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GABRIEL CASTILLO: Ultrafast laser inscription of photonic devices in transparent dielectrics.

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Ultrafast laser inscription is a technique by which pulses from a femtosecond laser, are used to micro-structure the surface or the bulk of solid materials. One of the most interesting features of this kind of lasers is the high peak intensities that can be reached when the delivered pulses are tightly focused. The intensities are typically in the range of 1012 −1015 W/cm2, which can easily induce nonlinear absorption in transparent materials. Therefore, if the laser beam is focused inside a transparent material, nonlinear absorption can be confined to a region near the focal volume allowing ultrahigh precision modifications and 3D microprocessing of the material. In particular, the interaction of femtosecond pulses with transparent dielectrics has attracted a lot of interest in the last two decades, mainly due to the possibility to induce localized refractive index changes to create complex photonic structures inside the material keeping the surface intact. Nowadays, this technique has been consolidated as a three dimensional (3D) photonic device fabrication technology. In this presentation, a brief review of the different techniques used for the fabrication of photonic devices using femtosecond laser pulses and some interesting results such as 3D photonic structures in different materials such as glasses, crystals, and ceramics will be presented.

Session Classification: SHORT TALKS

Track Classification: SYMPOSIUM ON LASER ABLATION