

Project for activation of a PhD Programme managed by the Politecnico di Milano

XXIX CYCLE

The project is composed of the following documents:

1. **Regulations** of the PhD Programme, prepared according to the enclosed form
2. **Details of the PhD Programme** (PDF of the page filled in on the MIUR Website – anagrafe)

Enclosed Documents:

- A1. Description of the composition of the **Advisory Board (Comitato di riferimento)**, short report of the activities carried out with the committee, minutes of the meeting(s) (in 2012)
- A2. (only in the case new courses are activated): Short descriptions (5 – 10 lines) of the new courses at PhD level introduced in the regulation for the cycle to be activated. The programmes are drawn up in accordance with the form which is inserted in the database of PhD courses.

The present document contains the forms to draw up training projects related to the activation of a PhD programme. The project must be submitted by the end of March 2013 and be accompanied by the decision of approval of the Academic Board of the PhD Programme and by the Department Board (for all the proposing Departments).

The forms are valid only for the PhD Programmes managed by the Politecnico di Milano. Regarding PhD Programmes managed by other Universities in which Politecnico di Milano takes part as an associated University, the interested Department must submit a request of agreement to the PhD School and fill in the appropriate forms (to be requested to the PhD School: phdschool@polimi.it).

The criteria and the regulations of the PhD Programmes of the Politecnico di Milano, which the activation proposals must comply with, are described in the “PhD School Planning Document” of the Politecnico di Milano, approved in September 2011 according to the current laws and regulations.

The project must be filled in electronically, using the provided file. The files must be sent to the following address: phdschool@polimi.it

**Proposal of a PhD Programme (PhD)
administered at the Politecnico di Milano**

PhD in: **PHYSICS**

CYCLE:..... XXIX

TYPE OF ACTIVATION PROPOSAL:

- A.) Re-proposal of a PhD already activated – no change to the training project
- B.) Re-proposal of a PhD already activated – no substantial changes to the training project
- C.) Re-proposal of a PhD already activated - substantial changes to the training project
- D.) Newly activated PhD (not applicable for the XXVIII cycle)

Proposing Department: **PHYSICS**

Other proposing departments:.....-.....

POLITECNICO DI MILANO



PhD School of the Politecnico di Milano

Regulations of the PhD Programme in PHYSICS XXIX Cycle

Campus: Milano Leonardo

(document to be submitted in English or in English+Italian)

1. General Information

PhD School of the Politecnico di Milano

PhD Course: **PHYSICS**

Official Language(s): English/Italian

PhD Programme campus: Milano Leonardo

PhD School Website: <http://www.ricerca.polimi.it/phd>

PhD Programme Website: http://www.fisi.polimi.it/en/teaching/teaching_offer/phd

2. General presentation of the PhD Programme:

(Please use the text registered in the MIUR database – Remember to highlight the possible presence of Areas, Research topics with a short description of the Department(s) research activities

Translation of scientific knowledge into new technology and transfer of innovation to the production system represent a necessary step for many companies, also dictated by an increasingly global market. For this purpose a figure with a broad cultural background is needed. In particular, many advanced sectors of industry and research require a good knowledge in topics such as condensed matter physics, optics, laser technology and instrumentation, and nanostructured materials. The aim of the PhD in Physics at Politecnico di Milano is the training of personnel with strong research capacity, able to operate in basic and applied research and development facilities, and to manage and design high-tech and innovative products and processes in various industrial sectors. This application-oriented character clearly distinguishes the present PhD course in Physics from those at the School of Science.

The education contents are strictly related to the research activities carried out in the research laboratories at the Department of Physics. They can be divided into two main areas:

1) Laser Physics, Photonic Devices and Applications

(optics and quantum electronics, including biomedical applications of lasers, laser applications in optical communications; diagnostics for works of art; time-resolved optical spectroscopy; ultrashort light pulse generation and applications; UV and X optical harmonics generation)

2) Solid State Physics: Advanced Spectroscopy, Scanning Probe Microscopy, Nanostructure Fabrication (photoemission; spin-resolved electronic spectroscopy; magneto-optics; X ray diffraction; magnetic nanostructures for spintronics; synchrotron radiation spectroscopy, positron spectroscopy, semiconductor nanostructures)

These research activities make use of advanced experimental laboratories located at Politecnico di Milano (Milano-Leonardo Campus and Como Campus), including:

Electron spectroscopy with spin resolution

Magneto-Optics

Growth and characterization of magnetic nanostructures for spintronics

Scanning Auger Microscopy (SAM)

Scanning Near-field Optical Microscopy (SNOM)

Scanning Tunneling Microscopy (STM)

Spectroscopy with synchrotron radiation

Spectroscopy with positrons

Epitaxial semiconductor nanostructures for electronics and optoelectronics

Optical and electron beam lithography

Biomedical applications of lasers

Time domain diffuse optical spectroscopy

Imaging and spectroscopy for Cultural Heritage

Optical projection tomography

Applications of lasers in telecommunications

Photonic and optofluidic devices

Ultrashort laser pulse micromachining

Solid state lasers

Coherent vibrational spectroscopy

Spectroscopy with femtosecond time resolution

Attosecond generation

Coherent Raman spectroscopy and microscopy

Moreover, many collaborations are in place with high-level international institutions, such as: European Synchrotron Radiation Facility (ESRF) in Grenoble, Polytechnic University of Zurich (ETH) and Lausanne (EPFL), Ecole Polytechnique -Palaiseau (Paris), Paul Scherrer Institut (PSI), Institut de Ciència de Materials de Barcelona, Institut d'Electronique Fondamentale Université Paris-Sud, Argonne National Laboratory, Technical University of Denmark, Royal Institute of Technology (KTH, Stockholm), Max Planck Institute-Stuttgart, University College London, Interuniversitair Micro-Elektronica Centrum (IMEC) Leuven Belgium.

Students in our PhD Programme will therefore have a real opportunity to gain experience also in prestigious laboratories abroad.

3. Mission and Goals:

The main purpose of the PhD Programme in Physics at Politecnico di Milano is the development of an experimental approach in problem-solving techniques and the attainment of a high level of professional qualification. Scientific education and training to develop general research abilities in all areas of applied physics is increasingly needed by advanced technological companies in Italy, especially northern Italy. The PhD aims at providing engineers and physicists, after a Bachelor of

Science ("Laurea", 3 years) and a Master of Science ("Laurea Magistrale", 2 years), with a general education in the basic areas of applied physics and specific knowledge in condensed matter physics, optics, lasers and photonics.

4. Professional opportunities and employment market

The PhD at Politecnico di Milano offers a wide range of opportunities in the fields of advanced technologies, such as photonics and optoelectronics (lasers, optofluidic devices), advanced physical instrumentation (electronic and atomic microscopy, nuclear magnetic resonance), biomedical optics (optical tomography, non-invasive diagnostic devices), vacuum technologies (thin film depositions), and material technologies (microelectronics and nanotechnologies, micromechanical processing). Concerning Italy and similar Countries, the following professional profiles are well established:

- Manager of devices, equipment and systems (see above) to solve methodological and technological problems within large industries and companies.
- Designer of optoelectronics advanced devices and systems relying on a physical background and competencies in optics and laser technologies to promote, design and realize new components and devices in high-tech industries as well as small innovative firms.
- Researcher in industries, universities, research centres operating in the technological areas outlined above.

Interesting opportunities are found also at the international level, where technological innovation is even more relevant than in the national scenario. In this frame, the PhD programme in Physics at the Politecnico provides excellent preparation for a highly competitive international arena.

5. PhD Programme Enrolment

5.1 Admission requirements

Italian and foreign citizens can apply. They are required to have graduated in accordance with the pre-existing laws MD 3.11.1999 n. 509 or have a master of science degree in accordance with MD 3.11.1999 n. 509 or a master of science in accordance with MD 22.10.2004 n. 270 or similar academic qualification obtained abroad, equivalent in duration and content to the Italian qualification and for an overall duration of university studies of at least five years.

Knowledge of the English language to at least a B2 level is required.

Admission to the programme will be decided by evaluating the academic curriculum, the cover letter that the candidates must submit together with their application form in reply to the admission call, and the capability of developing a PhD research line consistent with the activities of the Department of Physics.

5.2 Admission deadlines and number of places available

The number of available positions is indicated in the call for admission to the 29th PhD Programme cycle: <http://www.polimi.it/phd>

Scholarships are available both on general and on specific topics, as specified the admission call.

6. PhD Programme Contents

6.1 Qualification attainment requirements

The attainment of a PhD in **Physics** requires study and research activity for a period of time equivalent to at least three years full-time.

The PhD in **Physics** requires **30** credits to be acquired from PhD level courses. Details can be found in the following paragraph 6.3.

6.2 Development of research and the PhD thesis

The aim of PhD Programmes at Politecnico di Milano is the development in candidates of a research-oriented mind-set, with expertise and skills in a specific research topic.

To develop a research-oriented mind-set, candidates must acquire problem-solving capabilities in a complex context, including in-depth analysis of the problem, identification of an original solution and capability of evaluating a solution and its applicability in given contexts.

These skills provide PhD candidates with major opportunities of development in their research both in the academic field and in public and private companies and organisations.

The main objective is the development of an original research contribution. The PhD thesis must contribute to increasing knowledge in the research field of the candidate. Besides, it has to be coherent with the research topics developed at the Department of Physics, where the PhD Programme is carried out.

The original research has to be submitted via a PhD thesis which contains and discusses the contribution, also with respect to the state of the art in the relevant research field.

The PhD research will be developed according to the guidelines of a supervisor, who supports the candidate in the setting-out and in everyday activities regarding the development of the thesis.

The supervisor does not have to be a member of the Academic Board and can also belong to an institution other than Politecnico di Milano. The supervisor can be supported by one or more co-supervisors.

To develop the capability of carrying out research activities, the candidate must attend courses according to the PhD Programme, defined for their study plan and pass them with a positive evaluation.

For each candidate admitted to the Programme, a tutor, belonging to the Academic Board, is appointed. The tutor supervises and supports the candidate in the overall training path. The supervisor and the tutor can coincide. The choice of courses will be overseen by the tutor and will be formalized in a study plan to be approved by the Coordinator of the PhD Programme.

Other activities for the development of personal skills and research expertise are encouraged during the PhD Programme.

The candidate must acquire the capability to present and discuss their work in the research community. Consequently both attendance at international conferences and publication of research results in reviewed international journals are encouraged.

Candidates are also encouraged to carry out part of their research activities in contact with other research groups in their field of interest, possibly abroad. Research visits of at least three months are strongly encouraged to research groups through which the candidate can acquire further skills to

develop their research work and thesis.
The duration of the programme is normally three years.

6.3 Objectives and overview of teaching activities

The PhD Programme and the PhD School may activate various types of training activities (courses, seminars, project workshops, laboratories). All will aim at:

- creating common starting knowledge for the PhD Programme;
- examining the basic research issues (problems, theories, research methods) which represent the cornerstone of the PhD Programme and clearly identify its position in the cultural landscape;
- exploring in a specialised manner selected research topics and issues related to the thesis work.

Courses are offered in English, unless otherwise provided for individual courses.

At least one path entirely in English is foreseen in the PhD Programme.

Certain teaching activities entitle to acquisition of ECTS credits (Structured teaching activities); other activities, typically specialised and for which it is difficult to make an assessment and quantification of learning, fall within the scientific activities which the Academic Board will take into account in the overall evaluation, but whose value is not quantified in ECTS.

Education Program

Training is organised over three years corresponding to 180 credits (ECTS): 30 ECTS (basic training) must be acquired from lecture-based courses and 150 ECTS are devoted to specific training, including research activities and development of the PhD thesis.

Basic training consists of **30** ECTS. **5** ECTS must be taken from the courses offered by the PhD School (chosen by the student among the courses in the corresponding list, see <http://www.ricerca.polimi.it/index.php?id=4186>). Further **15** ECTS must be acquired from courses specifically designed for the PhD programme in Physics (the Physics Department offers courses corresponding to 25 ECTS). The remaining **10** ECTS can be chosen from courses offered from any PhD Programme or from the PhD School.

The tables below show the foreseen path referring to coursework activities. At the same time, the Programme foresees that the candidate performs research activity in a continuous manner, following the guidelines of their Supervisor and of the Academic Board.

FIRST AND SECOND YEAR

<i>Course type</i>	<i>Number of ECTS (min-max)</i>	<i>Notes</i>
<i>PhD School Courses</i>	<i>5 – 15</i>	<i>Chosen from the corresponding list available at: (http://www.ricerca.polimi.it/index.php?id=4186)</i>
<i>Courses characterising the PhD Programme</i>	<i>15 – 25</i>	<i>Chosen among the 25 ECTS offered by the Department of Physics (see Table A)</i>
<i>Other PhD Programmes</i>	<i>0 – 10</i>	<i>List available at: (http://www.ricerca.polimi.it/index.php?id=4585)</i>

THIRD YEAR

In the third year the candidates should devote themselves entirely to research and to the development of the PhD thesis.

At the end of each year, the candidates will present their research work to the Faculty Board that will verify the overall activity (including passed exams and research work) for the admission to the next year or to the thesis defence.

PHD COURSES

A) The PhD Programme in Physics organises the following **Characterising Courses** (see table A) For admission to the final exam acquisition of **at least 15 credits** is **mandatory** through the “characterising” PhD courses offered by the PhD Programme.

B) The PhD School organises every year general and **Interdoctoral courses**. Acquisition of **at least 5 credits** is **mandatory** from type B courses.

C) Other PhD courses

Up to 10 ECTS can be acquired from PhD courses of type A or B, or from courses provided by any other PhD Programmes of Politecnico.

SPECIALISTIC COURSES, LONG-TRAINING SEMINARS

Attendance of Specialist Courses, Workshops, Schools, Seminar cycles is strongly encouraged and (if those activities are certified and evaluated) may permit the acquisition of credits according the procedures established by the Academic Board and prior approval of the study plan submitted by the candidate.

These courses and workshops can be included in the study plan, even if they are not evaluated (and therefore not qualified as credits), as optional “supplementary teaching”.

Table A: PHD COURSES CHARACTERISING THE PHD PROGRAMME

In the following table, the schedule is provided for the 2013-14 and 2013-14 academic years. It is possible that other courses are subsequently activated by the PhD Programme in Physics (“characterising” courses) and/or by the PhD School. In case, the candidates will be promptly

informed.

Name of Course	Teacher	Language	ECTS
Spectroscopy of Solids	L. Braicovich	English	5
Nano and nanobio-particles and structures	P. Taroni	English	5
Photon migration and wave diffusion in random media	A.Torricelli	English	5
Plasmonics	P. Biagioni – G. Della Valle	English	5
Theory of electronic structure of solids	P. Folegati	English	5

6.4 Study plan submission

Each PhD candidate must submit a study plan for approval. Candidates will have the opportunity to review it periodically (every three months) in order to adapt it to possible changes in the training offer or to needs justified by the development of their study plan. The study plan is approved by the Coordinator of the PhD Programme, according to the procedures established by the Academic Board of the PhD Programme itself.

6.5 Annual exam procedures

Every year the candidate is evaluated for admission to the next year.

In the annual exam of the third year, the admission of the candidate to the final exam (held by the external Commission) is evaluated. The candidates present their work to the Academic Board at least once a year. After each annual evaluation, the candidates admitted to the next year will receive an evaluation (A/B/C/D)

If the candidate does not pass the exam, he/she will qualify as a “Repeating candidate”(Er) or “not able to continue with the PhD (Ei)”.

At the end of the last year, candidates may obtain an extension of 6 to 12 months to complete their thesis.

The last two rules may be modified if required by MD 8.2.2013 n. 94.

6.6 PhD thesis preparation procedures

The PhD study and research work will be carried out full-time during the three years of the PhD course. The possibility of internships or study periods in Italian or foreign companies or external entities and universities is foreseen.

The main objective is the development of an original research contribution.

The PhD thesis must contribute to increasing knowledge in the research field of the candidate.

The thesis must also be coherent with the research issues developed in the Department in which the PhD programme is developed.

The candidate must present an original thesis, discussing its contribution to the state of the art in the relevant research field.

The PhD research will be developed following the guidelines of a Supervisor who supports the candidate in setting out and in everyday activities regarding development of the thesis. The admission of the candidate to the final exam will be evaluated by the Academic Board. Upon positive evaluation of the Academic Board, a final exam (thesis defence) is taken in order to attain the qualification, in which the research work carried out and the thesis will be evaluated by an Examination Committee composed of three members, including at least two external examiners.

7. Laboratories

Students will join different advanced research laboratories of the Department of Physics, learning about experimental techniques, contributing to research activity and attending meetings and internal seminars aimed at providing a more in-depth knowledge on research topics. A non-comprehensive list of experimental laboratories is provided below:

1 - Ultrashort light pulse generation and applications to the study of ultrafast phenomena in the matter

- Attosecond Reaction Microscope
- Femtosecond laser laboratory
- High-energy attosecond pulse laboratory
- Laboratory for coherent Raman spectroscopy and microscopy
- Laboratory for IR-VIS ultrafast spectroscopy
- Laboratory for XUV ultrafast spectroscopy
- Positron laboratory
- Terawatt laser laboratory

2 - Solid state lasers and photonic devices for integrated systems

- Characterization of photonic and optofluidic devices
- Frequency comb laboratory - Campus Point (Lecco)
- High-resolution and high-precision laser spectroscopy
- Laboratorio virtuale di elettromagnetismo computazionale
- Laboratory of coherent vibrational spectroscopy
- Solid state lasers
- Two-photon polymerization by femtosecond lasers
- Ultrashort laser pulse micromachining
- Wet etching in hydrofluoric acid for microfluidic circuits

3 - Photonics for health, food and cultural heritage

- Diffuse Optical Spectroscopy
- Diffusive Optical Phantoms
- Fast Fluorescence Molecular Tomography
- Fluorescence Spectroscopy
- Functional Near Infrared Spectroscopy
- Gated Photon Counting
- Imaging Spectroscopy for Cultural Heritage
- Near Infrared Spectroscopy for Food

Optical Mammography
Optical Projection Tomography

4 - Epitaxial growth and nanostructure fabrication

Electron Beam Lithography
Materials and devices for Spin Electronics
Nanobio
Scanning Tunnelling Microscope
Semiconductor growth
Versatile Electron Spectroscopy Instrumentation

5 - Electronic, optical and magnetic properties of low-dimensional systems

Magneto-Optical Kerr
Scanning Auger Microscope
Scanning probe microscopy
Scanning near-field optical microscopy
Synchrotron radiation facilities
Ultrafast Photoemission and Optical Spectroscopy
Variable energy positron annihilation spectroscopy

9. Internationalisation and other activities

Carrying out study and research at other laboratories is strongly recommended.

Politecnico also offers the possibility of PhD Programmes with foreign universities as well as double and joint PhD Programmes. Further information can be found on the PhD School and PhD Programme websites.

10. PhD Secretary Services

Stefania Mosca
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Attachment A1 – PhD Advisory Board (mandatory attachment)

The Advisory Board is composed of five distinguished researchers/managers representative of different applied research environments: two of them belong to important international technical universities (ETH and EPFL); one to an important Research Institution (Center for Nano Science and Technology, Fondazione Istituto Italiano di Tecnologia, IIT), and the last two to leading high-tech companies (Numonyx and Balzers), as specified in the following table:

Surname	Name	Institution	Role
BEZ	ROBERTO	NUMONYX	Scientific fellow - R&D
PARISINI	EMILIO	CNST - Fondazione Istituto Italiano di Tecnologia (IIT)	Team Leader (Biochemistry)
DE ROSSI	STEFANO	Oerlikon Balzers Coating Italy S.p.A.	General Manager
von KÄNEL	HANS	ETH - Zuerich	Professor
GRIONI	MARCO	EPFL (Lausanne)	Professor

Periodic meetings of the Advisory Board with the PhD School, open to all PhD students and other researchers of the Department, are foreseen to discuss the PhD programme organisation and possible professional opportunities. The minutes of the last meeting are enclosed.



POLITECNICO DI MILANO
DIPARTIMENTO DI FISICA

piazza Leonardo da Vinci 32
20133 Milano (ITALY)

Verbale della riunione del Comitato di Riferimento del 19-10-2012

Il Comitato di Riferimento del Dottorato in Fisica del Politecnico di Milano si è riunito il giorno 19.12.2012 al Politecnico di Milano presso l'aula Natta alla presenza del Collegio dei Docenti del Dottorato, appositamente convocato.

Le seguenti componenti del Comitato sono intervenute alla Riunione o in presenza o rappresentate da un delegato ufficiale:

Componente del Comitato	Istituzione
Roberto Bez (rappresentato da Agostino Pirovano)	Micron
Emilio Parisini	CNST - Fondazione Istituto Italiano di Tecnologia (IIT)
Stefano De Rossi	Oerlikon Balzers Coatings
Hans von Känel	ETH (Zürich)
Marco Grioni	EPFL (Lausanne)

Sono inoltre presenti numerosi dottorandi del XXV ciclo e dei successivi due cicli, docenti e ricercatori del Dipartimento di Fisica.

La riunione ha inizio alle ore 14:30.

Il Coordinatore, Prof. Ciccacci, presenta i membri del Comitato, che è stato parzialmente rinnovato, descrive brevemente la struttura del Dottorato in Fisica ed illustra in particolare le modifiche che verranno introdotte al piano di studi per la formazione dei dottorandi rispetto ai cicli precedenti.

Grioni chiede un chiarimento sulla corrispondenza tra ore di frequenza/studio e crediti, per meglio valutare il carico didattico previsto nei primi due anni di Dottorato. Ciccacci chiarisce la situazione e aggiunge che il numero di crediti attualmente richiesto è il minimo (30 cfu) previsto dalla Scuola di Dottorato.

Si apre poi la discussione.

- Lanzani chiede agli studenti cosa pensano della differenza tra la situazione italiana, con il Dottorato che dura sempre 3 anni (con solo una possibile estensione di 1 anno), e quella in molti paesi stranieri, in cui il Dottorato si conclude quando il lavoro di tesi è concluso, tipicamente in 4-6 anni.
- Alcuni studenti rispondono che sarebbe interessante adottare lo stesso modello in Italia solo se avere un Dottorato facesse una differenza sostanziale nelle successive possibilità di impiego.
- Lanzani ribatte che in Italia un Dottore entra nel mondo del lavoro come un laureato, ma la carriera può essere molto più rapida, non tanto per il titolo, ma perché di fatto un Dottore può/dovrebbe essere più preparato.

- Pirovano concorda e aggiunge che i dottori dovrebbero cercare lavoro in quelle compagnie che valutano il Dottorato.
- Grioni nota che molto dipende dalle motivazioni che spingono un laureato ad affrontare un Dottorato. In Italia c'è spesso l'idea che il Dottorato sia il trampolino di lancio per la carriera accademica e questo non è necessariamente corretto.
- Per Lanzani, in paesi come gli USA, dopo il PhD spesso i Dottori aprono piccole aziende ad elevato contenuto innovativo. Da noi non accade.
- Von Kaenel chiede quanti stanno pensando di aprire un'azienda. Risposta: nessuno.
- Per Valentini, molti non hanno le competenze per aprire e gestire un'azienda. Il Politecnico offre un supporto, ma non può essere sufficiente. I neo-dottori devono essere i primi giudici di se stessi e capire se hanno "idee" sufficienti per sostenere un'azienda.
- Alcocer (XXVII ciclo) sostiene che forse, dovendo concludere il Dottorato (corsi e tesi) in soli 3 anni, i Dottorandi non hanno il tempo per poter valutare concretamente l'idea di aprire un'azienda.
- Cubeddu dice che però la situazione è diversa rispetto ad altri Paesi, come gli USA, perché negli USA il dottorando segue, sostanzialmente da solo, un tema di ricerca e quindi aprire start-up o spin-off sull'argomento di Dottorato è, in qualche modo, una naturale evoluzione. Qui, tipicamente, il dottorando è inserito in un lavoro di un più ampio gruppo di ricerca e quindi, al termine del Dottorato, non è così comune che il neo-Dottore sia l'unico coinvolto nella ricerca sulla quale basare una start-up.
- Cubeddu chiede poi quale sarebbe il vantaggio di un Dottorato di 4 anni anziché 3 e Lanzani risponde che sarebbe solo un modo da per fare un migliore lavoro di tesi e che comunque la soluzione migliore sarebbe la flessibilità: 3 o 4 anni a seconda dei casi.
- Ciccaci invita i membri del Comitato che provengono da aziende a presentare la loro posizione.
- Pirovano dice che per un Dottore in Italia la possibilità migliore è quella di creare una piccola azienda. Trovare lavoro in grandi aziende ora non è facile in Italia. Per lavorare in una grande azienda, dovrebbero pensare di cercare lavoro all'estero.
- De Rossi interviene spiegando che lavora in una multinazionale presente anche in Italia (Oerlikon Balzers Coatings) e che la sua impressione è diversa da quelle appena espresse e chiede quanti dottorandi hanno iniziato il Dottorato pensando che poi avrebbero cercato un lavoro in una grande azienda. Risposta dalla platea: Nessuno. De Rossi spiega che questa risposta negativa non lo stupisce, perché ha recentemente fatto colloqui per offrire un posto a un Dottore e non ha trovato candidati. Critica quindi le aspettative dei dottorandi, che vedono il Dottorato come trampolino per la carriera accademica.
- Grioni chiede se Ciccacci sa quanti dei Dottori lavorano in grandi compagnie e se pensano che il Dottorato sia utile. Ciccacci risponde che abbiamo informazioni per 2 anni dopo il Dottorato e il 70% fa ancora ricerca. Però 2 anni sono un intervallo di tempo troppo corto.
- Parisini dice che i Dottori vorrebbero fare un post-doc di 1 o 2 anni all'estero, ma temono di non riuscire più a re-inserirsi in Italia. E hanno ragione. Grioni aggiunge che un post-doc è un'ottima scelta per chi vuole rimanere nel mondo accademico, ma non per andare poi nell'industria.
- Parisini dice che su un Dottorato di 3 anni non è frequente stare all'estero 1 anno, ma un tempo minore non è veramente utile dal punto di vista della ricerca. Se il Dottorato durasse 4 anni, 1 anno all'estero sarebbe più facile da gestire.
- Alcocer (XXVII ciclo) chiede cosa significa che l'insegnamento per il Dottorato non è riconosciuto come didattico. Cubeddu spiega che è sempre stato visto come parte della formazione alla ricerca e non della didattica.

- Pirovano spiega che il lavoro offerto dalle aziende non sembra prevedere molta “ricerca” e non attrae i Dottori, ma la situazione reale è diversa, soprattutto a mano a mano che l’attività progredisce, perché spesso vengo richieste ed utilizzate molte delle competenze dei Dottori.
- Duò sostiene che spesso i giovani vengono criticati, perché iniziano un Dottorato con il sogno di restare nel mondo accademico, anche se sanno che le possibilità sono molto ridotte. Però in fondo molti che ora sono docenti hanno fatto lo stesso e hanno realizzato il loro sogno.
- Cubeddu invita a non essere interessati solo a quelli che sembrano gli argomenti più “nobili” della ricerca pura, ma a valutare anche la ricerca applicata, che può avere molti risvolti interessanti e offrire migliori possibilità di impiego.

Non essendoci ulteriori interventi, la riunione si conclude alle ore 16:30.

Il Coordinatore del Dottorato in Fisica
Prof. Franco Ciccacci

