UNIVERSITÀ DI PARMA

PHYSICS	
Cycle	**XXXIV**
Coordinator	Prof. Cristiano VIAPPIANI Department of Mathematical, Physical and Computer Sciences email: cristiano.viappiani@unipr.it
Duration	3 years
Starting date of the PdD programme	01/11/2018
Participation with positive results in international calls	**Progetto UE H2020 – MSCA ITN "Innovative Training Networks" ITN-ETN EuroPLEx** • Thimble regularisation of Lattice Gauce Theories • Phase structure of quantum gauge theories on compact manifolds at finite temperature

Research Topics

- Muon site and couplings in superconductors, magnets, and molecular nanomagnets
- Epitaxial growth and study of wide bandgap oxide semiconductors
- Carbon based nanostructured materials for energy storage
- Synthesis and characterization of nanostructures for medicine
- Development of molecular systems for the delivery of photosensitizers and for applications in super-resolution microscopy
- Molecular probes for photoacoustic microscopy
- Fluorescent proteins as biosensors for single cell nitric oxide imaging
- The gauge/gravity correspondence and its QFT realizations
- Implications on the physics of fundamental interactions from cosmological observations
- Dynamic processes on Time Evolving Networks
- Quantum transport of ultracold atoms

A detailed description of the themes is available at the address: http://smfi.unipr.it/it along with the contact person for each of the proposed themes.

Training Objectives

The PhD in Physics, with a duration of 3 years, is established as a unifying element of the third-level University education in the Physics` area. Besides their main commitment to the research activity, students are supposed to spend a substantial part of their training period in attending advanced courses as well as national and international schools. Students are encouraged to spend part of their time abroad in order to participate in scientific collaborations in their fields of interest and follow advanced courses in support of their research program. During the three-years, teaching commitments are progressively reduced towards a full time engagement in the research activity. The evaluation of the training program is carried out - at the end of each year - through open seminars held by the students. The independent scientific research is expected to lead to publication of results in international, peer reviewed journals. The ultimate goal of the PhD in physics is a highly specialized scientific training that opens professional carriers in academic institutions and research laboratories, either public or private. The PhD in Physics is divided into three areas corresponding to major groups of disciplines of Physical Sciences covered by the research activity of the Department of Mathematical, Physical and Computer Sciences: Condensed Matter and Materials Physics, Theoretical Physics, Biophysics and Applied Physics.

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Admission requirements
Applicants who have one of the following degrees may participate in the selection: - Laurea specialistica or Laurea magistrale (second cycle degree) - Laurea Vecchio Ordinamento (degree obtained under the Italian previous regulations); - an academic Master's degree obtained abroad, comparable to the above mentioned Italian degrees and recognized as suitable for the admission to doctoral programmes. Undergraduate applicants may also submit applications with the obligation of getting their degree by **October 31st 2018.**

POSITIONS PUT OUT TO COMPETITION	
With Scholarship	8
Reserved to holders of scholarship funded by foreign States	1
TOTAL	**9**

Positions with University Scholarship

N°	***Funding entity***	***Research Topic, if any***
4	Scholarship Ministerial funds	---
1	Scholarship co-funded by Fondazione Cariparma	---

Position with Scholarship LINKED TO SPECIFIC TOPICS (art. 11 of the Call for applications)

During the Oral Exam, applicants may express their interest in being assigned a scholarship dedicated to a specific research topic to the Examination Board. The Board will express its judgement on eligibility to be assigned the scholarship in consideration of the specific competences, experience and specific aptitudes of the applicants.

N°	***Funding entity***	***BOUND RESEARCH TOPIC***
1	INFN – The Italian Nationale Insitute of Nuclear Physics	• Implications on the physics of fundamental interactions from cosmological observations
2	Fondazione IIT – Istituto Italiano di Tecnologia	• Development of molecular systems for the delivery of photosensitizers and for applications in superresolution microscopy • Molecular probes for photoacoustic microscopy

Position reserved to holders of scholarship fundend by foreign States

N°	***University or Foreign State***
1	Reserved to holders of Albert-Ludwigs-Universität Freiburg (Germany) **Research topic**: Quantum transport of ultracold atoms

ADMISSION PROCEDURES	
Assessment of QUALIFICATIONS: up to 50 points **ORAL EXAM:** up to 70 points **Minimum score for ELIGIBILITY**: 70/120	
ADMISSION PROCEDURES for positions reserved to holders of scholarship funded by foreign States	**Assessment of QUALIFICATIONS**: up to 120 points **Minimum score for ELIGIBILITY**: 70/120

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Foreign Language	Language the fluency of which shall be assessed during the Oral Exam: **ENGLISH**.

Possibility of videoconference for candidates residing or temporarily abroad (the relevant request shall be submitted using the form attached to the competitive examination announcement)	**YES**
THE INTERVIEW MAY BE HELD ALSO IN ENGLISH	

LIST OF QUALIFICATIONS TO BE SUBMITTED AND THEIR ASSESSMENT

Mandatory documents to be attached to the on-line application

- **ANNEX A** (art. 5 of the Call for Applications)
- Scanned Copy of a **valid identification document** with photo
- **Curriculum Vitae et studiorum** (art. 4 of the Call for Applications)
- **Abstract of the second cycle master's degree thesis.** Undergraduate applicants may submit the draft of the thesis countersigned by their supervisor.
- **Certificates and academic transcript of records for both the Bachelor' and the Master' degrees** containing the following details for each degree held: (art. 4 of the Call for Applications):
  - University that granted the degree
  - Type of degree (first cycle/second cycle/single cycle)
  - Name of the degree programme
  - Date of graduation
  - Final mark
  - List of exams and corresponding scores (academic transcript of records)
  - Translation into Italian or English (only for degrees issued in languages other than Italian or English)

Further qualifications that may be attached to the application, if in possession of the applicant
(only qualifications attested by a document drawn up in Italian or in English)

- **Research Project and Statement or Research Interest:** A brief text (max 3 pages) in English. The candidates must describe their research interests and indicate the preferred topic among those listed above, possibly suggesting a second choice theme. For the first choice theme, candidates must outlay an original research project including a concise state of the art, the relevance of the problem and the expected results. Candidates are warmly invited to contact the potential supervisors listed at http://smfi.unipr.it/it.
  it does not represent a constraint with respect to the following choice of the doctoral thesis, that shall be defined together with the supervisor and approved bya the Academic Board;
- **Any other document** certifying the applicant's traning and abilities. Publications, awars, presentations to scientific meeting, stages, fellowships, reference letters, etc.

EVALUATION CRITERIA

QUALIFICATION	EVALUTATION CRITERIA	POINTS
Curriculum Vitae et studiorum	Including academic career and postgraduate experience, accompanied by a statutory declaration in lieu of the certification of the exams passed with the relevant marks, as well as the final graduation mark. Voting examinations and graduation marks will be the most relevant element of the evaluation.	**Up to 25 points**

Graduation thesis	Consistency of the Master's Degree thesis with the doctoral programme research topics. The assessment will make use of the information contained in the abstract (max 1 page) of the thesis (although not yet discussed, in this case countersigned by the thesis supervisor) and in the curriculum, where a brief description of the thesis work should be reported.	**Up to 5 points**
Research Project and Statement of Research Interest	The project will be evaluated in relation to its scientific value and originality. The motivation expressed by the candidate in relation to the themes of the research doctorate will be evaluate	**Up to 10 points**
Other qualifications	publications, awards, presentations to scientific meetings, stages, fellowships etc…	**Up to 10 points**
ORAL EXAMINATION	**EVALUATION CRITERIA**	**POINTS**
The ORAL EXAM includes the presentation of the research project and is intend to assess the suitability of the applicant to pursue scientific research as well as the general knowledge of issues connected to the PhD course	○ preparation on the issues related to the Master's degree thesis ○ research project presentation ○ general knowledge of issues connected to the PhD course ○ knowledge of foreign languages	**Up to 70 points**
LIST OF QUALIFICATIONS TO BE SUBMITTED AND THEIR ASSESSMENT – Positions reserved to holders of scholarship funded by ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG		
Curriculum Vitae et studiorum and other qualifications	Including academic career and postgraduate experience, accompanied by a statutory declaration in lieu of the certification of the exams passed with the relevant marks, as well as the final graduation mark	**Up to 60 points**
Graduation thesis	Consistency of the Master's Degree thesis with the doctoral programme research topics. The assessment will make use of the information contained in the abstract (max 1 page) of the thesis (although not yet discussed, in this case countersigned by the thesis supervisor) and in the curriculum, where a brief description of the thesis work should be reported.	**Up to 30 points**
Other qualifications	publications, awards, presentations to scientific meetings, stages, fellowships etc.	**Up to 30 points**
SCHEDULE OF THE ADMISSION EXAMS		
ORAL EXAM	**ORAL EXAM DATE:** 17 September 2018 **TIME:** starting from 10:00 am in accordance with the schedule to be published on the website of the Department of Mathematical, Physical and Computer Sciences http://smfi.unipr.it/it **PLACE:** Department of Mathematical, Physical and Computer Sciences – Physics Building Parco Area delle Scienze, 7/A – 43124 PARMA - ITALY	

OTHER INFORMATIONS	The Oral Exam will focus on the description of the research work carried out to prepare the Graduation Thesis for the Laurea Magistrale/Specialistica, as well as on the research project that the candidate proposes to carry out within the research topics of the Research Doctorate Program in Physics at the Department of Mathematical, Physical and Computer Sciences of the University of Parma which are described at http://smfi.unipr.it/it In the application to participate in the competitive examination, the candidate must choose and specify one research. The candidate may indicate a second priority choice. The above choice will be binding with regard to the winner's research activity. For foreign candidates, the admission examinations may be held in English at the candidate's choice.