

EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: 1st April, 2016 – 11th September, 2016

Laboratory : ICFO – Molecular NanoPhotonics, Niek van Hulst group City, Country : Castelldefels, Barcelona

Title of the master thesis: WHY DO BIOMOLECULES PRESERVE COHERENCE?

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Subject:

WHY DO BIOMOLECULES PRESERVE COHERENCE?

Traditionally, coherence was considered to be a quirk of microscopic objects, atoms, molecules, quantum dots..., in vacuum and at low temperatures.. Now, however, coherence is observed even in macroscopic systems at room temperature: photosynthetic complexes which play a crucial role in the energy storage of nature. How and why are such systems coherent, and does the coherence play a role in the efficiency of energy transfer? Can we learn a lesson for artificial solar cells?

In this project you will assist in addressing individual photosynthetic complexes with ultrafast few fs-lasers. The research combines ultrasensitive confocal microscopy with coherent control and broad band lasers. Thus the project is largely experimental. So we are looking for a student with a good feeling for experimental physics, who likes to work experimentally on the limits of fs and nm experiments.

Keywords : quantum coherence; molecular antennas; energy transfer

Additional information:

* Required skills: experimental optics; some electronics; affinity with real-time dataacquisition is handy.

* Miscellaneous: a project for students who like to construct their own experiments.