# Real-time Measurements, Rogue Phenomena, and Single-Shot Applications V

Daniel R. Solli Georg Herink Serge Bielawski Editors

4 February 2020 San Francisco, California, United States

Sponsored and Published by SPIE

Volume 11265

Proceedings of SPIE 0277-786X, V. 11265

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

Real-time Measurements, Rogue Phenomena, and Single-Shot Applications V, edited by Daniel R. Solli, Georg Herink, Serge Bielawski, Proc. of SPIE Vol. 11265, 1126501 © 2020 SPIE · CCC code: 0277-786X/20/\$21 · doi: 10.1117/12.2569730

Proc. of SPIE Vol. 11265 1126501-1

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 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 Real-time Measurements, Rogue Phenomena, and Single-Shot Applications V, edited by Daniel R. Solli, Georg Herink, Serge Bielawski, Proceedings of SPIE Vol. 11265 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

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

ISBN: 9781510632936 ISBN: 9781510632943 (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 © 2020, 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 \$21.00 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/20/\$21.00.

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

- v Author Index
- vii Conference Committee

### NONLINEAR DYNAMICS IN LASERS AND MICRORESONATORS I

- 11265 09 How equidistant are microresonator frequency combs? [11265-7]
- 11265 0B **Time-stretched all-fiber supercontinuum source for spectroscopy** [11265-9]

### NONLINEAR DYNAMICS IN LASERS AND MICRORESONATORS II

11265 OFStability of a long cavity laser [11265-13]

#### **REAL-TIME AND TIME-STRETCH INSTRUMENTS**

- 11265 0G Coherent frequency conversion for quantum information processing (Invited Paper) [11265-14]
- 11265 01 Infrared absorption spectroscopy of dynamically compressed water (Invited Paper) [11265-16]
- 11265 0L Temporal imaging system based on four-wave mixing interaction which do not require synchronization to a pump wave [11265-19]

### POSTER SESSION

- 11265 0M **Temporal imaging of ultrafast signals in time and space simultaneously** [11265-20]
- 11265 0Q Open-path remote sensing for multi-species gas detection using a broadband optical parametric oscillator [11265-24]

### **Author Index**

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Clemmen, Stéphane, 0G Dolan, Dan, Ol Duadi, Hamootal, OL, OM Escoto, Esmerando, 09 Farrell, Carl, 0Q Fridman, Moti, 0L, 0M Friedman, Ori, OL, OM Gowda, Uday, OF Huyet, Guillaume, OF Kara, Oguzhan, 0Q Klein, Avi, 0L, 0M Kristensen, Poul, OB La Lone, Brandon, Ol Leburn, Christopher G., 0Q Mance, Jason, Ol Meir, Sara, OL, OM Nicholson, Jeffrey W., OB Palsdottir, Bera, OB Pimenov, Alexander, OF Ramsey, Darrell, Ol Reid, Derryck T., 0Q Roche, Amy, OF Rutkauskas, Marius, OQ Sander, Michelle Y., OL Shahal, Shir, OL, OM Sibony, Inbar, 0L, 0M Slepneva, Svetlana, OF Steinmeyer, Günter, 09 Sweeney, Frazer, 0Q Viktorov, Evgeny, OF Vladimirov, Andrei, OF Westergaard, Philip G., OB

### **Conference Committee**

### Symposium Chairs

 Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland)
Xianfan Xu, Purdue University (United States)

### Symposium Co-chairs

Craig B. Arnold, Princeton University (United States) Takunori Taira, Institute for Molecular Science (Japan)

### Program Track Chairs

Vladimir Ilchenko, GM Cruise LLC (United States) Paul O. Leisher, Lawrence Livermore National Laboratory (United States)

### **Conference** Chairs

Daniel R. Solli, University of California, Los Angeles (United States)
Georg Herink, Universität Bayreuth (Germany)
Serge Bielawski, Université des Sciences et Technologies de Lille (France)

### Conference Program Committee

Nail Akhmediev, The Australian National University (Australia) Mohammad H. Asghari, University of California, Los Angeles (United States) Corey V. Bennett, Lawrence Livermore National Laboratory (United States) John M. Dudley, FEMTO-ST, Université de Franche - Comté, CNRS (France) Moti Fridman, Bar-Ilan University (Israel) Hideaki Furukawa, National Institute of Information and Communications Technology (Japan) Goëry Genty, Tampere University of Technology (Finland) Takuro Ideguchi, The University of Tokyo (Japan) Bahram Jalali, University of California, Los Angeles (United States) Dario Polli, Politecnico di Milano (Italy) Claus Ropers, Georg-August Universität Göttingen (Germany) Günter Steinmeyer, Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy (Germany)

Pierre Suret, Laboratoire de Physique des Lasers, Atomes et Molécules (France) Masayuki Suzuki, Aichi Medical University (Japan)

Majid Taki, Université des Sciences et Technologies de Lille (France) Giovanna Tissoni, Institut de Physique de Nice (France)

### Session Chairs

- 1 Nonlinear Dynamics, Solitons and Rogue Waves Georg Herink, Universität Bayreuth (Germany)
- 2 Nonlinear Dynamics in Lasers and Microresonators I Daniel R. Solli, University of California, Los Angeles (United States)
- 3 Nonlinear Dynamics in Lasers and Microresonators II Serge Bielawski, Laboratoire de Physique des Lasers, Atomes et Molécules (France)
- 4 Real-time and Time-stretch Instruments Georg Herink, Universität Bayreuth (Germany)