

## Progetto Laurea Magistrale Plus

(Students enrolled for the first time in the Academic Year 2020/21, undertaking the internship in the company in 2021/2022)

### University infos

Laurea degree: PHYSICS
University tutor / Thesis supervisor: Prof. Matteo Galli
Courses / Expertize of the university tutor: Integrated photonics for classical and quantum applications

### Company infos

<b>Company name: CEA-Leti</b>
Company Tutor(s): Léopold VIROT, Ségolène OLIVIER and Benoît CHARBONNIER
Role in the company of the tutor(s): R&D engineer in silicon photonics

### Contents and infos on project and internship

<b>Project title: Development of integrated tunable components and circuits on silicon for quantum information</b>
<u>Activity scenario and targets of the internship - Area/Department/office/lab (where the trainee will be involved):</u> High-rejection filters and reconfigurable manipulation circuits are key building blocks for quantum information applications. The student will start with wafer-level characterization of a first generation of ring resonators based filters using different approaches (cascaded ring resonators with several filter orders as well as matrix filters). Modeling of the devices and numerical simulations will be performed in order to verify and understand the experimental results. The student will then carry out chip-level characterizations in Pavia, involving photon-pair generation and filtering as well as coincidence to accidental ratio measurement. In parallel, the student will also perform numerical simulations to design integrated manipulation circuits based on reconfigurable nested Mach-Zehnder interferometers and implement them in a maskset. He/She will partially contribute to the CMOS fabrication in clean room and then carry out wafer-level characterization of the fabricated reconfigurable circuits and compare the results with simulations.
Background / Expertize of the student required for the internship: Master studies including semiconductors, photonics, nanotechnologies
Potential thesis topics: To be discussed
Company location and place of work: (Full address) CEA-Leti – Optics and Photonics Department – 17 rue des Martyrs – 38054 Grenoble - France
Time length of the internship: <b>12 MONTHS (including 3 to 6 months in Pavia)</b>
Benefits provided by the company (at least reimbursement of 500€ per month): Reimbursement of >=500€ per month in Grenoble
Specific company requests: Strongly motivated students with good exam scores, team working and flexibility skills to work in a multi-disciplinary environment (photonic component design, pre-industrial clean room fabrication, optical characterization)
Other comments: The student will work with several highly-qualified people in the the field of design, CMOS fabrication and optical characterization, with state-of-the-art equipment. He/She will get a pratical insight of the various aspects of integrated silicon photonics technology in one of the largest technological R&D institutes in Europe.