Politecnico di Milano

PhD in
INFORMATION TECHNOLOGY

Research Area n. 2 Title Electronics

Research Title: New DC-DC Converter Architectures

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. *1400* (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified)
Increase in the scholarship for stays abroad	€ 566,36 per month, for up to 6 Months
Number of scholarships	1
Beginning of PhD	1 February 2021
Deadline for application	*3 December 2020*
Context of the research activity	
Motivations and objectives of the research in this field	Any electronics system heavily relies on DC-DC converters for power conversion from a battery source. The efficiency and the cost of those circuits as well as the static and dynamic performance are key parameters in both consumer and high-end applications. The idea is to explore novel architectures of 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. Solutions based on resonant switched capacitor converters and those based on high-frequency inductive converters will be explored.

Methods and techniques that will be developed and used to carry out the research	The research is supported by STMicroelectronics within the Joint Research Laboratory. The study will be carried out using system theory and dedicated tools for system analysis. Then, the functionality and performance of the new conceived systems will be assessed in test-chip demonstrators. Those test chips 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	Power electronics design expert in the R&D areas of major semiconductor companies. Academic career.
Composition of the research group	Number of Full Professors 2 Number of Post-Docs 1 Number of PhD students 1
Names of the research directors	Prof. Massimo Ghioni, Prof. Salvatore Levantino
Contacts	massimo.ghioni@polimi.it 02-2399-6093 salvatore.levantino@polimi.it 02-2399-3731
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	*STMicroelectronics*

Additional support

Educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student per year	2nd year: max 1534,00 euro per student 3rd year: max 1534,00 euro per student
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*