Press Release

Save the Date – April 2027: The 9th UKP Workshop explores how higher laser power drives increased productivity

Ultrafast laser technology on the threshold of a new power class

On April 27 and 28, 2027, the international ultrafast laser community will gather in Aachen for the 9th UKP Workshop – Ultrafast Laser Technology. How can manufacturers use increasingly powerful lasers to process more material, faster, and without sacrificing precision? Which technologies have already proven themselves in practice, and where do technical limits remain? The Fraunhofer Institute for Laser Technology ILT invites experts from industry and research to discuss the next steps in ultrafast laser technology.

Ultrashort-pulse lasers are now well established in precision materials processing. They cut, structure, and ablate a wide range of materials with high accuracy. As average laser power increases, they are opening up new opportunities for processing larger areas and higher production volumes cost-effectively. But this higher power also places greater demands on process control and system technology. More laser power alone does not automatically mean greater productivity.

"Simply directing more and more power at the same spot often achieves very little. We need to distribute that power in space and time so that we can process more material while maintaining the high quality of ultrashort-pulse laser processing," explains Dr. Dennis Haasler, Head of the Micro- and Nano Structuring Group at Fraunhofer ILT and Chair of the UKP Workshop.

Turning high laser power into productive processes

For several years, researchers at Fraunhofer ILT have been working with kilowatt-class ultrashort-pulse lasers to determine how to make full use of their power. Their work has shown that established system technologies can already achieve high processing speeds. New approaches offer further possibilities: High-speed scanners distribute laser power over large areas, multibeam systems process several regions in parallel, and optical stamping can process entire areas simultaneously.

But which technology is best suited to which process? Where do scanners and optics reach their limits? Are there other approaches worth exploring? How can manufacturers control thermal effects as more power reaches the workpiece? These questions are becoming increasingly important as kilowatt-class laser processing moves into industrial production.

Artificial intelligence is also playing a growing role in improving process productivity. Neural networks can enable robust, complex beam shaping for optical stamping. Bayesian optimization and digital twins can support process development, while machine learning can improve process control. Together, these approaches help processes achieve the highest possible productivity.

Learning from industrial experience, exploring new solutions

The UKP Workshop will address these challenges. It will feature real-world applications and firsthand experiences shared by companies already using ultrafast laser processes in industrial production. Speakers will examine the difficulties they encountered during implementation, how companies have overcome them, and which technologies are suitable for productive industrial use. Presentations on current research will introduce emerging trends and new approaches.

These applications range from microelectronics and semiconductor technology to glass processing, batteries, and hydrogen technologies. High-power ultrafast lasers offer significant potential for speeding up processes that already work well technically but are still too slow for industrial production.

Participants will be able to explore different approaches, compare them with their own processes, and discuss with experts which solutions could be applied to their individual challenges.

Technical exchange extends into the laboratories

A key highlight of the workshop is bringing together researchers, laser manufacturers, system suppliers, and industrial users for direct networking. Alongside the technical presentations, the accompanying marketplace will give participants a chance to discover new technologies and make contacts.

During a laboratory tour at Fraunhofer ILT, participants will see current research and laser processes demonstrated live. They can also speak directly with researchers about technical details, unresolved questions, and potential applications.

Over two days, the workshop will offer more than an overview of the current state of ultrafast laser technology: Participants will also take away new ideas and practical approaches for their own work.

Save the date

9. UKP Workshop – Ultrafast Laser Technology, April 27–28, 2027, Aachen

Organizer: Fraunhofer Institute for Laser Technology ILT
Conference language: English

Further information and registration:
https://www.ilt.fraunhofer.de/en/fairs-and-events/events/2027/ukp-27.html



Image 1: The UKP Workshop is an important gathering for everyone involved with ultrashort-pulse lasers. Experts from industry and research exchange ideas on current developments, technical challenges, and new applications. © Fraunhofer ILT, Aachen, Germany.

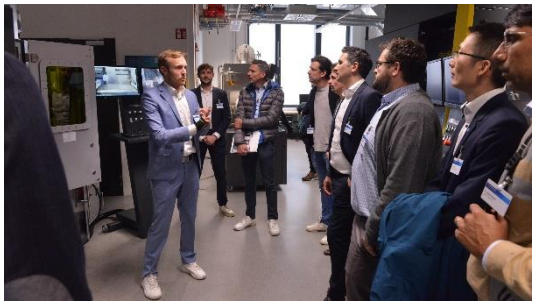


Image 2: During the Lab Tour at Fraunhofer ILT, participants get a first-hand look at current research projects and innovative laser processes. Live demonstrations provide an opportunity to discuss technical details directly with the researchers. © Fraunhofer ILT, Aachen, Germany.

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With more than 30,000 employees at 74 institutes and independent research units in Germany, Fraunhofer operates with an annual budget of 3.6 billion euros. Contract research, Fraunhofer's mainstay, generates 3.2 billion of this budget.

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