Research activities at the Institute of Optics (CSIC) & Materials processing with ultrashort laser pulses at the Laser Processing Group

J. Solis, Instituto de Optica, CSIC, Serrano 121, E-28006 Madrid, SPAIN

The presentation will start with a brief description of the research activities at the Institute of Optics of the National Research Council of Spain (CSIC). The second part of the talk will review several aspects of the work at Laser Processing Group (IO-CSIC) aimed at using the unique properties of ultrashort laser pulses for materials processing applications and understanding the associated structural transformation dynamics. This part will be divided in two sections describing our research on:

a) Non-linear processing of dielectrics with ultrashort laser pulses, where an overview of the fundamentals of this processing technique will be provided as well as different strategies aimed either at better controlling the energy deposition inside the material or at producing functional photonic elements in "difficult" materials like heavy metal oxide glasses or more simple ones like silicon oxide and phosphate glasses.

b) Phase change optical recording with ultrashort laser pulses, where the advantages of using ultrashort laser pulses for this application will be analyzed and the associated materials issues will be described. Results on "old" and "new" materials that are cyclable under ps and fs laser pulses will be presented.