POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 40th cycle

THEMATIC Research Field: STRUCTURED-LIGHT MATTER INTERACTION IN 2D MATERIALS

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	Optical metasurfaces recently added to the optical toolset for light manipulation and structuring. Such devices are thin (less than human air) and allow manipulation of amplitude, phase and polarization of light. Metasurfaces can be designed by means of numerical simulation softwares and fabricated with cleanroom techniques. Recently, such nanophotonics techniques have also allowed the temporal structuring of light, together with the spatial degree of freedom. The aim of the project is to investigate the interaction of structured light with matter, with both spatial and temporal resolution. The materials of interest will be mainly, but not limited to 2-dimensinal semiconductive and dielectric materials.
Methods and techniques that will be developed and used to carry out the research	Numerical simulations with commercial software (Lumerical FDTD, Comsol, CST, ecc.). Realization of optical metasurfaces with cleanroom techniques. Development of optical setups for light manipulation and sample characterization.
Educational objectives	Learning to structure light in time and space by means of digital holography and home-made nanostructured optical devices (metasurfaces); learn how to design and fabricate optical metasurfaces; gain specific skills in spectral and temporal characterization of light-matter interaction at the microscopic scale.
Job opportunities	The research proposed is at the forefront of scientific innovation in Optics that sees the attention of Tech giants

	for the development of next generation integrated optical devices, like smart cameras, visors, ecc. Moreover, such research topic in Nanophotonics is subject every year for several new academic positions in the top University around the World.
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
antonio.ambrosio@iit.it *https://www.iit.it/it/people-details/-/people/antonio-ambrosio/*

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

Educational activities

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.

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.

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