



PhD in FISICA / PHYSICS - 40th cycle

THEMATIC Research Field: LIGHT-MATTER INTERACTION AT THE NANOSCALE

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Modern scanning probe techniques allow to investigate hybrid light-matter states inside materials with the necessary nanometric resolution, well below the diffraction limit of standard optical microscopes. Such hybrid modes, especially polaritons in 2D materials, are attracting increasing interest for the possibility to transport and deliver electromagnetic energy in reduced, sub-diffraction, volumes. Such characteristic is fundamental in pushing the miniaturization of optoelectronics circuits. This project aims at engineering light matter interaction in 2D materials and characterize it by means of the most advanced nano-imaging and nano-spectroscopy techniques.
Methods and techniques that will be developed and used to carry out the research	Numerical simulations by means of commercial software (Lumerical FDTD, Comsol, CST, ecc.). Production of structured and non-structured 2D materials samples. Development of optical setups for imaging and spectroscopy at the nanoscale.
Educational objectives	Learning commercial software for simulation of light-matter interaction at the nanoscale; Learning 2D samples preparation and cleanroom nanofabrication techniques; learning nano-imaging and nano-spectroscopy techniques and their data interpretation.
Job opportunities	The research proposed is at the forefront of scientific innovation in the design of 2D materials-based devices and their characterization. The related job opportunities span from Industrial R&D to academic positions in a



	research field that is constantly contributing advancing Nanotechnology.
Composition of the research group	1 Full Professors 2 Associated Professors 4 Assistant Professors 2 PhD Students
Name of the research directors	Antonio Ambrosio

Contacts
<p><i>antonio.ambrosio@iit.it</i></p> <p><i>https://www.iit.it/it/people-details/-/people/antonio-ambrosio/</i></p>

Additional support - Financial aid per PhD student per year (gross amount)			
Housing - Foreign Students	1st year	2nd year	3rd year
	2000.0 € per student	2000.0 € per student	2000.0 € per student
	max number of financial aid available: 1, given in order of merit (only for students with scholarship)..		
Housing - Out-of-town residents (more than 80Km out of Milano)	1st year	2nd year	3rd year
	2000.0 € per student	2000.0 € per student	2000.0 € per student
	max number of financial aid available: 1, given in order of merit (only for students with scholarship)..		

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Educational activities</p> <p>Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per 3 years: max 6.114,50 euros per student.</p> <p>Teaching assistantship: There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p>



Computer and desk availability: individual or shared use computer and desk