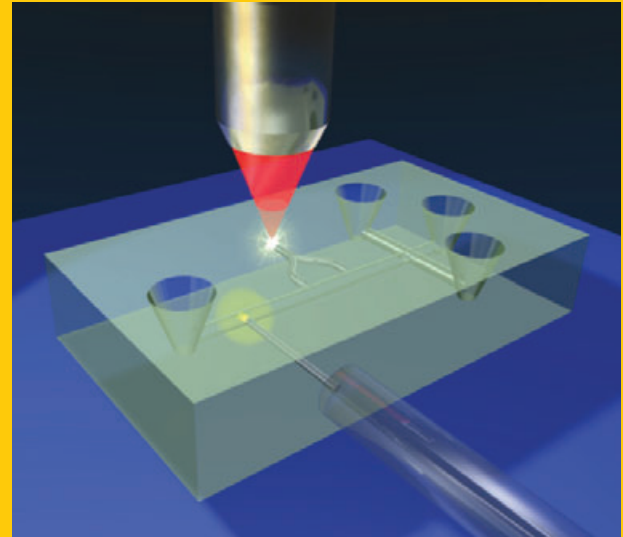


Abstract This paper provides an overview of the rather new field concerning the applications of femtosecond laser microstructuring of glass to optofluidics. Femtosecond lasers have recently emerged as a powerful microfabrication tool due to their unique characteristics. On the one hand, they enable to induce a permanent refractive index increase, in a micrometer-sized volume of the material, allowing single-step, three-dimensional fabrication of optical waveguides. On the other hand, femtosecond-laser irradiation of fused silica followed by chemical etching enables the manufacturing of directly buried microfluidic channels. This opens the intriguing possibility of using a single laser system for the fabrication and three-dimensional integration of optofluidic devices. This paper will review the state of the art of femtosecond laser fabrication of optical waveguides and microfluidic channels, as well as their integration for high sensitivity detection of biomolecules and for cell manipulation.



Femtosecond laser microstructuring: an enabling tool for optofluidic lab-on-chips

Roberto Osellame¹, Hugo J. W. M. Hoekstra², Giulio Cerullo^{1,*}, and Markus Pollnau²