

# EUROPHOTONICS-POESII MASTER COURSE

### PROPOSAL FOR A MASTER THESIS

## Dates: April 1<sup>st</sup>, 2016 – September 30<sup>th</sup>, 2016

Laboratory : Optical Communications Laboratory. UPC Campus Nord D4. City, Country : Barcelona

Title of the master thesis : Tuning control of Wavelength-to-the-User networks.

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#### Summary of the subject (maximum 1 page) :

This Master Thesis will be developed in the Optical Com. Group in the framework of the Romula national project and the Coconut European project.

This project aims at the design of a novel transmission system that enables next-generation large-scale access networks to the homes, based on ultra-dense wavelength division multiplexing (U-DWDM), with channel spacing as low as few GHz, and thus achieving a huge THz-range aggregate bandwidth. This new network requires low-cost tunable coherent homodyne detectors, optical routers and finely-tunable cost-efficient lasers and modulators. To obtain the expected performances with low cost components, an advanced electronic signal processing and a high resolution spectrum management have to be developed, as well as a new FTTH network architecture. The network elements support an entirely new, far beyond the current standards, access network approach that targets service provision to more than 1000 users by assigning dedicated wavelengths,  $\lambda$ -channels, with 1Gbit/s (an 10GBit/s) symmetrical communication to each user. The planned test-bed aims at demonstrating the advanced concept of Wavelength-to-the-Home (wTTH).

This Master Thesis will mainly focus on the optical wavelength multiplexation of finely narrow spaced of user signal wavelengths, in terms of drifts, tuning characteristics, current and temperature dependency, crosstalk, loses, phase noise, etc. We will study several multiplexing strategies and perform tests over the udWDM fiber network, including the newly proposed concept of statistical multiplexing of transmitter wavelengths and their fast tuning control.

# Keywords : optical communications, laser, WDM coherent transmission, FTTH. Additional information :

\* Required skills : instrument operation and control, electronic circuits.