PROCEEDINGS OF SPIE

Nonlinear Optics and Applications XI

Mario Bertolotti Alexei M. Zheltikov Editors

1–3 April 2019 Prague, Czech Republic

Sponsored by SPIE

Cooperating Organisations ELI Beamlines (Czech Republic) Laserlab Europe European Optical Society HiLASE (Czech Republic)

Published by SPIE

Volume 11026

Proceedings of SPIE 0277-786X, V. 11026

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

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 Nonlinear Optics and Applications XI, edited by Mario Bertolotti, Alexei M. Zheltikov, Proceedings of SPIE Vol. 11026 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510627185 ISBN: 9781510627192 (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 © 2019, 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/19/\$18.00.

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: 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 Authors
- ix Conference Committee
- xi Introduction

SESSION 1 FEMTOSECONDS

- 11026 03 Subcycle pulses in the mid-infrared: ultrafast ionization dynamics in solids (Invited Paper) [11026-1]
- 11026 04Flexible control of nonlinear processes under femtosecond filamentation using adjustable high-
pressure gases and supercritical fluids [11026-2]
- 11026 06 Photoacoustic and optical imaging of the femtosecond filament in water [11026-4]
- 11026 07 Supercontinuum enhancement using Bragg solitons on a CMOS-compatible chip (Best Student Paper Award) [11026-5]

SESSION 2 CHIRALITY AND SYMMETRIES

11026 08	Nonlinear optics in chiral materials (Invited Paper) [11026-6]
11026 09	Enhancing nonlinear processes from dielectric nanoantennas: the role of the substrate [11026-8]
11026 0A	Switching in the PT-symmetric nonlinear periodic structures [11026-9]

11026 0B Optical activity of chiral semiconductor gammadions [11026-10]

SESSION 3 NONLINEAR MATERIALS AND THZ: SPECIAL SESSION HONORING PROF. JOSEPH W. HAUS

11026 0D	Optical limiting behavior of single-walled carbon nanotubes in water dispersion at different
	concentrations [11026-12]

- 11026 OETwo-photon-activated light energy conversion in quantum dot-purple membrane hybrid
material [11026-13]
- 11026 0G The effect of a waveguide on the formation of optical terahertz solitons [11026-15]

11026 01 Theoretical investigation of terahertz generation from two-color laser pulse ionized gases: the role of the thickness of the nonlinear crystal [11026-17]

SESSION 4 NONLINEAR EFFECTS

11026 OL	Two-component few-cycle light bullets in a gradient waveguide with quadratic nonlinearity
	[11026-20]

11026 0M Vortex light bullets forming at second harmonic generation [11026-21]

SESSION 5 PLASMONICS AND SHG

- 11026 00 Surface and bulk harmonic generation in the opaque region of GaAs [11026-24]
- 11026 0Q Multibound solitons generation with a controllable number of bound states in a passive modelocked all-fiber erbium-doped ring laser [11026-25]

SESSION 6 NONLINEARITIES IN QUANTUM SYSTEMS AND APPLICATIONS

- 11026 0S Quantum spin Hall effect in bound states in continuum (Invited Paper) [11026-27]
- 11026 0T Slide-free histopathological imaging of hematoxylin-eosin-stained whole mount tissues using Cr:forsterite laser-based nonlinear microscopy [11026-29]
- 11026 0U Self-written net waveguides using photopolymer media [11026-30]
- 11026 0V Role of deposited energy density and impact ionization in the process of femtosecond lasermatter interaction in solids: scaling from visible to mid-IR wavelength [11026-31]
- 11026 0W Features of laser cooling of Yb-doped fluorite nanocrystals using coherent population transfer techniques [11026-32]

POSTER SESSION

11026 OX	Laser-induced shockwave crystallization of nitrates [11026-34]
11026 OY	Vibration interaction between chitosan molecules and ablative silver and gold nanoparticles [11026-35]
11026 OZ	Linear and nonlinear chiro-optical properties of carvone molecule mirror-image configurations [11026-36]

- 1102610 Towards analytical description of intense short pulses propagating in a gas-filled hollow-core photonic crystal fiber [11026-37]
- 1102611 THz generation from mid-infrared two-color laser pulses in air and a simple method for controlling the THz intensity [11026-38]
- 1102612 Resonant and non-resonant interaction of semiconductor quantum dots with plasmons localized in silver and zinc nanoparticles [11026-39]
- 1102613 Generation of Raman solitons with minimal losses for dispersion radiation due to longitudinally nonuniform fiber [11026-40]
- 1102614 Spatio-temporal light bullet formation from the laser pulse propagating in the tunneling ionization regime [11026-41]
- 1102615 Resonance energy transfer from quantum dots to bacteriorhodopsin affects the saturation of two-photon absorption under a pulsed femtosecond excitation [11026-43]
- 1102616 Synchronously-pumped all-solid-state Raman lasers based on YVO4 and GdVO4 crystals with pulse shortening by higher than 30 times down to 850 fs [11026-44]
- 1102618Efficient synchronously-pumped all-solid-state SrWO4 Raman laser at 1178 and 1227 nm on
single and combined Raman modes with 26-fold pulse shortening down to 1.4 ps [11026-46]
- 1102619 Anti-Stokes nanosecond cyan 503, 507, and 508 nm generation at tangential phase matching in extracavity parametric Raman lasers based on crystals with different birefringence [11026-47]
- 110261A Structuring of carbon nanotubes array under the action of pulsed laser radiation for nanoelectronics [11026-48]
- 110261C Piezoelectric resonance spectroscopy of a metal-dielectric heterostructure under laser irradiation [11026-50]
- 110261D A hybrid maximum power point tracking algorithm that uses the illumination and the temperature sensor in solar tracking systems [11026-51]
- 110261E Comparison of the maximum power point tracking algorithms with hybrid method that uses a light sensor in the real shading conditions [11026-52]
- 110261F Parity-time symmetric laminar-turbulent transition in coupled Raman fiber lasers [11026-53]
- 110261G Studying of filtering properties of SNAP microresonators on the surface of optical fibers [11026-54]
- 110261H Ultrasound laser-induced breakdown spectroscopy and acoustic spectroscopy of resonance inclusions in liquids [11026-55]
- 11026 11 Sampling strategy and product validation over nonuniform surface-based on TEM and CGM upscaling: A case study on LAI [11026-56]