DOCTORAL PROGRAMME
IN
PHYSICS AND ASTRONOMY

Director Prof. Giovanni Modugno

XL cycle – academic year 2024/2025

<table>
<thead>
<tr>
<th>SCIENTIFIC AREA</th>
<th>ADMINISTRATIVE OFFICE</th>
<th>PARTNER INSTITUTIONS</th>
<th>WEB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Department of Physics and Astronomy</td>
<td>Istituto Nazionale di Fisica Nucleare (INFN)</td>
<td><a href="http://www.fisica.unifi.it/dottorato">www.fisica.unifi.it/dottorato</a> in fisica e astronomia</td>
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</tbody>
</table>

POSITIONS AVAILABLE: 24

Positions with Scholarship: 22
Positions without Scholarship: 2*

* standard ranking only

RANKING LIST FOR STANDARD POSITIONS
SCHOLARSHIPS AVAILABLE: 8

5 - University of Florence
3 - Istituto Nazionale di Fisica Nucleare (INFN)

RANKING LISTS FOR POSITIONS WITH SPECIFIC RESEARCH TOPICS
SCHOLARSHIPS AVAILABLE: 14

1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)
Thematic: “Search and characterization of binaries in star cluster with time-series photometry and large photometric, spectroscopic, and astrometric surveys”

1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)
Thematic: “Stellar rotation as a means to study exotic stellar populations in star clusters”

1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)
Thematic: “Analysis of the surface chemistry of stars with distorted shape, caused by fast rotation or by the interaction with close companions”

1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)

1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)
Thematic: “Direct detection and spectral characterization of protoplanets: from VLT/ERIS to ELT/MICADO & ELT/METIS”
1 - Istituto Nazionale di Astrofisica - Osservatorio Astrofisico di Arcetri (INAF)
**Thematic:** “Theoretical, Observational Astrophysics and related Instrumentation and Technology”

1 - Istituto di Ricerca e di Studi in Ottica e Optometria (IRSOO)
**Thematic:** “Virtual Refraction: comparison of methods for refraction in domestic settings”

1 - Department of Physics and Astronomy
**Thematic:** “Development and characterization of photonic chips for quantum internet”
Funded by ERC project “Quantum Optical MULTidimensional NETwork (QOMUNE) - G.A. n. 101077917

2 - Department of Physics and Astronomy
**Thematic:** “Galactic archeology in the local group with spectroscopic observations”
Funded by ERC project “TREASURES: Digging into dwarf galaxies” (TREASURES) - G. A. n. 101117455

1 - Department of Physics and Astronomy
**Thematic:** “Study and realization of advanced atomic interferometers for precision measurements and fundamental physics tests”
Funded by HORIZON-CL4-2021-DIGITAL-EMERGING-02 project “Deep Ultraviolet Laser For Quantum Technology” (UVQuanT) - G. A. n. 101080164

1 - Department of Physics and Astronomy
**Thematic:** “Multiplexed light-sheet microscopy for 3D molecular phenotyping of biological tissues”
Funded by Swiss National Science Foundation project “3Dhist: Evolution of colorectal cancer metatases using multimodal 2D and 3D images”

1 - The PhD course presented two projects entitled "Applications of artificial intelligence techniques to the study of cosmic ray spectra with in-orbit experiments" and "Application of muography to the geophysical prospection of terrestrial analogues, for the modeling of the geological risk associated with the future exploration of the Moon and Mars" as part of the ASI Call - Public notice to start collaborations with National Universities for PhDs on themes of interest ASI, for the funding of two scholarships for the 40th cycle of the PhD in Physics and Astronomy, the results of which have not yet been disclosed.
For more information, please consult the call for applications: [https://www.asi.it/2024/02/avviso-pubblico-per-avviare-collaborazioni-con-gli-atenei-nazionali-per-dottorati-di-ricerca-su-tematiche-di-interesse-asi/](https://www.asi.it/2024/02/avviso-pubblico-per-avviare-collaborazioni-con-gli-atenei-nazionali-per-dottorati-di-ricerca-su-tematiche-di-interesse-asi/)

If one or both projects are funded by ASI, the scholarship(s) will be awarded to the eligible candidate(s) according to the order of the ranking.

<table>
<thead>
<tr>
<th>STUDY/RESEARCH PERIODS ABROAD</th>
<th>3 months</th>
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**DOCUMENTS REQUIRED FOR THE ADMISSION**

(under penalty of exclusion)

- Copy of the Identification Document
- Self-declaration for qualifications obtained in Italy (laurea Triennale, Specialistica o Magistrale o ciclo unico) with a list of all exams taken and their marks, title of the thesis and graduation mark.
  (download the form [here](#), make sure you fill in all the fields)
- Qualifications obtained abroad (Bachelor’s and Master’s Degrees or combined cycle Degree) with a list of all exams taken and their marks, title of the thesis and graduation mark.

*The same documentation except for the final mark must be submitted by those who will graduate within the 31/10/2024*

<table>
<thead>
<tr>
<th>DOCUMENTS REQUIRED FOR THE EVALUATION</th>
<th><strong>MANDATORY</strong></th>
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<tbody>
<tr>
<td></td>
<td>• Curriculum vitae et studiorum (maximum 2 pages, A4)</td>
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<td></td>
<td>• Research project (maximum 2 A4 pages)</td>
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<tr>
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<th><strong>OPTIONAL</strong></th>
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<tbody>
<tr>
<td></td>
<td>• List of publications</td>
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<tr>
<td></td>
<td>• Thesis abstract</td>
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<td></td>
<td>• Other qualification documents</td>
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**RESEARCH PROJECT**

The project may be written in Italian or English and must outline a possible research activity to be carried out within one of the research groups in the Dipartimento di Fisica e Astronomia or in the linked Enti di Ricerca.

The candidate may present the same project for the standard scholarship and for any scholarship with specific research topic and separate ranking lists he/she intends to apply for, or alternatively may present different projects for each scholarship, indicating clearly to which scholarship each project refers.

**INTERVIEW MODE**

Remotely (videocall)

The interview is conducted in English language.

**FURTHER INFORMATION**

The interview will concern the research project, the CV and the publications. Questions may be asked concerning the master’s thesis work and basic physics knowledge related to the project and to the thesis.
EVALUATION MARKS

<table>
<thead>
<tr>
<th>parameter</th>
<th>minimum score</th>
<th>maximum score</th>
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<tbody>
<tr>
<td>Research project, other titles and publications, curriculum vitae et studiorum, and list of taken exams with accompanying grades</td>
<td>30/120</td>
<td>45/120</td>
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Applicants who obtain a mark of at least 30/120 will be admitted to the interview.

Interview: discussion of research project, thesis, qualification documents and publications

Eligibility is achieved with a minimum score of 80/120

EXAMINATION SCHEDULE

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<th>DATE</th>
<th>TIME</th>
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<tbody>
<tr>
<td>INTERVIEW</td>
<td></td>
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<tr>
<td>July 11th, 2024</td>
<td>09:30 a.m.</td>
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The list of candidates admitted to the interview and the final ranking will be published at the following web page: https://www.unifi.it/p12593