

MASTER IN PHOTONICS – “PHOTONICS BCN” ERASMUS+ “EUROPHOTONICS”

MASTER THESIS PROPOSAL

Dates: April - September 2019

Laboratory : Ultrafast Dynamics of Quantum Solids
Institution: ICFO
City, Country : Barcelona

Title of the master thesis: Characterization and compression of femtosecond broadband light from a photonic crystal fiber

Name of the master thesis supervisor: Allan Johnson / Simon Wall

Email address : allan.johnson@icfo.es, simon.wall@icfo.es

Phone number : +34 935 542 236

Mail address :

ICFO - The Institute of Photonic Sciences
Barcelona Institute of Science and Technology
Mediterranean Technology Park
Av. Carl Friedrich Gauss, 3
08860 Castelldefels (Barcelona), Spain

Keywords : Ultrafast, photonics, spectroscopy, nonlinear optics

Summary of the subject (maximum 1 page) :

Broadband and ultrafast light sources are powerful tool for spectroscopy of materials out of equilibrium. In order to study systems out of equilibrium, a large number of photons need to be packed into short pulses of light. Due to the Fourier bandwidth the limit, the broader then bandwidth, the shorter the pulse. In addition, high bandwidths also provide more spectroscopic information. This enabling experiments to probe a wider range of processes in a material in a single pulse.

This project is an experimental project that will take a 100 femtosecond pulse with a central wavelength of 800 nm and generate a broad spectrum covering the visible and near IR spectral regions using the non-linear optical properties of a photonic crystal fibre. The

properties of this beam will be fully characterized and compared to our existing sources. The pulses will also be compressed and their pulse durations measured. Depending on the rate of progress in the lab, the new light source will be used to probe the dynamics inside materials during a light-induced phase transition

Additional information :

The applicant should have a good knowledge of optics and non-linear optics and be happy working in the lab.