

PhD expertise mission

Mission

Development of an Educational Laboratory on Quantum Entanglement Using a Commercial Experimental Kit

Scientific and Educational Content

The **QuantEdu-France** project aims to strengthen and structure student training in quantum technologies, in particular through the development of experimental laboratory sessions that are representative of the key concepts in the field.

Within this framework, we wish to recruit a PhD student to design, develop, and validate an educational experiment on quantum entanglement, intended to be integrated into a series of quantum technology laboratory classes at the undergraduate and master's levels.

The experiment will be based on a commercially available quantum optics educational kit (polarization-entangled photon-pair source). It will be structured into modular laboratory sessions lasting between 3 and 6 hours, depending on the students' level and the targeted learning objectives.

The main objective of the project is to transform an existing experimental setup into a structured, robust, and scientifically rigorous teaching tool, enabling students to:

- manipulate a source of entangled photons,
- observe and quantify polarization correlations,
- perform a Bell test (CHSH),
- connect experimental observations with the fundamental concepts of quantum physics.

The experiment is designed to be easily transportable.

Scope

The PhD student's main responsibilities will include:

- full experimental familiarization with the entanglement kit,
- adaptation and structuring of the experiments into pedagogical laboratory sessions,
- preparation of teaching materials (student handouts, instructor guides, theoretical supplements),
- definition of clear learning objectives for each session,
- participation in the national dissemination and valorization of the laboratory within the QuantEdu-France framework (distribution, sharing, feedback).

Required profile

We are seeking a candidate with:

- a Master's degree (or equivalent) in physics, quantum physics, optics, photonics, or related fields,
- a strong interest in experimental work,
- a strong motivation for teaching and pedagogy,
- solid foundations in optics and quantum mechanics.

Place

Institut de Physique de Nice.

The laboratory sessions will subsequently take place at the Valrose Campus.

Conditions de candidature :Applications condition

Enrolled as a PhD student and employed by Université Côte d'Azur for the 2025–2026 academic year and holding a 3-year doctoral contract (except DCME).

The mission will be carried out through an amendment to the initial employment contract or via a reimbursement agreement with the primary employer.

15 working days per year (with the possibility of renewal).

€87 gross per day.

Complementary informations

Applications, including a curriculum vitae and a cover letter, should be sent to: virginia.dauria@univ-cotedazur.fr before **21/03/2026**.

This mission is open to applicants with disabilities.