Laser Based Manufacturing Goes Ultrafast

The latest developments highlighted at the SLT '14

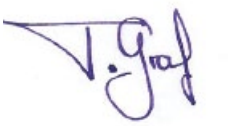
The need to increase the productivity of high-quality micro processing with ultrafast lasers is still awaiting its fulfilment due to the lack of suitable laser sources with kilowatts of average power and appropriate pulse energies. The recent realization of an ultrafast disk laser system which for the first time provides ps pulses with average output powers exceeding 1 kW and at the same time several mJ of pulse energy therefore has the potential to finally take laser materials processing to a new dimension. This was already demonstrated at the IFSW with first experiments on cutting carbon-fiber reinforced plastic (CFRP) with unprecedented speed and quality. Referring to micro processing with such parameters the term "ultrafast" will no longer just stand for the pulse duration; it will also refer to the processing speed.

Hence, as in the past the needs of industrial materials processing continue to initiate exciting progress in the field of laser development which in return opens up unprecedented new prospects for numerous applications and help to significantly widen the range of processable materials such as e. g. transparent materials, fibre-reinforced materials, or other composite structures. The trend towards novel materials and material combination is also a significant development in the field of macro material processing, especially for welding. The eighth international Stuttgart Laser Technology Forum SLT'14 will therefore highlight numerous breakthroughs along the above lines.

In the field of laser development the presentations include the latest development especially on power and energy scaling of ultrafast lasers and on high-brightness cw systems. Further sessions are devoted to beam shaping and ultrafast scanners. The benefits of shaped high-quality beams are highlighted with contributions on the processing of "difficult" materials. This includes welding of dissimilar materials such as copper with aluminium, processing of brittle and transparent materials as well as machining of CFRP. Due to the specific challenges related to the processing of such materials, process monitoring and process control is another key topic highlighted at the SLT'14. As an example the unique diagnostics opportunities offered by high-speed X-ray videos allow to calibrate new monitoring equipment which provides online measurement of the welding depth.

The mission of the SLT is to address laser technologies for materials processing in a fundamentally scientific and yet comprehensible manner with about half of the contributions presented by international and German research institutes and universities. The SLT will show how new laser sources with a larger choice of wavelengths and special beam properties, new concepts for system engineering, system components, and sensors for process control and the development of novel laser processing techniques for new materials and material combinations will continue to contribute to the fast progress of industrial manufacturing and with it to our economic prosperity.

I wish you inspiring reading of this issue of Laser Technik Journal!



Prof. Dr. Thomas Graf
Institut für Strahlwerkzeuge (IFSW),
Stuttgart

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LASYS
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