PROCEEDINGS OF SPIE

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XXII

Peter R. Herman Roberto Osellame Adela Ben-Yakar Editors

22–27 January 2022 San Francisco, California, United States

20–24 February 2022 ONLINE

Cosponsored by Amplitude (France) TRUMPF Inc. (United States)

Sponsored and Published by SPIE

Volume 11991

Proceedings of SPIE 0277-786X, V. 11991

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XXII, edited by Peter R. Herman, Roberto Osellame, Adela Ben-Yakar, Proc. of SPIE Vol. 11991, 1199101 · © 2022 SPIE · 0277-786X · doi: 10.1117/12.2635766

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 SPIEDigitalLibrary.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 Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XXII, edited by Peter R. Herman, Roberto Osellame, Adela Ben-Yakar, Proc. of SPIE 11991, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510648531

ISBN: 9781510648548 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

v Conference Committee

	BIOMEDICAL APPLICATIONS FOR ULTRAFAST LASER SYSTEMS I
11991 02	Optimization of processing parameters and conditioning for efficient bone tissue ablation by femtosecond laser [11991-2]
11991 03	Comparing Bessel-Gauss and Gaussian beams for ultrashort pulsed laser surgery [11991-1]
	BIOMEDICAL APPLICATIONS FOR ULTRAFAST LASER SYSTEMS II
11991 04	Longitudinal multiphoton microscopy of neural structure using a diamond Raman laser and Yb fiber amplifier [11991-4]
	MICROMACHINING OF TRANSPARENT MATERIALS I
11991 05	Integrated fast optical switch fabricated by femtosecond laser micromachining [11991-16]
	NOVEL ULTRAFAST LASER SOURCES
11991 06	Mid-infrared femtosecond pulses from a quantum cascade laser [11991-20]
	MICROMACHINING OF TRANSPARENT MATERIALS II
11991 07	Chamfered-edge laser cleaving of transparent materials [11991-25]
11991 08	Customized non-diffracting beams for advanced transparent materials processing [11991-26]
11991 09	Ultrafast laser singulation of optical circuits with optical quality end-facets [11991-27]

NOVEL PROCESSING AND CHARACTERIZATION TECHNIQUES

11991 OA	Remote characterization and delivery of dispersion-compensated ultrashort pulses over dynamic optical fiber links [11991-30]
11991 OB	Space-time division multiplexing-based superfast spectral-domain optical coherence tomography up to 1 MHz A-scan rate [11991-32]

Conference Committee

Symposium Chairs

Craig B. Arnold, Princeton University (United States)
Takunori Taira, Institute for Molecular Science (Japan)
Stefan Kaierle, Laser Zentrum Hannover e.V. (Germany)
John M. Ballato, Clemson University (United States)

Program Track Chairs

Henry Helvajian, The Aerospace Corporation (United States) **Guido Hennig**, Daetwyler Graphics AG (Switzerland)

Conference Chairs

Peter R. Herman, University of Toronto (Canada) **Roberto Osellame**, CNR- Istituto di Fotonica e Nanotecnologie (Italy) **Adela Ben-Yakar**, The University of Texas at Austin (United States)

Conference Program Committee

Craig B. Arnold, Princeton University (United States)
Yves Bellouard, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Daniel Flamm, TRUMPF Laser- und Systemtechnik GmbH (Germany)

Alexander Heisterkamp, Leibniz University Hannover (Germany)

Denise M. Krol, University of California, Davis (United States)

Eric Mazur, Harvard University (United States)

Eric P. Mottay, Amplitude Systèmes (France)

Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland)

Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

Aleks Ovsianikov, Technische University Wien (Austria)

Christopher B. Schaffer, Cornell University (United States)

Jan Siegel, Instituto de Óptica "Daza de Valdés" (Spain)

Koji Sugioka, RIKEN Center for Advanced Photonics (Japan)

Mitsuhiro Terakawa, Keio University (Japan)

Alfred Vogel, University of Lübeck (Germany)

Dvir Yelin, Technion-Israel Institute of Technology (Israel)