POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 38th cycle

THEMATIC Research Field: ULTRAFAST MULTI-DIMENSIONAL SPECTROSCOPY

Monthly net income of PhDscholarship (max 36 months)
€ 1195.5 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	This fellowship will be in the context of the iPHOQS project, a large-scale Italian Research Infrastructure in the field of photonics and quantum science. One of the goals of iPHOQS is to develop a set of experimental apparatuses for multi-scale, multidimensional time-resolved optical spectroscopy, with a worldwide unique combination of capabilities, such as temporal resolution, sensitivity, temporal and spectral coverage, excitation frequency resolution and spatio-temporal resolution. The scholar will work on the development of a two-dimensional electronic spectroscopy (2DES) setup covering the visible and near-infrared range, guaranteeing simultaneously high temporal resolution (down to sub-10-fs) and high spectral resolution.
Methods and techniques that will be developed and used to carry out the research	The scholar will develop a workstation for 2DES, an upgrade of transient absorption that employs two phase-locked broadband pump pulses and one probe pulse, detecting signals that correspond to one interaction with each pulse. By performing a Fourier transform of the delay between the two pump pulses, an excitation frequency axis can be obtained, while keeping very high temporal resolution. Thus, for each pump-probe delay 2DES gives a correlation map between excitation and detection frequencies. Two independent 2DES setups will work in the visible and in the near-infrared, using a birefringent interferometer invented at Politecnico di Milano for the generation of phase-locked excitation pulses. Two-color 2DES experiments will also be possible.

Educational objectives	The scholar will receive a multidisciplinary training in topics including nonlinear optics, ultrafast spectroscopy and condensed matter physics. He/she will have the opportunity to visit partner laboratories in the iPHOQS project.
Job opportunities	Due to the multidisciplinary training in cutting edge techniques of optics and photonics as well as solid-state physics and nanoscience, the scholar will have excellent job opportunities in high-tech industries. In addition, he/she will be well positioned for an academic career.
Composition of the research group	1 Full Professors 3 Associated Professors 2 Assistant Professors 5 PhD Students
Name of the research directors	Giulio Cerullo

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	597.75 €
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

4.872,90 euros.

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 availability: individual use

Desk availability: shared use