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High-Power Lasers: Technology and Systems, Platforms, and Effects II

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3 Fiber Laser and Beam Combing
Jason M. Auxier, U.S. Naval Research Laboratory (United States)

4 Laser Interaction, Effects, and Components
David H. Titterton, UK Defence Academy (United Kingdom)

Introduction

This was the seventh high-power laser conference, which had good attendance throughout the four sessions, despite a few last-minute cancellations. In general, the quality of the papers was high, with some excellent innovative ideas presented. In addition, some intensive discussions and exchange of ideas took place among the experts in some sessions of the conference. It provided an excellent forum for attendees, specialists and newcomers, especially in the areas of laser-device demonstration and evaluation of laser-based systems, along with analysis of laser-induced effects.

In the first session, Laser Architectures for Power Scaling and Platforms, an invited paper was given by Sebastian Strecker describing the test range that has been developed at Meppen in Germany, for evaluation of high-power laser systems and investigation of laser-induced effects. There was a second invited paper that discussed power scaling and characterisation of single-mode fibre laser systems. There were two supporting papers, the first described a defence system based on a high-altitude airship, using a chemical oxygen-iodine laser. The second supporting paper discussed thulium-doped sesquioxide ceramic devices for high-power ultra-fast laser applications.

The second session, Diode-Pumped Alkali Lasers and Optically Pumped Rare Gas Lasers, started with two invited papers from American Institutions. The first given by Prof. Michael Heaven described progress with optically-pumped rare gas lasers. The second paper discussed laser-induced degradation effects in diode-pumped alkali lasers. The supporting paper, from The Ben-Gurion University of Negev, discussed a parametric study that they had undertaken of both static and flowing-gas caesium diode-pumped alkali lasers.

The third session, Fibre Lasers and Beam Combining, was introduced through two invited papers, again both were from the USA. The first was from Dr. Brandon Shaw, describing the development of all-crystalline, cladded single crystal fibres for high-power laser beam generation. The second paper, from the n-Light team, reported on the development of high-brightness, high efficiency and low size, weight and power (SWaP) 976 nm diode pump lasers for fibre amplifiers used in directed-energy applications. The first supporting paper, by Dr. Jan Jabczynski, discussed the performance achieved from combination of partially coherent laser beams in a 2D array. The second supporting paper, which replaced a cancelled paper, was delivered by Dr. Jason Auxier, which reviewed novel optical materials, and their performance, developed at the US Naval Research Laboratory for use from the visible to the far infrared.

The final session covered presentations on Laser Interaction, Effects and Components with an invited paper from Dr. Joe Talghader describing particle

acceleration in the presence of laser radiation and particle-induced breakdown in high-power laser optics. The second paper from Dr. Zhang discussed the use of laser pulses of differing pulse durations for very efficient cutting of holes in aluminium alloy.

All of the sessions were well attended, and as indicated above, the discussion was certainly very valuable. These discussions provided an invaluable insight into the way that the high-power source technology and systems are evolving and being applied to meet military capability requirements.

The current fiscal constraints and failure of presenters to attend had an adverse effect on the conference programme. Consequently, there was an impact on the content of the programme; however, despite this impediment, this was still a viable and most valuable conference.

The chairmen thanked the presenter for their valuable presentations and the audience for their participation through questions and points of discussion.

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