POLITECNICO DI MILANO

PhD in FISICA / PHYSICS - 37th cycle

PON - GREEN Research Field: RAMAN WIDEFIELD MICROSCOPY FOR IDENTIFICATION OF MICROPLASTIC POLLUTION IN ENVIRONMENTAL SAMPLES.

Monthly net income of PhDscholarship (max 36 months)
€ 1180.0 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	Global plastic production has increased exponentially since the end of World War II, resulting in the accumulation of debris in the environment. Plastics are progressively fragmented by weathering and biological processes, leading to the formation of microplastics (MPs). In addition, MPs are intentionally manufactured as ingredients in consumer products. Because plastics have a low degradability and long lifetime, MPs have emerged as an urgent planetary problem for the threats to biota and human health Therefore, it becomes important to develop tools to identify and classify microplastics dispersed in the environment and accumulated in living organisms. https://www.epa.gov/trash-free-waters/toxicological-threats-plastic
Methods and techniques that will be developed and used to carry out the research	The major aim of the PhD Program is the development of a high throughput, wide-field, Raman microscope, based on an original technology invented and patented by Polimi, for discovering the MPs in the environment. The goal is the introduction in the field of a new analysis technique capable of recognizing and classifying microplastic samples of micrometric or sub-micrometric size, not detectable with currently available methods. The technological advancement will increase the ability to understand the impact of microplastics on the environment and human health.
Educational objectives	The PhD Candidate will develop and use a new microscope based on a ultracompact interferometer

	featuring high throughput, spectral resolution and stability. He/she will also become acquainted with spectroscopy techniques and will study advanced data analysis methods.
Job opportunities	The Candidate will do an internship at the company CRI, a Spin-off of Polimi and University of Cambridge. Job opportunities will be in companies that develop advance photonics system for environment, material science and health.
Composition of the research group	2 Full Professors 2 Associated Professors 1 Assistant Professors 2 PhD Students
Name of the research directors	Gianluca Valentini

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	566.36 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	Cambridge Raman Imaging (CRI)
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	Cambridge University
By number of months abroad	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

***Educational activities* per year :**
1st year: 0
2nd year: 1534 euros per student
3rd year: 1534 euros per student

or 1022 euros per student for each year.

***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: individual use