

MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April - September 2017

Laboratory: Quantum and Atom Optics Group
Institution: Universitat Autònoma de Barcelona
City, Country: Bellaterra, Spain

Title of the master thesis: Chiral Quantum Optics with Three-Level Atoms

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Summary of the subject (maximum 1 page) :

In chiral quantum optics the emission and absorption of photons strongly depends on the propagation direction and local polarization of light as well as on the polarization of the coupled atomic transitions. In this project, we will investigate the dynamics of three-level atoms coupled by two coherent fields propagating in a semi-infinite waveguide, i.e., a long enough waveguide with a perfect mirror in one of its ends. We will investigate the dynamical behavior of light-matter interaction in the so-called dark-bright basis. The dark state is characterized by the fact that the two pathways for photon emission interfere destructively. Different three-level schemes will be investigated: Λ , V and cascade schemes, following the lines of the recent article: P.O. Guimond, H. Pichler, A. Rauschenbeutel, and P. Zoller, Phys. Rev. A **94**, 033829 (2016).

Keywords : Chiral Quantum Optics, Three-Level Atoms, Dark States

Additional information :

* Required skills :

* Miscellaneous :