



PhD in FISICA / PHYSICS - 38th cycle

THEMATIC Research Field: NANOSTRUCTURING ADVANCED MATERIALS FOR MAGNON COMPUTING AND SPINTRONICS

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

Nanostructured materials allow to control and study novel effects in condensed matter. In this context, developing novel methodologies for crafting and studying the magnetic and transport properties of materials is crucial. The research aims to develop and use novel fabrication and characterization methods, based on controlling highly localized energy sources such as heat and light. The investigated systems will be thin film heterostructures, where tunable localized excitations will be used for manipulating and characterizing the magnetic and transport properties, and imprinting novel functionalities. 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 3 PhD Students
Name of the research directors	Edoardo Albisetti; Daniela Petti

Contacts
<p>edoardo.albisetti@polimi.it;</p> <p>daniela.petti@polimi.it;</p> <p>PhyND group. https://phynd.polimi.it/</p>

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	625.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>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 5.095,96 euros per student.</p> <p>Teaching assistantship There are various forms of financial aid for activities of support to the</p>



teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer and desk availability: Computer availability: individual use

Desk availability: individual use