

| PhD Programme in PHYSICS | |
|---------------------------------------|--|
| DISCIPLINARY SCIENTIFIC AREA | 02- PHYSICAL SCIENCES |
| COORDINATOR | PROF. UMBERTO D'ALELIO |
| HEAD DEPARTMENT | DEPARTMENT OF PHYSICS |
| DURATION | 3 YEARS |
| LEARNING OUTCOMES AND RESEARCH TOPICS | <p>The PhD Project:</p> <p>The organization of the PhD programme in Physics allows PhD students to acquire fundamental tools and expertise to conduct research activity in academic and industrial sectors, as well as to develop skills in activities of public engagement and teaching. The composition of the PhD Board, covering a broad range of research fields in Physics, gives PhD students the opportunity to acquire high-level expertise in a large variety of scientific areas. This will be also strengthened by the possibility to be part of large national and international collaborations. Special care is also devoted to problem solving skills, allowing PhD students to face more general situations outside research.</p> <p>The PhD programme in Physics pursues the following goals:</p> <ol style="list-style-type: none"> 1. COMPLETING THE BACKGROUND IN PHYSICS – The PhD candidates will attend specific lectures, seminars, and additional lecturing activities at post-graduate level. 2. DEVELOPING A PROPER RESEARCH ATTITUDE - The PhD candidate will be assigned a supervisor according to the state-of-the-art research topic who will supervise her/his research and training activities. PhD students join research groups and will work in teams including undergraduate students, post-docs, researchers, and faculty members. Additionally, to complete the training to research, the supervisor will favour the involvement and the commitment of the PhD candidate in international collaborations, the attendance at workshops and conferences as well as in drawing up internal reports and scientific articles. 3. WORKING ON AN INNOVATIVE RESEARCH TOPIC – The research activity of the PhD candidates will be inserted in research projects. The PhD candidates have (i) to work on a novel topic; (ii) to publish the obtained results in national and international scientific journals; (iii) to present the research line and the obtained results in both internal review sessions (year-end seminars and year-end reports) and workshops and/or conferences. 4. DEEPENING ASPECTS OF PROJECT MANAGEMENT – The PhD candidate will be exposed to specific courses on skills related to drafting and managing a project including issues associated with the intellectual property. 5. DEVELOPING SKILLS IN AREAS OUTSIDE RESEARCH – The PhD candidate will be involved in periodic meetings with PhDs working in the context of public engagement and outreach. <p>In Italy, PhDs in Physics are usually employed in the academy and/or in public research institutes. However, due to the involvement of research groups of the Physics Department in projects with a strong contribution from companies (INFN projects at CERN, the SRT-Sardinian Radio Telescope,</p> |



| | |
|--|--|
| | <p>the RESET project within the European Innovation Partnership and the project supported by the NIH-National Institutes of Health), the connection with industries and companies will be strengthened.</p> <p>PhDs in Physics are also involved in activity of public engagement and editorial services at high level: some examples are their recruitment at the Bruno Kessler Foundation and the Editorial Office di Nature Communication.</p> |
| ELIGIBILITY AND OTHER REQUIREMENTS FOR CANDIDATES (ART. 2 - NOTICE OF COMPETITION) | <p>LM-8 Biotecnologie industriali LM-9 Biotecnologie mediche, veterinarie e farmaceutiche LM-17 Fisica LM-18 Informatica LM-20 Ingegneria aerospaziale e astronautica LM-21 Ingegneria biomedica LM-22 Ingegneria chimica LM-23 Ingegneria civile LM-25 Ingegneria dell'automazione LM-26 Ingegneria della sicurezza LM-27 Ingegneria delle telecomunicazioni LM-28 Ingegneria elettrica LM-29 Ingegneria elettronica LM-30 Ingegneria energetica e nucleare LM-31 Ingegneria gestionale LM-32 Ingegneria informatica LM-33 Ingegneria meccanica LM-34 Ingegneria navale LM-35 Ingegneria per l'ambiente e il territorio LM-40 Matematica LM-44 Modellistica matematico-fisica per l'ingegneria LM-53 Scienza e ingegneria dei materiali LM-54 Scienze chimiche LM-58 Scienze dell'universo LM-71 Scienze e tecnologie della chimica industriale LM-74 Scienze e tecnologie geologiche LM-79 Scienze geofisiche LM Sc. Mat. Scienze dei materiali 8/S (specialistiche in biotecnologie industriali) 9/S (specialistiche in biotecnologie mediche, veterinarie e farmaceutiche) 20/S (specialistiche in fisica) 23/S (specialistiche in informatica) 25/S (specialistiche in ingegneria aerospaziale e astronautica) 26/S (specialistiche in ingegneria biomedica) 27/S (specialistiche in ingegneria chimica) 28/S (specialistiche in ingegneria civile) 29/S (specialistiche in ingegneria dell'automazione) 30/S (specialistiche in ingegneria delle telecomunicazioni) 31/S (specialistiche in ingegneria elettrica) 32/S (specialistiche in ingegneria elettronica) 33/S (specialistiche in ingegneria energetica e nucleare) 34/S (specialistiche in ingegneria gestionale) 35/S (specialistiche in ingegneria informatica) 36/S (specialistiche in ingegneria meccanica) 37/S (specialistiche in ingegneria navale) 38/S (specialistiche in ingegneria per l'ambiente e il territorio)</p> |



| | |
|---|--|
| | <p>45/S (specialistiche in matematica) 50/S (specialistiche in modellistica matematico-fisica per l'ingegneria) 61/S (specialistiche in scienza e ingegneria dei materiali) 62/S (specialistiche in scienze chimiche) 66/S (specialistiche in scienze dell'universo) 85/S (specialistiche in scienze geofisiche)</p> <p>Foreign candidates: Master's degree in Physics and related subjects (to be evaluated on a case-by-case basis)</p> |
| ADMISSION TESTS | <p>ASSESSMENT OF QUALIFICATIONS AND CURRICULUM VITAE, AND VIDEOCONFERENCE INTERVIEW</p> <p>The interview will mainly focus on the presentation and discussion of the candidate's research project (to be written using the form available on the webpage https://unica.it/dottoraticerca - "Instructions for registration to the competition and forms - Annex C"), in order to assess the adequacy of the profile with regard to personal competence in the disciplinary field of the project, aptitude for scientific research and linguistic knowledge (English language).</p> |
| POSITIONS | 1 |
| SCHOLARSHIPS | 1 funded by NRRP Ministerial Decree no. 630/2024 |
| CONTACT PERSON | <p>PROF. UMBERTO D'ALELIO EMAIL: umberto.dalesio@ca.infn.it - TEL. +39 0706754912</p> |
| WEBSITE | http://dottorati.unica.it/fisica/ |
| SCHOLARSHIP FUNDED BY MINISTERIAL DECREE NO. 630/2024 | |
| CUP | F22B24000220005 |
| RESEARCH PROJECT | SELENE: Solar Events and space weather effect of muon flux variations measured at sea Level by a NETWORK of low-cost detectors |
| PRINCIPAL INVESTIGATOR | Prof. Piernicola Oliva |
| DESCRIPTION OF DOCTORAL TRAINING | <p>The SELENE research project investigates the impact of sea-level muon flux variations caused by solar events. The industrial PhD track will offer an international and interdisciplinary experience, involving institutes in Italy, Maldives, Dubai, Finland and Slovakia. PhD students will be trained in the installation, use, calibration, and maintenance of specific portable detectors developed together with the industrial partner (CAEN), as well as in the analysis of collected data. Training includes advanced data analysis techniques, correlation with neutron monitors and solar event instruments. The Ph.D. student will gain hands-on skills at various monitoring sites and develop expertise in particle physics, geophysics and sensing technologies. The project is also supported by INFN, UNIMIB, and UNISS personnel, offering a broad scientific and professional background.</p> |
| COMPANY/RESEARCH INSTITUTION | CAEN S.p.A., via Vetraia 11 Viareggio, Lucca - Contact person: Dr. Cristina Mattone |
| NO. OF MONTHS TO BE SPENT IN THE COMPANY/RESEARCH INSTITUTION | 6 |
| FOREIGN INSTITUTION | Science and Technology Facilities Council (STFC), Polaris House, North Star Avenue, Swindon SN2 1SZ, United Kingdom |
| NO. OF MONTHS TO BE | 6 |



| | |
|-------------------------------------|--|
| SPENT IN THE FOREIGN INSTITUTION | |
|-------------------------------------|--|