

# **Femtosecond laser processing of glass: a micro-manufacturing platform for single-material systems that combine optical, mechanical and fluid-handling functions.**

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## ***Abstract***

Ultra-fast lasers are characterized by ultra-high peak power pulses (Gigawatt/mm<sup>2</sup> or even Terawatt/mm<sup>2</sup> with table-top, commercial systems) leading to a radically different laser-matter interaction than conventional lasers: in particular, non-linear absorption phenomenon like multi-photons processes are observed opening new and exciting opportunities to tailor the matter in its intimate structure with spatial resolution unmatched before and noticeably, in three dimensions but also with spatial resolutions smaller than the laser wavelength itself.

In this talk, we will discuss the effect of these lasers on fused silica (the amorphous phase of SiO<sub>2</sub>). In particular, we will show how these localized structural modifications can be used to manufacture novel types of microsystems that integrate multiple functionalities in a single monolith. As an illustration, we will present various microsystems that perform opto-fluidics and opto-mechanical functions.

## **Bio**

Dr. Yves Bellouard is Associate Professor in Micro-/Nano- Scale Engineering at the Mechanical Engineering Department of Eindhoven University of Technology in the Netherlands. He received a BS in Theoretical Physics and a MS in Applied Physics from Université Pierre et Marie Curie in Paris, France in 1994-1995 and a PhD in Microengineering from the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland in 2000.