



PhD in FISICA / PHYSICS - 37th cycle

THEMATIC Research Field: ADVANCED NANOFABRICATION FOR SPINTRONICS AND NANOELECTRONICS.

Monthly net income of PhDscholarship (max 36 months)

€ 1250.0

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

Controlling at the nanoscale the physical properties of materials enables the study of new phenomena and the realization of complex functionalities for next generation devices. The research aims to develop and employ a technique called "phase nanoengineering" for producing highly controlled changes in the structural phase of thin films. This will in turn allow to tune their transport and magnetic properties. The technique will then be used for realizing artificial nanomaterials and devices with enhanced functionality for spintronics and nanoelectronics. The research activity is part of the H2020-ERC-2020-Stg: "Beyond Nanofabrication via nanoscale phase engineering of matter (B3YOND - GA 948225)"

Methods and techniques that will be developed and used to carry out the research

Growth of thin film multilayer structures via magnetron sputtering. Nanoscale surface characterization of the morphology, electric and magnetic properties via Scanning Probe Microscopy. Conventional Nanofabrication techniques, e.g. optical lithography, e-beam lithography, ion milling. Advanced Nanofabrication via thermal scanning probe lithography. Magnetic characterization via Kerr microscopy, vibrating sample magnetometer and synchrotron-based techniques. Electronic transport measurements: Magnetoconductance, Hall measurements. Cryogenic transport measurements in cryostat. Numerical methods: Micromagnetic simulations and Finite Elements Method simulation of electronic and thermal transport.



Educational objectives	Understanding of electronic transport and magnetism in nanostructured materials. Training in cleanroom techniques, nanoscale measurements, transport measurements and micro-nanofabrication methods. Participation and presentation in local and international workshops and conferences. Writing of scientific articles and proposals.
Job opportunities	Post-doc opportunities in academia both in Italy and abroad. R&D positions in companies, universities and research centers in Italy and abroad. Managerial positions in the field of innovation and technology.
Composition of the research group	0 Full Professors 1 Associated Professors 1 Assistant Professors 1 PhD Students
Name of the research directors	Edoardo Albisetti, Daniela Petti

Contacts
edoardo.albisetti@polimi.it, daniela.petti@polimi.it PhyND group. https://phynd.polimi.it/

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	564.01 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activities per year : 1 st year: 0 2 nd year: 1534 euros per student 3 rd 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 and Desk availability: individual use