POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 2 - Electronics

INTERDISCIPLINARY Research Field: COST-EFFECTIVE GERMANIUM SINGLE-PHOTON DETECTORS FOR THE NEAR-INFRARED WAVELENGTH RANGE

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch, during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Interdisciplinary PhD Grant The PhD research will be carried out in collaboration with research groups of the PhD programme in "**PHYSICS**". See https://www.dottorato.polimi.it/?id=422&L=1 for further information. A growing number of applications, from quantum communications to quantum computing, require cost-effective microelectronic photodetectors with single-photon sensitivity in the short-wave infrared range and with new advanced features for on-chip processing. The present research project aims at developing Ge-on-Si single-photon detectors (SPADs) by exploiting all the advantages of the silicon technology for integrating a near-infrared absorbing material (germanium) onto a silicon substrate.
Methods and techniques that will be developed and used to carry out the research	The single-photon detectors will be modeled and designed with TCAD simulations. Detectors will be grown and fabricated at LNESS laboratory and POLIFAB, and fully characterized for assessing electrical and optical performance.
Educational objectives	The PhD student will acquire solid background in physics of semiconductor devices, integrated circuit design,

	electronic systems. To this aim, the doctorate activity will include attendance of academic courses, conferences, summer schools and workshops.
Job opportunities	Like recent PhD graduates from our research group, this PhD experience, spanning from electron devices to electronic systems, will give access to a wide variety of jobs, from semiconductor industries to application-oriented companies, from academia to start-ups.
Composition of the research group	1 Full Professors 2 Associated Professors 0 Assistant Professors 6 PhD Students
Name of the research directors	Alberto Tosi

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)			
	1st year	**2nd year**	**3rd year**
Housing - Foreign Students	1500.0 € per student	1000.0 € per student	1000.0 € per student
	max number of financial aid available: 2, given in order of merit ..		
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
LIST OF UNIVERSITIES, COMPANIES, AGENCIES AND/OR NATIONAL OR INTERNATIONAL INSTITUTIONS THAT ARE COOPERATING IN THE RESEARCH: LNESS, Como; Micro Photon Devices srl 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 5.707,13 Euro per student

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.

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