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

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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