



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

MASTER THESIS PROPOSAL

Dates: April - September 2018

Laboratory : Dynamics, Nonlinear Optics and Lasers
Institution: Universitat Politecnica de Catalunya (UPC)
City, Country : Terrassa, Spain

Title: Generation of high optical pulses by small controlled perturbations

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Summary of the subject:

Ultra-high optical pulses that can be generated “on demand” by a very small perturbation of a control parameter can find many applications. For example, they can be used for *sensing*, as a small variation of a control parameter can be easily detected because it will generate a light pulse with high peak intensity. The goal of this Master Thesis is to perform simulations of a simple semiconductor laser model in order to determine the optimal conditions that allow generating extreme pulses on demand. By applying a periodic perturbation, a second goal of the project will be to analyse which characteristics of the perturbation (amplitude, frequency, shape) will produce a regular sequence of pulses.

Keywords : semiconductor lasers, extreme pulses

Additional information :

- * Required skills: the student will need to have good computer skills (matlab, and/or C and/or python)
- * Miscellaneous: the proposed work will be done by numerical simulations, but if the student prefers to do experimental work, a similar project can be done in the Semiconductor Laser Lab in Terrassa.

* Read more: C. Bonatto et al, Phys. Rev. Lett. 107, 053901 (2011).

