the position of director of the Council of doctoral school (CSD), as well as elections by the students of their representative in CSD and the evidence of their conduct:* they have been done following the Institutional Regulations on the Organisation and Functioning of University Doctoral Studies adopted in 2012

*(c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies):* The Methodology of admission, decided by the DSP Council and approved by CUDSis published in the DSP website together with that of ISDS. The methodology of completion of university doctoral studies in the case of both DSP and ISDS is the same as that implemented in general by the University of Bucharest.

*(d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad:* the procedure for automatic recognition by the University of Bucharest of the status of doctoral supervisor obtained at recognized universities abroad as well as the procedure for automatic recognition by the University of Bucharest of the diploma and title of doctor in sciences or related professional fields obtained abroad, are posted on the website.

*(e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings:* the DSP Council (as well as the ISDS Council) meets in ordinary sessions at least



twice per semester, and in extraordinary sessions when convened by the Director of the DSP. the decisions of the DSP Council can be taken by electronic vote.

*f) the contract for doctoral studies:* the Contract of University Doctoral Studies is approved by the Senate of UB. The framework of this contract is made public on the SDF and ISDS websites.

*g) internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies:* The structure of the Curriculum is the same for all seven directions of studies, but differs in the themes/contents of the 4 modular disciplines of the seven PhD directions. The content of the themes of the modular courses, is established by the coordinator of each direction of study upon consultations with the doctoral supervisors in the respective direction, especially with those having students in the first year of doctoral stage. The Scientific research program of each doctoral student is established by consent between the doctoral supervisor and the student, is assumed by signature by the members of the advisory panel and endorsed by the DSP Council.

All these issues have been analyzed and discussed at the different meetings and found in agreement with what it is declared in the internal evaluation.

*Recommendations:*

***The indicator is fulfilled***

***Performance Indicator A.1.1.2.*** *The doctoral school' Regulation includes mandatory criteria, procedures and standards binding on the aspects specified in Article 17, paragraph (5) of the Government Decision No. 681/2011 on the approval of the Code of Doctoral Studies with subsequent amendments and additions.*

The regulations of the DSP and ISDS are available in the website of the doctoral school and detailed in the document

<http://doctorat.fizica.unibuc.ro/Doctorat/Regulamente/FIZICA%20Regulament%20SDF+anexe%202018.pdf>.

This includes: the procedures to welcome new doctoral supervisors or to withdraw their status together with the procedure to change supervisor or interrupt the doctoral program; the mechanism of decision regarding the training courses. It also contains the description of the methods prevent fraud in scientific research and the assurance of access to research infrastructures.

From the internal report and the discussions at the different meetings, my evaluation is very positive.

*Recommendations:*

***The indicator is fulfilled.***

***Standard A.1.2.*** *The IOSUD has the logistical resources necessary to carry out the doctoral studies' mission.*

***Performance Indicator A.1.2.1.*** *The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.*

Since the academic year 2018/2019, the University of Bucharest implements the University Management System application to manage the doctoral students' career, protecting the personal data. From the internal report and the discussions at the different meetings, this indicator looks fulfilled.

*Recommendations:*

***The indicator is fulfilled.***



**Performance Indicator A.1.2.2.** *The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.*

Since 2016, all doctoral dissertations have been verified for similarities and plagiarism. Two certified softwares are in use.

From the internal report and the discussions at the different meetings, this indicator looks fulfilled.

*Recommendations:*

**The indicator is fulfilled**

**Standard A.1.3.** *The IOSUD makes sure that financial resources are used optimally, and the revenues obtained from doctoral studies are supplemented through additional funding besides governmental funding.*

*\*general description of the standard analysis.*

**Performance Indicator A.1.3.1.** *Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.*

This doctoral school has a partnership agreement with different research institutions in Magurele, most of them of very high level. These institutions provide grants to the PhD students or employ them. They also support the participation of the students to conferences, summer schools and research programs.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator \*A.1.3.2.** *The percentage of doctoral students active at the time of the evaluation, who for at least six months receive additional funding sources besides government funding, through scholarships awarded by individual persons or by legal entities, or who are financially supported through research or institutional / human resources development grants is not less than 20%.*

From a total of 255 students from DSP and ISDS, 117 of them have received financial external support for more than 6 months, this is more than 45%.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator \*A.1.3.3.1** *At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students*

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<sup>1</sup> The indicators marked with an asterisk (\*) hold a special status, referring exclusively to the evaluation of doctoral studies domains, as per Article 12 from the annex No.1 of the Order of the minister of education No. 3651/12.04.2021 approving the Methodology for evaluating university doctoral studies and the system of criteria, standards and performance indicators used in the evaluation. In case they are not met, the Agency extends a period of maximum 3 years to IOSUD to correct the respective deficiencies.



*(attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).*

The students are stimulated to participate to school, conferences and research stages. The forms are available in the website. The funds are available and increased by the contribution of the single associated research centres, as stated in the internal evaluation.

From the meetings with the management and the students, it has been put in evidence the lack of information regarding the amount of funds available to each student. The management assures to make this available to the students soon.

*Recommendations:* to make this information available to the students.

***The indicator is fulfilled.***

## **Criterion A.2. Research infrastructure**

*\*general description of the criterion analysis.*

*Standard A.2.1. The IOSUD has a modern research infrastructure to support the conduct of doctoral studies' specific activities.*

*\*general description of the standard analysis.*

***Performance Indicator A.2.1.1.*** *The venues and the material equipment available to the doctoral school enable the research activities in the evaluated domain to be carried out, in line with the assumed mission and objectives (computers, specific software, equipment, laboratory equipment, library, access to international databases etc.). The research infrastructure and the provision of research services are presented to the public through a specific platform. The research infrastructure described above, which was purchased and developed within the past 5 years will be presented distinctly.*

As results from the internal evaluation and the discussions, the UB has invested in the last 5 years an important amount of funds to improve the services and research infrastructures. In addition to the infrastructures of the Faculty of Physics, the partnership agreement with R&D institutes in the Magurele campus offer a large variety of resources, infrastructures and services. The information is thoroughly described in the internal report.

This has been confirmed by the meeting with the students and the management of the DSP and the research centres in the Magurele platform.

*Recommendations:*

***The indicator is fulfilled.***

## **Criterion A.3. Quality of Human Resources**

*\*general description of the criterion analysis.*

*Standard A.3.1. At the level of each domain there are sufficient qualified staff to ensure the conduct of doctoral study program.*

*\*general description of the standard analysis.*

***Performance Indicator A.3.1.1.*** *Minimum three doctoral thesis advisors within that doctoral domain, and at least 50% of them (but no less than three) meet the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU) in force at the time when the*



evaluation is carried out, which standards are required and mandatory for obtaining the enabling certification.

From the Internal evaluation it is clear that the standards of supervisors are quite high and more than 90% of them fulfil the minimum standards of the CNATDCU. This is also evinced from the documents uploaded in the cloud.

*Recommendations:*

***The indicator is fulfilled.***

***Performance Indicator \*A.3.1.2.*** *At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.*

From the documentation made available it is clear that more than 50% of the doctoral supervisors are tenured at UDSOI.

*Recommendations:*

***The indicator is fulfilled.***

***Performance Indicator A.3.1.3.*** *The study subjects in the education program based on advanced higher education studies pertaining to the doctoral domain are taught by teaching staff or researchers who are doctoral thesis advisors / certified doctoral thesis advisors, professors / CS I or lecturer / CS II, with proved expertise in the field of the study subjects they teach, or other specialists in the field who meet the standards established by the institution in relation with the aforementioned teaching and research functions, as provided by the law.*

The training program is quite vast and involves 7 different directions of studies. This program is published in the <http://doctorat.fizica.unibuc.ro/Doctorat/?Page=Orar>. All the teachers meet the standard requested, as detailed in the available documentation.

*Recommendations:*

***The indicator is fulfilled.***

***Performance Indicator \*A.3.1.4.*** *The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs<sup>2</sup> does not exceed 20%.*

Presently the number of supervisors that coordinate more than 8 doctoral students, but no more than 12 is less than 5%.

*Recommendations:* Reduce the limit of doctoral students per supervisor to 3 or 4 to assure an efficient follow up of the students.

***The indicator is fulfilled.***

***Standard A.3.2.*** *The Doctoral advisors within the domain are carrying out a scientific activity visible at international level.*

*\*general description of the standard analysis.*

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<sup>2</sup> 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No.1/2011 with subsequent amendments and additions, with additional extension periods approved as per Article 39, paragraph (3) of the Code of doctoral studies approved by the GD No. 681/2011 with subsequent amendments and additions.





**Performance Indicator A.3.2.1.** *At least 50% of the doctoral thesis advisors in the evaluated domain have at least 5 Web of Science- or ERIH-indexed publications in magazines of impact, or other achievements of relevant significance for that domain, including international-level contributions that indicate progress in scientific research - development - innovation for the evaluated domain. The aforementioned doctoral thesis advisors enjoy international awareness within the past five years, consisting of: membership on scientific boards of international publications and conferences; membership on boards of international professional associations; guests in conferences or expert groups working abroad, or membership on doctoral defense commissions at universities abroad or co-leading with universities abroad. For Arts and Sports and Physical Education Sciences, doctoral thesis advisors shall prove their international visibility within the past five years by their membership on the boards of professional associations, membership in organizing committees of arts events and international competitions, membership on juries or umpire teams in artistic events or international competitions.*

As declared in the internal evaluation document and the annexes AD18, AD22 and AD23, more than 80% of the supervisors fulfil this requirement, not only by the number of relevant publications but by the participation to editorial and organizing scientific committees.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator \*A.3.2.2.** *At least 50% of the doctoral thesis advisors in a specific doctoral study domain continue to be active in their scientific field, and acquire at least 25% of the score requested by the minimal CNATDCU standards in force at the time of the evaluation, which are required and mandatory for acquiring their enabling certificate, based on their scientific results within the past five years.*

More than 80% of the doctoral supervisors fulfil these requirements as results from the annexes AD18 and AD24.

*Recommendations:*

**The indicator is fulfilled.**

## **Domain B. EDUCATIONAL EFFECTIVENESS**

*\*general description of domain analysis.*

### **Criterion B.1. The number, quality and diversity of candidates enrolled for the admission contest**

*\*general description of the criterion analysis.*

*Standard B.1.1. The institution organizing doctoral studies has the capacity to attract candidates from outside the higher education institution or a number of candidates exceeding the number of seats available.*

*\*general description of the standard analysis.*

**Performance Indicator \*B.1.1.1.** *The ratio between the number of graduates of masters' programs of other higher education institutions, national or foreign, who have enrolled for the doctoral admission contest within the past five years and the number of seats funded by the state budget, put out through contest within the doctoral domain is at least 0.2 or the ratio between the number of candidates within the*



past five years and the number of seats funded by the state budget put out through contest within the doctoral studies domain is at least 1,2.

The ratio between this number and the number of places financed from the state budget at the admission competition at DSP in the last 5 years is of about 0.28 and the ratio between the number of candidates within the past five years and the number of seats funded by the state budget put out through contest within the doctoral studies domain is 1.3 as results from the internal evaluation document and the annex AD25.

*Recommendations:*

**The indicator is fulfilled.**

*Standard B.1.2 Candidates admitted to doctoral studies demonstrate academic, research and professional performance.*

*\*general description of the standard analysis.*

**Performance Indicator \*B.1.2.1.** Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional performance, their interest for scientific or arts/sports research, publications in the domain and a proposal for a research subject. Interviewing the candidate is compulsory, as part of the admission procedure.

The admission process is very well implemented and allows to select the best students and reduce the drop-out. The methodology is made public on the webpage of the doctoral school

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator B.1.2.2.** The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission<sup>3</sup> does not exceed 30%.

The dropping out is quite reduced (less than 5%) due to important measurements to follow up and help the students in different aspects of their career, e.g. social, economical, scientific. The process and measurements are detailed in the website: <https://doctorat.unibuc.ro/studii-universitare-de-doctorat>

*Recommendations:*

**The indicator is fulfilled.**

## **Criterion B.2. The content of doctoral programs**

*\*general description of the criterion analysis.*

*Standard B.2.1. The training program based on advanced university studies is appropriate to improve doctoral students' research skills and to strengthen ethical behavior in science.*

*\*general description of the standard analysis.*

**Performance Indicator B.2.1.1.** The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing.

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<sup>3</sup> 3 years for the doctoral university studies with the duration stipulated at Article 159, paragraph (3), respectively 4 years for the doctoral university studies with the duration stipulated at Article 174, paragraph (3) of the Law of national education No. 1/2011 with subsequent amendments and additions.





The training program is quite rich and offers both specific and interdisciplinary courses. All the information is available in <https://doctorat.unibuc.ro/noutati/> and on the DSP webpage: [https://doctorat.fizica.unibuc.ro/Doctorat/Orar/Oferita competente transversale.pdf](https://doctorat.fizica.unibuc.ro/Doctorat/Orar/Oferita%20competente%20transversale.pdf). The fact that the students can choose to follow interdisciplinary courses is very relevant.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator B.2.1.2.** *At least one discipline is dedicated to Ethics and Intellectual Property in scientific research or there are well-defined topics on these subjects within a discipline taught in the doctoral program.*

All doctoral students of both DSP and ISDS follow the course Academic Ethics and Integrity.

This is detailed in the annexes AD3 and AD4.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator B.2.1.3.** *The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes”, specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities<sup>4</sup>.*

The knowledge, abilities, responsibilities and autonomy that the doctoral students should acquire after following each course in the Training program based on advanced university studies are specified in the respective syllabus. These are evaluated and assessed not only by the exams but also by the scientific articles drafted by the PhD students, the developed skills. This is also evinced by a questionnaire offered to the students.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator B.2.1.4.** *All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.*

Each student is followed up by an advisory panel chosen by the supervisor. This is detailed in the annex AD27. This is appreciated by the students as results from the discussion we had and documented in the questionnaire AD15.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator B.2.1.5.** *For a doctoral study domain, the ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance must not exceed 3:1.*

The students are advised by a large number of specialists in the Physics fields. The ratio between the number of doctoral students and that of guiding specialists is about 1:1. This is documented in the annex AD28.

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<sup>4</sup> Or by what the graduate should know, understand and to be able to do, according to the provisions of the Methodology of 17 March 2017 regarding inscription and registration of higher education qualifications in the National Register of Qualifications in Higher Education (RNCIS) approved by the Order No.3475/2017 with subsequent amendments and additions.



Recommendations:

**The indicator is fulfilled.**

### **Criterion B.3. The results of doctoral studies and procedures for their evaluation.**

*\*general description of the criterion analysis.*

*Standard B.3.1. Doctoral students capitalize on the research through presentations at scientific conferences, scientific publications, technological transfer, patents, products and service orders.*

*\*general description of the standard analysis.*

**Performance Indicator B.3.1.1.** *For the evaluated domain, the evaluation commission will be provided with at least one paper or some other relevant contribution per doctoral student who has obtained a doctor's title within the past 5 years. From this list, the members of the evaluation commission shall randomly select 5 such papers / relevant contributions per doctoral study domain for review. At least 3 selected papers must contain significant original contributions in the respective domain.*

The list of articles by the DSP and ISDS doctoral students is very relevant and fulfils the required standards, as results from the annexes AD29, AD30 and AD5.

Recommendations:

**The indicator is fulfilled.**

**Performance Indicator \*B.3.1.2.** *The ratio between the number of presentations of doctoral students who completed their doctoral studies within the evaluated period (past 5 years), including posters, exhibitions made at prestigious international events (organized in the country or abroad) and the number of doctoral students who have completed their doctoral studies within the evaluated period (past 5 years) is at least 1.*

The number of presentations at conferences by the doctoral students in the last 5 years is larger than two. This is documented in the annex AD6.

Recommendations:

**The indicator is fulfilled.**

*Standard B.3.2. The Doctoral School engages a significant number of external scientific specialists in the commissions for public defense of doctoral theses in the analyzed domain.*

*\*general description of the standard analysis.*

**Performance Indicator \*B.3.2.1.** *The number of doctoral theses allocated to one specialist coming from a higher education institution, other than the evaluated IOSUD should not exceed two (2) in a year for the theses coordinated by the same doctoral thesis advisor.*

The internal evaluation document points out that the requirement of not assigning more than 2 theses per year to a reviewer by a certain doctoral supervisor was not explicitly stated until the drafting of the evaluation methodologies of doctoral schools. Therefore, this rule was followed only in 2020. Previously, in 2016 there was 1 external reviewer that took part at more than two doctoral theses coordinated by the same supervisor and two were in this situation in 2018 and 2019. This is documented in the annex AD31 and justified by the difficulty of finding external experts in some areas.



*Recommendations:* the requirements of the indicators have to be transmitted to the doctoral school well in advance

**The indicator is fulfilled.**

**Performance Indicator \*B.3.2.2.** *The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.*

The ratio results of about 0.11, well below the required limit.

*Recommendations:*

**The indicator is fulfilled.**

## **Domain C. QUALITY MANAGEMENT**

*\*general description of domain analysis.*

### **Criterion C.1. Existence and periodic implementation of the internal quality assurance system**

*\*general description of the criterion analysis.*

*Standard C.1.1. There are an institutional framework and procedures in place and relevant internal quality assurance policies, applied for monitoring the internal quality assurance.*

*\*general description of the standard analysis.*

**Performance Indicator C.1.1.1.** *The Doctoral school in the respective university study domain shall demonstrate the continuous development of the evaluation process and its internal quality assurance following a procedure developed and applied at the level of the IOSUD, the following assessed criteria being mandatory:*

- (a) the scientific work of Doctoral advisors;*
- (b) the infrastructure and logistics necessary to carry out the research activity;*
- (c) the procedures and subsequent rules based on which doctoral studies are organized;*
- d) the scientific activity of doctoral students;*
- e) the training program based on advanced academic studies of doctoral students;*
- f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.*

Different measurements have been implemented in the last 5 years to include active young supervisors and withdraw supervisors that remained inactive or without PhD students for many years. At the same time counselling, carrier orientation and other important services to students have been implemented.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator \*C.1.1.2.** *Mechanisms are implemented during the stage of the doctoral study program to enable feedback from doctoral students allowing to identify their needs, as well as their overall*



level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.

An analysis on annual basis is done on both the professional trajectory of graduates at certain intervals following graduation, and on student and teaching staff satisfaction (see i.e. <https://unibuc.ro/wp-content/uploads/2020/11/Raportul-Biroului-de-statistica-pe-anul-2019.pdf>). In addition, the DSP collects feedback from students (see AD15). Improvements are being implemented to the Training program based on advanced university studies.

*Recommendations:*

**The indicator is fulfilled.**

## **Criterion C.2. Transparency of information and accessibility of learning resources**

*\*general description of the criterion analysis.*

*Standard C.2.1. Information of interest to doctoral students, future candidates and public interest information is available for electronic format consultation.*

*\*general description of the standard analysis.*

**Performance Indicator C.2.1.1.** *The IOSUD publishes on the website of the organizing institution, in compliance with the general regulations on data protection, information such as:*

- (a) the Doctoral School regulation;*
- (b) the admission regulation;*
- (c) the doctoral studies contract;*
- (d) the study completion regulation including the procedure for the public presentation of the thesis;*
- (e) the content of training program based on advanced academic studies;*
- (f) the academic and scientific profile, thematic areas/research themes of the Doctoral advisors within the domain, as well as their institutional contact data;*
- (g) the list of doctoral students within the domain with necessary information (year of registration; advisor);*
- (h) information on the standards for developing the doctoral thesis;*
- (i) links to the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented; this information will be communicated at least twenty days before the presentation.*

The information can be found in <http://doctorat.fizica.unibuc.ro/Doctorat/>

*Recommendations:*

Not all the pages in the website are in English, in particular the rules. Try to make available all the information also in English

**The indicator is fulfilled.**

*Standard C.2.2. The IOSUD/The Doctoral School provides doctoral students with access to the resources needed for conducting doctoral studies.*

*\*general description of the standard analysis.*

**Performance Indicator C.2.2.1.** *All doctoral students have free access to one platform providing academic databases relevant to the doctoral studies domain of their thesis.*



The consultation of scientific literature via electronic systems is provided by specific software that allows the students to access from the computers at the University or research centres or from outside.

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator C.2.2.2.** *Each doctoral student shall have access, upon request, to an electronic system for verifying the degree of similarity with other existing scientific or artistic works.*

The students have access to the similarity control electronic system by doctoral students of the University of Bucharest (<https://doctorat.unibuc.ro/studii-universitare-de-doctorat/>)

*Recommendations:*

**The indicator is fulfilled.**

**Performance Indicator C.2.2.3.** *All doctoral students have access to scientific research laboratories or other facilities depending on the specific domain/domains within the Doctoral School, according to internal order procedures.*

The students have access to the facilities of the research institution of their supervisors or and can request access at the research infrastructure of a different institution accordingly to the Internal Order Regulations of the respective institution.

*Recommendations:*

**The indicator is fulfilled.**

### **Criterion C.3. Internationalization**

*\*general description of the criterion analysis.*

*Standard C.3.1. There is a strategy in place and it is applied to enhance the internationalization of doctoral studies.*

*\*general description of the standard analysis.*

**Performance Indicator \*C.3.1.1.** *IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.*

In spite of the fact that the pandemic in 2020 has precluded the mobility abroad, the number of students that in the first 4 years had travel abroad for Erasmus, research, conferences and summer schools.

*Recommendations:* To publish the amount of funds available by each PhD student for the mobility

**The indicator is fulfilled.**

**Performance Indicator C.3.1.2.** *In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.*

The information given in AD35-38 is encouraging



Recommendations:

**The indicator is fulfilled.**

**Performance Indicator C.3.1.3.** *The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).*

Although some measurements and initiatives have been implemented, the internationalization needs to be improved.

*Recommendations:* All thesis should be written in English to improve the international visibility of the students' research work. Increase the number of international PhD students.

**The indicator is fulfilled.**

#### IV. SWOT Analysis

<p><b><u>Strengths:</u></b> The scientific quality of the DSP and ISDS are of very high level, also thanks to the access to state-of-the-art research facilities and infrastructures in the Magurele area. From the evaluation process, continuous efforts to improve the services to the students in all aspects results evident.</p>	<p><b><u>Weaknesses:</u></b> - supervisors should not follow more that 3-4 PhD students contemporarily - reduced number of international students - too many thesis are not written in English</p>
<p><b><u>Opportunities:</u></b> The variety of Physics fields in which the local researches are involved and the richness of the facilities and infrastructures may be an opportunity to improve interdisciplinary ventures and collaborations involving PhD students and theses.</p>	<p><b><u>Threats:</u></b> The duration of the PhD should not exceed 4 years.</p>

#### V. Overview of judgments awarded and of the recommendations

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
1.	PI	A.1.1.1. The existence of specific regulations and their application at the level of the Doctoral School of the respective university doctoral study domain:	Fulfilled	



No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		a) the internal regulations of the Doctoral School; b) the Methodology for conducting elections for the position of director of the Council of doctoral school (CSD), as well as elections by the students of their representative in CSD and the evidence of their conduct; c) the Methodologies for organizing and conducting doctoral studies (for the admission of doctoral students, for the completion of doctoral studies); d) the existence of mechanisms for recognizing the status of a Doctoral advisor and the equivalence of the doctoral degree obtained abroad; e) functional management structures (Council of the doctoral school), giving as well proof of the regularity of meetings; f) the contract for doctoral studies; g) internal procedures for the analysis and approval of proposals regarding the training for doctoral study programs based on advanced academic studies.		
2.	PI	<b>A.1.1.2.</b> The doctoral school' Regulation includes mandatory criteria, procedures and standards binding on the aspects specified in Article 17, paragraph (5) of the Government Decision No. 681/2011 on the approval of the Code of Doctoral Studies with subsequent amendments and additions.	Fulfilled	
3.	PI	<b>A.1.2.1.</b> The existence and effectiveness of an appropriate IT system to keep track of doctoral students and their academic background.	Fulfilled	
4.	PI	<b>A.1.2.2.</b> The existence and use of an appropriate software program and evidence of its use to verify the percentage of similarity in all doctoral theses.	Fulfilled	
5.	IP	<b>A.1.3.1.</b> Existence of at least one research or institutional / human resources development grant under implementation at the time of submission of the internal evaluation file, per doctoral study domain under evaluation, or existence of at least 2 research or institutional development / human resources grant for the doctoral study domain, obtained by doctoral	Fulfilled	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		thesis advisors operating in the evaluated domain within the past 5 years. The grants address relevant themes for the respective domain and, as a rule, are engaging doctoral students.		
6.	PI *	<b>A.1.3.2.</b> The percentage of doctoral students active at the time of the evaluation, who for at least six months receive additional funding sources besides government funding, through scholarships awarded by individual persons or by legal entities, or who are financially supported through research or institutional / human resources development grants is not less than 20%.	<b>Fulfilled</b>	
7.	PI *	<b>A.1.3.3.</b> At least 10% of the total amount of doctoral grants obtained by the university through institutional contracts and of tuition fees collected from the doctoral students enrolled in the paid tuition system is used to reimburse professional training expenses of doctoral students (attending conferences, summer schools, training, programs abroad, publication of specialty papers or other specific forms of dissemination etc.).	<b>Fulfilled</b>	<b>To make this information available to the students.</b>
8.	CPI	<b>A.2.1.1.</b> The venues and the material equipment available to the doctoral school enable the research activities in the evaluated domain to be carried out, in line with the assumed mission and objectives (computers, specific software, equipment, laboratory equipment, library, access to international databases etc.). The research infrastructure and the provision of research services are presented to the public through a specific platform. The research infrastructure described above, which was purchased and developed within the past 5 years will be presented distinctly	<b>Fulfilled</b>	
9.	CPI	<b>A.3.1.1.</b> Minimum three doctoral thesis advisors within that doctoral domain, and at least 50% of them (but no less than three) meet the minimum standards of the National Council for Attestation of University Degrees, Diplomas and Certificates (CNATDCU) in force at the time when the evaluation is	<b>Fulfilled</b>	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		carried out, which standards are required and mandatory for obtaining the enabling certification.		
10.	PI *	<b>A.3.1.2.</b> At least 50% of all doctoral advisors have a full-time employment contract for an indefinite period with the IOSUD.	<b>Fulfilled</b>	
11.	PI	<b>A.3.1.3.</b> The study subjects in the education program based on advanced higher education studies pertaining to the doctoral domain are taught by teaching staff or researchers who are doctoral thesis advisors / certified doctoral thesis advisors, professors / CS I or lecturer / CS II, with proved expertise in the field of the study subjects they teach, or other specialists in the field who meet the standards established by the institution in relation with the aforementioned teaching and research functions, as provided by the law.	<b>Fulfilled</b>	
12.	PI *	<b>A.3.1.4.</b> The percentage of doctoral thesis advisors who concomitantly coordinate more than 8 doctoral students, but no more than 12, who are themselves studying in doctoral programs does not exceed 20%.	<b>Fulfilled</b>	<b>Reduce the limit of doctoral students per supervisor to 3 or 4 to assure an efficient follow up of the students.</b>
13.	CPI	<b>A.3.2.1.</b> At least 50% of the doctoral thesis advisors in the evaluated domain have at least 5 Web of Science- or ERIH-indexed publications in magazines of impact, or other achievements of relevant significance for that domain, including international-level contributions that indicate progress in scientific research - development - innovation for the evaluated domain. The aforementioned doctoral thesis advisors enjoy international awareness within the past five years, consisting of: membership on scientific boards of international publications and conferences; membership on boards of international professional associations; guests in conferences or expert groups working abroad, or membership on doctoral defense commissions at universities abroad or co-leading with universities abroad. For Arts and Sports and Physical Education Sciences, doctoral thesis advisors shall prove their international visibility within the past five years	<b>Fulfilled</b>	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		by their membership on the boards of professional associations, membership in organizing committees of arts events and international competitions, membership on juries or umpire teams in artistic events or international competitions.		
14.	PI *	<b>A.3.2.2.</b> At least 50% of the doctoral thesis advisors in a specific doctoral study domain continue to be active in their scientific field, and acquire at least 25% of the score requested by the minimal CNATDCU standards in force at the time of the evaluation, which are required and mandatory for acquiring their enabling certificate, based on their scientific results within the past five years	<b>Fulfilled</b>	
15.	PI *	<b>B.1.1.1.</b> The ratio between the number of graduates of masters' programs of other higher education institutions, national or foreign, who have enrolled for the doctoral admission contest within the past five years and the number of seats funded by the state budget, put out through contest within the doctoral domain is at least 0.2 or the ratio between the number of candidates within the past five years and the number of seats funded by the state budget put out through contest within the doctoral studies domain is at least 1,2.	<b>Fulfilled</b>	
16.	PI *	<b>B.1.2.1.</b> Admission to doctoral study programs is based on selection criteria including: previous academic, research and professional performance, their interest for scientific or arts/sports research, publications in the domain and a proposal for a research subject. Interviewing the candidate is compulsory, as part of the admission procedure.	<b>Fulfilled</b>	
17.	PI	<b>B.1.2.2.</b> The expelling rate, including renouncement / dropping out of doctoral students 3, respectively 4, years after admission does not exceed 30%.	<b>Fulfilled</b>	
18.	PI	<b>B.2.1.1.</b> The training program based on advanced academic studies includes at least 3 disciplines relevant to the scientific research	<b>Fulfilled</b>	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		training of doctoral students; at least one of these disciplines is intended to study in-depth the research methodology and/or the statistical data processing.		
19.	PI	<b>B.2.1.2.</b> At least one discipline is dedicated to Ethics and Intellectual Property in scientific research or there are well-defined topics on these subjects within a discipline taught in the doctoral program.	<b>Fulfilled</b>	
20.	PI	<b>B.2.1.3.</b> The IOSUD has mechanisms to ensure that the academic training program based on advanced university studies addresses „the learning outcomes”, specifying the knowledge, skills, responsibility and autonomy that doctoral students should acquire after completing each discipline or through the research activities.	<b>Fulfilled</b>	
21.	PI	<b>B.2.1.4.</b> All along the duration of the doctoral training, doctoral students in the domain receive counselling/guidance from functional guidance commissions, which is reflected in written guidance and feedback or regular meeting.	<b>Fulfilled</b>	
22.	CPI	<b>B.2.1.5.</b> For a doctoral study domain, the ratio between the number of doctoral students and the number of teaching staff/researchers providing doctoral guidance must not exceed 3:1.	<b>Fulfilled</b>	
23.	CPI	<b>B.3.1.1.</b> For the evaluated domain, the evaluation commission will be provided with at least one paper or some other relevant contribution per doctoral student who has obtained a doctor's title within the past 5 years. From this list, the members of the evaluation commission shall randomly select 5 such papers / relevant contributions per doctoral study domain for review. At least 3 selected papers must contain significant original contributions in the respective domain	<b>Fulfilled</b>	
24.	PI *	<b>B.3.1.2.</b> The ratio between the number of presentations of doctoral students who completed their doctoral studies within the evaluated period (past 5 years), including	<b>Fulfilled</b>	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		posters, exhibitions made at prestigious international events (organized in the country or abroad) and the number of doctoral students who have completed their doctoral studies within the evaluated period (past 5 years) is at least 1.		
25.	PI *	<b>B.3.2.1.</b> The number of doctoral theses allocated to one specialist coming from a higher education institution, other than the evaluated IOSUD should not exceed two (2) in a year for the theses coordinated by the same doctoral thesis advisor.	<b>Fulfilled</b>	<b>The requirements of the indicators have to be transmitted to the doctoral school well in advance</b>
26.	PI *	<b>B.3.2.2.</b> The ratio between the doctoral theses allocated to one scientific specialist coming from a higher education institution, other than the institution where the defense on the doctoral thesis is organized, and the number of doctoral theses presented in the same doctoral study domain in the doctoral school should not exceed 0.3, considering the past five years. Only those doctoral study domains in which minimum ten doctoral theses have been presented within the past five years should be analyzed.	<b>Fulfilled</b>	
27.	PI	<b>C.1.1.1.</b> The Doctoral school in the respective university study domain shall demonstrate the continuous development of the evaluation process and its internal quality assurance following a procedure developed and applied at the level of the IOSUD, the following assessed criteria being mandatory: a) the scientific work of Doctoral advisors; b) the infrastructure and logistics necessary to carry out the research activity; c) the procedures and subsequent rules based on which doctoral studies are organized; d) the scientific activity of doctoral students; e) the training program based on advanced academic studies of doctoral students; f) social and academic services (including for participation at different events, publishing papers etc.) and counselling made available to doctoral students.	<b>Fulfilled</b>	
28.	PI *	<b>C.1.1.2.</b> Mechanisms are implemented during the stage of the doctoral study program to	<b>Fulfilled</b>	



No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		enable feedback from doctoral students allowing to identify their needs, as well as their overall level of satisfaction with the doctoral study program in order to ensure continuous improvement of the academic and administrative processes. Following the analysis of the results, there is evidence that an action plan was drafted and implemented.		
29.	<b>CPI</b>	<p><b>C.2.1.1.</b> The IOSUD publishes on the website of the organizing institution, in compliance with the general regulations on data protection, information such as:</p> <ul style="list-style-type: none"> <li>a) the Doctoral School regulation;</li> <li>b) the admission regulation;</li> <li>c) the doctoral studies contract;</li> <li>d) the study completion regulation including the procedure for the public presentation of the thesis;</li> <li>e) the content of training program based on advanced academic studies;</li> <li>f) the academic and scientific profile, thematic areas/research themes of the Doctoral advisors within the domain, as well as their institutional contact data;</li> <li>g) the list of doctoral students within the domain with necessary information (year of registration; advisor);</li> <li>h) information on the standards for developing the doctoral thesis;</li> <li>i) links to the doctoral theses' summaries to be publicly presented and the date, time, place where they will be presented; this information will be communicated at least twenty days before the presentation.</li> </ul>	<b>Fulfilled</b>	<b>Not all the pages in the website are in English, in particular the rules. Try to make available all the information also in English</b>
30.	<b>PI</b>	<b>C.2.2.1.</b> All doctoral students have free access to one platform providing academic databases relevant to the doctoral studies domain of their thesis.	<b>Fulfilled</b>	
31.	<b>PI</b>	<b>C.2.2.2.</b> Each doctoral student shall have access, upon request, to an electronic system for verifying the degree of similarity with other existing scientific or artistic works.	<b>Fulfilled</b>	
32.	<b>PI</b>	<b>C.2.2.3.</b> All doctoral students have access to scientific research laboratories or other facilities depending on the specific	<b>Fulfilled</b>	

No.	Type of indicator (PI, PI *, CPI)	Performance indicator	Judgment	Recommendations
		domain/domains within the Doctoral School, according to internal order procedures.		
33.	PI *	<b>C.3.1.1.</b> IOSUD, for every evaluated domain, has concluded mobility agreements with universities abroad, with research institutes, with companies working in the field of study, aimed at the mobility of doctoral students and academic staff (e.g., ERASMUS agreements for the doctoral studies). At least 35% of the doctoral students have completed a training course abroad or other mobility forms such as attending international scientific conferences. IOSUD drafts and applies policies and measures aiming at increasing the number of doctoral students participating at mobility periods abroad, up to at least 20%, which is the target at the level of the European Higher Education Area.	<b>Fulfilled</b>	<b>To publish the amount of funds available by each PhD student for the mobility</b>
34.	PI	<b>C.3.1.2.</b> In the evaluated doctoral study domain, support is granted, including financial support, to the organization of doctoral studies in international co-tutelage or invitation of leading experts to deliver courses/lectures for doctoral students.	<b>Fulfilled</b>	
35.	PI	<b>C.3.1.3.</b> The internationalization of activities carried out during the doctoral studies is supported by IOSUD through concrete measures (e.g., by participating in educational fairs to attract international doctoral students; by including international experts in guidance committees or doctoral committees etc.).	<b>Fulfilled</b>	<b>All thesis should be written in English to give international visibility to the students' research work. Increase the number of international PhD students</b>

*The recommendations contained in the report shall be resumed in the indicators' analysis. Other general recommendations may be made that do not fit within a particular indicator.*

**VERY IMPORTANT!!!** – *Each identified weakness must be correlated with at least one recommendation to improve the situation!*

## VI. Conclusions and general recommendations

My conclusions on this evaluation are very positive. The Doctoral School on Physics demonstrate a high scientific level with a relevant scientific production. The standards of the school are excellent and well oriented towards a continuous improvement in all aspects. The possibility of collaborating with the research facilities and infrastructures in the Magurele area constitutes an invaluable resource.



All indicators are fulfilled, most of them are found well above the required thresholds.

My recommendations regard mainly the improvement of the internationalization in several aspects such as the increase of the number of foreign students and the stages abroad of the local students. All the information at the website should be available in English.

## **VII. Annexes**

*The following types of documents shall be attached:*

- *The detailed schedule of the evaluation visit – MANDATORY.*
- *The survey questionnaire applied to doctoral students or academic staff in the doctoral study domain under review, the results - optional (e.g., in graphic form) and their interpretation - if applicable.*
- *Scanned documents – any document requested from the IOSUD during the evaluation visit and received, which is not found in the internal evaluation file received before the visit and referred to in the report.*
- *Pictures – if relevant issues are raised regarding the condition of the student residences, cafeterias, premises for teaching and learning activities, library etc.*
- *Screenshots/Print screens of the Doctoral School/IOSUD website proving specific claims in the report, accompanied by the date when they were accessed and saved.*
- *Any other documents relevant to the evaluation process referred to in the report.*

Padova, December 3<sup>rd</sup>, 2021

Prof. Silvia M. Lenzi