

PROCEEDINGS OF SPIE

Optical Technologies for Arming, Safing, Fuzing, and Firing VI

Fred M. Dickey
Richard A. Beyer
Editors

2 August 2010
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 7795

Proceedings of SPIE, 0277-786X, v. 7795

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Optical Technologies for Arming, Safing, Fuzing, and Firing VI*, edited by Fred M. Dickey, Richard A. Beyer, Proceedings of SPIE Vol. 7795 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X
ISBN 9780819482914

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Copyright © 2010, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/10/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, lighter font. To the right of the text is a stylized graphic consisting of three vertical bars of increasing height, resembling a bar chart or a signal waveform.

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

v *Conference Committee*

SESSION 1 LASER IGNITION AND INITIATION

- 7795 02 **Thermal and radiative transport analysis of laser ignition of energetic materials (Invited Paper)** [7795-01]
D. Damm, Sandia National Labs. (United States); M. Maiorov, AKELA Laser Corp. (United States)
- 7795 05 **Functional performance of the T-6A Texan (JPATS) CFIS laser detonator** [7795-04]
T. J. Blachowski, T. Thom, Naval Surface Warfare Ctr. (United States)
- 7795 06 **Optical initiation of nanoporous energetic silicon for safing and arming technologies (Invited Paper)** [7795-05]
W. A. Churaman, Army Research Lab. (United States); C. R. Becker, Army Research Lab. (United States) and Univ. of Colorado at Boulder (United States); G. D. Metcalfe, Army Research Lab. (United States); B. M. Hanrahan, Army Research Lab. (United States) and Univ. of Maryland, College Park (United States); L. J. Currano, Army Research Lab. (United States); C. R. Stoldt, Univ. of Colorado at Boulder (United States)

SESSION 2 DIODE LASER ADVANCES

- 7795 07 **Novel 300-watt single-emitter laser diodes for laser initiation applications (Invited Paper)** [7795-06]
C. F. Hand, Alfalight, Inc. (United States)
- 7795 0A **Reliability of fuzes based on diode laser assemblies** [7795-09]
M. Maiorov, AKELA Laser Corp. (United States); D. Damm, Sandia National Labs. (United States); I. Trofimov, V. Zeidel, R. Sellers, AKELA Laser Corp. (United States)

SESSION 3 OPTICAL COMPONENTS AND TECHNIQUES

- 7795 0B **An overview of micro-optical components and system technology: bulk, planar, and thin-film for laser initiated devices (Invited Paper)** [7795-10]
T. Lizotte, Hitachi Via Mechanics USA, Inc. (United States)
- 7795 0D **Optimal polishing methods for high-energy optical fibers** [7795-13]
M. D. Bowden, S. L. Knowles, M. C. Cheeseman, Atomic Weapons Establishment (United Kingdom)
- 7795 0F **Polymer waveguide technology: optical connectivity for small form factor applications** [7795-15]
T. Lizotte, Hitachi Via Mechanics USA, Inc. (United States)

SESSION 4 LARGE LASER SYSTEMS

- 7795 0G **Optical pulse generation system based on OTDM technique for SG-III Laser Facility [7795-16]**
J. Wang, Sichuan Univ. (China) and Research Ctr. of Laser Fusion (China); D. Xu, M. Li, H. Lin,
R. Zhang, Y. Deng, N. Zhu, Research Ctr. of Laser Fusion (China); S. Zhou, Sichuan Univ.
(China)
- 7795 0H **Single-pulse driven plasma Pockels cell with 350mm×350mm aperture [7795-18]**
X. Zhang, D. Wu, J. Zhang, D. Lin, K. Zheng, F. Jing, Research Ctr. of Laser Fusion (China)

Author Index

Conference Committee

Program Track Chair

José Sasián, College of Optical Sciences, The University of Arizona
(United States)

Conference Chairs

Fred M. Dickey, FMD Consulting LLC (United States)
Richard A. Beyer, U.S. Army Research Laboratory (United States)

Program Committee

Adrian A. Akinci, Los Alamos National Laboratory (United States)
Ron Bechtold, Alfalight, Inc. (United States)
Thomas J. Blachowski, Naval Surface Warfare Center (United States)
Michael D. Bowden, Atomic Weapons Establishment (United Kingdom)
Gary C. Catella, Gooch & Housego, Cleveland (United States)
David L. Damm, Sandia National Laboratories (United States)
David W. Ewick, Ensign-Bickford Aerospace & Defense Company
(United States)
Andrew Forbes, CSIR National Laser Center (South Africa) and
University of KwaZulu-Natal (South Africa)
Scott J. Hamlin, MegaWatt Lasers, Inc. (United States)
Christopher R. Hardy, Kigre, Inc. (United States)
Stephen R. Lerner, Laser Diode Inc. (United States)
Todd E. Lizotte, Hitachi Via Mechanics USA, Inc. (United States)
Mikhail A. Maiorov, Akela Laser Corporation (United States)
Robert V. McDaniel, Kollsman, Inc. (United States)
Gregg L. Morelli, Honeywell Federal Manufacturing & Technologies,
LLC (United States)
Barry T. Neyer, PerkinElmer Optoelectronics (United States)
Adam Parker, QinetiQ Ltd. (United Kingdom)
Alex Rosiewicz, EM4, Inc. (United States)
Kelly Simmons-Potter, The University of Arizona (United States)
Bolesh J. Skutnik, CeramOptec Industries, Inc. (United States)
Gabriel L. Smith, Army Research, Development and Engineering
Command (United States)

Session Chairs

- 1 Laser Ignition and Initiation
Mikhail A. Maiorov, AKELA Laser Corporation (United States)
- 2 Diode Laser Advances
Scott J. Hamlin, MegaWatt Lasers, Inc. (United States)
- 3 Optical Components and Techniques
Michael D. Bowden, Atomic Weapons Establishment (United Kingdom)
- 4 Large Laser Systems
Gregg L. Morelli, Honeywell Federal Manufacturing & Technologies, LLC (United States)