

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ  
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

**Τίτλος**

**"Control of ultrafast Laser – surface interactions  
through polarization and temporal pulse shaping"**

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**Αίθουσα Φ2, Κτίριο Φυσικής,**

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**Abstract**

In this work we present the results of a series of experiments that combine temporal pulse shaping and polarization conformation in order to control the laser-matter interaction dynamics and the corresponding ultrafast dynamical process which follow. The final result of the interaction is surface nanostructuring which is studied compared to recent bibliographical reports. Conclusions are drawn regarding the material time-dependent dynamics.

In the experiments presented sets of crossed polarized double femtosecond laser pulses were used in order to study the influence of polarization modification and time delay between the two pulses on the induced nanostructure morphology. The overall delay regime extends from 0 fs to 80 ps and the experiment is divided into four temporal regimes respectively to the predominant interaction mechanism in each one. In all these regimes it was found that the nanostructure morphology, i.e. the laser-induced periodic nanostructures, also known as ripples is strongly dependent on the delay between the two cross polarized laser pulses.