



NANOTECHNOLOGY SEMINARS

Contributions to ultrafast laser processing of transparent materials.

Wednesday, 13th June 2026

10:30 am

Sala de Grados | Piso -1 | ETS de Ingenieros Industriales y de Telecomunicación

ABSTRACT:

Ultrafast laser processing is a powerful technique for structuring and tailoring the properties of a wide range of materials, including dielectrics, metals, semiconductors, polymers, and ceramics, across length scales from nanometers to centimeters. By tightly focusing ultrashort pulses, optical and electronic material properties can be modified with high precision, opening a route for micro- and nanoscale fabrication.

In this talk, I present our recent advances in two processing approaches: selective laser etching and ultrafast laser ablation. I will show how polarization and pulse density influence etching capabilities, and discuss the advantages and implications of using sub-50 fs pulses for both surface and in-volume modifications. These results are demonstrated in fused silica and contribute to ultrafast laser processing of materials with higher precision and improved quality.



THE SPEAKER:

Mario Ochoa was born in Mexico. He received a Ph.D degree in solar energy from the Solar Energy Institute of the Technical University of Madrid, Spain, in 2018. From 2018 to 2021, he was a postdoctoral scientist at Empa-Swiss Federal Laboratories for Materials Science and Technology (Switzerland). His research during these stages kept focus on contrasting modelling and simulation with characterisation that limit solar results, providing a better understanding of the mechanisms that limit solar cell efficiency. From 2021, he has been working on ultrafast laser processing of materials, including selective laser etching and processing with ultrashort pulses (<50 fs).



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