

MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April - September 2017

Laboratory : Mitchell Group
Institution: ICFO - The Institute of Photonic Sciences
City, Country : Barcelona, Spain

Title of the master thesis: Quantum optics with atoms and photons

Name of the master thesis supervisor: Prof. Morgan Mitchell

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Summary of the subject (maximum 1 page) :

Quantum optics studies quantum systems, e.g. light and atoms, that behave in ways that classical particles cannot. Quantum optics is the basis for quantum technologies, including quantum computing, quantum communications, and quantum sensing. The Mitchell group works with both light and atoms, and especially with the interaction between them, with applications in quantum sensing and quantum communications. Possible topics include the use of Bose-Einstein condensates to make ultra-sensitive measurements of magnetic fields, interaction of pairs of photons with a single atom, and entanglement of very large numbers of atoms. The specific topic of the master thesis will be decided between the student and the supervisor, and it is strongly recommended that interested candidates directly contact Prof. Mitchell early in the application process to begin this discussion.

For a list of recent publications, see
https://www.icfo.es/research/groups-details?group_id=20

Keywords : Quantum optics, atomic physics, quantum technologies, quantum sensing, Bose-Einstein condensates, squeezed light, entanglement, quantum information.

Additional information :

* Required skills : Background in quantum physics, atomic physics, optics, or related fields.

* Miscellaneous :