# Laser induced micro-dot generation inside transparent materials: B) Process implementation, optimization and utilization

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**Abstract**

Laser-induced micro-dots find their application in direct part marking, to address full life cycle traceability. In our studies on ultra-short laser interaction with transparent materials we address the possibility of generating internal markings with minimal stress. At present, we concentrate our effort in utilizing picosecond laser pulses at a wavelength of 532 nm.
One important strategy followed in (single-shot) laser pulse micro-dot generation is using scanner systems with standard optics, e.g. F-Theta lens with 80 mm focal length, to ensure industrial-near implementation. Recent results show that the transient energy relaxation processes up to several 100 ns after laser excitation can strongly affect the host material over a region that exceeds the micro-dot size by several micrometers.
We will present and discuss the processing strategies recently developed to optimize the size and appearance of internal micro dots, based on demonstrators and referring to the scientific results in material response obtained using time-resolved phase microscopy after femtosecond and picosecond laser pulse excitation.