Special Issue

Femtosecond Laser Micromachining for Photonics Applications

Message from the Guest Editors

Femtosecond lasers are a formidable micromachining tool, applicable to a variety of materials. In particular, femtosecond laser processing has shown unique capabilities in altering the optical properties of the bulk of transparent dielectric substrates in a permanent fashion and with a micrometric resolution, thus allowing the manufacture of innovative integrated devices for photonics applications. One important application of this technique is the direct and rapid inscription of integrated waveguide circuits with three-dimensional layouts. In the last decade, such circuits have found impressive applications in diverse fields, which include optical sensing, telecommunications, astrophotonics, and quantum photonics. Femtosecond laser pulses have also been exploited to locally engineer the birefringence of the substrate and to produce microstructured birefringent plates. Femtosecond laser nanostructuring at the diffraction limit further allows the inscription of gratings and photonic crystals, as well as dense optical storage of information.

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