



# PhD in FISICA / PHYSICS - 38th cycle

## THEMATIC Research Field: RECONFIGURABLE MAGNONIC DEVICES BASED ON MAGNETIC MEMS

### Monthly net income of PhDscholarship (max 36 months)

€ 1350.0

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 PhD will work in the framework of the EU project MandMEMS n. 101070536 which aims at combining the tunability of magnonic systems with the power efficiency and the agility of micro-electro-mechanical systems (MEMS), thus empowering a new generation of devices for radio-frequency (RF) communication and microwave signal processing.

The idea is that of using movable permanent micromagnets integrated in MEMS devices to reconfigure the functionality of magnonic and spintronic devices, by varying the bias magnetic field just by moving said micromagnets in close proximity to the active device.

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

The PhD will carry out the following activities:

- Simulation of micromagnets and magnonic devices by micromagnetic simulation platforms
- Design and realization of magnetic MEMS/magnonic devices in the cleanroom of Politecnico di Milano ([www.polifab.polimi.it](http://www.polifab.polimi.it))
- Investigation of spin-wave propagation in hybrid magnonic-MEMS devices, using broadband spectroscopy, Brillouin Light Scattering, Time resolved MOKE and advanced dynamical microscopy techniques at large-scale facilities.

#### Educational objectives

Development of interdisciplinary knowledge at the



	boundary between physics, microfabrication technology, signal processing and electronics.
<b>Job opportunities</b>	This activity will be carried out in a group involved in the Joint Research Center of STM and Politecnico di Milano (STEAM), in strong connection with the world of MEMS development and production. Other relevant companies are involved in the EU project MandMEMS (Thales, IMEC, NOKIA, Rohde & Schwarz). This PhD will represent a solid basis for careers both in academia and in semiconductor industry.
<b>Composition of the research group</b>	1 Full Professors 2 Associated Professors 2 Assistant Professors 4 PhD Students
<b>Name of the research directors</b>	Riccardo Bertacco

<b>Contacts</b>
<p>riccardo.bertacco@polimi.it tel. 0039 02 2399 9663; <a href="https://www.fisi.polimi.it/en/people/bertacco">https://www.fisi.polimi.it/en/people/bertacco</a></p> <p>In collaboration with the staff of Polifab <a href="http://www.polifab.polimi.it">www.polifab.polimi.it</a></p> <p><a href="http://nabis.fisi.polimi.it">http://nabis.fisi.polimi.it</a></p>

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

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	675.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<b>Educational activities</b>



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 5.503,32 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 availability:** individual use

**Desk availability:** individual use