Course guides
32072 - EXQOPT - Experimental Quantum Optics with Photons and Atomic Ensembles

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 893 - ICFO - Institute of Photonic Sciences.
Degree: Academic year: 2015  ECTS Credits: 2.5
Languages: English

LEcTURER

Coordinating lecturer: MORGAN MITCHELL (icfo)
Others: HUGUES DE RIEDMATTEN (ICFO)

TEACHING METHODOLOGY

PRESENCIAL TEACHING + ACTIVITIES

LEARNING OBJECTIVES OF THE SUBJECT

We present the development of experimental quantum optics along milestone experiments.

CONTENTS

(ENG) Quantization of the electromagnetic field

(ENG) Quantum states of light: single photons, coherent states, squeezed states, entangled states.

(ENG) Detection of quantum light: photon counting, coincidence counting, phase-sensitive detection.

(ENG) Generation of quantum light by non-linear optical processes.

(ENG) Experimental signatures of quantum behaviour.

(ENG) Interaction of light with atomic ensembles.

(ENG) Spin squeezing and quantum-enhanced measurements.
(ENG) Quantum memories based on Electro-magnetically Induced Transparency, Photon echoes, DLCZ.

(ENG) Experimental quantum communications: Quantum teleportation, entanglement swapping, quantum repeaters

GRADING SYSTEM

- Full and active participation
- Written assignments
- Oral presentation

EXAMINATION RULES

THE USUAL IN UNIVERSITY TEACHING