



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

### **MASTER THESIS PROPOSAL**

**Starting full time from April 2024**

**Presentation at the end of July or beginning of September 2024**

**Laboratory:** Quantum Communications

**Institution:** U. Barcelona

**City, Country:** Barcelona

**Title of the master thesis:** Design and implementation of a telescope for quantum communications

**Name of the master thesis supervisor and co-supervisor:** Jose Maria Gomez Cama, Bruno Julia Diaz

(for external proposals a co-supervisor from the Master program and a collaboration agreement is needed)

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**Keywords:** Quantum Communications, QKD, Telescopes

### **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/>

### **Objectives:**

The main goal of the project is to design a telescope to be hosted initially at the Facultat de Física which can be used to collect photons from a single photon source placed nearby. This will be divided into two main projects:

- a) design and construction of a light weight telescope for quantum comms
- b) mount the telescope with a single photon counting module
- c) test the setup in lab conditions with a single photon source



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**Additional information (if needed):**

\* Required skills: Knowledge of programming languages

\* Miscellaneous: We will try to provide an stipendium during the realisation of the Master Thesis

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