PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10638

, "Front Matter: Volume 10638," Proc. SPIE 10638, Ultrafast Bandgap Photonics III, 1063801 (11 July 2018); doi: 10.1117/12.2500517

SPIE.

Event: SPIE Defense + Security, 2018, Orlando, FL, United States

PROCEEDINGS OF SPIE

Ultrafast Bandgap Photonics III

Michael K. Rafailov

Editor

16–19 April 2018

Orlando, Florida, United States

Sponsored and Published by
SPIE

Volume 10638

Proceedings of SPIE 0277-786X, V. 10638

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

Ultrafast Bandgap Photonics III, edited by Michael K. Rafailov, Proc. of SPIE Vol. 10638,
1063801 · © 2018 SPIE · CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2500517

Proc. of SPIE Vol. 10638 1063801-1

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers 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 these proceedings:

Author(s), "Title of Paper," in *Ultrafast Bandgap Photonics III*, edited by Michael K. Rafailov, Proceedings of SPIE Vol. 10638 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510617872

ISBN: 9781510617889 (electronic)

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 © 2018, 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/18/\$18.00.

Printed in the United States of America.

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

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five 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.

Contents

vii	<i>Authors</i>
ix	<i>Conference Committee</i>

METASTABILITY OF TRANSIENT STATES

10638 03	Ultrafast dynamics and coherent order parameter oscillations under photo-excitation in the excitonic insulator Ta₂NiSe₅ (Invited Paper) [10638-2]
----------	--

ULTRAFAST CARRIER DYNAMICS

10638 07	Nonresonant pump/probe electronic Raman scattering within nonequilibrium dynamical mean-field theory (Invited Paper) [10638-6]
----------	---

ULTRAFAST DYNAMICS: LOWERING THE DIMENSIONS

10638 0F	Hydrogen-assisted graphene transfer: surface engineering for chemical, electronic, and biological applications (Invited Paper) [10638-15]
10638 0H	Ultrafast photonics in coherently coupled III-V semiconductor nanostructures (Invited Paper) [10638-17]

ULTRAFAST DYNAMICS OF SOLAR MATERIALS

10638 0K	Nonlinear spectroscopy in perovskite quantum dots (Invited Paper) [10638-20]
10638 0M	Shedding light on surface effects: nonlinear probes of complex materials (Invited Paper) [10638-22]

ULTRAFAST DYNAMICS: 2D

10638 0O	Optical 2D coherent spectroscopy of valley dynamics in monolayer transition metal dichalcogenide (Invited Paper) [10638-24]
----------	--

TRANSIENT METAMATERIALS

- 10638 0Q **Theory of ultrafast spin-charge quantum dynamics in strongly correlated systems controlled by femtosecond photoexcitation: an application to insulating antiferromagnetic manganites (Keynote Paper)** [10638-26]

TRANSIENT OPTIC EFFECTS

- 10638 0Y **Nonlinear chirped soliton: self-formation at Gaussian pulse propagation in a medium with non-instantaneous nonlinear response (Invited Paper)** [10638-34]

ULTRAFAST MAGNETISM: SPIN AND ORBITAL CONTROL

- 10638 15 **Spin-dependent electronic scattering dynamics in a ferromagnetic model system: numerical aspects (Invited Paper)** [10638-40]

OPTICS OF TOPOLOGICAL MATERIALS

- 10638 1A **Field effect photoconductivity in graphene on undoped semiconductor substrates (Invited Paper)** [10638-45]
- 10638 1E **Harmonic generation via excitation of surface states formed from spatially separated electrons and holes in nanocomposites (Invited Paper)** [10638-49]

LASERS FOR ULTRAFAST DYNAMIC CONTROL

- 10638 1F **Singly and doubly resonant femtosecond optical parametric oscillators for precision spectroscopy from the near-to mid-infrared (Keynote Paper)** [10638-50]
- 10638 1H **Mode-locked thin-disk lasers and their application for high-power THz generation (Invited Paper)** [10638-52]
- 10638 1K **Solid state high-order harmonics driven by long-wavelength lasers (Keynote Paper)** [10638-55]

PROPAGATION OF INTENSE ULTRASHORT PULSES: ATMOSPHERE

- 10638 1L **Simulation of LWIR TW ultrashort pulses over kilometer ranges in the atmosphere (Keynote Paper)** [10638-56]
- 10638 1O **The effect of laser noise on the propagation of laser radiation in dispersive and nonlinear media (Invited Paper)** [10638-59]

PROPAGATION OF INTENSE ULTRASHORT PULSES: SOLIDS

10638 1S	Spatio-temporal localization of powerful femtosecond pulses in Kerr media and light bullet regimes (Invited Paper) [10638-62]
10638 1T	Ultrafast laser induced hot carriers from metallic tip (Invited Paper) [10638-63]
10638 1V	High-average power ultra-broadband infrared radiation generation (Invited Paper) [10638-65]

FREQUENCY COMB: CONCURRENT-JOINT SESSION WITH CONFERENCES 10639 AND 10638

10638 1W	Optical frequency comb stabilization of a gigahertz semiconductor disk laser (Keynote Paper) [10638-71]
10638 1Y	Stable electro-optic frequency comb generation using an ultrahigh finesse etalon filtered optoelectronic oscillator (Invited Paper) [10638-67]
10638 20	Standoff detection from diffusely scattering surfaces using dual quantum cascade laser comb spectroscopy (Invited Paper) [10638-69]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Agustsson, Steinn Ymir, 03	Kaiser, Stefan, 03
Allen, Mark G., 20	Kapetanakis, M. D., 0Q
Allmendinger, Pitt, 20	Kara, O., 1F
Ang, L. K., 1T	Keimer, Bernhard, 03
Beetar, John E., 1K	Keller, Ursula, 1W
Bonato, Luiz Gustavo, 0K	Khasanov, O., 1E, 1S
Boris, Alexander, 03	Kim, Minjae, 03
Brito Cruz, Carlos H., 0K	Koch, S. W., 1L
Brochard, Pierre, 1W	Kolarczik, Mirco, 0H
Brown, Justin M., 20	Kolesik, M., 1L
Bustos Ramirez, Ricardo, 1Y	Larkin, Timofei, 03
Calhoun, Tessa R., 0M	Leckron, Kai, 15
Castañeda, Juan A., 0K	Lee, Woo-Kyung, 0F
Cazalas, E., 1A	Li, Hebin, 0O
Charsley, J. M., 1F	Lingos, P. C., 0Q
Chen, Y. P., 1A	Lu, Yangfan, 03
Cheng, Y. S., 1F	Lysak, Tatiana M., 0Y
Childres, I., 1A	Maidment, L., 1F
Chini, Michael, 1K	Mangold, Markus, 20
Chu, Hao, 03	Manske, Dirk, 03
Chung, T.-F., 1A	Mansourzadeh, S., 1H
Crites, Erin, 1K	Matveev, O. P., 07
Delfyett, Peter J., 1Y	McCracken, R. A., 1F
Devereaux, T. P., 07	Meyer, F., 1H
Doughty, Benjamin, 0M	Moloney, J. V., 1L
Epstein, Zachary, 1V	Mootz, M., 0Q
Faist, Jérôme, 20	Nagamine, Gabriel, 0K
Fedotova, O., 1E, 1S	Nogueira, Ana F., 0K
Fobbe, F., 1H	O'Shaughnessy, Thomas, 0F
Freericks, J. K., 07	Owschimikow, Nina, 0H
Gaižauskas, E., 1E, 1S	Padilha, Lazaro A., 0K
Gayvoronsky, V., 1E	Panagiotopoulos, P., 1L
Geiser, Markus, 20	Peñano, Joseph, 1V
Gholam-Mirzaei, Shima, 1K	Perakis, I. E., 0Q
Gürel, Kutun, 1W	Plascak, Michael E., 1Y
Hafizi, Bahman, 1V	Pokharel, Amrit, 03
Hakobyan, Sargis, 1W	Pokutnyi, S., 1E
Hekmat, N., 1H	Reid, D. T., 1F
Helmrich, Sophia, 0H	Robinson, Jeremy T., 0F
Hensley, Joel M., 20	Rosenow, P., 1L
Herzog, Bastian, 0H	Rost, Andreas W., 03
Höppner, Marc, 03	Rusetsky, G., 1E, 1S
Huang, Emily, 03	Saraceno, C. J., 1H
Hugi, Andreas, 20	Sarker, B. K., 1A
Isaacs, Joshua, 1O	Schilt, Stéphane, 1W
Jornod, Nayara, 1W	Schneider, Hans Christian, 15
Jovanovic, I., 1A	Schuh, K., 1L
Juoy, Pierre, 20	Schulz, Armin, 03
Kadan, V., 1S	Shabestari, Parmida, 03

Sheehan, Paul E., 0F
Shvaika, A. M., 07
Smirnova, T., 1E, 1S
Sprangle, Phillip, 1O, 1V
Südmeyer, Thomas, 1W
Takagi, Hidenori, 03
Takayama, Tomohiro, 03
Thommes, Kevin, 0H
Titze, Michael, 0O
Trofimov, Vyacheslav A., 0Y
Waldburger, Dominik, 1W
Wang, J., 0Q
Watson, Brianna R., 0M
Werdehausen, Daniel, 03
Whitener, Keith E., Jr., 0F
Wittwer, Valentin J., 1W
Woggon, Ulrike, 0H
Wright, E. M., 1L
Yaresko, Alexander, 03
Yassitepe, Emre, 0K
Zakharova, Irina G., 0Y
Zhu, Y. B., 1T

Conference Committee

Symposium Chair

Arthur A. Morrish, Raytheon Space and Airborne Systems
(United States)

Symposium Co-chair

Ruth L. Moser, Air Force Research Laboratory (United States)

Conference Chair

Michael K. Rafailov, University of Alberta (Canada)

Conference Program Committee

Jason M. Auxier, U.S. Naval Research Laboratory (United States)
Sophia Economou, Virginia Polytechnic Institute and State University
(United States)
Matt W. Graham, Oregon State University (United States)
Stefan Kaiser, Max-Planck-Institut für Festkörperforschung (Germany)
Stefan Mathias, Georg-August-Universität Göttingen (Germany)
Igor Pastirk, Coherent, Inc. (United States)
Joseph R. Peñano, U.S. Naval Research Laboratory (United States)

Session Chairs

- 1 Metastability of Transient States
Rolf Binder, College of Optical Sciences, The University of Arizona
(United States)
- 2 Ultrafast Carrier Dynamics
Stefan Kaiser, Max-Planck-Institut für Festkörperforschung (Germany)
- 3 Ultrafast Carrier Dynamics: Quantum Dots
Jason M. Auxier, U.S. Naval Research Laboratory (United States)
- 4 Ultrafast Dynamics: Lowering the Dimensions
Jason M. Auxier, U.S. Naval Research Laboratory (United States)
Igor Pastirk, Sydor Technologies (United States)
- 5 Ultrafast Dynamics of Solar Materials
Matt W. Graham, Oregon State University (United States)

- 6 Ultrafast Dynamics: 2D
Matt W. Graham, Oregon State University (United States)
- 7 Transient Metamaterials
Matt W. Graham, Oregon State University (United States)
- 8 Transient Optic Effects
Jason M. Auxier, U.S. Naval Research Laboratory (United States)
- 9 Ultrafast Magnetism: Spin and Orbital Control
Rolf Binder, College of Optical Sciences, The University of Arizona (United States)
- 10 Optical Control of Spin in Solids
Ajit Srivastava, Emory University (United States)
- 11 Optics of Topological Materials
Sam G. Carter, U.S. Naval Research Laboratory (United States)
- 12 Lasers for Ultrafast Dynamic Control
Igor Pastirk, Sydor Technologies (United States)
- 13 Propagation of Intense Ultrashort Pulses: Atmosphere
Joseph R. Peñano, U.S. Naval Research Laboratory (United States)
- 14 Propagation of Intense Ultrashort Pulses: Solids
Joseph R. Peñano, U.S. Naval Research Laboratory (United States)
- 15 Frequency Comb: Concurrent-Joint Session with conferences 10639 and 10638
Michael K. Rafailov, University of Alberta (Canada)