

Course on Quantum nonlinear photonics

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Lecture #1-2 (30/3/2015: 9h-12: 30): Room 355A

Quantization of the electromagnetic field. In this part of the course we will talk about the problem of quantizing the electromagnetic starting from typical approaches used in quantum field theory. Then, we will introduce a new strategy based on scattering theories (see Liscidini PRA 2012), which is particularly suitable for integrated photonic structures, as it is essentially independent of the system geometry.

Lecture #3-4 (31/3/2015: 9:00-12:30): Room 206A

Generation of non-classical states of light by parametric fluorescence. We will deal with spontaneous parametric processes, namely spontaneous parametric down-conversion and four-wave-mixing. We will explain how these phenomena can be described in the framework of a quantum treatment of the electromagnetic field. We will show how the efficiency of such processes can be greatly enhanced using resonant and non-resonant micro- and nano-structures.

Lecture #5-6 (01/04/2015: 9:00-12:30): Room 355A

Two-photon states. We will introduce the biphoton wavefunction, which characterizes a generic two-photon state. We will discuss the engineering of the biphoton wavefunction. We will talk about the problem of determining the biphoton wavefunction via quantum state tomography. We will introduce other possible approaches.

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comment venir:

http://www.univ-paris-diderot.fr/DocumentsFCK/implantations/File/Plan_A3_GE_2012-2013.pdf