



## **Master in Photonics – “PHOTONICS BCN” Master ERASMUS Mundus “EuroPhotonics”**

### **MASTER THESIS PROPOSAL**

**Full time from April 2026** (it can start part time from February 2026)  
**Presentation date to be chosen: end of July or beginning of September 2026**

**Note:** The main Master Thesis supervisor has to be a professor of the Master in Photonics program. One co-supervisor (internal or external) can be defined. Main Supervisor is responsible for the subject of the proposal and has to give continuous support to the student (research development, Report writing and presentation preparation). For external proposals a co-supervisor from the Master program and a collaboration agreement with UPC are needed. You can find all information about the Master Thesis process in [our webpage](#).

**Laboratory:** UB Quantum Communications,  
**Institution:** University of Barcelona  
**City, Country:** Spain

**Title of the master thesis:** Design and deployment of a Free Space Optical link in the Barcelona metropolitan area

**Name and affiliation of the master thesis supervisor:** Jose Maria Gomez Cama

**Name and affiliation of the co-supervisor** (if any): Bruno Julia

(for external proposals a co-supervisor chose among the Master Program professors and a collaboration agreement with UPC is needed)

**Email address:** [jm.gomez@ub.edu](mailto:jm.gomez@ub.edu)

**Phone number:**

**Mail address:**

**Keywords:** Quantum Communications, free space links, telescopes

#### **1. Summary of the subject (maximum 1 page):**

Quantum communications and quantum key distribution rely to a large extent on our ability to emit and detect single photons at large distances. In our group we are developing single and entangled photon sources for ground and space use. In this project, we want to start working on the detection of single photons using a custom made light weight telescope.

Web of the group, <https://quantumcomms.fqa.ub.edu/>

#### **2. Objectives (maximum 1 page):**

The main goal of the project is to test and deploy a free space quantum communications link between the Facultat de Física UB and the Fabra Observatory. This will be divided into two main projects:

- Preparation of the emitter in the laboratory
- Deployment of the free space channel and test with classical light.

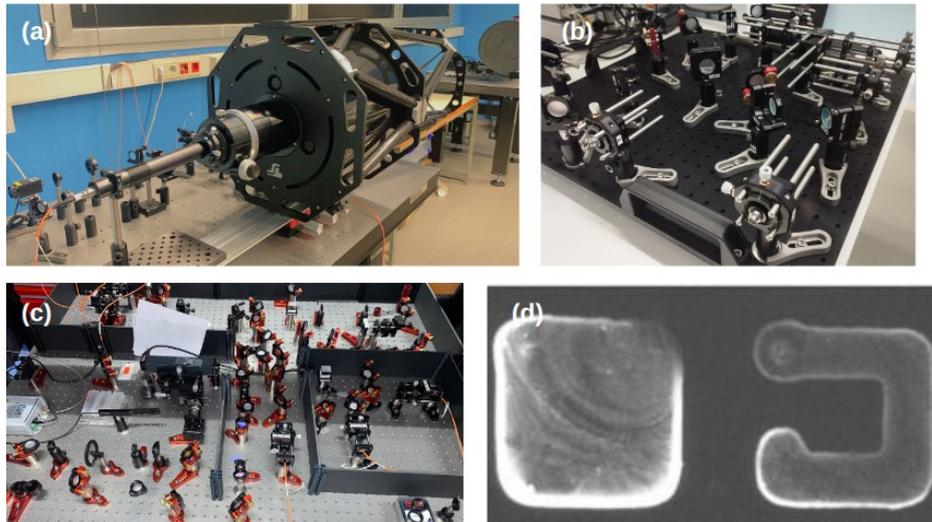


Figure 1 : Pictures from the Quantum Communications laboratory at UB, (a) Telescope of the free space communications link. (b) passive Bob setup, (c ) setup for the autocorrelation measurements, and (d) image of the quantum dots positioning technique

**Additional information (if needed):**

- \* Required skills: Knowledge of optics and programming
- \* Miscellaneous: Willingness to work in an experimental setup