



ERASMUS MUNDUS



EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April 1st, 2016 – September 30th, 2016

Laboratory : Ultrafast Optical Dynamics of Solids

City, Country : Barcelona, Spain

Title of the master thesis : Optical control of thermal diffusion in phase change materials

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Summary of the subject (maximum 1 page) :

Phase change materials show strong optical contrast between their crystalline and amorphous states which is exploited in re-recordable DVDs and BluRays to encode data. Light can be used to switch between the crystalline and amorphous state and recently, our group was the first to directly observe how the lattice and electronic properties change during this process.

When using femtosecond optical pulses, the initial change in the optical properties of phase change materials is dictated by changes in the electronic structure, however, the long term dynamics are dictated by thermal processes which ultimately limit the operation of the device.

This project will examine how these thermal processes can be controlled by shaping the spatial profiles of the pump pulse, which controls the thermal distribution inside of the material. These will be compared to simulations of the thermal transport in the material.

Keywords : Ultrafast Optical Physics, Condensed Matter Physics

Additional information :

Required skills : A good background in optics and programming experience is strongly recommended.