www.multiflex-project.eu

MultiFlex

MAKING ULTRAFAST LASERS FASTER

MultiFlex – THE PROJECT

Lasers with ultrashort pulses in the picosecond and femtosecond range are known for their ultra-precise ablation and cutting results, but also for their long process durations. We aim to make material processing with ultrafast lasers up to a hundred times faster by using a high-power USP laser with 1 kW average power and a selective multibeam approach to deliver the power efficiently to the workpiece.

- 6 Partners
- 3 Countries
- 4.7 Million €
- 36 Month, 01/2019–12/2021

CONSORTIUM

OPTO-ELECTRONIC
Amplitude
Fraunhofer ILT
lasea PRECISION LASER SOLUTIONS
lasea ADVANCED OPTICAL SYSTEMS
TOS Chair for Technology of Optical Systems | RWTH AACHEN UNIVERSITY

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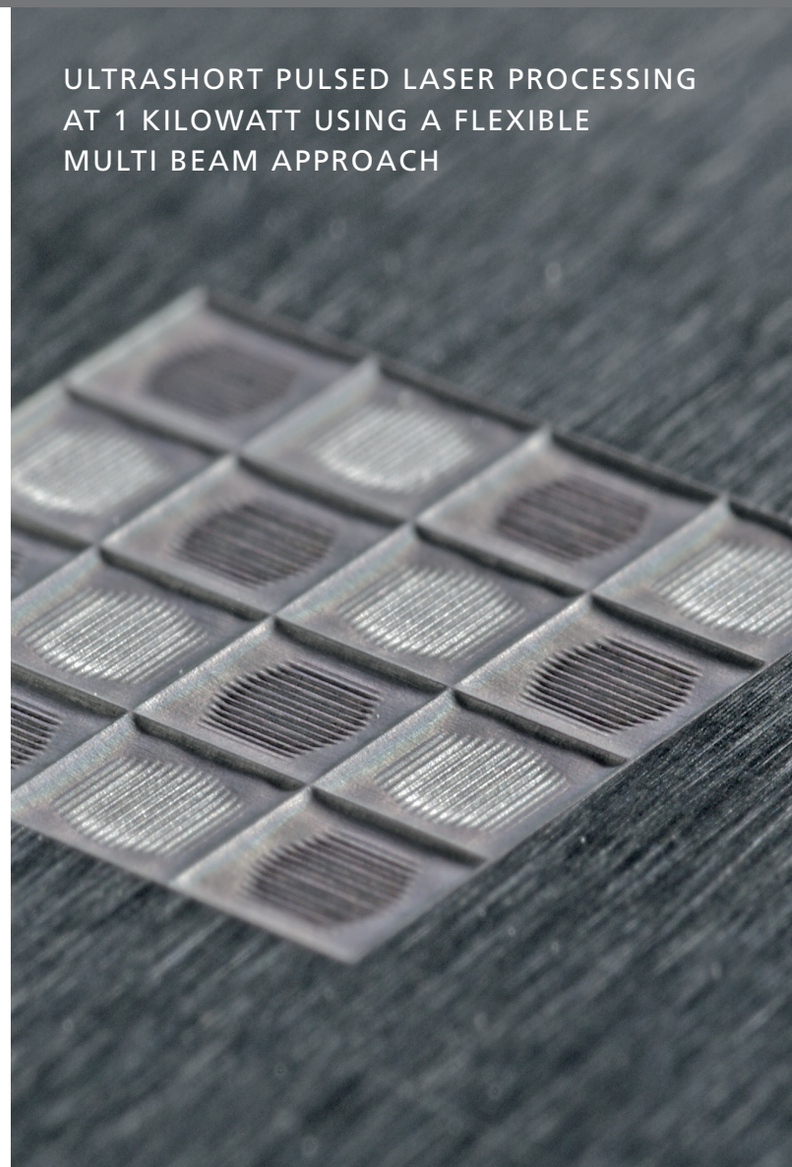
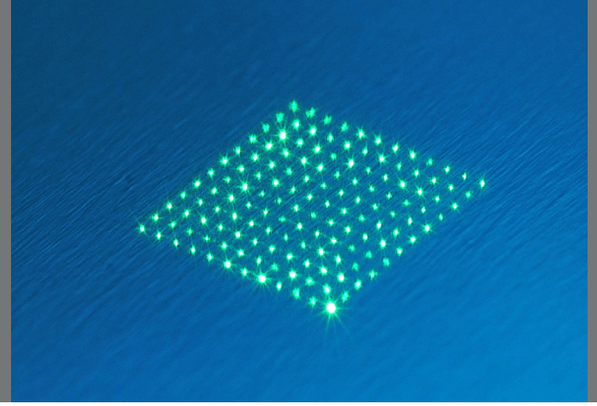
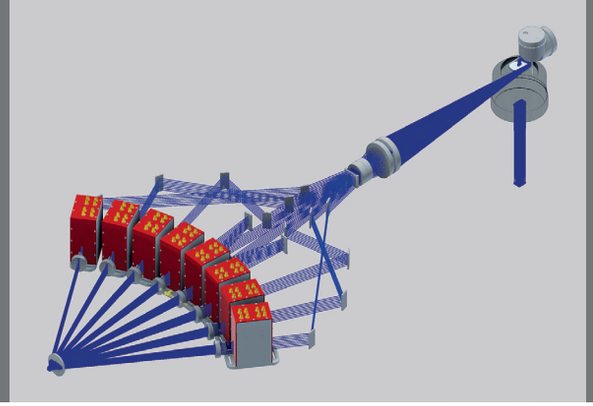
PHOTONICS 21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

ULTRASHORT PULSED LASER PROCESSING AT 1 KILOWATT USING A FLEXIBLE MULTI BEAM APPROACH

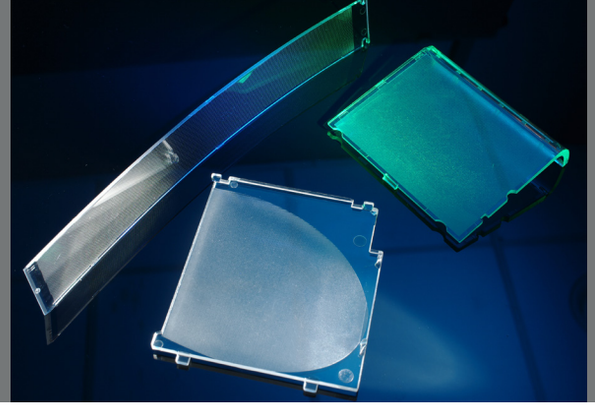




Multi-beam array.



Design concept for the flexible multi-beam approach.



Illumination light guides as use cases for MultiFlex technolgies.

CHALLENGE

Highly precise, melt-free processing of nearly all kinds of materials makes ultrafast laser processing a unique technology with huge potential.

However, the lack of throughput is still inhibiting industrial applications in many cases. By developing a kilowatt-class high-power lasers and high-efficiency processing technologies, the MultiFlex project aims to make ultrafast laser processing up to a hundred times faster enabling new fields of application.

APPROACH

The basic idea behind MultiFlex is to set up a high power "USP laser-dot-matrix-printer". A high power laser beam is split into a matrix of multi-beams. By enabling the flexible switching of the separated single beams using a sophisticated control system, arbitrary surface structures can be generated with highest precision and throughput.

IMPACT

The MultiFlex project aims for a completely new dimension in ultrafast laser processing. By efficiently using twenty times higher laser power compared to conventional processes and a 20 times faster control system an up to 100 times higher productivity will be reached. With the developed technology opening up a new dimension of multi-beam processing, large area applications get feasible. This helps to bring the advantages of ultrafast laser processing to a broader range of applications and to replace environmental problematic technologies.

JOIN THE PROJECT

The MultiFlex consortium is open to benchmark the developments for additional industrial applications. Contact us, provide a suitable use-case and join the industry reference group of this project.

PROJECT OVERVIEW

- Ultrafast laser with more than 1 kW average power, burst capability and free triggering
- Multi-Beam-Optics, capable of controlling every single beamlet using multi channel AOMs
- FPGA-based control system to control every single beamlet and correcting field distortions with highest precision
- Demonstrator machine to integrate all developed components and to validate the innovative technologies
- Integrating a data acquisition and processing system to monitor the optical system and process stability
- Validating the developed solution within industrial use cases given by associated industrial partners

MultiFlex