PROGRAMA DE DOCTORAT EN ENGINYERIA ELECTRÒNICA UPC-UIB

CURSOS i SEMINARIS DE FORMACIÓ DOCTORAL – CURS 2011-2012

SHORT COURSE: **THERMAL PHYSICS IN MICROSYSTEMS AND NANOMATERIALS**

by Stefan Dilhaire

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COURSE DESCRIPTION:

"How can light be used to generate and detect thermal and mechanical waves in solids?"

Microsystems

What information does light, reflected from a running electronic device, carry? Let's focus upon thermal aspects of optical probing. In the general principle of laser techniques light is shined upon a running electronic device. When the device under test is operated, reflection (due to light-material interaction) modifies the properties of the outgoing light wave relative to the incoming one. Light can be characterized, among other things, by its amplitude, phase, polarization, direction, and divergence. All of these parameters can carry information related to physical phenomena occurring within the device. Temperature changes, thermal expansion with its induced effects of deformation, and stress are examples of phenomena that modify the properties of reflected light and therefore apply a signature on the light beam.

Nanomaterials

The principle of *pump-probe laser testing* is to use an intense (100 KW) and ultrashort (10^{-13} s) light train pulses as a hammer to produce a thermo acoustic perturbation in the medium. A second light train pulses delayed is used as a stroboscope to detect the surface motion or temperature with a sub picosecond time resolution. The acoustic spectrum is extended up to 1THz and the acoustic wavelength is in the order of the nanometer. That allows this technique to be very well suited to *micro and nano thermal physics*, and *nanomaterial* physical properties measurement.

PROGRAM:

DAY1: Monday 18th June, 2012, 9:30 – 13:00h, Aula de Postgrau, 116, Edifici C5, Campus Nord UPC, Barcelona (http://maps.upc.edu/)

DAY2: Wednesday 20th June, 2012, 9:30 – 13:00h, Aula de Postgrau, 116, Edifici C5, Campus Nord UPC, Barcelona (http://maps.upc.edu/)

DAY3: Thursday 21st June, 2012, 9:30 – 12:30h, Aula de Postgrau, 116, Edifici C5, Campus Nord UPC, Barcelona (http://maps.upc.edu/)

LIMITED PLACES AVAILABLE

Courses registration: eel.doctorat@upc.edu

ATTENDANCE CERTIFICATE WILL BE PROVIDED.

FREE REGISTRATION FOR MASTER AND Ph.D. STUDENTS

Please, indicate your Master or Doctoral Program in the registration e-mail.

These courses are organized with the financial support of the "Ayudas de Movilidad para Programas de Doctorado con la Mención de Excelencia" of the Spanish Ministry of Education.

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