

PROCEEDINGS OF SPIE

***High Energy/Average Power  
Lasers and Intense Beam  
Applications III***

**Steven J. Davis  
Michael C. Heaven  
J. Thomas Schriempf**  
*Editors*

**26–27 January 2009  
San Jose, California, USA**

*Sponsored and Published by*  
SPIE

**Volume 7196**

Proceedings of SPIE, 0277-786X, v. 7196

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 *High Energy/Average Power Lasers and Intense Beam Applications III*, edited by Steven J. Davis, Michael C. Heaven, J. Thomas Schriempf, Proceedings of SPIE Vol. 7196 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 0277-786X  
ISBN 9780819474421

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 © 2009, 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](http://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/09/\$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](http://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 COIL AND EOIL

---

- 7196 02 **Research on advanced chemical and discharge oxygen-iodine lasers (Invited Paper)** [7196-01]  
J. Kodymová, V. Jirásek, J. Schmiedberger, O. Špalek, M. Čenský, Institute of Physics (Czech Republic)
- 7196 03 **Spatial and recovery measurements of gain in an electric oxygen-iodine laser** [7196-02]  
G. F. Benavides, CU Aerospace LLC (United States) and Univ. of Illinois at Urbana-Champaign (United States); J. W. Zimmerman, B. S. Woodard, Univ. of Illinois at Urbana-Champaign (United States); A. D. Palla, D. L. Carroll, J. T. Verdeyen, CU Aerospace LLC (United States); W. C. Solomon, Univ. of Illinois at Urbana-Champaign (United States)
- 7196 05 **Catalytically enhanced singlet oxygen for EOIL (Invited Paper)** [7196-04]  
S. Lee, W. T. Rawlins, S. J. Davis, Physical Sciences Inc. (United States)
- 7196 06 **Demonstration of an iodine laser pumped by an air-helium electric discharge** [7196-05]  
B. S. Woodard, J. W. Zimmerman, G. F. Benavides, D. L. Carroll, J. T. Verdeyen, A. D. Palla, T. H. Field, CU Aerospace LLC (United States); W. C. Solomon, Univ. of Illinois at Urbana-Champaign (United States); S. Lee, W. T. Rawlins, S. J. Davis, Physical Sciences Inc. (United States)

---

## SESSION 2 HIGH POWER GAS LASER TECHNOLOGY I

---

- 7196 07 **Electra: a KrF electron-beam-pumped high-average-power laser system for inertial confinement fusion applications** [7196-06]  
P. M. Burns, Research Support Instruments (United States); J. D. Sethian, M. F. Wolford, M. Myers, J. L. Giuliani, Naval Research Lab. (United States); F. Hegeler, M. Friedman, Commonwealth Technology Inc. (United States); R. Jaynes, Science Applications International Corp. (United States)
- 7196 08 **Advanced-UV excimer laser processing** [7196-07]  
R. Delmdahl, Coherent GmbH (Germany)
- 7196 0A **Slab overtone carbon monoxide laser** [7196-09]  
A. A. Ionin, A. Yu. Kozlov, L. V. Seleznev, D. V. Sinitsyn, Lebedev Physical Institute (Russian Federation)

---

**SESSION 3 HIGH POWER GAS LASER TECHNOLOGY II**

---

- 7196 0B **ZnSe aspherical microlens systems enable new beam-shaping approaches for CO<sub>2</sub>-lasers** [7196-10]  
O. Homburg, B. Guetlich, F. Toennissen, T. Mitra, L. Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany)
- 7196 0C **Self-channeled laser pulse induced effects at distance** [7196-11]  
R. Bernath, M. Richardson, College of Optics and Photonics, Univ. of Central Florida (United States)

---

**SESSION 4 OPTICALLY PUMPED ALKALI LASERS**

---

- 7196 0D **Lasing in alkali atoms pumped by the dissociation of alkali-rare gas exciplexes (excimers)** [7196-12]  
J. D. Readle, C. J. Wagner, Univ. of Illinois at Urbana-Champaign (United States);  
J. T. Verdeyen, D. L. Carroll, CU Aerospace LLC (United States); J. G. Eden, Univ. of Illinois at Urbana-Champaign (United States)
- 7196 0E **Rubidium and potassium alkali lasers** [7196-13]  
J. Zweiback, General Atomics (United States); B. Krupke, WFK Lasers (United States)
- 7196 0F **Transverse-pumped Cs vapor laser** [7196-14]  
B. V. Zhdanov, M. K. Shaffer, J. Sell, R. J. Knize, US Air Force Academy (United States)
- 7196 0G **Spectroscopic investigations of Rb- and Cs- rare gas systems** [7196-15]  
S. J. Davis, W. T. Rawlins, K. L. Galbally-Kinney, W. J. Kessler, Physical Sciences Inc. (United States)
- 7196 0H **Theoretical investigations of alkali metal: rare gas interaction potentials** [7196-16]  
J. M. Merritt, J. Han, T. Chang, M. C. Heaven, Emory Univ. (United States)

---

**SESSION 5 HIGH-POWER FIBER LASERS**

---

- 7196 0K **High order harmonic generation at ultra high repetition rate from ytterbium doped fiber chirped pulse amplification** [7196-19]  
J. Boulet, Ctr. Lasers Intenses et Applications, CNRS, Univ. de Bordeaux (France); Y. Zaouter, Amplitude Systèmes (France); J. Limpert, Friedrich-Schiller-Univ. Jena (Germany); S. Petit, E. Mével, E. Constant, E. Cormier, Ctr. Lasers Intenses et Applications, CNRS, Univ. de Bordeaux (France)

---

**POSTER SESSION**

---

- 7196 0L **OFl rare-gas excimer amplifier for high-intensity VUV pulse generation** [7196-20]  
M. Katto, M. Kaku, K. Oda, T. Kamikihara, A. Yokotani, S. Kubodera, Univ. of Miyazaki (Japan); N. Miyanaga, K. Mima, Osaka Univ. (Japan)

*Author Index*

# Conference Committee

## *Symposium Chairs*

**Donald J. Harter**, IMRA America, Inc. (United States)  
**Peter R. Herman**, University of Toronto (Canada)

## *Symposium Cochairs*

**Henry Helvajian**, The Aerospace Corporation (United States)  
**Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany)

## *Program Track Chair*

**Gregory J. Quarles**, VLOC (United States)

## *Conference Chairs*

**Steven J. Davis**, Physical Sciences Inc. (United States)  
**Michael C. Heaven**, Emory University (United States)  
**J. Thomas Schriempf**, Naval Sea Systems Command (United States)

## *Program Committee*

**David L. Carroll**, CU Aerospace LLC (United States)  
**Jarmila Kodymová**, Fyzikální Ústav (Czech Republic)  
**Timothy J. Madden**, Air Force Research Laboratory (United States)  
**William E. McDermott**, University of Denver (United States)  
**Wilson T. Rawlins**, Physical Sciences Inc. (United States)

## *Session Chairs*

- 1 COIL and EOIL  
**Steven J. Davis**, Physical Sciences Inc. (United States)
- 2 High Power Gas Laser Technology I  
**J. Thomas Schriempf**, Naval Sea Systems Command (United States)
- 3 High Power Gas Laser Technology II  
**J. Thomas Schriempf**, Naval Sea Systems Command (United States)
- 4 Optically Pumped Alkali Lasers  
**Wilson T. Rawlins**, Physical Sciences Inc. (United States)
- 5 High-Power Fiber Lasers  
**Michael C. Heaven**, Emory University (United States)

