

**PhD Programme Table - 38th cycle**  
**NRRP “National Recovery and Resilience Plan” Call for Applications**



**Funded by the  
European Union**  
NextGenerationEU



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

Section “Available Positions and Scholarships” integrated on 01/07/2022

Section “Available Positions and Scholarships” integrated on 13/07/2022

Section “Available Positions and Scholarships” integrated on 28/07/2022

PROGRAMME’S NAME	<b>PHYSICS</b>
ASSOCIATED PARTNERS <i>Pursuant to art. 3 para 2 lett. b) of the MD n. 226/2021</i>	Istituto Nazionale di Fisica Nucleare - INFN
DURATION	3 years
PROGRAMME START DATE	01/11/2022 (DD/MM/YYYY)
LANGUAGES	Italian, English
COORDINATOR	Prof. Michele Cicoli ( <a href="mailto:michele.cicoli@unibo.it">michele.cicoli@unibo.it</a> )
RESEARCH TOPICS	<ul style="list-style-type: none"> <li>- Theoretical Physics</li> <li>- Nuclear and Subnuclear Physics</li> <li>- Physics of Condensed Matter, Atoms and Molecules</li> <li>- Applied Physics and Complex Systems</li> <li>- Physics Education and History of Physics</li> </ul>
PHD POSITIONS	6
ADMISSION PROCEDURE	Qualifications evaluation Oral examination

**Available Positions and Scholarships**

Pos. n.	Financial Support	Description	Positions linked to research topics
1	<b>PhD Scholarship Ex M.D. 351/2022 - NRRP Research</b>	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 1, Investment 4.1 (MD 351/2022) – NRRP Research; partly co-funded with funds made available by the project ALFAEVOLAB – Ref. Prof. Armando Bazzani	Artificial Intelligence algorithms for real time video analysis to study and model the mobility flows and crowd dynamics
2	<b>PhD Scholarship Ex M.D. 351/2022 - NRRP Research</b>	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 1, Investment 4.1 (MD 351/2022) – NRRP Research; cofunded with funds made available by the project LION HEATED (Grant Agreement n° 828984) – Ref. Prof. Tobias Cramer	Nanostructured semiconductor interfaces investigated by advanced atomic force microscopy

3	<b>PhD Scholarship Ex M.D. 352/2022</b>	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by Aqseptence Group S.r.l.	Development of AI techniques and image processing in industrial environment: application to multifunction robots for the maintenance of filter-press machines
4	<b>PhD Scholarship Ex M.D. 352/2022</b>	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by Enereco S.p.A	Innovative sensors for toxic and dangerous gases detection based on nanotechnology with low environmental impact
5	<b>PhD Scholarship Ex M.D. 352/2022</b>	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by SACMI IMOLA	Innovative sensors based on advanced materials for monitoring industrial process parameters
6	<b>PhD Scholarship</b>	Funded by Bundesanstalt für Materialforschung und -prüfung (BAM)	Geometric deep learning for enhanced segmentation of 3D tomographic reconstructions and for data fusion

Applicants awarded with Ex M.D. 351/2022 or Ex M.D. 352/2022 PhD scholarships shall have specific obligations (i.e. mandatory research periods abroad and/or in a firm) during their PhD programme. For detailed information, refer to the Call for Applications, articles 1.2 and 1.3, and to the text of the law.

For any other eventual PhD positions, a 6-month research period abroad is mandatory.

## Admission Exams

The admission exams detailed schedule shall be published **starting from July 12<sup>th</sup>, 2022:**

- on the [University website](#), selecting the relevant PhD Programme > “More information”, at the bottom of the page in the section “Notices”;
- on [Studenti Online](#) (select “summary of the requests in progress” > “see detail” and open the .pdf file at the bottom of the page). **No personal written communication will be sent to applicants.**

## Required and Supporting Documents to be attached to the application

All the documents listed below **shall be drawn up in English or in Italian.** In case of documents originally issued in any other language (e.g. identity document, qualifications), an official translation is required.

Only qualifications obtained **during the last 5 calendar years** shall be taken into consideration, except for the University Degree. The Admission Board will assess the relevance of the supporting documents to the PhD Programme.

REQUIRED DOCUMENTS	
<b>Identity document</b>	Valid identity document with photo (i.e. identity card, passport)
<b>Curriculum Vitae</b>	<p>We recommend all applicants to draw up their Curriculum Vitae according to the <a href="#">Curriculum Vitae form</a>, in Attachment 1 to the present PhD programme table and downloadable in .docx from the <a href="#">University Website</a> (select the PhD Programme → “More information”, then check “Notices” at the bottom of the page).</p> <p>The following experiences will be deemed evaluable:</p> <ul style="list-style-type: none"> <li>- Postgraduate vocational programmes and/or specialisation programmes relevant to the PhD Programme</li> <li>- Teaching activity carried out at academic level</li> <li>- 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</li> <li>- Work activity</li> <li>- Curricular or non-curricular professional internships</li> <li>- Documents attesting the applicants’s foreign languages proficiency</li> <li>- Study periods completed by applicants outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes)</li> </ul>

	- Other qualifications attesting the suitability of the applicants (scholarships, prizes, etc.)
<b>Degrees</b>	Documents attesting the awarding of the first and second cycle degrees, the exams taken and the marks obtained (see Art. 3 of the Call for Applications)
<b>SUPPORTING DOCUMENTS</b>	
<b>Thesis description</b>	Description of the second cycle degree thesis, drawn up using the <a href="#">template Thesis Description</a> , in Attachment 2 to the present PhD programme table and downloadable in .docx from the <a href="#">University Website</a> (select the PhD Programme → “More information”, then check “Notices” at the bottom of the page). The document cannot exceed a 2-pages length (A4, font size 11, single line spacing). It must be structured as follows: <ul style="list-style-type: none"> <li>- State of the art and scientific background</li> <li>- Thesis abstract, detailing attained or foreseen results</li> <li>- Future development of the research activity begun with the thesis</li> </ul> Graduands may submit a description of the thesis they are currently working on. Applicants awarded with a degree in a foreign institution, not including a research thesis as part of the programme, can submit a research proposal with the described structure.
<b>Personal Statement</b>	Personal statement drawn using the <a href="#">template Personal statement</a> , in Attachment 3 to the present PhD programme table and downloadable in .docx from the <a href="#">University Website</a> (select the PhD Programme → “More information”, then check “Notices” at the bottom of the page). The document cannot exceed a 2-pages length (A4, font size 11, single line spacing). It must be structured as follows: <ul style="list-style-type: none"> <li>- reasons prompting the applicant to attend the PhD Programme</li> <li>- research interests</li> <li>- relevant experiences</li> <li>- position/s linked to a specific research topic applicants wish to express their interest in.</li> </ul>
<b>Reference letter/s</b>	<b>No more than 3 reference letters</b> 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 in the scientific research. Letters shall be uploaded following the procedure on <a href="#">Studenti Online</a> , detailed in the Call for Applications (Art. 3.2).
<b>Publications</b>	Lists of publications (i.e. monographs, articles on scientific journals), minor publications (conference papers, etc.), abstracts and posters presented during national and international conferences, etc.

## Evaluation criteria\*

Scores will be expressed in points out of 100, as follows.

### 1. Qualifications evaluation

Minimum score for admission to the oral examination: 30 points, Maximum score: 50 points

Second cycle degree (Master’s) final mark. Graduands shall be evaluated according to the Weighted Average Mark (WAM)	10 points max
Publications	3 points max
Curriculum Vitae evaluation (e.g. thesis abstract, reference letters, other qualifications)	7 points max
Thesis description	15 points max
Personal statement	15 points max

### 2. Oral examination

Minimum score for eligibility: 30 points, Maximum score 50 points

English language proficiency	3 points max
Thesis description presentation	25 points max
General knowledge of issues encompassed by the PhD Programme	22 points max

Oral examination aims to assess the suitability of the applicant for scientific research as well as the general knowledge of issues encompassed by the PhD Programme (see the list of [research topics](#) at the bottom of the present document).

**The oral examination is carried out in English.**

\* Possible further evaluation criteria will be available on the [University website](#), selecting the relevant PhD Programme > “More information”.

**Curriculum Vitae*****PhD Programme in Physics*****Personal Information**

First name(s) / Surname(s)	
Nationality	
Date of birth (day, month, year)	
Gender	
Email address	

**University Education*****Master***

Official duration in years				
Dates (start – end or planned end)				
Awarding institution	<i>(e.g. University of Bologna - Italy)</i>			
Title of qualification awarded	<i>(e.g. MSc in Biology)</i>			
<b>Marks</b>	<b>YOUR mark</b>	<b>Minimum PASS mark</b>	<b>Maximum mark</b>	<b>ECTS conversion (if available)</b>
Final grade (if available)				
Weighted average of exam marks				
Title and topic of Master Thesis				

***Bachelor***

Official duration in years				
Dates (start – end or planned end)				
Awarding institution	<i>(e.g. University of Bologna - Italy)</i>			
Title of qualification awarded	<i>(e.g. BSc in Pharmacy)</i>			
<b>Marks</b>	<b>YOUR mark</b>	<b>Minimum PASS mark</b>	<b>Maximum mark</b>	<b>ECTS conversion (if available)</b>
Final grade (if available)				
Weighted average of exam marks				
Title and topic of Bachelor Thesis				

### **Employment**

Currently employed	<input type="checkbox"/> Yes <input type="checkbox"/> No
Summary of current employment	
Past employment record and skills obtained	

### **Research and Study Abroad Experiences**

*List periods of study abroad (Erasmus and/or others), and research periods at universities or public/private institutions (only the last 5 years will be considered)*

Scientific research of any kind (basic, oriented, translational, applied etc.)
Periods of study abroad (e.g. Erasmus)

### **Other qualifications**

*List other experiences relevant to the PhD Programme (only the last 5 years will be considered)*

University Master Courses (Master universitari di I e II livello) completed in Italy (1st or 2nd level) relevant to the PhD Programme
Postgraduate training programmes/specialization programmes relevant to the PhD Programme
Internships

<b>University teaching at any level</b>					
<b>Other qualifications attesting the applicant's skills and education (prizes, grants etc.)</b>					
<b>Language Proficiency</b>					
Mother tongue(s)					
Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
Language:	Level:	Level:	Level:	Level:	Level:
	Language certificate:				
Language:	Level:	Level:	Level:	Level:	Level:
	Language certificate:				
	Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user Common European Framework of Reference for Languages				

## **Description of Second Cycle Degree (Master) Thesis or Equivalent Research Project**

Description of Master thesis (or corresponding draft for those who have not graduated yet) or equivalent research project (for foreigner candidates who did not work on a thesis): maximum 2 A4 pages, font size 11, single line spacing.

### **State of the art**

Describe here the state of the art and the scientific background of the thesis work.

### **Results**

Outline here the main results obtained (or expected) in the thesis work stressing their scientific relevance and originality.

### **Future developments**

Illustrate here potential future directions of research opened up by the thesis work.

## **Personal Statement**

Letter of Intent: maximum 2 A4 pages, font size 11, single line spacing.

### **Motivation**

Illustrate here the motivation behind applying for a PhD position in Physics at the University of Bologna.

### **Research interests**

Describe here your scientific interests and the research line you would like to focus on if admitted to the PhD programme in Physics of the University of Bologna.

### **Personal qualifications**

Explain here why you deem yourself well qualified to perform successfully in the PhD programme in Physics of the University of Bologna.

### **Intentional choice of PhD Scholarships**

List here the titles of the PhD Scholarships you are interested in (this list will have to be confirmed at the oral interview, if admitted). A brief description of each PhD Scholarship can be found in the attached file which contains also the name and email address of Unibo and INFN staff who can be contacted to get more info.