

Press release

Aachen,
May 30, 2012

International Laser Technology Congress AKL'12: Short pulse lasers make inroads into everyday industrial applications

Experts from the field of industrial laser technology gathered in Aachen from May 9 to 11, 2012 for the International Laser Technology Congress AKL'12. The outstanding technical innovations included the processing of new materials, ultrashort pulse lasers, and progress in the field of laser additive manufacturing.

The AKL'12 set a new record this year, attracting over 600 visitors. The biennial congress has further consolidated its position as the leading forum for applied laser technology for manufacturing applications. International participation also rose further. As always, the program in Aachen was extremely varied, including some 76 presentations that nonetheless remained tightly focused on delegates' varying interests: in addition to the beginner's seminar on Laser Technology and the Technology Business Day for executives and marketing managers, the first day was also host to two EU Innovation Forums and a seminar focused on the usage of ultrashort laser pulses in industry. The EU seminars devoted to "Laser Additive Manufacturing (LAM) in Aeronautics and Power Generation" (EU joint project MERLIN) and "Perspectives of Polymer Welding with Lasers" (EU joint project POLYBRIGHT) provided an insight into the current state of development of this compelling laser technology for the user industries.

Dr. Ingomar Kelbassa (Fraunhofer Institute for Laser Technology ILT), Chairman of the EU Session LAM, invited visitors after the presentations to take a tour of the Fraunhofer ILT, which included live presentations on the very latest process and system developments. These processes can, for instance, be used in the manufacture and repair of BLISks (Blade Integrated Disks). Developments at the ILT pave the way towards lower production costs and improved

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integration of innovative technologies, to cite just two achievements that led the U.S. magazine Aviation Week to award its Innovation Challenge 2012 in the “Power and Propulsion” category to a team from the Fraunhofer ILT in Washington DC in March 2012.

Laser Technology Innovation Award honors use of ultrashort pulse laser in the print industry

On the evening of May 9, the Innovation Award Laser Technology 2012 was presented in the Coronation Hall of Aachen City Hall. The award – backed by prize-money of €10,000 – went to a team under the direction of Dr. Stephan Brüning, (Schepers GmbH & Co KG, Vreden, Germany). They fought off competition from a host of other applications by coming up with a solution for three-dimensional micro-structuring of large surfaces for print and embossing applications using high-power ultrashort pulse lasers. In the PIKOFAT joint project funded by the German Federal Ministry of Education and Research (BMBF), Schepers GmbH & Co KG was joined by cooperating companies and institutes to develop a new scanner technology and ablation processes, which support scan speeds of up to 50 m/s. A fast-rotating cylinder, and a high-speed scanner based on an acousto-optic deflector, in combination allow the use of picosecond laser pulses working at over 10 MHz to deliver high-quality results in micromachining. The Innovation Award Laser Technology is presented biennially by the Arbeitskreis Lasertechnik e.V. and the European Laser Institute ELI as a European research award.

“Digital Photonic Production” at the Laser Technology Conference

The Laser Technology Conference on May 10 and 11, 2012 constituted the mainstay of the congress. Three separate series of presentations showcased new developments in the fields of beam sources and laser material processing in the micro and macro range.

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Dr. Dieter Steegmüller (Daimler AG) looked at two trends, in particular, in his opening presentation: greater flexibility in manufacturing and new materials in vehicle manufacturing. The materials covered included high-strength steels, new Al alloys, magnesium, and fiber-reinforced plastics. Prof. Reinhart Poprawe focused on the issue of flexibility in his presentation afterwards. Under the heading “Digital Photonic Production” he outlined a new world of manufacturing in which virtually any complex, high-precision components can be manufactured rapidly and directly from computer-generated specifications, as part of customized or series production.

The subsequent presentations demonstrated that such applications are already a reality in many places: for instance with the extended application of LAM processes in the aero engine segment. In such applications it is clear that additive processes, in particular, offer a high level of flexibility coupled with maximum customization during manufacturing, at no additional cost. Poprawe summed up the advantages of Digital Photonic production in a striking phrase: “Complexity and individualization for free.”

In the field of beam sources, ultrashort pulse lasers (USP) again took center stage, alongside current developments in diode and fiber lasers. Entirely new applications are being opened up thanks to the availability of systems with average output of over 100 watts. A new generation of USP lasers with high operating reliability, long service life, and acceptable costs has finally made inroads into industrial manufacturing.

Laser Technology Live

A particular highlight awaited those delegates that were able to stay in Aachen on the Friday afternoon: no fewer than 79 different technical installations and exhibits presented current research findings and developments in industrial laser technology in the Laser Technology Center of the Fraunhofer ILT. These covered the fields of laser material processing as well as EUV technology, or laser beam sources and optics

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components. The applications are wide-ranging: alongside mechanical engineering, the line-up includes medical technology and electronics, aeronautical and automotive industry as well as energy and solar technology.

The high-power short pulse laser, which defines the high-end segment at output power in excess of 1 kW, attracted a great deal of attention. Project manager Dr. Peter Rußbüldt explained the technical details with a look inside the system. In recognition of its outstanding multi-disciplinary collaboration across all locations, the Fraunhofer ILT and several cooperation partners from science and industry received the Stifterverband's Science Award 2012 for their work on scaling the output of ultrashort laser pulses. This prize was presented on May 8, 2012 as part of the Fraunhofer annual general assembly in Stuttgart.

Conclusion

This year too, the International Laser Technology Congress AKL'12 offered a great deal of scope for knowledge sharing and the opportunity to talk directly to different experts, not to mention the many excellent presentations. The next and tenth AKL will be held in Aachen from May 7-9, 2014.

Captions:

Fig. 1: Professor Reinhart Poprawe's presentation outlined how laser technologies can help us tackle global challenges. Source: Fraunhofer Institute for Laser Technology ILT, Aachen.

Fig. 2: This year, 45 partners from the field of industrial laser technology took part in the industry exhibition. Source: Fraunhofer Institute for Laser Technology ILT, Aachen.

Fig. 3: At the entrance to the Fraunhofer ILT an ice sculpture welcomed visitors to the live presentations. A closer inspection revealed a metallic cheekbone manufactured using Selective Laser Melting (SLM). Source: Fraunhofer Institute for Laser Technology ILT, Aachen.

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AKL supporting organizations:

- Arbeitskreis Lasertechnik AKL e.V.
- European Commission
- EPIC - European Photonics Industry Consortium
- European Laser Institute ELI e.V.
- SPECTARIS - Deutscher Industrieverband für optische, medizinische und mechatronische Technologien e.V.
- VDA - Verband der Automobilindustrie e.V.
- VDI Technologiezentrum GmbH
- VDMA - Verband Deutscher Maschinen- und Anlagenbau e.V.