



PHOTONICS - EUROPHOTONICS MASTER COURSE

MASTER THESIS PROPOSAL

Course 2014 –2015

Laboratory: ICFO – The Institute of Photonic Sciences

City, Country: Barcelona, Spain

Title of the master thesis: Controlling fluid transport in microchannels using electrokinetics and plasmonic structures

Name and affiliation of the tutor of the master thesis: Raul Rica and Romain Quidant

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Summary of the subject (maximum 1 page):

Confinement effects in micro and nanochannels make it difficult to induce and control flow and convection on lab-on-a-chip devices. Electroosmosis, and particularly induced charge electroosmosis, is a phenomenon that allows one to induce and control fluid flow in microchannels. This is achieved thanks to the interaction of an electric field with the space charge at the interface between a polar liquid and a charged wall or electrode.

Another possible strategy to induce flow and convection could be the presence of temperature gradients due to heating close to plasmonic structures excited with a laser.

In this experimental project, the student will explore the combination of induced charge electroosmosis with plasmonic nanostructures to control fluid flow in microchannels. The student will be involved in the design and implementation of the electrodes and on the realization of experiments to optimize the technique.

Keywords: Optofluidics, lab-on-chip technology.

Additional information :

* Amount of the monthly allowance (if it is the case):

* Required skills: experience with optical and electronic instrumentation

* Miscellaneous: