POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 38th cycle

THEMATIC Research Field: HYPERSPECTRAL IMAGING MICROSCOPY

Monthly net income of PhDscholarship (max 36 months)
€ 1200.0 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	The research activity is part of the project “HYPERIA”, an EIC Transition from Horizon Europe, grant agreement n. 101058039.Hyperspectral Imaging is a new analytical technique based on spectroscopy. It collects hundreds of images at different wavelengths for the same spatial area. While the human eye has only three color receptors in the blue, green and red, hyperspectral imaging measures the continuous spectrum of the light for each pixel of the scene with fine wavelength resolution, not only in the visible but also in the near-infrared. The collected data form a so-called hyperspectral cube, in which two dimensions represent the spatial extent of the scene and the third its spectral content.Each material possesses a specific spectral signature that can be employed as a ‘fingerprint’ for its unique identification. Therefore, hyperspectral imaging finds a wide range of applications in remote sensing, thanks to its standoff, label-free and non-destructive capability in recognizing the components of matter. Hyperspectral imaging is employed in different fields such as astronomy, agriculture, molecular biology, biomedical imaging, mineralogy, geology, physics, cultural heritage, food processing, environment and surveillance.Further information can be found at www.nireos.com The research activity is part of the project “HYPERIA”, an EIC Transition from Horizon Europe, grant agreement n. 101058039.Hyperspectral Imaging is a new analytical technique based on spectroscopy. It collects hundreds of images at different wavelengths for the same spatial area. While the human eye has only three color receptors in the blue, green and red, hyperspectral imaging measures the continuous

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Methods and techniques that will be developed and used to carry out the research	The researcher will apply hyperspectral imaging to microscopy for various applications. In particular, she/he will employ a novel technology patented by Politecnico di Milano and commercialized by NIREOS s.r.l., in which the 3D hypercube is recorded using a Fourier-transform approach, employing a novel birefringent interferometer. The advantage with respect to other competing technologies is that it does not require any relative movement between the camera and the sample, thus it perfectly suits microscopy applications. The work will be carried out in close relationship with NIREOS s.r.l.
Educational objectives	The candidate will gain specific skills in microscopy, imaging, optics, linear and nonlinear spectroscopy and applications to biology (imaging cells and tissues), solid-state materials for photonics applications and minerals as well as remote sensing, agriculture etc
Job opportunities	The skills acquired during this research project will give the opportunity of a career in industrial companies oriented to the R&D of innovative laser systems, spectroscopic instruments and microscopes, as well as in bio-photonic labs and industries.
Composition of the research group	1 Full Professors

	2 Associated Professors 1 Assistant Professors 4 PhD Students
Name of the research directors	Dario Polli

Contacts
Email: dario.polli@polimi.it Webpage: http://polli.faculty.polimi.it/ Tel number: 02.23.99.60.86

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	600.0 €
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 4.892,40 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: shared use computer and desk

Other Information*:* See www.vibra.polimi.it.