Master in Photonics – "PHOTONICS BCN"
Master ERASMUS+ "EuroPhotonics"

MASTER THESIS PROPOSAL

Dates: April 2020 - September 2021

Laboratory: Institute of Cosmos Sciences of the University of Barcelona (ICCUB)
Institution: Universitat de Barcelona
City, Country: Barcelona, Spain

Title of the master thesis: Construction of an entangled photon apparatus for quantum technology popularisation

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Keywords: Entangled photons, experimental setup

Summary of the subject (maximum 1 page):

Entanglement is a fantastic quantum resource which is the key ingredient of all the currently developed quantum technologies. It seems thus of capital importance to approach this important concept to our society by well-developed and high-quality science popularisation experiments.

In this Master Thesis project, we will produce an entangled photon apparatus following a proposal, replicated in many laboratories around the world, described in [2]. The project will be carried out at the Technological unit of the ICCUB, which has a long time expertise in international collaborations like LHCb, Gaia, Solar Orbiter or CTA. In particular, the group has worked extensively with single photon detectors which should help in the design of the entangled photon apparatus.

All the components to build the entangled photon apparatus are already in place, thus, the student will be able to fully participate in the building and subsequent setup and characterization of the experiment. The setup was originally designed to test Bell inequalities,

our goal is to build a portable setup which can be used to explain entanglement to a broader audience, from physics undergrads to highschool students interested in quantum physics.

References:
[1] Acin et al, The quantum technologies roadmap: a European community view, New J. Phys. 20 080201 (2018).

[2]Dehlinger y Mitchell, Am J. Phys. 70 (9) (2002).

Additional information:
* Required skills: Some knowledge of electronics, instrumentation and software (data acquisition and processing). Basic background on quantum physics and electronics.
* Miscellaneous:

Additional information (if needed):
* Required skills: Working with laboratory instrumentation and programming.
* Miscellaneous: