

LABORATORY CEA-Grenoble/PHELIQS

M1/2A Quantum internship – Academic year 2025-2026

Optical study of semiconductor quantum dots in nanowires as single-photon emitters

Level: master M1/ 2A

General Scope:

The field of quantum technologies has witnessed remarkable progress in recent years, with single-photon emitters playing a pivotal role in the development of quantum communication and quantum computing. Among the most promising candidates for such emitters are semiconductor quantum dots (QD) embedded in nanowires (NW). These NW-QD nanostructures combine the unique optical properties of quantum dots—such as discrete energy levels and high radiative efficiency—with the versatility and scalability of nanowire platforms.

Research topic and facilities available:

Our group develops the growth of CdSe/ZnSe NW-QD heterostructures by Molecular Beam Epitaxy. The QD is embedded in a photonic wire (NW) to enhance the photon extraction and to guide its emission. The internship will contribute to the characterization of the optical properties of these CdSe/ZnSe NW-QD, including emission spectra, photon statistics, and coherence times, in order to optimize these nanostructures and assess their potential for future applications in quantum communication.

The internship will take place both in CEA-PHELIQS and CNRS-NEEL and will allow learning about different topics in nanoscience and quantum optical properties: NW growth by Molecular Beam Epitaxy, micro-photoluminescence studies, coherence properties, etc...

Required skills:

Semiconductor physics, quantum physics, optics, with interest for experiments.

Starting date and duration: May 2026, 2-3 months

Contact:

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This M1/2A internship is offered as part of the QuanTEdu programme. The deadline for applications (cover letter and CV) is Friday 9 March 2026.