

PHYSICS

Section "Positions and scholarships" integrated on 14/05/2020

Section "Positions and scholarships" integrated on 19/05/2020

Section "Positions and scholarships" integrated on 22/05/2020

Section "Positions and scholarships" and "Admission exams" integrated on 04/06/2020

Coordinator	Prof. Silvia Arcelli Department of Physics and Astronomy Via Irnerio 46 - Bologna silvia.arcelli@bo.infn.it		
Starting date of the PhD Programme	01/11/2020		
Duration	3 calendar years		
Language of the PhD Programme	Italian and English		
Mandatory stay abroad	Yes (6 months)		
Associated partners pursuant to art. 2, para 2, lett. a) of the M.D. n. 45/2013	Istituto Nazionale di Fisica Nucleare (INFN)		
Research topics			
<ul style="list-style-type: none"> - Nuclear and Subnuclear Physics - Theoretical Physics and Foundations of Physics - Condensed Matter Physics - Applied Physics 			
PhD positions and scholarships			
Position n.	Financial support	Description	Positions linked to research subjects
1	PhD Scholarship	Totally funded by the University of Bologna general budget	
2	PhD Scholarship	Totally funded by the University of Bologna general budget	
3	PhD Scholarship	Totally funded by the University of Bologna general budget	
4	PhD Scholarship	Totally funded by the University of Bologna general budget	
5	PhD Scholarship	Totally funded by the University of Bologna general budget	
6	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Physics and Astronomy	Design of a prototype imaging system for neutrino interactions in liquid argon
7	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Physics and Astronomy	Data analysis and physical modelling for biological and epidemiological data
8	PhD Scholarship	Funded by the University of Bologna general budget and co-funded by the Department of Physics and Astronomy	Study of quantum materials and implementation of quantum technologies using magnetic resonance spectroscopies
9	PhD Scholarship	Funded by the Department of Physics and Astronomy with funds made available by Progetti di Sviluppo Strategico dei Dipartimenti (PSSD) - COFIN PSSD	Development of Innovative Sensors, Data Acquisition and Processing for Physics
10	PhD Scholarship	Funded by the Istituto Nazionale di Fisica Nucleare (INFN)	Nuclear, subnuclear and astroparticle physics and physics of the fundamental interactions, investigated both experimentally and theoretically and technological research and development

11	PhD Scholarship	Funded by the Istituto Nazionale di Fisica Nucleare (INFN)	Nuclear, subnuclear and astroparticle physics and physics of the fundamental interactions, investigated both experimentally and theoretically and technological research and development
12	PhD Scholarship	Funded by the Istituto Nazionale di Fisica Nucleare (INFN)	Experimental characterisation via particle identification of the non-perturbative properties of QCD at present and future high-energy colliders
13	PhD Scholarship	Funded by the Istituto Nazionale di Fisica Nucleare (INFN)	Nuclear, subnuclear and astroparticle physics and physics of the fundamental interactions, investigated both experimentally and theoretically and technological research and development
14	Inter-sectoral doctorate	Position reserved for employees of the Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (IRST) S.r.l., IRCCS	
15	Inter-sectoral doctorate	Position reserved for employees of the Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (IRST) S.r.l., IRCCS	
16	PhD Scholarship	Funded by the Department of Physics and Astronomy with funds made available by the Project ERC - COG 2019 (GA: 865633) "SLIDE - Advancing Solid Interfaces and Lubricants by First Principles Material Design" (Ref: Prof. Maria Clelia Righi)	Reactions activated by mechanical forces: fundamental understanding and applications in tribology
17	PhD Scholarship	Funded by the Department of Physics and Astronomy with funds made available by the Project ERC - COG 2019 (GA: 865633) "SLIDE - Advancing Solid Interfaces and Lubricants by First Principles Material Design" (Ref: Prof. Maria Clelia Righi)	Advancing solid interfaces for tribological applications and energy harvesting by first principles material design
18	PhD Scholarship	Funded by International Foundation Big Data and Artificial Intelligence For Human Development	The research topic will be chosen among the following options: 1) Quantum machine learning techniques; 2) Heuristic algorithms for combinatorial optimization; 3) Analysis of the semantic relations in classical data embedded in quantum states.
19	PhD Scholarship	Funded by Istituto Nazionale di Fisica Nucleare (INFN)	Analysis of the spectroscopic data of the Euclid NISP instrument: from raw data to cosmological parameters
20	PhD Scholarship	Funded by CNR-ISMN	Investigation of charge transport and light emission properties in organic and hybrid multifunctional field-effect transistor for use in optical sensing

Positions linked to specific research subjects: during the oral test, applicants may express to the Admission board their interest in one or more positions linked to specific research subjects. Considering the expressions of interest above, the Admission Board shall express its view on the suitability of the interested applicants, taking into account their specific skills, experience and aptitude.

Admission requirements

Please, see art. 2 of the Call for applications

Mandatory documents to be attached to the application

Please, see art. 3 of the Call for applications

Further qualifications that may be attached to the application, if in possession of the applicant (only qualifications attested by documents drawn up in Italian, English, French, German and Spanish shall be considered as valid and assessed by the Admission Board)

- Abstract of the second cycle master's degree thesis. Undergraduate applicants may submit the draft of the thesis approved by their supervisor (please, note that abstracts cannot exceed 5.000 characters, including spaces and formula possibly used. The above figure does not include: the title of thesis, the outline, and images such as graphs, diagrams, tables etc. - where present)
- No more than 2 reference letters signed by Italian and international academics and professionals in the research field, which do not form part of the Admission Board, attesting the suitability of the applicant and his/her interest for the scientific research.
Please, note that the above letters cannot be uploaded by applicants. When filling the online application form on <http://studenti.unibo.it>, applicants will only be allowed to provide the email accounts of the requested academic/professional. The latter shall receive an email from the University of Bologna providing for the instructions for uploading. Only letters in pdf format submitted before the expiry date and time of the Call shall be accepted. A Reference Letter *fac-simile* is available on the [Unibo website](#).
- Multi-annual research project, with special emphasis on the activities to be completed during the first-year course. The proposal must meet the following requirements:
 - o It must indicate in the cover page the research topic of the PhD Programme covered by the research project proposal and for which the applicant is applying
 - o It cannot exceed 20.000 characters, including spaces and formula possibly used. This figure does not include: the title of project, the outline, references and images (such as graphs, diagrams, tables etc. - where present);
 - o It must include: the state of the art; description of the project; expected results; lead-time for implementation; (proposed) criteria to be used to assess the findings obtained; references.
 The research projects that successful applicants shall carry out during their doctoral career may possibly differ from the project proposed at the application stage. This shall be defined together with the supervisor and approved by the Academic Board.
- Motivational letter. This must include the reasons prompting the applicant to attend the PhD Programme and those relevant experiences and research interests, that make the applicant suitable for the specific PhD Programme (3000 characters maximum, including spaces).
- List of the publications (monographs, articles published on scientific journals, volume's chapters).
- List of the minor publications (conference papers, etc.).
- List of the abstracts and posters presented during national and international conferences, etc.
- Professional Master courses completed in Italy (1st or 2nd level) relevant to the PhD Programme.
- Postgraduate vocational training programmes/specialisation programmes relevant to the PhD Programme.
- Summary of the thesis defended within the framework of Specialization Schools. The summary cannot exceed 2000 characters.
- Research activity of any kind - whether basic, applied, translational, etc. - carried out in any capacity, including when covered by research grants, and as a staff member of research projects.
- Documents attesting the knowledge of foreign languages
- Study periods completed by students outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes).
- Other qualifications attesting the suitability of the applicants (scholarships, prizes, etc).

Admission exams (art. 4 of the call for applications)

Examination type	Schedule (please, note that applicants shall not receive any communication concerning the exams schedule)	Examination results publication (please, note that applicants shall not receive any communication concerning the publication of results)
Qualifications and research project evaluation	Non-presential.	The results of the qualifications and research project evaluation shall be available online starting from the 05/06/2020 19/06/2020 at the page http://studenti.unibo.it (please, select "summary of the requests in progress" - "see detail" and open the pdf file "risultati valutazione titoli e progetto")
Oral examination	Date	15/06/2020 29/06/2020 In case that the oral examination cannot be completed in one day due to the large number of applicants, the oral exam schedule shall be made available at the webpage http://studenti.unibo.it together with the results of the qualifications and research project evaluation
	Time	

Applicants shall take the exam remotely. For further details please refer to the relevant provision laid down in art. 4 of the Call for applications.

Evaluation criteria

Points will be allocated to applications out of a total of 100 on the basis of the following weighting:

1. Qualifications and research project

- Minimum for admission to the oral exam: 30 points
- Maximum: 50 points

Only qualifications relating to the last 5 calendar years prior to the calendar year of publication of the Call for applications shall be taken into consideration, with the exception of the University Degree (Diploma di laurea). Please, note that qualifications must be consistent with the PhD Programme.

Points relating to qualifications shall be allocated on the basis of the following criteria:

- Graduation final mark. Undergraduates shall be evaluated on the basis of the Weighted Average Mark (WAM): max 10 points
- Publications: max 3 points
- Overall assessment of the qualifications (CV, study periods spent abroad, etc.): max 12 points.

Points relating to the research project shall be allocated on the basis of the following criteria:

- Scientific value and ground-breaking nature of the proposal: max 10 points
- description and structure of the proposal: max 7 points
- proposal feasibility: max 8 points

2. Oral examination

- Minimum for inclusion in the final ranking list :30 points
- Maximum: 50 points

Oral examination includes the presentation of the research project and is intended to assess the suitability of the applicant to pursue scientific research as well as the general knowledge of issues connected to the PhD Programme. During the oral examination, knowledge of English language shall be assessed. The oral examination is carried out in Italian or in English.

Points relating to the oral examination shall be allocated on the basis of the following criteria:

- knowledge of the English languages: max 3 points
- research project presentation: max 25 points
- general knowledge of issues connected to the PhD Programme: max 22 points

Possible evaluation sub-criteria will be available on the [Unibo website](#), selecting the relevant PhD Programme → “PhD programme information” at the bottom of the page in the section “Notices”.

Final ranking list and enrolment (arts.6 and 7 of the call for applications)

After the publication of the results of the oral exam, the final ranking list will be available on the [Unibo website](#), selecting the relevant PhD Programme → “PhD programme information” at the bottom of the page in the section “Notices”.

Following the publication of the final ranking list, successful applicants must enrol on <http://studenti.unibo.it> by the deadline indicated on the [Unibo website](#), selecting the relevant PhD Programme → “PhD programme information”.