



Progetto Laurea Magistrale Plus

(realizzazione esperienza in azienda anno accademico 2026/27)

University details

Degree Course

PHYSICS

University tutor/Thesis supervisor - Area of expertise of the university tutor

Prof. Matteo Galli - Integrated photonics for classical and quantum applications

Company details

Company Name

CEA-Leti

Company Tutor and Function/Role of the Company Tutor

Romain Dezert - R&D engineer in quantum photonics

Project content and information about the internship

Title of the internship project

Characterization and modeling of superconducting single-photon detectors for integrated quantum photonics

Activities/objectives planned for the internship and area/department in which the intern will be placed

Integrated quantum photonics has emerged as one of the leading platforms for quantum technologies, enabling applications in quantum computing, secure communications, sensing, and metrology. By integrating multiple optical components onto a single chip, photonic circuits offer superior scalability and a much smaller footprint than bulk-optics implementations or other quantum hardware platforms.

As photon losses directly limit the performance of quantum photonic systems, a key challenge remains the on-chip integration of efficient single-photon detectors. Among the available technologies, superconducting nanowire single-photon detectors (SNSPDs) have become the state-of-the-art detectors thanks to their near-unity detection efficiency, ultralow timing jitter, nanosecond recovery time, and broadband operation from the visible to the mid-infrared.

CEA-Leti is developing the integration of SNSPDs on its silicon and silicon nitride low-loss photonic platforms. As part of a laboratory comprising around 40 permanent and non-permanent researchers, you will contribute to this effort through the following internship activities:

- Characterization of SNSPDs fabricated in our cleanroom facilities and cooled to ~2K in a cryostat. You will evaluate their performance through key metrics including detection efficiency, dark count rate, timing jitter, and recovery time.
- Operation and further development of a fiber-based optical characterization setup.
- Analysis of experimental results and identification of strategies for improving device performance by developing a solid understanding of SNSPD operating principles.
- Numerical modelling of SNSPDs to support device design and reliability.
- Participation in the assembly, interfacing, automation, and qualification of a new detector characterization setup built around an upcoming 1K cryostat.

Intern's requirements/skills Master studies including semiconductors and photonics
Training courses offered by the company during the internship (specify whether training courses will be offered and, if so, the title and area in which the intern will be trained)
Potential scope and topic of thesis Possible in principle, subject to funding
Internship location CEA-Leti – Optics and Photonics Department 17 rue des Martyrs - 38054 Grenoble - France
Duration of the internship 4+6 months
Expense reimbursement - information to be obtained if the company has a policy different from the minimum (min £500/net - max £800/net) - indicate any other benefits (shuttle bus, canteen, guest accommodation, etc.) Reimbursement of 1300€ per month in Grenoble + benefits
Specific requests from the company Strongly motivated students with a good academic record, hands-on experimental skills, and a strong interest in photonics and quantum technologies. Teamwork, adaptability, and the ability to thrive in a multidisciplinary environment are essential.
Notes/to be reported You will join CEA-Leti, a world-leading R&D institute in miniaturization technologies, and work at the interface of photonics, superconductivity, cryogenics, and quantum technologies while gaining insight into the integrated silicon photonics ecosystem.