PHOTONICS - EUROPHOTONICS MASTER COURSE

MASTER THESIS PROPOSAL

Course 2014 –2015

Laboratory : Institut de Microelectrònica de Barcelona (IMB-CSIC) and Optics Group. Universitat Autònoma de Barcelona
City, Country : Bellaterra, Spain

Title of the master thesis: Light propagation in arrays of polymer optical waveguides

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Summary of the subject (maximum 1 page):

Polymer technology is nowadays one of the most promising technologies to fabricate advanced photonic systems. For instance, by means of techniques like stereolithography [1] it is possible to fabricate sub-micrometer tridimensional polymer photonic structures, in which the magnitude of the evanescent field is larger than the confined intensity. This scenario is optimal for high sensitive label-free biosensor [2]. On the other hand, the use of light as carrier of information allows very high data transfer rates and avoids key issues such as electromagnetic interferences or the miniaturization limits of electronic components [3]. In this project, we will investigate light propagation in arrays of sub-micrometer polymer waveguides with the aim of characterizing the effect of the coupling between waveguides in different tridimensional geometrical distributions. The study will contain a first part of analytical development, numerical simulations and design of the structures followed by the fabrication and the experimental demonstration of the theoretical predictions.

[1] T. Ergin *et al.*, Science **328**, 337 (2010).
[2] D.J. Sirbuly *et al.*, Adv. Mater. **19**, 61 (2007).
[3] M. G. Thompson *et al.*, IET Circuits Devices Syst., **5**, Iss. 2, 94 (2011).

Keywords : polymer waveguides, light propagation
Additional information :
* Required skills: Basics of light propagation in optical waveguides and programming skills