



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 39th cycle

Research Area n. 2 - Electronics

THEMATIC Research Field: IN-MEMORY COMPUTING CIRCUITS BASED ON 2D SEMICONDUCTORS (CIRCUITI DI CALCOLO IN MEMORIA BASATI SUI SEMICONDUTTORI 2D)

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

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	2D semiconductors are attracting a strong interest for their excellent scaling, good carrier mobility and 3D integration in the back end. Charge trap memories based on 2D semiconductors can be used in novel in-memory computing circuits for their ultra-low current and good linearity of programming. The objective of this PhD project is to assess the performance and scaling of devices and circuits based on 2D semiconductors for in-memory and neuromorphic computing.
Methods and techniques that will be developed and used to carry out the research	The activity will consist of the fabrication and characterization of devices and circuits based on 2D semiconductors such as MoS ₂ and WS ₂ . The methodology includes deposition techniques (CVD, sputtering) and lithographic patterning for device and circuit fabrication. Electrical characterization will be executed by current-voltage characteristics and accurate program/verify algorithms.
Educational objectives	The doctorate activity will include attendance of academic courses, conferences, summer schools and workshops for the training of the student on the topics relevant for the research (clean room fabrication techniques, in-memory computing, device physics).



Job opportunities	The competence developed during the doctorate studies will enable access to job positions in process engineering, device engineering and integrated circuit design.
Composition of the research group	1 Full Professors 0 Associated Professors 3 Assistant Professors 9 PhD Students
Name of the research directors	Daniele Ielmini

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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student.</p> <p>TEACHING ASSISTANTSHIP: availability of funding in recognition of supporting teaching activities by the PhD student. 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.</p> <p>COMPUTER AVAILABILITY: individual use.</p> <p>DESK AVAILABILITY: individual use.</p>