

Comparative Analysis into the Ablation Characteristics of Double Pulses by means of Nanosecond and Picosecond Pulses

Bachelor / Semester Thesis

Motivation

The feature quality when laser processing of materials in many cases can be enhanced by several methods (e.g. smaller focal spot size, narrower wavelength, shorter pulse duration). In this project, the concept of double pulses is proposed. Double pulses serve to couple a higher percentage of laser energy into the work piece at a reduced intensity and at a higher frequency. As a result, the ablation rate, throughput time and especially the quality are all significantly improved. The IWF microprocessing group has already built an experimental setup and confirmed the generation of double pulses in their lab. Therefore, it is necessary that an in-depth understanding and reliable generation of double pulses is carried out. Furthermore, one is then able to determine the difference in ablation characteristics using double pulses at nanosecond and picosecond pulse durations.

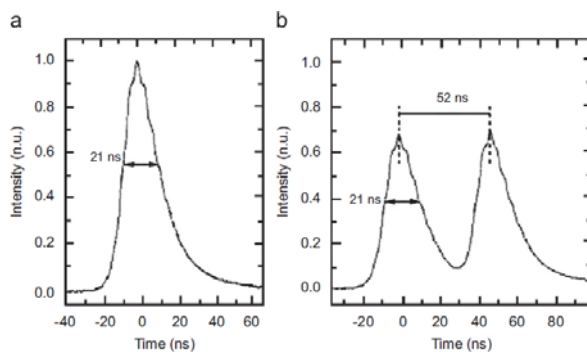


Fig. 1: Example of a single pulse (a) and of double pulses (b)

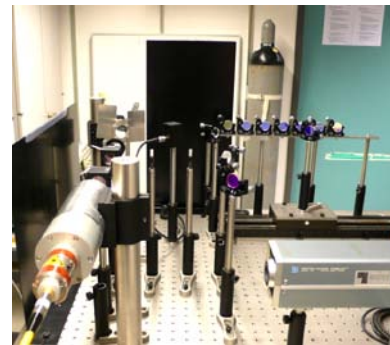


Fig. 2: Double pulse experimental setup

Task

- Literature review of burst pulses and experimental setup
- Experimentation using a infrared nanosecond and picosecond laser
- Evaluation of experimental results
- Documentation

Peripherals

The project offers insight into hands-on experimentation, evaluation and laser technology. A nanosecond and picosecond laser, scanheads and optical components are available in our laser micromachining lab at Technopark Zurich. An ideal candidate may have interest in laser technology and engineering design. Previous knowledge in one or more of the above mentioned fields is preferred, but not mandatory. Time to become familiar with the topic will be given. Documentation may be in English or German. Teamwork available.

Start

FS 2012 or upon agreement

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