



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 37th cycle

Research Area n. 2 - Electronics

THEMATIC Research Field: SWITCHED-CAPACITOR DC/DC CONVERTERS

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	Any electronics system relies on DC-DC converters to efficiently convert power from a battery source. The efficiency and the cost, as well as the static and dynamic performance, are key parameters of those devices, in both consumer and high-end applications. The idea of this PhD is to explore novel architectures of switched-capacitor and resonant DC-DC converters, in the range of 1-10W, with better efficiency and reduced silicon area occupation with respect to state-of-the-art implementations.
Methods and techniques that will be developed and used to carry out the research	The research is supported by STMicroelectronics, within the Joint Research Center of Politecnico di Milano. The study will be carried out using system theory and dedicated tools for system analysis. Then, the performance of the new conceived system will be assessed in a test-chip demonstrator. The test chip will be designed, fabricated, and experimentally verified.
Educational objectives	In this field, the student will be educated in different areas such as system analysis and verification, analogue microelectronics design, chip assembly, laboratory measurements.
Job opportunities	1. Power electronics design expert in the R&D areas of major semiconductor companies



	2. Academic career
Composition of the research group	0 Full Professors 2 Associated Professors 0 Assistant Professors 2 PhD Students
Name of the research directors	Massimo Ghioni, Salvatore Levantino

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	564.01 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>The research will be developed within the Joint Research Center involving Politecnico di Milano and STMicroelectronics. The research will focus on new architectures of switched-capacitor and resonant DC-DC converters. The main goal will be to shrink of the size of both silicon area and off-chip components, to reduce the overall implementation costs. Besides, unconventional control strategies, such that based on time-based processing, will be adopted as a further element to reduce die areas. The integrated circuit will be designed, and the fabricated chip will be experimentally verified.</p> <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 per year 2nd year: euros per student (1534) 3rd year: euros per student (1534)</p>



TEACHING ASSISTANSHIP: (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.

COMPUTER AVAILABILITY:

1st year: individual use

2nd year: individual use

3rd year: individual use

DESK AVAILABILITY:

1st year: individual use

2nd year: individual use

3rd year: individual use